

## NEWEST DEVELOPMENTS OF IMMUNOTHERAPY OF CANCER

Chatchenko A.V.

Scientific supervisor: associate prof. Geyderikh O.G.

National University of Pharmacy, Kharkiv, Ukraine

microbiology@nuph.edu.ua

**Introduction.** For today the problem of treatment of patients with malignant new formations remains actual, that predefined both high by morbidity and insufficient efficiency of therapy. Reason is covered in that the traditional methods of treatment (surgery, ray and chemotherapy) almost attained the limit of the development and for the last decades substantially did not improve the indexes of survivability of patients of oncologic type. Other substantial factor of braking of efficiency of traditional antitumoral therapy is natural or purchased medical resistance of tumour's cells. Possibly, it stipulated growth of interest of researchers to the methods of biotherapy, in particular immunotherapy, patients with a cancer.

**Aim.** To analyse modern information, in relation to new approaches in treatment of patients with oncologic pathology.

**Materials and methods.** An analysis of scientific literature and results of researches is in the area of oncology and immunology.

**Results and discussion.** One of the perspective going near the decision of problem of treatment of patients with a cancer there is application of antitumour vaccines, made on the basis of tumour-associated antigens (TAA) the action of which is based on forming of specific reactions of antitumour immunity. But majority of TAA is had low immunogenicity which predetermines the necessity of search of various ways of its increase. By other method an increase of immunogenicity of antitumour vaccines is the use of xenogeneic material. Perspective at that rate there are embryonic albumens. It is known that they contain areas, homological to such which enter in the complement of tumour albumens. The use of antigen similarity of cancer and embryo fabrics can become promising direction for development of the effective going near immunotherapy of tumour illness. A large value in carcinogenesis has immunosuppression. It is experimentally set that the T-suppressor-cell repress T-killer activity and assist development of cancer of skin for mice. Origin of lymphadenoma of Berkita at infecting of B-lymphocytes by the virus of Epshteyna-Barr, for certain, also related to the action of suppressors against T-killers. Some scientists express opinion, that a cancer is investigation of immunodeficiency, that is why large attention gets immunotherapy. But determination of that link of immunity, which is low-spirited for a concrete patient, is a difficult enough task. In modern oncology the immunotherapy is widely used together with other methods of treatment. In the last years certain directions appeared at immunotherapy of cancer: activating of cells of the immune system of patient and introduction of them is in tumour fabrics (T-killers are activated by interleykine-2 on occasion cause the defeat of tumour); use of cytokines of IF-, IF-, IL-2, TNF end al; application of monoclonal antibodies, in a that number conjugated with radionuclides or cytostatics for early diagnostics and treatment of cancer; development of vaccines on the basis of tumour cells, hyposthenic chemical agents or irradiation, and also plugging in these tumour cells of genes of cytokines, by the methods of the gene engineering; the use of antiidiotypic serum is with the purpose of neutralization of antibodies which block neoantigens; application of immunomodulators of bacterial origin, especially derivatives of peptidoglycan and lipopolysaccharides, for induction of synthesis of factor of necrosis of tumours. Usually the immune system independently finds and destroys cells which mutate. By such method an organism does not give to propagate oneself cells-mutants. However much cancer cells can repress this mechanism of defence, that allows a tumour quickly to grow and deprives the organism of possibility to contest with it due to own immunity. Exactly Nobel laureates from medicine of 2018 got busy the searches of methods of counteraction these properties of cancer cells. They are found out reasons of loss of anticarcinogenic activity immune cells and found the methods of counteraction. The member of the National academy of sciences of the USA, immunologist James Ellison, devoted key works the searches of methods of fight against a cancer, for which got over 30 rewards in the USA and in the whole world. He studied the squirrel of CTLA-4, attracted in activity of the immune system and found out, that blocking of this albumen in the organisms of animals with cancer

diseases resulted in activating of anticarcinogenic answer of organism and diminishing of tumour. At the same time his colleague is Japanese immunologist Tasuku Khondze – employee of the National academy of sciences of the USA – opened the receptor of PD-1 (Programmed Cell Death Protein-1) on-the-spot lymphocytes, activating of which results in suppression of their activity. Lymphocytes are able to fight, in particular, with cancer cells, and consequently blocking of PD-1 also allowed to strengthen anticancer activity of the immune system. Both researches allowed to create the new going near therapy of cancer without the use of radio- and chemotherapy, which was named a «immune checkpoint blockade». On the basis of researches scientists developed preparation of «Ipilimumab», which contains antibodies which block CTLA-4. Preparation was approved to the use against a melanoma. And also preparation of «Nivolumab» with antibodies to Pd-1, which will use against a melanoma, cancer of lungs, kidneys and other types of cancer.

**Conclusions.** All is listed above testifies to large potential and prospects of immunology in the decision of problem of cancer.

## USE OF BOTULINUM TOXIN FOR MEDICAL AND COSMETIC PURPOSES

Deineka A. S.

Scientific supervisor: ass. prof. Dubinina N.V.  
National University of Pharmacy, Kharkiv, Ukraine  
microbiology@nuph.edu.ua

**Introduction.** Botulinum toxin is the strongest among the currently known neurotoxins. In modern history, botulinum toxin has come a long way from the most powerful deadly natural poison to a potent nerve poison, and then to a highly effective drug.

**Aim.** Using literature data to study the effect of the use of botulinum toxin for medical and cosmetic purposes. Results and its discussion. The history of the development of botulinum toxin preparations goes deep into the XVIII century.

The first scientific studies of botulinum toxin were carried out in connection with the possibility of its use as a bacteriological weapon until the mid-40s of the 20th century.

At the beginning of the 60s, they developed a technology for purifying and obtaining a crystalline, highly purified culture. The results of these studies interested clinicians.

In the 80s, for the first time in clinical practice, namely in ophthalmology, botulinum toxin A (Akulin, now Botox) was used to treat strabismus, blepharospasm and hemifacial spasm.

Today, this drug is used in almost all areas of clinical medicine: urology, surgery, gastroenterology, dentistry, orthopedics, gynecology, etc.

In the treatment of many neurological diseases, as well as in the rehabilitation of patients after a stroke or traumatic brain injury, intramuscular administration of botulinum toxin has the highest level of evidence regarding muscle tone reduction and improvement of the passive function of the affected limb. In cosmetology, botulinum toxin A-based preparations began to be actively used in the early 2000s to smooth facial wrinkles. The principle of action of the drug is based on the relief of nerve impulses that cause the muscles to contract, and the skin to form folds.

Existing drugs of botulinum toxin type A – Botox, Dysport, Xeomin and Lantox have different safety and efficacy profiles, differences related to the production, composition and algorithm of use. When any preparation of botulinum toxin is injected in the tissues, neurotoxin and protein complex are separated. The mechanism of action of the neurotoxin is due to the blockade of the presynaptic membrane and the violation of the release of the mediator acetylcholine into the synaptic cleft.

**Findings.** Botulinum toxin, being the strongest neurotoxin, in safe doses and of adequate quality can be used for both medical and cosmetic purposes. The main rule of effective botulinum therapy is an individual approach to the determination of indications, the choice of dose and the site of administration.