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abstract book

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Effect of Low-Frequency Ultrasound on Transdermal Delivery of Ibuprofen Esters

Iryna Kravchenko^{a*}, Bogdan Prystupa^b

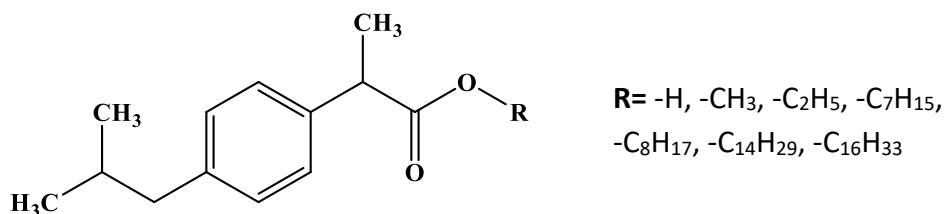
^aOdessa National Polytechnic University, Department of Organic and Pharmaceutical Technology, Odessa, Ukraine

^bOdessa National Medical University, Department of Pharmacology and Pharmacognosy, Odessa, Ukraine

* kravchenko.pharm@gmail.com

Ultrasound therapy is included in the basic program of physiotherapeutic treatment of inflammatory joint diseases. Recently, low-frequency ultrasonic vibrations are often used in physiotherapy practice. The biological effect of ultrasound depends on its dose, small doses of ultrasound accelerate protein synthesis, lead to the synthesis of elastin and collagen fibers, loosen connective tissue, have anti-inflammatory, absorbable, analgesic and antiseptic effects. The combination of thermal, chemical and mechanical changes in the skin structure under the influence of ultrasound enhances the administration of drugs. Cavitation causes changes in the lipid structure of the stratum corneum, which leads to increased transdermal drug administration.

The aim of the study was to investigate the effect of low-frequency ultrasound on the anti-inflammatory activity of ibuprofen esters.



The study was carried out on a model of the inflammatory response caused by subplantar injection of 0.2% carrageenan solution into the hind paws of rats. Ibuprofen esters were used in the form of a 0.5% ointment, and skin permeability was enhanced using 10 minutes of sonication at a frequency of 23 kHz. The control group of animals was treated with 5% ibuprofen ointment.

It was found that the combined use of ibuprofen esters with low-frequency ultrasound leads to a more rapid removal of the inflammatory response compared to the control group. Combined usage of ultrasound with ethyl ester of ibuprofen made it possible to reduce the concentration of the active substance from 5% (for the ointment with ibuprofen in the control group) to 0.5% with an increase in the anti-inflammatory effect.

It was hypothesized that this is due to increased penetration of ibuprofen esters through intact skin and the anti-inflammatory effect of low-frequency ultrasound.

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