

THE EFFECT OF RADIATION ON THE HUMAN BODY AND METHODS OF PROTECTION

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Abstract

In the modern era of scientific and technological progress, radiation has become an integral part of human activity. It is widely used in medicine, energy, industry, and scientific research. Radioisotopes are applied in the diagnosis and treatment of diseases, particularly in radiotherapy and nuclear medicine, as well as in quality control of materials and the generation of electrical energy. However, despite its undeniable benefits, uncontrolled exposure to ionizing radiation can pose a serious threat to human health and the biosphere as a whole. The key challenge of contemporary society is the responsible and safe use of radiation technologies in the interest of health and sustainable development.

Ionizing and non-ionizing radiation affect cells in different ways, causing DNA damage, the formation of free radicals, and cellular mutations, which in some cases lead to carcinogenesis and genetic disorders. The biological effects of radiation depend on the dose (measured in sieverts, Sv), duration, and type of exposure — whether acute or chronic. **Acute radiation syndrome (ARS)** manifests as severe systemic disorders, whereas chronic exposure may cause delayed consequences, including the development of oncological diseases.

Special attention is also given to problems of environmental radioactive contamination, including the effects of radon, cosmic rays, gamma, and X-rays. Modern methods of dosimetry and radiation shielding ensure monitoring and control of radiation risks, thus contributing to the protection of public health and the sustainable development of society.

Conclusion

Radiation is a powerful force of nature and technology that requires respect and careful handling. Although it provides significant benefits in medicine, energy, and science, uncontrolled exposure to radiation represents a serious threat to human health and the environment. Understanding the nature of radiation, its biological effects, and safety measures is essential for everyone who works with radiation sources or lives in their vicinity.

In conclusion, it should be emphasized that human health can be preserved only through education, strict safety regulations, continuous monitoring, and responsible use of radiological

technologies. Radiation is not an invisible enemy but a powerful tool that must be used wisely for the benefit of humanity.

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