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CONTENT OF CALCIUM AND PHOSPHORUS IN THE BLOOD PLASMA UNDER INFLUENCE BY DERIVATIVES OF β -CYCLODEXTRIN

In the present work the maintenance of the element maintenance of calcium and phosphorus in plasma of blood at laboratory animals is investigated at application of the new derivative connections which are being clathrate and conjugate of β -cyclodextrin with acid paraaminobenzoic were used. Positive dynamics of the maintenance of defined elements under influence of the synthesized substances is revealed. The most positive tendency is found out in the skilled group received conjugate of β -cyclodextrin with acid paraaminobenzoic.

Keywords: acid paraaminobenzoic, β -cyclodextrin, phosphorus, calcium

Maintenance phosphorus-calcium a homeostasis - a necessary condition for normal ability to live of an organism.

About 99 % of all quantity of calcium and 85 % of phosphorus are in the bone fabric, being the core of depot in an organism. Allocate the various mechanisms which are taking part mastering of given minerals in an organism. Recently a greater role in a phosphorus-calcium exchange give kidney y to the device [5].

There is a set of various factors capable to influence mechanisms всасывания the given elements. One of such is paraaminobenzoic the acid which physiological role up to the end is not investigated yet. It is known, that as chemical compound acid paraaminobenzoic (PABA) it is known with 1863, with 1939 as the substance possessing properties of vitamin, and with 1940 is established its antibacterial property in relation to сульфаниламидам and it sulfonamide has been allocated from yeast then its necessity for synthesis of a folic acid [13]. Besides by researchers it is noted, that PABA it is capable to stimulate physical endurance and working capacity [7], and also positively to influence a condition of the central nervous system [4, 6]

Alongside with it is known, that β -cyclodextrin (I) and its numerous derivatives have found wide application in physiology and pharmacology, mainly as "containers" of medical products, owing to the unique opportunity to encapsulation various waterproof connections (formation of connections of inclusion of type "visitor-owner") [8, 11]. Encapsulation protects the included medicinal substance from biodecomposition, promotes increase of its solubility and promotes its selective delivery in a necessary place for the demanded period of time [9,10,12]. In previous our works high physiological and pharmacological activity of similar connections, in

particular conjugates and clathrates β -cyclodextrin with acetylsalicylic acid, Ibuprofen, PABA for their anti-inflammatory, aktoprotektnoy other kinds of physiological activity [1]. In this connection represents the certain interest studying of the given substances on other biological models.

The purpose of the present research was studying the element maintenance in plasma of blood of calcium and phosphorus at laboratory animals under influence of three new synthesized connections β -cyclodextrin with PABA in comparison is direct with PABA.

In experiment the following new synthesized connections (fig. 1) have been used: clathrates silyl derivative β -cyclodextrin (II) with PABA (Compound III), representing connection of inclusion in the ratio "visitor-owner" 1:1; conjugates β -cyclodextrin (I), containing covalently attached PABA through carboxyl group with a degree of replacement hydroxyl groups in β -cyclodextrin equal 1 (Compound IV); conjugates β -cyclodextrin (I), containing two rests covalently attached PABA through an amino group (Compound V). In the given connection in a molecule β -cyclodextrin a little hydroxyl groups are replaced on bromide, a degree of replacement 2, and it represents cation (secondary ammonium) derivative β -cyclodextrin.

Organic connections I and II are predecessors on stages of organic synthesis for connections III, IV, V. Use I and II in experiment proves, that their physiological activity is shown in a greater degree due to conjugation or inclusions PABA.

Experiment is lead on 48 white not purebred male rats. Animals contained in standard conditions vivarium in cages on 4-5 individuals, at natural illumination and an easy approach to water and food. In work principles of the Helsinki declaration on the humane attitude to animals were observed. In experiment all individuals have been divided into five groups: intact (n=8), receiving placebo; control group (n=8), received PABA (10 mg/kg); experimental group (n=6), received connection III (150 mg/kg); experimental group (n=8), received connection IV (100 mg/kg); experimental group (n=8), received connection V (60 mg/kg). For definition of the maintenance of calcium and phosphorus in plasma used spent kompleksonometrichesky a method.

All investigated substances were entered perorales for 3 hours prior to the beginning of experiment. Research was spent within 3 days.

Statistical processing of results of research spent by means of the program «Biostat» [2] on methods of variational statistics with an estimation of the statistical importance of parameters and distinctions considered samples by t-criterion Student. Distinctions in compared groups considered authentic at a significance value of 95 % ($p < 0,05$). Definition normality distributions

of an investigated attribute in compared groups that has given the basis to a choice of the given criterion has preliminary been made.

Analyzing the received results (are presented in tab. 1), it is necessary to note, that the element maintenance of calcium in control group has increased in 1,08 times with authentically significant difference ($p < 0,05$). Yielded results will be coordinated with the received conclusions of other group of the researchers studied a calcium-phosphorus exchange at experimental animals in age dynamics under influence PABA [3]. At application of the synthesized connection III maintenance of calcium in plasma has increased in 1,05 times in comparative aspect with result intact groups (without an authentic difference, 0,05). The Most maximal difference between the quantitative maintenance of calcium was marked in the experimental group received derivative IV, where quantit of the defined element has increased in 1,23 times and in 1,13 times in comparison with intact and control groups accordingly. In experimental sample of the animals received connection V, practically it was not found out differences of the given parameter with similar in groups of comparison.

The defined element maintenance of phosphorus in all experimental groups tended to increase though thus of authentically significant difference it was not found out anywhere. In experimental group of the laboratory animals received connection IV, the maximal increase in the quantitative maintenance of phosphorus (in 1,2 times) was marked.

From the received data it is visible, that the optimal change of element structure of calcium and phosphorus is fixed at the experimental animals received connection IV. The observable phenomenon, most likely, can be connected with feature of a structure of this synthesized complex. Despite lacking in some above-stated results of authentically significant difference with groups of comparison, presence of the tendency to increase in the element maintenance of calcium and phosphorus (at introduction of all new connections) can render powerful influence on a calcium-phosphorus homeostasis of an organism. Calcium acts as the activator of many fermental processes, participating in the mechanism of regulation of a cellular exchange and excitability of alive structures, affect on intimate activity, plays the important role in processes of curtailing of blood, etc. Phosphorus is one of the important components of macropower phosphates, phosphorylated sugars, is a part phospholipids, forming cellular membranes, and also in structure of nucleinic acids, that having the direct attitude to genome of the person [5]. In this connection, even the insignificant increase in the given elements, finally can render positive physiological effect in an organism.

The executed experimental work gives the precondition to further deeper studying biological activity at given new (and similar) complex connections, reflecting initial approbation a stage of their complex research.

1. Positive influence of derivatives β -cyclodextrin on the element maintenance of calcium and phosphorus in plasma is experimentally established.
2. The most positive results are established at the new connection which are being conjugates β -cyclodextrin, containing covalently attached through карбоксильную group paraaminobenzoic an acid with a degree of replacement hydroxyl groups β -cyclodextrin equal 1.
3. An Increasing physiological activity paraaminobenzoic in our case concerning an element exchange can be connected acids with positive influence β -cyclodextrin on process of redistribution of new connections in an organism.

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