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**How Events at the Nano/Bio Interface Determine Good and Adverse Biological Outcomes**

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We have come to recognize that much of biology is executed at the nanoscale level, therefore providing a rational approach to using discovery about the structure and function of engineered nanomaterials (ENMs) at the nano/bio interface for interrogation of disease, diagnosis, treatment, and imaging at levels of sophistication not possible before. Moreover, the behavior of ENM's at the nano/bio interface also constitutes the basis for hazard generation and is therefore key for understanding the safety assessment and safer design of nanomaterials. In this overview, I will discuss how discovery at the molecular, cellular, organ and systemic nano/bio interfaces has helped us to make progress in the fields of nanomedicine and nanotoxicology. I will explain how the physicochemical properties of nanomaterials relate to nanoscale interactions at the membrane, intracellular organelles, tissues and organs in response to exposure to a variety of commercial ENMs as well as for therapeutic nanocarriers. I will delineate how the use of high throughput screening to establish structure-activity relationships can be used for the design of improved nanocarriers for cancer treatment as well as hazard and risk ranking of large categories of commercial ENMs on their way to the marketplace.