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Application of Prostaglandins in Medicine

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ANNOTATION
This article discusses the structure of prostaglandins and their uses in medicine, as well as the benefits of prostaglandins in diseases. To date, certain facts have accumulated indicating the involvement of prostaglandins in the metabolism of carbohydrates and lipids. The influence of prostaglandins on fat metabolism has attracted much more attention from both a clinical and theoretical point of view. Further study continues on the role of various prostaglandins in carbohydrate utilization and their relationship with the function of the insular apparatus.
KEY WORDS: prostaglandins, cytokine, inflammation, membrane, stress, disease.

Introduction. The participation of prostaglandins in the formation of a cellular response to extracellular neurohumoral influences through the cyclic nucleotide system (cAMP and cGMP) leads pharmacotherapy to its cherished goal: the creation of drugs that affect intracellular regulatory mechanisms responsible for the synthesis of enzymes, hormones and other vital substances. Seminal fluid is characterized by the highest content of prostaglandins. In human seminal fluid, the total content of prostaglandins averages 213-240 μg/ml and varies depending on age and health status. From a clinical point of view, all natural prostaglandins have two most significant disadvantages: an extremely wide range of pharmacological effects and a short duration of action. The most vulnerable units in the prostaglandin molecule to enzymatic attack are the allylic hydroxyl group at position C15 and the carboxyl and methyl chains. In the clinic, intravascular infusions of 5 μg/min 15-methyl-PGF2a and 75 μg/min PTF2a were used for similar purposes and with the same therapeutic effect, however, the use of such DOZES of 15-methyl-PGF2a causes severe side effects in a greater number of cases. One of the interesting biological effects of prostaglandins, not only from a theoretical but also a practical point of view, is their antisecretory and antiulcerogenic effect. As for group F prostaglandins, in particular the very widely used GF2a at present, there is evidence in the literature about the stimulating effect of PGF2a on the process of gastric secretion, especially the production of hydrochloric acid. Group A prostaglandins act similarly to group E prostaglandins, inhibiting gastric secretion in humans and animals of various species. Lack or absence of prostaglandins can lead to the development of pathological changes in the gastric mucosa. This is often observed with long-term administration of indomethacin and acetylsalicylic acid, which are strong inhibitors of biosynthesis in vitro and in vivo. Of these, only PGD2 has a strong anti-adhesive effect. PGE2 increases the adhesive properties of blood platelets. From the resulting endoperoxides, as we have already noted, thromboxanes (A, B) are formed, and under the influence of enzymes of the microsomal function of the vascular endothelium of various types of organisms, including humans, a new compound is formed - prostaglandin-prostacyclin - the most powerful anti-adhesive, antiaggregate-ionic animal factor.

Materials and methods. Injection of PGF2a up to 3 μg/kg into the vertebral artery does not cause a response from the vascular system and heart in dogs. In another group of dogs, an infusion of PGF2a at a dose

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of 100 mcg/min when administered into the lobar artery resulted in a pronounced increase in lobar blood pressure. The pressure rose sharply in the 1st minute of the infusion period, after which a constant level was reached, which was then maintained for 5 minutes of the infusion period. The rise in lobar arterial pressure was accompanied by a significant increase in lobar venous pressure, but left atrial pressure did not change. During PGFg infusion, there was a significant increase in the gradient between the lobar artery and the small vein, and between the small vein and the left atrium. During the infusion of PGgo, the pressure in the aorta and main pulmonary artery did not change significantly. After the end of the infusion, the pressure in the lobar artery and vein returned to 50% of the control level within 8 minutes and did not change further for 25 minutes after the infusion. Results and their discussions. The nature of the effect of PGF2a on blood pressure depends on the OT dose of the drug. A similar effect of PGF_2a on blood pressure was noted by V.V. Ryazhenov et al. (1975) in studies carried out in the laboratory of prof. A. N. Kudrina. The authors who studied the effect of PHF_2a on blood pressure showed that the drug in small doses (2.5 μg/kg) causes a small and short-term decrease in blood pressure in white rats when administered into the femoral vein. The stimulating effect of prostaglandins, especially groups E and F, on the contractile activity of the uterine muscles was first used by Karim et al. (1968) to induce labor in 10 women with a gestational age of 34-44 weeks Thus, it has been shown that in anesthetized dogs, intravenous administration of PGE leads to a decrease in blood flow in the gastric mucosa, revealing MOGE by aminopyrine clearance (Wilson, stomach 1972). Thus, 10 mg of PGE_2 and 38 mg of β-cyclodextrin are dissolved in 30 ml of water, the solution is filtered through a bacterial filter, placed in vials and lyophilized in a freeze-drying vacuum dryer (patent no. 7426416, 1974, Japan). If prostaglandin is slightly soluble in isotonic water. or buffer solutions, which is typical for prostaglandins of group E, as well as for 15-methyl-PGF2a (even its tromethamine salt is poorly soluble in water), the following technique is used to prepare a solution suitable for injection (Green, Bygdeman, 1976): 2 mg of prostaglandin is dissolved in 0.2 ml of 99% (or absolute) ethyl alcohol (or an alcohol solution of prostaglandin of a larger volume is prepared, but with the same ratio of prostaglandin and alcohol) and mixed with 1.8 ml of a sterile isotonic solution. PHF was dissolved in a standard solvent system (pH 7.4), sodium etaminal was administered intracoronarily as a control, and in no experiment did this administration have any effect on the studied parameters. The mechanism of the pressor action of PGF2a still remains unclear. The possibility of using prostaglandins for the treatment of cardiovascular diseases in the clinic is currently being studied. Conclusion. Prostaglandins of groups A and E act on the body as depressant agents, that is, they cause natriuresis, thereby increasing diuresis and lowering blood pressure, and also affect water and electrolyte metabolism; their use has become of great importance in the treatment of cardiovascular diseases. Almost the first observations of the biological effects of prostaglandins, characterized by their clear influence on the contractility of the smooth muscle muscles of the uterus, indicated their connection with the functional activity of the reproductive system (Kurrok, Lieb, 1930).

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