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Application of aptamers for heavy metal detection

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Heavy metal pollution is one of the reasons of poisoning owing to their toxicity and long lifetime in the environment. They can be released from sorses of natural and artificial origin and be a serious factor of decreasing of human health. They are accumulated in the water sourses, soil, food and food chains. To detect it in different sources spectral or chromatographic methods are applied. However, the necessity of cheap and rapid methods for its detection requires the development of alternative techniques. With the development of analytical methods for the determination of toxicants, a large number of compounds specifically interacting with metals are used. Thus, various receptor molecules are applied – low and high molecular weight compounds. Among them aptamers with different composition and length are described as selective and sensitive receptors for heavy metals binding accompanying metallic nanoparticles as a carrier. In this work different aptamers were conjugated with gold nanoparticles with average size 28 nm and used for the detection of different metals in homogenous media. The interaction of the synthesized conjugates of nanoparticles and aptamers with lead and mercury was confirmed *via* spectrophotometry and transmission electronic microscopy techniques. The selectivity of the interaction was studied when replacing the detectable ions with other one-two and trivalent ions. The water samples were chosen as priority objects for the study. Characterization of the interaction of the conjugates was carried out by spectrophotometry by the detection of optical density at 595 nm. The work was financially supported by Program # 36 of the Presidium of the Russian Acad. Sci. "Fundamental Foundations and New Effective Methods of Chemical Analysis and Investigation of the Structure of Substances and Materials".

Biography

Anna N Berlina has completed her PhD from AN Bach Institute of Biochemistry, Russian Academy of Sciences. Her interests laid in the area of analytical chemistry, nanotechnology and alternative labelling in immunoassay. Anatoly V Zherdev is leading researcher in Research Center of Biotechnology RAS His current research interests are analytical chemistry, immunoanalytical methods, quantitative patterns of immunochemical reactions, biosafety and nanotechnology. Boris B Dzantiev is a deputy director, head of laboratory in Research Center of Biotechnology RAS. His current research interests are analytical chemistry, physicochemical regularities of the interaction of antigen-antibody, development of methods for immunodetection of biologically active compounds.

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