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ГЕННАЯ ТЕРАПИЯ: РИСКИ И ПРЕИМУЩЕСТВА

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Генная терапия - метод лечения, направленный на изменение генетического материала человека с целью устранения или предотвращения заболеваний. Она имеет потенциал для лечения наследственных заболеваний, рака и иных серьезных аббераций организма. Однако, генная терапия также имеет риски, требующие особого внимания.

Ключевые слова: Генная терапия, опухолевые заболевания, генная инженерия

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GENE THERAPIES: RISK AND BENEFITS

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Gene therapy is a treatment method aimed at changing a person's genetic material in order to eliminate or prevent diseases. It has the potential to treat hereditary diseases, cancer and other serious aberrations of the body. However, gene therapy also has risks that require special attention.

Key words: Gene therapy, tumor diseases, genetic engineering

Gene therapy is an innovative approach to the treatment of various diseases based on changing the genetic material of organisms. This method can have significant benefits for patients suffering from genetic, oncological diseases and other conditions that are not amenable to traditional treatments. However, like any other treatment method, gene therapy has its risks and limitations.

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Gene therapy using E. coli bacteria is one of the promising methods of fighting cancer. This method is based on the use of genetically modified bacteria capable of releasing therapeutically beneficial substances that inhibit the growth and division of cancer cells.

The method of using E. coli bacteria in cancer gene therapy includes several stages: genetic modification of E. coli, cultivation of bacteria, introduction of bacteria into the body, control, and monitoring of the patient's condition.

It is important to note that the use of modified E. coli in cancer gene therapy is still at the research and development stage. Additional studies are needed to evaluate the safety and effectiveness of this treatment method. In addition, it is necessary to consider the possible side effects and risks associated with the use of these bacteria in the human body [1].

Speaking about the risks of using gene modification technology, we mean the unpredictability of changes in genetic material. Thus, a new DNA sequence embedded in human genes is likely to lead to the development of malignant neoplasms and a decrease in the activity of the immune defense.

If the therapy is aimed at working with cells of the immune system, the most likely and undesirable consequence may be hyperactivation of cells of this system, which can damage healthy ones.

There is a problem with the perception of target cells, because of which a genetically modified organism begins to attack, destroy, and inhibit the activity of standard cells.

It should also be borne in mind that modern gene therapy provides for the possibility of using not only the previously mentioned bacteria, but also the viral vector. However, it is important to consider that when they are introduced into an organism with weakened immunity, difficulties may arise with subsequent work with viruses [2]. So, in 2003, the FDA (Food and Drug Administration) decided to temporarily discontinue clinical trials, during which a group of retroviruses on blood stem cells was used, since 2 out of 10 subjects initially suffering from combined immunodeficiency had the development of leukemia. The reason was the activation of the oncogene by a modified virus. At the same time, it is important to mention that already in April 2004, the FDA, for the successes achieved in gene therapy, relaxed the ban [3].

To date, gene modification is possible not only at the level of microorganisms, but also of macroorganisms. Thus, in 2022, the international recommendations of the World Health Organization (WHO) on the introduction of editing human gene structures for the purpose of treatment were published. They were formulated based on the principles of safety, effectiveness, ethics and consider scenarios for the use of gene therapy for the treatment of genetic pathologies [4].

Overall, genetic engineering has huge potential to improve people's lives. However, it also has its own risks and limitations that need to be considered and controlled. It is important to conduct thorough safety studies and assessments before using new genetically modified organisms. It is also necessary to ensure transparency and public awareness of the risks and benefits of genetic engineering to ensure its safe and ethical use.

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