

Interaction of colloidal hybrid nano- and microparticles with cells

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What happens to inorganic nanoparticles (NPs), such as plasmonic gold or silver, superparamagnetic iron oxide, or fluorescent quantum dot NPs, after they have been administrated to an animal or a human being? The review discusses the integrity, biodistribution, and fate of NPs after in vivo administration. First the hybrid nature of the NPs is described, by conceptually dividing them into the inorganic NP core, an engineered surface coating around the core which comprises the ligand shell and optionally also bioconjugation, and into the corona of adsorbed biological molecules. It is shown that in vivo all of these three compounds may degrade individually and that each of them can drastically modify the life-cycle and biodistribution of the whole hetero-structure. The NPs thus may be disintegrated into different parts, of which biodistribution and fate would need to be analyzed individually. Multiple labelling and quantification strategies for such purpose will be discussed. All reviewed data indicate that in vivo NPs no longer should be considered as homogeneous entity, but should be seen as inorganic/organic/biological nano-hybrids with complex and intricately linked degradation pathways.

References:

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