

## PEPTIDES FOR SPORTS AND FITNESS

ENHANCING THE RESERVE CAPACITY OF THE BODY IN FITNESS CLUB MEMBERS AND ATHLETES USING PEPTIDE AND NON-PEPTIDE BIOREGULATORS

Methodological guidelines Saint-Petersburg / 2025

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## ABSTRACT

Methodological guidelines for the use of peptide and non-peptide bioregulators are prepared by ta group of authors based on scientific research findings of Saint-Petersburg Institute of bioregulation and gerontology in the field of evaluation of the reserve capabilities of the athletes' bodies and practical experience of their application by the Peptides company employees. The paper presents a developed methodology of increasing biological reserves of the people exercising in fitness-clubs and athletes specializing in complex coordination sport. The application of a combination of peptide and non-peptide bioregulators in conjunction with observance of the principles of proper nutrition, daily regimen and regular workouts helps improve physical performance and boost the body's physiological reserve capabilities of fitness enthusiasts and professional athletes.

The methodological recommendations provided in the paper can be beneficial for fitness instructors and their clients, athletes, dance and yoga coaches for providing recommendations on the application of peptide and non-peptide bioregulators in order to increase the effectiveness of the training process.

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## REVIEWS OF THE LEADING RUSSIAN SCIENTISTS – PROFESSORS OF MEDICINE, BIOLOGY AND PHARMACOLOGY

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Health, youth and beauty are the foundation of a happy and fulfilled life. The manual "Enhancing the reserve capacity of the body in fitness club members and athletes using peptide and non-peptide bioregulators" by the doctors and scientists of the Peptides company provides a clear and detailed description of how to be physically active and healthy. It contains simple step-by-step instructions on how to make fitness, daily regimen and proper nutrition the foundation of activity and longevity. I might, as a specialist in molecular biology, tell that the bioregulators recommended by the authors have been subjected to extensive scientific and clinical testing and are the key to effective training and preservation of health.

Professor, Doctor of Biological Sciences Victoria Polyakova



coined by the ancient Greek philosopher Aristotle. Nowadays it is particularly relevant. The illustrated and exemplified manual sets out in a popular language a way to implement this slogan in our daily lives. An important function in this regard is served by nanotechnology - developments of the leading Russian scientists and doctors in the field of peptide and non-peptide bioregulation of ageing. The manual lays out the foundations for efficient sport and fitness activities. To my mind, what's important is that all the recommendations are practical, detailed schemes for the use of bioregulators are provided for amateurs and professionals in various sports. I am sure this guide will help you build a healthy and beautiful dream body.

"Movement is life" - this phrase was

Professor, Doctor of Medical Sciences Irina Vinogradova



## **1. INTRODUCTION. MOVEMENT IS LIFE**

"Movement is life, while life is movement"! This statement belongs to ancient Greek scholar and philosopher Aristotle, who lived in the 4th century BC. Now it is particularly relevant. Practice has shown that physically active individuals get sick less, they are more successful in career building, retain their youth, beauty and mental activity longer.

In the 21st century, as digital technologies continue to develop, more and more conditions are being created for sedentary lifestyle. This leads to the development of metabolic syndrome (obesity), diseased vessels, cardiac disorders, pulmonary diseases and joint conditions, reduced libido and reproductive function in men and women and increased incidence of acute respiratory infections. You would agree that it is much easier and more pleasant to prevent all these diseases by including sport and fitness in your life than to undergo a long treatment, which will not always give the desired result. While feeling healthy, active, energized and beautiful is so wonderful! It is worth thinking about exercise and a healthy lifestyle for this reason. And this is the trend observed in Russia in recent years. Nearly half of the residents of our country are involved in sports or physical exercise with

71% of young people aged 18-24 years. Older Russians are not far behind: almost every second person plays sports. The most popular sports among Russians are running, racewalking, fitness, complex physical training, physical therapy, ice-skating, skiing, bicycling, swimming, yoga and dance.

However, many people wish they could join a sporting activity but are unsure how to get started with training: how to choose the right diet and exercise programme to enjoy a healthy lifestyle. Our study guide will help you in achieving this goal – the manual contains a step-by-step description of how to choose the right physical activity, plan your meals and mode of the day, support the body with peptide bioregulators. The actionable insights are supplemented by illustrative material and a large number of schemes.

## 2. FOUR ESSENTIAL REQUIREMENTS FOR EFFECTIVE FITNESS TRAINING

#### 2.1. Proper nutrition

In our daily lives, not all of us give much thought to what we eat. In the meantime, the understanding of the fact that our bodies are the result of the food we consume. A healthy and beautiful body can't be built out of poor quality food the same way as a strong house can't be built out of poor quality materials. Simply put, the better we eat, the better we feel. There's a lot of evidence to suggest that proper nutrition is essential for effective workouts and building a healthy and beautiful body. Take, for example, the participants of the Chernozem bodybuilding and fitness Championship in the nomination "fitness model" 2023. These women are from 35 to 45 years old, they have families, children and jobs. However, they managed to significantly improve their physical condition through training and proper nutrition. Each of us can look similar with discipline and desire to be healthy and beautiful.

What do you need to know about nutrition to build your dream body?

Nutrients (nutritional substances) are biologically active food elements necessary for the life support of the body. They are divided into micronutrients and macronutrients (proteins, fats, carbohydrates). Micronutrients are nutritional substances contained in food in small quantities (milligrams or micrograms) in stark contrast to macronutrients (proteins, fats, carbohydrates), which make up the majority of food. Micronutrients are not energy sources, but active in food food absorption, regulation of cell functions of all organs and tissues and maintenance of the body's homeostasis.

#### **ESSENTIAL MICRONUTRIENTS:**

- vitamins: A, D, E, K, C, B1, B2, B3 (PP), B6, B12, folic acid, pantothenic acid, biotin;
- vitamin-like substances: choline, carnitine, bioflavonoids, lipoic acid, lecithin, Coenzyme Q10, inositol, p-aminobenzoic acid (PABA), pangamic acid, orotic acid;
- minerals or micronutrients (100 mg per day or more): calcium, potassium, phosphorus, sodium, chlorine, magnesium, sulfur;
- antioxidants: phenol derivatives, sulfur inorganic compounds, tocopherols, lecithins, carotene, phospholipid compounds, quinons, ascorbic, phosphoric and citric acid, vitamin K, catalase;
- micronutrients (less than 100 mg a day): iron, zinc, iodine, chromium, selenium, fluoride, molybdenum, cuprum, manganese;
- flavonoids: : natural dyes, dietary antioxidants, tanning substances. Flavonoids deliver antibacterial effect and are used as medications (rutin, quercetin);

**fiber:** food components that are not digested by the enzymes of the human body but are processed by the beneficial intestinal microflora;

## polyunsaturated fatty acids: omega-3, omega-6.

Macronutrients are the foundation of our nutrition, while their ratio is determined by the set objective: gaining, losing and maintaining body weight. In order to gain muscle mass, you need to consume approximately 40-60% of carbohydrates, 25-35% of proteins and 15-25% of fats. The recommended guidelines for maintaining body weight are 30-50% carbohydrates, 25-33% proteins and 15-25% fats. If you wish to reduce body weight, you should consume 10-20% carbohydrates. 40-50% proteins, 30-40% fats. The amount of fats in the diet should not be lower than 15%, as the body synthesizes hormones from fats. Importantly, your diet should encompass unsaturated fats found in avocado, olives, nuts, vegetable unrefined oils, salmon and other fish species, seafood. The sources of beneficial saturated fats include egg volk. meat, chicken and dairy products. Meat, eggs, chicken, fish, dairy and seafood are excellent sources of animal proteins.

Animal-based proteins are optimal in their amino acid composition for maintaining and gaining muscle mass.

Legumes, soybean plans and cereals are rich in vegetable protein. The carbohydrates are divided into slow and fast ones. Slow



Figure 2.1. Chernozem bodybuilding and fitness Championship in the nomination "fitness model", November, 2023 / The photo is taken from the personal archive of N.Linkova https://nosorogpro.ru/photo-gallery/nosorog-pro-15-ch1

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carbs include all types of cereals, crispbreads, bread and potato. Fast carbohydrates refer to bakery and confectionery products, alcoholic beverages. Carbohydrates can be found in fruits and vegetables as well. A 75%:5%:15% ratio of slow, fast, fruit and vegetable carbohydrates is desirable. Slow carbs provide energy for the body for a long period of time.

The daily allowance of proteins and fats is 1 to 1.5 grams per kilogram of body weight, while the same figure for carbohydrates is 3-4 grams per 1 kilogram of body weight. This range depends on gender, age, body type, percentage of fat and muscle mass, and the defined goal. Here is an example of how to calculate your protein, fat and carbohydrate (PFC) ration.

Female, 25 years old, height is 165 cm, weight is 55 kg, 27% adipose tissue (normal physique). Started working out at the gym 3 times a week for 1.5 hours (cardio and strength training) for gaining muscle mass and reduction of in the percentage of subcutaneous fat. The PFC recommendation for her may be as follows:

- Animal-based proteins = 1,5 g x 55 = 82,5 g (330 kcal)
- Fats = 1,3 g x 55 = 71,5 g (572 kcal)
- Carbohydrates = 3 g x 55= 165 g (660 kcal)
- PFC 82,5/71,5/165 (1562 kcal)

80% of success in losing weight or gaining muscle mass is proper nutrition. Many people mistakenly believe that they can achieve results by putting all your energy into grueling and avoiding a proper diet and daily regimen. Some fitness club customers get depressed and start "eating" stress as a result of declining to implement the trainers' recommendations on nutrition, daily regime and training and without seeing any progress. In addition, many aspiring fitness enthusiasts resort to the use of pharmaceuticals and dietary supplements for weight loss and fat burning, which may lead to negative health outcomes.

So why do many exercisers find it difficult to stick to a proper diet? Many people experience difficulty in paying attention to their diet and preparing food at home due to their hectic work schedules and daily activities. Instead, they snack on fast food, sweets and flour. A caloric surplus is emerging, which results in gaining excess weight and the appearance of various diseases. Fitness instructors argue that it is very difficult to change a client's unhealthy eating habits. They are formed over a long period of time and become automatic reactions to certain situations, e.g. stress. Non-peptide bioregulators can be used for overcoming this problem.

#### "An ideal snack replacement and protein source can be the Reviform shake (Figure 2.2)."

It contains an isolated soy protein, skimmed milk, coconut powder, cheese whey, chicory inulin, soluble dietary fiber (arabic gum), vitamins C, Bl, B6, Bl2, PP, folic acid, calcium pantothenate, biotin, iron, manganese, copper, iodine, selenium, zinc. Reviform cocktail can be used for correction of cholesterol and glucose metabolism, normalization of digestion, prevention of diabetes, obesity and cardiovascular disease. It will help you avoid overeating with sweet and floury foods and build beautiful body proportions.



Figure 2.2. Reviform® cocktail – a drink for figure and weight correction

#### Revilab Pro Elements (Figure 2.3)

compensates the deficiency of vitamins (A, E, D3, B6), micro- and macroelements, essential for maintaining collagen synthesis in cartilage and joints and post-workout recovery.



#### Figure 2.3.

Revilab Pro Elements – a dietary supplement based on a complex of microelements, minerals and vitamins

«Amvix» (Figure 2.4) — is a complex of amino acids and vitamins, "Olecap" (Figure 2.5) contains cold-water salmon oil and flaxseed oil, both rich in omega-3 fatty acids, as well as vitamins A and E. To enhance training efficiency and normalize metabolism Revilab Peptide Collagen (Figure 2.6), can be recommended. This formulation includes cartilage-derived peptides, fish collagen, native marine collagen from giant squid, and vitamin C. It supports joint and ligament strength while improving skin, hair, and nail health. Additionally, "Volustom" (Figure 2.7) — an adsorbent complex based on dietary fibers-can aid in gastrointestinal function regulation and weight management by promoting detoxification and metabolic normalization.



Figure 2.5. Olecap – a natural encaspulated angiorestorer



#### Figure 2.6.

Revilab Peptide Collagen – a dietary supplement formulated for healthy joints, ligaments, cartilage and preserving the beauty of hair, skin and nails





Figure 2.4. Amvix – a dietary supplement in the form of instant tablets

Figure 2.7. Volustom – a complex for cleansing of the body and restoring gastrointestinal tract function

## 2.2. Daily regimen

The effectiveness of exercise is determined by the way the body recovers during sleep. Sleep is regulated by biorhythms. The biorhythms (circadian rhythms) are dependent on the synthesis of melatonin hormone, which is produced in the pineal gland - a central organ of the neuroimmunoendocrine system. Melatonin ensures a good night's sleep through the night (23:30-7:00), during which muscle repair and growth hormone synthesis occur. This hormone reduces the severity of painful muscle sensations and contributes to recovery from training. Melatonin reduces stress levels (activates the antioxidant system, reduces cortisol levels in the blood), boosts the immune system, normalizes lipid metabolism and accelerates fat burning, normalizes the synthesis of sex hormones responsible for muscle growth and adrenal function.

In many people, melatonin synthesis is impaired with age or due to shift work patterns. In this case, you can take exogenous melatonin as prescribed by your doctor. However, it is important to remember that the use of any hormonal drugs, including melatonin is a serious interference with the endocrine system. The side effects of melatonin are: impaired synthesis of intrinsic melatonin and accelerated aging, arrhythmia, increased blood pressure, aggressive behavior, hyperexcitability or daytime sleepiness, dizziness and nightmares.

An effective and safe alternative to the use of melatonin is the activation of the body's own melatonin synthesis using the polypeptide complex of the epiphysis - "Endoluten". Endoluten complex is obtained by extraction from the epiphysis of young animals. "Endoluten" contains peptides with molecular weights ranging from 75 to 10,000 Da. The product is recommended for the prevention of accelerated aging and in diseases of the neuroimmunoendocrine system, for normalization of melatonin synthesis and reproductive function in women. Endoluten' is designed in the form of a dietary supplement as an analogue of the drug "Epithalamin", included in the Pharmacopoeia of the Russian Federation in 1990. The author of "Epithalamin" and "Endoluten" is Academician of the Russian Academy of Sciences, Professor V.H. Khavinson. The normal functioning of the neuroimmunoendocrine system and its main organ, epiphysis, which synthesises melatonin, is required for recovery of the body after workouts, reducing the percentage of fat tissue and increasing the amount of muscle tissue. "Endoluten" contributes to activating

the synthesis of your own melatonin, which avoids hormone therapy and increases the effectiveness of training many times over.

## 2.3. The use of peptide bioregulators for increased training efficiency

A considerable number of national and international organizations assert the health benefits of physical activity and sport. Studies have conclusively demonstrated that an active lifestyle enhances the quality and duration of life. However, many young and middle-aged men and women who initiate intensive exercise regimens fail to consider the potential stress on the body and the adverse effects. Overtraining syndrome can result in chronic decreased performance, adverse health consequences, and can often lead to the termination or shortening of an athlete's competitive season.

Numerous studies have documented the occurrence of short-term increases in cortisol levels in response to exercise, and these increases have been associated with a subsequent decrease in testosterone levels. Furthermore, evidence suggests that the presence of testosterone and cortisol in the bloodstream can have a deleterious effect on athletes, even during periods of rest and baseline.

The resolution of this issue can be achieved through the utilization of peptide regulators, including immunoprotectors such as "Vladonix" and "Crystagen," a polypeptide complex of muscles "Cotratix," a polypeptide complex of heart "Chelohart," a polypeptide complex of heart "Chelohart," and peptide bioregulators normalizing the function of the sexual system - "Zhenoluten" and "Testoluten."

"Vladonix" (figure 2.8) —) is a polypeptide complex obtained by extraction from the thymus of young animals, an analogue of the drug "Thymalin". The active ingredient of "Vladonix" is an EDP tripeptide — "Crystagen" (figure 2.9), which includes glutamic acid, asparagic acid, and proline. "Vladonix" and "Crystagen" stimulate differentiation and activation of T- and B-cells, macrophages, NK cells, activate proliferation (division) and reduce apoptosis (programmed death) of immune and stem cells.

These peptides produce antioxidant and stress-protective effects. "Crystagen" is rec-

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ommended to maintain the functionality of the immune and antioxidant systems during physical exertion and psycho-emotional stress in athletes. The effectiveness of its use is shown in female athletes of the Russian national rhythmic gymnastics team.



Figure 2.8. Vladonix – a dietary supplement in the encapsulated form



Figure 2.9. Crystagen – a dietary supplement in the encapsulated form



Figure 2.10. Gotratix – a dietary supplement in the encapsulated form

"Gotratix" (figure 2.10) — is a polypeptide complex obtained by extraction from the muscles of young animals. Peptides contained in "Gotratix" regulate metabolic processes in muscle cells, increase their reserve capabilities, producing a favorable effect on adaptation processes and efficiency of intensive physical exertion during sports. It is recommended for restoration of muscle system functions after diseases of various genesis (including viral ones). The efficacy of Gotratix was demonstrated in a clinical study in 37 veteran sportsmen (rowing, athletics) aged 40-64 vears. The application of this peptide biorequlator improved the following parameters: long jump, step-test, flexibility; reduced fatigue and a shorter recovery period after training.

"Chelohart" (figure 2.11) — is a polypeptide complex obtained by extraction from the heart of young animals. "Chelohart" is effective in arterial hypertension, atherosclerosis of the blood vessels, endarteritis, ischaemic heart disease, myocardial hypertrophy, myocardiodystrophies. The heart works in an intensive mode during physical exertion, especially during cardiovascular exercise. Maintaining the functional activity of the cardiovascular system is important both for beginners in training and experienced athletes. Thus, "Chelohart is recommended to be used for this purpose.



#### Figure 2.11. Chelohart – a dietary supplement in the encapsulated form

"Endoluten" (Figure 2.12) — is a polypeptide complex extracted from the epiphysis of young animals. This polypeptide complex exhibits a selective action on the cells of the neuroendocrine system, normalizing metabolism in epiphysis cells and secretion of serotonin and melatonin, and regulating hormonal metabolism. Melatonin, the predominant hormone of the epiphysis, regulates various biorhythms within the body, including the sleep-wake cycle, blood pressure, body temperature, and the rhythm of alucocorticosteroid synthesis. Its benefits extend to metabolism, hormones, blood rheology, anti-inflammatory, anti-stress, and anti-allergic effects.

Research has demonstrated that melatonin can exert a beneficial influence on testosterone levels by augmenting its production within the body. The relationship between melatonin and testosterone is thought to be





reciprocal, signifying that an escalation in the level of one hormone concomitantly results in an increase in the level of the other. Melatonin has been demonstrated to stimulate the production of luteinizing hormone, which is imperative for testosterone synthesis.

The influence of various physiological factors on the athletic performance of both men and women is a multifaceted phenomenon, with testosterone being a prominent example of an anabolic agent that contributes to protein metabolism and the development of muscle mass. However, it should be noted that this process is not solely dependent on the presence of testosterone. A well-designed training regimen can facilitate muscle development, leading to enhanced strength and power. Additionally, testosterone has been observed to have a positive impact on hematopoiesis and hemoglobin concentration. The latter, in turn, can increase blood oxygen content and maximal aerobic capacity (VO2max). All of these componentsstrength, power, oxygen content, and VO-2max—are critical factors in a multitude of athletic activities and essential elements in the adaptation to training.



Figure 2.13 Zhenoluten – a dietary supplement in the encapsulated form

"Zhenoluten" — is a polypeptide complex, obtained by isolation from the ovaries of young animals. Imbalanced female sex hormones and its antagonist testosterone in the female body can cause muscular dystrophy, obesity, painful and irregular menstrual periods. In this case, the use of "Zhenoluten" (it can be combined with "Endoluten" as well) in women will contribute to the normalization of the hormonal background, absence of pain on critical days and muscle growth activation. It's worth noting that the analogue of the dietary supplement "Endoluten" is the medicinal preparation "Pineamin", which is used in menopausal women. "Pineamin" differs from "Endoluten" by a higher concentration of peptides and is used as prescribed by doctor. "Endoluten" contains a smaller amount of epiphysis peptides and, therefore, can be used for preventing ageing and reproductive system diseases in women.



Figure 2.14 "Testoluten" – a dietary supplement in the encapsulated form

"Testoluten" (Figure 2.14) — is a complex of peptide fractions obtained from testes of young animals. Testoluten has a selective effect on the epithelium of seminal tubules, stimulating the production of spermatozoa, increasing their functional activity, and enhancing motility. T his peptide bioregulator affects Leydig cells that produce testosterone. The effectiveness of Testoluten in the complex restoration of the function of the male reproductive system has been demonstrated in cases of hypofunction of the testes, after exposure to ionizing radiation, male infertility, and exposure to various toxic factors that negatively affect the male sexual system, with a decrease in the level of testosterone in the blood. Testoluten has also been shown to be effective in older age groups to maintain the function of the sexual system. The concomitant administration of Testoluten and Endoluten has been demonstrated to facilitate the maintenance of the male reproductive system, expedite post-training recovery, and ensure optimal testosterone and melatonin synthesis. These hormones are instrumental in maximizing the efficacy and benefits of the training process.

In addition, the use of Revilab ML 09 (Figure 2.15) — is recommended. This is a complex of short peptides (B-links of the immune system, vascular wall, cartilage), chondroitin sulfate, omega-3 polyunsaturated fatty acids, superoxide dismutase (SOD), catalase, and carnosine, which has been shown to have a positive effect on the musculoskeletal system. The peptide B-link of the immune system has been demonstrated to influence the reactions of cellular, humoral immunity and nonspecific resistance of the body. Additionally, it has been observed to stimulate regeneration processes in cases of their inhibition and to improve the course of cellular metabolism processes.

Vascular wall peptide regulates metabolic processes in the vascular wall, promoting increased elasticity of arterial, venous, and lymphatic vessels. It reduces the risk of damage to the vascular wall, hemorrhage, and thrombosis, improves blood supply to organs and tissues, and stimulates hematopoiesis.

Cartilage peptide ("Sigumir" and "Cartalax") exhibits biological activity, manifesting in the normalization of metabolism within bone and cartilage tissues. It further promotes the regeneration of joints and connective tissues comprising the skin framework.



Figure 2.15. Revilab ML 09 - a dietary supplement in the encapsulated form

### TO SUMMARIZE: WHAT CONDITIONS DO WE NEED TO FULFIL IN ORDER TO INCREASE TRAINING EFFICIENCY AND WELL-BEING?

- Following the principles of healthy nutrition: the choice of food and calculating the PFC ratio (proteins/ fats/ carbohydrates).
- Observance of the exercise and rest regime: sleep from 23:30 to 07:30; regular workouts in 1-2 days, 3-4 times a week.
- Daily cardio exercise: walking, cycling, cardiovascular equipment according to the age-appropriate pulse rate (HR - heart rate\*).
- The use of peptide and non-peptide bioregulators aimed at increasing the reserve capacity of all body systems and recovery from physical activity.

# **2.4.** Practical schemes of the use of peptide and non-peptide bioregulators for increased training efficiency

The scheme on the use of non-peptide bioregulators for increased efficiency when starting fitness classes:

- · Reviform cocktail 1-2 tablespoons (supper substitute) for 2 months.
- Revilab Peptide Collagen 1 capsule 2 times a day
- Revilab Pro Elements 1 tablet 2-3 times a day swallow with water (do not dissolve!)
- "Olecap" I capsule in the morning and evening
- "Volustom" I tablespoon 10 minutes before meals in afternoon and evening

## The scheme on the use of cytomaxes for increased efficiency when starting fitness classes:

#### 1<sup>st</sup> month:

- Endoluten" 1 capsule in the morning 1 time a day
- "Gotratix", "Sigumir", "Ventfort" 1-2 capsules in the morning

#### 2<sup>nd</sup> month:

- "Sigumir" 1-2 capsules in the morning
- "Glandokort" I capsule in the morning
- "Chelohart, "Thyreogen" 1-2 capsules in the morning
- "Zhenoluten" ("Testoluten") 1 capsule in the morning

The use of peptide bioregulators has been shown to enhance physical exercise efficiency and reduce fatigue.

These products have been found to be safe and free of adverse effects, complications, and drug dependence.

## 3. EVIDENCE OF PEPTIDE BIOREGULATORS' EFFICACY IN SPORTS

The growing political and global importance of sports, the intense competition among athletes, and their aspiration to triumph have led to the extensive integration of the most recent advancements in scientific and technical progress in sports. This has prompted the exploration of novel methods to enhance the efficiency of training and participation in competitions among athletes. Consequently, the employment of biologically active additives for the purpose of enhancing the performance of athletes has emerged as a pivotal element of contemporary sports, serving as a means to augment the human body's capabilities.

Modern sports science demands the development and utilization of pharmacological support to enhance physical performance, expedite recovery, and adapt to super-intensive physical and psychological stresses, particularly in high-performance sports. This approach encompasses the prevention of overtraining, treatment of sports injuries, prolongation of sports longevity, and enhancement of quality of life. A promising area for developing new drugs that enhance the body's protective functions, physical and mental performance, and endurance involves the use of peptide bioregulators [Lysenko A. V., 2004]. This area is currently a major focus for foreign pharmaceutical companies.

The St. Petersburg Institute of Bioregulation and Gerontology, established by Academician V. Kh. Khavinson, has a prominent position in the field. Its research on peptide bioregulators in healthcare has shown the efficiency of these substances in various pathological conditions. The fundamental research of the St. Petersburg Institute's staff in the field of increasing the reserve capabilities of the human organism laid the foundation for the development of peptide bioregulators. These bioregulators have been shown to enhance physical performance and facilitate the rapid recovery of athletes' resources after extreme exertion.

The Institute developed a technology of extraction of low molecular weight peptide fractions from animal organs and tissues, which allowed to create on their basis a new class of drugs, generally known as "Cytomaxes". The mechanism of action of these peptides involves the normalization of metabolism in the specific cells of the target tissues. For instance, peptides extracted from muscles act on muscle cells, peptides extracted from testes act on cells of the male sexual system, and peptides extracted from the brain act on brain cells [Khavinson V. H. et al., 2018].

Through a novel approach to the discovery of physiologically active peptides, the St. Petersburg Institute of Bioregulation and Gerontology has developed a new class of peptide bioregulators based on short, synthesized peptides called "Cytogenes." These peptides are the active ingredient of "Cytomaxes." Unlike "Cytomaxes," "Cytogenes" act in smaller doses but have a shorter action time. To ensure optimal results, it is recommended to use bioregulators in combination: first, a course of "Cytogenes" should be administered, followed by "Cytomaxes." In cases where swift results are required within a short timeframe, it is advisable to employ a combination of "Cytogenes" and "Cytomaxes" for intensive and rapid impact. This combination should be administered at a dose of 1-2 capsules, twice daily, for a duration of 15-20 days. It is recommended to consult with a physician prior to adjusting the dosage.

Peptide bioregulators ("Cytogenes" and "Cytomaxes") feature properties of all groups of underdosing substances (except vitamins) used in sports pharmacology as performance stimulants, prevention and correction of fatigue and increase of adaptive capacity of athletes. "Pinealon" and "Endoluten" exhibit antioxidant activity, "Pinealon" and "Cerluten" perform nootropic activity, "Pinealon", "Crystagen", "Endoluten" and "Vladonix" perform adaptogenic and immunomodulatory activity, "Bonomarlot" stimulates hematopoiesis while "Endoluten", "Svetinorm" and "Gotratix" activate metabolism and cell regeneration.

## 3.1. The effect of the neuroprotective peptide "Pinealon" on the reserve capabilities of the organisms of the female judo athletes

The investigation into the neuroprotective properties of the peptide bioregulator "Pinealon" in female athletes was conducted at the Faculty of Physical Education and Sports at Southern Federal University and the clinical Diagnostic Center "Nauka" in Rostov-on-Don [Lysenko A.V. et al., 2012]. The investigation involved female athletes who were masters of iudo and aged between 16-22 years. The study recorded two sets of indicators: the first set recorded prior to the administration of the peptide bioregulator "Pinealon," and the second set recorded after the administration of "Pinealon." The peptide bioregulator "Pinealon" is a tripeptide consisting of glutamic acid, aspartic acid, and arginine (Figure 3.1), contributing to the normalization of the functional activity of brain neurons.



Figure 3.1. A. "Pinealon" – a two-dimensional structure of the Pinealon molecule





Figure 3.1. B. Pinealon – a dietary supplement in the encapsulated form



#### Figure 3.2. A.

Evaluating the degree of fatigue following physical exertion for the indicator of the quality of the equilibrium function (QEF) – the result of the use of Pinealon

Hereinafter in Figures 3.3 - 3.5: \*p< 0,05 – compared to the index before exercise before applying "Pinealon"; \*\*- p< 0,05 – compared to the index after exercise after applying "Pinealon".

"Pinealon" activates mental performance in people of different ages, improves concentration. The efficacy of "Pinealon" in enhancing cognitive function across diverse age groups has been demonstrated through clinical trials. The product improves concentration and memory, as well as prevents and treats impaired brain function in patients suffering from conditions such as stroke, brain injury, and surgical interventiona.

The active ingredient in "Pinealon" is EDR peptide, which is also contained in the preparation "Cortexin". Pinealon can be recommended for athletes to enhance physical and mental performance and restore antioxidant system function under conditions of elevated stress, including preparation for competitions and training regimens.

The athlete strategically adjusted the center of gravity of her body in space (while standing on a stable platform and not moving on it) to hold a constantly moving red square in the center of the target shown on the screen for a predetermined time. The quality of the equilibrium function (OEF) was then calculated as a percentage, with higher values indicating better coordination and reaction time. Before the application of «Pinealon» after physical activity, QEF significantly decreased by 29%. However, when «Pinealon» was administered before physical activity, there was a notable 16% increase in QEF. Following the combination of physical exercise and «Pinealon» application, there was a significant 62% decrease in CRF compared to the group that did not receive the peptide bioregulator (Figure 3.2. A).



Stress tolerance was also measured using the Stabilan-01 device, according to the strain index of regulatory systems (SI) as defined by Baevsky. The SI is a measure of the function of the cardiovascular system. At rest, a normal SI value falls within the range of 50 to 150 conventional units.

Figure 3.2. B. General view of the device "Stabilan-01"



Figure. 3.3. Assessment of stress tolerance by the strain index of regulatory systems (SI) \* - p < 0,05 - compared to the index before applying "Pinealon";

Prior to the use of "Pinealon," the strain index of regulatory systems (SI) increased by 8.4 times after physical exertion. After using "Pinealon" before physical activity, SI levels significantly decreased by 22%. Additionally, when "Pinealon" was administered after physical exertion, the increase in SI levels was 4 times lower compared to the group that did not use this peptide bioregulator (Figure 3.3). This indicates that "Pinealon" has the ability to enhance stress resilience in female athletes.

Furthermore, blood analysis was performed on the female athletes. Blood smears were fixed using May-Grünwald's eosin-methylene blue solution and then stained using the Romanowsky-Giemsa method. The number of formed elements in the leukocyte formula was counted using a light microscope. To determine the type of adaptation response, the leukocyte index (LI) was calculated. The LI is the ratio of the number of lymphocytes to the number of segmented neutrophils. The LI values indicate the following levels of the body's adaptation to stress caused by physical exertion: 0.5–1.0 indicates a stress reaction, 0.3–0.5 denotes a training reaction, and less than 0.3 signifies an acute stress reaction. In judo athletes who did not use "Pinealon," the LI was 0.93, corresponding to a stress reaction. In contrast, athletes who used "Pinealon" had an LI of 0.43, indicating an optimal adaptive capacity of the body to physical stress (Figure 3.4).

"Pinealon" normalized (reduced) the erythrocyte sedimentation rate (ESR), the activity of liver enzymes (ALT - alanine aminotransferase, AST - aspartate aminotransferase), and the frequency of chromosomal aberrations in blood cells among female athletes (Table 3.1). This indicates the anti-inflammatory, stress-protective, and geroprotective effects of this peptide bioregulator.

Table 3.1.	
The Effect of «Pinealon» on Blood Test Parameters in Female Judo Athlete	es.

Index	Average rate	Before applying Pinealon	After applying Pinealon
ESR, mm/h	10	13,4±2,5	4,8±1,3*— <b>64</b> %
ALT Activity, conv. Units	0,02	0,11±0,01	0,08±0,02*-2 <b>8%</b>
AST Activity, conv. Units	0,02	0,08±0,01	0,06±0,02*-31%
Frequency of chromosomal aberrations, %	6	0,08±0,01	4,2±0,2*— <b>36</b> %

\*p < 0.05 – compared to the baseline value before the administration of «Pinealon.»





2



#### Figure 3.5.

#### Assessment of the Duration of Static Balance.

\* - p < 0.05 – compared to the baseline value before the administration of «Pinealon.»

"Pinealon" significantly increased the duration of static balance (the ability to maintain a single posture for an extended period) in female judo athletes by nearly twofold (Figure 3.5). Initially, due to high physical exertion, the biological age of the athletes was, on average, 7 years greater than their chronological age. "Pinealon" reduced the discrepancy between chronological and biological age in the athletes by an average of 5 years. Thus, "Pinealon" contributes to the preservation of youth in athletes' bodies, preventing accelerated aging.

## 3.2. he effect of peptide bioregulators on the reserve capabilities of the female gymnasts' organism

The study involved the Russian Olympic rhythmic gymnastics team, consisting of female athletes aged 13 to 20 years [Trofimova S. V. et al., 2011; Khavinson V. Kh. et al., 2018; Methodology for Enhancing the Reserve Capabilities of Elite Female Athletes Using Peptide Bioregulators, 2011]. All athletes were examined by a therapist and cardiologist, including molecular genetic testing (genetic passport), treadmill testing, clinical, biochemical, and immunological blood tests, assessment of the antioxidant system, and biological age (based on blood melatonin levels). All gymnasts were randomly divided into two equal groups: the main group received peptide bioregulators-"Crystagen" for immunoprotection, "Pinealon" to enhance performance, normalize antioxidant status, and support nervous system functions, and "Vesugen" to maintain cardiovascular system functions. The second group served as the control. All participants in the main group took the bioregulators with meals, 1 capsule twice daily for 20 days.

"Vesugen" is a tripeptide composed of lysine, glutamic acid an aspartic acid. It is effective in treating vascular atherosclerosis and erectile dysfunction. During physical exertion, particularly when performing complex coordination exercises, the heart and blood vessels operate under intense conditions. Maintaining the functional activity of the cardiovascular system is crucial for athletes. "Vesugen" can be applied for supporting cardiovascular functions. It is available in both capsule and solution (sublingual) forms. "Vesugen" is administered in doses of 1-2 capsules, 1-2 times a day with meals or 5-6 drops under the tongue 3-4 times a day, 10-15 minutes before meals (Figure 3.6).

23



Α.



В.

C.

Α.



60 CAPSULES OF 0,215 g

C.



545

Figure 3.6 A, B - Dietary supplement «Vesugen» in capsule and sublingual formulations; C - Twodimensional molecular structure of «Vesugen».

"Crystagen" is a tripeptide composed of glutamic acid, aspartic acid, and proline. It stimulate the differentiation and activation of B-cells and macrophages, promotes proliferation, and reduces apopoptosis in immune and stem cells. The tripeptide regulates immune system functions and exhibits antioxidant and stress-protective effects. During physical exertion and psychoemotional stress in athlets, "Crystagen" may be recommended to support the functionality of the immune and antioxidant systems. It is available in capsule and sublingual solution forms. "Crustagen " is administered in doses of 1-2 capsules 1-2 times a day with meals or 5-6 drops sublingually 3-4 times a day, 10-15 minutes before meals (Figure 3.7).

#### Figure 3.7 A, B - Dietary supplement «Crystagen» in capsule and sublingual formulations; C - Twodimensional molecular structure of «Vesugen»

To assess the immune status of the subjects, parameters of the T- and B-cell immune systems were determined, including the levels of natural killer cells (CDI6+ cells), poorly differentiated lymphocyte precursors (CD3+ cells), and mature T-cell subpopulations: CD8+ cytotoxic T-lymphocytes, CD4+ T-helper cells, and CD20+ B-lymphocytes. To detect surface antigens of immune cells (clusters of differentiation – CD), the indirect immunofluorescence reaction method was employed using mono- clonal antibodies.

Following the administration of peptide bioregulators, the number of CD3+ lymphocyte precursors increased by 23%, indicating peptide-induced stimulation of the proliferation of poorly differentiated lymphocytes in the blood of female athletes and contributing to an expansion of the pool of reserve immune cells. Prior to peptide correction, the counts of T-helper cells, cytotoxic T-cells, and B-lymphocytes were slightly reduced in both the main group and the control group.

After the application of peptides, their numbers increased by 22%, 40%, and 23%, respectively, reaching normal values. This effect of peptide bioregulatory therapy may be attributed to both the stimulation of T- and B-lymphocyte proliferation and the induction of differentiation of their CD3+ precursors. The peptides also contributed to a 2.2-fold increase in the proportion of natural killer cells relative to the baseline value, which was at the lower limit of the normal range (Table 3.2).

In addition, peptide bioregulators reduced the level of hydroperoxides in the blood of gymnasts. During the administration of peptide bioregulators, 80% of the athletes did not contract influenza or other acute respiratory viral infections. Following the use of peptide bioregulators, normalization of the levels of immunoglobulins M, G, and E in the athletes' blood was observed, indicating their anti-allergic effect.

"Pinealon" is a tripeptide composed of glutamic acid, aspartic acid, and arginine, which regulated the expression of genes associated with the oxidative capacity of skeletal muscles. PPARA and PPARG, as well as the stress-responsive gene HSP1A1 encoding heat shock protein (Figure 3.8). The increased expression of these genes in female athletes indicates Pinealon's ability to enhance the functional activity of muscles and promote faster recovery between training sessions.



## Figure 3.8

The effect of «Pinealon» on the expression of skeletal muscle genes and the gene encoding heat shock protein.



The effect of peptide bioregulators on the number of various subpopulations of immune cells in the blood of gymnasts.

	Number of cells x 10 <sup>9</sup> /L				
Index	Norm	Control	Application of peptide bioregulators		
Lymphocyte precursors, CD3+	1,34 - 3,09	1,21±0,1	1,49±0,2*		
T-helper cells, CD4+	цц0,83 - 2,11	0,81±0,01	0,99±0,01*		
Cytotoxic T-lymphocytes, CD8+	0,49 - 1,30	0,37±0,02	0,52±0,04*		
Natural killer cells, CD16+	0,12 - 0,76	0,11±0,03	0,24±0,03*		
B-lymphocytes, CD20+	0,21 - 0,62	0,17±0,01	0,21±0,02*		

\*- p < 0.05 – compared to the control parameter

### 3.3. The experience of using polypeptide muscle complex "Gotratix" in sports veteran (rowing and athletics)

The study on the efficacy of the muscle polypeptide complex "Gotratix" (Figure 3.9) was conducted at the Medical Center of the St. Petersburg Institute of Bioregulation and Gerontology [Khavinson V. Kh. et al., 2018]. The study involved 37 veteran athletes aged 40 to 65 years, including 19 men and 8 women specializing in rowing and athletics. Participants in the control group (17 individuals) followed a general training program. Athletes in the main group (20 individuals) took **"Gotratix"** at a dosage of 2 capsules twice daily with meals for 30 days. The efficacy of "Gotratix" was assessed by measuring maximum handgrip strength using a dynamometer for both the right and left hands, as well as by evaluating the standing long jump performance.

Endurance was assessed using a test based on the Harvard Step Test (stepping onto a platform for 5 minutes). Flexibility was evaluated through a forward bend exercise performed while standing on a gymnastic bench. All parameters were measured before the start of the study and one month after the completion of the **"Gotratix"** course.

#### Таблица 3.3. Влияние «Готратикса» на физические качества у спортсменов

	Test	Dynamometry		Length	Step test,	Flexibility	
	Group	Right hand, kg	Left hand, kg	cm	step	cm	
Prior to the	Control	46±1,4	43±1,3	212±6	53±6,3	6,3±2,1	
study	Main	47±2,1	42±1,7	215±4	55±3,1	7,0±1,1	
1 month after	Control	47±1,6	45±1,8	219±6	57±7,5	7,5±1,7	
the end of - study	Main	<b>53±3,9*</b> +13%	<b>48±1,4*</b> +14%	231±3* +7%	58±6,8	9,2±2,1	

\*- p < 0.05 compared to the corresponding indicator before the start of the study.



From Table 3.3, it is evident that the indicators of speed-strength qualities, as measured by dynamometry and the long jump, significantly improved in the main group compared to the baseline values, while the examined control group showed no change from their initial levels. The step-test and flexibility indicators in the subjects taking "Gotratix" demonstrated a tendency to increase compared to the baseline data, although the differences were not statistically significant. During the course of "Gotratix" intake, athletes reported reduced fatigue during training compared to the baseline level and faster muscle recovery after exertion.

A.



В.

#### Figure 3.9.

A – The polypeptide complex of muscle tissue «Gotratix» in capsule form, B – in sublingual drops form (sublingual administration).

## 3.4. The efficacy of "Gotratix" and "Ventfort" in female bodybuilders

Building muscle mass is one of the most important goals for successful participation in competitions. The use of hormonal drugs for this purpose can cause significant harm to athletes' health. At the same time, women engaging in strength training experience relatively slow muscle growth due to their hormonal profile. Therefore, the use of peptide bioregulators, which lack the side effects associated with hormone therapy, is a promising approach in female bodybuilding. Peptide bioregulators are not classified as doping and have been successfully used by the Russian national rhythmic gymnastics team. In gymnasts, peptides targeting blood vessels, the brain, and the immune system reduced the frequency of acute respiratory infections by 80%, improved movement coordination, accelerated post-training recovery, and provided stress-protective effects.

Objective of the study: Evaluating the effectiveness of muscle peptide bioregulators ("Gotratix") and vascular peptide bioregulators ("Ventfort") in women engaged in bodybuilding.

The study was conducted from December 19, 2023, to January 19, 2024, at the ALEX FITNESS club (Ushinskogo St., 14, Building 2, St. Petersburg, Russia) with two individuals engaged in bodybuilding (a combination of cardio and strength training).

The study participants included Maria Buchel (35 years old, height - 167 cm) - a gym trainer, absolute champion of St. Petersburg in classic bodybuilding, silver medalist at the Russian Bodybuilding Championship in the "Women's Physique" category, and winner of running marathons and bench press competitions. Her training goal during this period was to maintain muscle mass: 4-5 strength training sessions per week combined with cardio (30-40 minutes before or after strength training) Natalia Linkova (39 years old, height - 160 cm) - trained under Maria's guidance, bronze medalist in the fitness model category at the Chernozemye Championship (Kursk, 2023) and in the fitness bikini category at the DAthletic tournament (St. Petersburg, 2023). Her training goal was to increase muscle mass: 5 strength training sessions per week combined with cardio (15 minutes before strength training).

To enhance training effectiveness, both women used "Gotratix Lingual" and "Ventfort Lingual" at a dosage of 6 drops sublingually 10–15 minutes before meals, 3 times a day for 1 month.

To assess the effectiveness of the peptide bioregulators, the following parameters were measured: body weight, flexibility assessed through the "bridge" exercise (length – a and height – b) and "forward bend," as shown in Figure 3.10. Endurance was evaluated using a modified "step test," which involved stepping onto a platform with dumbbells until failure. Blood pressure and pulse were measured before and after the step test using a tonometer. All parameters were measured before and after the use of the peptide bioregulators.





Figure 3.10. Flexibility assessment

The choice of "Gotratix" and "Ventfort" to enhance training effectiveness was based on the following rationale. "Gotratix" is a polypeptide complex obtained through extraction from the muscles of young animals. The efficacy of "Gotratix" was demonstrated in a clinical study involving 37 veteran athletes (rowing, track and field) aged 40-64 years. The use of this peptide bioregulator led to improvements in key performance indicators such as the long jump, step test, and flexibility, as well as reduced fatigue and shorter recovery periods after training.

"Ventfort" is a polypeptide complex obtained through extraction from the blood vessels of young animals. It is effective in managing conditions such as arterial hypertension, vascular atherosclerosis, endarteritis, coronary heart disease, myocardial hypertrophy, and myocardial dystrophy. During physical exertion, particularly during cardio exercises, blood vessels operate under intense conditions. Therefore, maintaining the functional activity of the cardiovascular system is crucial during gym training. For this purpose, "Ventfort" can be utilized. The sublingual form of peptide bioregulators was chosen for the study due to its faster onset of action compared to capsules (Figure 3.11).

According to the flexibility assessment in the "Bridge" exercise, this indicator improved by 5-15% in both athletes after the use of peptide bioregulators (Table 3.4, Figure 3.12). In the "Back Arch" exercise, flexibility improved by 47% in Maria and 2.1 times in Natalia after the application of peptide bioregulators (Table 3.5, Figure 3.13).

Based on the step-test results, both athletes demonstrated enhanced strength and endurance under the influence of peptide bioregulators. Maria's number of step-ups increased by 40%, while Natalia's increased by 47%. Notably, Natalia was able to perform the exercise with heavier dumbbells after using the peptide bioregulators: 10 kg instead of 5 kg (Table 3.6, Figure 3.14). Neither woman showed significant changes in blood pressure or pulse rate, which may be attributed to their high baseline level of fitness.

Additionally, the use of peptide bioregulators contributed to an increase in muscle mass for Natalia. After one month of use, her body weight increased from 47.2 kg to 48.1 kg, accompanied by an increase in hip circumference from 84 cm to 85 cm and thigh size from 45 cm to 46 cm, while her waist circumference remained unchanged at 60 cm.





#### Figure 3.11.

В.

A – Polypeptide complex of blood vessels «Ventfort» in capsule form, B – in sublingual drops form (sublingual administration).

#### Table 3.4. Assessment of Flexibility in the «Bridge» Exercise Before and After the Use of Peptide Bioregulators

"Bridge"	Maria		Natalia	
	Length, cm	Height, cm	Length, cm	Height, cm
Before application of peptide bioregulators	80	56	84	60
After the use of peptide bioregulators	76	60	80	69

#### Table 3.5.

## Assessment of Flexibility in the «Back Arch» Exercise Before and After the Use of Peptide Bioregulators

«Back Arch»	Maria	Natalia
Before application of peptide bioregulators	24	14
After application of peptide bioregulators	35	29

#### Table 3.5.

#### Assessment of Endurance in the «Step Test» Before and After the Use of Peptide Bioregulators

"Step Test"			a	
	Load	Index	Pressure, mmHg	Heart rate, bpm
Before application of peptide bioregulators	10kg dumbbells, 20 steps	before the test	127/72	75
		after the test	127/72	74
After application of peptide bioregulators	10kg dumbbells, 35 steps	before the test	133/70	68
		after the test	133/70	55

#### Table 3.6.

#### Assessment of Endurance in the «Step Test» Before and After the Use of Peptide Bioregulators

"Step Test"		Nata	lia	
	Load	Index	Pressure, mmHg	Heart rate, bpm
Before application of peptide bioregulators	5kg dumbbells, 17 steps	До теста	89/50	57
		После теста	87/58	61
After application of peptide bioregulators	10kg dumbbells, 25 steps	До теста	104/72	72
		После теста	110/73	76









Figure 3.13. Performance of the «Step Test»

The use of peptide bioregulators **"Gotratix Lingual"** and **"Ventfort Lingual"** at a dosage of 6 drops sublingually 10–15 minutes before meals, 3 times a day for 1 month, contributes to improved flexibility, endurance, and strength qualities in women engaged in bodybuilding in the categories of "fitness model," "fitness bikini," and "Women's Physique."

## CONCLUSIONS TO SECTION 3

The use of peptide bioregulators "Pinealon," "Crystagen," "Vesugen," "Ventfort," and "Gotratix" contributes to increasing the vitality and performance of athletes by:

- Reducing fatigue;
- Enhancing the body's resistance to physical and emotional stress caused by training processes and competition preparation;
- Improving physical performance;
- Normalizing transaminase activity and exerting an anti-inflammatory effect;
- Reducing the frequency of chromosomal aberrations;
- Lowering biological age (slowing down the aging process);
- Decreasing the incidence of acute respiratory diseases;
- Enhancing muscle recovery after physical exertion and promoting muscle growth.

### 3.5. Protocol for the Use of Peptide and Non-Peptide



## Bioregulators for Athletes

(During muscle mass gain, competition preparation, and post-competition recovery)

#### 1<sup>ST</sup> MONTH:

- Revilab ML09 a complex of short peptides (targeting the immune system, blood vessels, and cartilage), omega-3, carnosine, and antioxidant enzymes to support musculoskeletal functions - 1 capsule in the morning, once daily.
- Revilab ML04 a complex of short peptides (targeting the pineal gland, blood vessels, and eart), omega-3, resveratrol, vitamin PP, and rutin to support cardiovascular function - 1 capsule in the morning, once daily.
- **"Gotratix"** a muscle tissue polypeptide complex. - 2 capsules in the morning, once daily.
- **Revilab Pro Elements** Replenishes deficiencies in vitamins (A, E, D3, B6), micro- and macronutrients essential for collagen synthesis in cartilage and joints, and supports post-training recovery - 1 tablet 2-3 times daily, taken with water (do not dissolve).

#### 2<sup>ND</sup> MONTH:

- "Endoluten" (pineal gland polypeptide complex), "Sigumir" (cartilage and bone tissue polypeptide complex), "Ventfort" (vascular polypeptide complex) - 1 capsule in the morning, once daily.
- **"Gotratix"** a muscle tissue polypeptide complex.- 2 capsules in the morning, once daily.
- Revilab Peptide Collagen strengthens joints and ligaments, provides antioxidant effects. - 1 capsule twice daily.

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## **SECTION 3 LITERATURE**

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## 4. PROSPECTS OF PEPTIDE AND NON-PEPTIDE BIOREGULATORS IN DANCE AND YOGA

Dance and yoga serve as foundational elements for physical and mental well-being, contributing to increased longevity and improved quality of life. Additionally, they offer an excellent form of active leisure, providing a boost of energy and a positive mood. Scientific research highlights that music, dance, yoga asanas and mantras can optimize consciousness, enhance interpersonal relationships, alleviate stress, and influence the recovery process. These practices share significant common ground with the psychogenic basis of traditional and complementary medicine.

## 4.1. Dance: foundation of physical harmony, memory, immunity, and stress relief

It is well-known that aging in both women and men leads to a decline in the synthesis of sex hormones and reduced receptor sensitivity to these hormones. Interestingly, regular dance practice has been shown to slow down this process.

The synthesis of the male sex hormone dehvdroepiandrosterone (DHEA) decreases by 1-5% annually starting from the age of 30, and by the age of 70-80, it reaches only 15-20% of the levels typical for individuals aged 20-30. Similarly, the blood concentration of testosterone, another male sex hormone, declines by more than 50% by the age of 70-80. This phenomenon is observed in both men and women. In women, the reduction in male sex hormone synthesis can lead to decreased physical and mental activity, mood swings, fatigue, thinning and dryness of the skin, and the appearance of wrinkles. After 8 weeks of ballroom dance practice (training 4 times a week for 1.5 hours), participants showed increased blood concentrations of DHEA and testosterone.

This was accompanied by an increase in muscle mass, enhanced collagen synthesis in the skin, improved skin appearance, and overall well-being. Additionally, dance has been found to positively impact immunity. One study demonstrated that regular hugging among dance practitioners reduced the risk of colds after controlled exposure to a weakened respiratory virus [Christensen J. F., et al., 2021].

In a review encompassing the analysis of 1,071 articles, the impact of dance on the volume, structure, and functions of the brain was investigated. Regular dance practice was associated with positive structural and functional changes in the brain, including an increase in hippocampal volume, gray matter in the left precentral and hippocampal gyri, and the integrity of white matter. Functional improvements included significant enhancements in memory, attention, balance, psychosocial characteristics, and changes in the synthesis of neurotrophic factors.

The primary conclusion drawn from this analysis is that dance practices improve the speed of interaction between neurons in the brain (neuroplasticity). When comparing dancers to non-trained individuals, the former exhibited higher neuroplasticity, stronger connectivity between specific brain regions, and thickening of gray matter in the dorsolateral prefrontal cortex. This suggests improvements in working memory, cognitive flexibility, and abstract thinking-functions associated with this brain region. Additionally, dance stimulates the release of serotonin and endorphins, which are responsible for mood enhancement [Murcia C. Q., et al., 2009]. The neurohormonal mechanism underlying the positive effects of dance on well-being is also mediated by the activation of oxytocin and prolactin production during hugging [Christensen J. F., et al., 2021]. Results from a study involving 28 women aged 46-78 who engaged in dance for 6 months showed reduced stress and depression levels, increased muscle strength, bone density, memory, and attention [Stringer M., 2015].

The ability of dance to harmonize a person's internal states, enhance cognitive performance, and foster better relationships with the external world has drawn the attention of psychotherapists. This has led to the development of alternative psychotherapy concepts, where dance therapy courses lasting 3-4 months are successfully used for psychocorrection and psychotherapy [Hackney M.E., et al., 2009].

Literature data indicate a reduction in stress levels following regular dance practice. It is well-known that music exerts multiple psychobiological effects. Of particular interest is the study of the combined influence of music and dance on neurohumoral changes in the body. For instance, one study measured the levels of the stress hormone cortisol and testosterone in the saliva of 22 tango dancers. The most significant reduction in cortisol levels, increase in testosterone levels. and improvement in psychoemotional state were achieved through regular dance sessions with a partner and musical accompaniment. The effects diminished in the following order: dancing with a partner without music, dancing without a partner but with music, and dancing without a partner or music [Piazza J. R., et al., 2018]. Dance sessions were found to reduce cortisol levels more effectively compared to cycling and aerobic exercises. These results were observed by measuring cortisol levels, a marker of chronic stress, in saliva 30 and 60 minutes after dance sessions conducted three times a week for three months. There is also evidence that dance therapy reduced high stress levels in women with breast cancer who underwent radiotherapy. The application of dance practices in these patients lowered cortisol levels, reduced pain and fatique, and improved sleep guality [Karkou V., et al., 2017]. Thus, dance is an excellent choice of physical activity for those seeking to relieve stress, improve mood, memory, attention, and immunity.

The presented data demonstrate that dance is closely associated with the regulation of muscle function, as well as the antioxidant, endocrine, immune, cardiovascular, and nervous systems, and even skin condition. To enhance the effectiveness of dance practice and improve the functioning of the body's key regulatory systems, Natalia Vladimirovna Friedman, a Candidate of Medical Sciences, dermatologist-cosmetologist, expert in anti-age medicine and peptide bioregulation, and researcher at the St. Petersburg Institute of Bioregulation and Gerontology, recommends the use of peptide bioregulators. Natalia Vladimirovna's recommendations are valuable not only as an expert in this field but also as a successful athlete competing in Argentine tango (Figure 4.1).

As previously mentioned, it is essential to protect the heart and blood vessels—this can be optimally achieved with the peptide bioregulator **Revilab ML 04**. Its composition includes peptides of the heart muscle, blood vessels, and the endocrine regulator—the pineal gland.

A comprehensive peptide preparation, **Revilab ML 09**, has been developed for supporting the musculoskeletal system of athletes. Its composition includes peptides of connective tissue (ligaments, cartilage, bones), blood vessels (microcirculation and tissue nutrition), and B-cell immunity—an activator of tissue regeneration speed.

The nervous system is responsible for complex coordinated movements in the body. It can be supported comprehensively through **Revilab ML 03**, which contains peptides for blood vessels, nervous tissue, and, as a bonus, the retina. Visual acuity significantly impacts the quality of performing complex figures and movements, especially in dance.

These preparations can be used either simultaneously (all three Revilab complexes together) at a dosage of 1 capsule in the morning or sequentially—one complex per month. The recommended course duration is from three to six months, depending on the level of physical load.

The support program can be supplemented with essential nutrients for every athlete: **Revilab Peptide Collagen** — a source of easily digestible collagen, **Revilab Pro Elements** — providing an increased supply of vitamins and trace elements. A functional nutrition shake, **Reviform®** cocktail — a source of amino acids, dietary fiber, and vitamins.

Nutraceutical support is recommended two to three times a year for one month (extendable to two to three months if necessary). Functional nutrition can be used continuously as a replacement or supplement to regular meals.

## 4.2. Yoga: harmony of mind, body, and spirit

The foundations of yoga were established in ancient Vedic traditions. Today, there are over 50 types of yoga practices. Yoga is an excellent choice for those seeking harmony with their soul, body, and the surrounding world. Scientific research confirms that yoga, as a health practice, normalizes the functions of the cardiovascular and respiratory systems, enhances endurance, strengthens bones and joints, improves concentration, reduces stress and anxiety levels, and enhances sleep quality.



#### Figure 4.1.

Dance tournament Moscow Winter Cup, December 2023. Natalia Vladimirovna Friedman and dancer/ instructor Andrey Petrovich Panferov—a prize winner and six-time finalist of the World Tango Championship (Mundial) in Buenos Aires, and multiple finalist of the European Tango Championship. Photo: Alexey Sidak.

However, dance, like any other sport, carries certain risks. The physical load on the body increases, particularly on the cardiovascular system [Kotenkova E. D., 2017] and the musculoskeletal system. The toes, ankle joints, and knees are especially vulnerable to increased stress, as some dance movements overload these joints beyond their normal capacity. Another challenge for dancers is that performing complex, coordinated movements requires a well-developed vestibular system and high neuroplasticity of the neurons in the cerebral cortex. Thus, all dancers — both amateurs and professionals - require additional nutritional support. This support can be provided through the use of bioregulatory therapy.

These preparations are natural activators of tissue growth and development processes, so by using them during training, athletes can not only protect themselves from potential injuries but also enhance the quality of their performance.

As previously mentioned, it is essential to protect the heart and blood vessels — this can be optimally achieved with the peptide bioregulator Revilab ML 04. Its composition includes peptides of the heart muscle, blood vessels, and the endocrine regulator — the pineal gland.

For instance, in September 2023, Indian scientists published a meta-analysis involv-

ing 1,820 men and women aged 17 to 75 with type 2 diabetes. It was found that those who practiced yoga were able to lower their blood sugar levels and prevent disease progression [Dhalia B., et al., 2023]. Other studies in 2022 demonstrated that yoga significantly improved the quality of life in men and women with reproductive system cancers [Greaney S.K., et al., 2022; Kaushik D., et al., 2022]. What is the optimal choice to ensure your first steps into yoga practice are both successful and enjoyable

#### YOGA FOR STRESS RELIEF

For individuals experiencing high psychoemotional stress, a fast-paced lifestyle, or those with medical contraindications to intense physical activity, Yin Yoga or Yoga Nidra are excellent choices. These practices balance physical and emotional stress, focusing on gentle, gradual stretching and relaxation. Poses (asanas) are held for extended periods, and the pace of practice is slow. Two to three sessions per week can help reduce stress, improve flexibility, enhance endurance, and provide a sense of inner peace. Yin Yoga was developed by martial arts master Paulie Zink and his student Paul Grilley. Based on the concept of Yin and Yang, the energy Qi (known as life force or prana in Indian culture) circulates through the body via specific channels. Yin Yoga practice clears these channels and brings balance to the individual. It is a smooth practice involving long static asanas—held for 2 to 10 minutes. Yoga Nidra, created by Swami Satvananda Saraswati, is based on research into brain physiology and ancient yogic practices. This method involves sequential work with the body through the brain, leading to a meditative state. Yoga Nidra activates the parasympathetic nervous system, which is responsible for relaxation and reducing anxiety. Another form of yoga aimed at harmonizing the soul and body is Kundalini Yoga. According to this concept, the human body has seven energy centers (chakras), each serving as a "gateway" through which energy ascends. Kundalini practice includes chanting mantras, dynamic kriyas (moving asanas), and meditation.

#### YOGA AS A STRENGTH PRACTICE

This category includes Hatha Yoga, whose name signifies "effort and necessity." The goal of Hatha Yoga is to establish balance (homeostasis) in the body and improve overall health.

Hatha Yoga is based on techniques of proper breathing. This form of yoga is often referred to as the "fusion of the Sun and Moon," as it effectively balances physical condition, mind, and emotions. Hatha Yoga was formalized in the 20th-21st centuries by Matsyendranath and Gorakshanath. Hatha 36

Yoga practices involve performing asanas with locks (bandhas), mudras (specific gestures), and pranayamas (breathing techniques). Examples of beginner asanas are illustrated in Figure 4.2.

For those with good physical fitness and a desire to start practicing yoga, **Ashtanga Vinyasa** or **Vinyasa Flow Yoga** are excellent options. These dynamic practices consist of sequences of asanas that "flow" seamlessly from one to another. In these styles, you perform an asana and hold it while maintaining proper breathing. Ashtanga Yoga, developed by Pattabhi Jois, comprises six series of asanas, with the author suggesting that mastering each series takes approximately five years. The poses follow a strict sequence, with significant emphasis placed on breathing.



Figure 4.2. Eighteen Yoga Asanas for Beginners

For those who value the calming aspect of yoga and wish to reduce the psychological stress load, practices such as **Yin Yoga, Yoga Nidra**, and **Kundalini Yoga** are highly suitable.

We can also support our body at the biochemical level, restoring endocrine balance and neurotransmitter metabolism in the cerebral cortex. This can be achieved with the unique pineal peptide preparation «Endoluten», as well as the nutraceutical «Temero Genero», which provides the body with precursors for many hormones and neurotransmitters. It is recommended to start with the sublingual form of **«Endoluten»** — 8-12 drops under the tongue in the morning. After two weeks to a month, you can switch to the capsule form -1 capsule per day. The course of use can last up to three months. «Temero Genero» is taken as two capsules in the morning and evening («Temero» in the morning. «Genero» in the evening).

Practitioners of strength-based yoga styles (such as Hatha Yoga, Ashtanga Vinyasa Yoga, Vinyasa Flow Yoga, etc.) should not overlook the health of their ligaments and joints. Strengthening connective tissue can be achieved with the help of peptides such as «Cartalax», «Vesugen», and «Sigumir». These preparations are taken at a dosage of 1-2 capsules in the morning. All bioregulators can be combined or taken one at a time over the course of a month. Additionally, if pain or heaviness occurs in overworked muscles and joints after practice, it is recommended to apply «Chondromix» cream to the affected areas. This cream improves blood flow in the discomfort zone and accelerates local tissue regeneration.

Another life hack for those who enjoy voga breathing practices—pranavama. This excellent technique helps restore lung respiratory capacity, boosts energy, and improves metabolic processes in the body. However, many individuals, especially those who have suffered viral or bacterial lung and bronchial infections, may find it challenging to begin these practices. Ideal support can be found in the preparations Revilab SL 06 and Revilab ML 05. The peptides of bronchial and lung tissue included in their composition accelerate the regeneration of alveolocytes in lung tissue and bronchial mucosal cells, helping to restore lung capacity more guickly and enhance local immunity in the nasopharynx. It is best to start with the sublingual form — Revilab SL 06 — 8-12 drops in the morning. A onemonth course is sufficient. Afterward, you can switch to the capsule form. **Revilab ML 05**-1 capsule in the morning before meals. Take for one to three months, depending on the initial condition of the bronchopulmonary system.

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## **5. PSYCHOLOGY IN FITNESS:** TRAINING IS A SUCCESS STORY

#### THE CENTRAL QUESTION: "WHAT IS FITNESS?"

Fitness is a form of physical activity aimed at maintaining good physical condition, which is achieved through balanced nutrition, rest, and physical exercise. But what if this is only half the truth? If we examine the term "fitness" from the perspective of one of its original meanings, we find that it more accurately signifies "suitability, adaptability, and functionality." Sometimes, words carry far more revelations than we realize, but they also harbor myths.

Regarding individuals who engage in fitness, there are two prevalent myths.

#### THEY HAVE SUPER ABILITIES!

According to the first myth, they are perceived as superheroes—unwaveringly inspired by their workouts and fitness goals, who, at the peak of their motivation, overcome any challenges, adhere strictly to their training schedules, and achieve exceptional results. These fitness heroes and heroines captivate with their example, gazing at us from promotional photos and videos, embodying a kind of happy ending within the fitness industry. While their example is commendable, it is too flawless to be authentic.

#### A HERO IS ONLY ONE WHO HAS OVERCOME EVERYTHING

In another narrative of the fitness myth, there is typically an element of drama, emotional turmoil, and a series of extremely unfortunate situations that the fitness hero must overcome in order to occasionally muster the effort to train. After enduring numerous trials, they either sporadically attend workouts, suffering and struggling without a clear system, or they give up entirely, abandoning their goals and watching everything "go up in flames."

At this point, we must acknowledge that the aforementioned myths are most characteristic of beginners and individuals who have had negative experiences not only with fitness training but also with planning in general.

Planning — is a skill that develops through the experience of both successes and failures. The level of planning skills you bring to the fitness gym can reveal much about your history of success. Simultaneously, there is a feedback loop: how you cultivate the experience of suc-

cess in your workouts will permanently alter your personal narrative. Every action marked by success encourages you to scale it, go further, and achieve something greater. This motivation typically leads you to create a plan for subsequent steps. Ensuring the success of each step hones your skills, making it easier and more confident to progress to the next levels. The experience of success fosters the skill of achieving success. Many people have noted that after experiencing success in the gym, they became more successful in their careers and personal endeavors, approached new tasks with greater confidence, and found it easier to plan and adhere to deadlines. This is why most coaches in various sports and choreographic educators believe that physical abilities account for only 50% of success. while the remaining 50% is a manifestation of psychological factors. Therefore, to successfully implement a fitness plan, it is necessary to make adjustments to the organization of training and recovery regimes, as well as to structure the training plan in a way that simultaneously addresses psychological challenges (Malkin V.R., Rogaleva L.N. Psychotechnologies in Sports. — Yekaterinburg, Ural University Press, 2013). Let us examine each of these aspects in more detail.

#### OPTIMAL LEVEL OF MENTAL STABILITY

This is one of the key factors for success in the training process and achieving set goals, such as weight loss, muscle gain, increased strength and endurance, etc. It is important to avoid mental and physical overexertion, which consistently leads to saturation, the emergence of irritation, and even aversion to training, followed by feelings of emptiness and exhaustion of one's capabilities.

Strive to reach an optimal level of psychological stability, where the training system is perceived as a chain of routine actions: packing your gear, putting it in a backpack, going to the gym, changing clothes, training until a state of mild fatigue and inspiration is achieved, and then taking a shower. Instead of planning gym visits and workouts based on time (30-45 minutes) or quantitative parameters (a specific number of exercises and sets), the focus should shift to evaluating the effectiveness of each exercise, the quality of its execution, the growth of strength and endurance, and the enjoyment of success. The emergence of a sense of enjoyment from training will inevitably enhance the value of the training process.

#### FORMATION OF PERSONAL MEANING IN TRAINING

With the recognition of the personal significance of fitness activities, motives of "self-affirmation" become dominant, and an orientation toward the very process of performing exercises begins to prevail. This facilitates the establishment of an optimal level of mental arousal and enthusiasm, wherein both the training sessions and the associated emotional context emerge as a valuable resource for success in other areas of life.

#### "DO OR DIE" OR THE RIGHT TO MAKE MISTAKES?

Here comes into play a crucial psychological principle-the right to make mistakes. You have the right to skip a workout or train at your current capacity. After all, what is procrastination? At its core, it's the fear of failure. This fear often stems from past experiences, frequently rooted in childhood-times when you weren't accepted for making mistakes or for not meeting expectations. The brain then compiles and exaggerates these experiences, triggering a self-sabotage mechanism. Many people avoid crossing a certain threshold because success frightens them more than failure does. Success brings responsibility-to yourself and your own expectations. It means being accountable for what you can achieve. Procrastination. in a way, is a defense mechanism; a person doesn't want others to expect anything from them, yet they also refuse to expect anything from themselves.

No matter how idealized success may seem, every hero or heroine has the right to stumble. The same applies to training—there's no need to chase flawless gym attendance or rigidly stick to a plan. Granting yourself permission to miss a session eases unnecessary anxiety and, more importantly, fosters confidence in your control over the situation. You have the power to steer your own success and occasionally deviate from the plan—consciously choosing what best serves your well-being in the moment.

#### THE SUCCESS COCKTAIL

Olt is an evident fact that, while you are addressing the tasks related to ensuring the psychological 50% of success, your body is doing everything possible to support the remaining 50%. This is facilitated by the neuroendocrine regulatory system, which the most significant potential lies in the omnipotent triad: adrenaline, dopamine, and endorphins. These substances are released in response to physical exertion, enhancing cardiac performance, muscle strength and endurance, metabolic rate, and cognitive functions (such as attention acuity, memory capacity, and speed of thinking). They also increase goal-directed motivation, alleviate pain, and induce a sense of pleasure. This triad represents the body's innate energy booster of extraordinary power—a true superpower!

Caution: it can be addictive. If you find yourself craving extreme activities or thrilling experiences, it is advisable to visit a fitness gym or take on a challenging project instead.

Following this, there will inevitably be an increase in the synthesis of testosterone—a sex hormone present in both men and women, albeit in different quantities. Testosterone promotes muscle recovery and growth after exercise, while also enhancing focus and emotional stability.

It is precisely due to this effect of testosterone that fitness training provides emotional relief after experiencing grief, stress, or other emotionally negative events.

Growth hormone, or somatotropin, is released in response to muscle damage caused by intense physical exertion. It exerts a powerful anabolic and anti-catabolic effect, while also contributing to the reduction of subcutaneous fat storage, enhanced fat burning, and an improved ratio of muscle mass to fat. Additionally, it accelerates tissue repair, including muscle recovery, and improves immune function.

Insulin regulates blood sugar levels and enables the body's cells to utilize glucose as an energy source. Physical activity enhances cellular insulin sensitivity and improves carbohydrate and lipid metabolism. Oxytocin, a peptide hormone, acts as a key counterpart to adrenaline, as post-exercise recovery and relaxation are crucial. To facilitate this, it is essential to rapidly suppress cortisol synthesis—the stress-associated hormone. This suppression not only promotes muscle growth and accelerates tissue repair after intense exertion but also enhances overall training adaptation.

Oxytocin also plays a vital role in social adaptation, increasing receptiveness to social interactions and fostering interpersonal bonding. This explains the high social cohesion observed in group training settings. As evidenced, this hormonal-peptide interplay not only enhances physical and emotional well-being but also regulates motivational and adaptive mechanisms, boosting confidence and proactive goal pursuit. However, individual physiological responses to exercise may vary due to factors such as health status, nutrition, and lifestyle. Despite these variations, the long-term benefits and adaptive potential offered by fitness make it a worthwhile endeavor—one that merits commitment and action.

#### EXPRESS METHOD FOR ENHANCING TRAINING EFFICIENCY USING NOVEL COMPLEX PEPTIDE BIOREGULATORS

Having read the methodological guide, you may have seen that the protocols for using peptide bioregulation to support the body during sports activities can be quite complex and varied. Surely, many want advice—where to start so that it's simple and effective? How can one effortlessly and without unnecessary hassle make their journey into fitness and a healthy lifestyle easy and enjoyable? We have the answer for you—the comprehensive polypeptide bioregulators GPL®Man for men and GPL®Femme for women.

Developed by Peptides Company and the St. Petersburg Institute of Bioregulation and Gerontology, these two innovative peptide bioregulators are based on specialized extracts. These new products embody the concept of physiological restoration of neuroendocrine regulation in conditions of stress, including that induced by physical exertion during training. The unique combination of dosages of various peptide bioregulators in GPL®Man and GPL®Femme ensures the most complete and physiologically balanced recovery effect, while also enhancing workout efficiency.

#### COMPOSITION OF GPL®MAN (65 MG OF PEPTIDES PER CAPSULE):

- Epiphysis peptides (5 mg)
- Cerebrum peptides (10 mg)
- Vascular peptides (10 mg)
- Liver peptides (15 mg)
- Pancreatic peptides (15 mg)
- Testicular peptides (10 mg)
- Alpha-lipoic acid

#### COMPOSITION OF GPL®FEMME (65 MG OF PEPTIDES PER CAPSULE):

- Epiphysis peptides (5 mg)
- Cerebrum peptides (10 mg)
- Vascular peptides (10 mg)
- Liver peptides (15 mg)
- Thyroid peptides (15 mg)
- Ovarian peptides (10 mg)
- Alpha-lipoic acid



Alpha-lipoic acid in the novel polypeptide complexes exerts antioxidant and anti-glycation effects, providing protection against exercise-induced stress. Furthermore, alpha-lipoic acid demonstrates neuroprotective properties and normalizes the synthesis of sex hormones. This is particularly important during the initial phase of training adaptation, when athletes may experience both physical and psychological stress from intense workouts.

The elevated liver peptide content in GPL®Man and GPL®Femme complex bioregulators enhances intensive detoxification and increases the body's responsiveness to other peptide bioregulators.

The GPL®Man complex contains pancreatic peptides, as pancreatic dysfunction (insulin resistance) adversely affects testosterone synthesis in men. Normalization of testosterone production through pancreatic and testicular peptides promotes physiological increases in muscle mass, strength, and endurance during male training. The GPL®Femme complex includes thyroid peptides, given the frequent thyroid dysfunction in women under stress. Combined with ovarian peptide-mediated normalization of female sex hormone synthesis, this provides stress protection and enhances post-exercise recovery and training efficacy in women.

## 6. CONCLUSION. PHYSICAL ACTIVITY AND BIOREGULATORY THERAPY – A FOUNDATION FOR HEALTH, LONGEVITY AND BEAUTY

To achieve a happy, productive, and healthy life while preserving youthfulness, maintaining high levels of physical activity is essential. Individuals may choose activities according to their preferences: gym workouts, park running, dancing, yoga, cycling, and more. However, many face challenges when initiating sports and fitness activities as the body often struggles to adapt to unfamiliar physical loads, structured daily routines, and proper nutrition. Both amateur and professional athletes also encounter difficulties, as competitive sports impose significant stress on the body, depleting its biological reserves.

In this manual, we describe how peptide and non-peptide bioregulators can support training processes. These biologically active compounds help maintain youth, support functions of all organs and systems, promote effective muscle recovery between workouts, and protect the body from stress. The guidelines provide examples of successful applications of peptide bioregulators in athletes practicing complex-coordination and strength sports (rhythmic gymnastics, bodybuilding, judo, rowing, track and field). Based on longterm experience of bioregulator application, the manual outlines usage protocols for fitness beginners and athletes, and provides peptide support recommendations for those engaged in dance and yoga. We hope these recommendations will help achieve training enjoyment, maintain youth and beauty, and promote a healthy lifestyle for many years.