Study of the adsorption of Immunoglobulinum humanum by functionalized - NH_2, - SH, - COOH groups on the surface of nanoscale magnetite

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Nanomaterials as substrates for targeted delivery of therapeutic or diagnostic agents are widely used in modern medicine. However, it remains important to study their interaction with both transported drugs and components of the biological environment. Compliance with the principles of biocompatibility, adsorption activity, residence time in the biological environment and the target zone, hydrophilicity / hydrophobicity etc. - the main requirements for the physico-chemical parameters of these materials.

Increasing biocompatibility through surface functionalization ensures the activity of the target system, the selectivity of the binding of nanoparticles to certain chemicals or cells. Therefore, it is important to understand the process and mechanism of interaction of biological substances with surfaces of different nature, the impact on the conformation and functional ability of protein substances. This interaction will be determined by the chemical nature of the active centers of the surface: physicochemical (surface charge, reactive groups, pHIIP) and geometric (size, surface structure) properties of nanoparticles.

Since one of the forms of external stimulation of physical targeting of drug delivery to cells is the magnetic field, nanocomposites based on Fe_3O_4 with - NH_2, - SH, - COOH functional groups were synthesized for the study. Immunoglobulinum humanum (Ig), which has a wide range of opsonizing and neutralizing properties against bacteria, viruses and other pathogens, selected as a model protein. The main purpose of this work was to study the processes of adsorption immobilization of Ig on synthesized composites.