

Use of polymer-based nanovectors in the immobilization of drugs

Tagiyev DB

Azerbaijan National Academy of Sciences, Azerbaijan

Recently, the researchers have focused on the synthesis of nanogellets and drugs with the long-term effectiveness. Use of polymers for this purposes plays the main role in the delivery of drugs to the necessary organs among modern methods. In this case, polymers as a matrix keep drugs for a long time and help their gradually separation in the body. Thus, drugs can not be released from the polymer until the polymer macromolecules entering the required cell. In this regard, it is reasonable using synthetic based polymer nanogels as vectors.

In the present work, polymer nanogellets with new memory were synthesized based on polyacrylic acid and poly-N-vinylpyrrolidone to immobilize doxorubicin. The sorption abilities of the obtained nanogels were studied and their higher sorption capacity were found. By using such polymers as vector, the therapeutic dose of doxorubicin in experimental treatment of tumor diseases could be significantly reduced.

Time dependence on the release of gel from the immobilized doxorubicin in polymer nanogels at 37°C and at different pH was investigated. It was determined that, the release of

doxorubicin from nanogel at 37°C occurs in small portions over a certain period of time and antibiotics keeps its bioactivity for a long time. This is due to the absorption of antibiotics both on the surface and volume of the polymer.

In addition, silver nanoparticles were synthesized in the medium of poly-N-vinylpyrrolidone and the complex of doxorubicin with silver nanocomposite polymer was obtained. It was determined that the distribution of silver nanoparticles depends on their presence in polymer environment. Thus, the poly-N-vinylpyrrolidone /Ag⁰/ doxorubicin system remains stable at pH = 5-8 for a long time and due to the protonation of poly-N-vinylpyrrolidone in carbonyl groups at pH = 1-3 doxorubicin loses its bioactivity regarding the breakdown of chemical bond between Ag⁰/doxorubicin and poly-N-vinylpyrrolidone.

Speaker Biography

Tagiyev DB is the director/professor of Institute of Catalysis and Inorganic Chemistry, Azerbaijan National Academy of Sciences. He has over 200 articles that have been cited over 470 times, and his publication H-index is 13.

e: dtagiyev@rambler.ru



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