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On the Negative Influence of Radiation on the Human Body

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Abstract: *This article discusses the spread of radiation on the globe, about the potential danger of nuclear power in the modern world, about the tests and consequences of nuclear weapons in the last century, about territories with a high level of radiation background. The regions of the globe with a high level of radiation were also studied, about the danger associated with radioactive contamination on the territory of the Tashkent region, about the negative effects of radiation on the human body, and recommendations were given on protection against radiation.*

Key words: *Level of terrestrial radiation, hot spots, sources of ionizing radiation, negative aspects of radioactive substances, radioactive preparations, internal and external exposure, radioactive fallout, watches with a luminous dial.*

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INTRODUCTION

Thanks to the phenomenon of radioactivity, a significant breakthrough was made in the field of medicine and in various industries, including energy. However, at the same time, the negative aspects of the properties of radioactive elements began to manifest themselves more and more clearly: it turned out that the effect of radiation on the human body can have tragic consequences.

The more information was received about the effect of radiation on the human body and the environment, the more contradictory opinions became about how much of a role radiation should play in various spheres of human activity.

Every inhabitant of the Earth over the past 70 years has been exposed to radioactive fallout caused by nuclear explosions in the atmosphere in connection with nuclear weapons tests. The maximum number of these tests took place in 1954 – 1958 y. and in 1961 – 1962 y. A significant part of the radionuclides was then emitted into the atmosphere, quickly carried over long distances in it, and slowly descended to the surface of the Earth for many months. The fission processes of atomic nuclei produce more than 20 radionuclides with half-lives ranging from fractions of a second to several billion years. The second anthropogenic source of ionizing irradiation of the population is the products of the functioning of nuclear power facilities. Although, during normal operation of a nuclear power plant, emissions of radionuclides into the environment are insignificant, the 1986 Chernobyl accident showed an extremely high potential hazard to nuclear power. The global effect

of the radioactive contamination of Chernobyl is because during the accident, radionuclides we reemitted into the stratosphere and within a few days were recorded in Western Europe, then in Japan, the USA and other countries.

LITERARY RESEARCH

The evolution of life on Earth since the emergence of its simplest forms occurs against the background of radioactive radiation. For millions of years, this natural background remains practically constant. However, thanks to man-made activities, humanity is constantly exposed to radioactive exposure. Due to the radioactive contamination of the environment, the use of radioactive drugs in medicine and technology, every person on the planet is, to one degree or another, exposed to artificial radiation. The effects of radiation on the human body can be different, but it is usually negative. In low doses, radiation can become a catalyst for processes leading to cancer or genetic disorders, and in high doses it often leads to complete or partial death of the body due to the destruction of tissue cells [1].

It is known that the levels of terrestrial radiation are not the same in different regions of the globe. As a rule, coals, phosphorus's, oil shale, some types of clays and sands, including beach ones, are often characterized by high radioactivity. According to Nebel B, there are several hot spots where radiation levels are much higher. These include several areas in Brazil: the vicinity of Posus de Caldas and the beaches near Guarapari, a city with a population of 12000 people, where approximately 300000 holidaymakers come to vacation annually, where radiation levels reach 175 and 200 millisieverts per year, respectively. This exceeds the average by 500 - 800 times. A similar situation has developed on the southwestern coast of India, a similar phenomenon due to the increased content of thorium in the sands. The above territories in Brazil and India are the most studied in this aspect, but there are many other places with high levels of radiation, for example, in France, Nigeria, Madagascar, the Trans-Urals, the Polar Urals, Western Siberia, the Baikal region, the Far East, Kamchatka, North-east of Russia [2].

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According to the author [3], the average dose of radiation to the population of the most contaminated regions of the Soviet Union in 1986–1995 y. was 3 times lower than due to the natural background radiation (Table 1). In some areas of the Earth (India, Africa), the population in 30 generations receives a dose from the natural background, more than 20 times higher than the dose in the resettled regions of Ukraine, Belarus and Russia and so far, no harmful effects of such increased exposure have been detected. Table 1 shows the average radiation doses to the human body due to the release of the emergency reactor and natural sources of radiation.

table 1

Population	Dose, mSv	Duration radiation exposure
Emergency release		
Residents of the most polluted regions of the Soviet Union	50-60	1986-1995
Residents of other polluted regions of the Soviet Union	6-20	1986-1995
Participants in the liquidation of the consequences of the Chernobyl accident	170	1986
	130	1987
	30	1988
	15	1989
135 thousand people evacuated from the 30 km zone around Chernobyl	15	
Residents of Europe	0.1-1.1	
Asian residents	0.006-0,12	The whole life (70 years)
Residents of North America	-0.003	
Residents of Poland	0.3	The whole life (70 years)
	0.9	
Natural background		
In the world	168	The whole life (70 years)
In regions with a high level of natural radiation (typical dose)	1200	The whole life (70 years)

Zones of increased radioactivity are unevenly distributed on the territory of the Republic of Uzbekistan. They are known in the mountainous and foothill environs, they mainly include the territories of the Tashkent, Namangan and Surkhandarya regions. It is in these regions that coal and other minerals are mined by open and mine methods. Threats associated with radioactive contamination in the territory of the Tashkent region were identified in 1995.

This was due to the work on stripping and mining of coal by the open method at the new Appartak site located in the northeastern part of AngrenAkhangaran Valley, where the radiation level exceeded the MPC by several tens of times. In this regard, the risk of possible radioactive contamination in these places and nearby environs has increased. Considering that the work carried out to eliminate the consequences of the emergency is too expensive, measures were urgently taken to warn the population in the adjacent territories about the impending danger, in particular about the unsuitability of coal from new deposits for domestic use.

Because of the preventive measures based on scientifically grounded emergency warning systems, a possible process of radioactive contamination of the area and adjacent territories, as well as the population of Angren was prevented. Based on these data, the government of the republic, the Republican Committee for Environmental Protection, as well as the Ministry of Emergency Situations of the republic drew up a joint plan for the disposal of radioactive coal and a certain amount of adjacent rocks from the Appartak site of the Angren coal deposit. Since 1999 to 2000 over 100 000 tons of radioactively charged coal and rocks were removed and buried in a specially designated dump [4].

Radiation is created by radioactive substances or specially designed equipment. The very same radiation, acting on the body, does not form radioactive substances in it, and does not turn it into a new source of radiation. Thus, a person does not become radioactive after an X-ray or fluorographic examination. By the way, an X-ray (film) also does not carry radioactivity.An exception is a

situation in which radioactive drugs are deliberately introduced into the body (for example, during a radioisotope examination of the thyroid gland), and the person becomes a source of radiation for a short time. However, drugs of this kind are specially selected so as to quickly lose their radioactivity due to decay, and the radiation intensity rapidly decreases [5].

It should be noted that there is no information in the world literature on the harmful effect of small doses of radiation - it has not been found. There is proven information on experimental and epidemiological observations that small doses are favorable for living organisms (as well as, for example, magneto therapy with weak fields, which is widely used in medicine).

The data of epidemiological studies [6] on the victims of atomic bombings showed that at a radiation dose of 5–100 mSv, the number of leukemia diseases decreases. In cases where there are no proven statistically significant risks of radiation carcinogenesis, the same has been confirmed for cancer cases by numerous studies of nuclear workers in the US, UK and Canada (95,673 people were examined for about 30 years)

As noted in the materials [7] in the cities of Hiroshima and Nagasaki, people exposed to low radiation lived longer lives than the post-war population of Japan, while the descendants of these people did not have genetic diseases

The work [8] systematically outlines the foundations of radiation ecology. The physical properties of ionizing radiation, their interaction with matter, various sources of radiation, radiation accidents at military and energy facilities, environmental pollution, the medico-biological effect of radiation at various levels, rationing, protective measures, non-ionizing radiation, medical

In the monography[9] summarizes the Commission's conclusions “International Chernobyl Project”, which was attended by 200 experts from 23 countries under the auspices of the IAEA (1990), which stated, “Measures to relocate and restrict food products should be taken on a smaller scale. The extent to which measures are taken is not justified in terms of radiation protection”. The maximum dose for taking measures was adopted at 1.0 mSv (1 ber = 0.01 Sv).

As you know, the main contribution to pollution from artificial sources is made by various medical procedures and methods of treatment associated with the use of radioactivity. The main device that all clinics and medical institutions can not do without is an X-ray machine, but there are many other diagnostic and treatment methods associated with the use of radioisotopes.

The exact number of people undergoing such examinations and treatment and the doses received by them is unknown, but it can be argued that for many countries the use of the phenomenon of radioactivity in medicine remains almost the only technogenic source of radiation

CONCLUSION

It should be noted that in addition to the above sources, there are some building materials characterized by increased radioactivity. Among such materials are some varieties of granite, pumice and concrete, in the production of which alumina, phosphogypsum and calcium-silicate slag were used. There are cases when building materials were produced from nuclear waste, which contradicts all standards. Natural radiation of terrestrial origin is added to the radiation emanating from the building itself. The easiest and most affordable way to at least partially protect yourself from radiation at home or at work is to ventilate the room more often.

In addition, there are a huge number of commonly used items that are a source of radiation. This is, first of all, a watch with a luminous dial, which gives an annual expected effective equivalent dose, which is 4 times higher than that caused by leaks at nuclear power plants, namely 2000 people. - Sound. An equal dose is received by workers of the nuclear industry and the crews of airliners.

Radium is used in the manufacture of such watches. The greatest risk is, above all, the owner of the watch.

In conclusion, we would like to note that the geography of the distribution of the level of terrestrial radiation is not the same in different regions of the globe. For a correct understanding of the problem of radiation contamination, it is necessary to have not fragmentary data, but a clear picture of the whole picture. This suggests that we do not have the right and ability to destroy the main source of radiation, i.e. nature, and also we cannot and should not give up the advantages that our knowledge of the laws of nature and the ability to use them give us.

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