INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

THE AGE-RELATED FEATURES OF METABOLISM

Saidova Aziza Yakubovna
Assistant of the Department of Physical Culture and Sports of the Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: jt-saidova_a@mail.ru

Abstract
This article discusses the age-related characteristics of metabolism. The influence of physical exercises on the intensity of oxidative processes, age-related changes in protein, carbohydrate and lipid metabolism and the reasons for a decrease in metabolic intensity.

Keywords: atrophy, regeneration, synthesis, haemoglobin, albumin, globulin, cholesterol, atherosclerosis, exercise, gamma globulin, high molecular weight protein, low molecular weight protein.

Introduction

Since the most important component of the body is protein, the process of growth and development, from a biochemical point of view, is, first of all, the processes of energetic synthesis of various proteins. In this regard, the need for food proteins and the intensity of protein metabolism in a growing body is much higher than in adults. So, for example, the daily protein requirement in an adult is 1-1.5 g per 1 kg of body weight, in a 15-year-old adolescent - 2 g, in a 12-13-year-old - 2.5 g, in a 2 - 5-year-old child - 3.5 g, and in a one-year-old - 4 g [1-4]. Protein synthesis, like all other biological syntheses, involves the absorption of energy. Therefore, the enhanced synthesis of proteins in a growing organism also requires relatively higher energy costs than in adults. The energy needed to synthesize proteins comes from biological oxidation processes, which create the ATP molecules used to activate amino acids. All this leads to the fact that oxidative processes in a growing organism are more intense. Oxygen absorption, calculated per 1 m^2 of the body surface, is 95% higher for a 3-year-old child than for an adult, 66% for a 6-year-old, 36% for a 9-year-old, and 25% for a 12-year-old. % [5-9].

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

Materials and Methods

Due to the greater share of plastic metabolism in the use of energy released as a result of oxidation processes, the possibilities for the energy supply of muscle activity in children and adolescents are less than in adults. This limitation is further enhanced by several other biochemical characteristics of a growing organism.

The content of haemoglobin in blood and myoglobin in muscles in children is lower than in adults, therefore the oxygen capacity of the body of children is less. Based on a kilogram of body weight, a child and adolescent absorb less oxygen with each breath than an adult, and with each heartbeat (pulse), they bring relatively less oxygen to the muscles, nervous system and other organs [10-17]. The cardiovascular and respiratory systems in children and adolescents, even at rest, work with greater stress than in adults, and therefore have less functional reserves, i.e. in the case of an increase in oxygen demand, the activity of these systems in children increases to a lesser extent.

All this limits the possibilities of aerobic energy supply of intensive work; when performing a lonely standard physical activity available to both adults and children (for example, climbing stairs at a given pace), the increase in the level of lactic acid in the blood in children and adolescents is greater than in adults [18-21]. At the same time, the possibilities of anaerobic energy supply of muscle activity and the ability to perform work under conditions of oxygen debt in children are also less than in adults. The more children there are, the lower the possible maximum power of work and the lower the increase in lactic acid in the blood, it is accompanied. So, in a 9-year-old child, the maximum work power is no more than 40% of the maximum work power of an adult, and the maximum increase in the level of lactic acid is half that of an adult.

Very important for the physical education of children and adolescents is the easy inhibition of the mobilization of carbohydrates during muscle activity. Many physical exercises (especially low-intensity and prolonged ones) quickly lead to low blood sugar levels in children. Only emotionally rich classes with a variety of exercises and especially with game elements help to maintain high blood sugar levels until the end of the lesson.

A characteristic feature of an ageing organism is a decrease in the intensity of plastic metabolism against the background of a general decrease in the intensity of metabolism [22-25]. A characteristic feature of an ageing organism is a decrease in

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

the intensity of plastic metabolism against the background of a general decrease in the intensity of metabolism.

Experiments with the use of labelled amino acids show that the self-renewal of proteins slows down with old age. Deterioration of protein synthesis leads to a decrease in the rate of cell division and to a violation of their physiological regeneration. Many cells atrophy and die. So, for example, if in a 20-30-year-old person the average weight of all muscles is about 36 kg, then in a 70-80-year-old person it is 23-24 kg due to muscle tissue atrophy. Decreases with old age and the number of nerve cells in the cerebral cortex and cerebellum. In accordance with this, the content of proteins in the brain also becomes less, and the content of lipids increases. The death and slowing down of the reproduction of bone cells lead to a thinning of bones and a decrease in their strength (senile osteoporosis). The formation of new red blood cells also slows down. Wound healing is impaired.

The weakening of protein synthesis in an ageing organism is possibly associated with a decrease in the content of DNA, with the participation of which this synthesis occurs.

The second feature of an ageing organism is a decrease in the intensity of oxidative processes. Oxygen consumption at rest (when calculating 1 kg of body weight) in a 70-year-old person is only 60% of the amount of oxygen consumed by a 20-30-year-old.

A decrease in the intensity of protein metabolism and a general decrease in the intensity of oxidative processes are closely related to each other and affect each other. The decrease in protein synthesis extends to the synthesis of oxidative enzymes, which are also proteins. This leads to a weakening of biological oxidation processes and to a decrease in the production of the energy required for DNA synthesis.

One of the reasons for the decrease in metabolic rate is the coarsening of colloidal particles of tissue proteins that occurs with age and, in general, an increase in the content of high-molecular-weight proteins with a decrease in the content of low-molecular-weight proteins. With age, the content of albumin in the blood decreases and the content of globulins increases, especially the highest molecular weight gamma globulins (Table 1).

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

Table 1. Change with age in the ratio of serum albumin and globulin

Age (in years)	13-14	40-50	60-70	70-80
Albumin globulin ratio	2,28	1,78	1,58	1,43

In old age, the possibilities of both aerobic oxidation and glycolysis decrease. Therefore, in older people, as in children, standard work is accompanied by a large, and maximum work - a smaller increase in the level of lactic acid in the blood compared with 20-30-year-olds.

The maximum possible power of work decreases sharply with age. In 60-year-olds, it is only 50% of the capacity that 20-30-year-olds are able to develop.

A slight slowdown in the mobilization of carbohydrates during muscle activity is also characteristic of the elderly; monotonous, boring exercise is accompanied by a decrease in blood sugar. With age, changes and lipid metabolism are observed, which is expressed in an increase in the content of cholesterol in the blood and a decrease in the content of lecithin. Cholesterol and its esters with fatty acids penetrate into the walls of blood vessels, are deposited and cause pathological changes. The deposition of calcium salts in the affected areas leads to the development of atherosclerosis, a pathological condition characterized by a decrease in the elasticity and strength of blood vessels.

In old age, physical exercise should have an effect opposite to the course of the natural process: to delay the process of age-related involution, i.e. to contribute to an increase in the general intensity of metabolism, and through this - to enhance the synthesis of tissue proteins. Numerous observations show that systematic physical exercise or physical labour (especially in the open air) retards the development of atherosclerosis, ensures active old age, and helps to prolong life. Even if exercise begins only in old age, this leads to a persistent decrease in cholesterol and an increase in the lecithin in the blood. Lecithin has a protective effect and prevents the penetration of cholesterol into the walls of blood vessels.

Observations carried out for elderly people who exercise in health groups for 4-6 years significantly increase the intensity of oxidative processes and rejuvenate the protein composition of the blood (2).

INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

Conclusion

The ratio of albumin and globulin is optimized. Physical activity for ageing organisms should be short-term, not requiring great power exertion and manifestations of significant speed endurance. It is these loads that occur in the absence of a stable state of metabolic processes, alternating with sufficient intervals of rest and not prolonged exercises of moderate-intensity, that most contribute to an increase in the intensity of oxidative processes and an increase in protein synthesis during the period of rest, delaying the ageing process.

References

1. Атамухамедова, М., Абдугаппаров, А., Михеева, А., & Ёрматов, Г. (2019). Влияние умственной деятельности у учащихся на газообмен в различных экологических условиях. Символ науки, (3).
2. Атамухамедова, М. Р., & Саидова, А. Я. (2020). Основные правила питания при занятиях спортом. In Новая наука: история становления, современное состояние, перспективы развития (pp. 265-267).
3. Атамухамедова, М. Р., Саидова, А. Я., & Исраилжанов, С. И. (2018). Функциональные сдвиги в организме детей в неблагоприятных условиях окружающей среды. In Проблемы. и Перспективы Развития Экспериментальной Науки (pp. 136-138).
4. Атамухамедова, М. Р., & Саидова, А. Я. (2020). Питание при железодефицитной анемии. In Новая наука: история становления, современное состояние, перспективы развития (pp. 267-269).
5. Shodieva, G. M. (2006). Improving the well-being of the household: problems and their solutions. Monograph, T.: Fan.
6. Мухаммадиева, З. Б., & Бердиева, З. М. (2020). Пищевая безопасность CO2-экстрактов из растительного сырья. Universum: химия и биология, (4 (70)).
7. Атамухамедова, М., Кузиев, О., & Исроилжонов, С. (2019). Уровень вентиляции и произвольное апноэ дыхания. In Наука В Современном Обществе: Закономерности И Тенденции Развития (pp. 265-266).
8. Бердиева, З. М., & Мухамадиева, З. Б. (2020). Проблемы и перспективы цепи снабжения агропроизводства. Universum: технические науки, (5-1 (74)), 10-13.

ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

9. Атамухамедова, М. Р., Аминжанов, А. А., & Исраилжанов, С. И. (2018). Экологические особенности энергетического метаболизма у детей в связи с антропогенными изменениями во внешней среде. In Проблемы и Перспективы Развития Экспериментальной Науки (pp. 134-136).
10. Кодиров, З. З. (2021). Влияние концентрации NaOH и избытка щелочи на состав продукта при рафинировании хлопкового, соевого, подсолнечного масла. Universum: технические науки, (3-3 (84)), 50-52.
11. Djuraeva, D. D., & Berdiyeva, Z. M. (2016). Cultural heritage as a factor of human development (on the example of Uzbekistan). Ученый XXI века, 23.
12. Кодиров, З. З. (2021). Физико-химические изменения и нормативные требования к хранению и доставке растительных масел населению. Universum: технические науки, (10-3 (91)), 8-12.
13. Shodieva, G. M. (2008). Problems of organizational and economic factors and service development in the improvement of family welfare (Doctoral dissertation, Dissertation for the degree of Doctor of Economics. Samarkand).
14. Кодиров, З. З., & Ибрагимов, Л. А. (2021). Исследование технологий экстракции растительного масла из гранулированного сафлорного семени. Universum: технические науки, (10-3 (91)), 13-15.
15. Джураева, Д. Д. К., & Бердиева, З. М. (2016). Культурное наследие как фактор развития человеческого потенциала (на примере Узбекистан). Ученый XXI века, 25.
16. Кодиров, З. З., & Кодирова, З. А. (2020). Изучение процесса гидрогенизации сафлорового масла. Universum: технические науки, (10-2 (79)).
17. Шодиев, Д. А., & Нажмитдинова, Г. К. (2021). Пищевые добавки и их значение. Universum: технические науки, (10-3 (91)), 30-32.
18. Mahammadjon, Q., & Anvar, A. (2021). Bioazot-n biopraparate in agriculture. Innovative Technologica: Methodical Research Journal, 2(11), 101-105.
19. Мадалиев, Т. А., Гоппиржонович, Қ. М., & Абролов, А. А. (2020). Биоразведка бактерий-продуцентов экзополисахаридов из различных природных экосистем для синтеза биополимеров из барды. Universum: химия и биология, (12-1 (78)).

ISSN: 2776-0987 Volume 2, Issue 12, Dec., 2021

20. Қосимов, М. Г., Мадалиев, Т. А., & Абролов, А. А. (2019). Улучшения качества зерна, выращиваемого в условиях ферганской области. Интернаука, (40-2), 28-30.
21. Ибрагимов, А. А., Маматкулов, М. Х., Косимов, М. Г., Мадалиев, Т. А., & Абролов, А. А. (2019). К вопросу о перспективах организации рыбной промышленности в Узбекистане и о рыбохозяйственном освоении водохранилищ Ферганской долины. Universum: технические науки, (12-3 (69)).
22. Усманов, Б. С., Гоппиржонович, Қ. М., Сайтбековна, Қ. У., & Умурзақова, Ш. М. (2019). Особенности состава и свойств сафлорового соапстока, определяющие области его применения. Universum: технические науки, (12-3 (69)).
23. Kodirov, Z. Z., Rakhmatovna, M. I., & Saydillaevna, K. N. (2021). Study of the process of sample refining and deodorization of sunflower and soybean oils. Innovative Technologica: Methodical Research Journal, 2(12), 8-15.
24. Буранова, Д. Я., & Кодиров, З. З. (2020). Исследование кинетики и селективности экстракции хлопкового масла на основе модификации растворителя. Universum: технические науки, (11-3), 32-34.
25. Sattarova Barnoxon Nabievna, & Abrolov Anvar Adxamjonovich. (2021). The chemical composition and properties of chicken meat. Innovative Technologica: Methodical Research Journal, 2(10), 25–28.