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CURRENT PROSPECTS FOR CELL THERAPY

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In recent years, revolutionary discoveries have been made in the field of immunology, which implement the latest approaches to the diagnosis and treatment of animals and humans in various pathologies. Significant advances have been made by scientists in the field of oncology, where cell therapy technologies are increasingly being used (Wang et al., 2019).

To date, medical biotechnology has equipped practitioners with a number of cellular engineering tools that allow the use of specific immune defense functions with greater potential in real clinical settings (Maude et al., 2019; Zhelavskyi, 2019).

The *aim* of the review of our work is to make a scientific search for new reliable information on cell therapy.

The essence of the latest biotechnological techniques in cancer immunotherapy is that the doctor "adjusts" the body's immune system to identify and destroy cancer cells. Numerous studies confirm that inhibitors of immune checkpoints are the optimal approach to immunotherapy, as the immune system itself "prepares" for effective cancer control. The latest methods of treatment of patients with oncogenic pathology, which are based on the management of cytotoxic activity of T cells, are becoming increasingly important in medical practice.

This cell technology is carried out as a method of modifying the receptors of immunocompetent cells, and using the receptor structures of chimeric antigens. It is well known that lymphocytes are able to migrate throughout the body, using specific receptors to recognize foreign, mutated and oncogenic cells, as well as trigger a cascade of immune responses aimed at destroying the pathogen. Such censorship functions are possessed by a subpopulation of cytotoxic T cells.

In the oncogenic process, the altered cells can "hide" from immune cells, which leads to the development of the disease. Today, the latest techniques make it possible to recognize oncogenic cells, in particular using dendrocytes, which are a kind of migrating spy cells (The Nobel Prize in Physiology or Medicine 2011 Ralph M. Steinman "For his discovery of the dendritic cell and its role in adaptive immunity").

Dendritic cells absorb and cleave proteins, as well as transfer adsorbed protein components of MHC II. Antigen presentation by active dentrocytes with T-lymphocytes occurs directly in the lymph node.

After that, activated T-killers actively multiply and form a specific clone of anti-cancer cells. In the future, cloned T-killers (on the surface of which there are protein molecules MHC I) begin to migrate throughout the body in search of oncogenic target cells. Upon recognition, the T-killer initiates apoptosis (programmed death) of the oncogenic cell.

Chimeric antigen receptor (CAR) T-cell therapy technology is becoming increasingly important in oncology, enabling clinicians to genetically reprogram patients' own immune cells and direct them to search for and attack cells with oncogenic changes. The essence of the technique is to conduct preclinical incorporation

"training" of immunocompetent cells, aimed at stimulating their proliferation with the subsequent introduction of cell culture to the patient.

Clinicians claim that the advantage of CAR therapy is the ability of inoculated immunocompetent cells to further actively multiply in the patient's body and potentiate their own immune mechanisms of antitumor protection.

Treatment of patients using the TCR Engineered T Cells method is also promising. The essence of cell therapy is to use specific T-lymphocytes, which on their surface contains a receptor (TCR), which is a complex of integral proteins of the membrane. Stimulation of TCR T lymphocytes occurs with the participation of MHC molecules, which is a necessary condition in the antigen presentation of oncogenic cells.

Also noteworthy are the studies of James P. Allison and Tasuku Honjo (The Nobel Prize in Physiology or Medicine 2018 was awarded jointly to James P. Allison and Tasuku Honjo "for their discovery of cancer therapy by inhibition of negative immune regulation). proteins that block the immune system in oncogenic diseases. Their research is based on fundamentally new approaches to managing the inhibitory potential of the immune system to attack the tumor.

Thus, the use of the latest developments in the field of clinical immunology allow researchers to fundamentally change and improve methods of diagnosis and treatment of patients with various pathologies.