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PHYSIOLOGICAL WAYS TO INCREASE THE ADAPTIVE RESERVES OF THE HUMAN BODY

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Abstract

This article analyzes physiological approaches to enhancing the adaptive reserves of the human organism. The study examines the concept of adaptive reserves, the organism's capacity to adjust to external and internal stressors, and the adaptive mechanisms underlying the functioning of physiological systems. Key physiological pathways for increasing adaptive reserves are identified, including physical exercise, breathing techniques, healthy nutrition, immune strengthening, and psychological stability. In addition, the paper provides scientific justification that improving adaptive reserves enhances fatigue resistance, work capacity, and overall health.

Keywords: adaptive reserves, organismal adaptation, stress tolerance, physical exercise, breathing techniques, immunity, healthy lifestyle, psychological stability, physiological mechanisms.

Introduction

Searching for ways to optimize the vitality of the human organism and to increase its functional reserves and adaptive capacities remains one of the most pressing issues in the biomedical field.



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Studying at a higher education institution objectively requires substantial strain from all functional systems of the organism, because under new socio-economic conditions a multi-level and complex process of adaptation develops during the student years. This process is accompanied by marked tension within the student's compensatory-adaptive systems. Persistent cognitive and psycho-emotional stress, as well as disruptions in work–rest and dietary regimens, often lead to maladaptation and to the development of a range of disorders.

In recent years, the search for methods to enhance the physiological reserves of the human organism has intensified considerably. However, the lack of a rigorous scientific conceptual framework often results in the predominance of empirical approaches. Because the demand for such means is extremely high, their practical implementation frequently outpaces scientifically grounded understanding of their mechanisms of action and conditions of application.

At present, many diverse methods and tools are known that can induce controllable, nonpharmacological changes in bodily functions, increase current work capacity, and improve overall health.

A review of the literature allows nonpharmacological methods for correcting the functional state of the human organism to be classified into three main groups:

1. Rhythmic sensory influences

- transcranial electrical stimulation,
- electroacupuncture,
- electrosleep (electrosone), and others.

2. Methods of voluntary self-regulation of physiological functions

- autogenic training,
- heterosuggestion,
- biofeedback-based self-regulation,



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- image therapy,
 - mental training, and others.
- 3. Auxiliary means for regulating physiological functions**
- functional music and/or light–music complexes,
 - breathing exercises,
 - massage and self-massage, and others.

In practice, one of the most widely used forms of nonmedicamental correction of functional state is guided relaxation. Its various techniques are applied as a means to prevent, correct, or eliminate the adverse effects of emotional stress on the organism.

During relaxation, a trophotropic (hypometabolic) state develops. It is mediated by the parasympathetic nervous system and is characterized by reduced psychophysiological reactivity.

Prolonged relaxation decreases elevated activity in limbic and hypothalamic regions, which is accompanied by reduced anxiety and diminished psychological and physiological responses to stress.

V. S. Lobzin (1980) notes that muscular relaxation is an external manifestation of positive emotions and a general state of calmness and balance. Therefore, achieving muscular relaxation helps reduce or eliminate emotional tension.

In addition, relaxation is accompanied by a marked reduction in afferent and efferent impulsion.

Given the wide range of applications of relaxation therapy, no single universal method of influence can exist. For this reason, each specific case requires a tailored set of techniques.

A number of approaches to achieving relaxation effects are known. These include general influences on the organism—such as various types of baths and functional



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music—as well as specific methods, including progressive muscle relaxation, autogenic training, and various meditation techniques.

E. A. Umryukhin and co-authors (1997) also used a method of controlled thermal–air exposure for relaxation. Its effectiveness lies in the fact that a pulsating stream of warm air directed onto the skin induces positive emotions. This is accompanied by an increase in cardiointerval duration and an enhancement of the EEG alpha index—objective indicators of reduced psychological tension.

One of the key determinants of success in any type of activity is the functional state of the individual performing it. This is fully applicable to the educational process and to the complex, regular intellectual work carried out daily by pupils, students, researchers, and teachers. The speed and quality of acquiring new knowledge largely depend on:

- the level of cognitive work capacity,
- the degree of emotional excitability,
- resistance to various stressogenic physical and psychological factors.

Preventive measures aimed at overcoming neuropsychic strain and ensuring high intellectual performance include programs of autogenic training and heterosuggestive influence.

These methods are based on verbal self-influence, that is, techniques of self-suggestion using verbal formulas combined with imagery. They are implemented against a background of reduced central nervous system activity, in a mild inhibitory state close to sleep.

M. M. Reshetnikov’s (1981) studies on long-term use of autogenic training made it possible to identify significant changes in a range of individual psychological



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indicators among individuals who practice this method regularly. In particular, the author reports:

- a reduction in restlessness,
- decreased anxiety levels,
- improved sleep quality and general well-being,
- positive changes in functional indicators of the cardiovascular system.

Conclusion

Enhancing the adaptive reserves of the human organism is physiologically substantiated and can be achieved through several pathways. Physical exercise, breathing techniques, proper nutrition, strengthening of the immune system, and psychological stability increase stress tolerance and improve work capacity. Therefore, developing adaptive reserves is an important factor that directly affects overall health and longevity.

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