STUDY AGMATINE EFFECT ON PHYSICAL ENDURANCE IN RATS

Falina M. S.
Scientific supervisor: prof. Zagayko A. L., assist. Briukhanova T. O.
National University of Pharmacy, Kharkiv, Ukraine
tatiana.briukhanova@gmail.com

Introduction. One of the topical issues for today is the search and development new effective medicines. Agmatine is an endogenous amine, one of the main products of arginine metabolism, which synthesized by arginine decarboxylase. Many studies have been conducted on the agmatine role as a transducer and neurotransmitter, therefore further study its physiological properties are perspectively.

Aim. Study of the agmatine effect on physical endurance in rats.

Materials and methods. Experimental studies were performed in rats. Agmatine was administered at a dose 20 mg/kg intragastrically for 10 days. This dynamic endurance animals was assessed using the swimming test in water (t=24-26°C), static endurance – by the time keeping animals on revolving rod (15 rev/min.), on 5^{th} and 10^{th} experiment days.

Results and discussion. Duration of swimming in intact rats on 5^{th} day of studies was 8.26±0.46 min, on 10^{th} day – 7.94±0.54 min. Duration of swimming in rats with agmatine administration significantly increased by 44.9% compared with the intact control group on 5^{th} day. On 10^{th} day, the swimming duration was also significantly increased by 56.8% compared with intact rats. The duration of holding on revolving rod in intact rats on experiment day 5^{th} was 105.33±1.41 sec, on 10^{th} day – 112.51±1.35 sec.

The duration of holding on revolving rod in rats with agmatine administration was significantly higher than during the entire observation period: on 5^{th} day it almost doubled (99.5%) relative to intact control group; on 10^{th} day – the duration of holding on revolving rod was 137.7% higher than corresponding indications of intact rats. The results indicate an increase rats physical endurance under agmatine administration. This was probably due to the fact that agmatin affects endothelial NO synthase and mediates the vasodilation, resulting in decreases hypoxia and, as a consequence, increased oxygen delivery to the muscles.

It is known that agmatin has a positive effect on the oxyhemoglobin transpot function in rats, which leads to increase static and dynamic endurance. Also, it is impossible to exclude the agmatine stimulates effect on imidazoline receptors, resulting in an additional vasodilating effect.

Conclusions Agmatin increases the static and dynamic physical endurance in healthy rats.

BIOLOGICAL ASPECTS OF FLUORINE

Ivanova E. A.
Scientific supervisor: assoc. prof. Koval A. A.
National University of Pharmacy, Kharkiv, Ukraine
haoasakura2004@gmail.com

Introduction. Biological aspects of fluorine describes the effects of fluorine-containing compounds with life. Fluorine (F_2) itself is very rare in everyday life, but hundreds of fluorine-containing compounds occur as minerals, medicines, pesticides, and materials.

Aim. Exploring the scientific reference books, describe the biological aspects of fluoride.

Materials and methods. Analysis of standard scientific publications, scientific literature and Internet sources.

Results and discussion. Since the mid-20th century, it has been discerned from population studies (though incompletely understood) that fluoride reduces tooth decay. Initially, researchers hypothesized that fluoride helped by converting tooth enamel from the more acid-soluble mineral hydroxyapatite to the less acid-soluble mineral fluorapatite. However, more recent studies showed no difference in the frequency of caries (cavities) amongst teeth that were pre-fluoridated to different degrees. When teeth begin to decay from the acid of sugar-consuming bacteria, calcium is lost (demineralization). However, teeth have a limited ability to recover calcium if decay is not too far advanced (remineralization). Fluoride appears to reduce demineralization and increase remineralization. Also, there is some evidence that fluoride interferes

with the bacteria that consume sugars in the mouth and make tooth-destroying acids. Of all commercialized pharmaceutical drugs, twenty percent contain fluorine, including important drugs in many different pharmaceutical classes. Fluorine is often added to drug molecules as even a single atom can greatly change the chemical properties of the molecule in desirable ways. Adding fluorine to biologically active organics increases their lipophilicity (ability to dissolve in fats), because the carbon–fluorine bond is even more hydrophobic than the carbon–hydrogen bond. This effect often increases a drug's bioavailability because of increased cell membrane penetration. Although the potential of fluorine being released in a fluoride leaving group depends on its position in the molecule, organofluorides are generally very stable, since the carbon–fluorine bond is strong. Fluorines also find their uses in common mineralocorticoids, a class of drugs that increase the blood pressure. Adding a fluorine increases both its medical power and anti-inflammatory effects. Fluorine-containing fludrocortisone is one of the most common of these drugs. Dexamethasone and triamcinolone, which are among the most potent of the related synthetic corticosteroids class of drugs, contain fluorine as well.

Manmade fluorinated compounds have also played a role in several noteworthy environmental concerns. Chlorofluorocarbons, once major components of numerous commercial aerosol products, have proven damaging to Earth's ozone layer and resulted in the wide-reaching Montreal Protocol.

Conclusions. Researching scientific reference books, encyclopedias and sites with scientific literature, we described the biological aspects of fluoride.

CONSERVATIVE CORRECTION OF THE OPEN ARTERIAL DUCT AT PREMATURELY BORN NEWBORNS

Karapetyan T. Sh., Mullen A. K.
Scientific supervisor: assoc. prof. Nurgaliyeva Zh. Zh.
Kazakh national medical university of S.D. Asfendiyarov, Almaty, Republic of Kazakhstan
tomik1010@mail.ru

Introduction. The Open Arterial Duct (OAD) is one of the most widespread defects among all congenital heart diseases (CHD) and its frequency is 10-18%. Now OAD meets more often, in connection with augmentation of survival of prematurely born newborns. A series of authors notices that the quicker there is a vessel constriction during the first hours after the birth, the spontaneous closing of OAD is more probable. Diameter of a duct is in feedback with gestational age at the birth, with the coverage varying from 20% among prematurely born with gestation terms more than 32 weeks up to 60% among the children who were born before the 28th week of a gestation. Clinical consequences of functioning of OAD depend on expression of the left-right shunting of a blood and ability of an organism of the newborn to compensate hemodynamic problems. Complications of dumping of a blood through an arterial duct are: the raised blood filling of lungs with development of pulmonary arterial hypertension; hypoperfusion of organs (kidneys, intestine, brain).

It is necessary to distinguish a pathophysiology of existence of an open arterial duct at prematurely born children whose mechanisms of closing of a duct remain unripe, and its pathophysiology at the children born in time at whom the open arterial duct really is congenital heart disease and it is perhaps bound to anomaly of an elastic tissue in a duct wall.

The most important physiological factor responsible for closing of a duct, the narrowing effect of a strain of oxygen in an arterial blood is considered. Such narrowing reaction amplifies in process of maturing of a fetus and arises at more low voltage of oxygen in process of approach of the extremity of pregnancy. However, in practice there are cases when at augmentation of partial pressure of oxygen in a blood of the child suffering from OAD Botallov a duct begins to decrease in the diameter. Generally it can be tracked when carrying out the giperoxygen test which is applied to differential diagnostics of a cardiogenic cyanosis and a cyanosis at others, is more often pulmonary, diseases. In the research Herrman spontaneous closing of an arterial duct at 86% of the newborns (middle gestational age – 28 weeks, weight – 998 g) who are written out from a hospital with OAD within 11 months is et al. described.