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Hepatoprotective Assessment of L-Ascorbate 1-(2-Hydroxyethyl)-4,6-Dimethyl-1, 2-Dihydropyrimidine-2-on in Toxic Liver Damage Test

Vladimir Zobov, Nail Nazarov, Alexandra Vyshtakalyuk, Vyacheslav Semenov, Irina Galyametdinova, Vladimir Reznik

Abstract—The aim of this study was to investigate hepatoprotective properties of the Xymedon derivative L-ascorbate 1-(2-hydroxyethyl)-4,6-dimethyl-1,2-dihydropyrimidine-2-one (XD), which exhibits high efficiency as actoprotector.

The study was carried out on 68 male albino rats weighing 250-400 g using preventive exposure to the test preparation. Effectiveness of XD in comparison with effectiveness of Xymedon (original substance) after administration of the compounds in identical doses. Maximum dose was 20 mg/kg.

The animals orally received Xymedon or its derivative in doses of 10 and 20 mg/kg over 4 days. In 1-1.5 h after drug administration, CCl₄ in vegetable oil (1:1) in a dose of 2 ml/kg. Controls received CCl₄ but without hepatoprotectors. Intact control group consisted of rats, not receiving CCl₄ or other compounds. The next day after the last administration of CCl₄ and compounds under study animals were dehematized under ether anesthesia, blood and liver samples were taken for biochemical and histological analysis.

Xymedon and XD administered according to the preventive scheme, exerted hepatoprotective effects: Xymedon — in the dose of 20 mg/kg, XD — in doses of 10 and 20 mg/kg. The drugs under study had different effects on liver condition, affected by induction with CCl₄. Xymedon had a more pronounced effect both on the ALT level, which can be elevated not only due to destructive changes in hepatocytes, but also as a cholestasis manifestation, and on the serum total protein level, which reflects protein synthesis in liver. XD had a more pronounced effect on AST level, which is one of the markers of hepatocyte damage. Lower effective dose of XD — 10 mg/kg, compared to Xymedon effective according to, and its pronounced effect on AST, the hepatocyte cytolysis marker, is indicative of its higher preventive effectiveness, compared to Xymedon.

Keywords—Hepatoprotectors, pyrimidine derivatives, toxic liver damage, xymedon.

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Thermography Evaluation on Recovery after Elastics

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Abstract—Thermography is a non-radiating and contact-free technology which can be used to monitor skin temperature. The efficiency and safety of thermography technology make it a useful tool for detecting and locating thermal changes in skin surface, characterized by increases or decreases in temperature. This work intends to be a contribution for the use of thermography as a methodology for evaluation of skin temperature in the context of orofacial biomechanics. The study aims to identify the oscillations of skin temperature in the left and right hemiface regions of the masseter muscle, during and after thermal stimulus, and estimate the time required to restore the initial temperature after the application of the stimulus. Using a FLIR T430sc camera, a data acquisition protocol was followed with a group of eight volunteers, aged between 22 and 27 years. The tests were performed in a controlled environment with the volunteers in a comfortably static position. The thermal stimulus involves the use of an ice volume with controlled size and contact surface. The skin surface temperature was recorded in two distinct situations, namely without further stimulus and with the additions of a stimulus obtained by a chewing gum. The data obtained were treated using FLIR Research IR Max software. The time required to recover the initial temperature ranged from 20 to 52 minutes when no stimulus was added and varied between 8 and 26 minutes with the chewing gum stimulus. These results show that recovery is faster with the addition of the stimulus and may guide clinicians regarding the pre and post-operative times with ice therapy, in the presence or absence of mechanical stimulus that increases muscle functions (e.g. phonetics or mastication).

Keywords—Thermography, orofacial biomechanics, skin temperature, ice therapy.

I. INTRODUCTION

THE use of thermography techniques has assumed a great importance and is currently a fundamental tool in several monitoring and evaluation procedures. Thermography is a technology without direct contact and the acquisition of real time images allows to identify a spectrum with the distribution of temperature in the zone of measurement. The use of thermography started in military applications and gets significant improvements over the last years in the quality of image and the accessibility of this equipment to other applications. For example, in civil engineering, the use of thermography to detect air leakage through the roller shutter handle and the window frame of a room has been regularly used [1].

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Being a application, for example, a temperature successfully involving t muscle found in literature. In fact, re the tempera flow, contro on both s thermograph region of int physiologic to verify the temporomandibular thermograph. The authors or inflamm allows for th of muscular pathophysiological functional al Thermograph temporomandibular over the ten temporalis m

Fig. 1 Region

Orofacial p head and neck muscles, which highlighted.

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The Actoprotective Efficiency of Pyrimidine Derivatives

Nail Nazarov, Vladimir Zobov, Alexandra Vyshtakalyuk, Vyacheslav Semenov, Irina Galyametdinova, Vladimir Reznik

Abstract—There have been studied effects of xymedon and six new pyrimidine derivatives, that are close and distant analogs of xymedon, on rats' working capacity in the test "swimming to failure". It has been shown that a single administration of the studied compounds did not have a statistically significant effect in the test. In the conditions of multiple intraperitoneal administration of the studied pyrimidine derivatives, the compound L-ascorbate, 1-(2-hydroxyethyl)-4,6-dimethyl-1,2-dihydropyrimidine-2-one had the lowest toxicity and the most pronounced actoprotective effect. Introduction in the dose of 20 mg/kg caused a statistically significant increase 440 % in the duration of swimming of rats on the 14th day of the experiment compared with the control group. Multiple administration of the compound in the conditions of physical load did not affect leucopoiesis, but stimulates erythropoiesis resulting in an increase in the number of erythrocytes and a hemoglobin level. The substance introduction under mixed exhausting loads prevented such changes of blood biochemical parameters as reduction of glucose, increased of urea and lactic acid levels, what indicates improvement in the animals' tolerability of loads and an anti-catabolic effect of the compound. Absence of hepato- and cardiotoxic effects of the substance has been shown.

Keywords—Actoprotectors, physical working capacity, pyrimidine derivatives, xymedon.

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