

# EFFECTS OF RADIATION ON THE HUMAN ORGANISM

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**Abstract.** *The effect of radiation on humans is related to damage to the human body exposed to radiation and damage to the genetic apparatus. Radiation enters the human body through the consumption of plant and animal products containing various radiations. Radionuclides can accumulate mainly in various places of the human body - the thyroid gland, liver, bone, and muscle tissues.*

**Key words:** *radionuclide, radiation effect, somatic effects, genetic effects, radioactive element, human organism.*

The effects of radiation on humans are generally divided into two categories. These are:

- 1) Somatic (bodily) - appears in the body of a person exposed to radiation.
- 2) Genetic - is associated with damage to the genetic apparatus, manifested in subsequent generations: these are manifested in the children, grandchildren and more distant descendants of the person exposed to radiation [1,2].

**1 Table.**

Effects of radiation effects on people	
Somatic effects	Genetic effects
Radiation diseases	Gene mutation
Regional radiation damage	Chromosome aberration
Leukemias	
Tumors of various organs	

There are finite difference (deterministic) and stochastic effects. The first occurs when the number of cells that die as a result of radiation, lose their ability to reproduce or function normally, reaches a critical value, and the functions of the affected organs are significantly impaired. Table 2 shows that the function of the affected organs depends on the severity of the disorder and the size of the radiation dose [3].

**2 Table.**

Effects of different doses of radiation on the human body	
Dose (amount of radiation) , Gr	Cause and effect of radiation exposure
$(0.7 - 2) \cdot 10^{-3}$	Annual dose from natural sources
0.05	The maximum permissible dose of occupational radiation per year
0.1	A doubling of the probability of a gene mutation
0.25	A single dose of reasonable risk in an emergency
1.0	A dose that causes acute radiation sickness
3-5	Without treatment, 50% of those affected will die within 1-2 months due to impaired bone marrow cell function.
10 - 50	Death occurs within 1-2 weeks, mainly due to damage to the gastrointestinal tract.
100	Death occurs after a few hours or days due to damage to the central nervous system

The whole population includes not only general healthy working employees, but also all people (children, elderly, etc.) Cosmic of rays intensity of the earth magnet area is also affected does North and southern poles the equator regions than more radiation takes Sea level medium in widths space of rays equivalent dose 4-5

km high space of rays about 10 % organize does Contemporary of airplanes height in flights space radiation the sea from the level one how many ten even high will be (Fig. 1). But, from the sound fast flying on airplanes flight during of speed significant difference because of passenger less to radiation subject [4].

Radionuclides accumulate unevenly in organs. In the process of metabolism in the human body, they exchange atoms of stable elements in various cell structures, biologically active compounds, which leads to high local doses [5-8].

The effect of radiation exposure can manifest itself in a completely different place exposed to radiation. Exceeding the dose of radiation causes the body's immunity to decrease and makes it prone to various diseases. Radiation also increases the likelihood of malignant tumors [9].

Radionuclides enter the body (respiratory and digestive organs), the most strongly irradiated organs, as well as the thyroid gland and liver. The doses absorbed in them are 1-3 times higher than in other organs and tissues. According to the ability to concentrate absorbed decomposition products, the main organs can be placed in the following order [10]:

**thyroid > liver > skeleton > muscles**

Thus, up to 30% of absorbed decay products, mainly radioisotopes of iodine, accumulate in the thyroid gland.

According to the concentration of radionuclides, the second place after the thyroid gland is the liver. The radiation dose received by this organ mainly depends on  $^{99}\text{Mo}$ ,  $^{132}\text{Te}$ ,  $^{131}\text{I}$ ,  $^{132}\text{I}$ ,  $^{140}\text{Ba}$ ,  $^{140}\text{La}$  radionuclides [11].

Iodine isotopes deserve special attention among man-made radionuclides. They have high biological activity, are able to actively participate in the biological cycle and move along biological chains, one of whose links can be a person.

In recent years, the processes of interaction of ionizing radiation with tissues of the human body have been studied in detail. As a result, radiation safety standards are being developed that reflect the actual radiation effects in terms of harm to human health.

In conclusion, we can say that various radionuclides accumulate in different parts of the human body. Radionuclides accumulate mostly in the thyroid gland, liver, bones and muscles of the human body. Radionuclides enter the body mainly through consumption of irradiated plant and animal products. Changes and swellings appear in different parts of the body under the influence of radiation. Under the influence of this, the immunity of a person decreases, which leads to the appearance of various diseases, including thyroid cancer and breast cancer.

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