Theories of the aging of the organism. The possibilities of BRT in pathological aging

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Human aging, like the aging of other organisms, is a biological process of gradual degradation of parts and systems of the human body and the consequences of this process.

The topic of human aging and the methods of rejuvenation associated with it are relevant in the modern world. This article reflects the initial stage of the author's research in this area.

In the early stages of aging research, numerous theories were viewed by scientists as competing in explaining the effects of aging. However, today it is believed that many mechanisms of cell damage operate in parallel, and cells must also spend resources fighting against many mechanisms. To investigate the interactions between all mechanisms of damage control, a systematic approach to aging has been proposed, which attempts to simultaneously take into account a large number of such mechanisms.

Distinguish between physiological (natural, age-related) and premature (pathological) aging. Physiological aging is understood asnatural onset and gradual development of senile changes characteristic of the human body.

With age, there is a decrease in body size and weight, an increase in atrophic processes in many organs (especially in the skin, kidneys, gonads, structures of the central nervous system, etc.), a weakening of the function of the barrier, digestive, excretory, nervous and genetic regulatory systems.

Premature pathological aging is understood as any acceleration of the aging rate characteristic of the middle age group of people.Aging (both physiological and pathological) is influenced by both internal, especially genetic, and external factors. Centenarians have a biological age less than the calendar age. With pathological aging, the biological age is ahead of the calendar. Pathological aging of the body is always a consequence of certain pathological changes in organs and tissues at all levels - from cellular to organismal. Any disease accelerates aging. Consequently, accelerated or pathological aging is a reliable marker of the "disease" of the body.

Currently, there are about two hundred different theories of aging. The most popular and studied are the following.

1. Hormonal-genetic approach

A) In the process of a person's life, starting from birth, there is an increase in the thresholdsensitivity of the hypothalamus, which ultimately after 40 years leads to hormonal imbalance and progressive disruption of all types of metabolism. The author of this concept is considered V.M. Dilman.

B) The pineal gland is the main pacemaker of the body's functions. At

With aging, the functional activity of the pineal gland decreases, which is expressed primarily in a violation of the rhythm of melatonin secretion and a decrease in the level of its secretion in general. In 1959, it was found that removal of the pineal gland at a young age leads to a significant decrease in the lifespan of rats compared to control (Malmea, 1959). In 1987 D. Pierpaoli and G. Maestroni reported that old mice, which they were given melatonin with drinking water at night, lived 20% longer than the controls, and looked clearly more vigorous than the latter.

C) The depressive effect of chronic psychological stress is knownon the entire hormonal system of the body, which, in turn, triggers pathological aging.

2. Immunological theory of aging

The association of age-related pathological processes with defects in the immune system has led to the assumption that aging of the immune system may limit life expectancy. In recent years, it has been found that some immunomodulators, in particular, peptide drugsthymus, may restore the competence of immune cells in the old organism and increase the lifespan of animals.

Thymic involution, which begins at puberty, is believed to be the main age-related change in the immune system. The yield of differentiated T cells decreases with increasing age. The synthesis and secretion of polypeptide hormones of the thymus, such as thymosin, thymopoietin and thymulin, are progressively reduced. It is believed that a decrease in the endocrine activity of the thymus plays a key role in age-related dysfunctions of the immune system, since hormone replacement therapy is able to restore various immune functions in old age. Zinc metabolism, which plays an essential role in immunocompetence, decreases in old age, while zinc supplementation can restore immune functions.

3. Theories of somatic mutations

A) The mutational theory considers aging to be the result of transformations taking place inside the cell. Mutations in cells occur throughout life, their number is infinitely large. It is estimated that more than 100 mutations occur in chromosomes during life, affecting vital intracellular systems. Mutational changes can be considered one of the possible causes of aging at the molecular level. Many studies have shown an increase with age in the number of somatic mutations and other forms of DNA damage, suggesting DNA repair (repair) as an important factor in supporting cell longevity.

B) Free radical or mitochondrial theory of aging. DNA damage is typical of cells and is caused by factors such as hard radiation and reactive oxygen species, and therefore DNA integrity can only be maintained through repair mechanisms. With age, there is an accumulation of altered (damaged and excess) proteins. Oxidized proteins are a typical result of the influence of reactive oxygen species (superoxide),

which is formed mainly in the mitochondria of the cell. With age, there is an incomplete suppression of the generation of reactive oxygen species (ROS) and incomplete harvesting of the formed ROS. Reactive oxygen species are chemically very aggressive: they damage proteins and DNA and, most importantly, cause lipid peroxidation
Is a self-sustaining process leading to severe membrane damage. In addition to the fact that free radicals accelerate the natural aging process, they also contribute to the aggravation of various pathologies characteristic of old age. For example, free radicals greatly exacerbate the course of a disease such as atherosclerosis. It is thanks to free radicals that cholesterol accumulates in atherosclerotic plaques.
Currently, the free radical or mitochondrial theory of aging is the main and most well-studied one.

C) Telomerase theory. V1961 L. Hayflick and P. Moorhead presented data that even under ideal cultivation conditions, human embryonic fibroblasts are able to divide only a limited number of times (about 50). It was found that with the most careful observance of all precautions during subcultures, cells pass throughin vitro a number ofmorphologically distinguishable stages (phases), after which their ability to proliferate is exhausted and in this state they are able to stay for a long time. In repeated experiments, this observation was repeated many times, the last phase of cell life in culture was likened to cellular aging, and the phenomenon itself was named "Hayflick's limit" by the author's name. Moreover, it turned out that with an increase in the age of the donor, the number of divisions that the cells of the body were able to perform significantly decreased, from which it was concluded that there was a hypothetical counter of divisions limiting their total number.

In 1971, Olovnikov, on the basis of the data on the principles of DNA synthesis in cells that had appeared by that time, proposed the hypothesis of marginotomy, explaining the mechanism of operation of such a counter. According to the author of the hypothesis, during the matrix synthesis of polynucleotides, DNA polymerase is not able to completely reproduce the linear matrix; the replica is always shorter in its initial part. Thus, with each cell division, its DNA is shortened, which limits the proliferative potential of cells and, obviously, is the "counter" of the number of divisions and, accordingly, the life span of a cell in culture. In 1972, Medvedev showed that repeating copies of functional genes can trigger or control aging.

The discovery in 1985 of telomerase, an enzyme that completed the construction of a shortened telomere in germ cells and tumor cells, ensuring their immortality, breathed new life into Olovnikov's hypothesis.

It was shown that when telomerase is injected, human fibroblast cells, which normally divide only 75–80 times, are able to divide 280 times without any signs of aging and pathology. Thorough examination revealed that these cells lack such signs of malignancy as chromosome instability, growth independent of the addition of natural serum, lack of contact inhibition, and loss of cell cycle control (Bodnarea, 1998; Moralesea, 1999).

In addition, and most importantly, these cells do not develop tumors when transplanted into athymic mice (Jiangea 1999). The data obtained indicate that the expression of telomerase in human cell culture does not necessarily cause the development of cancer, i.e. telomerase is devoid of the oncogene properties that were attributed to it. Apparently, the main property of telomerase is the control of cell division, and additional mutations and factors are required for the occurrence of tumor growth.

To summarize, according to modern concepts, the cell ages as a result of the accumulation of damage. The rate of this accumulation is determined, first of all, by genetically determined costs for the repair and maintenance of cellular structures, which, in turn, are determined by the body to meet its ecological needs. Long-lived organisms have higher costs (sometimes longer metabolism), which leads to a slower accumulation of damage.

It is human nature to grow old and die. This is due to the laws of development of the population as a whole. The old must go away in order to give way to the new, more progressive. But it is important that aging occurs physiologically. In the modern world, we practically do not observe this. It is quite possible that being both externally and internally young, for example, at 70–80 years old, is not so impossible. And in this we can be helped by electropunctural diagnostics and bioresonance therapy.

As mentioned above, a systematic approach to the problem of pathological aging is important. To implement it within the framework of ART and BRT methods, it is first necessary to compile a complete list of signs of aging of a particular organism, and then select a comprehensive index from it for subsequent therapy. To do this, we perform the following steps:

1. We compile a complete list of signs of aging of the body, using for the following scales and indicators:

- miasms;
- suboptimal hormones in complex potencies (those that, when directly tested, cause a decrease in the measurement level); we pay special attention to the hormones of the pineal gland, pituitary gland and thymus;
- aging scales: “stress and aging”, “telomerase gene”, “age marker”, “death of embryonic neuroblasts”, “death of male and female pluripotent cells”, “death of fibroblasts”;
- DNA from "Medpharma" preparations (we select all that, during direct testing, cause a decrease in the measuring level); special attention should be paid to the mitochondrial index test;
- chromosomes (at the 2nd, and better at the 3rd level of ART +);
- all tumor markers from the ART window: DNA index, anticancer resistance, the degree of malignancy of the process, onco-Protein, the potential of malignancy, the presence of tumors (1–5 cu), biosentetic processes at the cellular and intercellular level (morphological scale).

Note: Interestingly, all chronic patients, without featuresage, pathological (accelerated aging) is tested on all scales.

2. From the selected indicators reflecting the aging of the body, we compose a comprehensive index for subsequent therapy, in which we add only pathogenetic indexes. The technology for selecting pathogenetic indicators is described by the author in [5].

3. Through the obtained complex aging indicator (SPU-S - the sum pathogenetic indicators of aging) we select therapy. Any therapy selected through SPU-S will simultaneously have a therapeutic and rejuvenating effect. Moreover, the result will always be good, since the therapy will be systemic, optimal and at the same time precisely aimed at rejuvenation.

Interestingly, unlike cosmetic rejuvenating procedures, which only imitate rejuvenation, the results obtained with the help of BRT induce a true rejuvenation of the body, which, of course, is reflected in the appearance as well. Although it is quite possible to add BR drugs that act directly on the skin and facial muscles to the main anti-aging drugs.

Conclusions:

1. Equipment "IMEDIS" allows you to identify the causes of aging organism, taking into account modern theories of aging.

2. The results obtained during testing reflect the maximum individual characteristics of the aging of a particular patient.

3. Applying a systematic approach to the problem of aging when creating BR-drugs, it is possible to get good results in human rejuvenation.

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