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Physiological individualization of painful sensitivity of an organism

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Undertaken theoretical and experimental researches have proved the universality and consistency of functional features in manifestation of the organism's painful sensitivity in humans and various species of laboratory animals. As a result of the biometric analysis of manifestations of nociceptive sensitivity was revealed general biological nature of intra-specific distribution of pain threshold in humans and traditional laboratory animals. Defined species boundaries varying values of the pain are threshold. It is statistically proven that intra-specific distribution of pain threshold in humans and animals corresponds to the normal distribution. There were significant differences between the distributions of the pain threshold in different populations of a single species of animals and humans. As a result a number of experimental researches were identifying the mechanisms of the central and vegetative organization and personalization of nociceptive reactivity of the organism. Revealed morpho-functional features of the nuclei of the anterior hypothalamus, limbic, parietal and frontal cortex of the brain related to the level of painful sensitivity of the organism of experimental animals. As a result of electro encephalographic researches were identified by specific issues of bioelectrical activity basic rhythms organization of the cerebral cortex in individuals with different levels of nociceptive sensitivity of the organism. At the analysis of cardio intervalography, it was revealed that people with high painful sensitivity observed a large liability of standard indicators activity of the cardiovascular system, mainly in the form of relative predominance of the sympathetic nervous system in the organization of vegetative homeostasis. In addition, depending on the individual pain threshold are differentiated manifestations of somatotype and morphological characteristics of the organism, circadian biorhythms, typology of higher nervous activity, psychological symptoms, and level of stress resistance of the organism. By results of researches there were developed methods of individual prognosis of human adaptation to environmental impacts, based on analysis of a combination of nociceptive reactivity, circadian chronotype and separate elements of the functional status of the organism.

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Development and characterization of structured lipid carriers based on homolipid mixtures for the delivery of Piroxicam

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Piroxicam is a drug used in pain management and its effectiveness depends on dissolution rate and consequently, bioavailability. The objectives of this study are to improve the solubility, dissolution rate and stability of Piroxicam. Goat fat was extracted from the adipose tissues of goat *(Capra hircus)* by wet rendering while irvingia fat was extracted from *Irvingia gabonensis* var excelsa *(Irvingia wombolu)* using petroleum ether (40-60°C). Piroxicam structured lipid carriers (LCs) were formulated using melt homogenization (60°C) of lipid matrices (5 %w/w) comprising goat fat and irvingia fat at 3:1 and 4:1 ratios, Labrasol® solution (1.5 %w/w) and sorbic acid(0.1 %w/w) in distilled water. The lipid carriers were characterized by drug encapsulation efficiency, yield, particle size, thermal properties, drug release and diffusion. The yield and particle size of the LCs were 98% and 4 µm, respectively, while the drug encapsulation efficiency of 4:1 and 3:1 LCs were 95% and 97%, respectively. All the formulations were stable. The drug delivery systems showed controlled release of Piroxicam and 3:1 goat fat/irvingia fat LCs showed higher delivery, releasing 49.8% of the drug after 8 h. Structured homolipid carriers can be used for improved delivery of Piroxicam which may increase the effectiveness of the drug in pain management.

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