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ACEXAMIC ACID DERIVATIVES AND THEIR BIOCHEMICAL EFFECTS

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Abstract: The article provides an overview of acetylaminohexanoic acid derivatives, such as zinc N-acetyl-6-aminohexanoate, acexamic acid ethylthiadazolylamide, silver N-Acetyl-6-aminohexanoate and 2-ethyl-6-methyl-3-hydroxypyridinium N-acetyl-6-aminohexanoate. The biochemical effects of these derivatives are promising for the creation of new drugs.
Keywords: Acetylamidocaproic acid, acexamic acid, acexamic acid derivatives.

INTRODUCTION

Currently, organic acids, which include acetylaminohexanoic acid (acesamic acid), as well as their derivatives, are widely used as active ingredients in drugs. It seems promising to synthesize new derivatives of acexamic acid in order to create effective drugs, since acexamic acid and its derivatives have a wide range of biochemical activity in the human body.

MATERIALS AND METHODS

Acetylaminohexanoic [1] acid (acesamic acid, AA) is a derivative of aminocaproic acid (Figure 1).

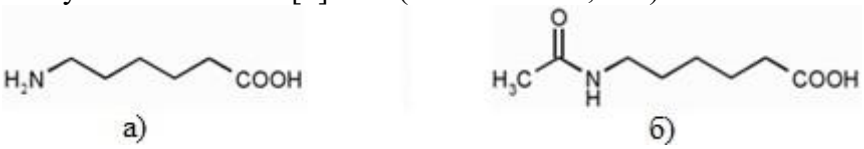

Figure 1. Chemical structure of: a) aminocaproic acid; b) acetylaminohexanoic acid

Aminocaproic acid is widely used in medical practice as a hemostatic agent due to its ability to block plasminogen activators, preventing partial proteolysis of the latter and, consequently, the fibrinolytic effect of plasmin.

Acetiaminohexanoic acid is used as a means of stimulating the regeneration of skin and bone tissue. Thus, in the article by Zhidkova Yu.Yu. [2] it is reported that the use of AK reduces exudative processes in the wound, accelerates the cleansing of the wound surface from necrotic masses, activates the growth of granulation tissue, stimulates vascularization and epithelization of wounds, accelerates the healing of bone fractures by stimulating the formation of callus.

The literature describes a study of the effect of the medicinal form of acexamic acid, Acemin ointment, on the reparative processes of the skin, during which the stimulating effect of this drug was proven, manifested in a general reduction in the time of regeneration of full-thickness skin defects [3]. It should also be noted that the drug "Acemin" is based on a fatty ointment base, along with such drugs as "Keratan" cream and balm

“Rescuer” can be used in the treatment of bitten areas of the face and neck on the second or third postoperative day, in order to prevent the formation of the cortical surface and keloid scars [4]. It has been experimentally proven that “Acemin” can be used in the complex treatment of periodontal disease (25% solution and 5% ointment based on acexamic acid) in a mixture with zinc oxide and artificial dentin in a 1:1 ratio. Complex therapy with the inclusion of Acemin ointment significantly stopped the activity of the pathological process in the periodontal tissues. After two or three applications of dressings based on 5% ointment, swelling, hyperemia, and bleeding of the gums decreased [5].

Thus, acexamic acid has a wide range of biological activity; in this regard, it is of scientific interest to search for information on existing derivatives of AK in order to continue the synthesis

of new derivatives and study their biochemical effects for the pathogenetic substantiation of therapeutic potential, which was the goal of this study.

RESULTS AND DISCUSSION

Currently, zinc N-Acetyl-6-aminohexanoate (zinc salt of acexamic acid) is most often used in medical practice, primarily as a therapeutic agent for peptic ulcers. Zinc acexamate reduces acid and peptic secretion, increases mucus secretion, eliminates the decrease in blood flow caused by norepinephrine, and, thanks to the above effects, protects the mucous membrane from ulcerative damage, including during a course of aspirin use as an antiplatelet agent.

It has also been experimentally proven that oral administration of zinc acexamate has a preventive effect on bone loss in steptozotocin-diabetic rats in vivo [2].

Administration of zinc acexamic acid helps reduce oxidative stress and inflammation and preserves mitochondrial integrity. It is believed that zinc released from salt helps to upregulate antioxidant enzymes. It is important to note that the effects of the zinc salt of acexamic acid are dose dependent, and its excess does not provide a similar effect [3].

Along with the study of the zinc salt of acexamic acid, studies were also carried out on the sodium salt of acexamic acid, however, the therapeutic potential of the latter has not been proven. Calcium and magnesium salts with acexamic acid were obtained and patented - patent US 3974215 (1976). However, clinical studies using these derivatives have not been conducted.

2-(5-ethyl-1,3,4-thiadiazolyl)amide of N-acetyl-6-aminohexanoic acid (ethylthiadazolylamide of acexamic acid) is known as a new non-steroidal anti-inflammatory drug from the 1,3,4-thiadiazolyl group [3].

CONCLUSION

Thus, an analysis of domestic and foreign scientific literature has shown that acexamic acid and its derivatives have positive biochemical effects on the tissues of the human and animal body, which substantiates the prospects for the synthesis of new derivatives of this organic acid as potential active ingredients for the creation of medicines.

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