Preface

Nanotoxicology appears to have emerged as a distinct research field, and it is possible to see both an accumulation of data and an enhanced understanding of relevant toxicity factors through the physicochemical characterization of new nanomaterials. Many new initiatives are now focusing on defining appropriate cytotoxicity and genotoxicity testing protocols.

The first part of this book introduces fundamental concepts of nanostructured materials, their interactions with cellular systems, and nanostabilities. Part 2 critically examines relevant methodologies and approaches to assessing the cytotoxicity and genotoxicity of nanomaterials, such as pharmacokinetics and pharmacodynamics, induced genotoxic effects, new approaches to the development and toxicological profiling of targeted nanomedicines, cellular mechanisms in nanomaterial internalization, and intracellular trafficking and toxicity.

Cyto- and genotoxicity in specific nanoparticles are examined in Part 3 of the book which presents detailed in vitro and in vivo case studies for specific nanomaterials including solid lipid nanoparticles, biogenically synthesized silver nanoparticles, iron oxide nanoparticles, poloxamers, polymeric nanoparticles, and copper nanoparticles. Other aspects of cytotoxicity such as accessing the erythrocyte toxicity of nanomaterials and toxicity of nanomaterials to microorganisms are also discussed.

Our major concern in this book was to review and validate current assessments of nanomaterials safety as well as the standard assays and protocols applied to nanotoxicology. Didactic aspects were emphasized in all chapters, making the book suitable for a broad audience ranging from advanced undergraduate and graduate students to materials scientists and toxicologists in academia and industry.

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