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The proresilients in multimodal programmes for the prevention of premature ageing

Vitautas Rubikas, Tatsiana Piatryshcha, Olga Rozhdestvenskaya, Elena Voronina, Alena Gerois

Vilnius University,
3 Universiteto St., Vilnius, 01513, Lithuania
Corresponding author: Tatsiana Piatryshcha (longtermcare.fmba@gmail.com)

Abstract
Background: Premature ageing is a common process. According to various authors, at least 10-20% of middle-aged people have unfavorable levels of discrepancy between biological and passport age. That is why the preventive direction is actively developing in gerontology. Various substances like the proresilients, for example, are actively studied for their geroprotective properties in terms of their impact on cellular mechanisms of premature ageing. **The aim of the study:** To study the properties of the proresilients in multimodal programs for the prevention of premature ageing. **Materials and methods:** We studied literary figures for 2015-2020 in computer databases, PubMed, Medical-Science, Elibrary, Ceeol, JSTOR, Web of Science, Scopus. **Results:** The proresilients are used in various programs for improving the body and reducing the aging process of cells, reducing oxidative stress and other pathological mechanisms. They act at the level of the cell so they can slow down the destruction of organs and balance systems. This is due to their positive effect on the entire body and the patient's well-being. The proresilients have the criteria of a good pharmaceutical practices and quality criteria of 4G. The application of the proresilients is important in three areas of medicine like cosmetology, anti-ageing and preventive medicine. Age-related skin changes are inevitable, but it is important to take measures to prevent premature ageing. That's why it`s important to use the proresilients to prevent skin changes and premature ageing. **Conclusion:** In conclusion, the proresilients is a new, actively developed group of nutraceutical drugs that can be successfully used in modern health management technologies in multi-modal prevention and rehabilitation programs.
Keywords: proresilients; age changes; age; multimodal programmes

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Introduction. Premature ageing is a common process. According to various authors, at least 10-20% of middle-aged people have unfavorable levels of discrepancy between biological and chronical age [1, 2].

The factor of polymorbidity, that is, the presence of a large number of age-associated diseases in one organism, leads to the development of premature aging syndrome and premature wear of organs and systems. Depletion of vital resources of the organism can also be a trigger for the development of these diseases. This is also an independent cause of the development of premature aging syndrome [3].

In this regard, preventive medicine has been developing more and more in the world. Currently, we are searching for substances and drugs to protect cells from aging, those that have chronoprotective and geroprotective actions and act at the cell level. These drugs include the proresilients [1, 4].

To implement the principles of preventive geriatrics, complex basic therapy should be supplemented with the application of the proresilients to level the processes of premature ageing. Thus, it is important to study the preparations of the proresilients in multimodal programs for the prevention of premature ageing [1, 3, 4].

The purpose of this research is to study the properties of the proresilients in multimodal programs for the prevention of premature ageing.

Materials and methods of research. We studied literary figures for 2015-2020 in computer databases, PubMed, Medical-Science, Elibrary, Ceeol, JSTOR, Web of Science, Scopus.

Results and discussion. Medical and biological sciences are searching for substances that have the properties of preventing the development of premature aging syndrome. The proresilients is a class of substances which inhibit the process of premature ageing at the cellular level [1, 4, 5].

The proresilients are used in various programs for improving the body and reducing the aging process of cells, reducing oxidative stress and other pathological mechanisms. They act at the level of the cell so they can slow down the destruction of organs and balance systems. This is due to their positive effect on the entire body and the patient's well-being [1, 4].

The proresilients have the criteria of a good pharmaceutical practices and quality criteria of 4G [4].

The proresilients are a substance (compound) that has experimentally and clinically proven effectiveness in preventing premature ageing, which have geroprotective preventive activity. They are most effective at the age of 35 years and older [1, 4].

The proresilients can affect the processes of oxidative stress, chronic intoxication in the form of chronic information exhaustion, the development of chronic fatigue, daily lead poisoning with minimal doses, alcohol or smoking.

We also use the term a bioregulatory nutraceutical drug – a drug for prevention and rehabilitation, which includes one or more proresilients, which are natural components of food and medicinal plants [1, 3, 4].

Natural proresilients are normally consumed with food. Life in the modern world involves poor nutrition; frequent use of restrictive diets leads to a lack of nutrients [6].

In fact, the main geroprotector is food, primarily due to the natural antioxidants contained in food and other compounds necessary for the normal maintenance of basic life functions. For example, regular consumption of foods with a high content of flavonoids (berries, coconut, tea, etc.) may contribute to the maintenance of cognitive abilities due to their participation in the regulation of cerebral blood flow, reducing damage to neurons by neurotoxins and circulating inflammatory cytokines. For example, dietary factors are important modifiable risk factors for coronary heart disease. Nutrients (beta-carotene, B9 (folic acid), fiber, vitamins A, B, C, etc.) are useful for the prevention of cardiovascular diseases [7].

There is increasing evidence that natural proresilients and herbal preparations have antioxidant, anti-inflammatory and antiamyloid properties. They are able to regulate mito-

chondrial stress, the activity of antioxidant systems, the activity of neurotrophic factors, apoptosis factors, that is, to influence the main mechanisms of cell ageing [1, 4, 8].

Some researchers are also interested in medicines, food and some plants as a potential source of the proresilients. The application of medicinal plants in gerontology is particularly relevant. The active substances interfere in the metabolism of an ageing body, change the immune system, purify all organs at the cellular level, have a restorative effect, and contribute to the preservation and improving health. The advantages of herbal medicines include a combination of effectiveness and high safety, polyfunctionality and softness of their pharmacological action, low toxicity and lack of drug dependence [9].

Currently, the proresilients are being developed in the Autonomous Non-profit Organization «Research Medical Center "Gerontology" (http://www.gerontolog.info) for scientific generalization of new achievements in the field of gerontology, geriatrics and anti-ageing medicine. The specialists of the Center have created new drugs for improving the profile of ageing and preventing premature ageing syndrome.

The proresilients and bioregulating nutraceutical preparations consist of amino acids, vitamins, mineral compounds and other components necessary for the organism after constant stress, chronic diseases and premature ageing syndrome. They can improve the quality of multimodal prevention and rehabilitation programs for patients and improve the quality of people's lives of different ages. The main proresilients are Energoton, MCM, Cardioton, Beta-alanine, Memoton, Proderma, C2 and others [1, 4].

The application of the proresilients is important in three areas of medicine like cosmetology, anti-ageing and preventive medicine [1, 4, 10].

Age-related changes in the skin begin at the age of 25: regeneration slows down, fibers thin, and elasticity decreases. The violation of circulation leads to a decrease in metabolic processes in the upper layer of the epidermis, a shortage of necessary trace elements and substances. The muscle tissue also undergoes changes: the mimic constriction increases, while its tone decreases, which leads to the formation of wrinkles. There is also a tendency to hyperpigmentation with age, there is a redistribution of subcutaneous fat in the face, which leads to sagging of the cheeks and eyes [1, 4, 11].

Hormonal changes in the body can be also observed after the age of 30, namely, the production of estrogen decreases, which leads to increased dryness of the skin and mucous membranes, a decrease in the amount of mucopolysaccharides, and the appearance of telangiectasias [12].

Age-related skin changes are inevitable. These include: exclusion of bad habits, reducing the influence of oxidative stress, nutritional support, and others. That's why it`s important to use the proresilients to prevent skin changes and premature ageing [4, 13].

In cosmetology we use the proresilients in the main cosmetic procedures like surface peels, biorevitalization, bioreparation, botulinum toxin therapy, thread lifting, laser removal of vessels and others.

In anti-age medicine we use the proresilients in comprehensive prevention and rehabilitation of persons with benign age-related forgetfulness, complex management of age-related hand and foot syndromes, correction of age-related dry skin, multimodal rehabilitation of persons with age-related androgen deficiency, pronounced vegetative manifestations, with climacteric syndrome with pronounced vegetative manifestations, age-associated malnutrition syndrome, comprehensive prevention of osteoarthrosarcopenia, rehabilitation for chronic information exhaustion and chronic asthenia syndrome, comprehensive case management of persons with premature ageing syndrome [1, 4].

In preventive medicine we use the proresilients in seasonal immunomodulation (with seasonal increases in the incidence of acute viral respiratory infections), bionutritional support in the presence of acute respiratory viral infections, maintenance of a comprehensive prevention of atherosclerosis, complex prevention of enthesopathies and

arthritis against the background of starting classes in health-improving physical culture, integrated hepatoprotective, the support of persons with syndromes of dependence on psychoactive substances (nicotine, alcohol), support for restrictive diets, including the periods during religious dietary restrictions, a complex therapy of sleep disorders, with emotional and physical overload, a complex therapy of allergoses, including atopic dermatitis and others [1, 4, 14].

Conclusion. In conclusion, the proresilients is a new, actively developed group of nutraceutical drugs that can be successfully used in modern health management technologies in multi-modal prevention and rehabilitation programs.

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Conflict of interests

The authors have no conflict of interest to declare.

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Information about the authors

Vitautas Rubikas, Scientific Researcher of the Vilnius University, E-mail: llc.gerontology@gmail.com, ORCID: 0000-0002-5228-5832.

Tatsiana Piatryshcha, Scientific Researcher of the Vilnius University, E-mail: longterm-care.fmba@gmail.com, ORCID: 0000-0001-9629-1698.
Olga Rozhdestvenskaya, Cand. Sci. (Medicine), Scientific Researcher of the Vilnius University, E-mail: llc.gerontology@gmail.com, ORCID: 0000-0002-7099-4341.
Elena Voronina, Cand. Sci. (Medicine), Scientific Researcher of the Vilnius University, E-mail: llc.gerontology@gmail.com, ORCID: 0000-0001-6602-3932.
Alena Gerois, Scientific Researcher of the Vilnius University, E-mail: llc.gerontology@gmail.com, ORCID: 0000-0003-3709-4242.