High throughput approach and in silico data analysis for toxicity screening of engineered nanomaterials

To investigate the potential adverse effects of ENMs to the environment and human beings, a key challenge is the ability to evaluate large numbers of new ENMs and develop reliable and cost-effective methods that can be used for hazard screening. We propose a predictive toxicological paradigm, which can be defined as the use of *in vitro* screening to make predictions about the physicochemical properties of ENMs that may lead to the generation of pathology or disease outcomes *in vivo*. This predictive paradigm necessitates the development of high throughput or content screening platforms to assess large number of material compositions and properties that are likely to lead to biological injury. The large data set obtained from the *in vitro* high throughput screening is necessary for *in silico* modeling to establish hazard ranking and structural-activity relationships (SARs) that can be used for modeling of ENM environmental and health impacts.