THE STUDY OF THE ANTIOXIDANT ACTIVITY OF ARBUTIN

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Introduction. Arbutin is a phenolic like glycoside belonging to the group of aryl-beta-glycosides a hydroquinone derivatives. Plants and preparations containing arbutin are used in medicine for diseases of the bladder as an antiseptic. Arbutin is found in bearberry leaves, pears fruits and in blueberries leaves. In cosmetology, arbutin is used to lighten the skin, since it has the ability to block tyrosinase involved in the synthesis of melanin. In addition to the bleaching effect, arbutin can also protect the skin from harmful ultraviolet radiation, increases the level of local immunity, has an anti-inflammatory effect and reduces the intensity of painful sensations. However, the properties of this compound are not well understood.

Aim. The purpose of this study was to investigate the antioxidant activity arbutin.

Materials and methods. The studies were conducted on female rats weighing 190±15 g, kept under standard conditions in the vivarium NUPh. The animals were decapitated under chloralose-urethane anesthesia. The liver was perfused with cold physiological solution and homogenized in Tris-HCl buffer solution, pH 7,4. Arbutin was added to homogenate in doses 50 μmol and 100 μmol and incubated at 37^{o}C during 30 min. Quercetin in dose 50 μmol was used as comparison drug. Lipid peroxidation intencity was evaluated by TBARS and conjugated diens (CD) levels. GSH level was determined with Ellman's reagent. The data obtained were processed statistically.

Results and discussion. Liver homogenate inhibition in the presence of arbutin was accompanied by a decrease in the content of peroxidation products TBARS and CD

Conclusions. Thus, the results obtained indicate that Arbuti exhibits antioxidant properties. The maximum effect was observed at a dose of 100 μmol. The antioxidant effect of arbutin was dose-dependent.

EFFECTS OF FLAVONOID INFLUENCE ON HUMAN ORGANISM

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Introduction. Flavonoids (Fl) are known to be plant pigments that stipulate leaf colouration, especially in autumn, and are responsible for shades of yellow, orange, red. There are many of them in plant seeds, citrus, olive oil, tea and red wine. More than 4000 specific Fl have already been identified. They are low-molecular weight compounds – phenylbenzopyrones (phenylchromones), which consist of 3 rings with different substitutes. Fl are classified on basis of such substitutes into: flavanols, anthocyanidins and flavones, flavanones, halkons. It was shown that humans consume more quercetin, and most important sources of Fl are tea (48% of total), onion, apple.

Aim. The aim of our report is further investigation of directions of influence of different Fl on the human organism for possible pharmaco-correction of abnormalities in metabolic processes. An issue of Fl interaction mechanisms with cells and tissues of the organism is of great importance too.

Results and discussion. It has been shown that Fl concentration in biological fluids of the organism is tightly bound with a diet that humans stick to. So, the Mediterranean diet is very rich in vegetables, olive oil, citrus, which supplies pharmacologically significant quatities of Fl to the organism. Evolutionally long influence of Fl on humans and animals has led to the development of a row of their biochemical and pharmacological activities. It is known that in plant physiology and biochemistry Fl act as antioxidants, inhibitors of certain enzymes, precursors of some toxins, photochemical process and energy transformation participants and so on. In many works with human and animal samples it has been ascertained that Fl reveal anti-inflammatory, antioxidant, anti-allergic, hepatoprotective, antithrombotic,

antiviral, anti-carcinogenic effects. Fl are typical phenolic compounds and that is why they possess a chelating activity with regard to metals, as well as fulfil a part of scavengers to free radicals.

It is important that some Fl have vitamin-like effects in the human organism. This was shown for a pair: citrine+hesperidin, which maintain vessel strengthening and anti-oxidant activities of vitamins P and C. At the end of the previous century many investigations were conducted to find out a connection between Fl structure and their systemic activities. Scientists made an accent on studying Fl carcinogenic, mutagenic and cancer preventing activities.

Nowadays we may say that Fl are present in many natural products, which are widely used in therapy, e.g. medical preparations on Ginkgo biloba basis possess a therapeutic effect due a great extent to different Fl in its content. It was also assumed that Fl were capable to accumulate in tissues and then model their functions (e.g. quercetin had been found in bovine retina).

Conclusions. The results of these investigations allow us to conclude that prevailing margin of different Fl and isoflavonoids are not only harmless to the human organism, but can bring much good to correction of metabolism under various pathologies.

ROLE OF d-ELEMENTS IN BIOCHEMICAL PROCESSES

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Introduction. d-elements are trace elements and provide in the body is actively involved in the most important processes that occur in the cells of the body: enzymatic catalysis of the reactions of the synthesis of transfer of electrons, molecules and molecular enzymes, regulation of the activity of the mechanisms and systems of cells. The study of the biochemical role of elements, the establishment of the possibility of their interaction with bioligands contributes to the creation of effective medicinal agents and the establishment of effective doses required for treatment.

Aim. To study the dependence of the biological role of d-elements on their electronic structure and position in the periodic system of D.I. Mendeleev.

Materials and methods.a literary analysis of the role d-elements in biological systems.

Result. biological systems mainly consist of Hydrogen, oxygen, carbon, and nitrogen. More than 99% of the atoms needed by biological cells are composed of these four elements. however, biological systems need many other elements. These include six d-elements: Iron, Copper, Zinc, Manganese, Cobalt and Molybdenum.

These essential trace elements are called “metals of life”. The role of these elements in the body is due to their ability to form complex compounds, most of which are stable in aqueous solutions. A special feature of d-elements is the fact that d-electrons screen the nuclear charge is weaker than s-and p-elements, therefore the energy of the acceptor, d-orbitals is most energetically beneficial. Anions and cations of d-elements have a smaller atomic radius compared to s-and p-elements and a larger nuclear charge, therefore molecules and ions of ligands easily polarize and form stable complex compounds. Interacting with diverse electron-donor groups Proteins. The ability to form covalent bonds by the donor-acceptor mechanism. Increasing the increase in the atomic number of an element in the rows of d-elements, respectively, increases the stability of their complexes formed by doubly charged ions Ln^{2+}< $Fe^{2+} < Co^{2+} < Zn^{2+} < Ni^{2+} < Cu^{2+}$.

Many enzymes that perform the role of catalysts in the body function due to the presence of metal ions in their composition. Almost all biochemical reactions are catalytic and enzymes contribute to a significant increase in the rate of these reactions in a narrow range of low temperatures of 36°-40°C.

Enzymatic Catalysis has high efficiency, specificity and is carried out under certain conditions. The activation energy of biochemical processes is 2-3 times less than the activation energy of ordinary chemical reactions, therefore the rate of biochemical reactions increases 10^3-10^6 times, compared with non-biological catalysts.

A specific enzyme in these conditions catalyzes only one biological reaction, or several similar ones.