Quantifying the interaction of nanoparticles with cells

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The use of nanotechnologies involving nano- and microparticles has increased tremendously in the recent past. There are various beneficial characteristics that make particles attractive for a wide range of technologies. However, colloidal particles on the other hand can potentially be harmful for humans and environment. Today, complete understanding of the interaction of colloidal particles with biological systems still remains a challenge. Indeed, their uptake, effects, and final cell cycle including their life span fate and degradation in biological systems are not fully understood. This is mainly due to the complexity of multiple parameters which need to be taken in consideration to perform the nanosafety research. Therefore, we will provide an overview of the common denominators and ideas to achieve universal metrics to assess their safety. The review discusses aspects including how biological media could change the physicochemical properties of colloids, how colloids are endocytosed by cells, how to distinguish between internalized versus membrane-attached colloids, possible correlation of cellular uptake of colloids with their physicochemical properties, and how the colloidal stability of colloids may vary upon cell internalization.

References: