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Determination of 4-hydroxy-2-nonenal in Various Biological Materials by High Performance Liquid Chromatography

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Abstract Keywords: *lipid peroxidation, 4-hydroxy-2-nonenal, HPLC*

Introduction: One part of oxidative stress is represented by lipid peroxidation. During this process phospholipids' membrane is attacked by free radicals, what leads to formation of secondary products, from which 4-hydroxy-2-nonenal (4-HNE) is the most abundant and explored. It derives from the most represented class of polyunsaturated fatty acids and is potentially able to undergo a number of reactions with proteins and nucleic acids. It is known, that 4-HNE doesn't serve only as a biomarker of lipid peroxidation, but also plays a biological role in cell signalling under physiological as well as pathological conditions, mainly in cell cycle regulation and gene expression. For this reason 4-HNE might be causally involved in the pathogenesis of number of inflammatory and degenerative diseases.

Aim: To develop and optimize the method for analysis of 4-HNE in various biological materials.

Material and Methods: The method is based on derivatization of 4-HNE with dinitrophenylhydrazine, followed by extraction to hexane. The level of 4-HNE is determined by reverse phase HPLC with UV detection.

Results: This method was successfully tested on human and animal plasma and perfusion solution from isolated animal hearts. Another biological materials such as tissue homogenates and urine will follow.

Conclusion: We optimized the determination of 4-hydroxy-2-nonenal by HPLC for several biological materials. Method is ready to be used in follow-up clinical studies.

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Influence of sodium glutamate prolonged administration on some parameters of carbohydrate metabolism

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Abstract Keywords: *sodium glutamate, glucose, lactate dehydrogenase, glucose-6-phosphatase*

Introduction: Sodium glutamate – is the sodium salt of glutamic acid, which is considered a potential precursor of gluconeogenesis. Despite the fact that about 25 % of the human

population is sensitive to sodium glutamate, it is the most commonly used flavor enhancer. In this case permissible limits may be significantly exceeded, leading to effects such as oxidative stress, hyperglycemic conditions and changes in lipid metabolism during prolonged using.

im: The aim of the study was to investigate some parameters of carbohydrate metabolism in rats during prolonged introduction of sodium glutamate.

Material and Methods: Investigation of the sodium glutamate influence was performed on rats, which were treated with 3 % aqueous solution per os daily in 1 ml for 30 mg/kg body weight within 28 days. Control group of animals received the same amount of distilled water without sodium glutamate.

esults: As a result of the research was found, that the four-week sodium glutamate introduction leads to significant increasing of glucose in rat liver homogenate at 21, 28 days of experiment compared with the control. The content of glycogen in the liver homogenate of experimental animals remained at the level of the control group during the whole period of sodium glutamate administration.

In the background of glucose increasing, the probable decrease of lactate and lactate dehydrogenase activity in rat liver homogenate at the 14 day of sodium glutamate administration was observed, and this trend remained until the experiment end, and also noted the increased glucose-6-phosphatase activity at 21 and 28 days compared with experiment control.

onclusion: Four-week oral administration of sodium glutamate showed a significant influence on some parameters of carbohydrate metabolism, that indicating the metabolic changes in glucose metabolism, especially the activation of aerobic glycolysis and gluconeogenesis in the liver of experimental animals.

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Can acute gastric ulcers be prevented by carbon monoxide?

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roduction: Carbon monoxide (CO) is generated intracellularly during the degradation of heme in reaction catalysed by heme oxygenase (HO). It has been identified that CO can modulate a variety of physiological processes, including vasodilation, neurotransmission, platelet aggregation. This gaseous mediator is known to act as important anti-inflammatory, anti-proliferative and antiapoptotic factor, however, the contribution of this gas to the mechanism of gastroprotection against acute mucosal injury has been little studied.

im: The aim of our study was to determine the involvement of Tricarbonyldichloro-iridium (II) dimer (CORM-2), a CO-donor, in the mechanism of gastric mucosal protection against exposure to 75 % ethanol.