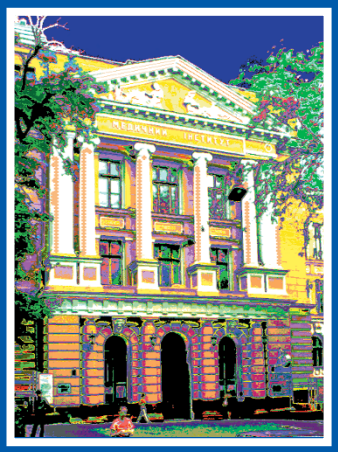

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The ENGLISH LANGUAGE

ОДЕСЬКИЙ МЕДУНІВЕРСИТЕТ

ОДЕСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ

THE ODESSA STATE MEDICAL UNIVERSITY

Бібліотека студента-медика

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Започатковано 1999 р. на честь 100-річчя Одеського державного медичного університету (1900–2000 рр.)

Initiated in 1999 to mark the Centenary of the Odessa State Medical University (1900–2000)

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A. V. Nestrelyay**

The ENGLISH LANGUAGE

*Recommended
by the Central Methodical Commitee on Higher Medical
Education of the Ministry of Health of Ukraine
as a manual for students of the higher farmaceutical
establishment and farmaceutical faculties of
higher medical establishments of the IV level
of accreditation*

Odessa
The Odessa State Medical University
2009

ВВС 81.432.1я.73
UDC 20:378.16:615.15

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The manual is intended for I–II year students of the Pharmacological faculty of extra-mural studies. It covers 274 hours of the English course. The texts are taken from original literature, textbooks on pharmacy and instructions to drugs.

The texts include the system of pretext and post-text assignments, control tests, which promotes effective and comprehensive mastering of the material.

The manual can be used at the practical classes of the students of the pharmaceutical faculties of the full-time studies.

Рекомендовано
Центральним методичним кабінетом з вищої медичної освіти МОЗ України
як навчальний посібник для студентів вищого фармацевтичного навчального закладу
і фармацевтичних факультетів вищих медичних навчальних закладів
IV рівня акредитації
(протокол № 3 від 15 червня 2006 р.)

Єрьомкіна Г. Г. та ін.

Англійська мова : навч. посібник / Г. Г. Єрьомкіна, А. П. Некрасова, Є. Г. Кривда [та ін.]. — Одеса : Одес. держ. мед. ун-т, 2009. — 164 с. — (Б-ка студента-медика).

ISBN 978-966-443-021-7

Навчальний посібник призначений для студентів I–II курсів фармацевтичного факультету заочної форми навчання. Він охоплює курс вивчення англійської мови в обсязі 274 години. Текстовий матеріал підібраний з оригінальної літератури, підручників з фармації, анотацій до лікарських засобів.

Тексти включають систему притекстових і післятекстових вправ, контрольні тести, що сприяє ефективному й осмисленому оволодінню матеріалом.

Посібник може бути використаний на практичних заняттях студентами фармацевтичних факультетів денної форми навчання.

Рис. 17. Табл. 3. Бібліогр.: 18 назв.

ББК 81.432.1я.73

ISBN 978-966-7733-47-6 (серія)
ISBN 978-966-443-021-7

PREFACE

The manual is intended for the students of the pharmaceutical faculty of extra-mural studies of the I–II year and meets the requirements of the foreign language curriculum of higher medical educational establishments of the III–IV level of accreditation.

The manual covers the English course at the Pharmaceutical faculty consisting of 274 hours. It consists of three parts: I — texts on general medicine; II — texts on speciality; III — texts for translation and instructions to medications.

The texts are taken from original literature, textbooks on pharmacy, instructions to drugs.

Every text includes the system of pretext and post-text assignments, which promote effective and comprehensive mastering of the text material; control questions (tests), which help a student to check up the level of mastering the grammar and lexical material.

The textbook contains supplements, which give brief coverage of the basic grammar material as tables and charts.

The vocabulary consists of the most frequent pharmaceutical terms and includes transcription of medical terms.

PART I

Lesson 1
HOW DO WE MOVE?

INTRODUCTION

Objective:
• ***To learn how muscles are constructed***

Muscles serve us in three important ways.

They move the body or any of its parts.
They help keep body erect and posture good.
They produce most of the heat that is generated in the body.

The muscles are made of bundles of muscle fibers held together in varying numbers and lengths by connective tissue. The muscle tissue contracts and expands according to bodily needs and returns to its original size because it is elastic like a rubber band.

There are three principal types of muscles.

The voluntary muscles are made of long striped cells. They are attached to the bony skeleton and move its parts. They are controlled by the will.

The involuntary muscles are composed of small spindle-shaped cells. They are found in the internal organs, principally the stomach, intestines and walls of blood vessels. They are not controlled by the will but work automatically.

The cardiac muscle is a special striped muscle found only in the heart. It is not controlled by the will. It is automatic.

ATTACHMENTS OF MUSCLES

Objective:
• ***To learn how muscles are attached and how they help the body move***

The muscles are arranged in pairs, one muscle counterbalancing the other. When one of the pair contracts, the other one relaxes. A contracted muscle appears thicker and shorter but actually there is no change in the amount of muscle tissue.

The muscles are attached at both ends to bones, cartilage, ligaments, tendons, skin and

sometimes to each other. The end which moves least during muscle contraction is the origin; the end moving most, the insertion.

The blood circulation supplies the food and oxygen necessary for the work of the muscle cells. The muscles store glycogen which they use during work. The muscles give off heat and waste following exercise. The blood removes the waste products which have accumulated during exercise. The muscle fatigue causes an accumulation of lactic acid which is a result of oxidation of the stored glycogen.

Each muscle is in contact with the nervous system through the motor nerve which carries messages from the brain to the muscles and thereby makes them always ready for action.

The sphincter muscles are circular muscles which serve as guards at body openings to prevent the passage of substances. Examples of sphincter muscles are the anus and urethra.

MUSCLES OF THE BODY

Objective:

• ***To learn the location and function of the body muscles***

The location of the principal muscles which you may need in your work is given in Fig. 1.

Other important muscles which you should know are: the diaphragm, a dome-shaped muscle which help the lungs in breathing; and the intercostal muscles which are found between the ribs. These muscles expand and contract as we breathe.

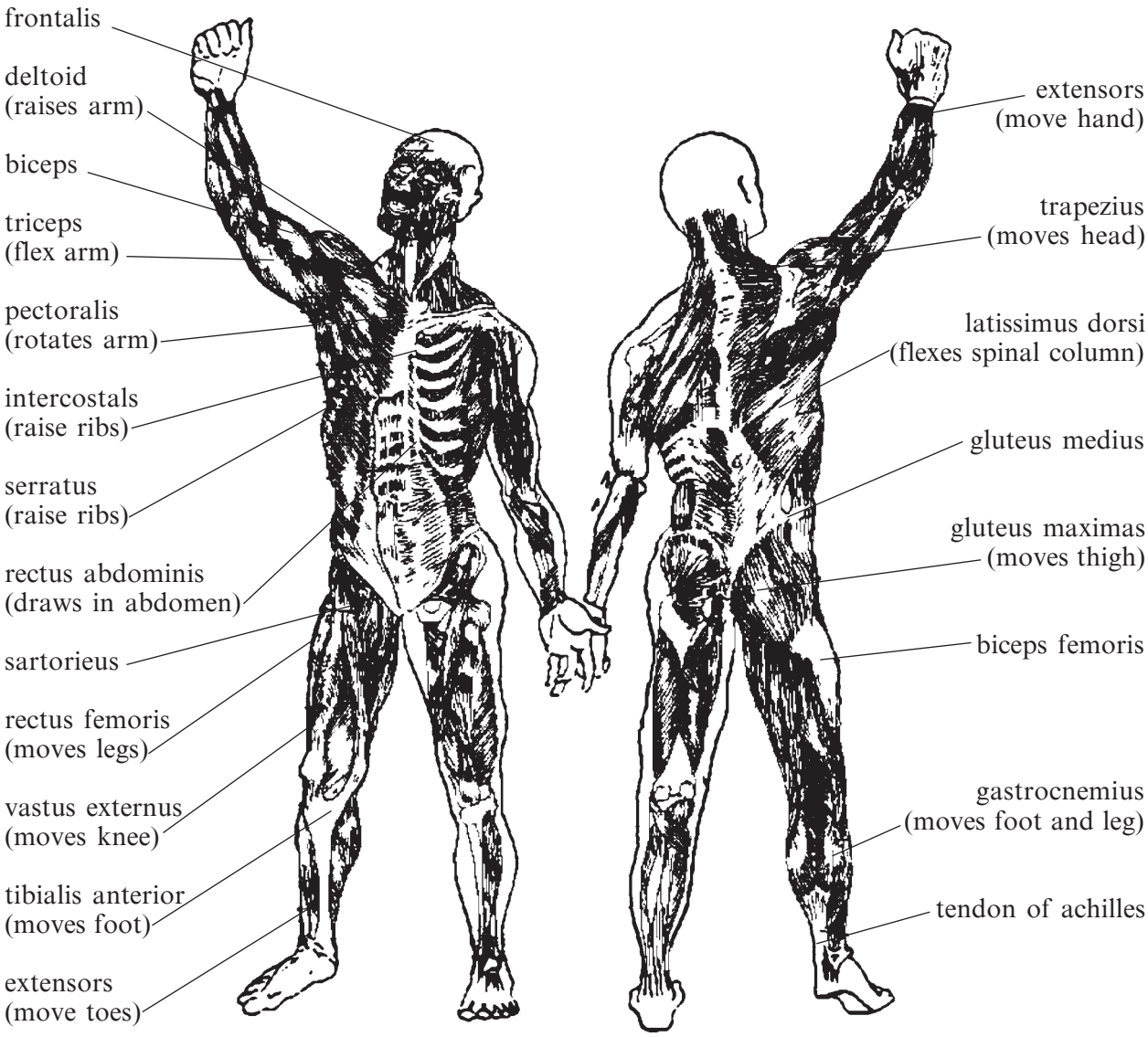


Fig. 1. Muscles of the body

MUSCLE INJURIES AND DISEASES

Objective:

• ***To become familiar with some of the diseases and injuries which may prevent the proper functioning of muscles***

We have now completed the study of the structure of the muscular system and how it works. We have learned that muscular coordination is extremely important if the person is to perform his daily functions efficiently.

There are some injuries and diseases which may develop in muscles which the nurse should know about. The retraining of injured or inactive muscles is termed rehabilitation. Let us examine some muscle injuries or diseases.

Arthritis is a disease characterized by pain, swelling and stiffness in and around the muscles or joints.

Bursitis is a condition in which the bursae become inflamed. Movement of such joints as the shoulder or knees may be quite painful.

Flat foot is a condition in which the supporting muscles of the arch are unable to meet the strain which is placed upon them. The strength of the muscles should be increased by exercise, massage and electrical stimulation.

An **abdominal hernia** or rupture may occur in a weak place in the abdominal wall. It is caused by bulging of the intestine through an opening in the wall of the abdominal cavity normally containing it. The **inguinal hernia** is the most frequent type of hernia.

Muscle atrophy is a condition in which the muscle shrinks up. This may be due to paralysis of nerves to the area or lack of use of the muscle.

Muscle fatigue may occur from overexercise or overuse of a muscle for too long.

Paralysis is a condition in which the nerve going to the area is partially or completely destroyed.

Stiff neck is an inflammation of the trapezius muscle due to exposure following unusual overuse of the muscle.

Tetanus or lockjaw is a continuous spasm of the muscles due to the toxins from the tetanus bacillus.

Muscular dystrophy is a chronic wasting disease of the muscles, the cause of which is unknown. It may be due to gradual degeneration of the nerve endings.

CHECK YOURSELF

1. Muscles are held together by … .
a) blood tissue
b) nerve tissue
c) epithelial tissue
d) connective tissue
e) muscle

2. Long striped cells make … .
a) involuntary muscles
b) voluntary muscles
c) cardiac muscles
d) hepatic muscles
e) intercostal muscles

3. Small spindle-shaped cells make … .
a) involuntary muscles
b) voluntary muscles
c) cardiac muscles
d) hepatic muscles
e) intercostal muscles

4. Special striped muscle is found only … .
a) in the stomach
b) in blood vessel wall
c) in the intestines
d) in the liver
e) in the spleen

5. What is necessary for the work of the muscle cells?
a) water
b) air
c) gas
d) food and oxygen
e) blood

6. What supplies the food and oxygen necessary for the work of the muscle cells?
a) respiration
b) blood circulation
c) secretion
d) reproduction
e) excretion

7. Each muscle is in contact with the nervous system through … .
a) connective tissue
b) cytoplasm
c) motor nerve
d) glycogen
e) cells

8. Muscles are arranged in … .
a) triangles
b) pairs
c) circles
d) quadrants
e) straight line

9. The muscles store … .
a) glycogen
b) protein
c) carbohydrate
d) alkaloid
e) fats

10. The muscle fatigue causes an accumulation of … .
a) glyconic acid
b) lactic acid
c) battery acid
d) uric acid
e) citric acid

11. The sphincter muscles serve as guards at …
a) the mouth
b) the eyes
c) body openings
d) the kidneys
e) the liver

12. Why is the deltoid muscle important?
a) it raises the arm
b) it flexes the arm
c) it moves the head
d) it flexes the spinal column
e) it moves the legs

13. Which muscles might be affected when a patient is confined to bed for long periods?
a) gluteus
b) trapezius
c) gastrocnemius
d) pectoralis
e) deltoid

14. The muscles that raises the arm are called … .
a) biceps
b) triceps
c) extensors
d) deltoid
e) gluteus

15. The muscle that moves the head is called … .
a) deltoid
b) trapezius
c) frontalis
d) extensors
e) triceps

16. The muscle that flexes the spinal column is called … .
a) serratus
b) trapezius
c) latissimus dorsi
d) extensors
e) triceps

17. The muscles which flex the arm are called …
a) biceps
b) triceps
c) extensors
d) pectoralis
e) frontalis

18. ... is stored in liver and muscles.
a) glucose
b) carbohydrate
c) glycogen
d) lactic acid
e) fat

19. The circular muscle which guards body opening, e. g. the anus:
a) deltoid
b) sphincter
c) extensors
d) sartorius
e) triceps

20. It moves foot and legs
a) tibialis anterior
b) rectus femoris
c) gastrocnemius
d) vastus externus
e) trapezius

Lesson 2

HOW DOES OUR BODY USE FOOD AND OXYGEN

INTRODUCTION

Objective:

• ***To learn the structure of the circulatory system and how it enables all parts of the body to get needed food and oxygen***

• ***To get familiar with the two phases of the blood circulation***

The circulatory system is concerned with the transporting of fluids from one part of the body to another. The blood stream carries food, oxygen and other materials to tissues which need these elements for their growth, upkeep and work. During such work, waste products are produced and are carried to organs where they are excreted.

The circulatory system consists of the heart, blood, arteries, veins and capillaries. It also includes the lymphatic system which assists the blood circulatory system in its job of supplying food and oxygen to the tissues and in carrying away waste products.

There are two phases of the circulation of the blood. These are: the general circulation which carries blood throughout the body with the exception of the lungs; the pulmonary circulation which carries blood from the heart to the lungs; the blood circulates throughout the body very rapidly. A complete tour of the blood only takes about one minute (Fig. 2).

THE HEART

Objective:

• ***To understand the structure and function of the heart***

Our blood circulatory system, like other systems of the body, is a marvel of efficiency. The main organ responsible for this efficiency is the heart, a tough, simply constructed muscle about the size of your closed fist.

The heart is a hollow, muscular pump which keeps the blood circulating through the blood vessels to all parts of the body. To gain some appreciation of this vital organ, do you realize that in a 70-year life span, the heart pumps enough blood to fill 70 thousand railroad tank

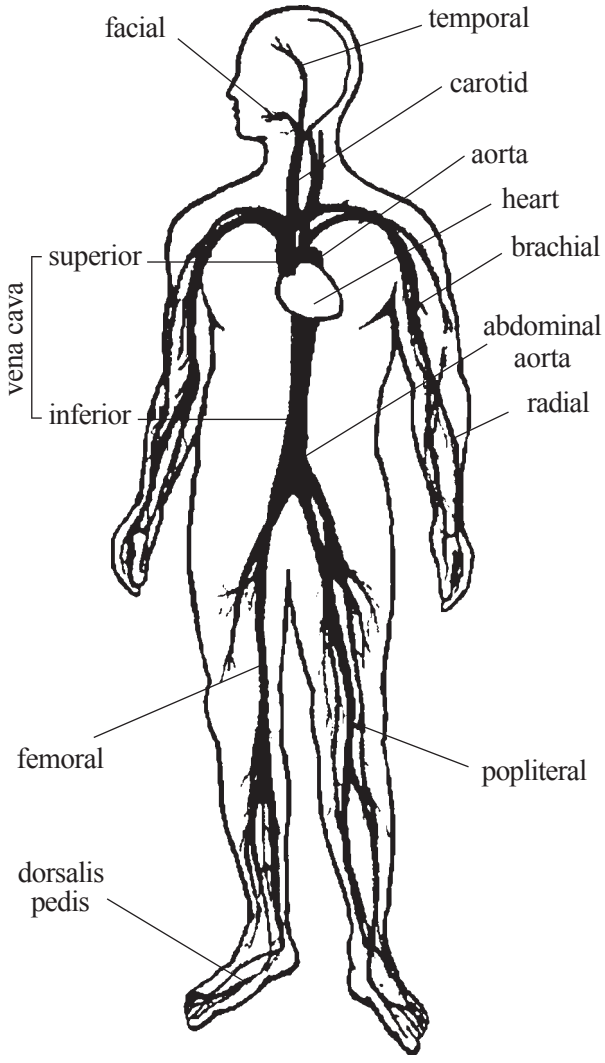


Fig. 2. General plan of circulation

cars? And were you aware that this tremendous muscle is seven times as strong as it needs to be to do its job?

The heart is conical in shape and is located between the lungs in the center and lower part of the chest cavity. It is enclosed in a sac called the *pericardium.* The smooth lining of the heart is called the *endocardium.* This tissue forms the valves. It closes and opens like an umbrella (Fig. 3).

The heart muscle is the *myocardium.* The heart or cardiac (myocardium) muscle contracts rhythmically in order to perform its duty as a forceful pump. The control of the contractions of the heart muscle is found in the sino-auricular node located at the opening of the superior vena cava into the right atrium (auricle). The node is called the *pacemaker* of the heart. A recently invented device called the electric cardiac pacemaker has successfully maintained a normal heartbeat under conditions of cardiac arrhythmia or complete heart block.

The heart is composed of four chambers called: the right auricle, the right ventricle, the left auricle or atrium and the left ventricle.

The heart has valves which permit the blood to flow in one direction only. These valves are located as follows:

a. Between each auricle and ventricle.

b. At the orifice of the pulmonary artery (right ventricle) and the aorta leaving the left ventricle.

These valves prevent the blood from returning to the previous chambers of the heart (Fig. 4).

FUNCTION AND PATH OF GENERAL CIRCULATION

Objective:

• ***To get familiar with the path of the general circulation and with its many functions***

The functions of the general circulation are fourfold; it carries nourishment, oxygen, water and secretions to all tissues (except the lungs) and back to the heart; it carries away from the tissues waste products such as carbon dioxide and other dissolved wastes; it helps equalize the body temperature; it aids in protecting the body from harmful bacteria.

The general circulation leaves the heart from the left thick-walled ventricle, by way of the aorta, the largest artery in the body. The aorta sends its many branches into the head, arms, trunk and legs. Following its tour of the body, this blood returns to the opposite side of the heart from which it left. It enters the right side of the heart by way of the vena cava (Fig. 5).

PULMONARY CIRCULATION

Objective:

• ***To discuss the route of the pulmonary circulation and what function it performs***

The pulmonary circulation carries blood from the heart to the lungs and back to the heart. The pulmonary artery carries blood which is a darker red than when it leaves the lungs because it has an accumulation of waste products in it.

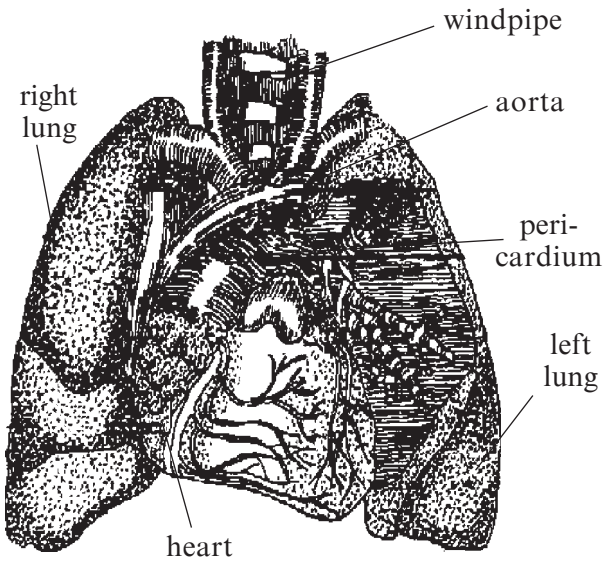


Fig. 3. Location of the heart

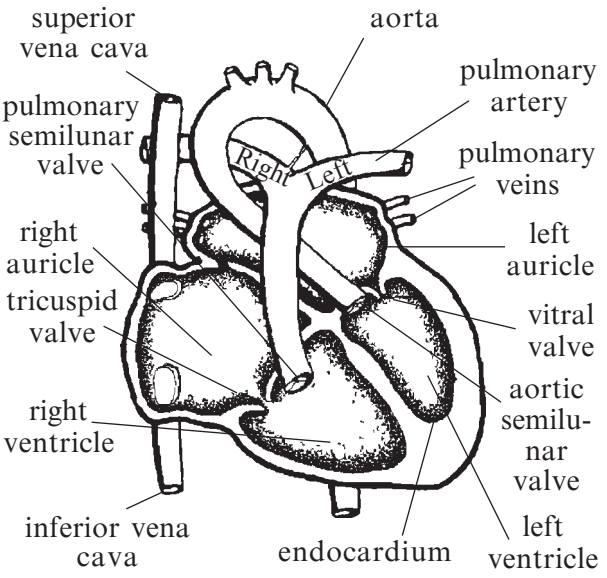


Fig. 4. The heart and its valves

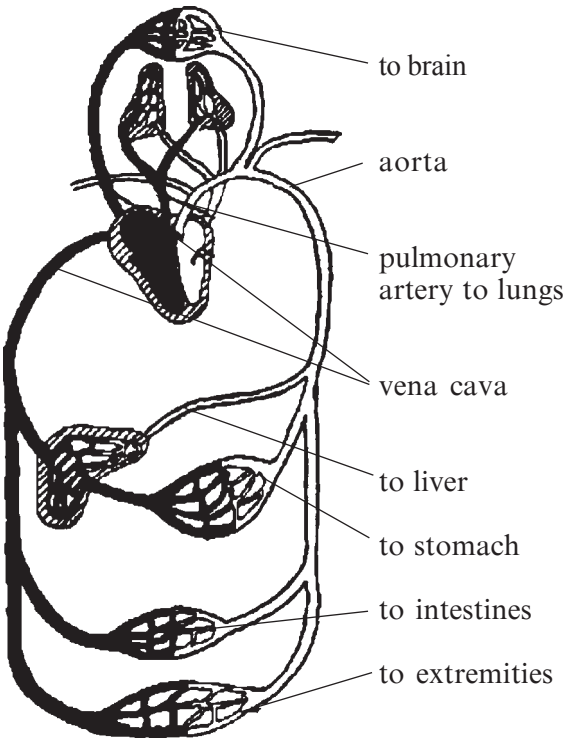


Fig. 5. General circulation

One of these waste products, carbon dioxide, will be exchanged for a new supply of oxygen in the lungs. The blood will then become a bright red.

The pulmonary circulation starts its tour by leaving the right ventricle of the heart through the pulmonary artery. This artery carries the blood to the lungs where the exchange of carbon dioxide for oxygen takes place. The blood freshly supplied with oxygen, returns to the heart. It enters the left auricle of the heart, the opposite side from which it left the heart. It is now ready to make its tour throughout the body by way of the general circulation to distribute its fresh supply of oxygen.

BLOOD VESSELS

Objective:

• ***To learn how the various types of blood vessels are adapted to their particular function***

The heart pumps the blood to all parts of the body through a remarkable system of three types of blood vessels:

The *arteries* carry blood away from the heart. They have elastic walls which expand and contract to the pumping beat of the heart. The aorta, the artery leading directly from the heart, is the largest blood vessel of the body. Blood carried by the aorta is bright red because it has just received a fresh supply of oxygen from the lungs. The blood carried by the pulmonary artery, however, is darker red because it is heavily laden with carbon dioxide which is to be exchanged for oxygen in the lungs.

The *capillaries* are very small; they must be seen through a microscope. They connect smaller arteries with smaller veins like a canal system. Their walls are extremely thin so that nourishment can pass out through them to the surrounding tissues and waste products from the tissues are absorbed back into the blood stream in the same way. This distribution and absorption is called capillary action.

The *veins* carry blood back to the heart. They are much less elastic than arteries. Since the pumping action of the heart is much diminished by the time blood reaches the veins for its return journey, the veins have valves which allow the blood to flow only in the direction of the heart.

PARTS OF THE BLOOD

Objectives:

• ***To become familiar with the important parts of the blood***

• ***To learn the contribution of each part to the general health***

The *blood* is the nourishing fluid of the body. It carries nutrients and oxygen to the tissues to nourish and refresh them. The average adult has four to five quarts of blood in his body. Loss of more than one quart at any one time may be serious. Blood generally has a slightly alkaline reaction.

The *plasma* is the straw-colored liquid part of the blood. It is the carrier of nutrients and waste products. It carries fibrinogen which helps in the clotting of the blood. It transports hormones as well as gamma globulin. Gamma globulin is used to prevent or alleviate some of the communicable diseases.

Erythrocytes (red blood cells) contain a red coloring substance called hemoglobin which consists of *globin,* a protein compound and *hematin*, an iron-containing pigment. The hemoglobin is the oxygen-carrying part of the blood. Erythrocytes also contain an antibody called the Rh factor which must be considered in prenatal care and in giving blood transfusions. The Rh factor is inherited.

Erythrocytes are made in the red bone marrow of the long bones. They live about 120 days and are probably broken up in the capillaries, spleen and liver. The hemoglobin again breaks

down into globin and hematin. The iron content of hematin is used to make new red blood cells.

A healthy person has 4,500,000 to 5,000,000 red blood cells per cubic millimeter of blood. The hemoglobin count is 14 to 16 grams per 100 cubic centimeters of blood.

Leukocytes (white blood cells) help to protect the body against infections. One type of leukocyte, called a phagocyte, goes to the site of an infection where germs are surrounded, engulfed and destroyed. Most of the leukocytes are made in the bone marrow. Our normal leukocyte count averages 7,000 to 9,000 cells per cubic millimeter of blood. Leukocytes vary in shape and size.

Thrombocytes (blood platelets), are plate-shaped cells which help the blood to clot. They are formed in the bone marrow and disintegrate in the bone marrow or lungs. The mode of disintegration is still questionable. The normal blood platelet count is 200,000 to 400,000 for each cubic millimeter of blood.

There are different kinds of blood groups called "types". An individual inherits his blood type from his parents.

The various blood types are:

O: Universal donor which can give blood to types A, AB, B and 0 but can only receive type 0.

AB: Universal recipient which can give only to type AB, but can receive blood from types A, B, AB and 0.

A: Can give blood to types A and AB and can receive from types A and 0.

B: Can give to types B and AB and can receive from types B and 0.

Blood must be cross-matched before a transfusion is administered as a safety measure for the patient.

Additional physiological norms are listed for your reference:

Test	*Normal range*
Bleeding range	1 to 3 min
Coagulation time	6 to 12 min
Hemoglobin count	14 to 16 g/s per 100 cc
Platelet count	200,000 to 400,000 per mm^3
Prothrombin time (Quick)	10 to 15 sec.
Sedimentation rate in first hour	Men — 0 to 12 mm Women — 0 to 20 mm

Two of the above norms may need explanation. Prothrombin is a factor in blood plasma needed for coagulation. Before and after the administration of vitamin K, a test is made to determine the prothrombin concentration in the blood plasma. If such concentration takes longer than the time shown to appear, it indicates liver damage or failure to absorb vitamin K.

Sedimentation rate is the rate at which erythrocytes settle to the bottom of an upright tube at room temperature. It indicates if disease is present. The Westergren method shows the rate for women normally slightly higher than for men.

LYMPHATIC SYSTEM

Objective:

• ***To become familiar with the lymphatic system and its importance in cell nourishment and excretion***

The lymphatic system has no pump similar to the heart in the blood circulatory system. The lymph, the fluid in the lymphatics, is kept moving by the contraction of the smooth muscles on the vessels.

The lymph is a fluid formed from blood plasma. It filters its way through the walls of the capillaries into the lymphatics. It bathes all portions of the body not reached by the blood. The lymph acts as a middleman between the blood and the tissues carrying and supplying food and oxygen to the cells and removing the wastes.

The lymph re-enters the general circulation through the thoracic duct at the left shoulder. In this way the waste products get back into the general circulation and are transported to the organs of excretion (Fig. 6).

DISORDERS OF CIRCULATORY SYSTEM

Objective:

• ***To become familiar with some of the disorders common to the heart, the blood vessels and the blood***

DISEASES OF THE HEART

Acute rheumatic heart disease is an infection of the membrane lining of the heart, usually caused by the streptococcus organism.

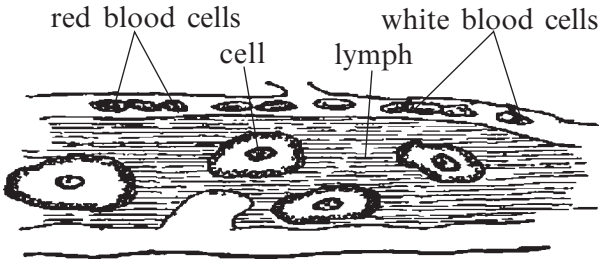


Fig. 6. Lymph circulation

Auricular fibrillation is a condition in which the atria (auricles) are never completely emptied of blood and their walls quiver instead of giving the usual contraction of a normal heartbeat.

Congenital heart disease is a condition in which the heart did not develop properly during fetal life.

Endocarditis is an inflammation of the membrane lining the heart.

Myocarditis is an infection of the heart muscle.

Pericarditis is an inflammation of the membrane covering the heart.

Angina pectoris is a condition in which the chief symptom is a severe pain down the arm, probably due to nerve spasm. The term is currently identified with coronary insufficiency. The heart is not usually damaged, but it is not receiving sufficient oxygen.

Murmurs may indicate some imperfection in the valves of the heart. They may take the form of gurgling and "hissing" sounds as the valves fail to close properly.

DISEASES OF THE BLOOD VESSELS

Arteriosclerosis is a thickening of the walls of the arteries and loss of elasticity — "hardening of the arteries."

Gangrene is the death of body tissue due to an insufficient blood supply. **Hemorrhoids** are varicose veins in the walls of the rectum.

Phlebitis is an inflammation of the lining of a vein accompanied by clotting of blood in the vein.

Varicose veins are the result of loss of elasticity in walls, causing a slowing up of circulation and a "backing up" of blood over the valves.

Cerebral hemorrhage is a hemorrhage within the brain due to arterial sclerosis or injury.

Aneurysm is a sac caused by an enlarging of the blood vessel with the thinning of the vessel wall.

DISEASES OF THE BLOOD

Anemia is a deficiency of red blood cells or hemoglobin content.

Embolism is an infected clot which is carried by the blood stream until it reaches an artery too small for it to pass through.

Hemophilia is a condition in which the blood clots very slowly. It is inherited by the male but transmitted by the female.

Leukemia is a condition in which there is a great increase in the number of white blood cells. (Sometimes this is known as cancer of the blood.)

Thrombosis is a blood clot which forms in an artery and remains in the same place in which it was formed.

DISORDERS OF BLOOD PRESSURE

Hypertension is high blood pressure in which the systolic reading stays above 140 mm Hg.

Hypotension is low blood pressure, usually under 100 mm Hg.

TEST YOURSELF

1. What is the Rh factor?
a) hemoglobin
b) antibody
c) serum
d) plasma
e) titre

2. Structures in the heart and veins which permit the blood to flow in one direction only:
a) chambers
b) valves
c) septum
d) ventricles
e) atria

3. Discoverer of circulation of blood:
a) Hippocrates
b) Vesalius
c) W. Harvey
d) M. Pyrogov
e) I. Pavlov

4. Red coloring matter of blood:
a) erythrocytes
b) hemoglobin
c) lymphocytes
d) leucocytes
e) thrombocytes

5. White blood cells which absorb and destroy harmful bacteria:
a) erythrocytes
b) phagocytes
c) lymphocytes
d) leucocytes
e) thrombocytes

6. Circulation through the kidneys:
a) portal
b) lymphatic
c) renal
d) pulmonary
e) cardiac

7. Lining of the heart:
a) endocardium
b) pericardium
c) cardiac muscle
d) myocardium
e) mesothelium

8. Arteries which nourish the heart:
a) cardiac
b) lymphatic
c) coronary
d) renal
e) pulmonary

9. Covering of the heart:
a) endocardium
b) pericardium
c) valve
d) auricle
e) mesothelium

10. The membrane lining the chest cavity:
a) plasma
b) serum
c) pleura
d) pulmonary membrane
e) pericardium

11. Varicose veins in the walls of the rectum:
a) embolism
b) hemorrhoids
c) adenitis
d) rectitis
e) colitis

12. Severe pain down the arm:
a) atherosclerosis
b) angina pectoris
c) embolism
d) coronary thrombosis
e) endocarditis

13. A condition in which the blood clots very slowly:
a) thrombosis
b) embolism
c) hemophilia
d) anemia
e) leukemia

14. An inflammation of the membrane covering the heart:
a) myocarditis
b) endocarditis
c) pericarditis
d) congenital heart disease
e) pleurisy

15. An inflammation of the membrane lining the heart:
a) myocarditis
b) endocarditis
c) pericarditis
d) congenital heart disease
e) pleurisy

16. An infection of the heart muscle:
a) gangrene
b) myocarditis
c) angina pectoris
d) embolism
e) pleurisy

17. Lymph is a fluid formed from … .
a) cytoplasm
b) water
c) blood plasma
d) serum
e) sarcoplasma

18. A complete tour of the blood throughout the body is about:
a) 1 second
b) 1 minute
c) several minutes
d) half an hour
e) 15 minutes

19. How many red blood cells are there in a healthy person?
a) about 3,000,000 m^3
b) 3,000,000–4,000,000 m^3
c) 4,500,000–5,000,000 m^3
d) 5,000,000–6,000,000 m^3
e) 7,000,000 m^3

20. How many white blood cells are there in a healthy person?
a) 4,000–5, 000 m^3
b) 5,000–6,000 m^3
c) 7,000–9,000 m^3
d) over 9,000 m^3
e) 10,000 m^3

Lesson 3

HOW DO WE BREATHE?

INTRODUCTION

Objective:

• ***To understand the meaning and purpose of respiration***

Breathing in man commonly refers to the inhalation of oxygen and the exhalation of carbon dioxide. This process takes place in the lungs.

True respiration refers to the oxidation of food within the body. Food, in order to be used by the body cells, must be burned or oxidized. Just as coal or wood when burned gives off energy in the form of heat, so does food when it is burned with the oxygen we inhale. As coal or wood burns, we further notice that they give off waste products; similarly, food when oxidized gives off wastes including carbon dioxide and water vapor. These are transported from the cell through the circulatory system and are removed from our bodies when we exhale. Respiration is controlled by the stimulation of carbon dioxide on the respiratory center in the medulla, a part of the brain.

ORGANS OF BREATHING

Objective:

• ***To study the organs which help us to breathe***

The organs of respiration are the lungs and a number of hollow organs which serve as a passageway to the lungs. These include the nose, pharynx, larynx or voice box, trachea or windpipe, and bronchi.

Air enters through the nose hairs (cilia) on the inside of the nostrils, filter out dust and dirt. The mucous membrane lining moistens the air and warms it. The air then passes through the larynx or voice box where the vocal cords are located on through the windpipe and into the bronchi, two tubes which lead into the lungs. Inside the lungs, these bronchi divide and subdivide into smaller and smaller tubes (bronchiole) until they finally become bunches of tiny air sacs called alveoli. By this time they are microscopic in size. The walls of the alveoli or lung tissue are richly supplied with blood. Here the exchange of oxygen and carbon dioxide takes place. The oxygen absorbed by the blood is carried back to the heart by the pulmonary vein and then is pumped through the general circulation. The carbon dioxide, brought to the lungs by the pulmonary artery, escapes through the walls of the alveoli and is exhaled.

As a result of respiration, man is constantly being refreshed and is provided with the warmth and energy needed to do work (Fig. 7).

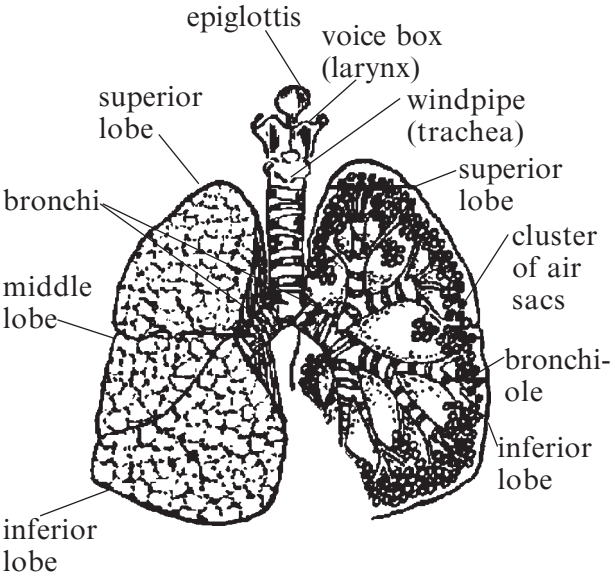


Fig. 7. The lungs and windpipe (cut-a-way section)

BREATHING MOVEMENTS

Objective:

• ***To understand how the diaphragm and ribs aid in exhalation and inhalation***

Ventilation of the lungs is due to changes in pressure which occur within the chest cavity. This variation in pressure is brought about by movements of the chest wall and by contractions of the diaphragm.

When we inhale, the ribs are raised by contraction of the intercostal muscles, increasing the size of the chest cavity. At the same time, the diaphragm contracts and becomes flattened, moving downward. This serves to increase the space in the chest cavity in a vertical direction. Air rushes in to fill the extra space which has just been created, resulting in inhalation.

When we exhale, just the opposite takes place. The intercostal muscles and diaphragm relax, the ribs moving down and the diaphragm moving upwards. These two movements decrease the space within the chest cavity. This increased pressure forces the air out, resulting in exhalation.

SOME RESPIRATORY AILMENTS

Objective:

• ***To become familiar with some of the respiratory ailments which may affect the body***

Our greatest loss in man-hours each year is due to the common cold. This respiratory infection spreads rapidly through the classroom or through a factory or business office. It is also very often the basis for more serious respiratory disease because it lowers our resistance and makes us open to infection. The direct cause of a cold is a virus; the indirect or contributing causes are lowered body resistance, chilling, fatigue, insufficient nourishment and rest. When one has a cold, one should remain in bed, drink warm liquids, take fruit juice, rest, and eat wholesome nourishing foods.

Other respiratory ailments include **laryngitis, sinusitis, pharyngitis, tonsilitis**, **diphtheria, bronchitis, tuberculosis, influenza, and pneumonia**. Each of these is caused by either a bacterium or a virus. More serious respiratory ailments include emphysema and cancer of the lung and larynx.

CHECK YOURSELF

1. What do we inhale?
a) carbon dioxide
b) nitric oxide
c) oxygen
d) hydrogen
e) smoke

2. What do we exhale?
a) carbon dioxide
b) nitric oxide
c) oxygen
d) hydrogen
e) water vapor

3. Respiration is controlled in the respiratory center in the … .
a) pituitary
b) medulla
c) cerebellum
d) brainstem
e) hypothalamus

4. The organs of respiration does not include … .
a) pharynx
b) larynx
c) esophagus
d) windpipe
e) lungs

5. During inhalation our ribs are … by contraction of the rib muscles.
a) lowered
b) raised
c) flattened
d) moving forward
e) moving backward

6. The microscopic air sacs in the lungs are called … .
a) capillaries
b) bronchioles
c) alveoli
d) bronchi
e) windpipe

7. The most common respiratory ailment is … .
a) bronchitis
b) tracheitis
c) sinusitis
d) a cold
e) cancer

8. When we inhale, the diaphragm moves … .
a) downwards
b) forwards
c) upwards
d) backwards
e) sideward

9. When we exhale, the diaphragm moves …
a) downwards
b) forwards
c) upwards
d) backwards
e) sideward

10. The walls of the alveoli and lung tissue are richly supplied with … .
a) lymph
b) plasma
c) blood
d) erythrocytes
e) water

11. What organ is not included into passage-way to the lungs?
a) the nose
b) the pharynx
c) the larynx
d) the tongue
e) the windpipe

12. Air enters through ... .
a) the windpipe
b) the pharynx
c) the larynx
d) the mouth
e) the esophagus

13. What filters out dust and dirt in the nose?
a) mucosa
b) cilia
c) skin
d) subcutaneous fat
e) nostrils

14. What moistens the air and warm it in the nose?
a) mucosa
b) cilia
c) skin
d) subcutaneous fat
e) nostrils

15. The bunches of tiny air sacs are called …
a) bronchi
b) bronchiole
c) alveoli
d) arteries
e) lungs

16. Exchange of oxygen and carbon dioxide takes place in … .
a) bronchi
b) bronchiole
c) alveoli
d) arteries
e) lungs

17. Ventilation of the lungs is due to … .
a) inhalation
b) changes in pressure
c) exhalation
d) heart contraction
e) muscle contraction

18. The principal waste product given off in exhalation is … .
a) hydrogen
b) oxygen
c) nitrogen
d) carbon dioxide
e) vitamins

19. Drugs used to destroy microscopic organ-isms are called ... .
a) laxatives
b) tranquilizers
c) antibiotics
d) vitamins
e) minerals

20. Diphtheria is caused by ... .
a) spores
b) fungus
c) virus
d) dust
e) vapor

Lesson 4

HOW DO WE DIGEST OUR FOOD?

INTRODUCTION

Objectives:

- ***To gain a view of the digestive system***
- ***To understand how the mouth and teeth contribute to digestion***

All food which we eat must be prepared within the body for final use by the cells. This means that certain physical and chemical changes must take place to change the food into a liquid which can be transported by the blood to all cells and be absorbed by them. The process of changing solid food into a liquid form which can be absorbed by the body cells is called **digestion**.

The organs which perform this change make up the digestive system, consisting of the alimentary canal and accessory organs. The **alimentary canal** includes the mouth, pharynx, gullet, stomach, small intestine and rectum. It is a 30 to 40 foot long canal through which food passes during digestion.

The accessory or helping organs are the teeth, the tongue, the salivary glands, the pancreas and the liver.

THE MOUTH AND DIGESTION

The role of the mouth in the digestive process is to break up food into smaller particles by chewing. The salivary glands manufacture an enzyme, *ptyalin,* which helps to change starch to sugar as a preliminary step in digestion. We will begin our study of digestion by examining the structures of the mouth.

It may be divided into two parts. The *vestibule* consists of the area between the lips and the teeth. The *mouth cavity* extends from the hard and soft palate on top to the tongue on the bottom. The vestibule and the mouth cavity is covered with mucous membrane.

The teeth are the hardest structure in the body since they are composed largely of mineral salts of calcium and phosphorus. An adult has 32 teeth which include *incisors* for biting food, *canines* for tearing it, *bicuspids* and molars for crushing and chewing. The shape of each is particularly adapted to its purpose (Fig. 8A).

Each tooth has a *crown,* a *root* and a *neck* (Fig. 8B). The crown is covered with a substance called enamel and the root is covered with cement. The bulk of the tooth is made up of *dentine.* The blood provides nourishment to the cells of the tooth.

The gingivae, or gums, serve as protection for the teeth. They are made up of fleshy tissue covered with mucous membrane which surrounds the teeth and covers the upper and lower jaws. To maintain mouth health, it is as important to stimulate the circulation in the gingivae and keep them free of food particles as to clean the teeth. Chronic infection of the gingivae is a frequent cause of tooth extraction.

The tongue lies on the floor of the mouth within the curve of the lower jaw, which is also called the *mandible.* The *tongue* is the principal organ of taste. It assists in chewing and swallowing food. On the surface of the tongue are projections called papillae. Some of these papillae contain taste buds which respond to food flavors. A few taste buds are also found in other areas of the mucous membrane lining the mouth cavity.

The *hard palate* is a bony structure which forms the roof of the mouth. The *soft palate* is a curtain-like muscular fold of membrane adjacent to the hard palate in the back of the mouth. A small, soft structure called the palatine uvula is suspended from the center edge of the soft palate. The uvula is composed of mucous membrane, muscle and connective tissue (Fig. 8C).

Behind the soft palate is the *pharyngopalatine arch.* This arch separates the mouth cavity from the pharynx. The *tonsils* are two prominent masses located on either side of the mouth

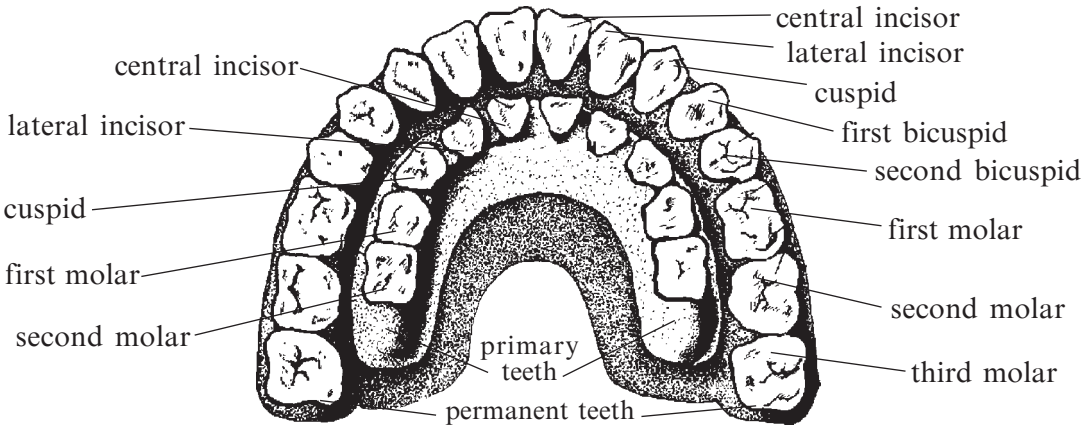


Fig. 8A. Dentition

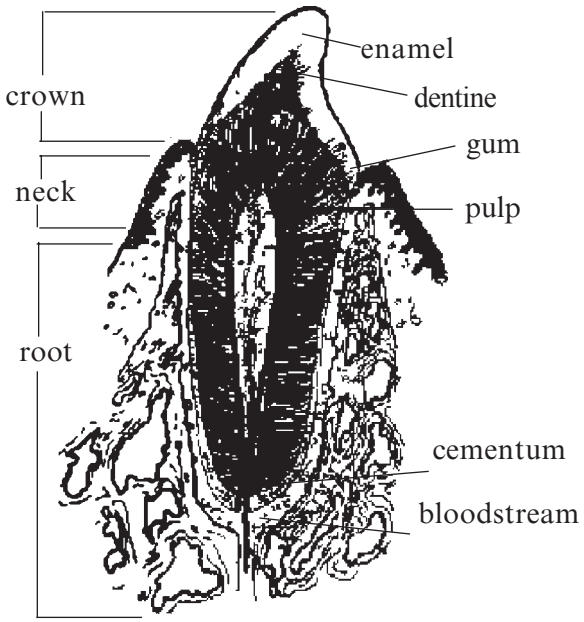


Fig. 8B. The tooth

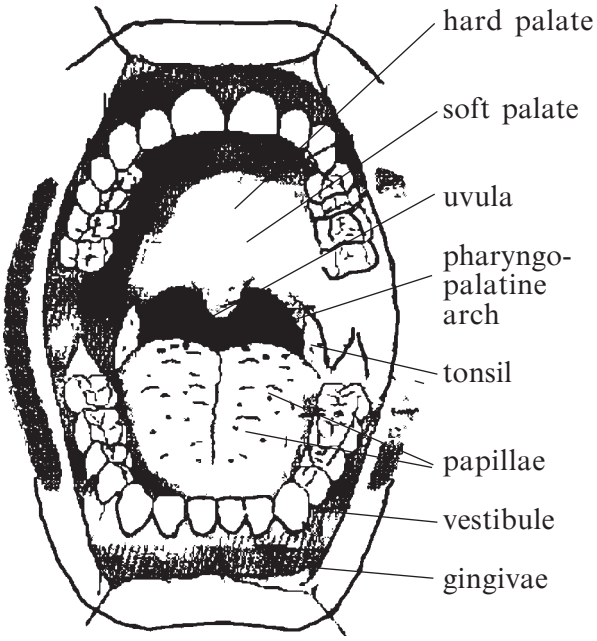


Fig. 8C. The oral cavity

cavity between the soft palate and the pharyngopalatine arch. They are made up of lymphatic tissue.

The salivary glands are located in three places. The parotid glands are found on each side of the face below the ear. Other salivary glands are located beneath the tongue on the floor of the mouth and beneath the mucous membrane lining the inside of the cheeks. The salivary glands respond to the taste buds and increase the secretion of saliva when we eat.

DIGESTION IN THE STOMACH

Objective:

- ***To learn how the stomach aids in digestion***

When food has been chewed and moistened with saliva in the mouth, it is swallowed by the action of the pharynx and passes through the esophagus to the stomach. *The esophagus* is nothing more than a passageway for the food.

The *stomach* is a storage place for food. It is a pear-shaped, elastic organ capable of stretching and shrinking to accommodate its contents. Its inner lining contains thousands of tiny digestive glands called gastric glands. These manufacture gastric juice which contains the enzymes *pepsin, rennin* and *gastric lipase,* and a small amount of *hydrochloric acid.* Oversecretion of this acid may irritate the stomach lining and lead to peptic ulcer. Pepsin acts upon proteins, lipase acts upon fats, and rennin and acid curdle casein or milk protein.

DIGESTIVE SYSTEM

These chemical changes are helped by the churning action of the stomach walls. The semiliquid food which results is called chyme. When the chyme is ready to leave the stomach, the lower end of the stomach called the pylorus

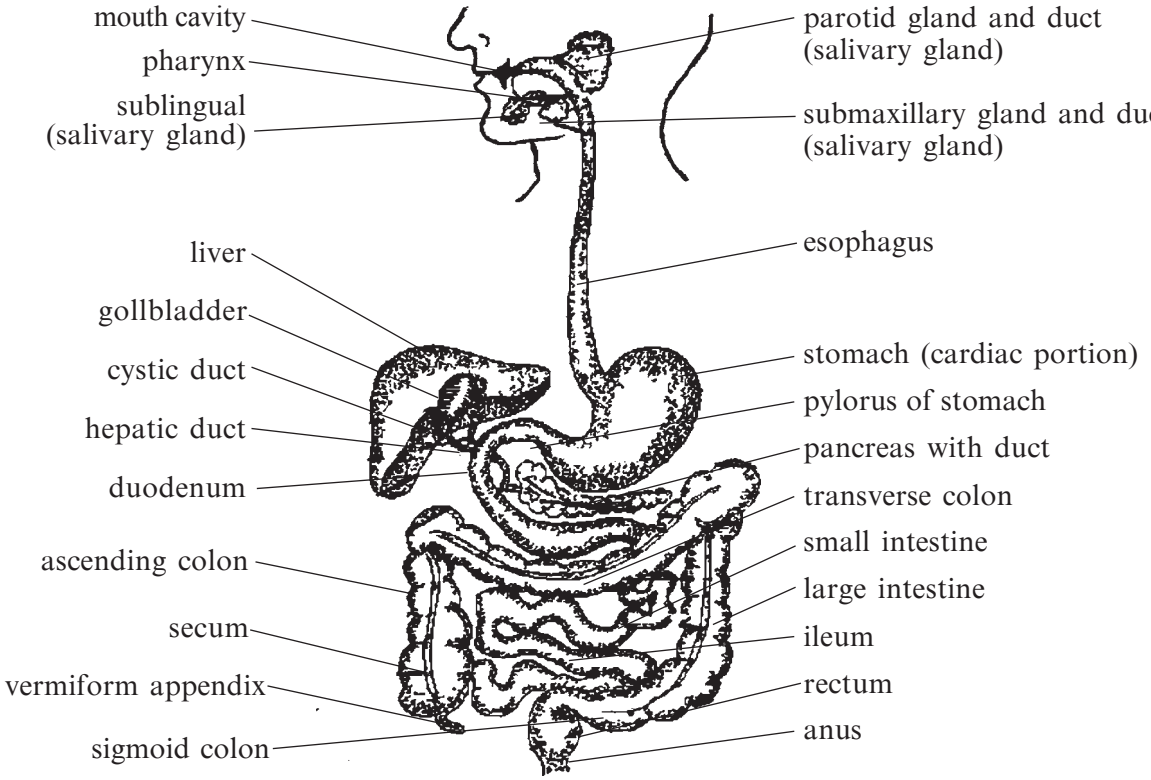


Fig. 9. Alimentary canal and accessory organs

opens from time to time and allows the food to spurt on into the small intestine. The word, pylorus, comes from a Greek word meaning "gatekeeper" which describes very well the action of this muscle. The contraction and expansion of muscles which push the food along the entire alimentary canal is known as peristalsis, an involuntary automatic muscular action.

DIGESTION IN THE INTESTINES

Objective:

• ***To study how the food in the intestines is finally prepared for entrance into the bloodstream***

The small intestine is a coiled portion of the alimentary canal about 8 m long and from 2.5 cm to 3.5 cm in diameter. In this organ, all digestion is completed.

The small intestine contains thousands of tiny glands called intestinal glands, which produce intestinal juice. In addition to intestinal juice, bile from the liver and pancreatic juice from the pancreas are poured into the small intestine. Thus, there are really three digestive juices functioning in the small intestine to complete the digestion of food.

The bile is necessary for the digestion of fats. The three juices working together complete breaking down the food mass into substances which can be absorbed into the bloodstream. This absorption is made possible by millions of tiny projections called villi, which line the walls of the small intestine. The usable portion of the food passes through the villi into the bloodstream and on to all our body cells. The unusable portion passes on into the large intestine.

THE LIVER AND GALLBLADDER

The liver, a large organ located just below the diaphragm on the right side, plays the part of a chemical factory in the process of digestion. It manufactures bile and passes it along to its storehouse, the gallbladder. When bile is needed for the digestion of fats, the gallbladder releases it through a duct into the small intestine.

In addition to manufacturing bile, the liver stores fat and glycogen. Besides contributing to the digestive process, the liver aids in removing waste materials from the bloodstream and checks bacterial action.

The bile contains mineral salts and if stored too long these salts may crystallize and form gallstones either in the gallbladder or in the ducts through which the bile passes. Sometimes these must be removed by surgery if they prohibit the bile from reaching the small intestine.

Observe the chart, showing the process of digestion of starch, fat and protein into simple forms ready for absorption (Fig. 10).

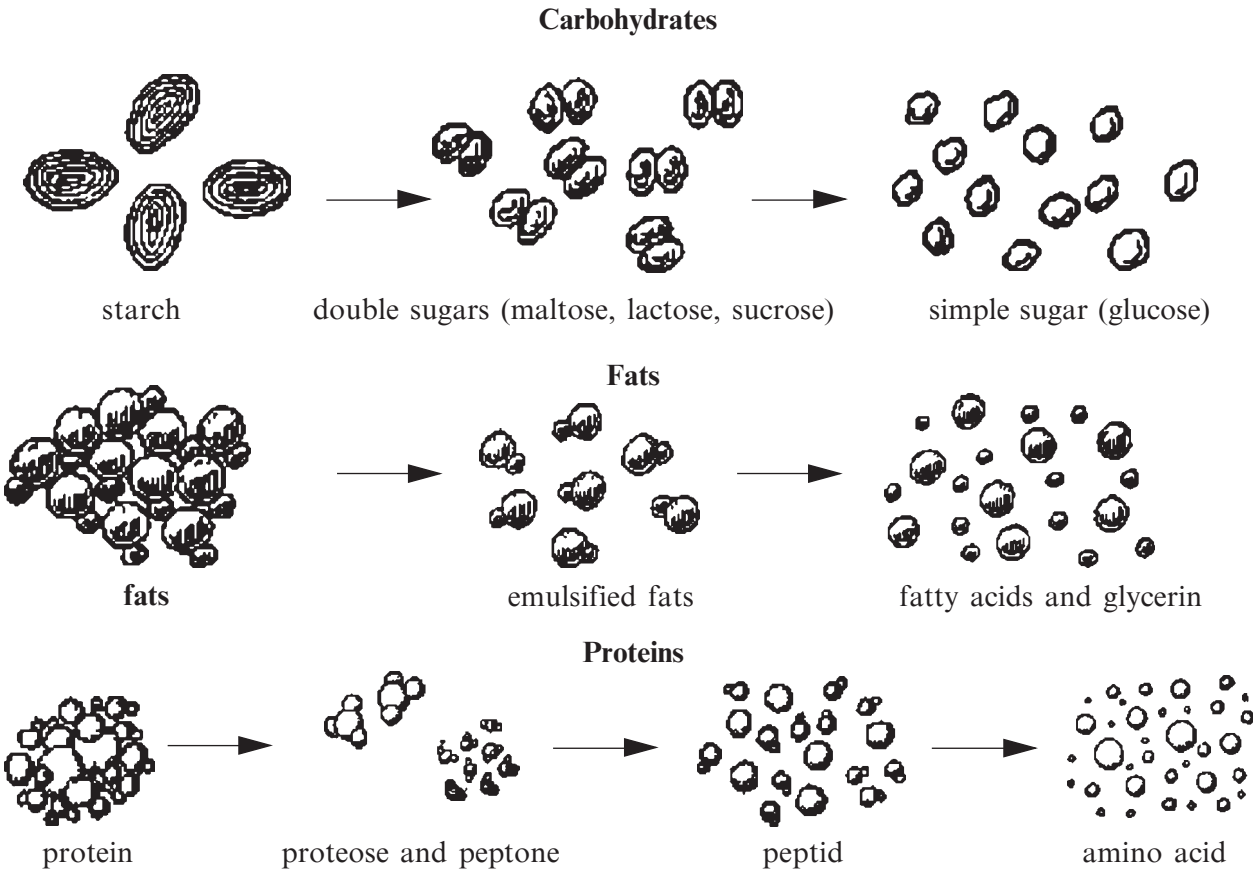


Fig. 10. Phases in the digestion of carbohydrates, fats and proteins

THE LARGE INTESTINE

Objective:

• ***To study the function of the large intestine***

The large intestine or colon, about 1.5 m long and from 3.7 cm to 6.2 cm in diameter, extends from the small intestine to the anus. A short distance from the point where the small intestine opens into the large, the appendix is located. The function of the appendix is unknown, but we do know that the appendix sometimes becomes inflamed and must be removed by surgery.

The large intestine is concerned with the storage and excretion of the waste products of digestion. It also aids in the regulation of the water balance of the body because its lining absorbs water. If the muscular activity of the large intestine is decreased, the waste products are not pushed along and constipation results.

Constipation may be avoided by exercise and by eating foods which contain bulk, such as cereals, fruits and vegetables. Regular bowel movements are of great importance to our health.

DISORDERS OF THE DIGESTIVE SYSTEM

Objective:

• ***To become familiar with some ailments of the digestive system***

You should be familiar with common disorders of the digestive system. Among these are:

Ulcers are lesions which may occur in either the stomach or intestinal walls. These ulcers result in an increased secretion of digestive juices which cause discomfort and hyperacidity. Complete rest and freedom from worry are prescribed. Surgery may be necessary.

Carcinoma or cancer may occur in any part of the digestive tract. Surgery, X-ray, or radium treatments are prescribed.

Chronic constipation may result from faulty dietary and health habits. It may result in headaches, pimples, abdominal cramps and feeling of sluggishness. Treatment consists of the establishment of correct dietary habits, good health habits, freedom from tension, exercises, and drinking plenty of liquids.

Diarrhea is the opposite condition from constipation. Too frequent bowel movement may be a symptom of cancer, nervousness, or some intestinal infection. The patient should be given only sips of water and plain tea until seen by the doctor who will determine the cause and treatment.

Appendicitis is an inflammation of the appendix. Pain is felt across the abdomen and on the lower right side; vomiting and nausea are common. A physician should be summoned at once. No cathartics are to be administered.

Hernia or rupture, occurs when a loop of the intestine slips through a weak spot in the wall of the abdomen. A swelling occurs and the patient vomits and feels pain. A physician should be called.

Gall stones are collections of stones which form in the gall bladder or the liver. Pain and digestive disturbances may occur. Often surgery may be necessary.

Hemorrhoids are dilations of the veins in the mucous membrane of the rectum.

Gastritis is an inflammation of the lining of the stomach caused by an irritant or by eating spoiled foods.

CHECK YOURSEF

1. Teeth are not composed of ... .
a) papillae
b) enamel
c) cement
d) lymph
e) pulp

2. Secretions which chemically aid in digestion are ... .
a) enzymes
b) vitamins
c) adrenalin
d) thyroxin
e) noradrenalin

3. The parotid glands are situated ... .
a) in the mouth
b) behind the sternum
c) in the pancreas
d) below the cerebrum
e) below the ear

4. Teeth used in grinding food are ... .
a) incisors
b) canines
c) bicuspids
d) molars
e) premolars

5. Bile is secreted by the ... .
a) pancreas
b) liver
c) gallbladder
d) stomach
e) bladder

6. The appendix is attached to the ... .
a) duodenum
b) cecum
c) jejunum
d) rectum
e) colon

7. The process of changing solid food into a liquid form to be absorbed by body cells is called ... .
a) digestion
b) transformation
c) secretion
d) conduction
e) excretion

8. The alimentary canal does not include ... .
a) mouth
b) pharynx
c) bronchi
d) rectum
e) stomach

9. The teeth are … structure in the body.
a) the softest
b) the hardest
c) the most elastic
d) the longest
e) the shortest

10. Gums are made up of ... .
a) spongy tissue
b) tough tissue
c) fleshy tissue
d) bony tissue
e) crystalline tissue

11. The principal organ of taste is ... .
a) soft palate
b) tongue
c) hard palate
d) teeth
e) uvula

12. The food is moistened with ... in the mouth.
a) sputum
b) water
c) saliva
d) blood
e) lymph

13. Rennin acts upon ... .
a) carbohydrates
b) fats
c) proteins
d) casein
e) lactic acid

14. Action of the pharynx:
a) swallow
b) digestion
c) absorption
d) secretion
e) excretion

15. ... is necessary for the digestion of fats.
a) water
b) bile
c) lactic acid
d) calcium
e) potassium

16. The part for storage and excretion of the waste products of digestion:
a) small intestine
b) large intestine
c) rectum
d) appendix
e) colon

17. The main function of the large intestine is ...
a) digestion of food
b) storage and excretion of the waste products
c) movement of food
d) absorption
e) reproduction

18. The substances which act chemically upon foods to change them to a simpler form are called ... .
a) hormones
b) enzymes
c) vitamins
d) adrenalin
e) noradrenalin

19. This organ stores fat and glycogen:
a) gallbladder
b) duodenum
c) pancreas
d) liver
e) bladder

20. It curdles milk:
a) pepsin
b) rennin
c) lipase
d) hydrochloric acid
e) lactic acid

Lesson 5

HOW DOES OUR BODY GET RID OF WASTE MATERIALS?

INTRODUCTION

Objective:

• ***To know the parts of the body involved in the excretory process***

We have studied how our body digests food and how the blood and lymph transport the products of digestion to the tissues and cells where they are needed. After the tissues have used the food and oxygen needed for growth and repair, the waste products formed must be taken away. If they are left to accumulate in the body they will act as poisons. It is the function of the excretory system to get rid of the many waste products as they are made.

The channels through which excretion takes place include the kidneys, the skin, the lungs and the intestines. The Table 1 indicates the body excretions:

Table 1. **Body excretions**

Organ	Excretion	Process
Lungs	carbon dioxide	exhalation
Kidneys	nitrogenous wastes dissolved in water	urination
Intestines	solid wastes	defecation
Skin	dissolved salts	perspiration

THE URINARY SYSTEM

Objective:

— To learn how the kidneys perform in excreting wastes from the body

The urinary system performs the greatest part of the excretory function. It consists of the kidneys, the ureters, the bladder and the urethra. The kidneys are two bean-shaped organs which lie deep in the abdominal cavity behind the peritoneum, one on each side of the spinal column (Fig. 11).

The kidneys serve as filters of the bloodstream. The renal artery supplies blood to the kidneys and the renal vein returns blood to the heart. In the process of passing through the kidney, wastes and water are removed from the blood by millions of tiny nephrons to form urine. Urine is the excretion of the kidneys and contains nitrogenous wastes dissolved in water. All tubules drain into the renal pelvis. The urine passes from the kidneys to the bladder through ducts called ureters. The bladder, a hollow muscular organ, acts like a reservoir, storing the urine until about one pint is accumulated. The bladder then becomes uncomfortable and must be emptied or voided. Voiding takes place by muscular contractions of the bladder which are involuntary, although we can control them to some extent through our nervous system. Contraction of the bladder muscles forces the urine through a narrow canal, the urethra, which extends to the outside opening.

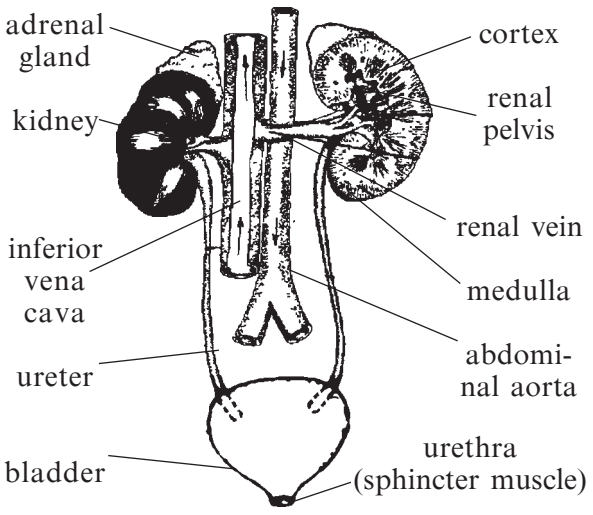


Fig. 11. The urinary system

THE SKIN

Objectives:

• ***To learn how the skin serves as a channel of excretion***

• ***To review the excretory function of the lungs and alimentary canal***

The skin functions as a channel of excretion by discharging wastes through the sweat glands in the skin. This process, called perspiration, is also an important factor in regulating body temperature.

The sweat glands are found over the entire skin surface. They are most numerous, however, under the arms, on the palms of the hands, the soles of the feet and on the forehead. Sweat glands are tubular glands which have a coiled base and a tubelike duct which ends in a pore in the skin. Each skin gland functions like a tiny kidney.

The sweat glands, under the control of the nervous system, are set into activity by several factors: a hot outside temperature, pain, fever, and nervousness.

The amount of water lost through the skin is almost 0.5 l a day. However, this will vary according to the type of exercise and the temperature. In profuse sweating a great deal of sodium chloride (salt) may be lost. It is vital to replace this, especially in hot weather when one perspires a great deal. Because of its constant exposure, the skin is subject to many ailments.

The excretory function of the lungs consists of giving off carbon dioxide and water vapor in exhalation.

The alimentary canal also has an important excretory function. The digested food reaches the colon in liquid form. As it passes through the colon the fluid is largely absorbed, leaving solid waste matter which is eliminated as feces.

Thus we see that there must be a constant exchange of food and oxygen for waste and carbon dioxide in the tissues. This process must be continuous if the organism is to continue to be well.

SOME DISORDERS OF THE EXCRETORY SYSTEM

Objective:

• ***To become familiar with some of the disorders associated with the excretory system***

We have studied the normal functioning of the excretory system. Let us now turn our attention to some of the disorders which may be associated with these systems.

DISORDERS OF THE URINARY TRACT

Cystitis is an inflammation of the mucous membrane lining the bladder, usually caused by an infection.

Pyelitis is an inflammation of the pelvis of the kidney, usually due to an infection.

Nephritis is an inflammation of the kidney causing damage to the tissue and resulting in the inability of the kidneys to carry on the task of elimination in an efficient manner.

Acute nephritis usually occurs in children. It may be a complication of a communicable disease, especially scarlet fever.

Chronic nephritis is a kidney condition which develops gradually in older people. It is usually accompanied by high blood pressure.

Kidney stones are formations of calcium deposits in the kidneys. It is thought that these may be caused as a result of the growth of small tumors of the parathyroid glands.

Tuberculosis of the kidney is a destructive kidney disease caused by the tubercle bacillus.

Uremia is an illness caused by the inability of the kidneys to eliminate waste.

Hematuria is presence of urine waiste products in blood.

DISORDERS OF THE SKIN

Acne vulgaris is a chronic skin disorder of adolescence marked by pimples, blackheads, cysts and scarring.

Athlete's foot is a contagious fungus infection of feet, usually contracted in public baths and/or showers.

Eczema is an allergic condition due to diet, clothing, creams, soaps, etc. Skin becomes dry, itchy and scaly.

Gangrene is the death of the tissue cells, caused by interference with the blood supply to the area.

Impetigo contagiosa is a contagious skin disease seen in babies, and young children, caused by the staphylococcus or streptococcus organism.

Pruritis is itching which may indicate a skin or general disease. Diabetes mellitus, liver ailments and thyroid disturbances may be the cause.

Psoriasis is a chronic disease characterized by reddened areas covered by silvery scales. It does not appear on the face.

Ringworm is a contagious fungus infection marked by red circular patches with crusts. May be on skin and/or in the hair.

Scabies is caused by tiny parasites which get under the outer layer of skin. Specific ointment, baths and change of clothing are prescribed.

Urticaria (hives) is a sudden appearance of edematous, raised pink areas which itch and burn. Usually caused by an allergy.

Furuncles (boils) are usually caused by staphylococcus infections in the hair follicle.

Carbuncles are deep abscesses. Treatment may require incision and drainage and use of antibiotics.

Shingles is a skin eruption thought to be due to a virus infection of the nerve endings. It is seen commonly on the chest or abdomen.

CHECK YOURSELF

1. When urine waste products are found in the blood, the condition is called ... .
a) hematuria
b) uremia
c) anemia
d) leukemia
e) hyperglycemia

2. The artificial removal of urine from the bladder is called ... .
a) cystoscopy
b) intravenous pyelogram
c) kidney function test
d) catheterization
e) Nechiporenko test

3. The kidneys are located ... .
a) in the abdominal cavity at the waistline
b) behind the abdominal cavity at the waistline
c) in the abdominal cavity in the upper back region
d) behind the abdominal cavity in the upper back region
e) in the peritoneum

4. A chronic skin disorder of adolescence:
a) pruritus
b) ringworm
c) acne
d) furuncles
e) carbuncle

5. The organs of excretion does not include ... .
a) kidneys
b) stomach
c) intestines
d) skin
e) lungs

6. The kidneys take part in ... .
a) urination
b) defecation
c) perspiration
d) exhalation
e) reproduction

7. The skin takes part in ... .
a) urination
b) defecation
c) perspiration
d) exhalation
e) reproduction

8. The intestines take part in ... .
a) urination
b) defecation
c) perspiration
d) exhalation
e) reproduction

9. The lungs take part in ... .
a) urination
b) defecation
c) perspiration
d) exhalation
e) reproduction

10. The renal artery supplies … to the kidneys.
a) oxygen
b) blood
c) serum
d) plasma
e) lymph

11. What organ acts like a reservoir for urine?
a) gallbladder
b) kidney
c) bladder
d) intestines
e) spleen

12. The urinary system does not include ... .
a) kidneys
b) ureter
c) urethra
d) rectum
e) genital organs

13. The sweat glands are under the control of the … system.
a) respiratory
b) reproductive
c) circulatory
d) nervous
e) excretory

14. The sweat glands are found ... .
a) in the abdomen
b) over the skin surface
c) on the back
d) in the lungs
e) on the limbs

15. The discharge of wastes through the sweat glands is called ... .
a) exhalation
b) excretion
c) perspiration
d) reproduction
e) inhalation

16. The sweat glands are not numerous ... .
a) under the arms
b) on the forehead
c) on the abdomen
d) on the palms
e) on the feet

17. Each skin gland functions like a tiny ... .
a) lung
b) kidney
c) rectum
d) mouth
e) nose

18. In profuse sweating a great deal of … may be lost.
a) potassium
b) calcium
c) sodium chloride
d) phosphorus
e) magnesium

19. The excretory function of the lungs consists in giving off carbon dioxide and … in exhalation.
a) water vapor
b) oxygen
c) nitrogen
d) calcium
e) magnesium

20. When urine waste products are found in the blood, the condition is called ... .
a) hematuria
b) uremia
c) anemia
d) leukemia
e) oliguria

Lesson 6

HOW DO WE SECURE CONTINUITY OF THE RACE?

INTRODUCTION

Objective:

• ***To learn how reproduction secures the continuity of the race***

We have already learned that tiny one-celled forms of life reproduce by simply dividing in two. In higher forms of life, as in man, reproduction is not that simple.

Human beings are reproduced by the uniting of two different cells, one from the female called the ovum, and one from the male, the spermatozoa. This union of the male and female cells is known as fertilization. It takes place in the fallopian tube.

After fertilization, the new cell comes down to and becomes imbedded in the wall of the uterus where it is nourished and protected until birth.

The fertilized human ovum is a new individual with forty-eight chromosomes which determine his characteristics. Twenty-four of these "determiners" come from the father and the same number from the mother. The DNA (deoxyribonucleic acid) of which the chromatin of the chromosomes is composed, seems to be directly involved in passing on and determining hereditary traits. While certain characteristics are dominant, some will be inherited from each parent. All characteristics however, are determined at the time fertilization takes place. This should be remembered as you work with parents. A young mother may hope that her coming baby will be a girl with blue eyes. The sex of the child and physical characteristics, such as eye color, were determined at the time of fertilization. Concentration on these points will not bring about change.

REPRODUCTIVE SYSTEM

Objective:

• ***To learn the organs of reproduction and how they function***

FEMALE ORGANS

The principal organs comprising the female reproductive system are protected within the pelvic cavity. These organs consist of: the ovaries, the uterine or fallopian tubes, the uterus, and vagina. The breasts have no part in the reproductive process, but are usually included as part of the reproductive system (Fig. 12).

The ovaries are two solid almond-shaped organs situated just below the outer ends of the fallopian tubes. They contain many thousand ova in different stages of development. They also discharge a secretion which seems to control menstruation.

The fallopian tubes are two hollow tubes extending from the uterus on one end and extending into the peritoneal or abdominal cavity. The function of the tubes is to carry the ova from the peritoneal cavity to the uterus.

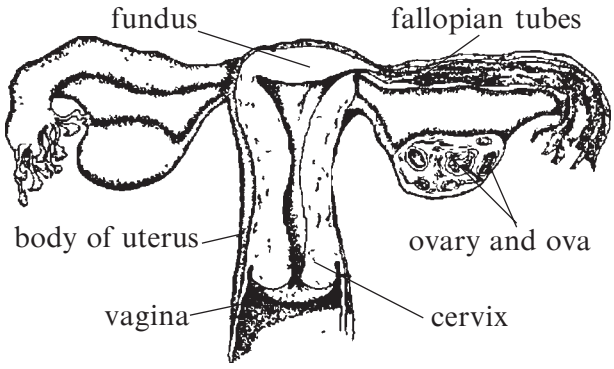


Fig. 12. Uterus, fallopian tubes and ovaries

The uterus is a hollow, pear-shaped organ situated between the bladder and rectum. It is supported by heavy ligaments to keep it in place. It is a muscular and elastic organ which expands greatly during pregnancy and contracts to expel the baby at birth. It nourishes and protects the fetus during pregnancy.

The vagina is an elastic canal located behind the urethra. Its lower end opens to the exterior of the body. Its upper end extends to the cervix, the lower part of the uterus. The vagina serves as an outlet for secretions of the uterus and for the baby to pass through at birth.

There are a few additional terms which you must know:

Ovulation is the process of casting off an ovum from the ovary. This occurs midway between menstrual periods. The ovum is picked up by the end of one of the fallopian tubes and is carried to the uterus.

Menstruation is the process of casting off the unfertilized ovum from the uterus along with a bloody excretion.

Pregnancy is a normal condition in which a woman has a fertilized ovum within her.

Menopause is the time when the menstrual cycle stops.

Corpus luteum is a yellow mass in the ovary which secretes the female hormone, progesterone, and induces the final premenstrual changes in the uterus.

Estrogen is the hormone produced by the Graafian follicle as it matures.

MALE ORGANS

The organs of reproduction in the male are especially adapted to transport the male reproductive cells to the female.

The testes, two glands which lie in a sac (scrotum) behind the penis and below the groin, correspond in function to the female ovaries. The testes manufacture the male reproductive cells, spermatozoa. These spermatozoa are discharged by the testes into a fluid (seminal fluid) and are carried through the urethra. The urethra serves two purposes: as a channel through which urine is voided from the bladder, and as a passageway for the spermatozoa. The urethra extends from the bladder inside the body through the penis outside the body. The male hormones are called androgens. One of these androgens, testosterone, is responsible for the male characteristics.

It is through the union of the spermatozoa of the male and the ovum of the female (zygote) that a new life begins.

DISORDERS OF THE REPRODUCTIVE SYSTEM

Objective:

• ***To become familiar with some of the disorders of the reproductive system***

FEMALE REPRODUCTIVE SYSTEM

Carcinoma is a cancer which may occur in the breasts or uterus.

Dysmenorrhea is a term used for painful menstruation.

Endocervicitis is inflammation in the canal of the cervix.

Fibroid tumors are fibrous tumors in the uterus. They are usually benign.

Hysterectomy is the surgical removal of the uterus.

Mastectomy is the surgical removal of the breast.

Retroversion is the backward displacement of the uterus.

Salpingitis is inflammation of the fallopian tubes.

Sterility is the inability to reproduce. It may occur in either sex.

MALE REPRODUCTIVE SYSTEM

Epididymitis is the painful swelling in groin and scrotum due to infection.

Prostatitis is an inflammation of the prostate gland. By pressing on the bladder, the prostate gland causes frequent, painful urination or, if pressure on the urethra is severe, may cause urine to be retained.

Prostatectomy is the surgical removal of all or part of the prostate gland.

Orchitis is the inflammation of a testis which may be a complication of mumps, influenza, etc. Symptoms are the swelling of scrotum, accompanied by high temperature.

CHECK YOURSELF

1. Lactation refers to that time in the life of a woman when ... .
   a) fertilization takes place
   b) milk is secreted
   c) menstruation stops
   d) menstruation begins
   e) during menstruation

2. Carcinoma is ... .
   a) a malignant tumor
   b) a benign tumor
   c) an inflammation
   d) a cyst
   e) an abscess

3. The menopause refers to the time when ...
a) pregnancy begins
b) menstruation stops
c) secretion of milk stops
d) birth takes place
e) menses begin

4. Genetics is ... .
a) the science of reproduction
b) a condition of pregnancy
c) the science of heredity
d) the study of fertilization
e) inheritance

5. The unborn baby in the uterus is called the ...
a) embryo
b) fetus
c) gene
d) egg
e) newborn

6. The union of the ovum and sperm cell is ...
a) reproduction
b) delivery
c) pregnancy
d) fertilization
e) birth

7. … are running from the ovaries to the uterus through which a female reproductive cell travels.
a) ureter
b) urethra
c) fallopian tubes
d) windpipe
e) cervix

8. Surgical removal of the uterus:
a) mastectomy
b) hysterectomy
c) appendectomy
d) endometritis
e) hysteroscopy

9. Surgical removal of the breast:
a) mastectomy
b) hysterectomy
c) appendectomy
d) endometritis
e) hysteroscopy

10. Inflammation of lining of the uterus:
a) leucorrhea
b) salpingitis
c) dysmenorrhea
d) endometritis
e) endometriosis

11. Conception:
a) pregnancy
b) reproduction
c) inflammation
d) fertilization
e) delivery

12. Female sex cell:
a) egg
b) sperm
c) ovum
d) embryo
e) fetus

13. Male sex cell:
a) egg
b) sperm
c) ovum
d) embryo
e) fetus

14. What disease is not related to females?
a) mastitis
b) orchitis
c) salpingitis
d) endocervicitis
e) endometritis

15. What disease is not related to males?
a) prostatitis
b) orchitis
c) salpingitis
d) epididymitis
e) impotence

16. The process of casting off an ovum from the ovary is called ... .
a) fertilization
b) ovulation
c) menstruation
d) pregnancy
e) coupling

17. The vagina is located ... .
a) over the anus
b) in front of the uterus
c) behind the urethra
d) in the uterus
e) behind the anus

18. The male hormones are called ... .
a) estrogens
b) androgens
c) progesterone
d) thyroxin
e) gene

19. The female hormones are called ... .
a) estrogens
b) androgens
c) progesterone
d) thyroxin
e) gene

20. Fertilization takes place in the ... .
a) uterus
b) ovary
c) vagina
d) fallopian tube
e) cervix

Lesson 7

WHY ARE WE WHAT WE ARE?

INTRODUCTION

Objective:

• ***To learn which glands make up the endocrine system and how they affect the body activities***

The endocrine glands are organized groups of cells which draw upon materials from the blood or lymph to make new compounds called hormones. These secretions are picked up by the blood as the circulation passes through the gland. The secretions are then transported to all areas of the body where they have a special influence on cells, tissues, organs and systems. Endocrine glands are also called ductless glands and glands of internal secretion because their secretions go directly into the bloodstream.

A few of the glands manufacture two secretions: an internal secretion and an external secretion. Such a gland is the pancreas whose internal secretion, insulin, is discharged directly into the bloodstream and whose external secretion is discharged through the pancreatic duct into the small intestine where it aids the digestive process. Pancreatic juice, therefore, is an external secretion because it discharges its secretion through a duct into the small intestines, instead of directly into the bloodstream (Fig. 13).

There are these six important endocrine glands or groups of glands in the body:

— The pituitary gland in the skull

— The thyroid gland in the neck

— The parathyroid glands near the thyroid gland

— The pancreas in back of the stomach

— The two adrenal glands, one over each kidney

— The gonads, or sex glands

PITUITARY GLAND

Objective:

• ***To learn the location and functions of the pituitary gland***

Each endocrine gland has specific functions to perform. Any disturbance in the functioning of these glands may cause changes in the appearance or functioning of the body. Sometimes both conditions arise.

The pituitary gland is located at the base of the brain. It is called the master gland because it secretes several different hormones into the bloodstream which affect other endocrine glands. For instance, the activity of the thyroid glands and the gonads is affected by the amount of hormone secretion discharged into the bloodstream by the pituitary gland.

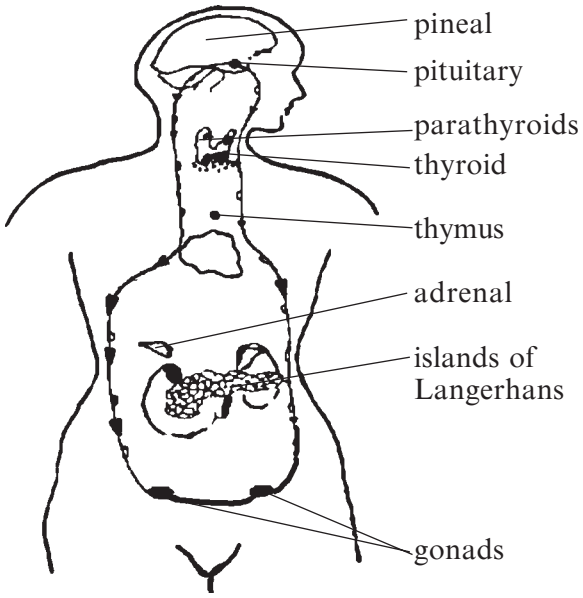


Fig. 13. Location of the endocrine glands

The pituitary gland is responsible for the growth of the long bones; therefore, it controls the height of the individual. Circus giants are frequently the result of overgrowth of the long bones due to oversecretion of the pituitary gland. The gland influences the organs of reproduction. Its secretions are essential to pregnancy and lactation. It is responsible for maintaining the water balance of the body.

It affects the bodily use of starches and sugars because of its control over the formation of insulin in the pancreas.

It secretes adenocorticotropic hormone (ACTH), one of the hormones used in the treatment of arthritis.

The pituitary gland, therefore, is responsible for many of the secretions which help to keep us well-balanced individuals.

THYROID AND PARATHYROID GLANDS

Objective:

• ***To learn the important functions of the thyroid and parathyroid glands***

The thyroid gland is located in the front middle portion of the neck on either side of the windpipe. It has two connected lobes. The chief function of the thyroid gland is to regulate the body metabolism. Metabolism is the rate at which the body functions take place. The gland helps to regulate rate of physical growth, mental development, sexual maturity, and the distribution and exchange of water and salts in the body. It can speed up or slow down the body's activities as needed. Iodine is stored in the thyroid gland because it is essential for the manufacture of its hormone, thyroxin.

The parathyroid glands, usually four in number, are tiny glands with the size of a grain of rice attached to the posterior surface of the thyroid lobes. Only one function of these glands is known. They control the use of calcium and phosphorus in the body. The thymus gland is located under the breastbone or the sternum. It is fairly large during childhood but begins to disappear at puberty. Very little is known about the gland, but it is thought to be associated with growth and maturity.

FUNCTIONS OF ADRENAL GLANDS AND GONADS

Objective:

• ***To learn the location and functions of the adrenals and gonads***

The adrenal glands lie on top of each kidney. The secretions of the adrenal glands perform several functions. Two of these functions are: (1) to release extra energy to help the body meet physical emergencies, and (2) to control the salt and water usage by the body. The cortex or outer part of the gland secretes a compound from which cortisone, used in the treatment of rheumatoid arthritis, is prepared. The medulla, or inner portion, secretes adrenalin, a powerful heart stimulant (Fig. 14).

The gonads, or sex organs, include the ovaries in the female and the testes in the male. The gonads are organs of both internal and external secretion. The ovaries are located in the pelvic cavity, one on either side of the uterus. The testes are located in the scrotum.

The secretion of the ovaries, estrogen and progesterone, are necessary for the normal female appearance, ovulation and characteristics. The secretion of the testes, testosterone, is essential to the development of the male sex characteristics. The gonads are responsible for fertility and reproduction of both sexes.

THE PANCREAS

Objective:

• ***To learn the location and endocrine functions of the pancreas***

The pancreas is an organ which is located behind the stomach. The gland cells of the pancreas are concerned with the production of pancreatic juice, a digestive juice. The islet cells secrete the hormone, insulin. Thus the pancreas is a gland of both external secretion and internal secretion.

The islet cells are groups of pale cells distributed throughout the pancreas. These cells have been named the islands of Langerhans for the doctor who discovered them. Their function is

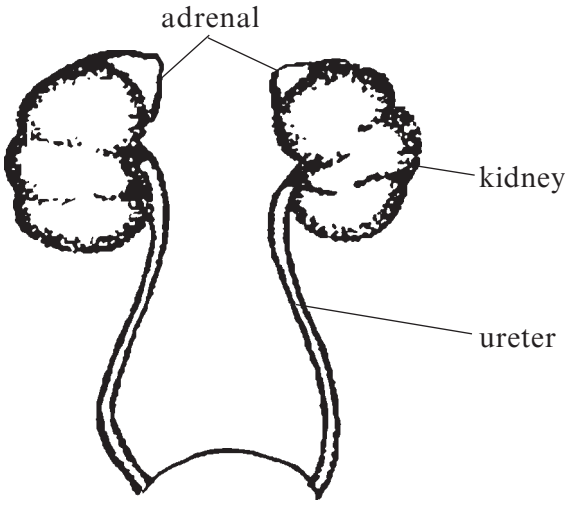


Fig. 14. The adrenal glands

the production of insulin which controls the use of carbohydrates and, consequently, fat metabolism by the body. The lack of insulin secretion by the islet cells causes diabetes mellitus.

Insulin was prepared for human use in 1921 by Doctors Banting and Best. This discovery has saved millions of lives throughout the world.

SOME ENDOCRINE DISEASES

Objective:

• ***To become familiar with the disorders of the endocrine glands which interfere with proper functioning of the bodily organs***

Endocrine gland disturbances may be caused by several factors such as:

— Disease of the gland itself
— Infections in other parts of the body
— Dietary deficiencies

Most endocrine disturbances may be the result of hyperactivity (oversecretion) of the gland or hypoactivity (undersecretion) of the gland.

THYROID DISTURBANCES

Hyperthyroidism or overactivity of the thyroid gland is usually shown by enlargement of the gland. This condition of enlargement is frequently noted in marked prominence of the eyeballs, rapid heartbeat, hand tremors and irritability.

Simple goiter is an enlargement of the thyroid gland due to a deficiency of iodine in the diet.

Hypothyroidism is a condition in which the underactivity of the thyroid gland slows down all body processes. Hypothyroidism may lead to:

Cretinism — a condition of infancy and early childhood in which mental and physical development are retarded.

The treatment for thyroid deficiency usually consists of giving the person enough thyroid extract to bring the metabolism up to normal. The basal metabolism test is an aid in diagnosing thyroid functioning. It measures the amount of oxygen the person uses in his many activities. This test is being rapidly displaced by the Protein-Bound Iodine (P.B.I.) test. This is a blood test which determines the concentration of thyroxin in the bloodstream. This test is performed on an empty stomach. The iodine intake is eliminated for the week previous to the test.

The Radioactive Iodine Uptake test determines the degree of activity of the thyroid gland. Dilute radioactive iodine is given by mouth.

PARATHYROID DISTURBANCES

Disturbances in functioning of the parathyroid gland cause a disturbance in the use of calcium by the body.

Hypofunctioning of the glands may cause tetany. This is a disease marked by convulsive twitchings. Vitamin D and calcium are given to restore normal balance.

Hyperfunctioning of the glands may cause the calcium in the blood to increase, thereby causing a tendency to crystallize in the kidneys as kidney stones.

PITUITARY DISTURBANCES

Disturbances in functioning of the pituitary gland may produce many body changes, chiefly in the growth function.

Hypofunctioning of the gland may cause: dwarfism, diabetes insipidus, menstrual disturbances.

Hyperfunctioning of the gland may cause overgrowth of the long bones leading to gigantism.

ADRENAL DISTURBANCES

Disturbances in adrenal gland functioning are usually due to new growths of the glands or to tuberculosis of the glands (Addison's disease).

GONADAL DISTURBANCES

Disturbances in the ovaries may consist of cysts and tumors, disturbances in menstruation, and changes at the menopause due to stopping or cessation of the endocrine activity of the ovaries.

PANCREAS DISTURBANCES

Diabetes mellitus is a condition caused by lack of secretion of insulin from the islet cells of the pancreas and in which carbohydrate and, therefore, fat metabolism are disturbed.

CHECK YOURSELF

1. Endocrine glands are called ... glands.
a) colorless
b) tasteless
c) ductless
d) invisible
e) visible

2. Secretions of the endocrine glands go directly into the ... .
a) brain
b) bloodstream
c) uterus
d) spinal column
e) lymph flow

3. What organ does not concern the endocrine glands?
a) thyroid
b) pituitary
c) duodenum
d) gonads
e) parathyroid

4. The secretion of the endocrine gland is called ... .
a) hormone
b) juice
c) urine
d) liquor
e) lymph

5. The internal secretion of the pancreas is ...
a) thyroxin
b) insulin
c) pepsin
d) rennin
e) gastric acid

6. What gland is called a master gland?
a) thyroid
b) gonads
c) pituitary
d) adrenals
e) parathyroid

7. The pituitary gland controls … of the individual.
a) complexion
b) stature
c) colour of the eyes
d) height
e) colour of the hair

8. ACTH is secreted by the ... .
a) thyroid
b) pancreas
c) adrenals
d) pituitary gland
e) hypothalamus

9. The pituitary gland is located ... .
a) in the middle of the neck
b) at the base of the brain
c) on the back
d) in the groin
e) on the neck

10. The thyroid gland is located ... .
a) in the middle of the neck
b) at the base of the brain
c) on the back
d) in the groin
e) in the chest

11. The parathyroid glands are usually … in number.
a) two
b) three
c) four
d) five
e) six

12. The chief function of the thyroid gland is ...
a) to control height of the individual
b) to maintain water balance
c) to regulate the body metabolism
d) to control lactation
e) to control growth

13. ... is stored in the thyroid gland.
a) glycogen
b) adrenalin
c) calcium
d) iodine
e) potassium

14. Iodine is essential for the manufacture of ...
a) insulin
b) thyroxin
c) adrenalin
d) estrogen
e) lactic acid

15. The parathyroid glands control the use of … in the body.
a) sodium
b) potassium
c) phosphorus
d) calcium
e) magnesium

16. The gonads in the male include ... .
a) testes
b) ovaries
c) uterus
d) prostate
e) cervix

17. The adrenal glands are located ... .
a) on the spine
b) in the groin
c) on the top of kidneys
d) on the liver
e) in the abdomen

18. The pancreas is located ... .
a) on the spine
b) behind the stomach
c) on the top of the kidneys
d) in front of the stomach
e) in the spleen

19. The islet cells of the pancreas secrete the hormone ... .
a) thyroxin
b) insulin
c) androgen
d) estrogen
e) iodine

20. When was insulin prepared for human use?
a) in 1918
b) in 1921
c) in 1930
d) in 1935
e) in 1945

Lesson 8

HOW ARE BODY FUNCTIONS COORDINATED?

INTRODUCTION

Objective:

• ***To study the overall structure of the nervous system***

The nervous system is the communication system of the body. It helps sending messages throughout the body, and it also controls many of our bodily actions. Without this network of tiny nerve tissues, our body systems would be unable to work together as one.

The basis of the nervous system, as with other systems, is the cell. The nerve cell or neuron is specially constructed to carry out efficiently its function of communication. In addition to the nucleus, cytoplasm and cell membrane, the neuron has extensions from the cell body. These extensions or processes are called dendrites and axons and there may be several or only one, depending upon the function of the particular nerve cell. These dendrites and axons form the paths along which impulses travel.

All cells possess the characteristic of being able to respond when excited and being able to pass along from cell to cell the reaction to a stimulus. We call these characteristics, irritability and conductivity.

Irritability is the ability to react when stimulated.

Conductivity is the ability to transmit a disturbance to distant points.

The nervous system consists of three main parts:

— The columnar central nervous system — brain and spinal cord

— The peripheral nervous system — cranial nerves (12 pairs), spinal nerves (31 pairs)

— The autonomic nervous system is ganglia on either side of the spinal cord

Where decision is called for and we must think about an action, the central and peripheral nervous systems carry the message to the brain and carry back to the organs or muscles whatever command the brain gives. The autonomic nervous system supplies the heart muscle, smooth muscles of the blood vessels, digestive organs and other organs and glands with nervous impulses as needed.

THE BRAIN AND SPINAL CORD

Objective:

• ***To study the structure of the brain and spinal cord***

The brain is a soft mass of the nervous tissue. Its under side is flattened and rests on the floor of the skull. Its upper surface is curved and lies underneath the roof of the skull. The brain is covered by three membranes called meninges. These are the dura mater (outer one), the pia mater (over the brain tissue and innermost one) and the arachnoid which separates the inner- and outermost ones. The space between the arachnoid and pia mater is filled with spinal fluid which is made in the ventricles of the brain. Between the three layers of meninges is the cerebro-spinal fluid. Inflammation of the brain membranes is called meningitis.

The brain itself is divided into three parts: the cerebrum, the cerebellum, and the brain stem. The brain stem is further divided into several parts, one of which is the medulla (Fig. 15).

The surface of the cerebrum is covered with wrinkles causing the brain to have the appearance of little mounds separated by grooves. These mounds are called convolutions and they serve to increase the surface area of the brain.

The outer surface of the brain is grayish and the center, white. The outside folded portion called the cortex is the highest center of the brain and is made up of so-called gray matter. The

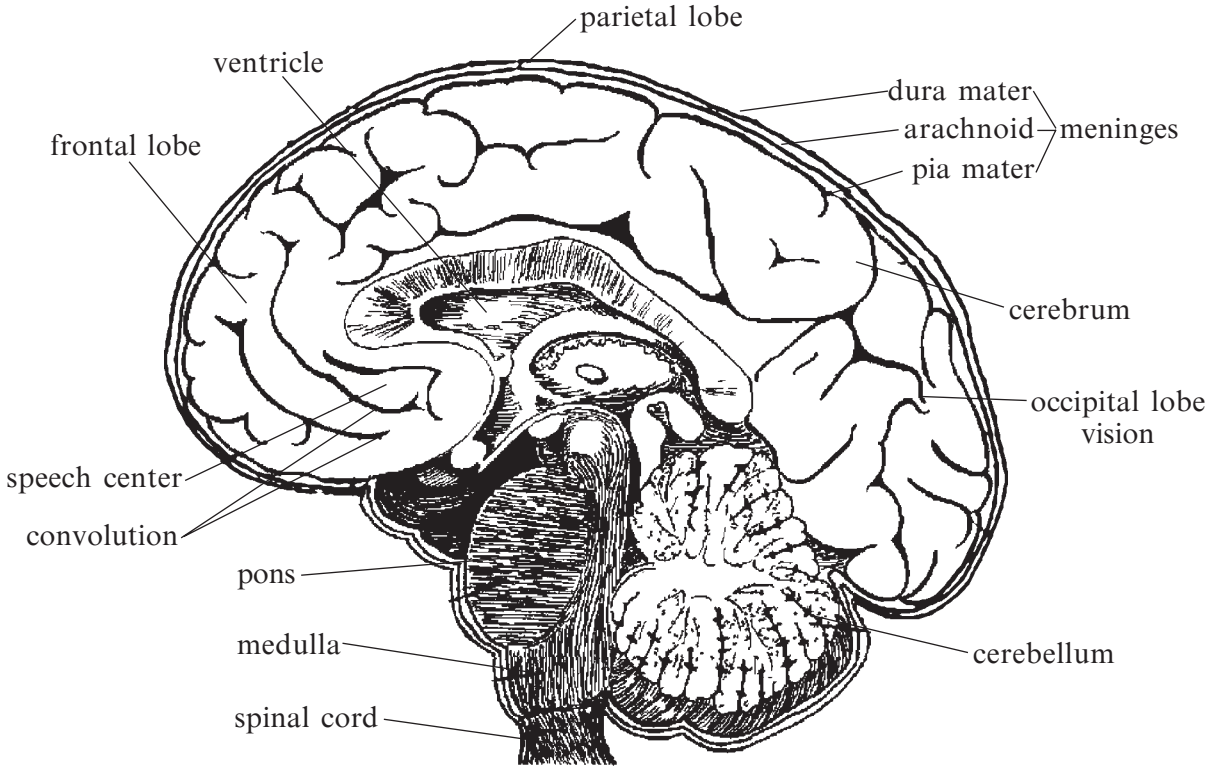


Fig. 15. Cross section of the brain

gray matter really consists of millions of nerve cells and naked nerve fibers; the white matter contains millions of nerve cell fibers with their myelin sheaths, thus accounting for the difference in appearance.

The cerebrum is divided into the right and left hemispheres. Cells in the right hemisphere control the voluntary movements which occur in the left side of the body. The left hemisphere controls voluntary movements of the right side of the body. The cerebrum contains the centers of reasoning, memory, thought, speaking and sensation. It is the largest part of the brain.

The cerebellum is also divided into two hemispheres, contains both gray and white matter, but is much smaller than the cerebrum. The function of the cerebellum is to coordinate the muscular movements of the body and thus govern the steadiness of our movements.

Beneath the cerebral hemispheres are the **thalamus** which relays messages, and the **hypothalamus** which helps regulate the body temperature.

The medulla controls the involuntary movements of the vital organs, such as the heart, blood vessels, lungs, stomach, and intestines.

The spinal cord continues down from the medulla. It is white and soft and lies within the vertebrae of the spinal column. Nerves enter and leave the spinal cord to carry messages between the parts of the body and the central nervous system. The spinal cord is surrounded by the three meninges which also surround the brain. The gray matter is located in the center of the cord, the white matter on the outside. Some of the nerve fibers carry impulses from the sense organs to the brain; these are the sensory or afferent fibers. Others carry impulses from the brain to the muscles and glands of the body; these are the motor or efferent fibers.

THE REFLEX ACT AND AUTONOMIC NERVOUS SYSTEM

Objective:

• ***To understand how a simple reflex act is carried out by the nervous system***

The simplest type of nervous response is the reflex act. This is an unconscious, automatic, involuntary act. The blinking of the eye when a particle of dust touches it, the removing of your finger from a hot object, the secretion of saliva when we see or smell food, the movements of the heart, stomach and intestines, are all examples of reflex actions. Every reflex act is preceded by a stimulus. Anything in the environment which causes activity is called a stimulus. Ex-

amples of stimuli are sound waves, light waves, and odours. The special organs which pick up these stimuli are called receptors. For example, the retina located in the eye is the receptor for light; special cells in the inner ear are receptors for sound waves. The reaction to the stimulus is called the response. The response may be in the form of movement, in which case the muscles are the effectors or responding organs; or, the response may be in the form of a secretion, in which case glands are the effectors.

The autonomic nervous system, as the name suggests, plays a part in these involuntary, reflex actions. It consists of a series of ganglia located on either side of the spinal cord. Let us analyze a typical reflex action, such as the removal of a finger from a burning object. The receptors located in the skin pick up the stimulus; the impulse travels through a sensory nerve to the ganglia outside the spinal cord and then enters the spinal cord. Here the impulse travels to a motor neuron directly, or, in some cases, there may be one or more intermediate neurons for connections. The impulse then leaves the spinal cord via a motor neuron which goes to the muscles in the finger, causing them to jerk the finger away from the hot object.

The center for some reflexes, such as the blinking of the eye, heartbeat, breathing movements and stomach movements, is located in the medulla. Other reflexes, such as the knee jerk and the removal of a finger from a hot stove, have their centers in the spinal cord.

SPECIAL SENSE ORGANS — THE EYE AND THE EAR

Objective:

• ***To become familiar with the general nature of some sense organs, especially the eye and the ear***

Sense organs or receptors are special structures which are stimulated by changes in the environment. General sense organs, such as touch, pain, temperature and pressure receptors, are found all over the body, located either in the skin or connective tissues. Special sense organs include the taste buds of the tongue, special cells in the nose, the retina of the eye and the special cells in the inner ear which make up the organ of Corti. When special sense organs are stimulated, the impulse travels along nerve pathways to the brain, where it is registered in certain areas. Sensation actually takes place in the brain but we refer the sensation back to the sense organ mentally. This is called projection of the sensation.

THE EYE

The eye is the sense organ which is stimulated by light rays. The wall of the eye is made up of three layers or coats: the outer, the middle and the inner. The outer layer is called the sclerotic coat. It is tough in order to protect the delicate structure within. The rear portion of this coat is the so-called "white of the eye". The front, in the very center of the sclerotic coat, is a circular, clear area which is called the cornea. This is the so-called "window of the eye." It is transparent to permit light rays to pass through it. The middle layer is the choroid coat; it is pigmented and has blood vessels to nourish the eye. In front, the choroid coat has a hole in it called the pupil.

The pupil is in reality a hole which lies behind the cornea. The circular band of the choroid coat which surrounds the pupil is the familiar iris of the eye. It may be brown, blue, black, hazel or whatever colour your eye happens to be. The iris, by contraction of its muscles, regulates the size of the pupil and thus determines the amount of light which may enter the eye. The pupil gets smaller when we enter the bright sunshine so that the eye will not be flooded by too much light; it gets bigger when we enter a darkened room or theater, in order to permit as much light as possible to enter. In this way, the eye may be compared to a camera; the iris corresponds to the shutter or diaphragm.

The retina of the eye is the innermost or third coat of the eye. It is upon this sensitive layer that the light rays from an image are focused. It corresponds to the film or plate in a camera. The retina contains pigment and specialized cells known as rods and cones which are sensitive to light. The portion of the retina where rods and cones are missing is the pathway of the optic nerve from the retina to the brain.

Vision is impossible when the rods and cones are missing. Thus, it is often called the "blind spot." The lens is a crystal structure behind the iris. Light rays travel through it and are bent or refracted so that they may focus on the retina.

The aqueous humor is a watery fluid which fills the compartment in front of the lens and which fills the compartment in back of it is called the vitreous body. It is jelly-like. Both aid in refraction of light. If rays of light do not focus correctly on the retina, we correct this by wearing glasses with properly fitted lenses which will bend the rays of light accurately.

The eyeball is moved by muscles. The eye is protected by the bones surrounding it and by the eyebrows, eyelids, and eyelashes.

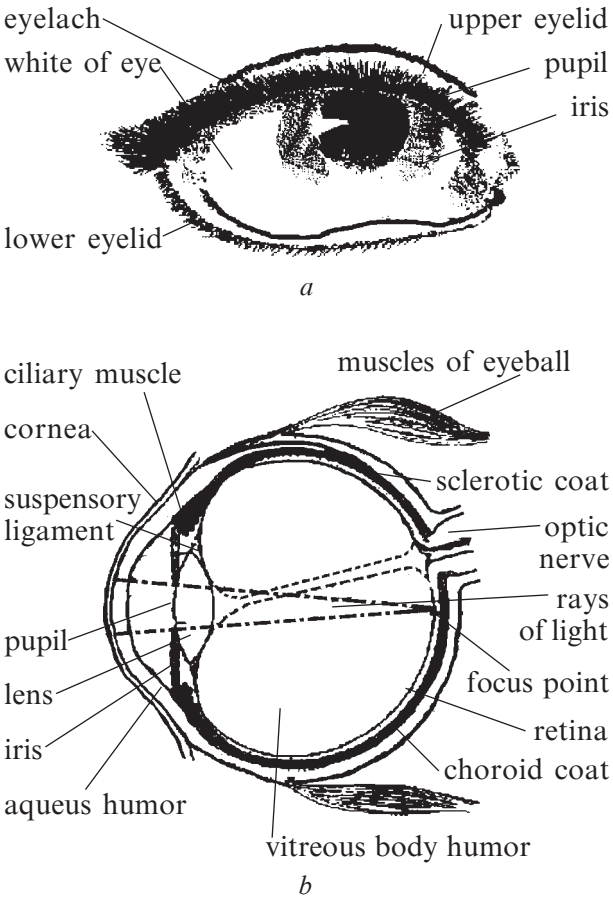


Fig. 16. The eye: a) external view; b) internal view

THE EAR

The ear is a special sense organ which is especially adapted to pick up sound waves and send these impulses to the auditory center of the brain, which is located in the temporal area just above the ears. The inner ear contains three semicircular canals which regulate the sense of equilibrium. These have nothing to do with the sense of hearing. The receptor for hearing is the delicate organ of Corti which is located within the cochlea of the inner ear (Fig. 17).

The ear has three parts: the outer ear, the middle ear and the inner ear. The outer ear consists of the visible portion and a canal which leads to the ear drum.

The middle ear is really a cavity in the temporal bone. It connects with the pharynx by means of a tube called the Eustachian tube. This tube serves to equalize the air pressure in the middle ear with that of the outside atmosphere. A chain of three tiny bones are found in the middle ear. These are called the hammer, the anvil, and the stirrup. These three bones carry the sound waves across the middle ear, from the ear drum to the inner ear.

The inner ear consists of several membrane-lined channels, which lie deep within the temporal bone. The special organ of hearing is a spiral-shaped passage known as the cochlea which contains a membranous tube called the cochlear duct.

This duct is filled with a fluid, which vibrates when the sound waves from the stirrup bone hit it. Located in the cochlear duct are the delicate cells which make up the organ of Corti. These hairlike cells pick up the vibrations of the fluid caused by the sound waves and transmit them through the auditory nerve to the hearing center in the brain.

Three semicircular canals also lie within the inner ear. They contain a liquid and delicate cells. These hair-like cells bend when the liquid in the canals is set in motion by head and body movements. These impulses are sent to the brain and proper body balance is maintained.

DISEASES OF THE NERVOUS SYSTEM

Objective:

• ***To become familiar with some diseases of the nervous system***

You will become familiar with many disorders of the nervous system. Among these are the following:

NERVOUS SYSTEM DISORDERS

Chorea or St. Vitus' Dance is characterized by involuntary twitching of the muscles of the legs, arms, and face. The disease may last from three to six months. It usually occurs in children. Treatment consists of rest, nourishing food, and protection of the child from fright and excitement.

Shingles or **Herpes Zoster** results in eruptions on the skin, accompanied by pain along the nerves in some parts of the body. The involved area must be treated by protecting it from air and from the irritation of clothing.

Neuralgia is a pain along a nerve. It is usually a symptom of some other disease.

Neuritis is inflammation of a nerve trunk. Like neuralgia, it causes pain and, in addition, it causes weakness of the muscles controlled by the nerve trunk.

Poliomyelitis or infantile paralysis is an acute infectious disease of the nerve pathways in the spinal cord. The muscles which are controlled by these diseased nerve paths become paralyzed. Death may occur. Vaccines are now available to protect against the disease. All children are given regular polio shots for immunization.

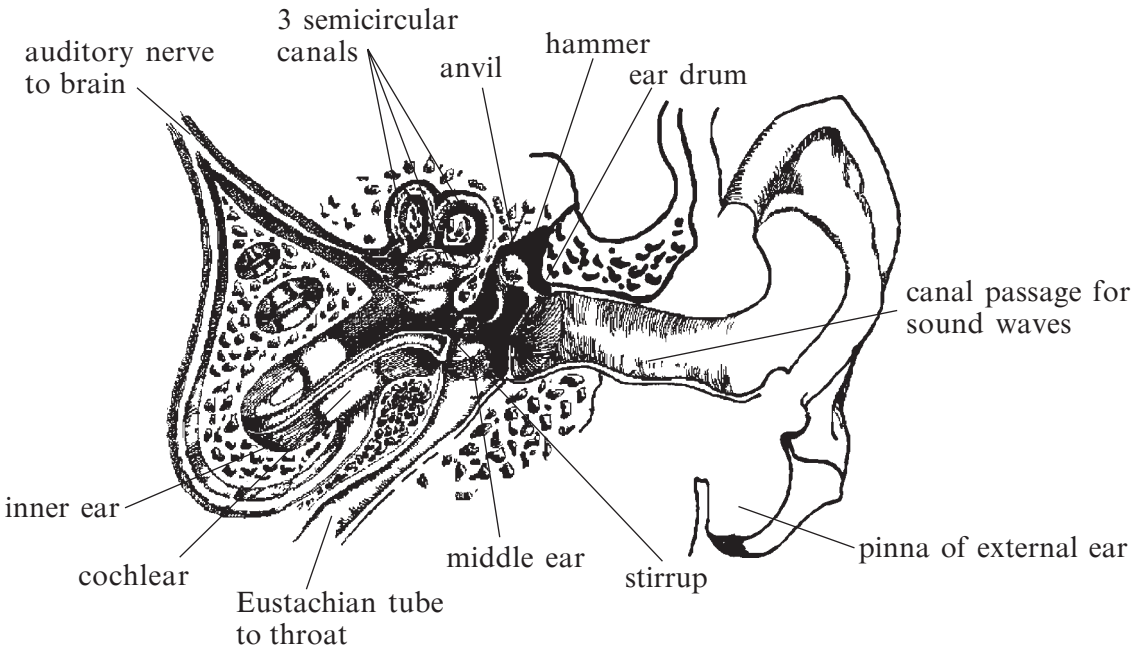


Fig. 17. The ear

Sciatica is a form of neuralgia or neuritis of the sciatic nerve in the leg.

Encephalitis is a brain disease. There are several forms of encephalitis. "Sleeping sickness" is a form of the disease accompanied by drowsiness, stupor, and great weakness.

Cerebral Palsy is a disturbance in voluntary muscular action due to a brain lesion. Definite causes are unknown. It may be due to birth injuries, intracranial hemorrhage or infections such as encephalitis.

Convulsions may occur due to high fever, indigestible food and lack of vitamin D.

Epidemic meningitis is caused by the meningococcus organism. Early diagnosis and treatment may prevent spread of infection to brain tissue.

Epilepsy is a disease of the nervous system for which no cure has yet been discovered. It is characterized by convulsions. Nothing can be done to shorten the convulsion. Medication is now available which, if taken regularly, will usually prevent attacks.

EAR DISORDERS

Ear infections of any type should be treated promptly by an ear specialist for they may cause deafness if not properly treated.

EYE DISORDERS

Conjunctivitis is an inflammation of the conjunctive membranes in front of the eye. Redness and discharge of mucus occurs. Since this is contagious, it should be promptly treated by a physician.

Glaucoma is a condition of the eye in which the aqueous humor does not circulate properly within the eye. If it is untreated, it may lead to blindness because it damages the retina and optic nerve. With prompt treatment, total blindness may be avoided. Early detection and treatment will usually prevent progress of the disease.

A cataract is a condition of the eye due to a lack of transparency of the lens. Light cannot pass through the clouded lens and therefore a person cannot see. Surgery can cure this condition by removing the opaque lens.

A sty is a tiny abscess at the base of an eyelash.

CHECK YOURSELF

1. The nervous system is the … system of the body.
a) communication
b) respiration
c) reproduction
d) excretion
e) transformation

2. There are … pairs of cranial nerves.
a) 2
b) 4
c) 6
d) 10
e) 12

3. The surface of the brain is covered with ...
a) coatings
b) lines
c) spots
d) wrinkles
e) cavities

4. The center surface of the brain is ... .
a) black
b) white
c) grayish
d) yellow
e) dark red

5. The spinal cord is … .
a) black
b) white
c) grayish
d) yellow
e) dark red

6. Colour portion of the eye is called:
a) retina
b) iris
c) sclera
d) pupil
e) cornea

7. The spinal cord lies within the ... .
a) medulla
b) cerebellum
c) vertebrae
d) chest
e) abdomen

8. A disease of the nervous system characterized by convulsions:
a) epilepsy
b) meningitis
c) encephalitis
d) neuritis
e) neuralgia

9. Involuntary twitching of the muscles of the legs, arms and face:
a) chorea
b) meningitis
c) encephalitis
d) neuritis
e) neuralgia

10. The eye is organ of ... .
a) smell
b) taste
c) vision
d) hearing
e) olfaction

11. The ear is organ of ... .
a) smell
b) taste
c) vision
d) hearing
e) olfaction

12. The eye is stimulated by ... .
a) temperature
b) light rays
c) pain
d) touch
e) radiation

13. What part of the eye is called "window of the eye"?
a) retina
b) iris
c) cornea
d) pupil
e) conjunctiva

14. The colour of the eyes depends on colour of ... .
a) retina
b) iris
c) cornea
d) pupil
e) conjunctiva

15. The pupil gets smaller in ... .
a) bright sunshine
b) dark
c) high temperature
d) touch
e) convulsion

16. The ear is stimulated by ... .
a) temperature
b) noise
c) pain
d) touch
e) whisper

17. Otitis is an inflammation of the ... .
a) outer ear
b) middle ear
c) inner ear
d) temporal bone
e) sinus

18. A lack of transparency of the lens is called ... .
a) glaucoma
b) conjunctivitis
c) blepharitis
d) cataract
e) exophthalmia

19. The ear sends impulse to the … center of the brain.
a) motor
b) vision
c) auditory
d) smell
e) pain

20. What helps to regulate body temperature?
a) thalamus
b) cerebellum
c) hypothalamus
d) medulla
e) pituitary gland

Lesson 9

HOW SHOULD WE CARE FOR THIS INTEGRATED ORGANISM?

We should eat a rational amount of good, nourishing food, well-prepared and served attractively. Food should be chewed thoroughly and slowly in order to enable the digestive juices to penetrate the particles of food for proper digestion. Eating between meals is usually not recommended for a normal healthy person. Under special circumstances, where a person may have some particular ailment requiring more frequent feedings, strict adherence to the doctor's orders must be followed.

Anger, worry, fear, severe physical or mental activity before or after meals will tend to interfere with proper digestion. The family should be in a happy frame of mind at the dinner table.

Six to eight glasses of water should be taken daily. Very cold liquids are not particularly recommended.

Foods which contain the minerals, calcium and phosphorus, are essential for strong teeth. Milk, eggs, green vegetables and whole grains contain these minerals. Fish liver oils and egg yolks which contain vitamin D are also necessary for good teeth. Citrus fruits, such as oranges, contain vitamin C and benefit our teeth and gums. Some hard foods should be chewed daily to exercise the gums. Brushing the teeth after every meal and semi-annual visits to the dentist will help maintain our teeth in the best condition possible. Diseased teeth are not only a source of discomfort but may lead to more serious ailments such as heart trouble and rheumatism. Fluoridation of the water supply is recommended by health authorities to prevent tooth decay.

Heart disease takes more lives annually than any other illness. Obesity is an additional burden on the heart and blood vessels and thus makes us more susceptible to heart and circulatory ailments. Tobacco is forbidden for people who have heart trouble or high blood pressure because of its effect upon the arteries. Rest, loss of weight and peace of mind are an essential part of the treatment for people who have circulatory diseases.

Secondary anemia may be of nutritional origin. This is a condition in which the hemoglobin is low. Since red corpuscles need iron, foods containing this element are prescribed, such as liver, steak, eggs, green vegetables and fresh fruits. Rest and fresh air are also an important part of the cure.

POSTURE, BREATHING AND EXERCISE

Correct breathing and proper ventilation are necessary for good health. We should breathe through our nostrils because this warms the air and filters out the dust. Mouth breathing may be caused by adenoids or other nasal obstructions. Correct breathing means using as much lung tissue as possible. The deeper we breathe, the more our lungs fill up with air. Good posture is essential to proper breathing.

Exercise causes us to breathe more deeply and helps the heart, arteries, lungs and other internal muscles maintain a normal tone. It stimulates the muscles of the digestive tract and helps them push the food downward. Thus, constipation can be relieved by exercise. When we exercise our muscles, we cause the lymph to flow in our bodies and this aids in the nutrition of the tissues and the removal of wastes. Exercise should not, however, reach the point of fatigue.

Good ventilation provides for a constant source of fresh air. When indoors, the windows should be opened from the bottom to permit fresh, cool air to enter, and from the top, to allow stale, warm air to leave the room. Air in steam-heated houses in the wintertime is often too dry and should be moistened by keeping a receptacle of water in some part of the room.

Good posture, good breathing habits and healthful exercise go hand in hand in helping us maintain a healthy body.

PERSONAL HYGIENE

The daily bath is important to remove dirt and keep the skin fresh and clean. A warm bath, using a mild, white, unscented soap will relax a tired body and help to induce sleep. A cool shower will tone the muscles and will stimulate the circulatory and nervous systems. A warm bath is recommended at night before retiring as it will relax the body and induce sleep. A cold bath, on the other hand, will awaken the system.

The hair should be brushed every morning and evening in order to stimulate the circulation of the blood in the scalp. It should be kept clean by frequent shampooing. The hands should be washed before every meal, before preparing food, and after using the bathroom. Cleanliness, fresh and clean garments, deodorants, neatness and good grooming are all important assets in any vocation.

Proper elimination is necessary for the healthy functioning of the organism. Daily bowel movements will be aided by proper diet, exercise, freedom from tension and a sufficient quantity of liquids. Foods which contain bulk such as cereals, fruits and vegetables will help to prevent constipation. Laxatives are to be avoided.

Plenty of water will also help to flush out the kidneys and replace the liquid lost in perspiration. **Constant** backaches and burning during urination should be promptly reported to the physician. A routine urine analysis is an important part of every physical examination.

CARE OF THE FEET

Because the feet bear the weight of the body, we should wear proper shoes so that the body will not become fatigued so readily. A foot is an intricate arrangement of twenty-six bones. Many of these bones are delicate and slender. When we try to crowd these bones into small or ill-fitting shoes, it will result in trouble. Flat feet and fallen arches should be referred to a podiatrist for treatment. It is just as important to wash the feet daily as it is to cleanse any other part of the body. Wastes are excreted through the perspiration in the feet and since air does not circulate readily around our feet to evaporate the moisture, the poisons will tend to produce bad odors unless daily bathing care is practiced. Toe and foot exercises are advised in order to maintain arches in good condition and to maintain good circulation.

CARE OF THE EYES

The human eye is a very wonderful and delicate structure, yet it is subjected to all kinds of abuses. For example, reading in poor light or at twilight when the light is fading can produce severe eyestrain. It is just as bad to read when very bright light or sunlight is directly facing the eyes. Also, light should not be reflected from a very shiny surface. The best light for reading is afforded when it is reflected on the page from over the left shoulder. Reading in moving vehicles or when lying down may also cause a strain on the eyes. A person should visit an oculist at the first sign of discomfort, which may include headaches, squinting, sties and blurred vision. No drops of any kind or any other advertised substances should be put into the eyes. An oculist is the only qualified person who may prescribe something for the eyes. He will prescribe glasses or contact lenses if they are needed.

MENTAL HEALTH AND RECREATION

The mental health of an individual is very important. The mental, emotional, moral and spiritual health of an individual all contribute to the physical well-being of a person. Relaxation and amusement will afford relief from the physical and nervous tension which will necessarily accompany work. Mental fatigue can be worse than physical fatigue. The brain should not be forced to work when it has already been overworked. Hobbies and forms of recreation which do not tax the brain and nerves should be indulged in by those who work constantly with their brains. For example, gardening, swimming, boating, walking and many other such activities offer relaxation and health-giving exercise.

DRUG ADDICTION

As all patients have pain following surgery, it is common for narcotics to be prescribed by surgeons to relieve this pain. This serves a useful purpose when so ordered by a physician. However, whenever drugs are taken without a doctor's prescription, various types of dangerous drug addiction can follow.

Among these harmful drugs are cocaine, heroin, morphine, barbiturates, amphetamines and various hallucinogens. None of these should be taken without a doctor's prescription.

SLEEP AND REST

Sleep is very important, for during this time the poisons which have accumulated in the body are eliminated. At this time also our nerves and muscles relax, fresh red corpuscles are built up and added to the bloodstream, and wornout tis-

sues are repaired. Children need even more sleep than adults because growth is taking place. Eight or nine hours of sleep are required by the average adult person in order to keep his system in the best possible functional state.

CURRENT PUBLIC HEALTH PROBLEMS

Within the past few years we have seen a marked increase in the incidence of respiratory ailments in such conditions as emphysema and cancer of the lung. Although repeated chronic bronchitis may be a basic causative factor in emphysema, there is little doubt that smoking and air pollution may be the exciting causes.

Heart and circulatory ailments continue to be our greatest causes of death. For the first time, recent statistics have shown a lowering incidence of coronary heart attacks, probably due to the intensive public health educational programs in this area. As a result, the concerned individual is seeking closer medical supervision, following the dietary regime specified by the physician, keeping within his normal weight range, resting adequately, getting the prescribed amount of daily exercise and learning a more positive philosophy of life. New drug therapy in the form of antihypertensive drugs and tranquillizing medications, have doubtless proven to be factors in allaying anxieties and in contributing to the decrease in the incidence of coronary occlusions.

An educational program concerning these conditions must be kept before the public in newspapers, magazine articles and pamphlets, otherwise the competitiveness of the job fields of today drive many people into anxiety states.

CHECK YOURSELF

1. How many glasses of water should be taken daily?
   a) one to two
   b) three to four
   c) five to six
   d) six to eight
   e) over 8

2. What are essential for strong teeth?
   a) stone
   b) minerals
   c) fat
   d) tobacco
   e) sodium

3. To exercise the gums it is necessary to chew ... .
   a) soft foods
   b) liquids
   c) stones
   d) hard foods
   e) chewing gum

4. What disease takes more lives than any other illness?
   a) cancer
   b) diabetes
   c) heart diseases
   d) leukemia
   e) fractures

5. Tobacco has direct effect upon the ... .
   a) aorta
   b) veins
   c) capillaries
   d) arteries
   e) lungs

6. The blood cholesterol seems to be a factor in ... .
   a) cancer
   b) coronary heart disease
   c) diabetes
   d) tuberculosis
   e) leukemia

7. Secondary anemia may be of … origin.
   a) nutritional
   b) respiratory
   c) nervous
   d) metabolic
   e) cardiac

8. Constipation can be relieved by ... .
   a) water
   b) exercise
   c) hard foods
   d) hot water bottle
   e) pain killer

9. A foot is an intricate arrangement of … bones.
   a) 18
   b) 20
   c) 22
   d) 26
   e) 28

10. The human eye is subjected … all kinds of abuses.
   a) at
   b) to
   c) for
   d) in
   e) by

11. Reading can produce severe eyestrain:
a) at noon
b) at night
c) in twilight
d) in the morning
e) at daybreak

12. Body tissues are restored during ... .
a) sleep
b) exercise
c) work
d) swimming
e) running

13. Reduction of the quantity of the oxygen-carrying pigment hemoglobin in the blood is … .
a) leukemia
b) hemophilia
c) anemia
d) hematuria
e) hyperglycemia

14. A condition in which bowel evacuations occur frequently is … .
a) vomiting
b) dehydration
c) diarrhea
d) constipation
e) nausea

15. The science of health and the study of ways of preserving it is ... .
a) physiology
b) hygiene
c) pathophysiology
d) anatomy
e) therapy

16. ... of the water supply is recommended.
a) purification
b) siliconization
c) vitaminization
d) ozonization
e) fluoridation

17. Tobacco is forbidden for people with... .
a) kidney trouble
b) surgical diseases
c) heart trouble
d) eye diseases
e) stomach ulcer

18. The mouth breathing may be caused by ... .
a) pharyngitis
b) laryngitis
c) foreign body
d) adenoids
e) tonsillitis

19. ... help to replace liquid lost in perspiration.
a) Fresh juice
b) Plenty of water
c) Alcohol
d) Plenty of tea
e) Warm milk

20. Flat feet and fallen arches should be treated by ... .
a) pediatrician
b) physician
c) surgeon
d) traumatologist
e) podiatrist

PART II

Lesson 10
THE HUMAN BODY

Grammar:
• ***The Passive Voice***

Exercise 1. Practice the pronunciation:
forehead ['fɔrid], tongue [tʌŋ], breathe [bri:ð], surface ['sə:fis], toe [təu], injury ['inʤ(ə)ri], thumb [θʌm].

Exercise 2. Vocabulary:
to consist of — складатися
to include — включати
to serve — служити
to grow — рости, зростати
to breathe — дихати
to be located — розташовуватися
to be called — називатися
to connect — з'єднувати
to be composed — бути складеним
to support — підтримувати
to protect — захищати
to be covered — бути покритим
forehead — лоб
thumb — великий палець
tongue — язик
surface — поверхня
injury — пошкодження
toe — палець ноги

Exercise 3. Read and translate the text:

The Human Body

The principal parts of the human body are the head, the trunk and limbs (extremities).

The head consists of 2 parts: the skull which contains the brain and the face including the forehead, the eyes, the nose, the mouth, the cheeks, the ears and the chin.

Each eye has the eyelids and the eyelashes that grow along the edge of the eyelids. There are the eyebrows over our eyes. The eyes serve as the organ of sight (vision).

The nose is the organ of smell through which we breathe.

The ear includes 3 principal parts: the external ear, the middle ear and the internal ear.

The mouth has 2 lips: an upper and a lower lip. The tongue which is the organ of taste, teeth and hard and soft palates are located in the mouth.

The head is connected with the trunk by the neck.

The upper part of the trunk is the chest. The principal organs in the chest are the lungs, the heart and the esophagus (gullet).

The lower part of the trunk called the abdomen consists of the stomach, the liver, the spleen, the intestines, the kidneys, the gallbladder and the bladder.

The surface of the body from the neck to the buttocks is called the back. The waist is the narrow middle part of the body above the hips.

When we speak of the upper extremity we mean the arm. The upper extremity connected with the chest by the shoulder consists of the arm, the forearm, the elbow, the wrist and the hand. We have 5 fingers on each hand. A short finger set apart from the other four is called the thumb.

The lower extremity called the leg consists of the hip (thigh), the knee, the calf, the ankle and the foot. The foot is composed of the toes, the heel, the sole and the arch. The nail is a hard part at the end of the toe and finger.

The framework of bones called the skeleton supports the soft parts and protects the organs from injury.

The bones are covered with muscles.

The body is covered with the skin.

POST-TEXT ASSIGNMENT

Exercise 4. Answer the following questions:
1. What are the principal parts of the human body?
2. What does the head consist of?

3. What does the face include?
4. Where are the teeth, the tongue, the palates located?
5. What is the organ of taste?
6. Where do the eyelashes grow?
7. What do we breathe through?
8. What is the head connected with the trunk by?
9. What are the principal organs in the chest?
10. What are the principal organs in the abdomen?
11. What parts does the upper extremity consist of?
12. What parts does the lower extremity consist of?
13. What is the nail?
14. What supports the soft parts and protects the organs from injury?
15. What are the bones covered with?
16. What is the body covered with?

Exercise 5. Translate the following words and word combinations:
1. вузька середня частина тіла
2. орган зору
3. по краях повік
4. сідниці
5. орган нюху
6. нижня кінцівка
7. поверхня тіла
8. нирки і селезінка
9. тверде і м'яке піднебіння
10. захищати органи від пошкодження
11. мозок
12. стегно
13. спина
14. брови
15. коліно і щиколотка
16. зап'ясток і кисть
17. серце і легені
18. ступня
19. шлунок і кишечник
20. бути покритим шкірою

Exercise 6. Fill in the blanks with the words from the text:
1. ... is the front part of the head.
2. ... is the part of the body we stand on.
3. We have 5 ... on each foot.
4. ... is a part of the face with which we smell.
5. We have 2 ... around our mouth.
6. ... is the part of the face we hear with.
7. ... is a line of hairs over each eye.
8. ... is the part of the face under our mouth.
9. ... is the hard part at the end of a finger or toe.
10. ... is the lower limb.
11. ... is the inside of the hand between our fingers and our wrist.
12. ... is the narrow middle part of the body above the hips.

Exercise 7. Complete the sentences:
1. The skull contains ... .
2. The face consists of ... .
3. The ear consists of ... .
4. The mouth has 2 lips: ... .
5. The nose is the organ through which ... .
6. The head is connected with the trunk by ... .
7. The chest contains ... .
8. The abdomen contains ... .
9. The back is the surface of the body from ... .
10. The part of the body from the shoulder to the wrist is called ... .
11. We see with ... .
12. A short finger set apart from the other four is called ... .
13. The framework of bones is called ... .
14. The upper extremity consists of ... .
15. The lower extremity consists of ... .

Exercise 8. Fill in the blanks with prepositions:
1. There are the eyebrows ... our eyes.
2. The nose is the organ ... smell ... which we breathe.
3. The head is connected ... the trunk ... the neck.
4. The teeth are located ... the mouth.
5. We have 5 fingers ... each hand.
6. The skeleton protects the organs ... injury.
8. The body is covered ... the skin.

CHECK YOURSELF

1. The pupil is part of the ... .
a) ear
b) stomach
c) eye
d) hand
e) trank

2. The sole is part of the ... .
a) hand
b) foot
c) eye
d) ear
e) chest

3. The calf is part of the ... .
a) leg
b) arm
c) chest
d) head
e) abdomen

4. The wrist is part of the ... .
a) hand
b) foot
c) eye
d) ear
e) heart

5. The iris is part of the ... .
a) hand
b) foot
c) eye
d) ear
e) chest

6. The heel is part of the ... .
a) hand
b) foot
c) eye
d) breast
e) abdomen

7. The palm is a part of the ... .
a) hand
b) foot
c) ear
d) breast
e) eye

8. The thumb is part of the ... .
a) hand
b) foot
c) head
d) chest
e) abdomen

9. The ancle is part of the ... .
a) arm
b) leg
c) head
d) breast
e) face

10. The kidneys are located in the ... .
a) abdomen
b) chest
c) arm
d) leg
e) face

Lesson 11

THE ODESSA STATE MEDICAL UNIVERSITY

Grammar:
• ***Simple Tense, Active and Passive***

Exercise 1. Practice the pronunciation:

outstanding [aut'stændiŋ], personality [pə:sə'næliti], vary ['vɛəri], status ['steitəs], association [ə'səusi'eiʃn], decree [di'kri:], enrolment [in'rəulmənt], specialization [speʃəlai'zeiʃ(ə)n], technician [tek'niʃ(ə)n], foreign ['fɔrin], pharmaceutist [fa:mə'sju:tist], personnel [pə:sə'nel], research [ri'sə:tʃ], effort ['efət], applied [ə'plaid], intellectual [inti'lektjuəl].

Exercise 2. Vocabulary:

outstanding personality — видатна особа
higher educational institution — вищий навчальний заклад
staffed with — укомплектований
teaching personnel — викладацький склад
advanced training — продвинутий етап навчання
research work — дослідницька робота
applied investigations — прикладні дослідження
to be accommodated — жити (мати оселю)
physical and intellectual development — фізичний та інтелектуальний розвиток
thanks to — дякуючи
trend — напрям
enrolment of students — прийом студентів

Exercise 3. Give Ukrainian equivalents of the following word combinations:

Great surgeon, International Association of Universities, each year, at present, well-known scientists, important trends, different fields of medicine, foreign students, all necessary conditions.

Exercise 4. Remember the numerals:

25, 14, 248, 44, 2833, 781, 7583, 17, 354, 1428, 177, 991, 1236, 15864, 7254, 1st, 18th, 22nd, 24th.

Dates: 1941, 2003, 1567, 1652, 1961, 1848, 2000, 1593, 1283, 1999.

Time: 5.30; 7.10; 8.50; 1.25; 6.15; 9.30; 4.25; 1.35; 9.40, 11.50, 10.07.

Exercise 5. Read and translate the text:

The Odessa State Medical University

The Odessa State Medical University was founded in 1900 as the Medical faculty of the Novorossiysk (now Odessa) University thanks to the efforts of the outstanding personality and great surgeon Nikolay Ivanovich Pirogov. In 1920 the Medical Faculty became an independent higher educational institution and was called the Medical Academy.

In 1921 the Medical Academy was reformed into the Medical Institute. The status of the University was given to the Institute by the Decree of the Cabinet of Ministers of Ukraine on August 29, 1994.

Now the Odessa State Medical University is a member of the International European Association of Universities. It is one of the largest higher medical schools in Ukraine staffed with highly qualified medical and teaching personnel.

The enrolment of students varies each year but it is about 710 at present. There are 3 faculties at the University: medical, stomatological and pharmaceutical. There are also departments for preparation of dental technicians and advanced training of nurses.

More than 4.5 thousand students including foreign students study at the Medical University.

The University trains specialists for different fields of medicine. The research work is concentrated on the most important trends of fundamental and applied investigations. Students work in the field of science at 59 departments of the University together with well-known scientists.

Students and postgraduates are accommodated in 6 hostels. The University has all necessary conditions for physical and intellectual development of students.

POST-TEXT ASSIGNMENT

Exercise 6. Make the sentences interrogative and negative:

1. The Medical Faculty became an independent higher educational institution.
2. The Medical Academy was reformed into the Medical Institute.
3. The enrolment of students varies each year.
4. The University trains specialists for different fields of medicine.
5. Students and postgraduates are accommodated in 6 hostels.

Exercise 7. Turn the sentences into the Past and Future Simple:

1. There are three faculties at the University.
2. The University trains specialists for different fields of medicine.
3. The research work is concentrated on the most important trends of fundamental and applied investigations.
4. The Odessa State Medical University is a member of the International European Association of Universities.
5. It is one of the largest higher medical schools in Ukraine staffed with highly qualified medical and teaching personnel.

Exercise 8. Choose the correct predicates given in brackets:

1. Who … home now? Who usually … home in the evening (returns, is returning)?
2. Our doctor … the operation a week ago. Our doctor … the operation from 10 till 12 a. m. yesterday (performed, was performing).
3. I … a corpse at 2 p. m. tomorrow. I … a cadaver tomorrow (shall dissect, shall be dissecting).
4. Who … for the life of this patient now? Who usually… for the life of the patients (fights, is fighting)?
5. We … examination twice a year. A doctor … examination of the patients now (take, is taking).

Exercise 9. Find the Ukrainian equivalents:

1. enrolment	a. сьогодні
2. research work	b. незалежний
3. to train	c. лікар
4. independent	d. набір (до навчального закладу)
5. personnel	e. галузь медицини
6. efforts	f. персонал
7. personality	g. особистість
8. physician	h. навчати
9. at present	i. зусилля
10. field of medicine	j. дослідна робота

Exercise 10. Complete the sentences:

1. The Odessa State Medical University is a member of ... .
2. The enrolment of students is ... .
3. Students and postgraduates are accommodated in ... .
4. More than 4.5 thousand students including foreign students ... .
5. The University trains specialists ... .

Exercise 11. Answer the questions:

1. When was the Medical faculty of Novorossiysk University established?
2. How many faculties are there at the Medical University now?
3. What is the enrolment of students now?
4. What specialists does the Odessa State Medical University train?
5. Where do the students live?

Exercise 12. Translate into English:

1. Сьогодні ОДМУ є одним з найбільших медичних центрів в Україні.
2. В ОДМУ навчаються іноземні студенти з різних країн.
3. Студенти займаються наукою на 59 кафедрах університету.
4. Медичний університет готує фахівців у різних галузях медицини.
5. Наукова робота в нашому університеті сконцентрована на найбільш важливих галузях медицини — як основних, так і прикладних.

Exercise 13. Make up 5 questions to the text and answer them.

Exercise 14. Give a brief outline of the Odessa State Medical University history.

CHECK YOURSELF

1. The Odessa State Medical University was founded in ... .
   a) 1890
   b) 1900
   c) 1902
   d) 1905
   e) 1921

2. The status of the University was given to the Institute in ... .
   a) 1900
   b) 1980
   c) 1991
   d) 1994
   e) 1998

3. Now the OSMU is a member of ... .
a) European Association of Phisicians
b) European Union
c) European Association of Students
d) International European Association of Universities
e) The World Health Organization

4. The OSMU is one of the … higher medical schools in Ukraine.
a) smallest
b) fewest
c) largest
d) most
e) quickest

5. In 1921 the Medical Academy … into the Medical Institute.
a) is reformed
b) was reformed
c) reformed
d) has reformed
e) was reforming

6. The University … specialists for different fields of medicine.
a) is training
b) train
c) has trained
d) trains
e) has been training

7. The Odessa State Medical University is staffed … highly qualified medical and teaching personnel.
a) by
b) in
c) with
d) at
e) for

8. The research work is concentrated … the most important trends of fundamental investigations.
a) by
b) with
c) at
d) for
e) on

9. Students work in the filed of science … 59 departments of the University.
a) in
b) on
c) at
d) with
e) for

10. The enrolment of students is about 710 … present.
a) in
b) at
c) by
d) on
e) for

Lesson 12

PRACTICE OF PHARMACY

Grammar:
• ***Simple Tense***

Exercise 1. Practice the pronunciation:

substance [ʼsʌbstəns], medicine [ʼmedsɪn], require [rɪʼkwaɪə], botany [ʼbɔtənɪ], pharmacognozy [ˌfaːməʼkɔːgnəsɪ], pharmacopoeia [ˌfaːməkəʼpiːə], purity [ʻpjuərɪtɪ], moisture [ʼmɔɪstʃə], deterioration [dɪˌtɪərɪəʼreɪʃ(ə)n], exposure [ɪkʼspəuʒə].

Exercise 2. Vocabulary:

to deal with — мати справу, займатися
to compound — змішувати, сполучати
to designate — позначати
moisture — волога
to describe — описувати
to require — мати потребу, вимагати
to dispense — готувати (ліки)
deterioration — ушкодження
to store — берегти, зберігати
exposure — виставлення
to fail to attract moisture — втрачати властивість, притягаючи вологу

Exercise 3. Translate the following word combinations into Ukrainian:

Chemical substance, preservation of drugs, medicinal substances, property of matter, basic principles, physical properties, to attract moisture, official description, test of purity, method of storing, to prevent deterioration.

Exercise 4. Read and translate the text:

Practice of Pharmacy

Pharmacy is the science which deals with medicinal substances. It speaks not only of medicines and the art of compounding and dispensing them, but also of their combination, analysis and standardization.

The word "pharmacy" is also used to designate the place where medicines are compounded, dispensed and sold. The title "pharmacist" means a person who is scientifically and professionally capable of working in the practice of pharmacy.

The compounding of medicines usually requires the scientific combination of two or more ingredients as prescribed by a physician, but dispensing may only require the transfer of products into a prescription container. To become a pharmacist one should achieve knowledge of different subjects, such as physics, chemistry, botany, etc.

Physics is that science which studies the phenomena associated with matter in general, especially its relation to energy. It generally studies constitution and property of matter, mechanics, sound and light, heat, optics, electricity and magnetism.

Chemistry is that science which explains the composition of matter and the transformations which it undergoes. It has many divisions such as general chemistry, dealing with basic principles and inorganic substances, organic chemistry, or the chemistry of carbon compounds, qualitative analysis, quantitative analysis, physical chemistry, biochemistry and many others.

Botany is the science that studies plants with reference to their structure, functions and classification.

Pharmacognozy is the science which includes the history, source, cultivation, collection, preparation, distribution, identification, composition, purity and preservation of drugs of vegetable and animal origin.

Pharmacology is defined as the science of drugs.

A pharmacopoeia is a book containing a list of medicinal substances with description, tests and formulas for preparation. The pharmacopoeial names of chemical substances do not always represent their chemical composition.

The official description usually includes physical properties such as colour, crystalline and other forms, odour, taste and the result of exposure to air. It is important for the pharmacists

to know whether chemicals are stable or whether they fail to attract moisture. The pharmacopoeia describes also the proper method of package and storage to prevent or retard deterioration.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the questions to the text:
1. What does pharmacy deal with?
2. What does the word "pharmacy" designate?
3. Why is it necessary for a pharmacist to achieve knowledge of different subjects?
4. What subjects should a pharmacist know?
5. What does an official description consist of?

Exercise 6. Put questions to the words in italics:
1. Medicines are compounded, dispensed and sold at *pharmacies.*
2. It is important for the pharmacist to know *whether the chemicals are stable.*
3. Pharmacy deals with *medicinal substances.*
4. The official description usually includes *physical properties.*
5. The compounding of medicines usually requires *the scientific combination of two or more ingredients.*

Exercise 7. Find the definition of the following terms:
1. pharmacy; 2. pharmacist; 3. physics; 4. chemistry; 5. botany; 6. pharmacognozy; 7. pharmacology; 8. pharmacopoeia.

Exercise 8. Insert suitable words:
1. The word "pharmacy" is also used … the place where medicines are cold.
2. General chemistry deals with … principles and … substances.
3. Pharmacognozy includes the history and preservation of drugs of … origin.
4. The … names of chemical substances do not always represent their chemical composition.
5. The official description usually includes its … properties.
6. The reaction to litmus is an … test of identity or purity.

Exercise 9. Give English equivalents of the following word combinations:
Спосіб складання лікарських речовин; спосіб розфасовки лікарських речовин; знання різних предметів; структура речовини; склад речовини; фізичні характеристики; фізичні явища; збереження ліків; хімічні речовини; список ліків.

Exercise 10. Translate into English:
1. Фармація — це наука, яка займається вивченням лікарських речовин.
2. Аптека — це місце, де змішуються, розфасовуються і продаються ліки.
3. Складання ліків вимагає наукового з'єднання кількох компонентів.
4. Фармацевт повинен мати знання з різних дисциплін.
5. Фармакологія — це наука про ліки.
6. Фармакопейний опис складається з фізичної характеристики і структури ліків.

CHECK YOURSELF

1. Pharmacy is the science which deals with ... .
a) basic principles
b) inorganic substances
c) internal diseases
d) medicinal substances
e) structure of the plants

2. Pharmacist is a person who is capable of working professionally in ... .
a) physics
b) practice of pharmacy
c) chemistry
d) dentistry
e) biology

3. Pharmacology is defined as ... .
a) the science of body functions
b) the science of body structure
c) the science of womens diseases
d) the science of historical events
e) the science of drugs

4. A pharmacopoeia is a … containing a list of medical substances.
a) manuscript
b) novel
c) manual
d) book
e) dictionary

5. The official description of chemical substance usually includes its ... .
a) taste
b) biological properties
c) physical properties
d) smell
e) Latin and Greek name

6. Physics is the science which studies the phenomena associated ... matter in general.
a) by
b) with
c) in
d) at
e) about

7. Botany in the science that studies plants with reference ... their structure, functions and classification.

a) at
b) with
c) to
d) by
e) for

8. It is important ... the pharmacists to know whether chemicals are stable or not.

a) to
b) at
c) by
d) with
e) for

9. The pharmacopoeia also describes the proper method ... package and storage of drugs.

a) by
b) with
c) on
d) of
e) for

10. The pharmacopoeia contains a list of medicinal substances ... description, tests and formulas.

a) on
b) with
c) for
d) by
e) in

Lesson 13
AT A PHARMACY

Grammar:
• ***Simple Tense. Personal Pronouns***

Exercise 1. Practice the pronunciation:
prescribe [prɪs'kraɪb], prescription [prɪs'krɪpʃn], injection [ɪn'dʒekʃ(ə)n], signature ['sɪgnɪtʃə], poisonous ['pɔɪznəs], overdosage [,əuvə'dəusɪdʒ], adverse ['ædvə:s].

Exercise 2. Vocabulary:
to have a prescription made up — виготовити ліки за рецептом
to stick a label on smth. — наклеїти етикетку на
drugs for injections (internal, external use) — ліки для ін'єкцій (внутрішнього, зовнішнього використання)
tablet for headache — таблетка від головного болю
prescription for smth — рецепт для
drug administration — вживання ліків
drug action — дія ліків
dose — доза, прийом
dosage — дозування, доза, норма
overdosage — передозування
ointment — мазь
powder — порошок
adverse — несприятливий
to relieve pain — полегшувати біль
irritation — подразнення
indigestion — розлад травлення

Exercise 3. Read and translate the following words and word combinations:
1. chemist: to work as a chemist, the chemist's, to work at chemist's, at a chemist's department;
2. label: labels of three colours, a white label, a yellow label, a bluelabel, to stick a label on a bottle, the dose of the drug is indicated on a label;
3. powder: powders for cough, powders for headache, take these powders three times a day, these are the powders for internal use;
4. to sponge: to sponge the skin with alcohol, to sponge the skin before injection;
5. to rinse: to rinse the mouth, to rinse after meals, to rinse the hands with alcohol before the operation.

Exercise 4. Read and translate the text:

At a Pharmacy

When you are ill, you consult a doctor. He prescribes you the treatment and writes out a prescription. Then you must go to the chemist's to have all the prescriptions made up.

There are usually two departments in any large chemist's: the chemist's department and the prescription department. At the chemist's department one can have medicine right away, other drugs have to be ordered at the prescription department.

At the chemist's all drugs are kept in drug cabinets. Every small box has a label with the name of the medicine stuck on it. There are labels of three colours: white ones are stuck to indicate drugs for internal use; yellow ones indicate drugs for external use, and blue ones indicate drugs for injections. The dose to be taken is usually indicated on a signature or a label. As a rule, the directions for the administration of a drug are written on the signature. It is necessary for chemists, nurses, doctors, as well as patients themselves, so that they won't confuse different remedies, because some of them are poisonous and their overdosage may cause adverse reactions, and sometimes even death.

In the drug cabinets we can see small parcels of different powders: ampoules of glucose and camphor used for intravenous and intramuscular injections: tubes of healing ointments, which are rubbed in to relieve pain or skin irritation; different pills for internal use; sedatives and tonics, such as bromide, vitamins; laxatives administered orally in case something is wrong with the patient's stomach because of indiges-

tion; sleeping pills; bottles of iodine and of brilliant green and so on.

At this chemist's shop one can also get drugs of all kinds as well as hot water bottle, medicine droppers and many other things which are quite necessary for medical care.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the following questions:

1. Whom do you consult when you are ill?
2. What does the doctor do after examining the patient?
3. Where do you go with the physician's prescription?
4. How many departments are there in the chemist's shop?
5. At what department do some drugs have to be ordered?
6. Where are all drugs kept?
7. What labels are there on each small box of medicine, tube or a box?
8. What must be indicated on the label and why?
9. What can the overdosage of medicine cause?
10. What can be also get at the chemist's shop?

Exercise 6. Fill in the blanks with prepositions or adverbs where required:

1. Have yon any pain ... the stomach? — Yes. I have sometimes. Something is wrong ... it.
2. The district doctor wrote ... a prescription ... some tablets.
3. As my brother was having a very high temperature the doctor gave him several injections ... bicillin to keep the fever.
4. The chemist wrote the name ... the drug ... the label and stuck it ... the bottle.
5. I'll prescribe you a tube ... healing ointment. Please, rub it ... to relieve the skin irritation.
6. What is the matter ... your friend?
7. Please, have this prescription made ... the chemist's ... your way ... the University.
8. The nurse ... duty gave an injection ... morphine ... the patient, who was hospitalized ... a poor condition and had a severe pain ... his abdomen.
9. Be careful! This drug is only ... external use. And besides, its overdosage may cause an irritation ... the skin.

Exercise 7. Find substitutes for the following words and word combinations:

1. The department where we can have the medicine right away.
2. The department where we order some medicine.
3. A small slip of paper on which the name of the medicine is written.
4. Drugs taken orally.
5. Unfavourable reaction.
6. The drugs which may cause an adverse reaction or sometimes even death.
7. The method of introducing some medicine into the vein.
8. The method of introducing some medicine into the muscle.
9. A substance made of oil or fat and applied on the skin to heal wounds.
10. The medicine which is prescribed in case of sleeplessness.
11. To mix the medicine in the bottle well.
12. A small instrument used for dropping medicine.
13. Neither a cold nor a hot place.

a. intramuscular injection
b. prescription department
c. adverse reaction
d. poisonous drugs
e. chemist's department
f. ointment
g. label
h. cool
i. dropper
j. intravenous injection
k. to shake
l. drugs for internal use
m. sleeping pill

Exercise 8. Open the brackets and put the Personal Pronouns in the required form:

1. Don't confuse different remedies because some of (they) are poisonous. 2. When the physician finished the physical examination of (I) sister, he prescribed (she) some pills, powders and an antiseptic mouth wash for tonsillitis. 3. The patient was in a very poor condition. The nurse gave (he) an injection of camphor and coffeine. 4. Please, take these tablets. They will give (you) an instant relief. 6. Have you any sleeping draughts? — Yes, we have a lot of (they). Which of (they) do you want to have? 7. During (he) reception hours Dr. Brown saw five cases. He examined (they) thoroughly.

Exercise 9. Find English equivalents of the following word combinations and sentences:

Приймати столову ложку цієї мікстури; у хворого щось не у порядку зі шлунком; передозування може викликати несприятливі реакції; мікстура від кашлю; іноді передозування може викликати навіть смерть; замовити ліки за рецептом; зберігати ліки в прохолодному місці; необхідні для медичного догляду; лікувальні мазі, які втираються, щоб зняти біль або роздратування шкіри; приймати ліки три рази на день.

Exercise 10. Make up your own situations using the following words and word combinations:

1. At the chemist's department; to have the medicine at once; pills; powders; to indicate; the dose.

2. At the prescription department, to have a prescription made up; to take a tablespoonful of; internal use; a cough mixture; to administer.

3. To sponge the skin; alcohol, to rinse the hands; to give the injections; a bottle of penicillin, novocaine.

4. A drug cabinet; a box; a bottle; to stick a label on; to indicate; a poisonous drug; directions for administration.

Exercise 11. Suggested topics for oral narration:

Describe the chemist's where you usually have your prescriptions made up.

Make up a dialogue between a customer and a chemist.

Give your directions for administration of a cough mixture to a patient.

CHECK YOURSELF

1. When you are ill, you ... a doctor.
a) instruct
b) see
c) consult
d) go
e) recommend

2. He prescribes you the treatment and writes ... prescription.
a) in
b) down
c) out
d) by
e) with

3. Then you must go to the chemist's department ... all the prescriptions made up.
a) to do
b) to have
c) to be
d) to make
e) to write out

4. There are usually ... departments in any large chemist's.
a) two
b) three
c) four
d) five
e) six

5. At the chemist's department one can have medicines ... .
a) in some time
b) right away
c) next day
d) soon
e) then

6. At the chemist's all the drugs ... in the drug cabinets.
a) keep
b) keeps
c) are kept
d) is kept
e) kept

7. Every small bottle has a label with the name of the medicines stuck ... it.
a) on
b) in
c) at
d) for
e) of

8. There are labels of ... colours.
a) two
b) three
c) four
d) five
e) six

9. ... do you consult when you are ill?
a) What
b) When
c) Where
d) Whom
e) Whose

10. How ... departments are there in the chemist's shop?
a) much
b) long
c) many
d) old
e) few

Lesson 14

PROGRESS OF CHEMISTRY

Grammar:
• ***The Future Simple Tense***

Exercise 1. Practice pronunciation:
to accept [ək'sept], to attach [ə'tætʃ], to own [əun], available [ə'veɪlbl], carbon ['ka:bən], convenient [kən'vɪnɪənt], survey [sə'veɪ], weight [weɪt], distinguish [dɪs'tɪŋgwɪʃ].

Exercise 2. Vocabulary:
to accept — приймати
to affect — впливати, вражати
to attach — прикріплювати
exciting — хвилюючий
to provide — забезпечувати
carbon — вуглець
slightly — злегка
to investigate — досліджувати
solution — розчин, рішення
convenient — зручний
survey — огляд
to own — володіти
do deal with — мати справу

Exercise 3. Match the following English word combinations with the Ukrainian ones:

1. attach	1. вуглець
2. solution	2. злегка
3. carbon	3. огляд
4. survey	4. забезпечувати
5. slightly	5. прикріплювати
6. to provide	6. розчин

Exercise 4. Find substitution of the following word combinations:
1. Science of the elements and compounds and their laws of combination and change resulting from interactions between substances in contact solution.
2. Solving or means of solving a problem or difficulty.
3. Quality or extent or manner of being strong.

Exercise 5. Translate the following sentences:
1. There will be a lot of people at the lecture.
2. This year will be accepted as a year of appearance of physical chemistry.
3. He will be out tomorrow afternoon.
4. We will make a short survey of the history of chemistry.
5. Inflammation will affect the internal organs.
6. He will remember us for ever.
7. There will be a lot of work to do tomorrow.
8. A modern chemist will use all available methods of investigation.

Exercise 6. Read and translate the text:

Progress of Chemistry

We will define chemistry today as the study of formation, composition, structure and reactions of the chemical elements and their compounds. Many will say that this is not the definition of chemistry but inorganic chemistry.

A modern chemist slightly distinguishes between inorganic, organic and physical chemistry. He will attach organic groups to a metal atom if it is more convenient for investigation; he will use any of the available methods of physical chemistry, if necessary for the solution of his problems.

Two facts helped the development of inorganic chemistry: the growth of the theoretical techniques of quantum mechanics and new optical, electrical and magnetic techniques of physical measurement by which they can be investigated. For a full understanding of the way in which these achievements affected the development of inorganic chemistry, we'll make a short survey of the history of the subject.

We will start with 1828, the year in which Wohler, the pioneer of organic synthesis, showed the interrelationship between inorganic and or-

ganic chemistry. For the next fifty years inorganic and organic chemistry progressed side by side.

The main work in inorganic chemistry dealt with the preparation of new compounds and the development of methods of analysis. Great number of new compounds were described and important work was carried out on the determination of atomic weights. At the same time organic chemistry developed into a system in which structure could be determined. Organic chemistry constantly attracted workers of inorganic chemistry. The year 1887 may be accepted as the date of appearance of physical chemistry.

People say that facts give a science its substance, but it is the theory, which provides its strength. It is owing to the development of the theory that chemistry has before it such exciting prospects at the present time.

POST-TEXT ASSIGNMENT

Exercise 7. Skim through the text and find the sentences expressing its main idea.

Exercise 8. Answer the followings questions:

1. What is chemistry?
2. What will many say about this definition?
3. What facts helped the development of inorganic chemistry?
4. What are the main branches of chemistry today?
5. Why will we make a short survey of the subject?
6. What did Wohler show in 1828?
7. How did organic and inorganic chemistry progress?
8. What work was carried out?
9. When did physical chemistry appear?
10. What system did organic chemistry develop?
11. What do people say about facts and the theory?
12. What prospects does chemistry have at the present time?

Exercise 9. Translate the following word combinations:

Definition of chemistry, interrelationship between inorganic and organic chemistry, available methods, inorganic chemistry, new compounds, optical techniques, convenient metal, quantum mechanics, physical measurements, full understanding.

Exercise 10. Find English equivalents for the following word combinations in the text:

Визначення хімії; зручніше; доступні методи; розв'язання проблем; квантова механіка; повне розуміння; короткий огляд; взаємовідношення; велика кількість; визначення атомного віку; саме в той час; саме та теорія.

Exercise 11. Find sentences in which the following words and word combinations are used in the text:

To define; modern chemist; the solution of the problem; to affect the development; to show the interrelationship; to deal with; to carry out, to develop into a system; to attract workers; it is owing.

Exercise 12. Compose sentences, using the following word and word combinations:

To define, the definition of, to distinguish between, to be more convenient, the growth of, to make a short survey, to deal with, to describe, at the same time, to provide.

Exercise 13. Form adverbs from the following adjectives; translate it:

Model: slight — slightly

Full, short, main, great, present, natural, nice, proud, definite, easy, historical, glad.

Exercise 14. Finish the sentences.

1. Chemistry today is ... .
2. A modern scientist slightly distinguishes between ...
3. Two facts helped to ... .
4. In 1828 Wohler showed ... .
5. Inorganic and organic chemistry progressed ... .
6. The year 1887 is the date of ... .
7. Facts give a science ... .
8. The theory provides ... .

Exercise 15. Speak about Progress of Chemistry.

Exercise 16. Look through the text and write a summary.

Exercise 17. Read and translate the additional text:

Mercury and its Compounds

The principal ore of mercury is the sulphide, cinnabar, and from it most of the mercury of commerce is extracted. The free metal sometimes occurs in its ores in the form of minute globules.

Mercury forms two series of salts — the mercurous salt, derived from mercurous oxide, and the mercuric salts, derived from mercuric oxide.

Tests for Mercury. 1) Many mercury compounds sublime unchanged when heated in a dry tube. 2) Solutions of mercurous salts give

with dilute hydrochloric acid, a white precipitate of mercurous chloride. The precipitate is insoluble in boiling water (distinction from lead), and turns black, but does not dissolve, when treated with ammonia solution (distinction from silver). 3) Solutions of mercuric salts give, with hydrogen sulphide, a black precipitate of mercuric sulphide. The precipitate is insoluble in nitric acid, but is oxidized and dissolved by a mixture of concentrated nitric and hydrochloric acids.

For purification, mercury is either distilled from iron retorts or shaken with 5 per cent nitric acid, for removing traces of lead, copper, and other metals. Mercury which contains metallic impurities tarnishes in air owing to the formation of their oxides.

Mercury is very heavy, its weight per ml being about 13.55. It boils at 357°, and solidifies at –39° to a lead-like mass. It does not undergo oxidation in air at ordinary temperatures, but tarnishes in air containing traces of hydrogen sulphide owing to the formation of a superficial film of sulphide. It is not acted upon by hydrochloric acid, dilute or concentrated; but it dissolves in concentrated sulphuric acid, with the evolution of sulphur dioxide and formation of mercuric sulphate.

It dissolves in cold, fairly dilute, nitric acid to form mercurous titrate, but with excess of hot, concentrated acid, mercuric nitrate is produced.

Mercury alloys with many other medals form liquid of solid amalgams. Some amalgams are used in dentistry.

CHECK YOURSELF

1. The pioneer of organic synthesis was ... .
a) Pavlov
b) Sechenov
c) Wohler
d) Duchenne
e) Pasteur

2. Physical chemistry appeared in ... .
a) 1828
b) 1880
c) 1883
d) 1887
e) 1900

3. Inorganic chemistry deals with ... .
a) formation of chemical elements
b) investigation of the chemical elements
c) structure of the chemical elements
d) the preparation of new compounds
e) reaction of new compounds

4. A modern chemist slightly ... between inorganic, organic and physical chemistry.
a) distinguish
b) distinguishes
c) distinguished
d) has distinguished
e) is distinguishing

5. People say that facts ... a science its substance.
a) give
b) is given
c) gave
d) is giving
e) has given

6. Wohler showed the interrelationship ... inorganic and organic chemistry.
a) in
b) between
c) by
d) with
e) without

7. Important work was carried out ... the determination of atomic weights.
a) in
b) at
c) on
d) for
e) into

8. We will make a short survey ... the history of chemistry.
a) at
b) of
c) in
d) over
e) on

9. For many years inorganic and organic chemistry ... side by side.
a) are progressing
b) progressed
c) were progressing
d) develop
e) will develop

10. Great number of ... compounds were described.
a) new
b) old
c) simple
d) complex
e) mixed

Lesson 15
WATER

Grammar:
- ***Present Indefinite Active***
- ***Present Continuous Active***

Exercise 1. Practice pronunciation:

amount [ə'maunt], artificial [artɪ'fɪʃ(ə)l], average ['ævərɪdʒ], constituent [kən'stɪtjuənt], contamination [kən,tæmɪ'neɪʃn], hydrogen ['haɪdrəʤən], liquid ['lɪkwɪd], occur [ə'kə:], odour ['əudə], purpose ['pə:pəs], quantity ['kwɔntɪtɪ], sewage ['su:ɪʤ], supply [sə'plaɪ], surface ['sə:fɪs], vapour ['veɪpə], siliceous [sɪlɪ'ʃəs].

Exercise 2. Vocabulary:

amount — кількість
artificial — штучний
average — середній
contamination — забруднення
constituent — складова частина
liquid — рідина
to occur — зустрічатися, траплятися
odour — запах
purpose — мета
sewage — стічні води
to supply — забезпечувати
twig — гілочка, прутик
vapour — пара
to be fit — бути придатним

Exercise 3. Find Ukrainian equivalents:

Domestic purpose, harmful contamination, soluble form, pure water, appreciable amount, alkaline water, carbonated water, vegetable tissue, dissolved mineral substances, siliceous water, potable water, fine particles.

Exercise 4. Define part of speech:

Abundant, commonly, natural, particular, fatty, frequently, watery, significant, silvery, lengthy, abundantly.

Exercise 5. Read and translate the text:

Water

About three quarters of the earth's surface is covered with liquid water. In vapour form, water is also an important constituent of the earth's atmosphere. In combined form, water also occurs abundantly in minerals such as in gypsum. Water occurs in animals and vegetable tissues. It constitutes some 70 per cent of the human body and over 90 per cent of some vegetables.

Naturally occurring waters frequently contain dissolved mineral substances. Thus we have mineral waters in which the total mineral content is significantly above the average, alkaline waters which contain unusual quantities of sodium, calcium, or potassium bicarbonate; carbonated waters which contain carbon dioxide dissolved under conditions of excessive pressure, either natural or artificial; sulfur waters containing large amounts of hydrogen sulfide readily detectable by odour; and siliceous waters containing unusual quantities of silica in soluble form.

Potable water is water which is fit to drink. Since water dissolves a part of nearly everything with which it comes in contact, absolutely pure water does not occur in nature.

The water for drinking and domestic purposes is generally supplied by rivers, lakes, wells, and springs. Such waters commonly contain salts of calcium, iron, magnesium, potassium, and sodium, organic matters from falling leaves and twigs; and traces of carbon dioxide, oxygen, nitrogen, ammonia, and other gases from the atmosphere. There is also a variety of suspended matter in natural water such as fine particles of clay, sand, microscopic organisms including bacteria, and fragments of vegetation. Waters having appreciable amounts of dissolved salts are always more acceptable for drinking than those

free from solids. But good drinking water must be free from toxic salts, disease producing organisms, and from harmful organic and sewage contamination.

POST-TEXT ASSIGNMENT

Exercise 6. Give negative form of the following words with the help of prefixes *dis-*, *de-*:

stable, constant, know, observed, desirable, bind, explained, hydrate, colourize, compose, brominate, chlorinate, acetylate, carbonize

Exercise 7. Make the sentences interrogative:

Model: Water occurs in minerals. — Does water occur in minerals?

1. Water occurs in animal and vegetable tissues.
2. Water contains dissolved mineral substances.
3. Water constitutes an important part of the earth's atmosphere.
4. Man uses water for countless purposes.
5. We use water for drinking and domestic purposes.

Exercise 8. Make the sentences negative:

Model: The chemist is determining the constituents of water. — The chemist isn't determining the constituents of water.

1. I am heating hydrogen in the tube.
2. They are studying chemistry now.
3. The analyst is still working in the laboratory.
4. They were making experiments from 5 to 8 o'clock in the lab yesterday.
5. They will be studying these elements all day long tomorrow.
6. The students were finishing their work when I entered the laboratory.

Exercise 9. Put the verb into Present Simple or Present Continuous Active:

1. Water (to occur) abundantly in minerals.
2. He (to pour) water into a test-tube now.
3. The students (to take part) in the experiment at present.
4. Water (to be) an important constituent of the earth's atmosphere.
5. Water (to dissolve) a part of nearly everything with which it (to come) into contact.
6. Most animals (to take in) large quantities of water with their food.

Exercise 10. Read and translate the sentences. Define the tense of the verb: Present Indefinite or Present Continuous Active:

1. We observe how these salts are dissolving in water.
2. Water has appreciable amounts of dissolved salts.
3. He is making an experiment from 2 till 3.
4. We use all the constituents in our experiment.
5. He calculates the amounts of substances contained in water.
6. We make many important observations this year.
7. The analyst is determining the properties of the ore now.

Exercise 11. Combine the pairs of simple sentences into one with the help of conjunctions **that, which, who**, translate them:

Model: There are mineral waters. Mineral waters have the total mineral content significantly greater than the average. — There are mineral waters which have the total mineral content significantly greater than the average.

1. We watched the reaction. It was taking place in a test-tube.
2. D. I. Mendeleyev was a great scientist. He arranged elements according to a definite system.
3. Water for washing contains some substances. The substances react with soap.
4. Phosphate is an important major constituent of raw materials. The determination of phosphate is also of particular interest.

Exercise 12. Find the Ukrainian equivalents:

Important component part of earth's atmosphere; dissolved mineral matters; common maintenance of minerals; unusual amounts of sodium; at large pressure; suspended matter; detectable by odour; drinking-water; fragments of vegetation; excessive pressure.

Exercise 13. Translate into English:

1. Вода дуже поширена в природі.
2. Вода зустрічається в природі у вигляді рідини і пари.
3. Три чверті земної поверхні покрито водою.
4. Рослини і тварини містять велику кількість води.
5. Вода становить близько 70 % маси людини.
6. Вода містить розчинні мінеральні речовини.
7. Для пиття звичайно використовують воду з річок, озер, колодязів, джерел.

Exercise 14. Answer the questions:

1. Is water widely distributed in nature?
2. In what states of aggregation does water occur in nature?
3. How many quarters of the earth's surface is covered with liquid water?
4. Where does water occur?

5. What is the composition of water?
6. What kinds of water do you know?
7. What water is fit to drink?
8. Does water play a vital part in the nutrition of animals and plants?
9. Where is water employed by man?
10. Does absolutely pure water occur in nature?

Exercise 15. Read and translate the additional text:

The Determination of Acrylamide in Water

The water industry increases the use of polyelectrolytes in water clarification. Many of these materials are derived from acrylamide. Polyacrylamide is itself non-toxic but acrylamide has a high chronic toxicity and its concentration in food and drink must be limited to very low levels.

In England in 1966 a committee was set up to assess the amount of new chemicals used in water treatment. One of the problems was to consider the use of polyacrylamide.

The committee therefore determined a permissible level of acrylamide in water. In the absence of a suitable method for the determination of acrylamide in water it was necessary to specify the acrylamide content of polymers and to limit the amounts of polymer used.

In order to determine acrylamide in potable water, a method of analysis is required which will enable to determine at least 0.25 mg of acrylamide per litre of water.

As no methods capable of determining acrylamide at these very low levels existed, work was undertaken to develop a suitable technique. A method is described that is capable of determining down to 0.1 mg of acrylamide per litre of water.

Analysis of the River Thames water. The method was used to analyse a large number of water samples containing acrylamide.

Acrylamide is dissolved in 10 ml of water in a 30 ml flask. To this are added 12.5 mg of potassium bromide dissolved in 15 ml of water and 10 ml of 6% sulphuric acid. The flask is fitted with a stopper with stopcocks and the air is evacuated. The flask is then enclosed in a box to exclude light, but with two "view" holes to enable the reaction to be followed visually. Potassium bromate (2.92 g) dissolved in 25 ml of water is then added with shaking, while preserving the vacuum. Between additions of potassium bromate all the liberated bromide is allowed to react. When half of the bromate is added a white solid separates. The small excess of bromine present is destroyed with sodium sulphite. The white solid is filtered off, washed with 10 ml of water and then air dried. This compound should have a melting-point of 132°C, which should not change with recrystallisation of the compound from benzene.

Results. Samples of acrylamide in water were prepared by adding known volumes of the aqueous standard solutions of acrylamide to 100 ml samples of the River Thames water. These solutions were then analysed.

CHECK YOURSELF

1. About three quarters of the earth's surface ... with liquid water.
a) were covered
b) are covered
c) has been covered
d) have been covering
e) covers

2. Water occurs ... animals and vegetable tissues.
a) at
b) over
c) about
d) in
e) with

3. Water also ... abundantly in minerals such as in gypsum.
a) describe
b) occured
c) occurs
d) describes
e) is occuring

4. Water constitutes some ... per cent of the human body.
a) 40
b) 50
c) 70
d) 75
e) 80

5. ... is composition of water?
a) Why
b) Where
c) Do
d) What
e) Which

6. ... what states of aggregation does water occur in nature?
a) During
b) About
c) In
d) Above
e) Of

7. Carbonated waters contain dioxide dissolved under conditions of ... pressure.
a) blood
b) excessive
c) decreased
d) reduced
e) low

8. Розчинені мінеральні речовини:
a) dissolvents mineral substances
b) artificial mineral substances
c) dissolved mineral substances
d) soluble mineral substances
e) dissolving substances of mineral

9. We have mineral waters in which the total mineral content is ... the average.
a) insignificantly above
b) significantly below
c) significantly above
d) insignificantly over
e) high enough

10. ... water is fit to drink?
a) Who
b) What
c) Why
d) How
e) Which

Lesson 16
COLOURING MATTERS

Grammar:
- ***to be (in all tenses)***
- ***Nominative with the Infinitive***
- ***Sequence of Tenses***

Exercise 1. Practice the pronunciation:
carotinoids ['kærətɪnoɪds], saturate ['sætʃəreɪt], characteristic [ˌkærəktə'rɪstɪk], citraurin ['sɪtrərɪn], classify ['klæsɪfaɪ], chlorophyll ['klorəfɪl], flavone ['fleɪvoun], lycopene ['laɪkəpi:n], oxygenated [ɔksɪʤiə'neɪtɪd], magnesium [mæg'ni:zɪəm].

Exercise 2. Vocabulary:
matter — речовина
to classify — класифікувати
flavones — жовтий, рослинний пігмент, флавон
sap — сік (рослини)
to express — вичавлювати (сік)
fat — жир
solvent — розчинник
to oxygenate — насичувати киснем
saturated — насичений
carrot — морква

Exercise 3. Translate into Ukrainian paying attention to the suffix **-ic**:
Basic, organic, economic, characteristic, democratic, scientific, alcoholic, therapeutic, diagnostic, rheumatic, gastric.

Exercise 4. Give Ukrainian equivalents to the following word combinations:
Organic pigments; characteristic colours; related substances; to be due; complex magnesium compounds; to be owing to; in colloidal suspension; the presence of chlorophyll; to be extracted from dried material; long-chain hydrocarbons; to vary in colours; in association with; to have vitamin A activity; oxygenated derivatives; expressed sap.

Exercise 5. Read and translate the text:

Colouring Matters

The organic pigments which give the characteristic colours to such organs as flowers, fruits, and leaves may be classified as belonging to one or the other of the following groups: the plastic pigments (chlorophyll and the carotenoid) and the soluble pigments (anthocyanins, flavones, and related substances).

Chlorophyll is the green pigment to which the colour of leaves is largely due. It is a mixture of complex magnesium compounds, chlorophyll-A and B, which occur in the chloroplasts. Sap expressed from fresh leaves is green owning to the presence of chlorophyll in colloidal suspension; it is extracted from dried material by alcohol, or chloroform, and alcoholic extracts of leaves are therefore green.

Carotenoids. The carotenoids are unsaturated long-chain hydrocarbons (polyenes) varying in colour from bright yellow to deep red or violet. They are insoluble in water but readily soluble in fats and organic solvents. The yellow colour of many flowers and the orange or red colour of many fruits is due to carotenoids.

The carotenoids occur in the green parts of plants in association with chlorophyll and in other plant organs such as carrot. They have vitamin A activity. The colours of the red tomato and the organs are due to the carotenoids lycopene and citraurin respectively. Some carotenoids are oxygenated derivatives of the simple polyenes.

POST-TEXT ASSIGNMENT

Exercise 6. Give English equivalents to the following words and word combinations:
Органічні пігменти; характерний колір; такі групи; розчинні пігменти; складні з'єднання магнію; наявність хлорофілу; висушений матеріал; мінятися за кольором; яскраво-жовтий колір; швидкорозчинний у жи-

рах; насичені киснем похідні; зв'язані речовини.

Exercise 7. Complete the following sentences and translate them:

1. The organic pigments may be classified to one or the other of the following groups: ... .
2. ... is the green pigment to which the colour of leaves is largely due.
3. Chlorophyll is a mixture of ... .
4. Sap expressed from fresh leaves is green owning to ... .
5. The carotenoids are unsaturated long-chain hydrocarbons varying in ... .
6. ... is readily soluble in fats and organic solvents.
7. The yellow colours of many flowers and the oranges or red colours of many fruits ... carotinoids.
8. The carotinoids occur in other plant organs such as ... .
9. Carotinoids have ... activity.
10. Some carotinoids ... of the simple polyenes.

Exercise 8. Answer the following questions to the text:

1. What gives the characteristic colours to such organs as flowers, fruits and leaves?
2. How can the organic pigments be classified?
3. What is chlorophyll?
4. Where does chlorophyll occur?
5. Why is sap expressed from fresh leaves green?
6. What is chlorophyll extracted from?
7. What are the carotinoids?
8. What are the properties of carotinoids?
9. What colors are due to carotinoids?
10. Where do carotinoids occur?

Exercise 9. Find equivalents to the following word combinations:

substance of which a physical thing is made;
substance (usually liquid) able to dissolve another substance;
to arrange in classes or groups;
oil substance in seeds;
silver-white metal (symbol Mg);
to cause one substance to absorb the greatest possible amount of another;
to press or squeeze juice or oil from;
liquid in a plant,
carrying food to all parts.

Exercise 10. Fill in the blanks with the verb "to be" in the necessary form and translate the sentences:

1. The colours of the red tomato and orange ... due to the carotenoids lycopene and citraurin respectively.
2. Some carotenoids ... oxygenated derivatives of the simple polyenes.
3. The yellow colour of many flowers ... due to carotenoids.
4. Our professor said that chlorophyll ... the green pigment.
5. At the lecture I got to know that carotenoids ... unsaturated long-chain hydrocarbons varying in colour from bright yellow to deep red or violet.
6. The organic pigments may ... classified to one or the other group.
7. Chlorophyll ... the green pigment to which the colour of leaves ... largely due.
8. Sap expressed from fresh leaves ... green owning to the presence of chlorophyll in colloidal suspension.
9. The carotinoids ... unsaturated long-chain hydrocarbons.
10. Chlorophyll ... a mixture of complex magnesium compounds, chlorophyll-A and -B.

Exercise 11. Translate the following sentences, pay attention to the Present-instead-of-Future Tense:

1. If you come today, we will study Pharmacology.
2. As soon as he comes, we will do our experiments.
3. If we express sap from fresh leaves, it will be green.
4. As soon as sap is extracted from dried material by alcohol or chloroform, the alcoholic extracts of leaves will be therefore green in colour.
5. If certain yellow flowers are treated with sulphuric acid, they will give dark blue, green or violet colors.
6. If lemon juice is added to vitamin C, a substance in certain cases will be capable of decreasing capillary fragility.
7. As soon as strong sulphuric acid is added to rhamnefin, it will give a yellow colour with a blue-green fluorescence.
8. If yellow flowers are treated with sulphuric acid, it will give dark blue, green or violet colours.
9. Most carotinoids will give a blue colour, if they are treated with antimony trichloride in chloroform.
10. If the test is carried out by stratifying ether of chloroform solution of the carotenoid with 85% sulphuric acid, a blue colour will be formed at the junction of two layers.

TESTS FOR CAROTENOIDS

Exercise 1. Practice the pronunciation:

sulphuric [sʌl'fjuərik], violet ['vaiəlit], stratify ['stretifai], crystalline ['kristəlain], lead [led], acetate ['æsəteit], species ['spi:ʃi:z], fluorescence [fluə'resns], fragility [frə'ʤiliti], onion ['ʌnjən], quercetin [,kwese'ti:n].

Exercise 2. Vocabulary:

to treat — обробляти, піддати обробці
to distinguish — відрізняти, розрізняти
junction — з'єднання
dilute — розбавлений, розведений
lead acetate — ацетат свинцю
derivative — похідне
dust — пил
oak bark — дубова кора
horse-chestnut — кінський каштан
fragility — крихкість, ламкість
onion — цибуля
quercetin — кверцетин
ether — ефір
rhamnus — жостер
senna — олександрійський лист
scale — луска

Exercise 3. Read and translate the following words. Pay attention to the adjective suffix **-al**:

Experimental, natural, practical, mineral, typical, personal, medicinal, special, clinical, artificial, formal, surgical, general, medical, colloidal, material.

Exercise 4. Give Ukrainian equivalents.

To be treated with acid; to serve as a means; to carry out; at the junction of two layers; concentrated hydrochloric acid; crystalline solids; precipitates with lead acetate; ferric chloride; various primulas; to be found in oak bark; to prepare for medicinal use; a by-product; to increase capillary fragility.

Exercise 5. Read and translate the text:

Tests for Carotenoids

In 1835 Marquart observed that certain yellow flowers when treated with sulphuric acid, gave dark blue, green or violet colours. This reaction is characteristic of carotenoids and serves as a means of distinguishing them from other natural pigments such as anthocyanins. The test is best carried out by stratifying ether of chloroform solution of the carotinoid with 85 per cent sulphuric acid, when a blue colour is formed at the junction of the two layers. Most carotenoids give a blue colour with antimony trichloride in chloroform, or a dark blue with concentrated hydrochloric acid containing a little phenol.

Flavones. Most of the flavones are yellow, crystalline solids, soluble in water, alcohol, dilute mineral acids and alkali. Their solutions yield yellow, orange, or red precipitates with lead acetate and give green or brown colours with ferric chloride. Flavone itself is the 2-phenyl derivative of benzopyrone. It occurs as dust on the flowers and leaves of various primu las, but its phenolic derivatives are more widespread. Many naturally ocurring pigments are phenolic derivatives of flavonol or 3-hydroxyflavone. Typical members are quercetin and kampferol. Quercetin in the form of its rhamnoside is of widespread occurrence and is found in oak bark, horse-chestnut leaves, and onion scales. Rhamnefin, the 7-niethylether of quercetin, is present in the fruits of species of rhamnus. With strong sulphuric acid it gives a yellow colour with a "blue-green fluorescence" and with ferric chloride a brown colour. Kampferol and its glycoside occur in senna and it is also present in delphinium flowers. Rutin is the rhamno-glycoside of quercetin. It occurs as a yellow powder soluble in water. It is now prepared for medicinal use as a by-product from tobacco and resembles hesperidin, as that it decreases capillary fragility.

Hesperidin and Eriodictyol. Lemon juice is said to contain in addition to vitamin C a substance which in certain cases was capable of decreasing capillary fragility. Later citrine was isolated (sometimes called vitamin P) which is now known to be a mixture of the rhamno-glycosides of eriodictyol and methyl eriodictyol (hesperidin).

POST-TEXT ASSIGNMENT

Exercise 6. Insert missing prepositions. Translate into Ukrainian:

1. Lemon juice contains ... addition ... vitamin C a substance which decreases the capillary fragility.
2. Certain yellow flowers when treated ... sulphuric acid gave dark blue, green or violet colours.
3. The test is best carried ... by stratifying ether of chloroform solution of the carotenoid ... 85% ... sulphuric acid.
4. Flavones occur as dust ... the flowers and leaves … various primulas.
5. Quercetin is found ... oak bark.
6. Rhamnefin is present ... the fruits of species of rhamnus.
7. Rutin occurs as a yellow powder soluble ... water.
8. It is now prepared ... medicinal use as a by-product from tobacco.

Exercise 7. Answer the following questions to the text:

1. What colours do certain yellow flowers give when treated with sulphuric acid?
2. Who observed this phenomenon in 1835?
3. When is the test carried out best?
4. What features of the flavones do you know?
5. What precipitates do the solutions of the flavones yield with lead acetate?
6. What is flavone by itself? Where does it occur?
7. Where is quercetin found?
8. What do you know about kampferol?
9. What is sometimes called vitamin P?

Exercise 8. Put the verbs in brackets into the correct Voice and Tense according to the Sequence of Tenses:

1. The teacher told the student to look up the information about carotenoids himself as it (to explain) many times.
2. A new building of our institute (to build) opposite our house lately, and my brother says that the number of students entering it (to increase).
3. As it was rather noisy in the classroom when I came in, I could not make out what (to discuss). From the words which I caught on coming close to them I understood that recent events (to speak about).
4. The test (to carry out) by stratifying an ether or chloroform solution of the carotinoid with 85% sulphuric acid, when a blue colour (to form) at the junction of two layers.
5. The mother (to tell) not to worry about her sick boy. — "He (to examine) soon by the doctor. Everything (to be) all right," said the nurse.
6. Rutin (to prepare) for medicinal use as a by-product from tobacco and (to resemble) hesperidin that it decreases capillary fragility.

Exercise 9. Translate into Ukrainian paying attention to the Nominative with the Infinitive:

1. Certain yellow flowers are said to give dark blue, green or violet colours when treated with sulphuric acid.
2. Solutions of flavones are likely to yield yellow, orange or red precipitates with lead acetate and give green or brown colours with ferric chloride.
3. Most carotinoids are reported to give a blue colour with antimony trichloride in chloroform or dark blue with concentrated hydrochloric acid containing a little phenol.
4. Flavone is known to have occurred on the flowers and the leaves of various primulas.
5. Most of the flavones are considered to be yellow crystalline solids, soluble in water, alcohol, dilute mineral acids and alkali.
6. Later citrin was isolated which is now to be a mixture of the rhamno-glycosides of eriodictyol and methyl eriodictyol.
7. Quercetin in the form of its rhamnoside is said to be of widespread occurrence and to be found in oak bark, horse-chestnut leaves and onion scales.

CHECK YOURSELF

1. What ... the characteristic colours to such organs as flowers, fruits and leaves?
a) do
b) does
c) gave
d) gives
e) doing

2. How can the organic pigments ... classified?
a) to be
b) be
c) is
d) are
e) been

3. What ... chlorophyll?
a) are
b) is
c) shall
d) to be
e) am

4. Where ... chlorophyll occur?
a) is
b) are
c) do
d) does
e) don't

5. What ... chlorophyll extracted from?
a) shall be
b) isn't
c) is
d) will
e) am

6. What ... the carotinoids?
a) are
b) is
c) be
d) being
e) was

7. What colours ... due to carotenoids?
a) wasn‘t
b) was
c) are
d) is
e) am

8. The carotenoids ... long-chain hydrocarbons.
a) are unsaturated
b) is unsaturated
c) are not unsaturated
d) not unsaturated
e) is not unsaturated

9. The carotenoids ... vitamin A activity.
a) have
b) has
c) haven‘t
d) have been
e) has not

10. Some carotenoids ... derivatives of the simple polyenes.
a) isn’t oxygenated
b) don’t oxygenate
c) isn’t oxygenated
d) are oxygenated
e) be oxygenated

Lesson 17

TANNINS AND RELATED SUBSTANCES. GENERAL TEST FOR TANNINS

Grammar:
- ***Numerals***
- ***Types of questions***

Exercise 1. Practice pronunciation:
astringent [əs'trɪnʤənt], doubt [daut], precipitate [prɪ'sɪpɪteɪt], immerse [ɪ'mɔːs], appreciably [ə'prɪʃɪəblɪ].

Exercise 2. Vocabulary:
complex substances — складні речовини
tannin — дубильна речовина
decoction — відвар
in close association — у тісному зв'язку
to immerse — занурювати
gold-beater — золотобоєць
astringent taste — терпкий смак
to boil — кип'ятити
to precipitate — облягати
to obtain — одержувати
to rinse — полоскати

Exercise 3. Read the following numerals:
0.5; 0.02; 0.25; 0.082; 0.1; 0.0043; 1.05; 1.2; 3.05; 7.03.

Exercise 4. Read and translate the text:

Tannins and Related Substances

Tannins are complex substances the molecules of which appear to be built up from comparatively simple phenolic acids. Many tannins occur in close association with simple sugars and appear to be glycosidic in nature. Very few have been obtained in a crystalline state and the details of their structure are still in doubt.

In general, tannins are appreciably in water, alcohol, dilute alkali and glycerol; their solutions have a typical astringent taste and give characteristic green or blue black colours of precipitates with solutions of iron salts. They precipitate soluble proteins from solutions.

General tests for tannins:

1. **Gold-Beater's Skin Test.** Soak a small piece of gold-beater's skin in 2 per cent hydrochloric acid for a few minutes, rinse with distilled water and immerse in the solution to be tested for about 5 minutes. Wash with distilled water and place in a 1 per cent solution of ferrous sulphate. Result: if the solution contains tannins the skin will be coloured brown or black.

2. **Phenazone Test.** Add 0.5 g of acid sodium phosphate to 5 ml of an aqueous decoction of the drug; warm, cool and filter. Add a sufficient quantity of 2 per cent solution of phenazone to the filtrate. Result: all tannins are almost completely precipitated. The precipitate is usually big and often coloured.

3. **Iron Complex Test.** Mitchell's reagent (ferrous sulphate 0.1 g and Rochelle'salt 0.5 g in 100 ml of water), or a 0.25 per cent solution of iron and ammonium citrate may be used, 5 ml of the reagent is added to 5 ml of the solution to be tested, and is followed by 0.5 to 0.1 g of sodium acetate. The mixture is then boiled, cooled and again, if necessary, boiled. Results: a purple, violet or blackish bulky precipitate is obtained if tannins be present, which is insoluble in hot water, alcohol or aqueous ammonis. A brown precipitate is given by some yellow plant colouring-matter. A purple, violet or blue solution indicates the presence of gallic acid, pseudotannins or pyran-phenols.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the following questions to the text:
1. What are tannins?
2. What are tannins soluble in?
3. What are general tests for tannins?
4. What is the result of gold-beater's skin test?
5. What is the result of phenazone test?
6. What is the result of iron complex test?

Exercise 6. Give Ukrainin equivalents:

Complex substances, crystalline state, soluble proteins, typical astringent taste, iron salts, aqueous decoction, sufficient quantity, big precipitate, completely precipitated, detection of tannins.

Exercise 7. Make these sentences interogative and negative:

1. Tannins are complex substances.
2. Many tannins occur in close association with simple sugars.
3. Tannins precipitate soluble proteins from solutions.
4. A purple solution indicates the presence of gallic acid.
5. Solutions of tannins have a typical astringent taste.

CHECK YOURSELF

1. Tannins are complex substances the molecules of which appear to be built up ... comparatively simple phenolic acids.
a) at
b) behind
c) from
d) to
e) near

2. Many tannins occur ... close association with simple sugars.
a) in
b) to
c) at
d) from
e) under

3. The details ... their structure are still in doubt.
a) near
b) in
c) for
d) of
e) at

4. It gives green or blue black colour of precipitates with solutions ... iron salts.
a) behind
b) of
c) in
d) at
e) before

5. They precipitate soluble proteins ... solutions.
a) from
b) near
c) for
d) at
e) to

6. In general tannin is appreciably … water, alcohol, dilute alkali and glycerol.
a) at
b) in
c) from
d) for
e) near

7. Their properties are used ... the detection of tannin.
a) along
b) to
c) for
d) between
e) by

8. Solutions of most alkaloidal salts are precipitated ... tannins.
a) at
b) by
c) across
d) behind
e) along

9. What are general tests ... tannins?
a) for
b) between
c) at
d) to
e) with

10. What is the result ... iron complex test?
a) during
b) of
c) for
d) from
e) at

Lesson 18
PHENOLS

Grammar:
- ***Simple Tense***
- ***General and Special Questions***

Exercise 1. Practice the pronunciation:

aqueous [ʼeɪkwɪəs], chloride [ʼklɔːraɪd], resorcinol [rəʼzɔːsɪnəl], phloroglucinol [flɔrɔʼgluːsɪnəl], furfural [ʼfəːf(ə)rəl], trihydric [ʼtraɪʼhaɪdrɪk], salicylic [sælɪʼsɪlɪk], pyragallol [ʼpɪrəʼgæ(ə)l], caustic [kɔːstɪk], protocatechuic [prəutəʼkætɪkjuːɪk], methyl [ʼmeθɪl].

Exercise 2. Vocabulary:

resorcinol — резорцин
to be united to smth — бути зв'язаним
e. g. = for example — наприклад
fern — папороть
gallic acid — галова кислота
protocatechuic acid — протокатехоїдна кислота
feeble — слабкий
to reduce — відновлювати

Exercise 3. Give Ukrainian equivalents to the following word combinations:

To absorb oxygen from the air; widely distributed; a carbon atom of an aromatic nucleus; feebly acidic nature; a carboxylic acid derived from catechol acid; a water-soluble substance; a powerful reducing agent; decomposition products.

Exercise 4. Read and translate the text:

Phenols

Phenols are compounds in which one or more hydroxyl groups are directly united to a carbon atom of an aromatic nucleus, e. g. phenol or carbolic acid. The simpler phenols are water-soluble substances of feebly acidic nature. In general, they are readily soluable in aqueous caustic soda. Their neutral aqueous or alcoholic solutions give characteristic colours with ferric chloride solution. The polyhydric phenols (e. g. phenols with several hydroxyl groups) are powerful reducing agents in alkaline solutions and absorb oxygen from the air. Phenolic substances are widely distributed in plants, usually in combination with sugars as glycosides.

Simple Phenols. Catechnol or α-dehydroxybenzene is one of the decomposition products of phlobatannins and catechins. It gives a green colour with ferric chloride. Resorcinol gives with ferric chloride in neutral solution a bluish-violet colour. Phloroglucinol is a trihydric phenol which is isometric with pyrogallol. Phloroglucinol gives a blue-violet colour with ferric chloride and a red colour with furfural in hydrochloric acid solution. It is a powerful reducing agent and has a sweet taste.

The important constituents of male fern are phloroglucinol derivatives. Pyragallol is a decomposition product of gallic and ellagic acids. It gives a deep red colour with ferric chloride and a solution in caustic soda rapidly darkens to black on exposure to the air.

Phenolic Acids. Salicylic acid occurs as methyl ester in oil of wintergreen. It gives an intense violet colour with ferric chloride. Protocatechuic acid is a carboxylic acid derived from catechol acid. Gallic acid is a derivative of pyragallol. It occurs as a glycoside. Digallic acid is a phenolic ester derived from two molecules of gallic acid. Ellagic acid is a phenolic acid related to gallic, from which it may be obtained by oxidation.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the following questions:

1. What are phenols?
2. What are the simpler phenols?
3. What are the polyhydric phenols?
4. What gives a green colour with ferric chloride?
5. What gives a bluish-violet colour with ferric chloride?

6. What gives a deep red colour?
7. What gives an intense violet colour?

Exercise 6. Insert proper words from the text:
1. Protocatechuic acid is a carboxylic acid derived from ... .
2. Salicylic acid occurs as methyl ester in oil of ... .
3. The important constituents of male fern are ... .
4. Phenolic substances are widely distributed in plants, usually in combination with ... .
5. Gallic acid is a derivative of ... .
6. The simpler phenols are readily soluble in ... .
7. Neutral aqueous or alcoholic solutions of the simpler phenols give characteristic colours with ... .

Exercise 7. Name the colours given by:
1. Catechol
2. Resorcinol
3. Phloroglucinol
4. Pyragallol
5. Salicylic acid with ferric chloride

Exercise 8. Make up general and special questions to the following sentences:
1. The simpler phenols are water-soluble substances.
2. Phenolic substances are widely distributed in plants.
3. Pyragallol is a decomposition product of gallic and ellagic acids.
4. Pyragallol solution in caustic soda rapidly darkens to black on exposure to the air.
5. Phenolic ester derives from two molecules of gallic acid.

CHECK YOURSELF

1. Phenols are ... in which one or more hydroxyl groups are directly united to a carbon atom of an aromatic nucleus.
a) marks
b) acids
c) compounds
d) goods
e) metals

2. The simpler phenols are ... substances of feebly acidic nature.
a) water-soluble
b) fatty-soluble
c) atom-soluble
d) carbon-soluble
e) acid-soluble

3. Phenols with several hydroxyl groups ... oxygen from the air.
a) absorbed
b) is absorbed
c) absorb
d) absorbs
e) was absorbed

4. Phenolic substances are widely distributed in ... .
a) water
b) plants
c) gas
d) air
e) fatty

5. ... is one of the decomposition products of phlobatannins and catechins.
a) catechol
b) fern
c) acid
d) compound
e) mark

6. Resorcinol gives with ferric chloride in neutral solution a ... colour.
a) violet
b) bluish-violet
c) bluish
d) green
e) white

7. Phloroglucinol is a trihydric phenol which is isometric with ... .
a) phlobatannin
b) phenol
c) pyrogallol
d) carbon atom
e) gas

8. The important constituents of male fern are ... .
a) phloroglucinol derivatives
b) simple phenols
c) ferric chloride
d) polyhydric phenols
e) acid

9. Protocatechuic acid is a ... derived from ferric chloride.
a) cyclic structure
b) alkaloids
c) organic solvents
d) carboxylic acid
e) gas

10. Gallic acid is a derivative of ... .
a) picric acid
b) pyragallol
c) alcohol
d) ferric chloride
e) ester

Lesson 19

COMPOUNDS OF SODIUM AND POTASSIUM

Grammar:
- ***Participle***
- ***Simple Passive***
- ***Pronouns***

Exercise 1. Practice the pronunciation:

lithium ['lɪθɪəm], potassium [pə'tæsjəm], rubidium [ru:'bɪdɪəm], caesium ['sɪzjəm], alkali ['ælkəlaɪ], hydroxide [haɪ'drɔksaɪd].

Exercise 2. Vocabulary:

abundant — рясний
affinity — спорідненість
alkali — луг
brine — розсіл
to calculate — підраховувати
decomposition — розщеплення
to employ — застосовувати
lime — вапно
oxidation — окислення
potassium — калій
to be saturated with — бути насиченим
comparatively — порівняно
to undergo — піддаватися
iron tanks — металеві ємності
on exposure to air — під дією повітря
carbonating tower — вуглецева колонка

Exercise 3. Form nouns with the help of the suffix **–tion** and translate them:

Model: eliminate — elimination

Oxidate, distribute, calculate, concentrate, precipitate, titrate, indicate, evaporate, evaluate, saturate, complicate, translate.

Exercise 4. Form verbs of the opposite meaning with the help of the prefix **-de** and translate them:

Model: compose — decompose

Acidify, alkalize, form, calcify, carbonate, gasify, hydrate, ionize, mineralize, saturate.

Exercise 5. Read and translate the text:

Compounds of Sodium and Potassium

The alkali metals — lithium, sodium, potassium, rubidium, and caesium — which fall in Group I of the Periodic Classification, are the most strongly electro-positive elements known. They are all univalent, and their compounds are soluble in water. The metals themselves are distinguished by their great affinity for oxygen. They undergo oxidation rapidly on exposure to air, and decompose water readily in the cold, with evolution of hydrogen and formation of soluble, strongly alkaline hydroxides. All these characteristics are most marked in caesium, and least in lithium.

Sodium and potassium compounds are widely distributed and abundant. Lithium compounds are found in comparatively small quantities, and rubidium and caesium are decidedly rare elements. The compounds of sodium and potassium are very widely employed in pharmacy, and corresponding compounds of the two metals are similar in therapeutic action.

The chief naturally occurring compound of sodium is the chloride, NaCl, which is present in sea-water to the extent of 2 to 3 per cent, and is also found as rock salt.

The manufacture of sodium carbonate, sodium bicarbonate, and sodium hydroxide forms the chief branch of the great alkali industry. Most of the sodium salts used in pharmacy are made from the carbonate or hydroxide.

Sodium hydroxide contains not less than 95.0 per cent of total alkali, calculated as NaOH, and not more than 2.5 per cent of Na_2COs. Sodium hydroxide is manufactured by heating sodium carbonate with water and lime in large iron tanks.

Most of the sodium carbonate produced at the present day is manufactured by the ammonia-soda process. The principle of the method

is simple. Strong brine containing a high concentration of ammonia is passed through a "carbonating tower" where it is saturated with carbon dioxide under pressure. The ammonia and carbon dioxide decomposition with the sodium chloride causes the precipitation of sodium bicarbonate, which is not very soluble in water, and is still less soluble in brine.

POST-TEXT ASSIGNMENT

Exercise 6. Substitute subordinate clauses for Past Participle:

Model: The alkali metals which were found before are the most strongly electro-positive elements. — The alkali metals found before are the most strongly electro-positive elements.

1. Lithium, sodium and potassium which we studied at the last lesson fall in Group I of the Periodic Classification.
2. The metals which are distinguished by their affinity for oxygen undergo oxidation rapidly on exposure to air.
3. All these characteristics that are most marked in caesium and lithium are well known.
4. Sodium and potassium are compounds which are widely distributed and abundant.
5. Most of the sodium salts which are used in pharmacy are made from carbonate or hydroxide.
6. Of all the compounds which we mentioned above, sodium and potassium compounds are of some importance for alkali industry.
7. The substances which are closely related to alkali compounds have a complicated structure.
8. Chloride which was found in rocks is also present in sea-water.

Exercise 7. Put the verbs in brackets into Present, Past or Future Simple Passive.

1. The compounds of sodium and potassium (to employ) very widely in pharmacy.
2. These methods (to introduce) to pharmaceutical industry some years ago.
3. The experiment (to carry on) in two months.
4. I think the reaction (to follow) by temperature rise.
5. Most of the sodium salts (to use) in the future.
6. Most of the sodium carbonate (to manufacture) by the ammonia-soda process.
7. The manufactured sodium compounds widely (to use) now.
8. Salts (to produce) by the interaction of acids and bases.
9. The elements (to arrange) by Mendeleyev according to a definite system.

Exercise 8. Put the sentences into the Passive Voice:

Model: Chemists call these compounds metals. — These compounds are called metals by chemists.

1. We prepare sodium salts from the carbonate or hydroxide.
2. The great affinity for oxygen distinguishes the metals.
3. They spoke much of the problem.
4. A discussion will follow the lecture.
5. They will comment upon new data in this article.
6. We began the experiment in the morning.
7. They discussed the results of the reaction yesterday.

Exercise 9. Translate into English:

Помітні нам ознаки; розподілені Менделєєвим елементи; складені мною таблиці; знайдений ним спосіб; прочитана професором доповідь; розташовані нами елементи; зроблені студентами повідомлення; відомі всім факти; узята нею пробірка; побачений нами дослід; принцип, що використовується у фармації.

Exercise 10. Define the function of the words having the ending **-ed**. Translate the sentences:

1. Substances composed of two or more elements are called compounds.
2. Most of the sodium salts used in pharmacy are made from the carbonate or hydroxide.
3. When evaporated to dryness, the solid matter contained sodium chloride and organic matter.
4. Rain-water if collected near the sea contains sodium chloride.
5. The manufactured sodium compounds are widely used in medicine.
6. A marked temperature rise was observed.
7. The substance obtained contained a small amount of chlorides.

Exercise 11. Substitute the personal pronouns given in brackets for the possessive pronouns:

1. (He) name is Popov.
2. Who is (they) teacher?
3. Where are (she) students?
4. Show me (you) laboratory.
5. Use (he) findings.
6. What is there on (I) table?
7. The laboratory worker gives the students (they) lab equipment.
8. The teacher asks him to begin (he) experiment in the morning.
9. I know you since (you) childhood.
10. The teacher tells (she) students to remember and observe the rules in handling the glass things.

Exercise 12. Substitute the pronouns in brackets for the personal pronouns in the objective case or possessive pronouns:

1. I see (he) and (he) friend very often.
2. My father knows (they) and (they) children very well.
3. They want to see (we) and speak about (we) experimental work.
4. Do you know that the professor wants to see (you) and (you) work?
5. He often tells (she) about (they).
6. The teacher is speaking about the manufacture of sodium and potassium compounds and (they) use in pharmacy.

Exercise 13. Substitute the words and word combinations in italics for pronouns:

1. I know *the alkali metals* well.
2. Prepare *sodium carbonate* in the lab.
3. Show her *the new substance*.
4. Help me to prepare *the necessary specimens* for the experiment.
5. The chief naturally occurring compound of *sodium* is the chloride.
6. Most of *the sodium salts* used in pharmacy are made of the carbonate or hydroxide.

Exercise 14. Translate into English:

1. Лужні метали швидко окислюються під дією повітря.
2. З'єднання натрію і калію дуже поширені в природі.
3. З'єднання літію знаходять у порівняно невеликих кількостях.
4. Гідроксид натрію одержують нагріванням карбонату натрію з водою і вапном у великих металевих ємностях.
5. Розкладання аміаку і двоокису вуглецю викликає осідання бікарбонату натрію.

CHECK YOURSELF

1. The alkali metals of group I of the Periodic Classification are ... .
   a) bivalent
   b) soluble in water
   c) univalent
   d) soluble in alcohol
   e) insoluble in fat

2. Sodium and potassium compounds are ... .
   a) rare
   b) widely distributed
   c) deficient
   d) of small amount
   e) not frequent

3. The manufacture of sodium compounds ... the chief branch of the great alkali industry.
   a) form
   b) is forming
   c) has formed
   d) forming
   e) had formed

4. The principle of the ammonia-soda process is ... .
   a) easy
   b) simple
   c) complex
   d) rare
   e) difficult

5. Sodium hydroxide contains not less than ... of total alkali.
   a) about 90%
   b) 93–94%
   c) over 95%
   d) 95%
   e) 100%

6. Most of sodium salts used in pharmacy are made of ... .
   a) potassium compounds
   b) the carbonate
   c) ferric salts
   d) salicylic acid
   e) ammonia

7. The alkali metals and their compounds are soluble in ... .
   a) fat
   b) alcohol
   c) hydrogen
   d) water
   e) brine

8. Sodium and potassium ... widely and abundant.
   a) are distributed
   b) has been distributed
   c) distribute
   d) distributed
   e) are being distributed

9. Alkaline hydroxides are most marked in ...
   a) lithium
   b) sodium
   c) caesium
   d) potassium
   e) rubidium

10. The metals are distinguished ... their great affinity for oxygen.
   a) with
   b) for
   c) by
   d) at
   e) to

Lesson 20
PROTEINS AND AMINO-ACIDS

Grammar:
• ***Nominative-with-the Infinitive Perfect Active***

Exercise 1. Practice the pronunciation:
hydrolysis [haɪ'drɔlɪsɪs], crystallize ['krɪstəlaɪz], colloidal [kə'lɔɪd(ə)l], nitrogen ['naɪtrəʤən], diminution [dimi'nju:ʃ(ə)n], digestion [dɪ'ʤestʃən], sulphur ['sʌlʃə], oxygen ['ɔksɪʤən], viscous ['vɪskəs], centrifugal [sen'trɪfjugəl], protein ['prəuti:n].

Exercise 2. Topical vocabulary:
to elaborate — детально розробляти
foodstuff — харчові продукти
to estimate — оцінювати
digestion — перетравлення, засвоєння їжі
nevertheless — проте
viscous — тягучий, липкий
to bring about — спричиняти
means — засіб
to be accompanied by — супроводжуватися
to diminish — зменшувати(ся)
to increase — збільшувати
to decrease — зменшувати
the breakdown of a single protein — розпад (розкладання) білка одного виду

Exercise 3. Choose the words that can be transformed into verbs without changing the base. Translate them:
Model: water — to water
Complex, study, change, form, matter, effect, difference, combination, drop, compound, powder, test, arm, exercise, light, analyst, experiment, variety, use, crystalline, increase.

Exercise 4. Form verbs from the following words with changes in writing and reading. Translate them:
Model: production — to produce
Crystalline, large, combination, acid, diminution, hydrolysis, digestion, different, gradual, concentration, action, progressive.

Exercise 5. Read and translate the sentences into Ukrainian. Pay attention to Nominative-with-the Infinitive construction:
1. Proteins are known to be highly complex compounds elaborated by living cells.
2. Most of the chemicals proved to be salts.
3. Proteins are considered to be particularly important as the source of combined nitrogen in foodstuffs.
4. You are likely to know that the molecular weights of proteins can be estimated only approximately.
5. These substances are not supposed to be sharply differentiated from one another.
6. Amino-acids are known to be the final stage of protein hydrolysis.
7. The data obtained appear to be identical with the previous findings.
8. Many of these proteins are sure to contain elements of carbon, hydrogen, oxygen and nitrogen.

Exercise 6. Find Ukrainian equivalents to the following word combinations:
Highly complex compounds, living cells, molecular weight, soluble proteins, colloidal solutions, diminution in solubility, various means, high complexity, ordinary conditions, crystalline form, final stage, gradual process, progressive decrease, corresponding increase.

Exercise 7. Read and translate the text:

Proteins and Amino-Acids

Proteins are highly complex compounds elaborated by living cells, and containing the elements of carbon, hydrogen, oxygen, nitrogen, and usually sulphur. They are particularly important as the source of combined nitrogen in foodstuffs. The percentage of nitrogen in most proteins varies from about 15 to 19.

The molecular weights of proteins are known to be estimated only approximately, but investigations by ultracentrifugal methods give results for the soluble proteins varying from a few thousands to many millions. Those proteins which

are soluble form colloidal solutions which are generally viscous and may form gels if sufficiently concentrated (e. g. gelatin). From their colloidal solutions many proteins are precipitated by electrolytes. Many of them (e. g. egg albumen) are coagulated by heat. When the temperature is above 60–80°C it produces a marked change in protein structure. This is an example of "denaturation", with diminution in solubility and other changes in properties, which may be brought about in proteins by various means, including the action of reagents. Substances of such high complexity would not be expected to crystallize under ordinary conditions; nevertheless, some proteins, including egg albumin and haemoglobin, can be obtained in crystalline form by special methods.

Proteins can be hydrolysed with formation of simpler substances. This process takes place, for example, during digestion in the stomach and intestinal tract.

Amino-acids represent the final stage of protein hydrolysis, and many different amino-acids are produced by the breakdown of a single protein.

The substances intermediate between proteins and amino-acids are not sharply differentiated from one another, since the breaking down process is a gradual one. The progressive decrease in molecular complexity on hydrolysis is accompanied by a corresponding increase in solubility and tendency to crystallization.

POST-TEXT ASSIGNMENT

Exercise 8. Point out predicates in the Perfect Active and translate the sentences into Ukrainian:

1. Academician R. Chagovets of the Academy of Sciences of Ukraine has proved that the so-called coenzyme vitamins belong to ancient elementary organic compounds.
2. Changes in the percentage of nitrogen in most proteins often take place.
3. The chemist will have estimated the molecular weights of these proteins by 10 o'clock.
4. When the temperature had risen above 60–80 °C it produced a marked change in protein structure.
5. Protein hydrolysis takes place during digestion in the stomach and intestinal tract.
6. In addition to the data mentioned we have also summarized the successive products of protein hydrolysis.
7. The most interesting changes were taking place when we raised the temperature above 60°C.
8. The progress of chemistry has enabled chemists to make hundreds of new chemical products.

Exercise 9. Make the sentences interrogative:

1. We have written the test-paper today.
2. I have prepared everything for the experiment.
3. The progress of chemistry during the present century has taken place in all directions.
4. The temperature above 60–80°C has produced a marked change in the structure of egg albumin.
5. The percentage of nitrogen in this protein has varied from 15 to 19.
6. For over the 60 years the output of chemical products in the country has increased 300-fold.

Exercise 10. Put the verbs given in brackets into the Present, Past or Future Perfect Active:

1. We (to isolate) more than 20 amino-acids from protein hydrolysates.
2. He (to work) much at the problem of obtaining proteins.
3. The reverse process (to take place) after the amino-acid molecules linked together in chains.
4. The progressive decrease in the molecular complex (to stop) by the end of the reaction.
5. Complete hydrolysis of proteins (to change) their properties.
6. Substances of such complexity (to crystallize) under ordinary conditions.
7. When the temperature (to rise) above 60–80°C, it produced a marked change in protein structure.

Exercise 11. Transform the sentences into compound sentences with the conjunctions **that, who, whom** or **which**:

Model: I think proteins are highly complex compounds. — I think that proteins are highly complex compounds.

1. The substances you have just mentioned about are not sharply differentiated from one another.
2. The experiment you speak about is very important.
3. We should also register the yield of the substance we obtained and the final result of each experiment.
4. All the vessels the students had used during the experiment were carefully washed and dried.
5. The change in density they have observed after the completion of the test will be recorded.

Exercise 12. Transform compound sentences into simple ones using Nominative-with-the Infinitive construction:

Model: It is likely that he knows the properties of proteins well — He is likely to know the properties of proteins well.

1. It is likely that you know some methods of preparation of proteins.
2. It seems that he is interested in complex compounds of proteins.
3. It is known that acids and bases react, forming salts and water.
4. It is found that the progressive decrease in molecular complexity on hydrolysis is accompanied by a corresponding increase in solubility.
5. It is said that proteins like amino-acids are amphoteric in character.
6. It appears that enzymes are soluble substances of complex composition which occur in plant cells.

Exercise 13. Translate into English using Nominative-with-the Infinitive construction:

1. Відомо, що солі одержують взаємодією кислот і основ.
2. Відомо, що молекулярна вага білків визначається приблизно.
3. Більшість із цих речовин, мабуть, входить до складу білків.
4. Стверджують, що дані, одержані цими ученими, точні.
5. Встановлено, що велике зменшення молекулярного комплексу під час гідролізу приводить до відповідного збільшення розчинності речовини.
6. Вважають, що процес розпаду білків поступовий.

Exercise 14. Answer the questions:

1. What kind of compounds are proteins?
2. What are they elaborated by?
3. What chemical elements do proteins contain?
4. How does the percentage of nitrogen in most proteins vary?
5. How can the molecular weights of proteins be estimated?
6. What methods of investigations of proteins do you know?
7. What stage of protein hydrolysis do amino-acids represent?
8. What happens to proteins?

CLASSIFICATION OF PROTEINS

Exercise 1. Practice pronunciation:

alcohol ['ælkəhɔl], yield [ji:ld], gluten ['glu:tən], seed [si:d], maize [maɪz], dilute [daɪ'lju:t], entirely [ɪn'taɪəlɪ], alum ['æləm], assay [ə'seɪ], salt [sɔ:lt], mixture ['mɪkstʃə], carbohydrate [,kɑ:bəu'haɪdreɪt].

Exercise 2. Vocabulary:

salt — сіль
solubility — розчинність
by heat — при нагріванні
gluten — клейковина
seed — зерно
cereals — хлібні злаки
alum — галун
tannic acids — дубильні кислоти
yield — давати, робити
purplish — багрянуватий
copper sulphate — сірчанокисла мідь
maize — кукурудза
interface — межа, поверхня
film — плівка
assay — аналіз
a number of ... — ряд ...
bond — з'єднання
when subjected to — коли піддається
to be degraded to ... — розщеплюватися на ...
biuret test — біуретова проба (на протеїни)

Exercise 3. Read and translate the text:

Classification of proteins

The proteins are classified according to their solubility; thus albumins are soluble in water while globulins are insoluble in water but soluble in dilute salt solutions. Both albumins and globulins are coagulated by heat. The gluten of the seeds of cereals is a mixture of gliadins and glutelins, proteins which are insoluble in water but soluble in dilute acids or alkalis. Hair and wool consist largely of scleroproteins (albuminoids) which are characterised by their stability and insolubility in water and in salt solutions. All proteins are insoluble in organic solvents and in alcohol, though some plant proteins are soluble in 70 per cent alcohol; they are precipitated by salts of heavy metals, by alums and by acids of high molecular weight — tannic acids, for example. Solutions or suspensions of protein in 10 per cent sodium hydroxide yield a pink or purplish-red colour with a trace of copper sulphate solution (biuret reaction). Another very sensitive test for protein is the formation of a film at the interface when a dilute aqueous solution is shaken with chloroform, a phenomenon familiar to all who carried out alkaloidal assays.

The simple proteins are composed of a large number of various amino-acids united together by peptide (amide) bonds to form molecules of colloidal dimension which may be combined with other substances, carbohydrates for ex-

ample, to form conjugated proteins. When boiled with dilute acids or when subjected to the action of proteolytic enzymes under suitable conditions, the protein molecule is degraded to metaproteins, proteases, peptones, polypeptides. The natural amino-acids are optically active, amphoteric substances, over twenty of which have been isolated from protein hydrolysates.

Most proteins contain nearly all the amino-acids. Exceptions are maize which contains no glycine; gelatin which consists almost entirely of glycine and argenine and contains no tryptophane, and insulin which contains polymethionine. The sclero-proteins of hair and wool yield large quantities of cystine (dicystine) on hydrolysis.

POST-TEXT ASSIGNMENT

Exercise 4. Answer the following questions to the text:

1. What are the proteins classified according to?
2. Are albumins soluble in water or in salt solutions?
3. What do you know about qualities of globulins?
4. What are coagulated by heat?
5. What is a mixture of gliadins and glutelins?
6. What do hair and wool consist of?
7. What substances are all proteins soluble in?
8. What do you know about plant proteins?
9. Do tannic acids have high molecular weight or low one?
10. What have you learnt about biuret reaction?
11. What is another very sensitive test for protein?
12. What are the simple proteins composed of?
13. What substances do hair and yield on hydrolysis?

Exercise 5. Give antonyms to the following words:

Reason, living, irreversible, simple, part, unknown, soluble.

Exercise 6. Fill in the blanks with corresponding words from the text:

1. Proteins are ... substances of ... weight.
2. They ... an essential part of all tissues.
3. It is known that enzymes are ... .
4. The proteins are ... according to their ... .
5. Albumins are soluble in ... .
6. Globulins are ... in water.
7. Hair and wool consist of ... .

Exercise 7. Speak about:

a) Proteins
b) Classification of proteins

CHECK YOURSELF

1. Proteins are ... nitrogenous organic substances of high molecular weight.

a) non-complex
b) simple
c) complex
d) complicated
e) far

2. It is known that enzymes are ... .

a) proteins
b) acids
c) tissues
d) water
e) gas

3. In living tissue, proteins are associated with ... .

a) fats
b) enzymes
c) substance
d) water
e) simple

4. Amino-acids represent the ... stage of protein hydrolysis.

a) final
b) initial
c) intermediate
d) the last but one
e) advanced

5. Changes of this type occur when plant materials ... .

a) dries
b) has dried
c) is dried
d) are dried
e) are not dried

6. The proteins are classified according to their ... .

a) composition
b) solubility
c) classification
d) exception
e) formation

7. Both albumins and globulins are coagulated by ... .
a) heat
b) heart
c) water
d) air
e) warm

8. They are precipitated ... salts of heavy metals.
a) at
b) to
c) by
d) with
e) near

9. Most proteins ... nearly all the amino-acids.
a) contains
b) was contained
c) contain
d) contained
e) containing

10. Insuliin contains no ... .
a) water
b) blood
c) solution
d) methionine
e) lymph

Lesson 21

CARBOHYDRATES

Grammar:

• ***Absolute Participial Construction***

• ***Perfect Active and Passive***

• ***Заміники іменників — that (those), one (ones)***

Exercise 1. Practice pronunciation:

sugar ['ʃugə], complexity [kəm'pleksıtı], polysaccharide [pɔlı'sækəraıd], starch [sta:ʧ], cellulose ['seljuləus].

Exercise 2. Vocabulary:

sulphuric acid — сірчана кислота
cellulose — клітковина
sucrose — сахароза
elimination — усунення
to be derived from — походити
purification — очищення
to treat with — обробляти
starch — крохмаль
to induce — приводити до
to apply — вживати

Exercise 3. Point out prefixes and translate the words:

Incapable, unstandard, impure, discontinue, irregular, illimitable, inactive, unpleasant, denaturalized, unlike, incorrect, unstable

Exercise 4. Find substitution of the following word combinations (oxygen, hydrogen, compounds, molecule, purification):

1. The smallest particle to which substance can be reduced by subdivision without losing its chemical identity.
2. Making pure of external elements.
3. Odourless tasteless gas, the lightest element, combining with oxygen to form water.
4. Substances consisting of two or more chemically united elements in fixed proportions.
5. An odourless tasteless gaseous element essential to animal and vegetable life.

Exercise 5. Read and translate the following sentences. Find Absolute Participial Construction.

1. The meeting being over, we went home.
2. My friend living far from me, I seldom see him.
3. The translation of the text being ready, I shall show it to you.
4. Her brother being ill, she could not go to the institute that day.
5. The question being too difficult, no one could answer it.
6. There being a very small nucleus in the centre of the cell, the structure is different.
7. The science of chemistry developing rapidly, we expect to obtain many interesting data in chemical research.

Exercise 6. Read and translate the text:

Carbohydrates

Carbohydrates are compounds containing the elements of carbon, hydrogen and oxygen, the last two elements being usually present in the proportions in which they are found in water. The group includes sugars of different degrees of complexity and polysaccharides such as starch, insulin and cellulose.

Classification of Carbohydrates:

Monosaccharides. These sugars contain three to nine carbon atoms, those with five and six carbon atoms (pentoses and hexoses) being the most important.

Di-, tri- and tetrasaccharides. These sugars are theoretically derived from two, three or four monosaccharide molecules of water.

Polysaccharides. These are derived from sugar molecules by condensation with the elimination of water.

Sugars are readily soluble in water and in general, can be induced to crystallise only with difficulty and after careful purification. They have a sweet taste. Of the polysaccharides insu-

lin is soluble in warm water but the more complex cellulose is insoluble.

All carbohydrates give a violet colour when treated with alphanaphtol followed by concentrated sulphuric acid. The test may be applied either to a solution or in the case of an insoluble carbohydrate to its suspension in water. Some carbohydrates are reducing. Non-reducing carbohydrates such as sucrose and the polysaccharides can be hydrolysed by boiling for about half an hour or more with a little dilute acid. After neutralising them an excess of caustic soda, it will be found that reducing sugars have been produced. Pentose sugars when boiled with concentrated hydrochloric acid containing a little phloroglucinol give a red colour. The process of hydrolysis is a reversible one and more complex carbohydrates are synthesized in the plant from sugar units. In addition to the sugars referred to above there are some relatively rare desoxy sugars which have so far only been found in nature in cardiac glycosides. These desoxy sugars contain one or two oxygen atoms fewer than the corresponding carbohydrates with six carbon atoms. They include rhamnose, digitoxose, and cymarose.

POST-TEXT ASSIGNMENT

Exercise 7. Read the sentences and translate them into Ukrainian. Pay attention to negative prefixes:

1. The more complex cellulose is insoluble.
2. Non-reducing carbohydrates can be hydrolyzed by boiling for about half an hour with a little dilute soda.
3. Many mercury compounds sublime unchanged when heated in a dry tube.
4. Impure substances usually soften first and require a range of temperature to cover the period between softening and complete melting.
5. Antibiotics can be produced from organic and inorganic substances.
6. The common fatty acids in fixed oils, fats and waxes in combination with glycerol or other alcohol may be saturated or unsaturated.

Exercise 8. Read the sentences choosing the appropriate form of the verb given in brackets and translate them:

1. Today the laboratory (produced, has produced) more complex carbohydrates.
2. They (solved, have solved) that problem two years ago.
3. He just (completed, has completed) his investigation.
4. At present production of synthesized carbohydrates (developed, has developed) into a new industry.
5. She (hasn't worked, did not work) at this problem since she left the institute.
6. The method (develop, was developed) at that institute.
7. Industrial production of a growth hormone intended for children who do not grow at the normal rate (has started, has been started) at the factory of endocrine preparations.

Exercise 9. Put the following sentences into the Passive Voice and translate the sentences:

Model: Lately our scientists have developed a new method of extracting sugars from carbohydrates. — A new method of extracting sugars from carbohydrates has been developed by our scientists lately.

1. N. D. Zelinsky has elaborated new methods for synthesizing a large number of new compounds.
2. Our industry has produced various types of complex carbohydrates.
3. After neutralizing carbohydrates with an excess of caustic soda we produced reducing sugars.
4. They have found rare desoxy sugars in nature.
5. You have applied the test either to a solution or to the suspension of a carbohydrate in water.

Exercise 10. Read the sentences and find Absolute Participial Construction. Translate the sentences into Ukrainian:

1. Carbohydrates are compounds containing the elements of carbon, hydrogen and oxygen, the last two elements being usually present in the proportions in which they are found in water.
2. Sugars contain three to nine carbon atoms, those with five and six carbon atoms being the most important.
3. Sugar molecules consist of atoms, each sugar molecule having its own special atom.
4. The reducing effect was calculated as glucose, the reduction being not necessarily due to this sugar alone.
5. A method for quantitative determination of novocain in water solutions is suggested, the latter containing products of its hydrolysis after the separation of p-amino-benzoic acid.
6. There are some relatively rare desoxy sugars found in nature, these desoxy sugars containing one or two oxygen atoms fewer than the corresponding carbohydrates with six carbon atoms.

Exercise 11. Transform the compound sentences into simple ones using Absolute Participial Construction:

Model A: After the professor had carried out investigations the students asked him about the results. — The professor having carried out investigations, the students asked him about the results.

1. After the gel has solidified the cell will be turned upright.
2. After a deep blue layer had been produced between the ether and the aqueous liquid the colour turned pink on shaking.
3. After polysaccharides had been derived condensation with the elimination of water was completed.
4. When the analyst had induced sugars to crystallize purification was not necessary.
5. After he had applied the test to the solution carbohydrates reduced.
6. After carbon disulfide had reacted, the temperature rose to 70°.

Model B: As the range of application of carbohydrates is very wide, scientists are greatly interested in them — The range of application of carbohydrates being very wide, scientists are greatly interested in them.

1. As the substance is highly soluble and readily absorbs dioxide from the air, the test should be carried out in vacuum.
2. Since fructose was present in the hydrolysis product, positive tests were obtained.
3. Since this procedure complies with the requirements for accuracy of photometric methods, a rapid routine determination of these solutions is possible.
4. As carbohydrates contain the elements of carbon, hydrogen and oxygen, they often occur in various compounds in nature.

Exercise 12. Point out sentences where **that, those, one** and **ones** are noun substitutes. Translate the sentences:

1. The process of hydrolysis is a reversible one, and more complex carbohydrates are synthesized in the plant from sugar units.
2. Chemical research for obtaining new compounds of carbohydrates is proceeding more rapidly at present than that was before.
3. The properties of the solution resemble those of a strong base.
4. Oxidation and reduction have much broader meanings than those indicated by the previous definition.
5. A solution of a mercuric salt is reduced giving first a white precipitate of mercurous chloride and later a greyish one of minute globules of metallic mercury.
6. Of barium compounds only one is of any pharmaceutical interest.
7. A number of oxides of sulphur have been described. The only ones of any importance are dioxide, SO_2, and the trioxide, SO_3.
8. The iodine produced in that way is titrated with N/10 sodium thiosulphate.

Exercise 13. Translate into English:

1. Вуглеводні — це сполуки, що складаються з вуглецю, водню і кисню.
2. Існує декілька груп вуглеводнів, які містять цукор і полісахариди, різні за складністю.
3. Моносахариди містять від 3 до 9 вуглеводних атомів.
4. Полісахариди одержують із молекул цукру шляхом конденсації з видаленням води.
5. Сахариди легко розчинні у воді.
6. Усі вуглеводні дають фіолетовий колір при обробці альфанафтолом.
7. Деякі вуглеводні відновлюються.
8. Вуглеводні, що не відновлюються, можуть бути гідролізовані під час кипіння протягом 1,5 години в розчині слабо розведеної кислоти.
9. Процес гідролізу є оборотним, і складніші вуглеводні синтезуються в рослинах з цукрів.

Exercise 14. Answer the following questions:

1. What elements do carbohydrates contain?
2. What are carbohydrates?
3. What are starch, cellulose and insulin?
4. How many groups the carbohydrates are subdivided into?
5. What do you know about monosaccharides?
6. What are polysaccharides?
7. In what case can sugars be induced to crystallize?
8. What is a taste of sugars?
9. Is cellulose soluble or insoluble in warm water?
10. When do all carbohydrates give a violet colour?
11. By what way can sucrose and the polysaccharides be hydrolysed?
12. Where may desoxy sugars be found in nature?

Exercise 15. Speak about:

a) Carbohydrates
b) Classification of Carbohydrates

Exercise 16. Look through the text and write a summary.

CHECK YOURSELF

1. The meeting ... , we went home.
a) shall over
b) being over
c) shall be over
d) over
e) will be

2. Her brother ... , she could not go to the institute that day.
a) being ill
b) ill
c) illing
d) shall ill
e) illed

3. The science of chemistry ... rapidly, we expect to obtain many interesting data in chemical research.
a) were developed
b) was developing
c) will be developed
d) is developing
e) developed

4. The group ... sugars of different degrees of complexity and polysaccharides.
a) includes
b) was included
c) including
d) shall included
e) include

5. Sugars ... in water.
a) are readily not soluble
b) are readily soluble
c) is soluble
d) is readily soluble
e) are not soluble

6. All carbohydrates ... a violet colour.
a) gives
b) give
c) given
d) giving
e) does develop

7. Pentose sugars when boiled with concentrated hydrochloric acid containing a little phloroglucinol give a ... .
a) neutral colour
b) light colour
c) blue colour
d) red colour
e) white colour

8. The process of hydrolysis is a ... one.
a) reversible
b) reversing
c) reverse
d) reversed
e) reverses

9. They ... in nature in cardiac glycosides.
a) has been found
b) have been found
c) have find
d) founded
e) has found

10. They ... rhamnose, digitoxose and cymarose.
a) was included
b) includes
c) include
d) were included
e) including

Lesson 22
ALKALOIDS

Grammar:
• ***Impersonal Constructions***

Exercise 1. Practice pronunciation:
alkaloid ['ælkəlɔɪd], cinchona [sɪn'kəunə], quinoline [kwɪnəu'laɪn], dicotyledon ['daɪkɔtɪ'li:d(ə)n], solanaceous ['səulə'neɪʃəs], residue ['rezɪdju:].

Exercise 2. Vocabulary:
salts of sanguinarine — солі сангвінарину
pomegranate — гранат
castor seeds — насіння рицини
simple base pyridine — прості піридинові основи
basis of importance — найважливіші основи-алкалоїди
quinoline (cinchona alkaloids) — хінолін (вид хінного дерева)
solanaceous alkaloids — алкалоїди з родини пасльонових
coca — кока, кокаїновий чагарник
calabar bean — калабарський біб
strychnos — блювотний горіх (чилібуха)
ergot — ріжки (споринья)
flowering plants — квіткові рослини
dicityledons — дводольні рослини
above reagents — вищезазначені реактиви
to evaporate — відвідувати

Exercise 3. Remember word-building element "heter(o)" — (of Greek origin) означає інший, другий, несхожий (на кого, що), різний, відмінний.
Analyse the following words and translate them:
Heteroatom, heterochain, heterocyclic, heterogeneous, heterocephalus, heterochromous, heteromorphic.

Exercise 4. Read and translate the text:

Alkaloids

Alkaloids are basic nitrogenous compounds of vegetable origin possessing some marked physiological action. Most alkaloids are crystalline substances and contain carbon, hydrogen, and oxygen in their molecules, but a few are liquids and oxygen free. Coloured alkaloids are rare; berberine is yellow and the salts of sanguinarine are copper-red. In most alkaloids the nitrogen atom is linked in a cyclic structure.

The alkaloids of hemlock, pomegranate, pepper and castor seeds are derived from the simple base pyridine.

Alkaloids occur in many families of flowering plants particularly in the dicotyledons. The free bases are usually only slightly soluble in water, but readily soluble in dilute acids with the formation of alkaloidal salts. Phenolic alkaloids such as morphine are soluble in both acid and alkali. In general, the free bases are soluble in alcohol and organic solvents and their salts but slightly soluble. Alkaloids are usually present in plants in the form of salts of organic acids or associated with tannins. The purine alkaloids are usually present in the fresh plant as unstable alkaloidal-phlobatannin glycosides and some solanaceous alkaloids occur in glycosidal combination with sugars.

Tests for Alkaloids. Most alkaloids are precipitated from neutral or slightly acid solution by Mayer's reagent (potassiomercuric iodide solution), by Wagner's reagent (solution of iodine in potassium iodine), by solution of tannic acid by Hager's reagent (a saturated solution of picric acid), a solution of phosphomolybdic acid and by Dragendorff's reagent (solution of potassium bismuth iodide). Other plant constituents such as proteins also give precipitates with

several of the above reagents so that the tests are often unreliable when applied directly to a plant.

The alkaloids should first be separated by means of organic solvents and the applied to the neutral or acid aqueous solution ultimately obtained. Alkaloids of the purine group (the bromine and caffein) and some other alkaloids such as colchicine are not precipitated by Mayer's reagent. Purine alkaloids may be acid, evaporating to dryness and exposing the residue to the vapour of ammonia when a purple colour is produced.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the questions to the text:
1. What kind of compounds are alkaloids?
2. Are most alkaloids crystalline substances?
3. What is the structure of most alkaloids?
4. What alkaloids are oxygen free?
5. What substances are called alkaloids?
6. What elements do most alkaloids contain?
7. What alkaloids are soluble both in acid and alkali?
8. What reagent is usually used to distinguish one group from another?
9. What alkaloids may evaporate to dryness?
10. Do alkaloids occur in nature and in what form?

Exercise 6. Name the verbs of the derived nouns:

Possession, action, composition, formation, precipitation, application, evaporation, production, addition, titration, dilution, neutralization.

Exercise 7. Fill in the blanks with the words from the text:

Flowering plants; vegetable origin; occur; most alkaloids; the nitrogen atom; are precipitated; carbon, hydrogen and oxygen; present.

1. Alkaloids are basic nitrogenous compounds of ... .
2. ... are crystalline substances.
3. They contain ... in their molecules.
4. In most alkaloids ... is linked in a cyclic structure.
5. Alkaloids ... in many families of ... .
6. Alkaloids are usually ... in the form of salts or organic acids.
7. Most alkaloids ... from neutral or slightly acid solution.

Exercise 8. Translate into English:

1. Алкалоїди, що є азотними сполуками рослинного походження, мають фізіологічну дію.
2. Більшість алкалоїдів, що містять вуглевод, кисень і водень, є кристалічними речовинами.
3. Алкалоїди, що зустрічаються в багатьох сімействах квітучих рослин, добре відомі.
4. Вільні основи, що утворюють алкалоїдні солі, легко розчиняються в розведених кислотах.
5. Інші складові частини, що осідають у пробірці під час експерименту, визначаються легко.

Exercise 9. Make up sentences using impersonal constructions:
It is important to know ... .
It is observed ... .
It is necessary ... .
It is known ... .
It is recommended ... .

Exercise 10. Speak about:
a) Main groups of alkaloids
b) Tests for alkaloids

CHECK YOURSELF

1. Alkaloids ... basic nitrogenous compounds of vegetable origin.
a) was
b) are
c) is
d) has been
e) wasn't

2. In most alkaloids the nitrogen atom ... in a cyclic structure.
a) has linked
b) were linked
c) is linked
d) linked
e) wasn't linked

3. Alkaloids ... in many families of flowering plants particularly in the dicotyledons.
a) occur
b) occuring
c) occurs
d) occured
e) has occured

4. Phenolic alkaloids ... in both acid and alkali.
a) solubles
b) are soluble
c) solubled
d) was soluble
e) was not

5. The purine alkaloids ... in the fresh plant.
a) are present
b) is present
c) was present
d) presenting
e) was presenting

6. Other plant constituents such as proteins also ... precipitates with several reagents.
a) given
b) gives
c) giving
d) give
e) does not give

7. The alkaloids ... by means of organic solvents.
a) separates
b) separating
c) shall separate
d) should be separated
e) will separate

8. Purine alkaloids ... acid, evaporating to dryness.
a) must
b) shall be
c) may be
d) must be
e) can

9. Alkaloids of the purine group and some other alkaloids such as colchicine ... by Mayer's reagent.
a) are not precipitated
b) is precipitated
c) are precipitated
d) were precipitated
e) is not precipitated

10. Purine alkaloids may be … .
a) soluable
b) unsoluable
c) acid
d) alkali
e) bitter

Lesson 23
SOLUTION. FILTRATION

Grammar:
- ***Nominative with the Infinitive***
- ***Participles***
- ***Conjunctions***

Exercise 1. Practice the pronunciation:

homogenous [hə'mɔʤənəs], disperse [dɪs'pə:s], suspension [səs'penʃən], ultimate ['ʌltɪmɪt], solute ['sɔlju:t], imperceptible [ɪmpə'septəbl], colloidal [kə'lɔɪdəl].

Exercise 2. Vocabulary:

homogeneous — однорідний
solid — тверде тіло
ultimate particle — елементарна частинка
to dissolve — розчиняти
former — перший з двох
extent of solubility — ступінь розчинності
to remove — видаляти
equilibrium — рівновага
solute — розчин, розчинена речовина
to disperse — поширювати, розсіювати
to depend on (upon) — залежати від
standpoint — точка зору

Exercise 3. Give Ukrainian equivalents to the following word combinations:

Homogenous mixture, fine sand, quantitative data, excess of a solid, available data, imperceptible amount, constant value, under certain conditions, saturated solution.

Exercise 4.

a) Read the sentences, pay attention to the translation:

1. He is said to live here. — Говорять, що він живе тут.
2. The patient is thought to suffer from pneumonia. — Думають, що хворий страждає на пневмонію.
3. Leucocytosis is known to develop in inflammation. — Відомо, що лейкоцитоз розвивається при запаленні.

b) Pay attention to the Voice of the predicate:

1. They seem to study Biochemistry. — Здається, вони вивчають біохімію.
2. He appears to suffer from tuberculosis. — Здається, він хворіє на туберкульоз.
3. The pain proved to be sharp on physical exertion. — Виявилося, що біль був гострим при фізичному напруженні.

Exercise 5. Read and translate the sentences:

He is supposed to discharge the patient from the hospital.

He is supposed to have discharged the patient from the hospital.

He is supposed to be discharged from the hospital.

He is supposed to have been discharged from the hospital.

Exercise 6. All these words can be combined in one group by one sign. What is it?

decompose — розкладати
misunderstand — неправильно розуміти
discomfort — незручність
irregular — нерегулярний
impossible — неможливий
abnormal — ненормальний
unable — нездібний
contraindication — протипоказання
counteraction — протидія

Exercise 7. Read and translate the text:

Solution

Any chemically and physically homogenous mixture of two or more substances is said to be a solution. It is possible to have solutions of solids in liquids, liquids in liquids, gases in liquids, solids in solids, etc.

Depending upon the size of the dispersed particles we recognize true solutions, colloidal solutions, and suspensions.

If sugar is dissolved in water, it is supposed that the ultimate sugar particle is of molecular dimensions and that a true solution is formed. On the other hand, if very fine sand is mixed with water, a suspension of comparatively large particles, each consisting of many molecules is obtained. Between these two extremes lies colloidal solution.

From the pharmaceutical standpoint solutions of solids in liquids are of the greatest importance and many quantitative data are available on the properties of such solutions.

When an excess of a solid is brought into contact with a liquid, molecules of the former are removed from its surface until equilibrium is established between the molecules leaving the solid and those returning to it. The resulting solution is said to be saturated at the temperature of the experiment.

The extent of solubility of different substances varies from small amounts to relatively large quantities but for any given solute the solubility has a constant value at constant temperature.

Under certain conditions it is possible to prepare a solution containing a larger amount of solute than is necessary to form a saturated solution. This may occur when a solution is saturated at one temperature, the excess of solid solute removed, and the solution cooled. The solute present in solution, even though it may be less soluble at a lower temperature, does not always separate from the solution and a supersaturated solution is produced.

POST-TEXT ASSIGNMENT

Exercise 8. Answer the following questions:

1. What mixtures may be defined as a solution?
2. Is it possible to obtain a solution only by dissolving solids in liquids?
3. What kinds of solutions are recognized?
4. What does the variety of a solution depend on?
5. What is very fine sand mixed with if we want to obtain a suspension?
6. Is much known about the formation of colloidal solutions?
7. Why are many quantitative data available on the properties of solutions of solids in liquids?
8. How does the extent of solubility of different substances vary?

Exercise 9. Find English equivalents of the following word combinations:

ступінь розчинності різних речовин; з другого боку; кількісні дані; зважені частинки; справжній розчин; елементарна частинка цукру; надлишок твердої розчиненої речовини; суспензія порівняно великих частинок; розчини твердих частинок у рідинах; речовина, що знаходиться в розчині.

Exercise 10. Translate into Ukrainian paying attention to Nominative with the Infinitive:

1. Most of the chemicals found on the laboratory shelves have proved to be salts.
2. Before 1942 uranium was said to have no important uses.
3. Salts containing hydrogen or hydroxide radicals are known to be acids or basic salts.
4. Penicillin was shown to have always been used most effectively in cases of wound infections.
5. The capsulating of medicinal substances both dry and liquid in gelatin is considered to be one of the most largely used methods for administrating medicines today.
6. The mould was proved to grow neither without oxygen nor in pure glucose media.

Exercise 11. Change the sentences using Nominative with the Infinitive:

1. It is known that spring and autumn are those seasons when the patients with ulcer suffer from the recurrence of the disease.
2. It is considered that constant tiredness, the lesions of the nervous system and past diseases contribute to the beginning of gastritis.
3. It appeared that the characteristic clinical manifestations of the disease were haemorrhage, vomiting and nausea.
4. It is known that exacerbation of duodenal ulcers occurs in spring and autumn.
5. It is considered that brain cortex stimuli send impulses to the stomach and duodenum.

Exercise 12. Translate the following sentences using Nominative with the Infinitive:

1. Ймовірно, у хворого метастази в печінці внаслідок раку шлунка.
2. Було виявлено, що у нього виразка шлунка.
3. Виявилося, що хворий був дуже слабкий для такої операції.
4. Відомо, що проривна (perforated) виразка дванадцятипалої кишки часто супроводжується рясною кровотечею.
5. Вважається, що затримка сечі є одним із клінічних проявів хвороби нирок.

Exercise 13. Read the sentences and insert the conjunctions:

provided — за умови, **if** — якщо, **even though** — навіть якщо

1. ... a liquid contains free acids or alkali, a double filter should be used.

2. ... solutions of the silver salts are exposed to the light, precipitation will take place.

3. ... the pharmacist is filling a prescription calling for a lot of powders, he assumes a serious responsibility in the identification of the material and in the accurate weighing.

4. You will certainly obtain a colloidal solution under existing conditions ... you know its properties.

5. Technical reasons will not influence ... it is possible to prepare a solution containing a large amount of solute under existing conditions.

6. The solid particles of the separating liquids are completely separated ... we use strainers instead of good paper filters.

7. More satisfactory results could be obtained ... the release rate was somewhat decreased.

8. Therefore *in vivo* results should be similar to those *in vitro*, ... that the assumptions made previously are valid.

Exercise 14. Read the sentences; choose the appropriate form of the Participle given in brackets:

1. Paper filters are employed in all the finer operations (required, requiring) filtration.

2. The paper (used, using) for this purpose is specially prepared and is called filter paper.

3. A solution (contained, containing) a larger amount of solute than is necessary to form a saturated solution may be prepared under certain conditions.

4. The substance (occurring, occurred) on the earth and in the sun and stars, is the first element of the Periodic Table.

5. Ointment bases (contained, containing) animal fats, vegetable oils or hydrocarbons are designated as oleaginous basis.

6. The juices so (obtaining, obtained) may then be evaporated.

Exercise 15. Translate into Ukrainian:

1. On the other hand when an excess of a solid is brought into contact with a liquid, molecules of the former are removed from its surface.

2. On the one hand soft elastic capsules are intended primarily for the administration of oily liquids, on the other hand they may contain solids combined with liquids.

3. Tablets are divided into two general classes, depending on their method of manufacture or their use.

4. The proportion of drugs represented in the different tinctures is not uniform but varies according to the established standards for each.

5. Under certain conditions it is possible to obtain a saturated solution.

6. Compound tinctures are made according to long established formulas.

7. Filtration is the process of separating liquids from solids with the view of obtaining the liquids in a transparent condition.

Exercise 16. Translate into English:

1. Розчин — це однорідна суміш двох або трьох речовин.

2. Залежно від розміру зважених часток розпізнаються такі розчини: справжні розчини, колоїдні розчини і суспензії.

3. Припускають, що справжній розчин утворюється, якщо цукор розчиняється у воді.

4. За певних умов можна приготувати цей розчин у нашій лабораторії.

5. Ступінь розчинності різних речовин залежить від певних умов.

6. Суспензію отримують, якщо дуже дрібний пісок змішують з водою.

Exercise 17. Read and translate the additional text:

Filtration

Filtration is the process of separating liquids from solids with the view of obtaining the liquids in a transparent condition.

The intervention of a porous substance called the filter is necessary in performing the process of filtration. The filter may be made of paper, paper pulp, sand, ground, glass, charcoal, porous stone, etc.

The liquid which has passed through the filter is called the filtrate and it should be perfectly clear.

Paper filters are the most useful of all filters for the pharmacists, and they are employed in all the finer operations requiring filtration. The solid particles are much more completely separated by filtration through good paper filters than through strainers, owning to the pores of the paper being smaller and more numerous. The paper used for this purpose is specially prepared and is called filter paper.

The filter in the funnel should be moistened with the liquid to be filtered or with a liquid corresponding to the solvent employed. This promotes rapid filtration, and washes the filter. If the liquid to be filtered contains free acid or alkali, or a very fine precipitate, or is very dense or hot, a double filter should be used.

One of the most important uses of precipitation is in testing as it affords the most ready means of identifying chemical substances or of ascertaining their purity. A great many pharmacopoeial tests are based upon this process. The colour, quantity and character of the precipitate are all taken into account. The terms “curdy”, “granular”, “flocculent”, “gelatinous”,

"crystalline", "bulky" and others, which are sufficiently distinctive, are used to define the particular form which the precipitate assumes.

If solutions containing albuminous matter are heated, a flocculent precipitate of coagulated albumin will be thrown down while if solutions of the silver salts are exposed to light, powdered precipitate will be thrown down.

CHECK YOURSELF

1. Most of the chemicals found on the laboratory shelves ... to be salts.
   a) has proved
   b) proved
   c) have proved
   d) has been proved
   e) does not prove

2. Before 1942 uranium ... to have no important uses.
   a) said
   b) saying
   c) was said
   d) is said
   e) have said

3. Salts containing hydrogen or hydroxide radicals ... to be acids or basic salts.
   a) is known
   b) are known
   c) was known
   d) known
   e) know

4. Penicillin ... to have always been used most effectively in cases of wound infections.
   a) was shown
   b) was showing
   c) show
   d) showed
   e) do not show

5. The mold ... to grow neither without oxygen nor in pure glucose media.
   a) proving
   b) have proved
   c) has proved
   d) was proved
   e) proved

6. Any chemically and physically homogenous mixture of two or ... substances is said to be a solution.
   a) more
   b) many
   c) much
   d) few
   e) no

7. From the pharmaceutical standpoint solutions of solids in liquids are of the ... importance.
   a) more greater
   b) most greater
   c) greater
   d) greatest
   e) great

8. It is possible to prepare a solution containing a ... amount of solute.
   a) largest
   b) larger
   c) more large
   d) much large
   e) large

9. Paper filters are the ... useful of all filters for the pharmacists.
   a) less
   b) little
   c) most
   d) more
   e) much

10. It is due to the pores of the paper being ... and ... numerous.
   a) smaller, more
   b) bigger, more
   c) smaller, the much
   d) smaller, much
   e) small, much

Lesson 24

PREPARATION OF TABLETS

Grammar:
- ***Impersonal sentences***
- ***Infinitive***
- ***Modal verbs + Passive Infinitive***

Exercise 1. Practice the pronunciation:

technique [tek'ni:k], auxiliary [ɔ:g'zılјərı], occasionally [ə'keıʒnəlı], binding [ĺbaındıŋ], halide ['heılaıd], glidant ['glaıdənt], strength [streŋθ], desintegration [di:sentı'greıʃn].

Exercise 2. Vocabulary:

medication — лікарський препарат
tabletting — виготовлення таблеток
alkali halides — галогеніди
binding or sticking — прилипання, приклеювання
ejection — випорожнення
lubricants and glidants — речовини, що мастять і ковзають
smooth — хисткий, м'який, рівний, без грудочок
desintegration — подрібнення

Exercise 3. Give Ukrainian equivalents to the following word combinations:

Common form, dry state, from a physical point of view, definite properties, auxiliary substances, mechanical strength, process of tabletting, different pressure, internal administration, important effect, powdery substance, natural starch, smooth eject, unnecessary complications.

Exercise 4. Translate into Ukrainian using your knowledge of Latin. Don't forget that suffixes **-fy**, **-ate**, **-ize** mean **action**:

Filtrate, acidify, granulate, fermentate, cultivate, concentrate, inactivate, characterize, vaporize, specify, oxydize, gasify, utilize, neutralize, sterilize.

Exercise 5. Form nouns from words in the exercise 4 using the suffix **-tion** and translate them into Ukrainian:

filtrate — filtration — фільтрація

Exercise 6. Read and translate the text:

Preparation of Tablets

The tablet is the most common form of medication for the administering of drugs in a dry state. Its preparation constitutes an important part of modern "Pharmaceutical Technology".

A tablet shows definite properties of mechanical strength and is also characterized by a definite rate of disintegration when brought into contact with water.

It is generally observed that tablets can be made easily from certain drugs, such as sodium chloride and other alkali halides, even without the addition of auxiliary substances. For some other drugs, such as lactose, the addition of auxiliary substances is found to be necessary to overcome certain difficulties in their tabletting. Some difficulties are occasionally experienced in the process of tabletting certain materials because of persistent binding or sticking in the tablet machine.

The application of different pressure during tabletting plays a very important role. The correct pressure must be applied in order to avoid unnecessary complications. Tablets which should dissolve slowly in the mouth must be more strongly compressed than other average tablets for internal administration.

Another important effect of higher pressures is an increase in friction which obviously necessitates the use of greater amounts of lubricants and glidants. Glidants are added to the tablet materials to improve their flow properties. They are generally powdery substances which deform only slightly when subjected to the compressing pressures. To glidants belong

such substances as natural starch, which have excellent flow improvement properties.

Lubricants are substances which facilitate smooth ejection of the compressed tablets.

The use of starch as an auxiliary in tablet making has been recognized for a very long time. It was stated that starches possess very good glidant properties in increasing the flow of tablet materials and they do not show any lubricating action.

POST-TEXT ASSIGNMENT

Exercise 7. Answer the following questions to the text:

1. What is the most common form of medication for the administering of drugs in a dry state?
2. How may the technique of tabletting be defined?
3. What does a tablet show?
4. What can tablets be made easily from?
5. What can you say about such drugs as lactose?
6. What is occasionally experienced in the process of tabletting certain materials?
7. What must be more strongly compressed?
8. What are added to the tablet materials to improve their flow properties?
9. What have excellent flow improvement properties?
10. What are lubricants?
11. What can you say about starches?

Exercise 8. Translate Ukrainian words using the verbs given below:

to know, to state, to observe, to be necessary, to find.

1. Відомо, that the tablet is the most common form of medication.
2. Було встановлено, that starches possess very good glidant properties increasing the flow of tablet materials.
3. Було необхідно to apply the correct pressure in order to avoid unnecessary complications.
4. Свідчать, that the results obtained from these tablets are satisfactory.
5. Спостерігалося, that tablets can be made easily from certain drugs.

Exercise 9. Transform simple sentences into sentences with the Complex Subject:

Model: Salicylic acid was found to be the most highly absorbed member of the salicylate group. — It was found that salicylic acid was the most highly absorbed member of the salicylate group.

1. The absorption of acetylsalicylic acid is known to be lower than that of salicylamide.
2. The preparation of deep convex tablets is said to be more difficult.
3. The therapeutic properties of galenicals were stated not to be always identical with those of the pure alkaloids or alkaloidal salts.
4. Percolation is said to be the best method for making tinctures.
5. The ultimate sugar particle is supposed to be of molecular dimensions.

Exercise 10. Read and point out the Infinitive. Translate the sentences:

1. To complete the drying process the granules were left in the pan over night.
2. Enough solvent was used to produce a mass having the necessary consistency into which the drug was suspended.
3. The mixture so prepared was spread to form a thin layer, left to dry for three days at room temperature.
4. The process was repeated for the upper layer, and the pressure was applied to form the tablet.

Exercise 11. Read the sentences, choosing the right form of the verb in brackets:

1. It is expected that equally satisfactory results (could obtain, could be obtained) upon administration to humans.
2. The waxy material used in each case (had to melt, had to be melted) in a breaker in which the remaining ingredients were suspended.
3. It (could be observed, could observe) that the extent of adsorption depended on the compound being absorbed.
4. The ointment (can apply, can be applied) in an extremely thin layer directly over the affected area.
5. The filter (may make, may be made) of paper pulp and sand.
6. Tablets which (have to coat, have to be coated) after compression must have a deep convex shape.

Exercise 12. Read and translate the sentences. Pay attention to the Participles:

1. When observed from the surface, the leaf shows upper epidermis cells.
2. If kept in cold, the ointment can be preserved for a considerable period of time.
3. If injected in concentration over 200 mg/cm^3, the drug may cause toxic effects.
4. When given daily over a considerable period of time, streptomycin may cause toxic effects.
5. When administered after the onset of fever, 0.1 cc of the serum either arrested the progress of the infection or modified its course.

Exercise 13. Form Past Participle of the following verbs:

To compress, to define, to observe, to apply, to improve, to be, to make, to define, to show, to find, may, to have, to recognize, to become, to do, to get, to have.

Exercise 14. Translate the following word combinations into Ukrainian:

Common form, for the administering, in a dry state, from a point of view, a known volume, to be observed, from certain drugs, without the addition, to be found, certain difficulties, much moisture, in turn, in order to, to dissolve slowly, a very important role, to improve some properties, to deform slightly, compressed tablets.

Exercise 15. Complete the following sentences and translate them:

1. The tablet is the most common ... .
2. The technique of tablet making may be defined ... .
3. A tablet is also characterized ... .
4. Tablets can be made easily from ... .
5. The addition of auxiliary substances is ... .
6. ... are occasionally experienced ... .
7. ... plays a very important ... .
8. ... generally powdery substances which ... .
9. ... important effect of higher pressures is ...
10. ... which facilitate smooth ... .

Exercise 16. Define part of speech of the following words, translate them:

Medication, preparation, purely, making, properties, disintegration, generally, easily, addition, overcome, tabletting, sticking, insufficient, application, unnecessary, complication, dissolve, compressed, internal, administration, increase, greater, added, powdery, deform, slightly, improvement, recognized, lubricating.

Exercise 17. Give summary of the text "Preparation of tablets".

Exercise 18. Read and give summary of the text:

Shapes and Sizes of Tablets

A great variety of shapes and sizes is available among medicinal tablets. The most common shape of the tablets is a circular body with flat or slightly convex sides. There are also rectangular, triangular and many other shape in the case of special tablets.

In the Scandinavian countries where the Pharmacopoeia provides official specification of formula and the method of preparation of the various tablets formulas, the size and shape is also specified officially.

The preliminary consideration in selection of particular shapes and sizes of the tablets is essentially ethical. These dimensions should be such that tablets prepared have a pleasing appearance. Similarly, the use of a tablet is also an important consideration. A tablet meant for making solutions will be required to dissolve as quickly as possible and so it should be as thin as possible. This will require a larger diameter than average tablets of the same weight. Tablets which are to be dissolved slowly in the mouth should be flat for convenience of the user and thick enough to have a lasting effect on which the efficiency of the tablet will depend. Similarly, tablets which have to be coated after compression must have a deep convex shape and be harder than other tablets. It is more convenient to have as thin edges as practicable since it is easier to cover a thin edge during the coating process.

In addition to the above considerations there can also be important technical reasons which may influence the selection of particular dimensions of the tablets. It is often found that the preparation of deep convex tablets is more difficult. The density and compression ratio (the extent to which a powder can be compressed) are also important factors.

Exercise 19. Fill in the missing prepositions:

1. A great variety ... shapes and size is available ... medical tablets.
2. Tablets which have to be coated ... compression must a deep convex shape.
3. ... the Scandinavian countries where the Pharmacopoeia provides official specification ... formula.
4. The preliminary consideration ... selection ... particular shapes and size ... the tablets is essentially ethical.
5. A tablet meant ... making solutions will be required to dissolve as quickly as possible.
6. Tablets which are to be dissolved slowly ... the mouth should be flat ... convenience ... the user.
7. The efficiency ... tablet will depend ... it.
8. It is often found that the preparation ... deep convex tablets is more difficult.
9. The different shapes ... tablets show a variation ... physical properties.
10. They are compressed ... similar unit area pressure.

Exercise 20. Make up sentences using the following word combinations:

1. A great variety of shapes and sizes.
2. The method of preparation.
3. To be specified officially.
4. In selection of something.

5. To have a pleasing appearance.
6. To use something.
7. As quickly as possible.
8. To be thin.
9. To be dissolved.

Exercise 21. Translate into English:

1. Таблетка — найпоширеніша форма лікарських препаратів.
2. Різний тиск використовують під час виготовлення різних форм таблеток.
3. Вважають, що таблетки можна приготувати легко з певних ліків.
4. Деякі таблетки готують із хлориду натрію та інших галогенідів, навіть без додавання допоміжних речовин.
5. Густина і стиснення є важливими чинниками в приготуванні таблеток.
6. Таблетки можуть бути різними за формою і розміром.
7. Для приготування розчинів таблетки повинні легко розчинятися у воді.
8. Деякі таблетки покриті оболонкою.
9. Таблетки з тонкими краями легше піддаються процесу покриття.
10. Різна форма таблеток указує на різноманітність фізичних властивостей.

CHECK YOURSELF

1. ... is the most common form of medication for the administering of drugs in a dry state?
a) What
b) When
c) Why
d) Where
e) Which

2. From a purely physical point of view, the technique of tablet making ... as a process which is subjected to pressure.
a) is defined
b) to be defined
c) may be defined
d) defines
e) defined

3. A tablet shows a definite properties ... mechanical strength.
a) under
b) at
c) in
d) of
e) by

4. ... does a tablet show?
a) Where
b) What
c) When
d) How many
e) How

5. Tablets ... easily from certain drugs, such as sodium chloride and other alkali halides.
a) makes
b) are made
c) is made
d) to have been made
e) made

6. Some difficulties are occasionally experienced ... the process of tabletting certain materials.
a) at
b) around
c) within
d) in
e) inside

7. ... may sticking occur?
a) When
b) Why
c) Where
d) Whom
e) Which

8. There ... too much moisture in the granules which in turn may be due to insufficient drying, etc.
a) will be
b) is
c) are
d) have
e) was

9. The application ... different pressure during tabletting plays a very important role.
a) under
b) out
c) over
d) of
e) outside

10. Tablets which ... slowly in the mouth must be more strongly compressed that other average tablets for internal administration.
a) should dissolve
b) would dissolved
c) should be dissolved
d) would be dissolved
e) is dissolving

Lesson 25

OINTMENTS. PREPARATION OF OINTMENTS

Grammar:
- ***Perfect Active and Passive***
- ***Participle I as Adverbial Modifier***
- ***Adverbs of Time***

Exercise 1. Practice the pronunciation:

mucous ['mju:kəs], major ['meɪʤə], petrolatum [petrə'leɪtəm], diadermic [daɪə'də:mɪk], compatibility [kəmpætɪ'bɪlɪtɪ], porcelain ['pɔ:s(ə)lɪn], polyethylene [pɔlɪ'æθɪli:n], collapsible [kə'læpsɪbl], aerosol ['ɛurəsɔl], medicinals [me'dɪcɪnlz].

Exercise 2. Vocabulary:

application — вживання
to penetrate — проникати
petrolatum — вазелін
wax — віск
melting point — точка плавлення
lard — сало, жир
stiffening agents — елементи, що додають жорсткості
compatibility — сумісність
stoneware — кераміка
porcelain — фарфор, порцеляна
wool fat — ланолін, шерстний жир
to oxidize — окисляти
collapsible metal tubes — роз'ємні металеві трубки
topically — локально
jar — банка

Exercise 3. Give Ukrainian equivalents:

Semi-solid preparations, external application, mucous membrane, medicinal substances, slight power of penetration, deeper layers of the skin, vegetable oils, opportunity for absorption, water-soluble bases, climatic temperature changes, easily oxidized medicinals, water sensitive drugs.

Exercise 4. Form words with the help of the suffix **-ity** and translate them:

Model: stable — стійкий, stability — стійкість.

Active, capable, pure, intensive, quantitative, relative, susceptible, compatible, sensitive.

Exercise 5. Read and translate the text:

Ointments

Ointments are semi-solid preparations for external application of such consistency that they may be readily applied to the body or to mucous membranes.

They should be of such composition that they soften but not necessarily melt when applied to the body.

The ointment base usually constitutes the major portion of the pharmaceutical preparation and may influence the efficacy of the incorporated medicinal substances.

Based on their penetration ointments have been divided into three classes. Epidermic ointments are those which demonstrate no, or very slight, power of penetration into the skin. In this group have been placed the bases which contain petrolatum, waxes and their combinations.

Endodermic ointments are those which possess some power of penetration into the deeper layers of the skin. Most of them have a somewhat lower melting point, approaching the temperature of the skin, and contain vegetable oils, lard, wool fat, lanolin, and/or combinations of these.

Diadermic ointments are those which penetrate the skin, thus, offering a better opportunity for absorption of the medicament. Ointments of emulsion type and the water-soluble bases belong to the group of absorption base.

Hydrocarbon bases include ointments prepared from petrolatum, or liquid petrolatum, with wax or other stiffening agents.

White and yellow ointments are relatively stable to normal climatic temperature changes. Absorption bases generally have a high index of compatibility toward the majority of medicines used topically. These bases have found a definite place in pharmacy as well as cosmetology.

Until recently, ointments and ointment type products were packaged in glass, stoneware, porcelain, polyethylene, or plastic wide-mouth

jars. Since a large area of the ointment was exposed to the effects of air, those ointments containing easily oxidized medicinals were packaged in collapsible metal tubes. The use of aerosol containers preventing contamination, drying out of the product as well as protecting water sensitive drugs is preferable.

POST-TEXT ASSIGNMENT

Exercise 6. Read the sentences, having chosen the correct from of the verb given in brackets:

1. A pair of dissimilar silver electrodes (has been used, has used) for the indication of argentometric iodide titration.
2. Based on their penetration ointments (have divided, have been divided) into three classes.
3. The use of alcohol as a solvent for the active or useful principles in drugs (has practised, has been practised) for many years.
4. Absorption bases (have been found, have found) a definite place in pharmacy as well as cosmetology.
5. The liquid which (has been passed, has passed) through the filter is called the filtration.
6. The tendency towards formation of various polymorphic forms by organic compounds under pressure (has known, has been known) for long.
7. Careful study of the literature (has been shown, has shown) the rarity of data as to the metabolism of the earlier used papaverine and perparine.

Exercise 7. Read the sentences choosing the appropriate form of the Participle:

1. Three-layer tablets with methadone are prepared (when using, used) the same procedure.
2. Different absorbent materials (included, including) antacids interacted in a variety of ways with anti-rheumatics.
3. The use of aerosol containers (preventing, prevented) contamination and drying out of the product is preferable.
4. The dry material is reduced to a fine powder (subjected, subjecting) to the usual routine tests.
5. The medication in fine powder is then slowly sifted into the melted material (by stirring, stirred) constantly.
6. The turbidity (forming, formed) in the tested solution should not exceed the standard.

Exercise 8. Read the sentences choosing the appropriate form of the Participle given in brackets:

1. (Studying, having studied) the metabolism of drotaverin the scientists elaborated a method for the isolation and purification of metabolites.
2. (Giving, having given) high doses of papaverine to dogs by oral and parenteral routes we could not demonstrate the presence of the compound in the blood.
3. (Preparing, having prepared) oleoginous ointments it is advisable to use a small amount of oil substance.
4. (Suspending, having suspended) the prepared forms in distilled water for 48 h at room temperature they obtained two hydrate forms.
5. The solution was cooled to 0°C (by using, having used) an ice-salt bath.
6. (Penetrating, having penetrated) the skin the ointment caused an intensive colouration of the body surface.

Exercise 9. Form Perfect and Nonperfect form of Participles and translate them into Ukrainian:

Model: to find — finding — faund — having found.

To penetrate, to constitute, to demonstrate, to prepare, to change, to expose, to perform, to distribute, to add, to apply.

Exercise 10. Find equivalents of the Ukrainian words in the list given below. Translate the sentences:

Thus, nevertheless, therefore, however, on the contrary, moreover.

1. (Тому) the aim of this investigation was to determine the photodegration rate of some solutions.
2. (Більш того), this reaction is also possible even in the absence of oxygen.
3. (Проте) the solubility of the iodo-substitution was greater than the bromo-salt.
4. (Проте) this metabolite could not yet be isolated in quantities sufficient for instrumental analysis.
5. (Навпаки), ascorbic acid represents a high-dosage drug, while pheno-barbital is an example of a small-dosage drug.
6. (Таким чином), endodermic ointments are those which possess some power of penetration into the deeper layers of the skin.

Exercise 11. Read and translate into Ukrainian word combinations of the type "noun + noun":

Temperature changes, emulsion type, absorption bases, potassium iodide, paper filter, sugar particle, penicillin production, filtration paper, ointment base, water solution, penetration ointments, hand sieve, starch portion, alcohol content, solvent activity.

Exercise 12. Insert words from the text:

vegetable, divided, petrolatum, absorption, penetration, temperature, wool.

1. Ointments of emulsion type belong to the group of ... base.
2. The substance obtained is stable to normal climatic ... changes.
3. Based on their penetration ointments have been ... into three classes.
4. Epidermic ointments possess very slight power of ... into the skin.
5. Most of endodermic ointments contain ... oils, ... fats, lanolin, and/or combinations of these.
6. Ointments belonging to the group of hydrocarbon bases are prepared from ... with wax.

Exercise 13. Answer the questions:

1. What kind of preparations are ointments?
2. Are ointments used for internal or external application?
3. What consistency are the ointments of?
4. Do ointments soften or melt when applied to the body?
5. What classes have ointments been divided into?
6. What ointments possess the power of penetration into the deeper layers of the skin?
7. What melting point do most of endodermic ointments have?
8. What substances do endodermic ointments contain?
9. What ointments belong to the group of absorption base?
10. What are ointments belonging to the group of hydrocarbon base prepared from?

Exercise 14. Read and translate the text. Give summary of the text:

Preparation of Ointments

Ointments are prepared by two methods: 1) mechanical incorporation and 2) fusion. The choice of method depends upon the medicament and the physical properties of the constituents of the base. An exception is the preparation of Mercuric Nitrate Ointment which is prepared by chemical reaction.

Preparation by Incorporation. Mechanical incorporation performed by trituration in water, or a glass slab with a spatula, is more frequently used by the pharmacist than any other method. The medicaments being incorporated into a base are frequently insoluble in the base and it is necessary, therefore, to reduce them to an impalpable powder. Best results can be obtained by using a small portion of the base and gradually incorporating the powder. It is very advantageous to use a small amount (approximately 1–5 per cent) of an oil or an oil-miscible substance as a levigating agent when preparing oleaginous ointments.

Certain medicinal substances, such as the pilular extracts of vegetable drugs or agents which are soluble in a certain solvent, are more easily distributed through the base by first softening with such solvents. Some salts such as potassium iodide, the alkaloidal salts and others may be dissolved in water provided they are very soluble. Some substances such as menthol can be dissolved in a small amount of liquid petrolatum prior to incorporation.

Preparation by Fusion. When wax, spermaceti, resin, or other hard, fusible bodies should be incorporated with soft, oleaginous materials, they are melted on a water bath to avoid excessive temperatures. It is necessaty to begin with the material possessing the higher fusion point and add the other ingredients in order of decreasing values until the softer oleaginous and perhaps liquid ingredients, have all been incorporated by stirring. The medication in fine powder is then slowly sifted into the melted material. If large quantities of aqueous liquids are to be incorporated with melted oleaginous materials, as in the preparation of Rose ointment, the liquid should be warmed and then added slowly with constant stirring or trituration to the mixture.

CHECK YOURSELF

1. ... are ointments?
a) Which
b) When
c) What
d) Where
e) Whom

2. There ... several types of ointment basis.
a) have been
b) will have been
c) is
d) are
e) would be

3. Ointments are intented to be applied externally ... the body or mucous membranes.
a) to
b) in
c) out
d) over
e) by

4. ... types of ointments do you know?
a) How much
b) Which of
c) Do
d) How many
e) Did

5. Ointments bases containing animal fats, vegetable oils or hydrocarbons ... as oleaginous basis.
a) has been designated
b) is designated
c) are designated
d) to designate
e) have designed

6. A base consisting primarily ... a mixture of animal sterols with petrolatum jelly is classified as an absorption base.
a) at
b) out
c) of
d) with
e) by

7. Ointment bases ... from the higher ethylene glycol polymers.
a) have been prepared
b) are prepared
c) to be prepared
d) may be prepared
e) is prepared

8. ... is known as the water soluble type?
a) Where
b) When
c) Who
d) What
e) Which

9. Based on their penetration, ointment bases have been placed ... 3 classes: epidermic, endodermic and diadermic.
a) over
b) into
c) within
d) during
e) by

10. Until recently ointments and ointment type products ... in glass, stoneware, porcelain, polyethylene, or plastic wide-mouth jars.
a) was packaged
b) have packaged
c) has been packaged
d) were packaged
e) is packed

Lesson 26

EXTRACTION OF DRUGS

Grammar:

• Revision of Tenses

Exercise 1. Practice the pronunciation:

constituent [kən'stɪtjuənt], inert [ɪnə:t], advantage [əd'va:ntɪʤ], scum [skʌm], accurate ['ækjurɪt], inversion [ɪn'və:ʃn], centrifuged ['sentrɪfju:ʤd], charcoal [ʧa:kəul], molasses [məu'læsɪz].

Exercise 2. Vocabulary:

draining or expressing the juice from the fresh plant material — збирання або вичавлювання соку з свіжого рослинного матеріалу

the canes — очерет

the green cane, stripped of leaves — зелений очерет без листя

decolorizing agent — обезбарвлюючий засіб

advantage — перевага

beet — буряк

otherwise — інакше

Exercise 3. Give Ukrainian equivalents:

An active constituent; to be separated from; process of draining; fresh plant material; an accurate dosage; an easier method of preparation; still green; inversion of the sugar; highly purified products; natural sources; to rupture the cells; to squeeze out; free organic acids; carbon dioxide; a decolorizing agent.

Exercise 4. Read and translate the text:

Extraction of Drugs

The active constituents of drugs may in some cases be separated from the inert tissue of the plant by the simple process of draining or expressing the juice from the fresh plant material. The juices so obtained may then be evaporated to dryness, e.g. aloes.

The isolation and use in medicine of the active constituents of drugs offers advantages such as stability, ease of administration, and accurate dosage, on the other hand, less highly purified products may be cheaper and equally efficacious and in some cases have advantages over the pure substances. Although many of the constituents of plants may be prepared synthetically, e.g. quinine, isolation from natural sources often remains an easier and cheaper method of preparation.

Sucrose. It is a disaccharide that is obtained from the sugar-cane of the sugar-beet. About twelve month after planting, the canes are cut while still green and removed to the mills. The green cane, stripped of leaves, is pressed between rollers which rupture the cells and squeeze out the juice that is next strained, boiled with lime to neutralize free organic acids which would otherwise cause hydrolysis or inversion of the sugar, and the scum which rises to the top remover. After treatment with carbon dioxide the liquid is filtered through a filter-press prior to concentration. The concentration is now done at a much lower temperature (160–180°F). When sugar has crystallized, the crystals are centrifuged to separate them from the syrupy molasses. The solid mass which remains in the centrifuge is usually shipped to the factories for refining there. The refining process involves the use charcoal as a decolorizing agent.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the questions:

1. What process may help the active constituent of drugs be separated from the inert tissue of the plant?
2. What are advantages of the isolation and use of the active constituent of drugs?
3. Why may products be cheaper?
4. When are the canes cut?
5. What is the process of getting the juice?
6. When is the liquid filtrated?
7. What is the temperature at which the concentration is done?
8. Where is solid mass which remains in the centrifuge shipped to?
9. Why is charcoal used?

Exercise 6. Group the words according to the parts of speech:

Active, drugs, separate, tissue, juice, fresh, use, medicine, offer, accurate, other, purify, many, from, often, easy, be, of, sugar, twelve, are, while, green, the, acid, which, is, mass, for, a, agent.

Exercise 7. Supply the missing words:

l. The juices so ... vary then be evaporated to dryness.

2. It is a ... that is obtained from the sugar-cane of the sugar-beet.

3. After treatment with ... the liquid is filtered by a filter press prior to concentration.

4. The concentration is now done at a ... temperature.

5. Although many of the ... of plants may be prepared synthetically.

6. The ... which remains in the centrifuge is usually shipped to the factories for refining there.

7. The refining process involves the use of ... as a decolorizing agent.

Exercise 8. Find the root of the following words and translate them:

Dryness, constituent, stability, administration, dosage, cheaper, synthetically, remove, neutralize, treatment, concentration, decolorizing.

Exercise 9. Give a summary of the text.

Extraction of Drugs (continued)

Sugar-beet is widely grown in Europe. The sugar-content of beet varies from 10 per cent and is dependent on the variety of beet, the climate, soil and other conditions. Beet also contains a variety of undesirable substances such as amino-acids, other organic acids of low molecular weight and ash-forming salts, these substances being readily soluble are extracted along with the sugar. The first stage of extraction is a diffusion process. The beet is cut into shreds and extracted by water at 78 to 80°C in a battery of diffusers. The diffusers are arranged so that the shredded beet passes from a liquid containing less sugar and finally to pure water. An advantage of the diffusion process is that the walls of the beet cells are used as a filter so that proteins and other colloidal substances are not extracted. The juice is heated up to 80–90°C. It coagulates and absorbs any colloidal impurities and neutralizes free acids. The acids bring about inversion of the sucrose. The liquid is then treated with carbon dioxide and passed through filter presses to remove calcium carbonate and the precipitated impurities. After passing carbon dioxide and filtering the juice is further processed by passing sulphur dioxide and filtration. The filtrate which contains some 12 to 15 per cent of sucrose is evaporated under reduced pressure to a thick juice. This juice reaches the super-saturation or graining point. At this stage the semi-crystalline mass of sucrose crystals and molasses passes to a centrifuge where the mother liquor is separated and the crystal washed with a little water. The sugar is then cooled, dried and screened.

POST-TEXT ASSIGNMENT

Exercise 10. Answer the questions:

1. Where is sugar-beet widely grown?
2. What does beet contain?
3. What stages of extraction do you know?
4. What do the acids bring?
5. When does the juice reach the super-saturation or graining point?

Exercise 11. Form the Past Tense of the following verbs:

To be; to vary; to contain; to cut; to pass; to heat; to bring; to treat; to remove; to reach; to come.

Exercise 12. Put the verbs in brackets into the correct Voice and Tense:

1. Although many of the constituents of plants may (to prepare) synthetically.
2. About twelve months after planting, the canes (to cut) while still green and (to remove) to the mills.
3. The green cane (to press) between very heavy rollers.
4. The refining process (to involve) the use of charcoal as a decolorizing agent.
5. The juice (to reach) the super-saturation or graining.
6. The sugar (to crystallize) the crystals are centrifuged to separate them from the syrupy molasses.
7. The active constituents of drugs may (to be separated) in some cases from the inert tissue of the plant.
8. The juice so obtained may then (to evaporate) to dryness.

Exercise 13. Put the questions to the printed in italics words:

1. The active constituents of drugs may be separated from the tissue *of the plant*.
2. The solution and use in medicine of the active constituents of drugs offers *advantages.*
3. *About twelve months* after planting the canes are cut.
4. After treatment with carbon dioxide the liquid *is filtered through a filter press*.
5. *The solid* mass which remains in the centrifuge is usually shipped to the factories for refining these.
6. Sugar-beet is *widely* grown in Europe.

7. Beet contains a variety of *undesirable* substance.

8. These substances are extracted along with *the sugar*.

9. The filtrate is evaporated under reduced pressure to a *thick juice*.

10. The juice is heated up to *80–90°C*.

Exercise 14. Translate into English:

1. Активні компоненти ліків можуть бути виділені з тканини рослин.

2. Процес збирання або вичавлювання соку з свіжої рослинної сировини широко використовується в медичній практиці.

3. Сік може повністю випаруватися.

4. Це є найлегшим і більш дешевим методом приготування препаратів.

5. Багато що може бути приготовано синтетично.

6. Сік фільтрують і кип'ятять з вапном, щоб нейтралізувати вільні органічні кислоти.

7. Вільні органічні кислоти можуть бути причиною гідролізу.

8. Розчин фільтрується.

9. Вміст цукру в цукровому буряку різний і залежить від різних чинників.

10. Цукровий буряк містить також багато небажаних речовин.

11. Обробка буряка проходить кілька стадій.

12. Перевага стадії дифузії полягає в тому, що білки і деякі інші речовини не виводяться.

13. Сік нагрівається до 80–90°C і обробляється вапном.

14. Фільтрат містить 12–15% сахарози.

15. Фільтрат випаровується під тиском.

16. Сік охолоджують.

CHECK YOURSELF

1. Active constituents of drugs may in some cases ... from the inert tissue of the plant by the simple process draining or expressing the juice from the fresh plant material.
a) to separate
b) is separated
c) are separated
d) be separated
e) to be separated

2. After passing carbon dioxide and filtering the juice is further processed ... passing sulphur dioxide and filtration.
a) for
b) in
c) by
d) on
e) from

3. What process may help the active constituents of drugs be separated from the inert tissue of the plant?
a) expressing
b) treating
c) isolating
d) straining
e) evaporating

4. What constituents of plant may be evaporated to dryness?
a) root
b) stem
c) seed
d) leaf
e) juice

5. The isolation and the use in medicine of the active ... of drugs offer advantages.
a) functions
b) compounds
c) structures
d) sources
e) constituents

6. Less highly purified products may be ... and equally efficacious.
a) expensive
b) cheaper
c) longer
d) isolated
e) purified

7. Many of constituents of plants may now be prepared ... .
a) naturally
b) ordinarily
c) possibly
d) synthetically
e) physically

8. Sucrose is a ... that is obtained from the sugar-cane.
a) monosaccharide
b) saccharine
c) tertasaccharide
d) disaccharide
e) trisaccharide

9. About ... months after planting, the canes are cut while still green.
a) 1
b) 1.10
c) 2
d) 9
e) 12

10. After treatment with ... the liquid is filtered through a filter press prior to concentration.
a) sulphur dioxide
b) hydrogen dioxide
c) carbon dioxide
d) water
e) iron

Lesson 27

HERBS

Grammar:
- ***Indefinite Active Participle I***
- ***Degrees of Comparison***

Exercise 1. Practice pronunciation:

herbaceous [hə:'beiʃ(ə)s], foliiferous [fɔ'lɪfərəs], floriferous [flɔ'rɪfərəs], powder ['paudə], fibre ['faɪbə], prior [praɪə], pubescence [pju(:)'besns], feature [fi:ʧə], entire [ɪn'taɪə], measure ['meʒə], hygroscopic [haɪgrəu'scəupɪk].

Exercise 2. Vocabulary:

herb — трава
foliiferous and floriferous stems — листоносні і квітконосні стебла
fruit-bearing — плодоношення
to blossom — цвісти
inflorescence — суцвіття
to gather — збирати
entire — весь
root — коріння
to thresh — обмолочувати
cotyledons — сім'ядоля
lens — лупа
trituration — розтирання в порошок
venation — розташування жилок
pubescence — пушок (на рослинах)
to steep — вимочувати
to flatten — розгладжувати
leaf arrangement — структура листя
feature — особливість
pericarp — оплодень
drugstore = pharmacy — аптека
with the naked eye — неозброєним оком

Exercise 3. Give Ukrainian equivalents to the following word combination:

The overground part; the period of full flowering; the length of the stem; blossoming inflorescences; characteristic features; different species; an insignificant amount; entire external appearance; straight lateral walls; well-ventilated premises; a magnifying glass; leaf venation; the leaf arrangement.

Exercise 4. Match the following English word combinations with the Ukrainian ones:

1. floriferous stems
2. external appearance
3. entire overground part
4. insignificant amount
5. different species

a. незначна кількість
b. різні види
c. квітконосні стебла
d. зовнішній вигляд
e. уся наземна частина

Exercise 5. Read and translate the text:

Herbs

Under "herbs" we mean the dried overground parts of herbaceous plants consisting of foliiferous and floriferous stems. Herbs are collected mostly during the period of full flowering, in some cases prior to flowering or at the time of fruit-bearing; herbs with gradually blossoming inflorescences are gathered at the time of the utmost flowering; in this case they may carry flowers and fruits in different stages of development. The way of gathering herbs is different for different species; in some only tops are gathered, in others the entire overground parts, with only the thick lower stems being rejected; in some herbs after threshing only the flowers and leaves are used. Some herbs are gathered with the roots.

Identity of entire herbs is determined by their external appearance. In cut and threshed material whole flowers and fruits are chosen and their shape and characteristics are examined using a lens. Leaves, when required, and powders, as a rule, are examined microscopically.

Description. Determined in dry herbs is the colour, odour at trituration, character of leaf venation and pubescence of various parts of the plant. The structure of the fruits is examined with the naked eye, or through a magnifying glass; the length of the stem and the size

of flower heads are measured. After rapid steeping of the herb in hot water it is flattened out on a glass plate to determine the leaf arrangement.

Elements of the stem, flower, seeds and fruits occur in the powder of herbs. Features characteristic of stem parts are larger vessels, fibres and epidermis (peel) cell with straight lateral walls. As a rule powders contain an insignificant amount of fruit and seed elements.

The material is stored in dry, well-ventilated premises, in a place protected from light; in drugstores in boxes provided with lids, some hydroscopic herbs in tins or jars with tight-fitting lids, when necessary sealed with paraffin. Prior to filling, jars should be dried at 60–70°C. Poisonous herbs are stored with the observation of special rules.

POST-TEXT ASSIGNMENT

Exercise 6. Find word-building elements in the following words and translate them:

consisting, development, different, appearance, trituration, additional, poisonous, observation, arrangement, flowering, gathering.

Exercise 7. Read and translate the following nouns and name their common structural element:

Mixture, moisture, manufacture, fracture, structure, admixture, lecture, adventure, literature.

Exercise 8. Form nouns from the given verbs with the help of suffixes **-or**, **-er** and translate them:

Make, build, observe, collect, react, examine, investigate, teach, manage, experiment

Exercise 9. Give the main forms of the following verbs:

E.g. to find — found — found

To show, to make, to fall, to cut, to be, to have, to give, to know, to shake, to break, to keep, to do.

Exercise 10. Write the sentences in Plural and translate them:

Model: The way of gathering fruits is different. — The ways of gathering fruits are different.

1. The flower is examined microscopically.
2. Is this herb examined with the naked eye?
3. The herb is flattened out on a glass plate to determine the leaf arrangement.
4. The poisonous herb was stored in a jar with tight-fitting lids.
5. A transverse section of the rhizome shows two rings of vascular bundles.

Exercise 11. Put questions to the printed in italics words:

1. The structure of the fruits is examined with *the naked eye.*
2. The material is stored in dry well-ventilated premises, *in a place protected from light.*
3. Herbs are collected mostly *during the period of full flowering.*
4. Herbs are not gathered entirely *as thick lower stems are often rejected.*
5. Similar enzymic activity was found *in a variety of plant material.*
6. The plant is made up of *four* principle parts.

Exercise 12. Substitute participial construction for subordinate clause:

Model: Gathering medicinal herbs we determine them by their external appearance. — When we gather medicinal herbs, we determine them by their external appearance.

1. Examining the structure of the fruit we determined its principle parts.
2. Examining the leaf from the surface we can see epidermis cells.
3. Removing the external layer of the fruit we found that the structure inside consisted of cotyledons.
4. Determining the leaf arrangement it is necessary to flatten it out on a glass plate.
5. Drying the plants it is necessary to protect them from the action of the sunrays.

Exercise 13. Insert adjectives in the necessary degree of comparison:

bright, good, green, familiar.

1. Petals are ... than sepals.
2. Flowers in the south are usually coloured ... than in the north.
3. You should be ... with the parts of the flower.
4. The structure of the fruit is examined ... with a magnifying glass than with the naked eye.

Exercise 14. Read the sentences and translate them into Ukrainian. Pay attention to the conjunction as ... as:

1. As little as 0.0001% of carbon dioxide is involved in the reaction.
2. Absorption sometimes begins at the temperature as low as 70°C.
3. It is as early as 3 o'clock in the morning.
4. The patient's temperature is as high as 101°F.

5. The solution contained as much as 0.324 mg of the sulphate salt.

6. The presence of 1 mole of sodium salicylate increases the solubility of the product at the temperature as low as 30°C.

Exercise 15. Answer the questions:

1. What is meant under "herb"?
2. When are herbs collected?
3. What can you say about the way of gathering herbs?
4. Are all herbs collected at the time of fruitbearing?
5. What parts of herbs are usually gathered?
6. What parts of herbs are examined microscopically?
7. What are stem parts characterized by?
8. What elements do powders contain?
9. What is determined in herbs?
10. Where is the raw material of herbs stored?

Exercise 16. Translate into English:

1. Висушені частини трав'янистих рослин складаються з квітконосних і листоносних стебел.
2. Суцвіття розпускаються поступово.
3. Трави збирають не тільки в період повного цвітіння.
4. У деяких випадках трави можуть мати квіти і плоди.
5. Верхівки деяких рослин теж збираються.
6. Збираючи трави, ми відкидаємо нижні товсті стебла.
7. Занурюючи рослину в гарячу воду, ми можемо краще роздивиться її структуру.

Exercise 17. Find substitution of the following word combinations:

threshing, flower, herb, stem, plant.

1. Plant whose stem is soft and dies down to the ground after flowering.
2. Main body of plant.
3. Organism containing chlorophyll enabling it to live wholly on inorganic substances.
4. Part of plant from which fruit or seed is developed.
5. Beating out or separating grain.

Exercise 18. Speak about:

1. Ways of gathering herbs.
2. Description of herbs.
3. Data determined in herbs.

Exercise 19. Write a summary of the text.

CHECK YOURSELF

1. Under "herbs" ... the dried overground parts of herbaceous plants.
   a) meant
   b) is meant
   c) we mean
   d) we meant
   e) was not meant

2. Herbs ... mostly during the period of bull flowering.
   a) is collected
   b) collected
   c) was collected
   d) are collected
   e) collecting

3. The way of gathering herbs ... for different species.
   a) is different
   b) different
   c) differented
   d) differing
   e) were different

4. Identity of entire herbs ... by their external appearance.
   a) is determined
   b) are determined
   c) determining
   d) determines
   e) are not determined

5. Leaves, when required, ... microscopically.
   a) exam
   b) examining
   c) are examined
   d) has been examined
   e) is examined

6. Elements of the stem, flower, seeds and fruits ... in the powder of herbs.
   a) occur
   b) occuring
   c) occurs
   d) occured
   e) was occured

7. Features characteristic of stem parts ... larger vessels, fibres and epidermis cell with straight lateral walls.
   a) are
   b) was
   c) be
   d) have
   e) is

8. As a rule powders ... an insignificant amount of fruit and seed elements.
a) contained
b) containing
c) contain
d) contains
e) was containing

9. Such reactions ... as an additional method for identification.
a) serves
b) serving
c) has served
d) serve
e) was served

10. Poisonous herbs ... with the observation of special rules.
a) are stored
b) is stored
c) has stored
d) have stored
e) have not stored

Lesson 28

LILY-OF-THE-VALLEY. ARNICAL FLORETS

Grammar:
• ***Simple Tense Active and Passive***

LILY-OF-THE-VALLEY

Exercise 1. Practice the pronunciation:
sheath [ʃi:θ], glabrous [’gleıbrəs], petioles [’petıəulz], naked [’neıkıd], raseme [rə’si:m], triangular [traı’æŋgjulə], perianth [’perıænθ], unilateral [’ju:nı’læt(ə)r(ə)l], axil [’æksıl], acuminate [ə’kju:mınıt], lanceolate [’la:nsıəl(ə)it].

Exercise 2. Vocabulary:
lily of the valley — конвалія
sheath — оболонка
acuminate — загострений
perennial — багаторічний
glabrous — гладкий, оголений
arching venation — дугоподібне жилкування
petiole — черешок листа
scape — стебло
naked — голий, відкритий
loose raceme — порожнисте суцвіття
axils of shirt, filmy, lanceolate bracts — пазухи плівчастих ланцеподібних приквітків
perianth — оцвітина
corolla-like — віночкоподібний
filament — тичинкова нитка
globular — кулястий
faint — слабкий
palisade — полісадний
ovary — зав’язь
stamen — тичинка
to emerge — виходити
raw material — сировина
to bend (bent, bent) — гнути(ся)
to stretch — витягувати(ся)

Exercise 3. Read and translate the text:

Herb of Lily-of-the-Valley

Overground parts of the wild perennial plant lily-of-the-valley are gathered at the time of flowering.

Two kinds of raw material are distinguished: flowers (inflorescence), leaves and grass. Leaves with long sheaths, separate or conjugate, oval or oblong-elliptical; acuminate, entire, glabrous on both sides, with arching venation, green, petioles often yellowish. The leaf is 10–20 cm long, 3–8 cm wide. Flower scapes are naked, light green, triangular or halfrounded in cross-section, terminating in a unilateral loose raceme. Flowers with a simple perianth on bent flower stems, emerging from the axils of shirt, filmy, lanceolate bracts. The corolla-like perianth is bell-shaped, 6 stamens on short filaments fixed at the base of the perianth. The superior ovary is globular, trilocular. Odour is faint.

Raw Material is pieces of flower scapes, leaves and whole flowers from 1 to 10 mm in size.

Microscopical Examination. When examining the leaf from the surface it shows on both sides epidermis (skin) cells stretched along the leaf axis. Cells of the “lying” palisade tissue are seen under the upper epidermis stretched horizontally and situated crosswisely in relation to the length of the leaf, which is characteristic of the lily-of-the-valley leaves.

POST-TEXT ASSIGNMENT

Exercise 4. Answer the questions:

1. When are the overground parts of lily-of-the-valley gathered?
2. What do leaves look like?
3. How long is the leaf?
4. What do flower scapes look like?
5. What is the shape of perianth?

6. What is the odour of lily-of-the-valley?
7. What do raw material consist of?

Exercise 5. Give English equivalents to the following word combinations:

Загострений лист, час цвітіння, слабкий запах, однобічне суцвіття, весь лист, проста оцвітина, стебло квітки, обидві сторони, довжина листа.

Exercise 6. Describe the herb.

ARNICAL FLORETS

Exercise 1. Practice the pronunciation:

arnica [a:nikə], receptacle [ri'septækl], bract [brækt], pistillate ['pistileit], allied [ə'laid], pubescent [pju:'besnt], achene ['eiki:n], surmount [sə:'maunt], pappus [pæpəs], rhizome [ri'zəum], larvae ['la:və].

Exercise 2. Vocabulary:

mower-head — квіткова верхівка
to bear pits — у ньому є заглиблення
lingulate florets — язичкові квіти
barbed bristles — колючі волоски
hermaphrodite — двопалий
bruises — синці
sprains — розтягування
larva, pl. larvae — личинка
receptacle — вмістище
brittle — ламкий
involucre — обгортнення суцвіття
pollen — пилок
achene — сім'яник
bundle — пучок
bark — кора
wiry — жилавий
pitch — серцевина
bract — приквіток
to bear pits — мати заглиблення
lanceolate — ланцетоподібний

Exercise 3. Fill in the blanks with prepositions or adverbs where required:

1. Arnica consists ... the dried flower-heads or flowers ... Arnica montana, a small perennial herb found ... alpine meadows ... Central Europe.
2. The receptacle bears pits, corresponding ... the position ... the flowers, ... each ... which is a stiff britle.
3. The involucre consists … two rows ... dark green, hairy, lanceolate bracts. ... 1 cm ... length.
4. The constituents are similar ... those ... the flowers.

Exercise 4. Read and translate the text:

Arnical Florets

Arnica consists of the dried flower-heads or flowers of Arnica montana, a small perennial herb found in alpine meadows in the Central Europe. The drug sometimes consists of the whole flower-heads, sometimes of the florets only. Several pharmacopoeias specify the florets only since the receptacles often contain the larvae of Trypeta arnicivora.

The receptacle, if present, is about 8 mm in diameter and is slightly convex. It bears pits, corresponding to the position of the flowers, in each of which is a stiff britale. The involucre consists of two rows of dark green, hairy, lanceolate bracts about 2 cm in length.

The pistillate, lingulate florets are about 3 cm long. Each consists of a yellow corolla having three teeth and seven to twelve veins, a style and stigma, and a pubescent, dark brown achieve 4 to 7 mm long. The latter is glandular and is surmounted by a large white pappus consisting of very characteristic, barbed bristles. The disk of florets resembling the lingulate ones have a tibular corolla and are hermaphodite. When examined microscopically, numerous spiny pollen grains and the form of the hairs are seen. Odour, slight but agreeable; taste, bitter and acrid.

Arnica contains about 0.5 per cent of voltile oil, a bitter principle (arnicin), resin, colouring matter, and arnidiol (amisterin).

A dilute tincture of arnica is used for bruises and sprains.

Arnica rhizome consists of the dried rhizome and roots of Arnica montana. The rhizome is dark brown, about 2 to 10 cm long and 2 to 6 mm in diameter. It bears numerous wiry roots and leaves. The transverse section shows a yellowish bark containing oleoresin ducts, a ring of vascular bundles, and a large pith. The constituents are similar to those of the flowers. About 10 per cent of inulin is also present but starch is absent.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the following question:

1. What does Arnica consist of?
2. Where does it grow?
3. Does the drug consist of the whole flower-heads or the florets only?
4. The receptacle, if present, is about 8 mm in diameter and is slightly convex, isn't it?
5. The involucre doesn't consist of two rows of dark green, hairy lanceolate bracts, does it?
6. What is the length of the pistillate, lingulate florets?

7. What are seen when examined microscopically?

8. What have you learnt about Arnica's constituents?

9. What is a dilute tincture of arnica used for?

10. Are there any allied drugs and what do you know about them?

CHECK YOURSELF

1. The overground parts of lily-of-the-valley are gathered ... .
a) when planted
b) with dry roots
c) with dry flowers
d) at the time of flowering
e) at the end of winter

2. Flower scapes are ... in cross section.
a) oval
b) round
c) rectangular
d) flat
e) triangular

3. The lily-of-the-valley leaf is ... cm long.
a) 5
b) over 5
c) 10–20
d) over 20
e) 21–25

4. The corolla-like perianth is bell-shaped with ... stamens.
a) three
b) four
c) five
d) six
e) seven

5. The odour of lily-of-the-valley is ... .
a) acrid
b) strong
c) faint
d) pleasant
e) very strong

6. Arnica is found in ... .
a) Latin America
b) Australia
c) Asia
d) Central Europe
e) Eastern Europe

7. The receptacle is about ... in diameter.
a) 2 cm
b) 8 mm
c) 9 cm
d) 10 mm
e) 12–15 mm

8. Arnica Montana is a small perennial ... .
a) tree
b) herb
c) bush
d) flower
e) root

9. Arnica has ... corresponding to the position of the flowers.
a) holes
b) sockets
c) cavities
d) pits
e) slits

10. The disc of florets has a tibular ... .
a) pollen
b) corolla
c) hair
d) branch
e) cavity

Lesson 29

FILLING OF AMPOULES

Grammar:
- ***Infinitive***
- ***Perfect Active and Passive***
- ***Gerund***

Exercise 1. Practice the pronunciation:

ampoule ['æmpu:l], parenteral [pæ'rentərəl], routine [ru:'ti:n], machine [mə'ʃi:n], cover ['kʌvə], label ['leɪbl], desired [dɪ'zaɪəd], evaporate [ɪ'væpəreɪt], aqueous ['eɪkwɪəs], weighing ['weɪɪŋ], laborious [lə'bɔ:rɪəs].

Exercise 2. Vocabulary:

to lead — вести
to charge with — наповнювати
to convey — передавати
filling machine — заповнююча машина (пристосування)
desired amount — бажана кількість
the latter — другий (з двох)
with regard to — відносно
to dismantle — демонтувати
tray — лоток
hood — ковпак
in bulk — цілком
time-consuming — займає багато часу

Exercise 3. Give Ukrainian equivalents:

Opposite ends, air-conditioned room, frozen state, fine powder, routine tests, moisture content, rubber cups, metal cover, dried salts, laborious method.

Exercise 4. Read and translate into Ukrainian the adjectives formed with the help of suffixes **-ic**, **-y**, denoting property or quality:

Alcoholic, phenolic, electronic, economic, atomic, mercuric, organic, icy, watery, windy, earthy, airy, showy, dirty, oily, sugary.

Exercise 5. Translate the words having the same root:

Prepare, preparation; associate, association, associated, associative; sterility, sterilize, sterilization, sterilized, sterilizer; complete, completion, completely; measure, measurable, measurement, measureless

Exercise 6. Read and translate the text:

Filling of Ampoules

The ampoules are first washed with ordinary water and then with pyrogen-free distilled water. They are sterilized in sterilizers provided with two doors at opposite ends. One leads into the non-sterile area for charging the sterilizers with washed, non-sterile ampoules, and the other leads into the sterile area for removing the ampoules after sterilization. After cooling the trays are conveyed to the automatic filling machines. Filling is carried out in a small air-conditioned room under a hood, provided with ultraviolet lamps. All parts of the filling machine which come in contact with the substance to be packed are daily dismantled, cleaned, and sterilized.

For parenteral use the dry sodium salt of penicillin is dispensed in ampoules usually in amounts of 100,000 or 200,000 units which are prepared in one of two ways.

A concentrated aqueous solution of sodium penicillin is dried in bulk from the frozen state. The dry material is reduced to a fine powder which is subjected to the usual routine tests (potency, toxicity, pyrogen content, sterility, moisture content). The desired amount is then measured into the ampoules by hand or automatic machines. After filling, the ampoules are closed with sterilized rubber caps or stoppers and then removed from the sterile area for receiving metal covers, labelling and final packing.

The concentrated solution of penicillin is put into the ampoules in the desired amounts, generally by using an automatic filling machine which discharges measured (1–2 ml) amounts, frozen in them and evaporated to dryness in the frozen state.

The method of drying the aqueous solution of penicillin salts in the final containers is practised more commonly in the large penicillin plants than the method of weighing the bulk of dried salts into each individual ampoule, but the latter, though more laborious and time-consuming, has given equally good results with regard to sterility and keeping power.

POST-TEXT ASSIGNMENT

Exercise 7. Answer the questions to the text:

1. In what amounts is the dry sodium salt of penicillin dispensed in ampoules?
2. What state is the dry material reduced to?
3. By what means is the desired amount of fine powder measured into ampoules?
4. What process usually takes place after filling the ampoules?
5. How many methods of dispensing the dry sodium salt of penicillin in ampoules are used in practice?
6. Which method is more commonly practiced in the large penicillin plants?
7. Can any water be used for washing ampoules?
8. What is the structure of sterilizers?

Exercise 8. Read the sentences having chosen the appropriate form of the Infinitive. Translate into Ukrainian:

1. The amount of plasma (to give, to be given) in case of burns depends on the condition of shock.
2. The penicillin (to be injected, to inject) intravenously or intramuscularly must be always freshly prepared.
3. Pavlov was the first (to open, to be opened) a new epoch in physiology.
4. The natural source of vitamins (to be given, to give) to the patients is in the food they consume.
5. The liquid (to be passed, to pass) through the filter press is first treated with carbon dioxide.
6. The tablets (to be dissolved, to dissolve) slowly in the mouth must be more strongly compressed than other tablets.
7. The daily dosage of vitamin B_1 (to give, to be given) to adults suffering from hypovitaminosis is 0.006–0.012 g.

Exercise 9. Transform the compound sentences into simple ones using the Infinitive:

Model: The dose of morphine which should be used by adult persons is 8–16 mg. — The dose of morphine to be used by adult persons is 8–16 mg.

1. The dry material which is to be measured into the ampoules is reduced to a fine powder.
2. All parts of the filling machine that come in contact with the substance which is to be packed are sterilized.
3. The liquid which should be concentrated at a much lower temperature is filtrated through a filter.
4. The ampoules which are to be filled with the dry sodium salt of penicillin are first washed with ordinary water and then with pyrogen-free distilled water.
5. The dry material is reduced to a fine powder which should be subjected to the usual routine tests before putting them into the ampoules.
6. The liquid which should be filtered through a filter press prior to concentration is treated with carbon dioxide.
7. Immerse a small piece of skin in the solution which should be tested for 5 min.

Exercise 10. Read the sentences choosing the correct form of the Gerund given in brackets:

1. It has been demonstrated that bacteria continue to multiply for a time after (planting, being planted) in broth containing small concentrations of penicillin.
2. After (being filled, filling) the ampoules are closed with sterilized rubber caps.
3. He dried the precipitate on the paper without (being removed, removing) it from the funnel.
4. Analysis of the active ingredient was accomplished by (employing, being employed) gas-liquid chromatography.
5. These gases were purified before (introducing, being introduced) into the absorption glass tubes.

Exercise 11. Read the sentences and point out the Gerund. Translate into Ukrainian:

1. One salt can be transformed into another by treating it with an acid.
2. After filling, the ampoules are closed with stoppers.
3. Filtration is the process of separating liquids from solids.
4. In addition, attention must be given to avoiding the incorporation of electrolytes into the solution.
5. The procedure was found to be reliable for solving certain analytical problems.

Exercise 12. Read the sentences, put the verb given in brackets in the Perfect Passive or Active.

1. Several formulae (to suggest) for the preparation of stable reserpine.
2. When sugar (to crystallize) the crystals were centrifuged.
3. Some penicillin salts (to prepare) from benzylpenicillin sodium salt.

4. They (to sterilize) all the ampoules when the assistant came into the laboratory.

5. Extraction spectrophotometry (to receive) considerable attention in recent years.

Exercise 13. Insert complex prepositions:

in view of, out of, according to, by means of, with regard to, regarding.

1. The proteins are classified chiefly ... their solubility.

2. The filling of ampoules is carried out ... automatic filling machine.

3. … the favourable results the doctor also prescribed mexaform.

4. ... 91 patients of this group only 9 failed to respond to mexaform.

5. During the investigation difficulties arose ... the structure of the compound.

6. Papers on the subject are very rare and contain no statement ... the stability of aqueous solutions of thioridazine hydrochloride.

7. The method described gives equally good results ... sterility and keeping power.

Exercise 14. Translate into English:

1. Сухий матеріал подрібнюється.

2. Дрібний порошок піддається звичним випробуванням.

3. Після наповнення ампули закриваються стерильними гумовими кришками.

4. Концентрований розчин пеніциліну містять в ампули за допомогою автоматичного заповнювача.

5. Звична вода застосовується для первинного промивання ампул.

6. Наповнення ампул проводиться в спеціальних приміщеннях.

Exercise 15. Read and translate the text using dictionary. Make a summary of the text:

Tinctures

Tinctures are defined as alcoholic or hydroalcoholic solutions prepared from animal or vegetable drugs or from chemical substances.

Tinctures differ from spirits in being made from nonvolatile bodies; the tinctures containing volatile constituents extracted from drugs and those containing iodine are exceptions to the rule.

Tinctures are made by percolation, maceration, solution, or dilution and the menstrua employed in the official tinctures are alcoholic, dilute alcohols of various strengths, aromatic ammonia spirit, ammonia water, or mixtures of alcohol, water and glycerin. Wines, such as Sherry, have also been used as menstrua, the resulting preparations being referred to as Vini or Wines.

The use of alcohol as a solvent for the active or useful principles in drugs have been practiced for many years, but it has required a long time and much experience to determine the proper proportion of water to be added. The menstrua should dissolve the therapeutically valuable constituents to the drugs without extracting the inert principles, and yet contain sufficient alcohol to secure permanent preparations that will not in time deposit a portion of their active constituents.

The proportion of drug represented in the different tinctures is not uniform but varies according to the established standards for each. Tinctures of potent drugs essentially represent the activity of 10 g of the drug in each 10 ml of tincture. Most other tinctures represent 20 g of the respective drug in each 100 ml of tincture. Compound tinctures are made according to long established formulas.

Tinctures are unsuitable for extended dilution with aqueous solutions or liquid of very low alcohol content.

Although a very small amount of such a liquid can be added to a tincture without marked precipitation, further addition causes a separation of a part of the extractive matter from the tincture. Considerable precipitation occurs when a tincture is added to a comparatively large volume of a vehicle of low alcohol content.

There are three different methods represented in the processes for making tinctures: percolation, maceration, and solution or dilution.

Percolation is the best method for making tinctures, when the drugs are capable of being readily extracted.

Maceration is the method of making tinctures is used in the case of resins, balsams, gums, soap, etc.

A few tinctures are made by solution or dilution, such as iodine tincture, by dissolving iodine in a solution of potassium iodine and adding alcohol; ferric chloride tincture, by diluting the ferric chloride solution with alcohol, etc.

Tinctures should be stored in tight, light-resistant containers protected from exposure to direct sun light and excessive heat.

CHECK YOURSELF

1. The ampoules are first washed with ... .

a) alcohol
b) distilled water
c) ethyl
d) ordinary water
e) solvent

2. Filling ... in a small air-conditioned room.
a) carry out
b) is carried out
c) carries out
d) has been carried out
e) is carrying out

3. A concentrated aqueous solution of sodium penicilin is dried from ... .
a) the liquid state
b) the gaseous state
c) the frozen state
d) the boiling state
e) the cooled state

4. After filling the ampoules are closed with ...
a) clamp
b) stopper
c) cotton wadding
d) plaster
e) adhesive plaster

5. The dry material is reduced to ... .
a) a gel
b) a tabletted form
c) a fine powder
d) an emulsion
e) a suspension

6. For parenteral use the dry sodium salt of penicillin is dispensed in ... .
a) vials
b) ampoules
c) boxes
d) syringes
e) tubes

7. The desired amount is measured ... the ampoules by hand or automatic machine.
a) in
b) into
c) on
d) inside
e) at

8. After filling the ampoules are removed ... the sterile area.
a) outside
b) on
c) by
d) from
e) with

9. The method of weighing of dried salts into the individual ampoule has given good results with regard ... sterility and keeping power.
a) in
b) on
c) by
d) at
e) to

10. The concentrated solution of penicillin is put into the ampoules generally ... using an automatic filling machine.
a) with
b) by
c) for
d) at
e) in

Lesson 30

VOLATILE OILS. EXTRACTION OF VOLATILE OILS

Grammar:
- ***Indefinite Sentences***
- ***Passive Voice***

VOLATILE OILS

Exercise 1. Practice the pronunciation:
aldehyde ['ældıhaıd], volatile ['vɔlətaıl], perfumery [pə'fju:mərı], eucalyptus [ju:kə'lıptəs], chamomile ['kæməumaıl].

Exercise 2. Vocabulary:
volatile oils — леткі олії
terpenes — терпени
mustard — гірчиця
to associate — асоціювати, зв'язувати
almond — мигдаль
chamomile — римська ромашка
ester — складний ефір
resin — смола, камедь
duct — протока, канал
flavour — приємний смак, присмак, аромат
oil of wintergreen — олія зимолюбки

Exercise 3. Read and translate the text:

Volatile Oils

Volatile or essential oils are usually mixtures of the terpenes and their derivatives. Exception are oil of mustard, oil of wintergreen, volatile oil of almonds, and oil of chamomile. Under the name terpene one usually includes the true terpenes of the formula $C_{20}H_{32}$, the sesquiterpenes, $C_{15}H_{24}$, and the diterpenes, $N_{20}I_{32}$. From these three types of hydrocarbons are derived the numerous alcohols, phenols, ketones, aldehydes, and esters which are found in volatile oils. They thus differ markedly in both chemical and physical properties from the fixed oils. With the exception of oils such as oil of bitter almonds, which are produced by the hydrolysis, volatile oils are contained as such in the plant. They are secreted in oil cells or in secretion ducts and cavities, where they are frequently associated with other substances such as gums and resins. Volatile oils are used for their medicinal action (e.g. oil of eucalyptus) for flavouring, or in perfumery (e.g. oil of rose). In pharmacy, however, oils are used for all three purposes.

POST-TEXT ASSIGNMENT

Exercise 4. Answer the following questions to the text:
1. What are volatile oils?
2. What is derived from the three types of hydrocarbons?
3. Where are volatile oils secreted?
4. What are volatile oils frequently associated with?
5. What purposes are volatile oils used for?

Exercise 5. Read and translate the following adjectives. Pay attention to the suffix **-al**:
Experimental, chemical, practical, physical, social, medicinal, personal, special, conical, clinical, formal, theoretical.

Exercise 6. Read and translate the following adverbs. Pay attention to the suffix **-ly**:
Daily, greatly, beautifully, markedly, friendly, normally, badly, frequently, really, shortly, yearly, partly.

Exercise 7. Translate the sentence into Ukrainian:
1. One must keep to the strict diet in the case of diabetes mellitus.
2. They say the attack of appendicitis has begun suddenly.
3. One must follow the prescription of the doctor.
4. They say that patient's health will be restored soon.

5. One knows that pulse rate becomes rapid on physical exertion.

6. It is estimated that his body weight considerably decreased during the prolonged illness.

Exercise 8. Give English variants for the Ukrainian words and translate the sentences:

1. *Встановлено,* that volatile or essential oils are usually mixtures of the terpenes and their derivatives.

2. *Думають,* that they differ markedly in both chemical and physical properties from the fixed oils.

3. *Вважається,* that they are secreted in oil cells or secretion ducts and cavities.

4. *Визначено,* that volatile oils are used for their medicinal action for flavouring, or in perfumery.

5. *Можна сказати,* that oils are used for all three purposes in pharmacy.

EXTRACTION OF VOLATILE OILS

Exercise 1. Practine the pronunciation:

distillation [disti'leiʃn], tough [tʌf], comminute ['kɔminju:t], facilitate [fə'siliteit], suitable ['sju:təbl], latter ['lætə], withdraw [wið'drɔ:], vice versa ['vaisi'vɔ:sə], clove [kləuv], caraway ['kærəwei], rectify ['rektifai], impurity [im'pjuriti], rigidly [ri'ʤidli], chenopodium [kinɔ'pəudiəm], cajuput ['kæʤəput], mixture [mikstʃə].

Exercise 2. Vocabulary:

oil of cade — ялівцева олія

still — випарний апарат, дистилятор, перегонний куб

to comminute — товкти, перетворювати на порошок

to facilitate — полегшувати

outlet — отвір

vice versa — навпаки

oil of clove — олія гвоздики

oil of cajuput — каяпутова олія

to rectify — очищати

oil of caraway — олія кмину

impurity — домішка

rigidly — жорстко, твердо

oil of chenopodium — хеноподієва олія

resinous — смолистий

tough material — твердий матеріал

Exercise 3. Read and translate the text:

Extraction of Volatile Oils

All volatile oils are extracted by distillation with the exception of oil of lemon and oil of cade.

The distillation of volatile oils by means of water or stream has long been practised, but modern plants for the purpose possess many advantages over the older stills in which undesirable decomposition of the oil often took place. Modern volatile oil still contain the raw material on perforated trays or in perforated baskets. Tough material such as barks, seeds and roots may be comminuted to facilitate extraction, but flowers are usually placed in the still without further treatment as soon as possible after collection.

The distillate, which consists of a mixture of oil and water, is condensed and collected in a suitable receiver. The latter is usually a large glass jar with one outlet near the base and another near the top. The distillate separates into two layers, the oil being withdrawn through the upper outlet and the water from the lower outlet, or vice versa in the case of oils such as oil of clove which is heavier than water.

Certain official oils, e.g. oil of cajaput, oil of caraway, oil of sandalwood are rectified. Rectification usually takes the form of a second distillation in steam, which frees the oil from resinous and other impurities. Light and atmospheric oxygen appear to have an adverse effect on most volatile oils and the official directions with regard to storage should be rigidly followed. The distillation of oil of chenopodium must be done as rapidly as possible, as the chief constituent gradually decomposes on boiling with water.

POST-TEXT ASSIGNMENT

Exercise 4. Answer the following questions:

1. What do modern volatile oil stills contain?
2. Where is the distillate condensed and collected?
3. What certain official oils are rectified?
4. Why must the distillation of oil of chenopodium be done as rapidly as possible?
5. What tough material may be comminuted to facilitate extraction?
6. How are flowers usually placed in the still?

Exercise 5. Read and translate. Pay attention to a noun-forming suffix **-tion**:

Direction, rectification, collection, decomposition, exception, distillation, extraction, education, diminition, graduation, impaction, inactivation, inattention, jugulation, parturition.

Exercise 6. Read and translate. Pay attention to an adjective-forming suffix **-al**:

Gradual, usual, official, material, additional, antiviral, chemical, carpal, internal, medical, optical, dental, congenital.

Exercise 7. Read and translate. Pay attention to a noun-forming suffix **-age**:

Storage, advantage, cartilage, nourage, ramage, bandage, stoppage, marriage, village, mucilage, passage.

Exercise 8. Translate into Ukrainian:

1. Some oils are extracted by distillation.
2. This process has been practised for many years.
3. Barks, seeds and roots may be comminuted to make easy the process of extraction.
4. As soon as the collection is over, the flowers are placed in the still.
5. This distillate was condensed and collected in a suitable receiver which had been brought three days before.
6. Certain official oils will be rectified in two days.
7. All official directions with regard to storage should be strictly followed by medical students.
8. The distillation must be done very quickly because of undesirable decomposition of the oil.

Exercise 9. Translate into English:

1. Твердий матеріал можна перетворити на порошок.
2. Продукт перегонки конденсується і збирається у відповідний приймач.
3. Олію лимона і ялівцю не можна отримати за допомогою процесу перегонки.
4. Олію гвоздики і кмину буде очищено через 15 хвилин.
5. Пацієнти повинні суворо дотримуватися вказівок лікаря.
6. Цей процес уже практикується протягом 5 років.

CHECK YOURSELF

1. Volatile or essential oils are usually ... of the terpenes and their derivatives.
a) decoctions
b) mixtures
c) tinctures
d) extracts
e) suspensions

2. All volatile oils ... by distillation.
a) extract
b) is extracted
c) are extracted
d) is extracting
e) extracted

3. Modern volatile oils ... the raw material.
a) contained
b) contains
c) are contained
d) have contained
e) contain

4. The distillate consists of ... .
a) pure water
b) mixed oils
c) a mixture of oil and water
d) a mixture of alcohol and oil
e) a mixture of alcohol and water

5. The distillation of chenopodium oil must be done ... .
a) slowly
b) as rapidly as possible
c) not very quickly
d) little by little
e) instantly

6. The chief constituent of chenopodium oil ... decomposes on boiling with water.
a) suddenly
b) slowly
c) quickly
d) gradually
e) immediately

7. Barks, seeds and roots must be ... to facilitate extraction.
a) dissolved
b) frozen
c) cooled
d) comminuted
e) warmed

8. The distillate is separated into ... layers.
a) two
b) three
c) four
d) five
e) six

9. Light and atmospheric oxygen have ... effect on most volatile oils.
a) favourable
b) irreversible
c) adverse
d) good
e) excellent

10. Rectification frees the oil ... resinous and other impurities.
a) by
b) with
c) in
d) from
e) between

Lesson 31
ANTIBIOTICS

Grammar:
• ***Infinitive***

Exercise 1. Practice the pronunciation:
antibiotic [ˈæntɪbaɪˈɔtɪk], penicillin [penəísɪlɪn], heterogeneous [hetərəˈʤiːnɪəs], dichloroacetic [daɪˈklɔːrəəísiːtɪk], streptomycin [streptəímaɪsɪn], ethyl [ˈeθəl], antidepressant [ˈæntɪdɪˈpresənt], toxicity [tɔkísɪsətɪ], chloramphenical [klɔræmˈfenɪkəl], ordinarily [ˈɔdnrɪlɪ].

Exercise 2. Vocabulary:
as a result of — у результаті, внаслідок
testing — дослідження, іспит, дослід
pure cultures — чисті (моно) культури
available — доступний, корисний
vast — величезний, обширний
habitation — житло, помешкання
heterogeneous — неоднорідний
finding — показник
medium — живильне середовище
peak blood concentration — максимальна концентрація речовини в крові
ordinarily — звичайно
for parenteral use — парентерально
for oral = by the oral route — перорально

Exercise 3. Give Ukrainian equivalents:
To inhibit, to assume, to occur, to obtain, to absorb, to market, to dilute, to cause, to produce, to involve, to administer, to follow, to contain, to reach, to isolate, to test, to believe, to inject, to encourage, to approve.

Exercise 4. Read and translate the text:

Antibiotics

Antibiotic substances are chemical compounds produced as a result of the metabolic activities of living cells which inhibit, in very low concentrations, the growth of microorganisms.

Penicillin was the first antibiotic to be produced and it still assumes a position of major importance in this field.

Antibiotic-producing organisms can be obtained by: testing pure cultures of organisms available in culture collections or isolated from natural sources, and selection from the vast heterogeneous mixed populations of the soil or other natural habitations of microorganisms. Once detected the antagonist is isolated in pure culture and identified, and the conditions for maximum production of the antibiotic substance produced by it are investigated. Generally, this involves finding the optimum temperature, pH and age of the culture. Important also is the composition of the medium.

Different organic and inorganic nitrogenous substances are tested, with and without various carbohydrates, minerals, heavy metals, etc.

Antibiotics are complex, rather large molecular weight substances whose synthesis may be extremely difficult.

Chloramphenicol is believed to be the first naturally occurring compound which contains a nitro group or which is a derivative of dichloroacetic acid. Chloramphenicol can be obtained from the filtrate of a Streptomycin culture by extraction with ethyl acetate.

Chloramphenicol is rapidly absorbed from the gastrointestinal tract; significant serum levels are obtained in 30 minutes and peak blood concentrations of 40 to 60 mg/ml are reached in about 2 hours. The drug is no longer detectable in the blood after 12 to 18 hours.

Chloramphnicol is marketed in capsules (50, 100, 250 mg) for oral use, as an ophthalmic ointment and solution (25 mg in a special buffer to be diluted with distilled water), and an injection for parenteral use.

The drug is ordinarily administered by the oral route, but it can be injected intramuscularly or intravenously. The initial oral dose is 3 to 5 g followed by 0.25 to 0.5 g every 3 hours. The intravenous dose is 1 g — every 12 hours.

POST-TEXT ASSIGNMENT

Exercise 5. Answer the following questions:

1. How are antibiotic substances generally described?
2. Do antibiotic substances inhibit or encourage the growth of microorganisms?
3. What was the first antibiotic to be produced?
4. How can antibiotic-producing organisms be obtained?
5. What property of antibiotics is the most important in medical practice?
6. What findings are very important for maximum production of the antibiotics?
7. What antibiotic was the first produced by man?
8. Chlorampenicol is believed to be the first naturally occurring, isn't it?
9. How is chloramphenicol marketed for oral use?
10. How is chloramphenicol is administered?

Exercise 6. Complete and translate the following sentences:

1. Antibiotic substances are chemical compounds produced as a result of ... .
2. Antibiotic substances inhibit in very low ... .
3. ... and is still assumes a position of major importance in this field.
4. Antibiotic-producing organisms can be obtained by ... .
5. ... whose synthesis may be extremely difficult.
6. For maximum production of the antibiotic substances important such findings as ... .
7. ... of a streptomycin cultures by extractions with ethyl acetate.
8. Chloramphenicol is rapidly absorbed from the ... .
9. Chloramphenicol is marketed in capsules for ... .
10. The drug is ordinarily administered by the ... .

Exercise 7. Approve or disapprove the following statements:

1. Antibiotic substances encourage the growth of microorganisms.
2. Penicillin is the last antibiotic to be produced.
3. Antibiotics are simpler rather small molecular weight substances whose synthesis may be extremely easy.
4. Chloramphenicol can be obtained from the filtrate of various carbohydrates cultures by extraction with ethyl acetate.
5. Chloramphenicol is slowly absorbed from the gastrointestinal tract.
6. The drug is longer detectable in the blood after 12 to 18 hours.
7. Chloramphenicol is marketed in suppositories.

Exercise 8. Translate into English:

1. Антибіотики можуть бути одержані шляхом вирощування мікроорганізмів у чистій культурі або синтетичним шляхом.
2. Температура і склад живильного середовища досліджуються.
3. Хлорамфенікол легко адсорбується з шлунково-кишкового тракту.
4. Ліки звичайно приймаються всередину, але можуть призначатися внутрішньовенно або внутрішньом'язово.
5. Інфекційні хвороби розповсюджуються, головним чином, при кашлі або чханні.
6. З'ясувалося, що хвороба інфекційна.

Exercise 9. Translate the sentences paying attention to the Infinitive:

1. Penicillin was the first antibiotic *to be produced* and still assumes a position of major importance in this field.
2. There exist a number of antibiotic substances *to be used* in medicine.
3. The antibiotic substances *to be discussed* are penicillin and chloramphenicol.
4. This mention of ginseng *to be used* in the treatment of diabetes conforms to the investigations conducted by Ukrainian and Japanese authors.

Exercise 10. Transform the compound sentences into simple ones using the Infinitive as an attribute:

Model: The drug which is ordinarily administered by oral route can be injected intramuscularly. — The drug to be ordinarily administered by oral route can be injected intramuscularly.

1. Chloramphenicol which is marketed in capsules is administered for oral use.
2. A solution of chloramphenicol which is diluted with distilled water in a special buffer is administered as an injection for parenteral use.
3. The method which is used should provide for the possibility to evaluate the "general condition" of the organism.
4. The usual dose of busulfan which is given in the treatment of leukemia constitutes 6–10 mg per day at weekly intervals.
5. The course of drug treatment of leukemia is accompanied by X-ray treatment which should be applied externally.

Exercise 11. Read and translate the text:

General Rules for Drug Taking

If medicine is taken incorrectly, it may actually cause harm. As a rule, the prescription contains information about dosage and doses, time for taking it and the way of taking. But some patients do not always strictly follow the prescribed instructions. To protect patients from possible harm basic suggestions are given:

1. Many medicines taken after a meal can completely lose their effect or their effect decreases by their interaction with food in the stomach and intestinal tract. Hence pharmacological therapy follows this general rule: medicines having an organic structure should be taking one-half hour or hour before mealtime.

2. Nonacid-resisting antibiotics, such as ampicillin, erythromycin, penicillin and other medicines should be taking with acidic juices or drinks containing alcohol.

3. Alcohol has a very negative influence on the effect of medicines. It intensifies the effect of histamines, barbiturates and tricyclic antidepressants. Alcohol increases the toxicity of barbiturates by more than 50%.

CHECK YOURSELF

1. Antibiotic substances are ... compounds.
a) physical
b) gas
c) fluid
d) chemical
e) hard

2. ... was the first antibiotic to be produced.
a) streptomycin
b) erythromycin
c) ampicillin
d) chloramphenicol
e) penicillin

3. Antibiotics are complex substances whose synthesis may be extremely ... .
a) easy
b) difficult
c) light
d) heavy
e) hard

4. Chloramphenicol is ... absorbed from the gastrointestinal tract.
a) slowly
b) widely
c) mainly
d) basically
e) rapidly

5. Significant serum levels of chloramphenicol are obtained in ... minutes.
a) 15
b) 30
c) 45
d) 60
e) 90

6. Intravenous dose of chloramphenicol is 1 g every ... hours.
a) 3
b) 4
c) 6
d) 12
e) 24

7. Medicines of an organic structure should be taken ... before mealtime.
a) 24 hours
b) 3 hours
c) one half an hour or hour
d) 15 minutes
e) 4 hours

8. Alcohol has a very ... influence on the effect of medicines.
a) positive
b) favorable
c) significant
d) beneficial
e) negative

9. Alcohol increases the toxicity of barbiturates by over ... .
a) 10%
b) 20%
c) 50%
d) 60%
e) 100%

10. Patients should ... follow the rules for drug taking.
a) rapidly
b) slowly
c) strictly
d) widely
e) moderately

Lesson 32
VITAMINS

Grammar:
• ***Conditional Sentences***

Exercise 1. Practice the pronunciation:
regimen [’reʤɪmen], gene [ʤi:n], requirement [rɪ’kwaɪəmənt], deficiency [dɪ’fɪʃənsɪ], store [stɔ:], ingest [ɪn’ʤest], nutrition [nju(:)’trɪʃ(ə)n], synthesized [’sɪntɪsaɪzd].

Exercise 2. Vocabulary:
feeding regimen — режим харчування
to sustain — підтримувати
husk — луска
deficiency disease — авітаміноз, вітамінна недостатність
gene — ген
to ingest — ковтати, проковтнути
to consume — вживати
to eliminate — знищити, ліквідувати
nutrition supplement — харчова добавка
to extract from smth — витягати, добувати
to gain from smth — витягувати з
B. C. = before Christ — до нашої ери

Exercise 3. Read the sentences and compare them with the translation:
1. If he is at the institute tomorrow, he will see my brother.
Якщо він буде в інституті завтра, він побачить мого брата.
If you take this drug now, you will feel an immediate relief.
Якщо ви приймете ці ліки зараз, ви відчуєте негайне полегшення.
2. If he were at the institute tomorrow, he would see my brother.
Якщо він був в інституті завтра, він побачив би мого брата.
If you took this drug now you would feel an immediate relief.
Якби ви прийняли ці ліки зараз, ви відчули б негайне полегшення.
3. If he had been at the institute yesterday, he would have seen my brother.
Якби він був в інституті вчора, він побачив би мого брата.
If he had taken this drug yesterday he would have felt an immediate relief.
Якби він прийняв ці ліки вчора, він відчув би негайне полегшення.

Exercise 4. Translate the sentences. Define the type of conditional sentences:
1. If the temperature is extremely high, viruses will not survive.
2. If biopsy had revealed cancer cells in the lung, the patient would have been operated on.
3. The gastric juice would contain much mucus, if the examined patient had carcinoma.
4. The patient would not have developed severe anemia, if he had not suffered from profuse external bleeding.
5. If you were more attentive, you would not forget to take drugs in time.

Exercise 5. Give Ukrainian equivalents:
Various diseases; appropriate feeding regimen; small amount; growth factors; original term; biochemical functions; single exception; fat soluble vitamins; artificial synthetic technique; healthy diet; average nutritional value.

Exercise 6. Read and translate the text:

Vitamins

From about 1500 B. C. it was known that various diseases could be treated with specific foods. In 1880 Christian Eijkman produced vitamin-deficiency conditions in animals and then reversed the condition with an appropriate feeding regimen. The general category of “vitamins” was defined as (1) substances found to be absolutely necessary for life (i. e. vital) and which (2) the body cannot synthesize on its own. In 1912 Cashmir Funk named these growth fac-

tors "vitamins" because they were required for life ("vita") and because he found that thiamins isolated from rice husks contained nitrogen (called "amine").

Funk's original term "vitamine" was changed to "vitamin" when many scientists identified, purified, and synthesized all of the vitamins and discovered they did not all contain nitrogen. In the 1930s a scientific discovery demonstrated the biochemical functions of the vitamins and established the body's requirements for them. From then on, they have been commercially produced.

Vitamins were given letters to go with their chemical names to simplify discussion about them.

So a vitamin is a substance which the body cannot synthesize on its own, yet which is necessary for life. Therefore, by definition, it is necessary to obtain all vitamins from outside the body. If a molecule can be synthesized in the body, it is not a vitamin. The single exception to this rule is vitamin D which can be synthesized in the skin, but only when exposed to sunlight and niacin (B_3) which itself can be synthesized in the liver in small amounts.

There are thirteen vitamins in all, divided into the four fat soluble (A, D, E and K) and the nine water soluble (eight A vitamins and vitamin C). The fat soluble vitamins can be stored in the body and do not need to be ingested every day. Because they can be stored, it is possible to store too much and thus become toxic on these vitamins. The water soluble vitamins cannot be stored, with the exceptions of A_{12} and folic acid and must be consumed frequently for optimal health. However, these vitamins can be taken in large amounts without toxicity, because they are not stored and are easily eliminated.

"Nutritional supplements", which includes vitamins, is a term applied to substances extracted from foods or manufactured in the laboratory.

POST-TEXT ASSIGNMENT

Exercise 7. Translate the sentences paying attention to conditionals.

1. If I were you, I would use different herb mixtures for cough.
2. Were I in your place, I should discontinue penicillin treatment.
3. Could the nurse carry out this procedure herself, she would not ask the doctor to help her.
4. Had the patient applied the ointment, the area of irritation would have been smaller.
5. Had the pain not radiated to the substernal area, the diagnosis of angina pectoris would have been excluded.
6. Had obstruction not been controlled, the patient would have undergone an emergency surgery.

Exercise 8. Make up 10 questions to the text Vitamins:

Exercise 9. Read and translate additional texts:

Vitamin B Complex

Vitamin B complex is a set of 12 related water-soluble substances. Eight are considered vitamins, by-virtue of needing to be included in the diet, and four are not, as the body can synthesize them. Since they are water-soluble, most are not stored to any great extent and must be replenished on a daily basis. The eight vitamins have both names and corresponding numbers. They are B_1 (thiamin), B_2 (riboflavin), B_3 (macin), B_5 (pantotholin), B_6 (pyridoxin), B_7 (biotin), B_8 (folic acid), and B_{12} (cobalamin). Biotin in particular is not always included in B complex supplements. As a group, the B vitamins have a broad range of functions. These include maintenance of myelin, which is the covering of nerve cells. A breakdown of myelin can cause a large and devastating variety of neurological symptoms. B vitamins are also key to producing energy from the nutrients that are consumed. Three members of this group — folic acid, pyridoxine, and cobalamin — work together to keep homocysteine levels low. This is quite important, since high homocysteine levels are associated with heart disease. Some B vitamins prevent certain birth defects (like neural tube defects), maintain healthy red blood cells, support immune function, regulate cell growth, aid in production of hormones, and may have a role in preventing some types of cancer. They also function in maintenance of healthy skin, hair and nails.

Fresh meats and dairy products are the best sources for most of the B vitamins, although they are prevalent in many foods. Cobalamin is only found naturally in animal source foods. Freezing of food and exposure to light of food or supplements may destroy some of the vitamin content. Dark-green leafy vegetables are an excellent source of folic acid. To make the most of the B vitamins contained in foods, don't overcook them. It is also best to steam rather than boil or simmer vegetables.

Vitamin C

Ascorbic acid is more commonly known as vitamin C. It is water soluble vitamin and occurs in certain fresh fruits and vegetables such as oranges, lemons, berries and less of it is in apples and bananas. It is destroyed by heat but

sometimes is present in canned or dried food if it is acid and has been preserved in the absence of air.

Most animals can manufacture vitamin C themselves but not in sufficient quantities and for a healthy life it needs to be supplied outside.

The chief deficiency disease is associated with lack of vitamin C and characterized by hemorrhage of the limbs and jaws. This is presumably caused by increased permeability of the walls of the blood vessels.

The absence of vitamin C leads to a reduced resistance to infections. Ascorbic acid is normally excreted in the urine but in certain infectious diseases it is found there in smaller quantities than normal, which suggests that it is being used up in the body.

Deficiency in vitamin C leads to the disease scurvy. It is characterized by easily bruised skin, muscle fatigue, soft swollen gums, decreased wound healing and hemorrhaging, osteoporosis and anemia. Vitamin C is readily absorbed and so the primary cause of vitamin C deficiency is poor diet and/or increased requirement. The primary physiological state leading to an increased requirement for vitamin C is severe stress or trauma.

Exercise 10. Put the verbs in brackets into the appropriate tense form and voice:

1. It (to be) essential that the food of man and animals (to contain) small amounts of organic substances.
2. If anyone of some fifteen or more of these compounds (to be lacking) in the diet there (to occur) a breakdown of the normal metabolic processes.
3. Certain vitamins cannot (to synthesize) in the tissues of animals.
4. Certain vitamins of the water-soluble group (to know) to be essential constituents of the respiratory enzymes.
5. Vitamin A (to synthesize) by three separate processes.
6. The ester forms of the vitamin (to find) to possess greater stability than the free alcohol.

Exercise 11. Translate into English:

1. Продукти харчування повинні містити певну кількість білків, жирів, вуглеводів і вітамінів.
2. Низка специфічних захворювань безпосередньо пов'язана з дефектами харчування.
3. Було доведено, що присутність вітамінів у їжі є дуже важливою і необхідною для організму.
4. Сьогодні відомо багато вітамінів і встановлена їх хімічна структура.
5. Вітаміни одержують шляхом переробки продуктів, в яких вони містяться.
6. Сьогодні розроблено низку методів отримання вітамінів.
7. Вітаміни ділять на дві групи: вітаміни, розчинні у жирах, та вітаміни, розчинні у воді.

Exercise 12. Make up situations:

1. Vitamins are important constituents of the living organism:

vitamins, to be important, compounds, man, animal, to be lacking, the diet, a breakdown, to occur, processes, metabolic, malnutrition, symptoms, result, to cause, deficiency, diseases.

2. Vitamins are unlike each other in chemical composition and functions:

vitamins, to be unlike, composition, chemical nature, to be alike, function, to be synthesized, animals, tissues, to fall into, categories, to perform, normal, metabolic, structural.

CHECK YOURSELF

1. In 1880 Christian Eijkman ... vitamin-deficiency conditions in animals on an experimental basic.
   a) produces
   b) has produced
   c) produce
   d) produced
   e) had produced

2. In 1912 Cashmir Funk ... the growth factors "vitamines" because they were required for life ("vita").
   a) name
   b) named
   c) has named
   d) had named
   e) names

3. Niacin in pharmacological doses can ... blood cholesterol level.
   a) lower
   b) lowers
   c) has lowered
   d) had lowered
   e) lowering

4. Vitamins ... letters to go with their chemical name.
   a) is given
   b) gave
   c) has given
   d) have given
   e) were given

5. Vitamin D can ... in the skin when exposed to sunlight.
a) in synthesized
b) was synthesized
c) were synthesized
d) be synthesized
e) have been synthesized

6. Vitamin B complex is a set of ... related water soluble substances.
a) 6
b) 10
c) 12
d) 13
e) 15

7. The fat soluble vitamins do not need to be ingested ... .
a) once a month
b) once a week
c) every four hours
d) every day
e) every six hours

8. The water soluble vitamins must be consumed ... .
a) every day
b) every four hours
c) frequently
d) once a week
e) once a month

9. There are ... vitamins in all.
a) 9
b) 10
c) 11
d) 13
e) 15

10. Vitamins of B complex are also key to producing ... from the nutrients that are consumed.
a) growth
b) prevention
c) energy
d) fats
e) acids

Lesson 33
CARDIOVASCULAR DRUGS

Grammar:
• ***Modal Verbs***

Exercise 1. Practice the pronunciation:

cardiovascular [ˌkaːdɪəˈvæskjulə], forcefulness [ˈfɔsfəlnəs], digitalis [dɪʤɪˈteɪlɪs], glycoside [ˈglu:kəusaɪd], sufficient [səˈfɪʃənt], crude [kru:d], strengthening [ˈstreŋθənɪŋ], myocardium [maɪəuˈkardɪəm], arrhythmics [əˈrɪðmɪks], quinidine [ˈkwɪnɪdi:n], idocaine [ˈli:dəukeɪn], xylocaine [ˈzaɪləukeɪn], propranolol [prəuˈprænəlol], ectopic [ekˈtopɪk], vasodilator [veɪzəudaɪˈleɪtə], flow [fləu], reserpine [ˈresəpi:n], nitrite [ˈnaɪtraɪt], trinitrate [traɪnaɪˈtreɪt], nitroglycerine [naɪtrəuˈglɪsərɪn], amyl [ˈæməl], involuntary [ɪnˈvɔləntərɪ], adequate [ˈædɪkwət], diuretics [daɪjuəˈretɪks], shrinkage [ˈʃrɪnkɪʤ], chlorothiazide [klɔrəuˈθaɪəzi:d], vasoconstrictor [ˌveɪzəukənˈstrɪktə], adrenaline [əˈdrenəlɪn], vasopressin [ˌveɪzəuˈpresɪn], anticoagulant [ˈæntɪkəuˈægjulənt], heparin [ˈhepərɪn] guanethidine [kwɔnəˈθaɪdi:n], alphamethyldopa [ælfəˈmeθəlˈdəupə].

Exercise 2. Vocabulary:

crude — неочищений, необроблений, сирий

involuntary muscle — м'язи, що мимовільно скорочуються

width — ширина

to promote — сприяти

shrinkage — скорочення, зменшення

to relay the message — передавати повідомлення (сигнал)

blood supply — кровопостачання

preserved blood — консервована кров

to retard the extension — перешкоджати розповсюдженню

clotting — утворення тромбу

Exercise 3. Translate into Ukrainian:

To effect the blood pressure; the effect of drug; to prevent blood clotting; rate and force of the heartbeats; to alter the rhythm of the heartbeat; digitalis glycosides; sufficient force; foxglove plant; crude mixture; leaf of the plant; myocardial impulses; bark of the cinchona tree; cocaine derivatives; to become dilated; involuntary muscle; angina pectoris; width of heart vessel; blood flow; lack of adequate blood; to be absorbed into the bloodstream; to promote excretion of fluid; shrinkage of blood volume; to relay the message to the vessels; formation of clots in veins and arteries; to cause occlusion; to retard the extension of something.

Exercise 4. Form words with the help of negative prefixes. Translate them into Ukrainian:

dis-: like, function, connection, agree, infection, location, orientation;

un-: consciousness, experienced, human, hurt, familiar, expensive;

in-: visible, different, curable, variable, voluntary, sociable, soluble;

im-: possible, practical, patient, passable, memorial, probable;

il(l)-: legal, logical, liberal, literal;

ir-: regular, responsible, rational, relevant

mis-: understand, translate, pronounce, diagnose, read, count;

mal-: nutrition, formation, position, treatment, occlusion, absorption.

Exercise 5. Translate the following sentences into Ukrainian paying attention to the modal verbs:

1. You needn't do an ECG: the diagnosis is clear.
2. Sometimes clinical death may result from an insult, in which case measures have to be taken.
3. A doctor won't be able to make the final diagnosis without receiving the findings of the analyses.
4. The students asked when the operation on the brain was to be performed, as they were eager to watch it.

5. You mustn't disturb your father. He must be sleeping now. He had to go out on call at night.

6. You shouldn't go to the Institute today if you feel bad. You'll be allowed to write the test next week.

7. She didn't have to call in a nurse to give the injections to her daughter. She was able to do it herself.

8. Convulsions in this patient might be caused by brain tumor.

9. Ann may have fallen ill. She didn't come to the lectures yesterday.

10. Her neurosis must have resulted from mental stress.

11. I'm sure the doctor ought not to have told the woman that her disease is incurable. He should have encouraged her.

12. My son can't have said such a thing. You must have misunderstood him.

Exercise 6. Read and translate the text:

Cardiovascular Drugs

These drugs may be divided into three groups: drugs that affect the heart; drugs that affect blood pressure and drugs that prevent blood clotting.

Drugs may affect the heart in two major ways: changing the rate and forcefulness of the heartbeat and altering the rhythm of the heartbeat.

The most common drugs used to change the rate and forcefulness of the heartbeat are the digitalis glycosides (cardiac glycosides). These drugs are used to treat patients in heart failure (when the heart is not contracting with sufficient force). Most of the digitalis glycosides are obtained from the leaf of the plant.

Drugs used to correct abnormal heart rhythm are called anti-arrhythmics. Examples of these drugs are quinidine, procainamide, lidocaine (xylocaine) and propranolol. These drugs help to restore the heart rhythm to a regular cycle by depressing ectopic (outside, unwanted) myocardial impulses.

Vasodilators are drugs which relax the muscles of vessels walls, thus increasing the size of blood vessels. These drugs are used in treating blood vessel diseases, heart conditions and high blood pressure (hypertension). Examples are sympatholytics (reserpine, guanethidine, and alphamethyldopa) and other agents such as hydralazine.

Nitrites are drugs which are also used as vasodilators. Examples of nitrite drugs are: glyceryl trinitrate (nitroglycerine) and amyl nitrate. Nitroglycerin dilates all smooth (involuntary) muscles in the body, but has a greater effect on the muscles of the coronary blood vessels.

A third type of the drug used to lower blood pressure is called a diuretic, an agent which promotes excretion of fluid and shrinkage of the volume of blood within the vessels. An example of this type is chlorothiazide (Diuril).

Vasoconstrictors are drugs which constrict muscle fibers around blood vessels and narrow the size of the vessel opening. Vasoconstrictors are needed to raise blood pressure, increase the force of heart action, and stop local bleeding. Examples of vasoconstrictor drugs are: epinephrine (adrenaline), vasopressin, and Aramine (metaraminol).

Drugs that prevent blood clotting are called anticoagulants. They are used to prevent the formation of clots in the veins and arteries. These clots may cause occlusion (thrombosis) of the blood supply to a vital organ, such as the brain or may travel from their point of origin to a new site and produce a sudden occlusion of a distant organ (embolism). Anticoagulant drugs are also used to prevent coagulation in preserved blood stored for transfusions.

POST-TEXT ASSIGNMENT

Exercise 7. Answer the questions using the text:

1. What are the main groups of cardiovascular drugs?
2. How may the drugs affect the heart?
3. What are the most common drugs used to change the rate and force of the heartbeats?
4. How can the most of the digitalis glycosides be obtained from?
5. What are the important effects of the digitalis glycosides?
6. What drugs are used to increase heart rate and the force of contraction?
7. What are the examples of drugs used to correct abnormal heart rhythm?
8. What drugs are used in treating blood vessel diseases, heart conditions, and high blood pressure?
9. What drugs are used to lower blood pressure?
10. What drugs are vasodilators?
11. What drugs are called anticoagulants?
12. What is the cause of thrombosis?

Exercise 8. Say whether these statements are right or wrong. Correct them if they are wrong:

1. The most common drugs used to change the rate and force of the heartbeat are the anticonvulsant.
2. The important effects of digitalis glycosides are the weakness of the myocardium and the increasing of the rate of contraction of the heart.

3. Other drugs which belong to the general class of anti-arrhythmics are used to increase heart rate and the force of contraction.

4. Drugs used to correct abnormal heart rhythm are called anticoagulants.

5. Quinidine increases the number of the heart muscle contraction in a given period of time.

6. The cocaine derivatives procainomide and lidocaine are not useful in controlling abnormal cardiac rhythms.

7. Vasoconstrictors are drugs which relax the muscles of vessels walls, thus increasing the size of blood vessels.

8. Blood flows more freely and blood pressure falls as blood vessels open and become constricted.

9. The relaxation of the muscle fibers around the blood vessel of the heart increases the width of these heart vessels and increases blood flow to the heart muscle.

10. Aramine is given orally and is effective in preventing the formation of new clots, as well as retarding the extension of those already formed.

Exercise 9. Translate the sentences using modal verbs:

1. Медсестрі довелося викликати лікаря, оскільки хворому стало гірше.

2. Як ви думаєте, чи зможе лікар допомогти моїй мамі?

3. Вам не потрібно приходити завтра в поліклініку. Ви можете викликати лікаря додому.

4. Ваша сестра скаржиться на головний біль. Їй слід звернутися до невропатолога.

5. Вам треба було почати лікування раніше. Тепер вам зможе допомогти тільки операція.

6. Де я можу знайти професора? — Почекайте в приймальні, він, мабуть, зараз зайнятий.

7. У кабінеті невропатолога нікого немає. Мабуть, він вже пішов.

8. Медсестрі не слід було говорити хворому, що у нього погані аналізи. Він, напевно, тепер хвилюється.

Exercise 10. Find English equivalents and make up the sentences of your own:

Ділитися на три групи; застосовуватися при серцевій недостатності; змінювати серцевий ритм; наперстянка; дія лікарського засобу; стенокардія; хінне дерево; сіль азотної кислоти; м'язи, що скорочуються мимовільно; ширина серцевої судини; відповідна кількість крові; кровотік; виведення рідини; скорочення об'єму крові; передавати імпульс далі; кровопостачання; життєво важливий орган; викликати раптову коронарну закупорку; консервована кров; переливання крові; перешкоджати розповсюдженню згустків крові.

Exercise 11. Make the following sentences negative:

1. Cardiovascular drugs may be divided into 3 groups.

2. Anti-arrhythmic drugs help to restore the heart rhythm.

3. Nitrites are drugs which are also used as vasodilators.

4. A diuretic is an agent which promotes excretion of fluid.

5. Vasodilatators are used in treating blood vessel diseases.

CHECK YOURSELF

1. Cardiovascular drugs may be divided into ... groups.
   a) two
   b) three
   c) four
   d) five
   e) six

2. Cardiac glycosides are used to treat patients in ... .
   a) cholecystitis
   b) heart failure
   c) pericarditis
   d) gastritis
   e) angina pectoris

3. ... are drugs which relax the muscles of vessel walls.
   a) vasoconstrictors
   b) pain killers
   c) vasodilators
   d) glycosides
   e) cocaine derivatives

4. Nitroglycerin dilates all ... muscles in the body.
   a) direct
   b) long
   c) oblique
   d) transversal
   e) smooth

5. Nitroglycerin is used by ... .
   a) placing under the tongue
   b) intramuscular injection
   c) swallowing
   d) intravenous injection
   e) rinsing the mouth

6. ... is an agent which promotes excretion of fluid.
a) anticoagulant
b) diuretic
c) vasodilator
d) vasoconstrictor
e) glycoside

7. ... are needed to raise blood pressure and stop local bleeding.
a) anticoagulants
b) vasodilators
c) vasoconstrictors
d) diuretics
e) glycosides

8. ... are used to prevent the formation of clots in the veins and arteries.
a) anticoagulants
b) vasodilators
c) vasoconstrictors
d) diuretics
e) glycosides

9. ... may cause thrombosis of the blood supply to a vital organ.
a) hemorrhage
b) high blood pressure
c) clots
d) low blood pressure
e) transfusion

10. Anticoagulant drugs are also used to prevent ... in preserved blood.
a) agglutination
b) coagulation
c) accumulation
d) congestion
e) destruction

Lesson 34

CENTRAL NERVOUS SYSTEM DRUGS

Grammar:
• ***Modal Verbs***

Exercise 1. Practice the pronunciation:

euphoria [ju'fɔ:rɪə], lethargy ['leθəʤɪ], coffee ['kɔfɪ], meperidine ['mi:pərɪdi:n], caffeine ['kæfi:n], amphetamine [əm'fetəmi:n], barbiturates [ba:'bɪtʃurəts], heroine ['herəuɪn], codeine ['kəudi:n], unconsciousness [ʌn'kɔnʃəsnəs], phenobarbital ['fi:nəu'ba:bɪtəl], anxiety [æŋ'zaɪətɪ], diazepam [daɪ'eɪzəpəm], chlordiazepoxide ['klɔ:rdaɪ'eɪzəpəksaɪd], diethyl [daɪ'eθɪl], phenothiazine ['fi:nou'θaɪəzi:n], tricyclic [traɪ'saɪklɪk], talkativeness ['tɔ:kətɪvnəs], ether ['i:θə], analgesics [ænəl'ʤi:zɪks], anesthetics ['ænəs'θetɪks], appreciation [ə'pri:ʃɪ'eɪʃən], cocaine [kou'keɪn], thiopental ['θaɪə'pentəl], halothane ['hælouθeɪn], chloral hydrates ['klɔ:rəl, 'haɪdreɪts], hypnosis [hɪp'nəusɪs], nitrous oxide ['naɪtrəs'ɔksaɪd].

Exercise 2. Vocabulary:

analgesics — болезаспокійливий засіб
anesthetics — знеболююче
anesthesia — знеболювання
unconsciousness — несвідомий стан
insomnia — безсоння
restlessness — збуджений стан; хвилювання
excessive dose — надмірна доза
anticonvulsant — протисудомне
hypnotics — снодійне
sedation — седативний ефект
addictive (habit-forming) — що викликає звикання
anxiety — тривога, страх
cerebral cortex — кора головного мозку

Exercise 3. Translate the following word combinations into Ukrainian:

Gastrointestinal disorders, central nervous system, spinal cord, to speed up the vital processes, in case of shock and collapse, to oppose the depressant effect, temporary feeling of euphoria, to relieve lethargy, side effects, to suppress the central nervous system, to be addictive (habit-forming), to be used for control, severe disturbances of behavior of psychoses, electrical discharges, to result in abnormal muscular movements, loss of consciousness, sensory and cognitive parts of the brain, to control motor and movement activity, to effect in several ways, to account for the talkativeness, consumption of alcohol, to be used as a dilator of blood vessels, to produce loss of sensation.

Exercise 4. Read and translate the text:

Central Nervous System Drugs

The drugs which affect the central nervous system are of two main types: those which stimulate the nerves in the brain and spinal cord, **stimulants**, and those which depress the nerves in the brain and spinal cord, **depressants**.

The central nervous system stimulants are used to speed up vital processes in cases of shock and collapse, and also to oppose the depressant effect of other drugs. Stimulants produce a temporary feeling of euphoria (well-being) and help to relieve lethargy. Examples of drug stimulants are caffeine and amphetamine (Benzedine). Amphetamines are much more powerful than caffeine and can produce restlessness, insomnia and nervousness as well as hypertension (high blood pressure) and gastrointestinal disorders when given in high doses. Used in excessive doses, these drugs can produce convulsions.

There are several types of central nervous system depressants. These include analgesics, hypnotics, sedatives and barbiturates, tranquilizers, anticonvulsants, alcohol and anesthetics.

Analgesics are agents which act to relieve pain. Examples of narcotic analgesics are opium, morphine, heroine, codeine and meperidine. Narcotics are drugs which in moderate doses can suppress the central nervous system and relieve pain but in excessive doses produce unconsciousness, stupor, coma and possibly death.

Most of the narcotic analgesics are addictive and habit-forming.

Sedatives are used to quiet and relax the patient without necessarily producing sleep. Some drugs act as sedatives in small doses and as hypnotics in large doses. Chloral hydrates is an example of another type of sedative. Depending on the dose and how it is administered, the response to a barbiturate may range from mild sedation to hypnosis and finally to general anesthesia.

Tranquilizers are drugs which alter behaviour, allowing for control of nervous symptoms such as anxiety, depression, fear or anger.

Anticonvulsant agents are used to treat epilepsy, a central nervous system disorder caused by abnormal electrical discharges within the brain which result in abnormal muscular movements, loss of consciousness and other symptoms.

Alcohol is another central nervous system depressant. It affects the cerebral cortex of the brain in several ways. One way is to block the processes which control or inhibit behaviour. This effect accounts for the talkativeness and lack of inhibition which accompany consumption of even small amounts of alcohol in some people. Alcohol is also used as a dilator of blood vessels in vascular disease and as a hypnotic.

Anesthetics are drugs which produce loss of sensation and particularly loss of appreciation of pain. General anesthetics produce loss of sensation throughout the entire body by depressing the central nervous system, producing sleep, unconsciousness and muscle relaxation.

POST-TEXT ASSIGNMENT

Exercise 5. Give English equivalents of the following words and word combinations:

Спинний мозок; центральна нервова система; тимчасове відчуття ейфорії; тахікардія; безсоння; страх; серцево-судинні захворювання; навіть мала кількість; затьмарення свідомості; кров'яні судини; втрата свідомості; відчуття болю; вживання алкоголю; електричні розряди; стимулятори; прискорювати життєві процеси; надмірна доза; болезаспокійливі; кров'яний тиск; шлунково-кишкові розлади; кора головного мозку; що викликає звикання; злість; змінювати поведінку; депресанти; побічні дії; снодійне; відповідати за мову; м'язова релаксація; протисудомне.

Exercise 6. Complete the following sentences:

1. There are two main types of the drugs which affect the central nervous system: those which ... .
2. Central nervous system stimulants are used to speed up ... .
3. Examples of drug stimulants are ... .
4. Amphetamines are much more powerful than caffeine and can produce ... .
5. The examples of central nervous system depressants are: ... .
6. Narcotics are drugs which in moderate doses can produce ... .
7. Tranquilizers are drugs which alter ... .
8. Anticonvulsant agents are used to treat ... .
9. Alcohol as another central nervous system depressant effects the ... .
10. Anesthetics are drugs which produce loss ... .

Exercise 7. Insert the missing prepositions:

1. Examples ... drug stimulants are caffeine and amphetamine.
2. Central nervous system stimulants are used to speed up vital processes ... cases of shock and collapse.
3. Used ... excessive doses, these drugs can produce convulsions.
4. Analgesics are agents ... act to relieve pain.
5. Narcotics are drugs which ... moderate doses, can suppress the central nervous system.
6. Sedatives are used to quiet and relax the patient ... necessarily producing sleep.
7. Tranquilizers are drugs which alter behaviour, allowing ... control of nervous symptoms such as anxiety, depression, fear or anger.
8. Alcohol as another central nervous system depressant which affects the cerebral cortex of the brain ... several ways.

Exercise 8. Answer the following questions:

1. What are the two main types of drugs which affect the central nervous system?
2. What are the central nervous system stimulants used to?
3. What do stimulants produce and help?
4. What are the side effects of amphetamines?
5. What are the main types of central nervous system depressants?
6. What can narcotics produce?
7. What are the hypnotic drugs?
8. What are anticonvulsants agents used to?

Exercise 9. Translate the following sentences into Ukrainian paying attention to the modal verbs:

1. We should begin the battle for a healthy nervous system from early years.
2. The doctor won't be able to make the final diagnosis without receiving the findings of the analyses.

3. A neuropsychologist is to treat people with brain damage (cerebral lesions, hemorrhages, tumors, etc.).

4. She didn't have to call in a nurse to make the injections to her daughter. She was able to do it herself.

5. Although the researchers were able to localize the effected area of the chromosome, as yet they have not been identify the specific gene responsible for Parkinson's.

6. Convulsions in this patient might be caused by brain tumor.

7. Her neurosis must have resulted from mental overstrain.

8. I'm sure the doctor ought not to have told him that his disease is incurable. He should have encouraged him.

Exercise 10. Fill in the blanks with the suitable modal verbs:

At about 2 o'clock on a cold winter morning a man telephoned a doctor and asked him if he ... come at once. "You ... hurry," he added. The doctor ... ... drives seven miles in answer to this call. When he reached the place, the man who had called him in said, "Doc, I ... ... strained myself (перевтомився). I haven't got any pain or anything, but I have a terrible feeling that I ... die soon."

The doctor examined the patient, felt his pulse, and took his temperature. "Have you made your will (завещание)?" he asked at last. — "Why, no, doctor," the man looked frightened. — You ... ... done it long ago," said the doctor. "Have you got a family?" — "Yes," said the patient. — "You ... send for them immediately. And your parents ... are called too." — "I say, Doc, do you really think I'm going to die?" — "No, I don't" replied the doctor. "But I don't want to be the only man you have made a fool of (обдурити) on the night like this."

CHECK YOURSELF

1. The drugs which affect the central nervous system are of ... main types.
a) two
b) three
c) four
d) five
e) six

2. The drugs that stimulate the nerves in the brain and spinal cord are called ... .
a) anticoagulants
b) stimulants
c) diuretics
d) vasodilators
e) depressants

3. The drugs that depress the nerves in the brain and spinal cord are called ... .
a) anticoagulants
b) stimulants
c) depressants
d) diuretics
e) vasodilators

4. Central nervous system stimulants are used to ... vital processes in case of shock and collapse.
a) slow down
b) smooth
c) reduce
d) strengthen
e) speed up

5. Stimulants produce a ... feeling of euphoria and help to relieve lethargy.
a) permanent
b) rare
c) constant
d) temporary
e) slow

6. Amphetamines are much ... than caffeine.
a) more powerful
b) slower
c) weaker
d) more rapid
e) more active

7. Narcotic drugs are those which depress the central nervous system and produce ... .
a) sleeplessness
b) restlessness
c) sleep
d) anxiety
e) excitement

8. Sedatives are used ... the patient without necessarily producing sleep.
a) to change behaviour
b) to excite
c) to depress
d) to relax
e) to stimulate

9. Anesthetics are drugs which produce loss of ... and particularly loss of appreciation of pain.
a) consciousness
b) sensation
c) talkativeness
d) depression
e) fear

10. Narcotics are drugs which in ... doses can suppress the central nervous system and relieve pain.
a) low
b) high
c) moderate
d) very low
e) very high

PART III

GUIDELINES FOR WORKING WITH DRUG INSTRUCTIONS

Анотація — це коротка характеристика лікарського засобу. Анотаціями забезпечені всі патентовані препарати. Нові лікарські засоби анотуються в медичних виданнях. Анотація містить основну інформацію про лікарський препарат, яка включає:

— назву;
— склад, фармакологічні властивості і дію;
— показання до вживання;
— протипоказання;
— побічні явища;
— запобігання;
— форму випуску;
— умови і термін зберігання.

У різних анотаціях кількість структурних одиниць і порядок їх розміщення може змінюватися.

NAME
Назва

Назва, як правило, — це товарний знак (ім'я). У заголовку може бути наголошений його синонім, аналог інших фармацевтичних фірм або інша його відмітна ознака.

Наприклад: Isocard (Isosorbit Dinitrate); Buscopan (Compositum antispasmotic & analgesic); Faustan (Diazepan) Tranquilizer, Anticonvulsant.

Часто в назві дається латинська основа, за якою можна визначити основне призначення лікарського засобу.

Наприклад: Vasocordin — за двома основами назви vas- — судина і -cor — серце визначається, що ліки служать для лікування судин серця.

Exercise 1. Визначте за назвою і підзаголовком загальну характеристику препарату та його відмітну ознаку.

a) Rowasa
(Mesalamine)
Suppositories (for rectal use only)
b) Atrovent (Ipratropium Bromide)
Inhalation Aerosol
c) Monopril
Fosinopril Sodium Tablets

Peflacine (perfloxacin) to be administered by the oral rout or by IV infusion

PHARMACOLOGY (PROPERTIES). MECHANISM OF ACTION (MODE OF ACTION). COMPOSITION
Фармакологічні властивості. Механізм дії. Склад

Vocabulary

to absorb — всмоктуватись
to act on — діяти на
anticoonvulsant (antispasmotic) — протиспазматичне
antifungal — протигрибкове
anti-inflammatory — протизапальне
antipyretic — жарознижуюче
anxiolytic effect — заспокійлива дія
to be related to — відноситись
compound — сполука
to contain — містити
derivative — похідне
to increase — збільшити
to inhibit — приглушити
preparation of choice — препарат на вибір
to provide — забезпечувати
to reduce — скорочувати
relief — полегшення
solvent — розчинник
soluble (unsoluble) — розчинний (нерозчинний)

vasoconstrictor — судинозвужуючий
vasoditator — судинорозширюючий
well tolerated — який добре переноситься

Exercise 2. Translate into Ukrainian:

1. Zaditen is an antiasthmatic drug with marked antianaphylactic properties and a specific antihistaminic effect.
2. Chemically, mesalanine is 5-amino-2-hydroxybensoic acid, and is classified as an antiinflammatory drug.
3. Benazepril hydrochloride is a white crystalline powder, soluble in water, in methanol.
4. Brinerdin is an effective and well tolerated antihypertensive.
5. Zocor is a cholesterol lowering agent that is derived synthetically from a fermentation product of Aspergillus terreus.
6. Following oral administration, Fosiopril is absorbed slowly.
7. Daflon treats venous insufficiently and oedema of venous origin by reinforcing the walls of veins.

Exercise 3. Translate into English:

1. У медичній практиці препарат використовується у вигляді гранул приємного солодкого смаку, добре розчинних у воді.
2. Це комбінований антиревматичний препарат.
3. Тримекаїн в ін'єкційній формі діє як місцевий анестетик.
4. Препарат легко всмоктується в кров із травного тракту і швидко виводиться з організму.
5. Нізорал — це синтетичне похідне імідазол-діоксолану з фунгіцидною активністю.
6. При оральному прийомі ефект препарату виявляється через 2 години і продовжується 6ñ8 годин.

INDICATIONS

Показання

Vocabulary

allergic disorders — алергічні розлади
anaphylactic reactions — анафілактичні реакції
arrhythmia — аритмія
attack — напад
biliary colic — жовчна коліка
congestive heart failure — застійна серцева недостатність
to control — регулювати
excessive acidity — підвищена кислотність
generalized (local) infection — загальна (місцева) інфекція
hypertension — гіпертонія
long-term treatment — тривале лікування
maintenance therapy — підтримуюча терапія
neoplastic condition — процес новоутворення
prevention — запобігання
renal colic — ниркова коліка
secondary infection — вторинна інфекція
strain ó штам
temporary relief — тимчасове полегшення
venous insufficiency — венозна недостатність
upper respiratory tract infection — інфекція верхніх дихальних шляхів
urinary tract infection — інфекція сечових шляхів

Exercise 4. Translate into Ukrainian:

1. Cetax is indicated for the treatment of patient with genitourinary infections caused by susceptible strains of microorganisms.
2. Brinerdin is indicated in essential hypertension of all grades of severity.
3. Monopril is indicated for the treatment of hypertension. It may be used alone or in combination with thiazide diuretics.
4. Atrovent is indicated as a bronchodilator for maintenance treatment of bronchospasm.
5. Eye drops may be used for the prevention of ocular infection after removal of a corneal or conjuctival foreign body.
6. Phenergan is indicated in many allergic disorders and anaphylactic reactions including hay fever, urticaria and sensitization reactions of various drugs.
7. Suppositories are indicated for the treatment of active ulcerative proctitis.

Exercise 5. Translate into English:

1. Це лікувальний засіб для регулювання і запобігання ангінним нападам.
2. Його можна використовувати як додатковий засіб при лікуванні хронічної застійної серцевої недостатності.
3. Позитивні властивості препарату виявляються при лікуванні гострих інфекцій сечових шляхів.
4. Еринiт застосовують для лікування хворих на хронічну коронарну недостатність із частими нападами стенокардії.
5. Препарат застосовують при різних запальних і інфекційних процесах за призначенням лікаря.
6. Застосовують для лікування психічних або неврологічних симптомів розладу мозкового кровообігу різної етіології.

DOSAGE AND USE
Дозування та використання

Vocabulary

at bedtime — перед сном
at most 60 mg daily — більше 60 мг щоденно
to be chewed — розжувати
to be swallowed as a whole — проковтнути цілим
to be taken with some liquid — приймати з рідиною
before meals — перед їжею
by slow intravenous injection — повільним внутрішньовенним вливанням
... capsules per day (daily) — ... капсул на день
during meals — під час їжі
efficient dose — ефективна доза
to hold in mouth — тримати в роті
in accordance with the physician's prescription — за вказівкою лікаря
on an empty stomach — натще
to shake until complete dissolution — струшувати до повного розчинення
teaspoonful 3ñ4 times daily — по чайній ложці 3ñ4 рази на день
twice a day — двічі на день

Exercise 6. Translate into Ukrainian:

l. The recommended initial dose is 10 mg once a day.

2. Dosage should be adjusted according to blood pressure response.

3. If blood pressure is not controlled with Privinil alone, a low dose of a diuretic may be added.

4. The most efficient dose is 20 mg daily in 3ñ4 doses.

5. If immediate action is required, the capsule could be chewed and held in mouth.

6. The suppository should be retained for one to three hours or longer, if possible, to achieve the maximum benefit.

7. Take half of the tablet twice daily or 1 capsule in the evening only for children under 3.

Exercise 7. Translate into English:

1. У важких випадках доза може бути більше 60 мг щоденно.

2. Препарат приймається не розжовуючи.

3. Добова доза становить 20–80 мг, приймати під час їжі.

4. 6ñ10 драже щоденно, приймати з рідиною.

5. Драже приймають не розжовуючи і запиваючи невеликою кількістю рідини.

6. Приймати тільки за призначенням лікаря для купірування і запобігання нападам.

7. Не приймайте ліків натще.

CONTRAINDICATIONS
Протипоказання

Vocabulary

acute or chronic hepatic/renal insufficiency — гостра чи хронічна печінкова/ниркова недостатність
allergy to ó алергія на
(hyper) sensitivity — (гіпер) чутливість
lactation = breast-feeding — годування груддю
none on record ó не зареєстровано
pregnancy ó вагітність

Exercise 8. Translate into Ukrainian:

l. Isocard is contraindicated in patients sensitive to the drug.

2. It's not to be used in severe liver or renal disorders, advanced arteriosclerosis, history of mental depression.

3. There are no known contraindications.

4. The use of Unasyn is contraindicated in individuals with a history of hypersensitivity to any of the penicillins.

5. Zocar may cause fatal harm when administered to a pregnant woman.

6. Hypersensitivity to atropine or its derivatives.

Exercise 9. Translate into English:

1. Коринфар приймають з обережністю при низькому кров'яному тиску.

2. Його не слід призначати годуючим матерям.

3. Протипоказань не встановлено.

4. Препарат не повинен застосовуватися у разі гострої або хронічної печінкової недостатності.

5. Гідрокортизон протипоказаний при активному туберкульозі, важких формах цукрового діабету, хворобі виразки шлунка і дванадцятипалої кишки.

SIDE EFFECTS (ADVERSE EFFECTS. ADVERSE SIDE EFFECTS)
Побічна дія

Vocabulary

convulsions — судороги
digestive disturbances — порушення травлення
to discontinue treatment — припинити лікування
dizziness — запаморочення
drowsiness — сонливістъ

dryness of the mouth — сухість у роті
exanthem, skin rash — шкірний висип
G. I. (gastrointestinal) upsets — шлунково-кишкове порушення
itching, pruritus — свербіння
IM/IV injection site — місце внутрішньом'язової/внутрішньовенної ін'єкції
to subside — убувати, спадати
urticaria — кропив'янка
vision disorders — порушення зору
weakness — слабкість

Exercise 10. Translate into Ukrainian:

1. The most frequent clinical adverse reactions were: fatigue, upper respiratory symptoms.
2. For the most part, adverse experiences were mild and transient in nature.
3. Suppository is usually well tolerated. Most adverse effects have been mild and transient.
4. The most common reported adverse reactions were: exacerbation of symptoms and irritation from aerosol, blurred vision and difficulty in accommodation.
5. Weight gain has occasionally been reported.
6. Tachycardia and blood pressure reduction may appear. They generally subside after a few days.
7. In rare cases, severe gastric bleeding or tarry stools can occur during frequent and long-term use.

PRECAUTIONS (WARNING. CAUTION)
Запобігання

Vocabulary

to avoid taking alcohol — уникати вживання спиртного
to be used after careful assessment ó використовувати після ретельної оцінки
to impair the ability to drive (driving ability) — відволікати увагу водіїв
to keep out of the reach of children — тримати подалі від дітей
regular check-ups — регулярне медичне обстеження
under medical supervision — під медичним наглядом
to withdraw — припинити прийом

Exercise 11. Translate into Ukrainian:

1. Prolonged use of antibiotics may give rise to overgrowth of nonsusceptible microorganisms and fungi. Should this occur, discontinue their use and institute appropriate therapy.
2. Pantrisin ophthalmic solution and ointment are incompatible with other preparations.
3. Should undesirable reactions occur, discontinue administration immediately.
4. Prior to an injection of any vaccine, all known precautions should be taken to prevent side reactions.
5. Do not take for colds for more than 3 days unless directed by a doctor.
6. Renal function should be closely monitored, as it may be further impaired by the use of antihypertensive drugs.
7. Kesalamine produces an acute intolerance syndrome characterized by acute abdominal pain and bloody diarrhea; in such cases prompt withdrawal is required.

Exercise 12. Translate into English:

1. При появі клінічних симптомів недостатності функції печінки необхідно припинити лікування.
2. Реопірин застосовують у дитячому віці тільки в стаціонарі під наглядом лікаря і при постійному контролі крові.
3. Застосовувати Тразикор під ретельним контролем лікаря.
4. Особливу увагу слід звернути на появу будь-якої ознаки серцевої недостатності.
5. Лікування Верошпіроном може викликати тимчасове підвищення рівня карбамідного азоту в сироватці.
6. Під час прийому препарату не можна водити транспортні засоби.
7. Під час лікування слід утриматися від вживання спиртного і не палити.

PRESENTATION. PACKING (PACKAGE HOW SUPPLIED. AVAILABILITY)
Форма випуску й упаковка

Vocabulary

ampoule of solvent — ампула з розчинником
blister pack — конвалюта
bottle — пляшка
dropper bottle — пляшка з піпеткою в пробці
ear drops — вушні краплі
extract — екстракт
eye drops — очні краплі
for oral use — для орального вживання
gel — гель
gelatin capsules — желатинові капсули
inhaler — інгалятор
liniment — рідка мазь
ointment — мазь
pack of 48 capsules — упаковка з 48 капсул
package of 20 tablets — упаковка з 20 таблеток
powder — порошок

suppositories — свічки
sugar-coated tablets — таблетки з цукровою оболонкою
tablet scored for halving — таблетки з розподілювальною рискою
tube — тюбик
vial — флакон

Exercise 13. Translate into Ukrainian:
Oral capsules; 30 capsules in blister pack; vial of 250 mg with sterile water for injections; box containing 30 sugar-coated tablets; packet of 40 tablets; blister pack of 30 tablets.

Exercise 14. Translate into English:
флакон порошку для ін'єкцій;
ампула з водою для ін'єкцій;
упаковка з 40 драже;
упаковка з 5 флаконів, що містять 1 г сухої речовини;
30 г мазі в тюбику;
20 таблеток по 1 мг;
2 флакони суспензії.

STORAGE
Зберігання

Vocabulary

to avoid excessive heat — уникати перегріву
to keep in a cool place — зберігати в прохолодному місці
to protect from light — оберігати від світла
to protect from moisture (humidity) — оберігати від вологи
to store at room temperature — зберігати при кімнатній температурі
tightly closed — щільно закритий

USABILITY (SHELF LIFE. TERM OF VALIDITY)
Термін зберігання

Vocabulary

expiry date — закінчення терміну зберігання
not stable for long period — не стійкий тривалий період
use within 7 days — використовувати протягом 7 днів

Exercise I5. Translate into Ukrainian:
1. Tablets Noroxin should be stored in a tightly closed container. Avoid storage at temperatures above 40°C (104°F) .
2. Protect from moisture, freezing and excessive heat.
3. Do not store above 86°F (30°C) . Keep the bottle tightly closed.
4. Protect from heat and light.
5. Do not use after the date printed on the pack after the letters "exp".
6. Store in a cool and dry place in airtight container, away from light. Keep out of children.
7. The expiration date is mentioned on the package (on strips "exp" followed month and year).

Exercise 16. Translate into English:
1. Зберігати при температурі не вище 25°С.
2. Препарат зберігати в захищеному від світла місці.
3. Зберігати в сухому, недоступному для дітей місці.
4. Зберігати при кімнатній температурі у сухому темному місці.

GRIPPOSTAD® C

International

Composition

A capsule contains:

200 mg paracetamol, 150 mg ascorbic acid, 25 mg caffeine, 2.5 mg of chlorphenamine hydrogen maleat. Gelatin, glycerol tristearate, lactose, colouring E 104, E 127, E 171.

Indication

For use in the treatment of influenzal infections and colds.

Contraindications

Grippostad® C should not be used in cases of serious renal dysfunction, hypersensitivity to paracetamol, genetically conditioned deficiency of glucose-6-phosphate-dehydrogenase (symptom: haemolytic anaemia), increased intra-ocular pressure and enlargement of the prostate gland (adenoma of the prostate) with formation of residual urine in the bladder.

Side effects

When used as directed, generally no side effects are to be expected; in individual cases, liver and kidney damage may occur following extended use of high dosages, serious damage to the liver may result from overdosage.

In extremely rare cases dyshaematopoiesis has been reported due to the active ingredient paracetamol, for example a reduction in blood platelets (thrombocytopenia) or white blood corpuscles (leucopenia) or of all blood cells (pancytopenia). In individual cases Grippostad® C can also lead to gastrointestinal complaints, tiredness, dryness of the mouth, glaucoma, hypersensitive reactions (e.g. skin reactions).

In individual cases hypersensitive reactions have been described for the ingredient paracetamol (swellings in the face, respiratory distress, sweating, nausea, drop in blood pressure to the point of shock).

Dosage, Administration and Duration of Use

Unless otherwise directed, at the beginning of the treatment adults take 2 capsules in the morning, at midday and in the evening with some liquid.

After a reduction in the complaints, 1 capsule in the morning, at midday and in the evening is sufficient.

Notice

Pain killers should not be taken for extended periods of time or in high doses without consulting a physician.

This preparation can alter the ability to react, even when taken as directed, to such an extent that the ability to operate a vehicle or machinery is impaired. This is true to an enhanced degree in combination with alcohol.

Expiry

The preparation should not be used after the expiry date printed on the package.

Keep all medicines out of reach of children.

PROFILAR®
KETOTIFEN FUMARATE

Description

Profilar is a brand name of ketotifen. It is an asthma prophylactic and anti-allergic drug with antihistaminic and marked anti-anaphylactic properties.

Mechanism of action

Ketotifen acts via a number of different pathways, including: histamine antagonism, inhibition of phosphodiesterases, blockade of calcium channels, functional antagonism of slow reacting substance of anaphylaxis, or an indirect effect mediated by 62-receptors. Ketotifen also inhibits platelet dependent bronchospasm.

Indication

Profilar is indicated in the following:

Long-term prophylactic treatment of bronchial asthma.

Inhibition of allergic symptoms such as rhinitis, skin rashes, food allergies and chronic urticaria.

Profilar is not effective in aborting established attacks of asthma.

Dosage and Administration

The onset of the prophylactic effect of ketotifen is slow; 4–6 weeks are required to achieve full prophylactic value.

Adult oral dose of Profilar: 1 mg tablet or 5 ml syrup twice daily, which could be increased up to 2 mg or 10 ml twice daily.

Children (over 3 years): 1 mg or 5 ml twice daily.

Children (6 months to 3 years): 0.5 mg or 2.5 ml twice daily. Note: the oral dose should be given with food.

Contraindications

No known contraindications. Ketotifen does not exhibit cross-tacnyphylaxis.

Precautions

— In steroid-dependent subjects with asthma, Ketotifen exerts a small steroid-sparing effect in steroid dependent asthmatics.

— Ketotifen may cause drowsiness and sedation.

Caution should be taken when driving a vehicle or when operating machinery.

— If intercurrent infection occurs, Ketotifen treatment must be supplemented with the specific antibiotic.

— Use during pregnancy: no teratogenic effects of Ketotifen have been documented in humans. But as with all other drugs, only use when extremely necessary.

Side effects

Ketotifen is a well tolerated drug with the exception of sedation which appears to be of short duration.

The most common side-effects are sedation, tiredness, weight gain and dry mouth. Less frequent side effects are dizziness, nausea and headache.

Storage

Store between 15–30°C.

How supplied

Profilar tablets: Blister packs of 30 tablets.

Each scored tablet contains 1 mg Ketotifen (as fumarate).

Profilar syrup: Each teaspoon (5 ml) contains 1 mg Ketotifen (as fumarate).

PLENDIL®

Tablets 5mg and 10mg

Composition

Tablets containing felodipine 5 mg in an extended release formulation.

Tablets containing felodipine 10 mg in an extended release formulation.

Description

Plendil is a vascular selective calcium antagonist primarily developed for the treatment of hypertension, which lowers arterial blood pressure by decreasing peripheral vascular resistance. Plendil exhibits a high degree of selectivity for smooth muscle in the arterioles and in therapeutic doses has no direct effect on cardiac contractility or conduction. Because of its lack of effect on venous smooth muscle and on adrenergic vasomotor control, Plendil is not associated with orthostatic hypotension.

Plendil possesses a mild diuretic effect and does not produce any general fluid retention.

Plendil is effective in all grades of hypertension. It can be used as monotherapy or in combination, e.g. with beta-receptor blockers or diuretics.

Plendil is generally well tolerated, also in patients with angina pectoris and congestive heart failure.

The formulation chosen ensures therapeutic plasma concentrations 24 hours post dosing.

Indication

Hypertension.

Contraindications

Pregnancy, including the early stages. Hypersensitivity to felodipine.

Precautions

Felodipine, like other effective arteriolar dilators, may in rare cases precipitate significant hypotension with tachycardia which in susceptible individuals may result in myocardial ischaemia.

Use in pregnancy and lactation

Plendil should not be given to women of child bearing potential. Most of these reactions are dose-dependent and appear at the start of treatment or after a dosage increase. Should such reactions occur they are usually transient and diminish in intensity with time.

In common with other dihydropyridines, Plendil may cause ankle swelling as a result of precapillary vasodilation. This appears to be dose related.

As with other dihydropyridines, patients with pronounced preexisting gingivitis/periodontitis may experience mild gingival enlargement. This can be prevented or reversed by careful dental hygiene.

Skin reactions such as rash and pruritus have been reported.

Dosage and administration

The dose should be adjusted individually. It is recommended that treatment is started with 5 mg once daily. The usual maintenance doses are 5 mg or 10 mg once daily. If necessary the

dose may be further increased or another antihypertensive agent added. The total daily dose should be taken once daily in the morning.

The tablets should be swallowed whole with water; they must not be divided, crushed or chewed.

Interactions

Concomitant administration of substances which interfere with the cytochrome P450 system may affect plasma concentrations of felodipine.

Enzyme inhibitors (e.g. cimetidine) have been shown to cause an increase in felodipine plasma levels.

Enzyme inducers (e.g. phenytoin, carbamazepine, barbiturates) will cause a decrease in plasma levels of felodipine.

The high degree of plasma protein binding of felodipine does not appear to affect the unbound fraction of other extensively bound drugs such as warfarin.

ASPISOL

Bayer Leverkusen

Composition:

1 injection vial of dry substance contains 0.9 g DL-lysine mono (acetylsalicylate), corresponding to 0.5 g acetylsalicylic acid, and 0.1 g aminoacetic acid. 1 ampoule of solvent contains 5 ml of water for injection.

Indications

Postoperative pain and all other pain states, e.g. colic pain (with a spasmolytic if necessary), hyperthermia, rheumatic disorders, neuralgia, and neuritis, inflammation of superficial veins (e.g. thrombophlebitis), reduction of thromboses and embolisms after operations.

Note

Owing to the possibility of Reye's syndrome, Aspisol should be given to children and adolescents with febrile diseases only on a doctor's instructions, and then only if other measures have proved ineffective.

Contraindications

Aspisol must not be taken by patients with gastric or duodenal ulcers or with a pathologically increased haemorrhagic tendency.

Aspisol must not be taken by patients undergoing concomitant treatment with anticoagulants (e.g. coumarin derivatives, heparin — with the exception of low-dose heparin therapy — with frequent and careful monitoring of the coagulation status), by patients with glucose-6-phosphate dehydrogenase deficiency (owing to the possibility of haemolysis, an individual analysis of the risks and benefits must be carried out), asthmatic patients, or those hypersensitive to salicylates, other anti-inflammatory/antirheumatic drugs, or other allergenic substances, patients with chronic or recurrent gastric or duodenal complaints or with impaired renal function (careful monitoring required), or by pregnant women, especially in the last trimester (possibility of increased risk of haemorrhage).

Note

Patients suffering from asthma, hay fever, swelling of the nasal mucosa (nasal polyps), or chronic respiratory tract infections (especially when associated with hay fever-like symptoms), and patients hypersensitive to analgesics and antirheumatics of all kinds are at risk from asthma attacks when using Aspisol (analgesic intolerance/analgesic asthma).

The following side effects can occur: stomach pains, gastrointestinal bleeding; in rare cases hypersensitivity reactions (bronchospasm, skin reactions); in very rare cases reduction in the platelet count (thrombocytopenia); reversible elevation of liver enzyme values (transaminases) during long-term therapy with high doses.

Dosage

In general, 1 injection vial of Aspisol. In very severe pain, as a premedication for operations, and in the case of colic pain, the contents of 2 vials should be administered at once. The daily dose with repeated use must not exceed 10 vials.

The usual daily dose for babies and children is 10–25 mg acetylsalicylic acid per 1 kg of the body weight, corresponding to 0.1–0.25 ml of the solution for injection. This daily dose must be divided into 2–3 administrations. The solution must be freshly prepared each time.

For antithrombotic treatment: 1–2 injection vials per day up to changeover to oral therapy with Colfarit®. The solvent is added to the dry substance, dissolution is promoted by brief shaking.

ZYRTEC®

Cetirizine hydrochloride film-coated tablets

Composition

Each film-coated tablet contains cetirizine hydrochloride 10 mg.

Dosage form, route of administration and packaging

Box containing 10, 20 or 100 film-coated tablets for oral use.

Peak blood levels of the order of 0.3 mcg/ml are reached between thirty and sixty minutes after administration of a 10 mg dose of Zyrtec. Its plasma half-life is approximately 11 hours. Absorption is very consistent from one subject

to the next. Its renal clearance is 30 ml/min and the excretion half-life is approximately 9 hours. Zyrtec is strongly bound to plasma proteins.

Indications

Symptomatic treatment of seasonal rhinitis and conjunctivitis, perennial allergic rhinitis as well as pruritus and urticaria of allergic origin.

Dosage and directions for use

Adults and children of 12 years and older.

In most cases, the recommended dose is one 10 mg tablet daily.

It is advisable to take the drug with a little liquid during the evening meal since the symptoms for which the product is given usually appear during the night.

If patients are affected by side effects, the dose may be taken as 5 mg in the morning and 5 mg in the evening.

Contraindications

Zyrtec tablets are contraindicated in patients with a history of hypersensitivity to any of the constituents.

Side effects

When Zyrtec is administered at recommended doses any side effects that may occur, such as agitation, dry mouth, drowsiness, or headache, do not differ significantly from placebo.

Very occasionally symptoms of hypersensitivity have been reported.

Special precautions

At therapeutic doses, Zyrtec does not potentiate the effect of alcohol. Care should, however, be taken.

Pregnancy and lactation

Teratology studies in animals have not demonstrated any special adverse effects. As a precaution, however, Zyrtec should not be administered to pregnant women during the first three months of pregnancy, nor should women who are breastfeeding take the drug.

Drug interactions

To date, there are no known interactions with other drugs.

Nevertheless, Zyrtec should be used with caution if sedatives are also being taken.

Driving or operating machinery

Studies in healthy volunteers on 20 or 25 mg/day have not revealed effects on alertness or reaction time. Patient should be advised, however, to take care not to exceed the recommended dose.

Overdosage

Drowsiness can be a symptom of overdosage, occurring from administration of 50 mg of Zyrtec as a single dose. To date, there is no specific antidote.

In the case of massive overdosage, gastric lavage should be performed as soon as possible. Usual supportive measures should be provided and routine observations carried out regularly.

Storage

Store below 25°C in a dry place.

Stability

The expiry date on the package, found after the mention "Exp." should not have been exceeded.

UNISAL[Æ]

Diflunisal

Unisal is a brand new diflunisal, an analgesic with antiinflammatory effects.

Indications

Unisal is indicated in the symptomatic treatment of pain, pain and inflammation associated with rheumatoid arthritis or osteoarthritis, and primary dysmenorrhea.

Dosage and administration

Usual adult dose. Two tablets anally followed by one tablet every 12 hours. Following the initial dose, some patients may require one tablet every 8 hours.

Rheumatoid arthritis, osteoarthritis and primary dysmenorrhea:

One to two tablets as a single dose or in two divided doses daily. Dosage should be adjusted to the nature and intensity of the pain being treated.

Diflunisal is not recommended for children.

The drug is **contraindicated** in the following cases:

— Hypersensitivity to diflunisal.

— In patients where asthmatic-attacks, urticaria or rhinitis are precipitated by aspirin or any other non-steroidal anti-inflammatory drugs.

— In patients with peptic ulceration and gastrointestinal bleeding.

— It is also contraindicated during pregnancy and lactation.

Precautions

— Platelet function may be inhibited and bleeding time increased by higher doses of diflunisal.

— Ophthalmologic studies should be performed in patients who develop eye complains during treatment.

— Patients with significantly impaired renal function should be monitored, and a lower dose should be used.

— Use with caution in patients with compromised cardiac function, hypertension or other conditions predisposing to fluid retention.

Drug interactions

— Concomitant use of diflunisal with Acetaminophen results in 50% increased acetaminophen plasma levels.

— Aluminium hydroxide suspension significantly decreases the absorption of diflunisal.

— Oral anticoagulants may increase hypoprothrombinemic effects of anticoagulants.

— Hydrochlolorothiazide, resulted in significantly increased plasma levels of hydrochlorothiazide.

— Indomethacin, the combined use of indomethacin and diflunisal has been associated with fatal gastrointestinal hemorrhage. This combination should not be used.

— Sulindac, resulted in lowering the plasma levels of the active metabolite of sulindac.

Side effects

Side effects are mild and transient and may include nausea, dyspepsia, gastrointestinal pain, diarrhea, vomiting, constipation, flatulance, rash, dizziness and insomnia.

Storage

Store between 15–30□C.

How supplied

Unisal 5000 tablets. Each tablet contains diflunisal 500 mg. Blister pack of 10 tablets.

NEUROPHARMACOLOGIC DRUGS

These drugs act on the nervous system. There are two major types of neuropharmacologic drugs: autonomic drugs and central nervous system drugs.

Autonomic drugs influence the body in a manner similar to the action of the parasympathetic and sympathetic nerves of the autonomic system.

The function of the sympathetic nerve network in the body is (1) to stimulate the flow of epinephrine from the adrenal gland, (2) to increase heart rate, (3) to constrict blood vessels, and (4) to dilate air passages.

Drugs which mimic the action of sympathetic nerves are called sympathomimetic or adrenergic agents. They stimulate the flow of epinephrine, increase heart rate, constrict blood vessels, and dilate air passages. Examples of sympathomimetic drugs are epinephrine (adrenaline) and norepinephrine (noradreneline). These drugs are the same chemicals which are naturally released from the sympathetic nerve endings and adrenal glands during times of stress or emergency.

Drugs which mimic the action of parasympathetic nerves are called parasympathomimetic or cholinergic agents. These drugs oppose the actions of the sympathomimetic (adrenergic) drugs, which means that they slow down heart rate, constrict air passages, and stimulate involuntary muscles in the digestive tract and other organs. The parasympathetic agent which is produced normally at all times by parasympathetic nerve endings is called acetylcholine, unlike a drug such as epinephrine, cannot be administered to patients. This is because there are enzymes in the body called cholinesterases which inactivate acetylcholine almost as quickly as it is given. Other cholinergic drugs are, therefore, chosen as exogenous agents. For example, bethanechol is used in postoperative urinary retention to include the constriction of the urinary bladder, siding urination.

Other autonomic drugs are parasym-pathol-itic agents which oppose the effect of parasympathetic nerve stimulation. Examples of these drugs are atropine and belladona, which are also known as antispasmodic drugs because they act to relax the muscles in the gastrointestinal tract and decrease peristalsis.

Sympatholytic agents, which block the action of the sympathetic nervous system, include reserpine, guanethidine, and phentolamine. These drugs are used to decrease blood pressure and protect against the excess epinephrine secretion liberated by pheochromocytomas (tumors of the adrenal gland).

Central Nervous System Drugs affect the nervous system. They are of two main types: those which stimulate the nerves in the brain and spinal cord, stimulants, and those which depress the nerves in the brain and spinal cord, depressants.

Analgesics are agents which act to relieve pain. Examples of analgesics are acetylsalicylic acid (aspirin), acetaminophen (Tylenol), and dextroproxyphene (Darvon). Aspirin and Tylenol are antipyretics (agents against fever) as well as analgesics. Darvon is used to lessen any type of mild pain, especially in recurrent or chronic disease.

Acetylsalicylic acid and dextropropoxyphene are examples of non-narcotic analgesics. Examples of narcotic analgesics are opium, morphine, heroine, codeine, and meperidine (Demerol). Most of the narcotic analgesics are addictive and habit-forming.

Hypnotic drugs are those which depress the central nervous system and produce sleep. Sedatives are used to quiet and relax the patient without necessarily producing sleep. Barbiturates, such as phenobarbital, secobarbital, and

pentobarbital, are the best known sedatives and hypnotics. Chloral hydrate is an example of another type of sedative. Depending on the dose and how it is administered, the response to a barbiturate may range from mild sedation to hypnosis and finally to general anesthesia.

Tranquilizers are drugs which alter behavior, allowing for control of nervous symptoms such as anxiety depression, fear, or anger. Minor tranquilizers, such as chlordiazepoxide (Librium) and diazepam (Valium), are used primarily for control of less severe states, while the major tranquilizers, such as phenothiazines (Thorazine, Stelazine), and tricyclic antidepressants, such as amitriptyline (Elavile), are used to controle severe disturbances of behavior or psychoses (loss of contact with reality).

Anticonvulsant agents are used to treat epilepsy, a central nervous system disorder caused by abnormal electrical discharges within the brain which result in abnormal muscular movements, loss of consciousness, and other symptoms. Ideally, anticonvulsant drugs should depress the part of the brain which controls motor, or movement, activity and not the sensory and cognitive (thinking) parts of the brain. An example of an effective anticonvulsant drug is diphenylhudantoin (Dilantin). Barbiturates like Phenobarbital are also used as anticonvulsant drugs.

Anesthetics are drugs which produce loss of sensation, and particularly loss of appreciation of pain. General anesthetics produce loss of sensation throughout the entire body by depressing the central nervous system, producing sleep, unconsciousness, and muscle relaxation. Examples of general anesthetics are diethyl ether, nitrous oxide, thiopental, and halothane. Local anesthetics relieve or prevent pain in a particular area of the body. The names of the most of the local anesthetics have the suffix *-caine*. Examples are cocaine, procaine (Novocain), lidocaine (Xylocaine), and tetracaine (Pontocaine).

ANTIHISTAMINES

These are drugs which block the action of chemical called histamine which is found in the body. Histamine is produced by most cells and especially by sensitive cells under the skin and in the respiratory system. When certain foreign antigens (protein substances which lead to the production of antibodies) enter the body, antibodies are made by cells. These antibodies attempt to inactive, or neutralize, the offending antigens and, as a result a chemical called histamine may be released by other cells. Histamine causes the characteristic allergic symptoms when it is liberated from cells: itching, hives, allergic rhinitis, bronchial asthma, hay fever, and, in some cases, anaphylactic shock.

Antihistamines, by blocking the action of histamine in the body, can relieve the allergic symptoms which histamine produces. Antihistamines cannot cure the allergic reaction, but they can relieve its symptoms. Some potentially dangerous side effects of antihistamines are drowsiness, sedation, and blurred vision. Examples of antihistamines are diphenhydramine, chlorpheniramine and tripelennamine.

CARDIOVASCULAR DRUGS

These drugs may be divided into three groups: drugs that effect the heart; drugs that effect blood pressure; and drugs that prevent blood clotting.

Drugs that effect the heart in two major ways: changing the rate and forcefulness of the heartbeat and altering the rhythm of the heartbeat.

The most common drugs used to change the rate and forcefulness of the heartbeat are the digitalis glycosides (cardiac glycosides). These drugs are used to treat patients in heart failure (when the heart is not contracting with sufficient force). Most of the digitalis glycosides are obtained from the leaf of the digitalis (foxglove) plant, either as a crude mixture or as the purified glycoside from the leaf of the plant.

Other drugs, which belong to the general class of sympathomimetics, are used to increase heart rate and the force of contraction. These include isoproterenol and epinephrine.

Drugs used to correct abnormal heart rhythm are called antiarrhythmics. Examples of these drugs are quinidine, procainamide, lidocaine, and propranolol. These drugs help to restore the heart rhythm to a regular cycle by depressing ectopic myocardial impulses. Quinidine comes from the bark of the cinchona tree and is the primary drug used to treat arrhythmias. Quinidine decreases the number of times the heart muscle can contract in a given period of time. The cocaine derivatives procainomide and lidocaine (Xylocaine) are also useful in controlling abnormal cardiac rhythms.

Vasolidators are drugs that effect blood pressure, they relax the muscles of vessels walls, thus increasing the size of blood vessels. These drugs are used in treating blood vessel deseases, heart conditions, and high blood pressure (hypertension). Blood flows more freely and blood pressure falls as blood vessels open and become dilated. Examples are sympatholytics (reserpine, guanethidine, and alpha-methyldopa) and other agents such as hydralazine.

Nitrites are drugs which are also used as vasodilators. Examples of nitrite drugs are glyceryl trinitrate (nitroglycerin) and amyl nitrate. Nitroglycerin dilates all smooth (involuntary) muscles in the body, but has a greater effect on the muscles of the coronary blood vessels. The relaxation of the muscle fibers around the blood vessel of the heart increases the width of these heart vessels and increases blood flow to the heart muscle. The pain (angina pectoris) caused by a lack of adequate blood to the heart is relieved by placing nitroglycerin under the tongue; from there the drug is quickly absorbed into the bloodstream. The other nitrite drugs work in a manner similar to that of nitroglycerin.

A third type of drug to lower blood pressure is diuretics. An example of this type of drug is chlorothiazide (Diuril).

Vasoconstrictors may act directly on the muscles of blood vessels or stimulate a region in the brain which relays the message to the vessels. Examples of vasoconstrictor drugs are: epinephrine (adrenaline), vasopressin, and Aramine (metaraminol).

Anticoagulants are used to prevent the formation of clots in veins and arteries.

Heparin is an anticoagulant chemical substance found normally in human cells in the liver and lungs. However, heparin can be made synthetically for commercial preparations by extracting it from the lungs of animals. When given intravenously or intramusculary, heparin prevents the formation of clots within vessels.

Another anticoagulant is bishydroxycoumarin (Coumadin and Dicumarol). Coumadin is given orally and is effective in preventing the formation of new clots, as well as retarding the extension of those already formed.

GASTROINTESTINAL DRUGS

There are a wide variety of gastrointestinal drugs. They each have different pharmacologic activities and are used mainly to relieve uncomfortable and potentially dangerous symptoms, rather than as cures for diseases. The table 2 gives the type of gastrointestinal drug, how it functions in the body, and examples of specific drugs of that type.

ANTIBIOTICS

An antibiotic is a chemical substance produced by a microorganism (bacterium or simple plant called a mold). The antibiotic can be bacteriological (able to kill microorganism such as bacteria) or bacteriostatic (inhabit the growth of other microorganisms). Antibiotics have been synthesized in the laboratory and are used to treat serious bacterial infections.

The term Gram-positive and gram-negative are often used to describe types of bacteria which are destroyed or inhabited by antibiotics. Gram-positive bacteria are those which stain purple with the Gram stain. Gram-negative bacteria lose the Gram stain and take the red colour of a "counter" stain. Examples of gram-positive bacteria are claustridia, staphylococci, and streptococci. Gram-negative bacteria are the bacteria causing meningitis, cholera, and typhoid fever.

The table 3 gives the names of the major antibiotic groups, the bacterial organism affected, the disease prevented, and an example of a specific antibiotic drug of that group.

The "sulfadrugs" are also used to inhibit the growth of bacteria. They are bacteriostatic, as opposed to bacteriocidal. These drugs are synthetic and made to resemble a substance bacteria need for making a necessary vitamin, folic acid. Sulfadrugs have been largely replaced by antibiotics which can act faster with fever side effects. However, such sulfonamides, as Gautrisin (sulfisoxazole) are effective in combating urinary tract infections.

VITAMINS

Vitamins are necessary for normal body functioning although none can be made by body itself. They are found in plant and animal foods and are needed in only minute quantities for good health. Vitamins play important role in the metabolic processes of the body, and can be synthesized in the laboratory.

Vitamins belong to ancient elementary organic compounds and existed before life originated on Earth.

The vitamins are unlike each other in chemical composition and their function in nature. They are alike only in that they cannot be synthesized in the tissues of animals. The functions they perform fall into two categories, the maintenance of normal structural and of normal metabolic functions. For example, vitamin A is essential for the maintenance of normal epithelial tissue; vitamin D functions in the absorption of normal bone salts for the formation and growth of a bony structure. Certain vitamins of the water soluble group, among them thiamine, etc., are known to be essential constituents of the respiratory enzymes that are required in the utilization of energy from oxidative catabolism of sugars.

Table 2. **Gastrointestinal drugs**

Type of drug	Function	Example
Antacids	Neutralize (render inactive) acid in the stomach. Used for peptic ulcer symptoms, which are esophagitic (heartburn) and epigastric discomfort	Magnesium trisilicate (given alone or combined with aluminium hydroxide in drug called Gelusil); magnesium hydroxide and aluminum hydroxide (Maalox); sodium bicarbonate (backing soda)
Emetics	Produce vomiting	Solution of table salt; syrup of ipecac
Purgatives Laxatives (mild) Cathartics (strong)	Promote defecation and relieve constipation; there are four modes of action: (1) Irritants disturb the lining of the intestine and produce contractions (2) Agents which swell in the presens of water and mechanically stimulate intestinal contractions (3) Salt (saline) holds water in the intestine, promoting contraction of muscles (4) Emollients soften the faces	Bisacodyl; castor oil Agar (from seaweed) Milk of magnesia; magnesium sulfate Mineral oil
Antinauseants	Relieve nausea and vomiting	Dimenhydrate; meclicine; prochlorperazine
Antidiarrheals	Treat diarrhea and decrease Rapid movement of bowels (spasm)	Atropine; belladonna

Table 3. **Major antibiotic groups**

Drug group	Bacteria	Disease	Example of Drug
Penicillin	cocci (berryshaped) bacilli (rodshaped) treponema of syphilis actinomyces	pneumonia streptococcal infection tetanus syphilis actinomycosis	ampicillin penicillin G penicillin V
Erythromycin	some gram-positive cocci; some gram-negative cocci	streptococcal, staphylococcal and pneumococcal infections	erythromycin
Streptomycin	tubercle bacilli many gram-positive plague	tuberculosis	streptomycin
Tetracyclines	streptococci cocci gram-negative bacteria rickettsia (parasitic organisms)	bacterial infections rickettsial infections	tetracycline aureomycin terramycin
Antifungal agents	fungi simple plants	skin infections and fungal meningitis	nystatin amphotericin B

BETTER AND CHEAPER THAN DRUGS?

Herbalism is a way of helping the body to build up its natural defences against illness by using plants or herbs. People who practice natural medicine believe that the body contains repairing processes within itself. Natural substances can activate these processes. Homeopaths believe that what harms when taken in quantity can heal when a little is taken to build up the body's resistance. So the principle of homeopathy is the opposite of the principle of much current Western medicine, allopathy. Allopathy uses substances which are quite different from the substances in the body which are causing harm.

Herbalists point out the danger of using modern drugs, which often have harmful side-effects. By using herbs, they say, a cure can be achieved which does more than just treat individual symptoms. Extracts from herbs, if they are used for a long time (usually for two years at least, when the disease is serious) can heal the whole organism rather than just temporarily treat a disturbance in the body. So using natural remedies is more effective in the end, as well as safe and cheap as a method. Indeed, the World Health Organisation locked at traditional medicine, and particularly herbal remedies, in 1977, and concluded that using local resources of medicinal herbs would be effective. They said that herbs do often cure, and that using them would reduce the drug bill of many developing countries.

Herbs are prepared in many different ways. To make an infusion, you pour boiling water over the herb and drink the liquid. A decoction is when you simmer the herb with water ever a fire until a third of the water has steamed away. You make ointments by cooking animal fat with the herb and leaving it to set; poultices are hot applications of the herb itself to the inflamed areas of the skin. Herbs which are said to cure insomnia are stuffed into pillows.

What kind of herbs can you use? Different herbs cure different diseases and can be prepared in the ways which were described above. Here is a list of the complaints herbs can be used for, compiled by a modern day herbalist. For an abscess, the antiseptic power of lemon: for a hangover, majoram; for shock, sage; for toothache, leadwort; for measles, marigold; for warts, dandelion and many, many more. So take a look in your garden or the country side and see if any of these herbs are growing there. It may pay you to take herbalism seriously.

ANTIBIOTIC RESISTANCE: AN ECOLOGICAL IMBALANCE

Antibiotic resistance towards the treatment of infectious diseases is known worldwide. Antibiotics are societal drugs. In a broader sense, the resistance problem is ecological. In the framework of natural competition between susceptible and resistant bacteria, antibiotic use has encouraged growth of the resistant strains, leading to an imbalance in relationships between susceptible and resistant bacteria. To restore efficacy to earlier antibiotics and to maintain the success of new antibiotics that are introduced, we need to use antibiotics in a way which assures an ecological balance that favors the predominance of susceptible bacterial flora.

In large part, bacteria live in harmony with other inhabitants of the earth. Although some infections are caused by bacteria for which humans are a specific host, in most instances the infections follow entry of bacteria into the body by chance. Over the past 50 years, the classic treatment of bacterial infectious diseases has been antibiotics, the discovery of which vastly changed the relationship between bacteria and people. Today we are witnessing another change, that is, among the bacteria themselves.

While diversity characterizes the microbial flora, antibiotic use has led to a further subgrouping into those bacteria that are susceptible and those that are resistant to antibiotics. Prior to antibiotic introduction, the large majority of commensal and infectious bacteria associated with people were susceptible to these agents. Over the ensuing five decades, the mounting increase in the use of antibiotics, not only in people, but also in animals and in agriculture, has delivered a selection unprecedented in the history of evolution. The powerful killing and growth inhibitory effects of antibiotics have reduced the numbers of susceptible strains, leading to the propagation of resistant variants. The antibiotic susceptibility profile of bacteria on the skin of people today, and in the environments of hospitals and homes, is very different from what it was in the pre-antibiotic era, and even 10 years ago. Multidrug resistance is commonly found in bacteria which cause infections as well as in commensal organisms which colonize our intestinal tract, skin and upper respiratory tracts. The resistant bacteria are the survivors of the antibiotic selection which has been taking place within various segments of society.

Microbes circulate everywhere, and there is a continual exchange among the different human, animal and agricultural hosts. We do not know which bacteria are resistant and which

are susceptible. As suggested, it would be very helpful if we had a system by which we could see resistant bacteria in different colors, distinguishing them from susceptible bacterial populations. We could determine the environments needing remediation, i. e. a return of susceptible flora.

Antibiotics are unique therapeutics. They treat more than just the individual. They treat the environment and in that way they affect society. This characteristic of antibiotics is why today's society is facing one of its gravest public health problems; numerous infectious bacteria with resistance to many, and in some cases to all, available antibiotics.

Antibiotics have also revealed the genetic fluidity of bacteria in terms of their ability to exchange genetic traits among genera and species.

In assessing the antibiotic resistance problem, we can identify a number of factors which have contributed and continue to impact on the emergence of resistance. The leading two are the antibiotic itself and the resistance determinant.

Antibiotics were initially developed for the treatment of infectious diseases in people. Their miraculous effects led to their being solicited and used for the treatment of animals and eventually plants. Antibiotics are used both internally and externally to control bacterial problems for society, maintaining the health of people, animals and agricultural crops. If different antibiotics had been chosen for animals and agriculture than those used in people, we might be witnessing a lower level of resistance today. But, in fact, with each ensuing year, 465% more antibiotics have been produced, developed and used. In the USA alone, an estimated 160 million prescriptions for antibiotics were written last year and over 50 million pounds were produced for use in people, animals and agriculture.

There are two major effects of an antibiotic: therapeutically, it treats the invading infectious organism, but it also eliminates other, or non-disease producing, bacteria in its wake.

GENETICS OF DRUG RESISTANCE AND SPREAD

The emergence of resistant bacteria raises concern about the bacteria and their progeny and also the extent that they can spread to other environments. The bacterium itself is the focus, if the resistance trait is linked solely to that bacterium and cannot be shared by others. This is, however, not the case with most resistance traits in the majority of bacteria. They have evolved extrachromosomal replicating genes called plasmids and their associated transposons which allow rapid and very broad dissemination of genes. Gene transfer crosses species and genus barriers. Thus, resistant enterococci selected in one environment can pass resistance genes not only to other members of their own genus and species but also to other organisms in other genera. Staphylococci share their plasmids with Listeria; E. coli can share genes with other members of the Enterobacteriaceae as well as the pseudomonads and Neisseria, just to mention a few. In fact, the same tetracycline resistance determinants can be found among Gram-positive and Gram-negative bacteria as well as in the mycobacterium. The genetic flexibility and versatility of bacteria have therefore contributed largely to the efficiency by which antibiotic resistance has spread among bacteria and among environments globally. However, it is equally evident that the transfer event has no consequence unless the antibiotic selection is there. Thus, the emergence and maintenance of bacterial resistance relies on the interrelationship between the resistance determinant and the antibiotic.

Resistance genes reside not only in disease-causing organisms, but in commensal organisms as well. These normally harmless bacteria, such as E. coli or enterococcus, can cause a fatal illness if the person is immunocompromised. Moreover, these bacteria harbor resistance genes which can spread to the bacterial strains that do cause infection. Unfortunately, these reservoirs are not being examined very much.

People today harbor many multidrug resistant bacteria. In a study of fecal flora from an ambulatory community, we found that 40% of people on antibiotics carried two or more resistances in 10% of their E. coli, 25% had three or more resistances, and 10% had four or more. People excrete resistant E. coli at the 50% level, even when not consuming antibiotics. High carriage levels of resistant fecal flora have been reported from Holland and elsewhere. Resistant bacteria are plentiful in the environment, providing evidence for an environment in a state of imbalance. While not necessarily inflicting harm, they certainly reflect a significant selection process.

One source of resistant bacteria is food. A large number of drug resistant Gram-negative bacteria are associated with uncooked foods. In the great majority of instances these bacteria pose no health problem. But they too tell us a lot about the environmental imbalance. A study from France assessed the contribution of food bacteria to the intestinal flora by examining the same volunteers when eating normal or sterilized food. Tetracycline resistance in the fecal

flora was high when the volunteers were eating normal, non-sterilized food for 21 days, but dropped dramatically when the diet was shifted to sterilized food for 17 days.

Besides the pneumococcus, there are other resistant bacteria confronting society at large. The tubercle bacillus, which causes tuberculosis, is multidrug resistant and, in some patients, incurable. The gonococcus, the agent of gonorrhoeae and a community acquired infection, is now resistant to penicillin, tetracycline, quinolones and some strains show early signs of resistance to cephalosporins. Few if any options remain after the cephalosporins. This is a societal problem. Imagine what's going to happen when we lose our ability to rapidly treat this organism. The staphylococcus can only reliably be treated with vancomycin. To these can be added Pseudomonas aeruginosa, Acinetobacter and other bacterial disease agents, all therapy by resistance. The decade of the 1990s is unique. Resistance is no longer confined to hospital environments, but is now common in community populations worldwide. As important, this crisis is heightened by a lack of new antibiotics developed during the decade.

In previous decades the pharmaceutical industry has been able to identify and produce newer and more potent antibacterial agents. However, experience in the present decade indicates that this is no longer true. Discovery has diminished, although encouraging signs are appearing once more. There are now renewed efforts in large pharmaceutical houses and smaller biotechnology companies to discover truly novel drugs. These drugs would be those with no structural relationship to antibiotics and thus not intrinsically subject to already existing resistances. This offers one approach towards a solution. Another is to define sufficiently the resistance mechanism and use it to identify novel drugs which can poison or inactivate resistance mechanisms and allow the effective antibiotic to work. This is the basis for the success of the combination of β-lactamase blockers and an effective β-lactam drug, initially introduced as clavulanate and amoxicillin by Beecham Pharmaceuticals. It is this same approach which we are using to restore efficacy to the tetracycline family. Here we are using a semisynthetic tetracycline to block a drug efflux, allowing a classical tetracycline to enter and stop growth.

The control of the antibiotic resistance problem lies in a better understanding of how we use antibiotics. Conditions can be envisioned whereby we encourage the re-emergence of susceptible strains following treatments and the maintenance of the normal susceptible microbial flora between treatments. We need to restore the original microbial balance between susceptible and resistant bacteria-α balance which has been devastatingly altered by the inappropriate and continued application of antibiotics to our environments.

AZTREONAM

Aztreonam is the first of a new class of β-lactam antibiotics known as monobactams. The drug is active against the majority of gram-negative bacteria and has been used successfully in combination with other antibiotics in the treatment of endometritis, cuff cellulitis, and pelvic inflammatory disease and as a single agent for the treatment of acute pyelonephritis. Common side effects of aztreonam are pain and phlebitis at the injection site, mild gastrointestinal disturbances, and skin rash. Cross-reactivity with penicillins and nephrotoxicity are rare. Despite the drug's effectiveness and safety, its use is limited by high cost. Aztreonam should be used when excellent gram-negative coverage is required and amino-glycosides are contraindicated. Obstetricians/gynecologists diagnose and treat a variety of pelvic infections including postpartum endometritis, posthysterectomy cellulites, pelvic inflammatory disease, pelvic abscess, mucopurulent cervicitis, cystitis, and pyelonephritis. Many of these pelvic infections are polymicrobial in nature, and frequently therapy for these infections must be initiated without identification of the responsible pathogens. As a result, initial therapy usually consists of a broad-spectrum single agent or a combination of antibiotics with specific activity against a certain class of organisms. There are many effective single agents or combinations from which to choose, and factors such as spectrum of activity, efficacy, side effects, compliance, and cost should be taken into account when deciding on an initial antibiotic regimen. Aztreonam is a monocyclic β-lactam, or monobactam, with excellent aerobic gram-negative coverage. It has been used alone or in combination to treat a number of obstetric and gynecologic infections.

Aztreonam first marketed in 1984, is the first of a new class of β-lactam antibiotics known as monobactams. The chemical structure of monobactam antibiotics resembles that of the penicillins and cephalosporins. They all have a β-lactam ring. However, the thiazolidine ring common to all penicillins is not present in the monobactams The remaining three-amino-monobactamic-acid ring is the nucleus around which all the monobactams are structured.

Aztreonam is active specifically against facultative or aerobic gram-negative bacteria. In general, the spectrum of activity of aztreonam is similar to that of the amino-glycosides except that aztreonam demonstrates no activity against gram-positive bacteria whereas aminoglycosides are active against Staphylococcus aureus. Aztreonam is effective even against strains of the above bacteria that are resistant to penicillin, older cephalosporins, and aminoglycosides. In addition, aztreonam is active against *Neisseria gonorrhoeae* and *Haemophilus influenzae*, including β-lactamase-producing strains.

Aztreonam has negligible activity against gram-positive bacteria and anaerobic gram-negative bacteria, including Bacteroides and Prevotella species. The drug is ineffective against some gram-negative bacteria, including *Acinetobacter species*, and *Legionella pneumophila*. Chlamydia trachomatis is not susceptible to aztreonam.

Aztreonam exerts its antimicrobial effect by inhibiting bacterial cell wall formation.

Aztreonam possesses a high degree of resistance to most common β-lactamases; therefore, the antibiotic is effective against bacteria that produce these substances. In addition, aztreonam maintains its antimicrobial effect even in the acidic, anaerobic conditions of an abscess cavity.

Overall, aztreonam is a safe and well-tolerated drug with a safety profile similar to or better than that of other β-lactam antibiotics. Common side effects of aztreonam are pain and phlebitis at the injection site, occurring in approximately 2% of patients; nausea and diarrhea, occurring in less than 2% of patients; and skin rash, also occurring in approximately 2% of patients. Aztreonam has been shown to be safe even for patients allergic to penicillin.

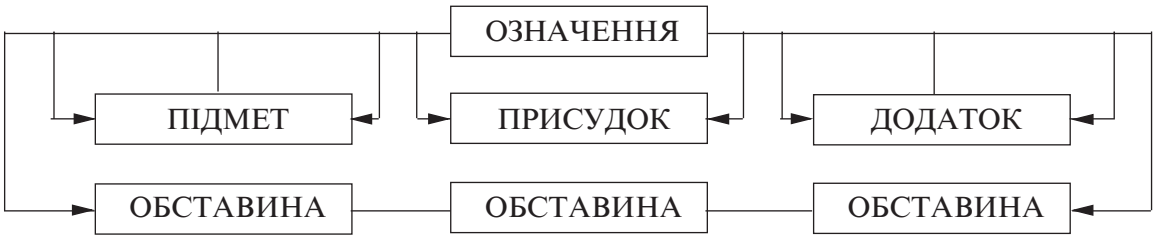
Although the spectrum of activity of aztreonam is similar to that of the aminoglycosides, the risk of nephrotoxicity associated with aztreonam is negligible. Other side effects also occur infrequently. Bleeding has been reported but is rare. Aztreonam can cause an elevation in hepatic transaminases, but these changes are mild and reversible. Neutropenia, thrombocytopenia, and eosinophilia all have been reported but are unusual.

Superinfections can occur with aztreonam; enterococcus and S aureus are the usual offending bacteria. Superinfections with yeast and gram-negative bacteria are rare.

In conclusion, aztreonam is a relatively new antibiotic with excellent effectiveness against gram-negative aerobic bacteria. It is safe and effective in the treatment of common obstetric and gynecologic infections. However, the routine use of aztreonam is limited by its expense. Aztreonam should be considered in the treatment of infections when excellent gram-negative coverage is required and aminoglycosides are contraindicated.

SUPPLEMENTS

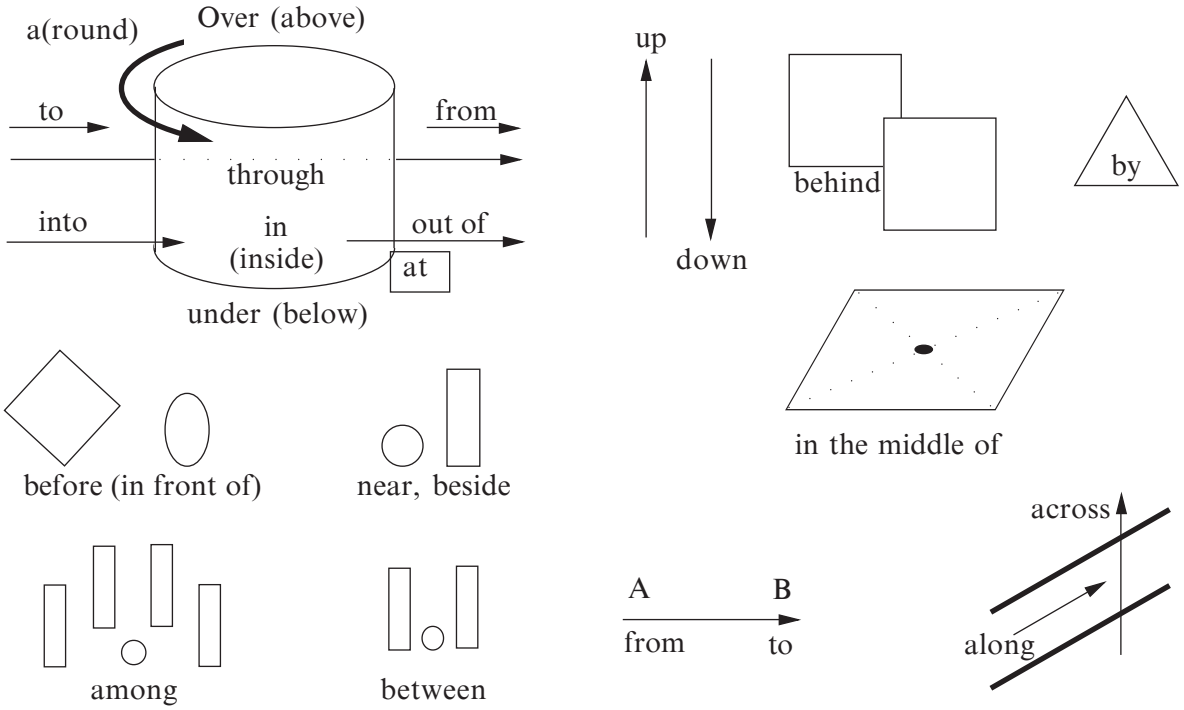
СТРУКТУРА АНГЛІЙСЬКОГО ПРОСТОГО РОЗПОВІДНОГО ПОШИРЕНОГО РЕЧЕННЯ



ПРИЙМЕННИКИ ЧАСУ

at 7 a. m. (p. m.) — о 7 ранку (вечора)
at night (at noon) — вночі, опівдні
in the morning (evening, afternoon) — вранці (удень, увечері)
at the end (beginning) — у кінці (на початку)
in summer — влітку
in June — у червні
on Tuesday — у вівторок
in 2 years — через 2 роки
on the 1st of May — 1-го травня
on a fine day — чудового дня
from 8 a. m. till (to) 8 p. m. — з 8 ранку до 8 вечора
before dinner — до обіду
after supper — після вечері
during vacation — під час канікул
for 3 hours — протягом 3 годин
since childhood — з дитинства
about 6 o'clock — близько 6 годин
by 5 o'clock — до 5-ої години

ПРИЙМЕННИКИ МІСЦЯ ТА НАПРЯМКУ



ЧИСЛІВНИКИ

One	1	Eleven	11	Thirty	30
Two	2	Twelve	12	Forty	40
Three	3	Thirteen	13	Fifty	50
Four	4	Fourteen	14	Sixty	60
Five	5	Fifteen	15	Seventy	70
Six	6	Sixteen	16	Eighty	80
Seven	7	Seventeen	17	Ninety	90
Eight	8	Eighteen	18	Hundred	100
Nine	9	Nineteen	19	Thousand	1,000
Ten	10	Twenty	20	Million	1,000,000

One — the first — перший — the 1st
Two — the second — другий — the 2nd
Three ó the third ó третій ó the 3rd
Five — the fifth — п'ятий — the 5th
Thirteen — the thirteenth — тринадцятий — the 13th

ЧИТАННЯ ДРОБІВ

1/3 — one third
5/6 — five sixth
0.05 — zero point zero five
10.45 — ten point four five

TIME

Time — час	Minute — хвилина
A quarter — чверть	Second — секунда
Half — половина	An hour — година

Examples
1.30 — half past one
7.20 — twenty past seven
9.15 — a quarter past nine
8.40 — twenty to nine
6.50 — ten to seven

DATES

1812 — eighteen twelve
1996 — nineteen ninety six
2000 — two thousand

ВІДМІНЮВАННЯ ДІЄСЛОВА "TO BE" (бути, знаходитись)

PRESENT (теперішній)	PAST (минулий)	FUTURE (майбутній)
I am	I was	I will (shall) be
You are	You were	You will be
He is	He was	He will be
She is	She was	She will be
It is	It was	It will be
We are	We were	We will (shall) be
They are	They were	They will be

Питальна форма: Is he a student? Yes, he is. Are you busy? No, I am not.

Заперечна форма: He is not (isn't) a student. They are not (aren't) pupils.

ВІДМІНЮВАННЯ ДІЄСЛОВА "TO HAVE" (МАТИ)

PRESENT (теперішній)	PAST (минулий)	FUTURE (майбутній)
I have	I had	I will have
You have	You had	You will have
He has	He had	He will have
She has	She had	She will have
It has	It had	It will have
We have	We had	We will have
They have	They had	They will have

Питальна форма: Do you have friends? Yes, I do.

Заперечна форма: I do not (don't) have any friends.

I have no friends.

УТВОРЕННЯ МНОЖИНИ ІМЕННИКІВ

Однина	Множина	Примітка
a desk	desks	Після глухих приголосних -s вимовляється як [s]
a room	rooms	Після голосних і дзвінких приголосних -s вимовляється як [z]
a box	boxes	Після шиплячих і свистячих ss, s, sh, ch, x -es вимовляються як [iz]
a story	stories	При додаванні -s -y в кінці слова після приголосних переходить в -i
a day	days	Після голосних змін не відбувається
a knife	knives	При додаванні -s кінцеві -f, -fe переходять у -ve Винятки: chief — chiefs, roof — roofs

ОСОБЛИВІ ВИПАДКИ УТВОРЕННЯ МНОЖИНИ

Однина	Множина
a man — чоловік, людина	men — чоловіки, люди
a woman — жінка	women — жінки
a tooth — зуб	teeth — зуби
a foot — ступня	feet — ступні
a child — дитина	children — діти

ВІДМІНЮВАННЯ ДІЄСЛОВА ПРОСТОЇ ФОРМИ

Стверджувальна форма	Питальна форма	Заперечна форма
Теперешній час		
I play (write)	Do I play (write)?	I do not play (write)
You play (write)	Do you play (write)?	You do not play (write)
He play**s** (write**s**)	Does he play (write)?	He does not play (write)
She play**s** (write**s**)	Does she play (write)?	She does not play (write)
It play**s** (write**s**)	Does it play (write)?	It does not play (write)
We play (write)	Do we play (write)?	We do not play (write)
They play (write)	Do they play (write)?	They do not play (write)
Минулий час		
I played (wrote)	Did I play (write)?	I did not play (write)
You played (wrote)	Did you play (write)?	You did not play (write)
He played (wrote)	Did he play (write)?	He did not play (write)
She played (wrote)	Did she play (write)?	She did not play (write)
It played (wrote)	Did it play (write)?	It did not play (write)
We played (wrote)	Did we play (write)?	We did not play (write)
They played (wrote)	Did they play (write)?	They did not play (write)
Майбутній час		
I shall play (write)	Shall I play (write)?	I shall not play (write)
You will play (write)	Will you play (write)?	You will not play (write)
He will play (write)	Will he play (write)?	He will not play (write)
She will play (write)	Will she play (write)?	She will not play (write)
It will play (write)	Will it play (write)?	It will not play (write)
We shall play (write)	Shall we play (write)?	We shall not play (write)
They will play (write)	Will they play (write)?	They will not play (write)

ОСОБОВІ ТА ПРИСВІЙНІ ЗАЙМЕННИКИ

Особові					Присвійні	
Називний відмінок (підмет)			Непрямий відмінок (додаток)			
Однина						
1-а особа	I	я	me	мені, мене	my	мій, моя, мою
2-а особа	You	ти	you	тебе, тобі	your	твій, твоя
3-я особа	He	він	him	йому, його	his	його
	She	вона	her	їй, її	her	її
	It	воно	it	йому, його, їй, її	its	його, її
Множина						
1-а особа	we	ми	us	нам, нас	our	наш, наша
2-а особа	you	ви	you	вам, вас	your	ваш, ваша
3-я особа	they	вони	them	їм, їх	their	їхній

ПИТАЛЬНІ СЛОВА

WHO	Хто?
WHOM	Кого? Кому?
WHOSE	Чий? Чия? Чиє?
WHAT	Що? Який?
WHICH	Який?
WHEN	Коли?
WHERE	Де? Куди?
WHY	Чому?
HOW	Як?
HOW MANY	Скільки? (обчислюване)
HOW MUCH	Скільки? (не обчислюване)

ПАСИВНИЙ СТАН (PASSIVE VOICE) to be + Past Participle

Indefinite
PRESENT

AM / ARE / IS → + Past Participle

I am paid stipend regularly.
Мені регулярно платять стипендію.

PAST

WAS / WERE → + Past Participle

He was invited to the party.
Його запросили на вечірку.

FUTURE

WILL + BE + Past Participle

The patient will be injected pain-killer.
Хворому зроблять укол болезаспокійливого.

МОДАЛЬНІ ДІЄСЛОВА

CAN

могти, вміти
He can read English.
Він вміє читати англійською.

MAY

мати дозвіл
He may take this book.
Він може взяти цю книгу.

можливість
She may come in 5 min.
Вона може прийти через 5 хвилин.

MUST

повинен
I must do this work.
Я повинен виконати цю роботу.

SHOULD

слід
You should read this book.
Тобі слід прочитати цю книгу.

NEED

треба, потрібно
We need your help.
Нам потрібна ваша допомога.

ІНФІНІТИВ (INFINITIVE)

Форми інфінітива	Active Voice	Passive Voice
Simple	To ask	To be asked
Continuous	To be asking	
Perfect	To have asked	To have been asked
Perfect Continuous	To have been asked	

Застосування інфінітива:

Підмет	*To walk* is useful.
Частина присудка	Our aim is *to master English*.
Означення	It will be done in the years *to come*.
Додаток	She likes *to sing*.
Обставина	She entered the University *to study* medicine.

НЕОЗНАЧЕНІ ЗАЙМЕННИКИ ТА ЇХ ПОХІДНІ

some 1) якийсь, 2) небагато, 3) декілька

some of — деякі з, хтось з

–? any — деякі з, хтось з

any — будь-який

any of — будь-який з

	body (one)	thing	where
+ some	**Somebody (smb)** **Someone** Хтось	**Something (smth)** Щось	**Somewhere** Кудись, десь
–? any	**Anybody, anyone** Хтось, кожний	**Anything** Щось	**Anywhere** Кудись, десь
no	**Nobody, no one** Ніхто, жоден	**Nothing** Нічого	**Nowhere** Ніде, нікуди
every	**Everybody, everyone** Всі, кожний	**Everything** Все	**Everywhere** Скрізь

СТУПЕНІ ПОРІВНЯННЯ ПРИКМЕТНИКІВ І ПРИСЛІВНИКІВ

	Початковий ступінь	Вищий ступінь	Найвищий ступінь
Одно- і двоскладові прикметники та прислівники	big high busy	bigg**er** high**er** busi**er**	the bigg**est** the high**est** the busi**est**
Багатоскладові прикметники та прислівники із закінченням -ly	interesting easily	**more (less)** interesting **more (less)** easily	**the most (least)** interesting **the most (least)** easily
Винятки			
	Good добрий, **Well** гарно	**better** кращий, краще	**the best** найкращий, найкраще
	Bad поганий **Badly** погано	**worse** гірший, гірше	**the worst** найгірший, найгірше
	Many, much багато	**more** більше	**the most** найбільший, найбільше
	Little мало	**less** менше	**the least** найменший, найменше
	Far дальній, далеко	**farther** дальший, далі **further** подальший	**the farthest** найдальший найдальше **the furthest** — далі за все

СИСТЕМА ЧАСІВ АНГЛІЙСЬКОЇ МОВИ

SIMPLE	CONTINUOUS	PERFECT	PERFECT CONTINUOUS
Present			
I, we, you, they + V Do? He, she, it + Vs Does? always, usually, often, every day	am are V-ing is now, at the moment, while	has Part. II V-ed/ V3rd f. have already, just, never, ever, still, yet, this week, for, since recently, lately	has + been + V-ing have for, since
Past			
V-ed Did? V-2nd form Yesterday, ago, last week, in 1900, when?	Was V-ing Were at 5 o'clock yesterday	had V-ed/V-part. II	had been V-ing
Future			
will+V Will? tomorrow	will be+ V-ing at 6 o'clock to morrow	will have V-ed/V-part. II by 5 o'clock	will have been V-ing

Note: V = verb, part. = participle

УЗГОДЖЕННЯ ЧАСІВ

HE SAYS	Одночасна дія	He works Is working Робить	HE SAID	Одночасна дія	He worked Was working Робить
	Передування дії	He worked Was working Робив		Передування дії	He had worked Had been working Робив
	Майбутня дія	He will work Will be working Буде робити		Майбутня дія	He would work Would be working Буде робити

SIGNS AND SYMPTOMS
ОЗНАКИ ТА СИМПТОМИ

acne [’æknɪ] прищ, вугор
allergy [’ælə:ʤɪ] алергія
anemia [ə’ni:mɪə] анемія
anorexia [ænə’reksɪə] втрата апетиту
apathy [’æpəθɪ] апатія
arrhythmia [’ərɪθmɪə] аритмія (розлад ритму серцевих скорочень)
asphyxia [æs’fɪksɪə] асфіксія, задуха
atrophy [’ætrəfɪ] атрофія (зупинка розвитку, зменшення об’єму)
baldness [’bɔ:ldnəs] облисіння
bed sores [sɔ:z] пролежні
belching [’beltʃɪŋ] відрижка
blindness [’blaɪndnəs] сліпота
blister [’blɪstə] пухир
blurred vision [blə:d’vɪʒən] затьмарений зір
boil [bɔɪl] фурункул
bradycardia [brædɪ’ka:dɪə] брадикардія (уповільнення серцевого ритму)
bruise [bru:z] синець
burn [bə:n] опік
cachexia [kə’keksɪə] виснаження (хворобливе)
chill [tʃɪl] озноб
clot [klɔt] згусток, тромб
colic [’kɔlɪk] коліки, різкий біль
concussion of the brain [kən’kʌʃn] струс мозку
confusion [kən’fju:ʒ(ə)n] спутаність свідомості
constipation [kɔnstɪ’peɪʃən] запор
convulsions (spasms, seizures) [kən’vʌlʃənz] конвульсії
cough [kɔf] кашель
  dry cough [draɪ] сухий кашель
  with expectoration з відкашлюванням
  barking cough [’ba:kɪŋ] гавкаючий кашель
cyanosis [saɪə’nəusɪs] ціаноз (синюшність)
cyst [sɪst] кіста
dehydration [di:haɪ’dreɪʃn] зневоднення
desquamation [deskwə’meɪʃ(ə)n] лущення
diarrhea [daɪə’rɪə] пронос
diathesis [daɪ’æθəsɪs] діатез
discoloration [dɪskʌlə’reɪʃn] знебарвлювання
discomfort [dɪs’kʌmfət] дискомфорт
diplopia [dɪ’pləupɪə] двоїння в очах
disease [dɪ’zi:z] хвороба
  congenital disease природжена хвороба
  hereditary disease [h’əredətərɪ] спадкова хвороба
  disease in a mild form [maɪld] хвороба в легкій формі
  disease in a severe form [sɪ’vɪə] хвороба у важкій формі
discharge [dɪs’tʃa:ʤ] виділення
dislocation [dɪslə’keɪʃən] вивих
distension [dɪ’stenʃən] здуття
distress [dɪ’stres] стомлення, знедуження
dizziness [’dɪzɪnəs], **giddiness** [’gɪdɪnəs], **vertigo** [’və:tɪgəu] запаморочення
drowsiness [’drauzɪnəs] сонливість
dysplasia [dis’pleiʒiə] порушення формування тканини
dyspnoe, breathlessness [dɪsp’nɪə, ’breθləsnəs] задишка
dystaxia [dɪs’tæksɪə] порушення координації
ecchymosis [ekɪ’məusɪs] синець
edema [ɪ’dɪmə] набряк
emesis [’emɪsɪs] блювота
enuresis [enju(ə)’ri:sɪs] енурез (нетримання сечі)
epistaxis [epɪs’tæksɪs] носова кровотеча
erosion [ɪ’rəuʒn] ерозія
eruption [ɪ’rʌpʃən] висипання
erythema [erɪ’θi:mə] еритема
exanthema [eksæn’θi:mə] шкірний висип
exhaustion [ɪg’zɔ:stʃən] виснаження
fatigue [fə’ti:g] стомлення
fever [’fi:və] лихоманка, жар
fissure [’fɪʃə] тріщина
flame spots [fleɪm] «мушки» перед очима
flush [flʌʃ] припливи крові
fracture [’frækʧə] перелом

hallucinations [həluːsɪ'neɪʃnz] галюцинації
hay fever [heɪ'fiːvə] сінна лихоманка
heartburn ['haːt'bɜːn] печія
hematuria [hemə'tju(ə)rɪə] гематурія (кров у сечі)
hemorrage, bleeding ['hemərɪʤ,'bliːdɪŋ] кровотеча
hiccup ['hɪkʌp] гикавка
hives ['haɪvz] кропив'янка
hoarseness ['hɔːsnəs] хрипота
hyperthermia [haɪpə'θɔːmɪə] гіпертермія, перегрівання
hypersensivity [haɪpə'sensɪ'tɪvɪtɪ] підвищена чутливість
icterus, jaundice ['iktərəs,'ʤɔːndɪs] жовтяниця
incontinence of urine [ɪn'kɔntɪnəns əv'juərɪn] нетримання сечі
inflammation ['inflə'meɪʃ(ə)n] запалення
irritation [ɪrɪ'teɪʃn] роздратування
itching ['ɪtʃɪŋ] свербіння
keratinisation [kerətənaɪ'zeɪʃən] ороговіння
lacrimation [lækrɪ'meɪʃ(ə)n] сльозотеча
malaise [mə'leɪz] нездужання
mental retardation ['mentəl riːta'deɪʃ(ə)n] розумова відсталість
myosis [maɪ'əusɪs] звуження зіниці
mydriasis [maɪ'draɪəsɪs] розширення зіниці
nightmare ['naɪtmeə] нічний кошмар
node [nəud] вузол
numbness ['nʌmnəs] оніміння
pain, ache ['peɪn,eɪk] головний біль
  headache ['hedeɪk] головний біль
  toothache ['tuːθeɪk] зубний біль
  acute pain ['əkjut 'peɪn] гострий біль
  severe pain [sɪ'vɪə 'peɪn] сильний біль
  dull pain [dʌl 'peɪn] тупий біль
  throbbing pain ['θrobɪŋ 'peɪn] пульсуючий біль
  squeezing pain ['skwiːzɪŋ 'peɪn] стискаючий біль
  unbearable pain [ʌn'beərəb(ə)l 'peɪn] нестерпний біль
  splitting pain ['splɪtɪŋ 'peɪn] розколюючий біль
  nagging pain ['nægɪŋ 'peɪn] ниючий біль
pallor ['pælə] блідість
palpitation [pælpɪ'teɪʃ(ə)n] прискорене серцебиття
paralysis, palsy [pə'rælɪsɪs, 'pɔːlzɪ] параліч
paraplegia [pærə'pliːʤɪə] параплегія (параліч двох кінцівок)
poisoning ['pɔɪz(ə)nɪŋ] отруєння
polydipsia [pɔlɪ'dɪpsɪə] підвищена спрага
pricking ['prɪkɪŋ] колення
pruritus [prəu'raɪtəs] сверблячка
pus [pʌs] гній
rales [raːlz] хрипи
  dry rales ['draɪ] сухі хрипи
  moist rales ['mɔɪst] вологі хрипи
rash [ræʃ] висип
restlessness ['restləsnəs] неспокій
retching ['retʃɪŋ] нудота
rupture ['rʌptʃə] розрив
scar [skaː] шрам
sleeplessness, insomnia ['sliːplənəs, ɪn'sɔmnɪə] безсоння
smell, odor [smel, 'əudə] запах
sneezing ['sniːzɪŋ] чихання
sore throat ['sɔː' θrəut] запалення горла
sputum ['spjuːtəm] мокротиння
stammering ['stæmərɪŋ] заїкання
stiffness ['stɪfnəs] нерухомість
sty [staɪ] ячмінь
suffocation [sʌfə'keɪʃ(ə)n] задуха
syncope, faint ['sɪŋkəpɪ, 'feɪnt] зомління
sweating ['swetɪŋ] піт
swelling ['swelɪŋ] припухлість
tachycardia [tækɪ'kaːdɪə] тахикардія (прискорення серцевого ритму)
tenderness ['tendənəs] болючість
thirst [θəːst] спрага
tingling ['tɪnglɪŋ] колення
tinnitus [tɪ'naɪtəs] шум у вухах
tumour, swelling, neoplasm ['tjuːmə, 'swelɪŋ, niːə'plæzm] пухлина
  benign tumour [bə'naɪn] доброякісна пухлина
  malignant tumour [mə'lɪgnənt] злоякісна пухлина
twitching ['twɪtʃɪŋ] сіпання
ulcer ['ʌlsə] виразка
uremia [ju(ə)'rɪmɪə] уремія
urination [juərɪ'neɪʃ(ə)n] сечовипускання
urticaria [əːtɪ'keərɪə] кропив'янка
vomiting ['vɔmɪtɪŋ] блювання
wart [wɔːt] бородавка
weakness ['wiːknəs] слабкість
weight loss ['weɪt 'lɔs] втрата ваги
wound [wuːnd] рана
xerostomia [kserə'stəumɪə/zɪrə'stəumɪə] сухість у роті

DISEASES
ХВОРОБИ

abscess ['æbsəs] нарив, абсцес
anginapectoris, stenocardia [æn'ʤaɪnə'pektərɪs] стенокардія
anthrax ['æntræks] сибірська виразка
appendicitis [ə'pendɪ'saɪtɪs] апендицит
arthritis [aː'θraɪtɪs] артрит
arthrosis [aː'θrəusɪs] артроз
asthma ['æsmə] астма
bronchitis [brɔn'kaɪtɪs] бронхіт
cancer ['kænsə] рак
cardio-vascular insufficiency ['kaːdɪəu 'væskjulə 'ɪnsə'fɪʃ(ə)nsɪ] серцево-судинна недостатність

chicken-pox [ˈʧɪkɪnˌpɔks] вітряна віспа
cholecystitis [kəˌlɪsɪsˈtaɪtɪs] холецистит
cholera [ˈkɔlərə] холера
cirrhosis [səˈrəusɪs] цироз
cold [ˈkəuld] простуда
colitis [ˈkəulaɪtɪs] коліт
coronary artery disease, ischemic heart disease [ɪˈskiːmɪk haːt dɪˈziːz] ішемічна хвороба серця
cystic fibrosis [ˈsɪstɪk faɪˈbrəusɪs] муковісцидоз
depression [dɪˈpreʃ(ə)n] депресія
dermatitis [dəːməˈtaɪtɪs] дерматит
diabetes mellitus [daɪəˈbiːtɪz məˈlaɪtəs/melɪtəs] цукровий діабет
diphtheria [dɪfˈθɪrɪə] дифтерія
duodenal ulcer [djuːəuˈdɪnəl ˈʌlsə] виразка дванадцятипалої кишки
dysentery [ˈdɪsəntrɪ] дизентерія
eczema [ˈeksɪmə] екзема
embolism [ˈembəlɪzm] емболія
emphysema [emfɪˈsiːmə] емфізема
empyema [empɪˈiːmə] епієма (скупчення гною в порожнині)
enterocolitis [entərəkəˈlaɪtɪs] ентероколіт
epilepsy [ˈepɪləˈpsɪ] епілепсія
gangrene [ˈgæŋgriːn] гангрена
gastric ulcer [ˈgæstrɪk ˈʌlsə] виразка шлунка
gastritis [gæsˈtraɪtɪs] гастрит
German measles, rubella [ʤəːmən ˈmiːz(ə)lz, ruˈbelə] краснуха
goiter [ˈgɔɪtə] зоб
gout [ˈgaut] подагра
hepatitis [ˈhepəˈtaɪtɪs] гепатит
hernia [ˈhəːnɪə] грижа
influenza, flu [ɪnfluˈenzə, fluː] грип
insult, stroke [ˈɪnsʌlt, strəuk] інсульт
leukemia [luˈkiːmɪə] лейкемія
lichen [ˈlaɪkən] лишай
malaria [məˈlɛərɪə] малярія
measles [ˈmiːz(ə)lz] кір
meningitis [menɪnˈʤaɪtɪs] менінгіт
mumps, parotitis [mʌmps, pærəˈtaɪtɪs] свинка
mycosis [maɪəˈkəusɪs] грибкове захворювання
myelitis [maɪəˈlaɪtɪs] мієліт
myocardial infarction [maɪəˈkadɪəl ɪnˈfaːkʃən] інфаркт міокарда
nephritis [nɪˈfraɪtɪs] нефрит
neuralgia [njuəˈrælʒɪə] невралгія
neuritis [njuəˈraɪtɪs] неврит
otitis [əuˈtaɪtɪs] отит
pancreatitis [pænkrɪəˈtaɪtɪs] панкреатит
peritonitis [perɪtəuˈnaɪtɪs] перитоніт
plague [ˈpleɪg] чума
pleurisy [ˈpluərəsɪ] плеврит
pneumonia [njuˈməunɪə] пневмонія
rabies [ˈreɪbiːz] сказ
renal failure [ˈrɪnəlˈfeɪljə] ниркова недостатність
rheumatism [ˈruːmətɪzm] ревматизм
rickets [ˈrɪkɪts] рахіт
scarlet fever [ˈskaːlətˈfiːvə] скарлатина
sclerosis [sklɪəˈrəusɪs] склероз
scurvy [ˈskəːvɪ] цинга
sepsis [ˈsepsɪs] зараження крові, сепсис
small pox [ˈsmɔːl ˈpoks] віспа
tetanus [ˈtetənəs] правець
thyroiditis [ˈθaɪrɔɪˈdaɪtɪs] тиреоїдит
tonsillitis [tonsəˈlaɪtɪs] тонзиліт, ангіна
typhoid fever [ˈtaɪfɔɪdˈfiːvə] черевний тиф
typhus [ˈtaɪfəs] тиф
urolithiasis [ˌjuərəlɪˈθəɪsɪs] сечокам'яна хвороба
whooping-cough, pertussis [ˈhuːpɪŋ kɔf, pəˈtʌsɪs] коклюш

MEDICAL PREPARATIONS AND THINGS FOR CARE

МЕДИЧНІ ПРЕПАРАТИ ТА ПРЕДМЕТИ ДОГЛЯДУ

adhesive plaster [ədˈhiːsɪvˈplaːstə] лейкопластир
alcohol [ˈælkəhəl] спирт
ampoule [ˈæmpuːl] ампула
antibiotics [ˌæntɪbaɪˈɔtɪks] антибіотики
antiemitic drugs [ˌæntɪɪˈmetɪk] протиблювотні засоби
anti-inflammatory drugs [ˌæntɪɪnˈflæmətərɪ] протизапальні засоби
antipyretic drugs [ˌæntɪpaɪˈretɪk] жарознижуючі засоби
antiseptics [ˌæntɪˈseptɪks] антисептики
bandage, dressing [ˈbændɪʤ, ˈdresɪŋ] бинт
blister pack [ˈblɪstə ˈpæk] конвалюта
bottle [bɔtl] пляшка
box [bɔks] коробочка
brilliant green [ˈbrɪljənt griːn] зеленка
capsule [ˈkæpsjuːl] капсула
cod liver oil [kɔd ˈlɪvə ˈɔɪl] риб'ячий жир
contraceptives [kɔntrəˈseptɪvz] контрацептиви
cotton wadding [ˈkɔtn ˈwɔːdɪŋ] вата
decoction [dɪˈkɔkʃn] відвар
dragee [dræˈʒeɪ] драже
dropper [ˈdrɔpə] крапельниця
drops [drɔps] краплі
drug [drʌg] наркотик
elixir [ɪˈlɪksə] еліксир
emulsion [ɪˈmʌlʃən] емульсія
enema [ˈenɪmə] клізма
extract [ˈekstrækt] екстракт
gauze [gɔːz] марля
gel [ʤel] гель
gloves [glʌvz] рукавички
gown [ˈgaun] халат
herbs [həːbz] трави
hot water bottle [ˈhɔt ˈwɔtə ˈbɔtl] грілка
inhaler [ɪnˈheɪlə] інгалятор
iodine [ˈaɪədaɪn] йод

juice [dʒu:s] сік
laxative [’læksətɪv] проносне
liniment [’lɪnɪmənt] рідка мазь
lotion [’ləuʃən] лосьйон
mask [mask] маска
medicine, remedy, drug [’medsɪn, ’remədɪ, ’drʌg] ліки
mixture [’mɪkstʃə] мікстура
mustard plaster [’mʌstəd ’plʌstə] гірчичник
ointment [’ɔɪntmənt] мазь
pain killer [’peɪn ’kɪlə] болезаспокійливе
pills [pɪlz] пілюлі
poison [’pɔɪzn] отрута
powder [’paudə] порошок
sachet [’sæʃeɪ] облатка
sedative [’sedətɪv] заспокійливе
sleeping pill [sli:pɪŋ ’pɪl] снодійне
solution [sə’lu:ʃən] розчин
solvent [’sɔlvənt] розчинник
suppository [sə’pɔzɪtərɪ] свічка
suspension [səs’penʃən] суспензія
(disposable) syringe [dɪsp’əuzəbl sɪ’rɪnʒ] (одноразовий) шприц
syrup [’sɪrəp] сироп
tablet [’tæblət] таблетка
thermometer [θə’mɔmɪtə] термометр
tincture [’tɪnktʃə] настоянка
tonic [’tɔnɪk] тонізуюче
tranquilizer, sedative [trænkwə’laɪzə, ’sedətɪv] заспокійливе
tube [tju:b] тюбик
vasoconstrictor [,væsɔkəns’trɪktə] судинозвужувальне
vasodilator [,væsɔdaɪ’leɪtə] судинорозширювальне
vial [’vaɪəl] флакон
vitamins [’vaɪtəmɪnz] вітаміни

GENERAL MEDICAL TERMINOLOGY

ЗАГАЛЬНА МЕДИЧНА ТЕРМІНОЛОГІЯ

absorption [əb’sɔ:pʃn] всмоктування
accident [’æksɪdənt] нещасний випадок
acid [’æsɪd] кислота
acidity [ə’sɪdɪtɪ] кислотність
adhesion [əd’hɪʒn] спайка
administration [əd,mɪnɪs’treɪʃn] призначення
admixture [əd’mɪkstʃə] домішка
adult [ə’dʌlt] дорослий
alkaloid [’ælkəlɔɪd] алкалоїд
ambulance [’æmbjuləns] машина щвидкої допомоги
amount [ə’maunt] кількість
analysis (analyses) [ə’næləsɪs] [ə’næləsɪz] аналіз (аналізи)
anesthesia [ænɪs’θi:zɪə] анестезія (знеболювання)
area [’ɛərɪə] область, поле
assay [ə’seɪ] аналіз, проба, зразок для аналізу
attack [ə’tæk] напад
blood [blʌd] кров
boiling point [’bɔɪlɪŋ ’pɔɪnt] точка кипіння
calcification [,kælsɪfɪ’keɪʃn] кальцифікація
case [keɪs] випадок, хворий
case history [’keɪs ’hɪstərɪ] історія хвороби
causative agent [’kɔ:zətɪv ’eɪdʒent] збудник
cause [kɔ:z] причина
cavity [’kævɪtɪ] порожнина
circulation [,sə:kju’leɪʃn] кровообіг
coat [’kəut] оболонка
complaint [kəm’pleɪnt] скарга
complication [,kɔmplɪ’keɪʃən] ускладнення
compound [’kɔmpaund] сполука
contamination [kən,tæmɪ’neɪʃn] забруднення, зараження
contents [kɔn’tents] вміст
contraindication [kɔntrə,ɪndɪ’keɪʃən] протипоказання
course [kɔ:s] курс, течія
data [’deɪtə] дані
death [deθ] смерть
decomposition [di:kəmpə’zɪʃn] розпад, розщеплювання
degeneration [dɪdʒənə’reɪʃn] переродження, звиродніліcть
density [’densɪtɪ] густина
department [dɪ’pa:tmənt] відділ, частина
deposit [dɪ’pɔzɪt] відкладення
diagnosis [daɪəg’nəusɪs] діагноз
diet [’daɪət] дієта, живлення, харчування
digestion [dɪ’dʒestʃən] засвоєння, травлення
dilution [daɪ’lju:ʃn] розведення, розчинення
disorder [dɪs’ɔdə] порушення, безладдя
disturbance [dɪs’tə:bəns] порушення
dosage [’dəusɪdʒ] дозування
dose [’dəuz] доза
duration [djuə’reɪʃn] тривалість
dye [daɪ] фарбник
dyspepsia [dɪs’pepsɪə] порушення травлення
effect [ɪ’fect] дія
emergency [ɪ’mə:dʒənsɪ] екстрений випадок
enlargement [ɪn’la:dʒmənt] збільшення (органа)
environment [ɪn’vaɪərənmənt] навколишнє середовище
enzyme [’enzaɪm] фермент, ензим
ester [’estə] складний ефір
ether [’i:θə] простий ефір
exacerbation [eksæsə’beɪʃn] загострення
examination [ɪgzæmɪ’neɪʃn] огляд
experiment [ik’sperimənt] експеримент
failure [’feɪljə] порушення, недостатність
fats [fæts] жири
film [fɪlm] плівка, знімок

findings [ˈfaɪndɪŋz] дані
fluid [ˈfluɪd] рідина
focus (foci pl.) [ˈfəukəs, ˈfəusaɪ] осередок (запалення)
follow-up [ˈfɔləuˈʌp] контроль, віддалені результати
food [fu:d] їжа
function [fʌŋkʃn] функція
harm [ha:m] шкода
healing [ˈhi:lɪŋ] загоєння
health [helθ] здоров'я
hearing [ˈhɪərɪŋ] слух
hospital [ˈhɔspɪtl] лікарня
improvement [ɪmˈpru:vment] поліпшення
impurity [ɪmˈpjuərɪtɪ] забруднення, домішка
indication [ɪndɪˈkeɪʃn] показання
infusion [ɪnˈfju:ʒn] вливання
in-patient department [ˈɪnˈpeɪʃənt dɪˈpa:tmənt] стаціонар
intake [ˈɪnˈteɪk] прийом (ліків)
intervention [ɪntəˈvenʃn] втручання
invasion [ɪnˈveɪʒn] вторгнення, упровадження
label [ˈleɪbl] етикетка
layer [ˈleɪə] шар
level [levl] рівень
long-term treatment [ˈlɔŋˈtə:m] тривале лікування
loss [lɔs] втрата
lubrication [lu:brɪˈkeɪʃn] змазування
lysis [ˈlaɪsɪs] розчинення, розпад, лізис
maceration [mæsəˈreɪʃn] розмочування
management [ˈmænɪʤmənt] керівництво, лікування
manifestation [mænɪfesˈteɪʃn] прояв
meal [mi:l] прийом їжі
measure [ˈmeʒə] міра
medication [medɪˈkeɪʃn] лікування ліками
medium [ˈmi:dɪəm] середовище
melting point [ˈmeltɪŋ ˈpɔɪnt] точка плавлення
metastasis [mɪˈtæstəsɪs] метастаз
method [ˈmeθəd] метод
morbidity [mɔ:ˈbɪdɪtɪ] захворюваність
mortality [mɔ:ˈtælɪtɪ] смертність
motion [ˈməuʃn] рух
movement [ˈmu:vmənt] рух
newborn [ˈnju:bɔ:n] новонароджений
nutrition [nju:ˈtrɪʃn] живлення, харчування
observation [ɔbzəˈveɪʃn] нагляд
obstruction [əbˈstrʌkʃn] непрохідність, закупорка
outbreak [ˈautbreɪk] спалах
outcome [ˈautkʌm] результат
outpatient [ˈautpeɪʃnt] амбулаторний хворий
oxidation [ɔksɪˈdeɪʃn] окислення
pain threshold [peɪn ˈθreʃəuld] поріг больової чутливості
patient [ˈpeɪʃnt] хворий, пацієнт
per cent [pə ˈsent] відсоток
percolation [pə:kəˈleɪʃn] проціджування
perforation [pə:fəˈreɪʃn] прорив
permeability [pə:mɪəˈbɪlɪtɪ] проникність
phenomenon, pl. phenomena [fɪˈnɔmɪnən, fɪˈnɔmɪnə] явище
position [pəˈzɪʃn] положення
pregnancy [ˈpregnənsɪ] вагітність
prescription [prɪsˈkrɪpʃn] рецепт
pressure [ˈpreʃə] тиск
procedure [prəˈsi:ʤə] процедура
puncture [ˈpʌnkʧə] пункція
quality [ˈkwɔlɪtɪ] якість
quantity [ˈkwɔntɪtɪ] кількість
radiation [reɪdɪˈeɪʃn] опромінювання
recovery [riˈkʌvərɪ] одужання
recurrence [rɪˈkʌrəns] рецидив, повернення
relief [rɪˈli:f] полегшення
remission [rɪˈmɪʃn] ремісія, послаблення хвороби
residue [ˈrezɪdju:] осад
resistance [rɪˈzɪstəns] опір
resorption [rɪˈsɔ:pʃn] всмоктування
respiration [respəˈreɪʃn] дихання
response [rɪsˈpɔns] відповідь, реакція
rest [rest] відпочинок
rupture [ˈrʌpʧə] розрив
saline solution [ˈseɪlaɪn səˈlu:ʃn] сольовий розчин
sensation [senˈseɪʃn] відчуття
sensitivity [sensɪˈtɪvɪtɪ] чутливість
serum [ˈsɪərəm] сироватка
side effect [ˈsaɪd ɪˈfekt] побічний ефект
sign [saɪn] ознака, знак
size [saɪz] розмір
solution [səˈlu:ʃn] розчин
specific gravity [spɪˈsɪfɪk ˈgrævɪtɪ] питома вага
structure [ˈstrʌkʧə] структура
suppuration [səpjuəˈreɪʃn] нагноєння
surface [ˈsə:fɪs] поверхня
symptom [ˈsɪmptəm] симптом
taste [teɪst] смак
temperature [ˈtemprɪʧə] температура
tolerance [ˈtɔlərəns] переносимість
toxicity [tɔkˈsɪsətɪ] токсичність
transfusion [træns'fju:ʒn] переливання
treatment [tri:tmənt] лікування
turbidity [tə:ˈbɪdɪtɪ] помутніння, каламутність
ulceration [ʌlsəˈreɪʃn] вкривання виразками
venom [ˈvenəm] отрута (тваринного походження)
vision [vɪʒn] зір
volatile oils [ˈvɔlətaɪl ˈɔɪlz] леткі масла
volume [ˈvɔljum] об'єм
wax [wæks] віск, парафін
X-ray [ˈeks ˈreɪ] рентген

KEYS

Lesson 1
1d, 2b, 3a, 4c, 5d, 6b, 7c, 8b, 9a, 10b, 11c, 12a, 13a, 14d, 15b, 16c, 17b, 18c, 19b, 20c

Lesson 2
1b, 2c, 3c, 4a, 5b, 6c, 7a, 8c, 9b, 10c, 11b, 12b, 13c, 14c, 15b, 16b, 17c, 18b, 19c, 20a

Lesson 3
1c, 2a, 3a, 4c, 5b, 6a, 7d, 8a, 9c, 10c, 11d, 12a, 13b, 14a, 15c, 16c, 17b, 18d, 19c, 20c

Lesson 4
1d, 2a, 3d, 4d, 5c, 6b, 7a, 8c, 9b, 10c, 11b, 12c, 13c, 14a, 15b, 16b, 17b, 18b, 19d, 20b

Lesson 5
1a, 2d, 3c, 4c, 5b, 6a, 7c, 8b, 9d, 10b, 11c, 12d, 13b, 14d, 15b, 16c, 17c, 18b, 19d, 20a

Lesson 6
1b, 2a, 3b, 4c, 5b, 6d, 7c, 8b, 9a, 10d, 11a, 12c, 13b, 14b, 15c, 16b, 17a, 18b, 19a, 20d

Lesson 7
1c, 2b, 3c, 4a, 5b, 6c, 7d, 8d, 9b, 10a, 11c, 12c, 13d, 14b, 15d, 16a, 17c, 18b, 19b, 20b

Lesson 8
1a, 2d, 3a, 4b, 5b, 6b, 7c, 8a, 9a, 10c, 11d, 12b, 13d, 14b, 15a, 16b, 17b, 18d, 19c, 20c

Lesson 9
1a, 2b, 3d, 4c, 5d, 6b, 7a, 8b, 9c, 10b, 11d, 12a, 13d, 14c, 15a, 16c, 17a, 18c, 19c, 20b

Lesson 10
1c, 2b, 3b, 4a, 5c, 6b, 7a, 8a, 9b, 10a

Lesson 11
1b, 2b, 3d, 4c, 5b, 6d, 7c, 8e, 9c, 10b

Lesson 12
1d, 2b, 3e, 4d, 5e, 6b, 7c, 8a, 9d, 10b

Lesson 13
1c, 2c, 3d, 4a, 5a, 6c, 7a, 8b, 9d, 10c

Lesson 14
1c, 2d, 3d, 4b, 5a, 6b, 7c, 8b, 9e, 10a

Lesson 15
1b, 2c, 3c, 4a, 5d, 6c, 7c, 8b, 9b, 10c

Lesson 16
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Підп. до друку 29.06.2009. Формат 60x84/8.
Папір офсетний. Гарн. Таймс. Друк різографічний. Ум. друк. арк. 21,51.
Обл.-вид. арк. 33,0. Тираж 50. Зам. 1260.
Видано і надруковано Одеським державним медичним університетом.
65082, Одеса, Валіховський пров., 2.
Свідоцтво ДК № 668 від 13.11.2001.