NANOPHARMACOLOGY

Konovalenko E. V., Drogovoz S. M.
National University of Pharmacy, Kharkiv, Ukraine
balachirev@gmail.com

Introduction. Nanotechnologies have become widely spread in medicine and pharmacy in recent years. Nanoscale drugs called drugs, which form the structure of molecules equal to or more than 1 nm in all three dimensions. Physical, chemical and pharmacological properties of nanoscale structures are very different from those for ordinary molecules. Nanoparticles similar in its characteristics to natural macromolecules involved in ensuring all biochemical functions. R. Smalley received the Nobel Prize in 1996 for their discovery of **fullerenes.** Fullerene molecule (C_{60} carbon) is highly lipophilic and its connection to another molecule leads to the formation of a lipophilic substance which pharmacokinentics will be different from the original. Lipophilicity fullerene allows you to enter it into the liposomes for aerosol administration to the lung of cancer patients. Huge prospects has fullerene chemistry, opening the possibility of the production of entirely new material. Fullerene C_{60} so easily attach free radicals, allowing the molecule called "radical sponge". Polyhydroxyl fullerenes are good antioxidants. $C_{60}(OH)_{24}$ - fullerenole has a protective effect against oxidative stress caused by Doxorubicine.

The **dendrimers** can themselves act as drugs. Unlike low molecular weight substances capable of forming bonds with the limited number of targets, dendrimers may form a plurality of links. Dendrimers act as inhibitors of the interaction of virus with a cell in the early stages of viral infection. Dendrimers can help fight bacterial strains resistant to antibiotics.

Dendrosomes represent an effective system of targeted gene delivery. Another possibility is the use of nanoparticles drug transport to certain receptors by changing the acidity and chemical stimuls. Of particular importance in the development of delivery systems is based nanocarriers drugs aimed at the treatment of cancer, diabetes, Alzheimer's and Parkinson's diseases, diseases of the cardiovascular system as well as antimicrobial, antiviral and gene products and vaccines. At present, it is necessary to solve such problems of nanopharmacology: identification of physical and chemical characteristics of synthetic nanoparticles responsible for the toxicity; development of methods of predicting the potential toxicity of nanoparticles etc.

Conclusions. Nanopharmacology can be considered as one of the most important and core technologies of the 21st century. The introduction of nanotechnology in the processes of development of original drugs is already happening and will determine the success of pharmacology and pharmacy in the near future.