**Title: ECOLOGY-GENETICALLY EVALUATION OF RADIATION EXPOSURE ON THE ENVIRONMENT, PUBLIC HEALTH OF CONTAMINATED AREAS**

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**Abstract**

This work presents the results of expeditionary and laboratory research to assess the risk of impact of the landfill on biota and public health. The objects of study are the territory of the west part region of the Republic of Kazakhstan adjacent to the Kapustin Yar test site. The generally accepted research methods were used: standard sampling methods; radiological, atomic adsorption spectrophotometry, cytogenetic (chromosomal, micronucleus, molecular genetics (DNA analysis). Measurements of radiation activity by gamma radiation showed that along the perimeter of the surveyed territory of the test site and in nearby settlements, the radiation level is in the range of 0.06–0.014 μSv/h.. The absolute maximum 0.73 μSv/h - was recorded at the points of missile impact in the Kaztal district. Cytogenetic studies carried out using a micronucleus test in fish and human revealed erythrocyte disorders in the studied species, So, anacytosis and poikilocytosis are degenerative phenomena and show functional insufficiency of hematopoietic organs, and are also observed in anemia. Along with the above pathologies has found, a displacement of the nuclei to the periphery (arising from swelling). Similar results we obtained during chromosome analysis in somatic cells in animals and humans. A significant excess of the frequency of cells with various types of aberrations was found than the generally accepted level of spontaneous aberrations. The frequency of dicentrics per cell, which is a proven indicator of the mutagenic effects of radiation, exceeds the results of a study of intact groups of people and the spontaneous level of dicentrics (0.61 + 0.3 x 10 per cell, 3.73-15.83 x 10 per metaphase), The population in this area is chronically exposed to low doses of radiation. Molecular genetic studies by restriction analysis methods of peripheral blood DNA of people from the polygon area showed that the distribution of the mutational genotype (Trp / Trp) of the XRCC1 Arg194Trp gene is only 1.7%, and the XRCC1 Arg399Gln (Gln / Gln) gene is 8.6%, XRCC3 Thr241Met - (Met / Met) 7.0% and XPD751 Lys751Gln - (Gln / Gln) 5.2%. These data are largely consistent with the data of other researchers. For example, Met / Met genotype is less common in different populations, i.e. among Europeans, the frequency of this genotype is 1.7% and Asians - from 0 to 1.2%. There is also a manifestation of polymorphism of DNA repair genes (XRCC1 Arg194Trp, XRCC1 Arg399Gln, XRCC3 Thr241Met, XPD751 Lys751Gln) with the development of various diseases and the distribution of genotypes of the studied genes in residents of Western Kazakhstan living near radiation-contaminated areas. In general, in the region there is an unsatisfactory state of health of children and women, especially of fertile age, a high level of primary morbidity, maternal mortality. They showed an increase in the risk of ecologic diseases in persons with severe genome instability. In the patients we observed with hereditary-degenerative diseases of the nervous system, with congenital malformations, chromosomal abnormalities, pronounced cytogenetic abnormalities were revealed, which indicates a negative effect of chronic exposure in low doses on the genetic apparatus and health of the population from the areas adjacent to the test site. A schematic map of the surveyed territory has been drawn up, where the places of pollution are indicated. As follows from the given schematic map, the maximum accumulation of radionuclides K40, Ra226, Th232 in environmental objects is noted. Moreover, in all surveyed areas, the maximum accumulation of K40 is observed both in the soil and in plants. An increased level of pollution is observed in certain areas of the Bokeyordinsky (Khanordasy, Saykyn and Bisen places) and Zhanibeksky (Bozai and Konys places) dustricts. Relatively low level of contamination with radionuclides in Kaztalovskiy (Seksenbay village and adjacent territories to Bozoi places) area..