

Part I

Preparation and Characterization of Metal Nanoparticles in Solutions

Several Words About the Contents of This Part

It is known that studies of the interaction of metal nanoparticles with various biological systems (microorganisms, cultured mammalian cells et al.) are carried out by the biologists in the laboratories of the corresponding profile. In most cases the nanoparticles used in these studies are prepared not in biological, but in chemical laboratories, the biologists not always having the possibility to choose the way of nanoparticles preparation the most suitable for the experiment with their biological object. Additional problems arise from the conventional view accepted by biologists (including those occupied with toxicological studies of medicinal remedies) which regards the nanoparticles as one more chemical reagent. Hence the researchers usually do not pay attention to the fact that nanoparticles represent a new class of factors having its peculiar features which should be taken into account for the correct organization of experiment. Therefore the standard procedures used in toxicological studies may be not applicable in the case of nanoparticles and then, to obtain the correct result, one should change the experimental procedure.

Methodological problems occurring in studies of the biological effects of metal nanoparticles will be considered in detail in the next part of this book. In the Part I it is necessary, as we believe, to give first the general notion about the methods used for the preparation of metal nanoparticles in solutions, and then, using biochemical synthesis as an example, to describe (1) the additional tasks which should be solved for the creation of nanoparticles or modified material suitable for the experiments with biological objects and (2) the new possibilities which can be revealed in studies of the nanoparticles' properties and their applications in medicine.