

## **THE MODERN CONCEPT OF THE EXTENSION OF ACTIVE LONGEVITY - GEROPROTECTORS AND EVIDENCE-BASED MEDICINE**

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The main drugs with geroprotection effect proven during the multi-stage clinical trials used in world medical practice for the extension of active longevity. The role of the drugs in the support structure of the global concept of physical, mental, emotional and social health preservation at the maximum lifespan and disability. The main drugs illustrates of modern geroprotectors classification on their mechanisms of action.

**Keywords:** geroprotectors, life expectancy, healthy life

## **СОВРЕМЕННАЯ КОНЦЕПЦИЯ ПРОДЛЕНИЯ АКТИВНОГО ДОЛГОЛЕТИЯ - ГЕРОПРОТЕКТОРЫ С ПОЗИЦИИ ДОКАЗАТЕЛЬНОЙ МЕДИЦИНЫ**

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Рассмотрены основные препараты с доказанным в ходе многоэтапных клинических исследований геропротекторным эффектом, применяемые в мировой медицинской практике для продления активного долголетия. Роль лекарственного сопровождения в структуре глобальной концепции сохранения физического, психического, эмоционального и социального здоровья при максимальной продолжительности жизни и трудоспособности. Современная классификация геропротекторов по их механизмам действия проиллюстрирована основными препаратами

**Ключевые слова:** геропротекторы, продолжительность жизни, здоровый образ жизни

What is health? Until now, there is no single accepted theory of health. Nevertheless, the current level of knowledge allows you to form a clear idea of what human health and even to determine its quantity. According to the most common definition, health - is the absence of disease, combined with a state of complete physical mental and social well-being. Human Health - is the process of preservation and development of his mental and physical qualities, optimum performance and social activity with a maximum length of life [8].

S.M.Trombach refers to blood clots following symptoms, determinants of health:

- 1) the presence or absence at the time of the survey of chronic diseases;
  - 2) the level of achieved physical and neuropsychological development and the degree of harmony;
  - 3) the level of functioning of the main systems of the body;
  - 4) the degree of adverse effects the body's resistance [9].
- Medications accompany people throughout their lives, because none of us are immune to the disease. Sometimes we are afraid to go out without a "favorite" tablets, though secretly dreaming to get rid of this pathological relationship. Perhaps soon, our dream will come true, and we cease to be sick, grow old, get better. The world stands on the threshold of a new era in which there will be no superfluous space medicine, and we will treat the micro-robots and nanovrachi. A few hundred years ago, human life was a struggle for survival, and the world is full of danger and pain. Today everything has changed, and we live in a relatively comfortable and almost safe environment. Thanks to the greatest advances in science are more and more effective drugs to fight the disease, and many previously deadly diseases have already been translated into the category of chronic [1].

Advertising abundance of information reduces people objectivity impact assessments of substances on the body. The booklets and brochures of manufacturers and distributors there is room for only positive information is often very controversial and unproven, and sometimes frankly absurd.

In this work we would like to talk about geroprotector - pharmacological drugs prolong life, as well as vitamins and bioadditives (BAA), which should be consumed to make up for the missing substances, which are indispensable for the maintenance of normal functioning of the body. The aging process begins in different organs and tissues occurs simultaneously with different intensity. In many ways, the intensity of aging depends on the innate, genetically determined properties of tissues. It is necessary to distinguish between the effect of substances on the average and maximum lifespan. Thus, drugs aimed at the treatment of specific diseases, it affects the average life expectancy, but not the maximum! The drugs increase the life expectancy is not due to reduction in the rate of aging, but due to the beneficial effects on any one function and counteract one of the causes of death [2].

Biologically active additives (BAA) to medicines similar only in appearance. Clinical trials, the longer, dietary supplements are not tested. Efficacy and safety of their scientifically confirmed. Some people trust advertising, mistakenly perceive dietary supplements as a cure for specific diseases. According to the definition of dietary supplements -. A source of biologically active substances and vitamins [6]. To ensure the benefit of dietary supplements should not be, it can only be assumed. However, there are serious reasons for which supplements to use appropriate, the only question is, which ones. Even with high-quality nutrition, modern man is still not enough vitamins, macronutrients and so forth. It is important to compensate for the deficiency with the help of well-chosen set of dietary supplements. For every person you need to pick up a set of dietary supplements alone. Geroprotector are means of prolonging life. They are different from drugs and other beneficial substances that slow down the process of aging and may increase not only high, but maximum lifespan. The published data on geroprotector very fragmentary, contradictory and often unreliable, both in terms of the adequacy of such investigations and their interpretation. We know very little substance geroprotector properties which can be considered sufficiently reliably established [2]. Below geroprotectors classification depending on what the proposed mechanism of action. On these grounds the substance can be grouped (although such a combination is conditional, as some agents may be classified in several groups at a time):

**Antioxidants.** Popularity antioxidants so increased that caused a real boom and the uncontrolled their use in food supplements. This serves as a disturbing signal, the use of large doses of antioxidants may lead to suppression of useful functions ROS. As geroprotektorov antioxidants tested in many studies. Especially significant increase in life expectancy observed in the short-lived

and relatively simple models - fruit flies. Unlike insects, antioxidants tested on laboratory mammals have passed, with varying success, and reports of high efficiency antioxidant alternated with opposite sense data. Adoption in unconditional utility consumption contested antioxidants [2].

The drug "Dibikor» contains taurine - an aminoacid that has the stressoprotection, neurotransmitter, cardioprotective, hypoglycemic properties and regulates the release of prolactin and adrenaline. Preparations containing taurine - the best anti-oxidants that protect against attack lung tissue irritants. In combination with other medicines recommended to use means "Dibikor" diabetes, heart failure [10].

It is necessary to bear in mind two things: 1) There is no strict relationship between the antioxidant and neuroprotective effect. The fact is that not all antioxidants slow down aging. 2) Antioxidants are complex chemical compounds, and their ultimate effect on life expectancy may not always be due to a purely free-radical mechanism. For example, some antioxidants reduce food intake, which in itself increases the lifespan and inhibits the development of tumors.

With the exception of vitamin E - commonly referred to as alpha-tocopherol, and possibly vitamin C, which reduce lipid peroxidation, in respect of all other antioxidants is no conclusive evidence of a protective effect in humans. Perhaps the important right choice of the period when the cell's own antioxidant system can not cope with free radicals and the body really needs external antioxidant protection. There is reason to believe that one of these periods is old age [7].

**Peptide bioregulators.** According to some experts - it is one of the best products that exist today. Cytomedines, Cytamins and Cytogens - this, according to the developers, a sort of revolution in the field of restoring health and extending life. Peptides - substances that are produced by the body's own cells and regulate them in normal metabolism. Depending on various organs and tissues are allocated for certain peptides, and when they are produced in sufficient quantities and in the right proportion, our body is functioning normally, characterized in that the beginning of life (for young organism) [7].

Over time, the activity of the bioregulators falls, the metabolic processes are distorted, and the body collapses and dies. For more than thirty years of working with peptide bioregulators experts it was created about 60 different drugs. The most interesting from the standpoint of prolonging life, according to the results of two studies mashtabnykh (including humans) were medication timalin thymus and pineal gland Epithalamin drug. It Epithalamin timalin and in many clinical trials showed the most significant increase in life expectancy by 30-35%. These metabolic processes bioregulators shift toward a younger body can slow the aging process and increase life expectancy of the species to the upper limit of 100-110 years [2].

There are different ways of how to make the cells produce peptide bioregulators, but they all have certain side effects. It was found the most physiologically acceptable way - scientists have

developed technology to separate these endogenous regulators of exactly the same structure as in humans, the tissues of young healthy animals to people have the opportunity to use them. Thus obtained and supplements called cytomedines (ampoules) and cytamins (tablets, capsules) [7].

**Enterosorbents.** Among the disturbing factors that lead to aging of the organism, a role played by a gradual poisoning of the body with various substances (autointoxication). To increase the life expectancy was proposed enterosorption. Chelators - drugs that absorb and leading out of the gastro - intestinal tract and the blood of harmful substances to the body, trapped in it from the outside, or arising in it under the influence of various pathological processes. There are four possible mechanisms of action enterosorption. The rats were allowed to feed coal enterosorbent the combined action and its limited-calorie diet, resulting in an increase to the average life expectancy of 56-60%, while the case of separate application enterosorbatsii and diet so pronounced effect of prolonging life are not mentioned. Allowed to use activated carbon or enterosorbents based on apple and citrus pectins with addition of various plant extracts and beneficial bacteria. It is crucial that the chelators are taking on an empty stomach, 30-60 minutes before meals. A portion of the drug is better to dissolve or drink water [2].

**Hormonal treatments.** Back in 1987 for the first time reported that old mice which drinking water were given melatonin at night, 20% lived longer than controls. These data were reproduced in mice of different lines, rats, fruit flies, though geroprotective effect of melatonin was not the same and sometimes absent. Summarizing data from studies on mice, melatonin increased life expectancy in the 12 experiments of 20. Overall, melatonin increases the life expectancy of males. It is known that melatonin has anti-cancer and anti-tumor properties. There is reason to believe that the main role in the action of melatonin geroprotector play its antioxidant properties, effect on apoptosis and immunomodulatory effect [2].

Melatonin sufficient only produced before the age of 25-30 years, and then production of the hormone gradually decreases. Applied once a day for 30-60 minutes before bedtime. Dosages of from 1 to 10 mg. Start drinking can have from 25-30 years, but the courses of 1-2 months and 2 months break. From the age of 40 years, the melatonin can be used as replacement therapy. According to some experts the growth hormone is a means to prolong life №1. For others - it can only do harm. Somatotropin - one of the most important hormones. Gradually, and lifelong learning, growth hormone levels steadily declined, to 60 years becomes a 5-five times less than a 20-th. In some cases, many of the signs of aging retreat with the beginning of the use of funds to increase the level of growth hormone in the blood. Subcutaneous fat is melted, muscle mass grew, the indicators of cardiovascular activity returned to normal, the skin thickens and were keen sense of energy tide. It is not surprising that some have called the fountain of youth, growth hormone, since in many respects it is "translated hours" ago. The core program to increase growth hormone

levels in the body is in the safe use of doses releasers, agonists or - substances which induce the release of growth hormone from the pituitary gland, or the use of growth hormone preparations (e.g., by injection). Despite the enthusiasm of professionals applying the GR in clinical practice, it should be with great caution in its use. There is evidence that long-term administration of growth hormone has led to the development of a tumor and reduce life expectancy. A study of all the functions and biological effects have not yet been completed. There is also a lot of information about the hormone dehydroepiandrosterone (dehydroepiandrosterone); and then information is contradictory [2, 7].

#### **Nootropy and exchange controls in the brain and central nervous system.**

That brain responsible for regulation of many processes in the body. If its regulatory role falls, then comes a more rapid decay of the body, the violation of internal balance contributes to a more rapid aging. Conversely, when the best brain can extract from the body of its maximum resources. An important feature of nootropics is their ability to enhance the activity of the hypothalamus, which is called the conductor of the entire hormonal system. Nootropics enhance blood supply to the brain, and therefore glucose, oxygen and others. Improve the "talk" to each other, as the individual brain cell and its parts and hemispheres. As a consequence, improved memory, focus, intelligence, etc. In some experiments, drugs can extend the life of 20-30%. From this group of preparations for the practical application is to provide "Deprenil" and "of DMAE" or made on its basis "Lucidril, Acephen" [2].

**Adaptogens.** In recent years the pharmaceutical market there are many drugs with adaptogenic action, which are offered as geroprotektorov. Noteworthy data on the properties of ginseng and Siberian Ginseng protect and activate the genetic apparatus of cells and affect the neuroendocrine system. There are reports about the positive effect of Ginkgo biloba extract - Chinese traditional medicines. Direct experiments indicate that only a few adaptogens (ginseng extract, Siberian ginseng, licorice root) increased the average life expectancy of rats is not more than 10%, almost no effect on the NRM [7].

**Protein biosynthesis inhibitors.** The group of substances (olivomycins, actinomycin, etc.) Can slow the metabolism of proteins and as a result, extend life cycle. Animals receiving olivomycin, lived 25% longer, and their general condition was much better than usual. A possible reason for the increase in life expectancy - peptide synthesis blockade, leading to cell death. However, such material is not widespread. The fact that they can be toxic at high concentrations in the body [2].

**Crosslinking inhibitors.** Increasing the age of cross intra- and intermolecular bonds is considered as one of the possible mechanisms of aging, since this process is accompanied by the formation of defective macromolecules. Increasing age crosslinking proven experimentally so far

only for extracellular proteins - collagen and elastin, and possibly for chromatin. Data on the ability of certain substances to inhibit the formation of cross-links formed the basis to assume that the search for promising geroprotectors in this group [2].

**Immunomodulators.** The use of immunomodulators to slow aging is based on the hypothesis linking the aging process with age-related changes in the immune system, and above all with the involution of the thymus. There is evidence that hormonal substances in the thymus, have a normalizing effect on the function of different systems, prevent the formation of tumors and stimulate the body's defenses [4]. However, experiments show that the known immune modulators have no significant effect on life expectancy.

**Other substances.** In western countries, a very popular drug is coenzyme Q10. In some experiments, coenzyme Q10 has shown the ability to prolong life is expressed. But what is interesting: there is a drug that plays a role in the body, similar to coenzyme Q10. It is succinic acid [5]. In experiments on mice it was shown that succinic acid is not influenced by the average life span, but increased by 30.5% of its maximum value. This halves the incidence of spontaneous tumors and 1.7 times the multiplicity of them [2].

**Conclusions.** Questions of rejuvenation, life extension and immortality are quite relevant in our time. As practice shows, the extension of life mainly depends on the person, on his way of life and worldview. Due to the high technologies, such as nano-medicine, genetic engineering, biotechnology, people are able to remain in a state of physical and mental health, as long as possible and extend the life of several decades. Future technologies will make it more efficient and more reliable. Extend its life, we have a great opportunity for self-knowledge, develop skills and abilities, creativity, relaxation, socializing, and more [3]. A healthy lifestyle, good nutrition, dietary supplements, disease prevention - these are the main ingredients for success in achieving purpose.

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