

Biological sciences

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**Viktor Sirenko**

M.Sc. in Physics and Mathematics

Independent researcher

## **GENETIC MUTATIONS PROBABILITY REDUCTION BY MEANS OF “HEAVY” WATER CONSUMPTION**

**Summary:** The experiment for check of a hypothesis of the quantum tunneling nature of genetic mutations and decreasing the probabilities of genetic mutation diseases by increasing the concentration of heavier atom isotopes in the molecular structure of DNA (for example, by consuming “heavy” water) is offered.

**Keywords:** oncological disease, genetic mutations, quantum tunneling.

In the present article, the model of Vogelstein and Kinzler [1, pp. 789-799] is used as the model of oncological disease appearance. This model emphasizes that cancer is ultimately a disease of damaged DNA, composed of a series of genetic mutations that can transform normal cells to cancerous ones.

The basis of the proposed method of decreasing the probability of genetic mutations, thus preventing the appearance of a tumor, is a hypothesis about the quantum nature of genetic mutations. In particular, during the DNA replication process, the solitary nuclei of hydrogen atoms hydrogen from one of the helices passes to the other helix via quantum tunneling. This transition changes nucleobases of the DNA, resulting in a genetic mutation. Hereafter, replication occurs with the changed DNA, which contributes to the transformation of the normal cell to a cancerous one.

As the quantum tunneling probability decreases quickly, whereas the mass of the tunneling particle increases  $\sim \exp[-\frac{1}{\hbar} \int_{x_0}^x \sqrt{2m(V(x) - E)} dx]$  [2, p. 549], it can be concluded that increasing the nuclear mass of the DNA atoms (for example, if an atom of hydrogen is replaced with an atom of deuterium) will lead to a decrease in quantum tunneling probability. Following the supposition of the quantum nature of genetic mutations, such a decrease in the probability of quantum tunneling will lead to a decrease in the probability of genetic mutations and, as a result, a decrease in the probability of the appearance of diseases caused by such genetic mutations (including oncological diseases).

The main objective of the research is theoretical, based on the hypothesis of decreasing the probabilities of genetic mutation diseases by increasing the concentration of heavier atom isotopes in the molecular structure of DNA (for example, by consuming “heavy” water), as well as the experiment proposed for such confirmation. In particular, part of a previously described experiment should be repeated [3, pp. 1- 266], involving a 2-year study on male F344/N rats with 1.5% aloe vera whole-leaf extract. The experiment could be conducted on two groups of male rats, with 48 specimens in each group, one group consuming aloe vera whole-leaf extract with normal water while the other consumes aloe vera whole-leaf extract with heavy water (with controls set-up in the same way as in the above mentioned study). If the frequency of oncological diseases showed a statistically significant decrease in the group of rats that consumed heavy water, compared with the group consuming normal water, such results could be seen as partial confirmation of the effectiveness replacing DNA atoms with heavier isotopes (for example, consumption of heavy water) to prevent genetic diseases including cancer. Furthermore, such results could be seen as indirect confirmation of the quantum tunneling nature of genetic diseases.

**References:**

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