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Insights on the safety of innovative nanocelluloses and ingested titanium dioxide nanomaterials
INSA, Friday, 16th September 2022

Background

- Awareness that nanomaterials's were being developed exponentially and specific safety concerns were arising
- Proposal of nanotoxicology project to national calls for funding



**Facilitating the safety evaluation of manufactured
nanomaterials by characterising their potential
genotoxic hazard**

2010-13

Grant Agreement #2009 21 01



**A common European approach to the regulatory
testing of nanomaterials**

2013-2017

Grant Agreement #310584

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PT NANO



<http://www.ptnano.pt>



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FCT Fundação
para a Ciência
e a Tecnologia
Cellular and Molecular Mechanisms of
Toxicity of Ingested Nanomaterials
PTDC/SAU-PUB/29481/2017
<https://www.facebook.com/INGESTnano>



ToxApp4NanoCELF

A PREDICTIVE TOXICOLOGY APPROACH TO CHARACTERIZE POTENTIAL RESPIRATORY
EFFECTS OF FUNCTIONALIZED NANOCELLULOSE FIBRES IN A CO-CULTURE SYSTEM
(PTDC/SAU-PUB/32587/2017)

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INSTITUTO RICARDO JORGE PROMOVE WORKSHOP DE NANOTOXICOLOGIA

O Instituto Nacional de Saúde Doutor Ricardo Jorge, através do seu Departamento de Genética Humana, promoveu, dia 25 de novembro, nas suas instalações em Lisboa, o workshop “A nanotoxicologia no contexto da avaliação da segurança de nanomateriais”. O evento contou com a presença de mais 40 participantes, entre os quais investigadores das áreas da síntese e aplicação de nanomateriais, da nanotoxicologia, profissionais das áreas da genética, saúde ambiental e ocupacional, estudantes, bem como cidadãos com interesse em nanotecnologias e nanotoxicologia. [| Ver mais |](#)

25 de novembro de 2019

The expertise gathered in this workshop laid the ground for a larger project of a book with the latest advances in nanosafety.

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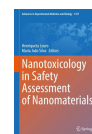
Nanotoxicology in Safety Assessment of Nanomaterials

A perspective on recent developments in **the synthesis, application, and characterization of nanomaterials and nanotechnologies, focusing on the use of nanotoxicology, including predictive nanotoxicology, for the accurate safety assessment of NMs early in the product development cycle.** This mechanistic knowledge has been evidenced as central to aid in grouping and reading across, based on similarities of induced cellular and molecular events, towards the risk assessment and regulation of nanomaterials.

Various experts from different organizations and countries discuss the above referred topics in the three parts of this book.

Target readers:

- Scientists, educators, and students.
- Industrial practitioners
- Regulators
- Policy makers.



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Approx. 300 p. 50 illus.

Printed book
Hardcover

eBook

Available from your library or
springer.com/shopMyCopy ^[3]

springer.com/mycopy

Henriqueta Louro, Maria João Silva (Eds.)

Nanotoxicology in Safety Assessment of Nanomaterials



- Worldwide experts present the latest knowledge on nanotoxicology
- Innovative approaches in synthesis/application of nanomaterials
- Provides central knowledge for applying safe and sustainable nanotechnologies with a "safe-by-design" approach



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Nanotoxicology in Safety Assessment of Nanomaterials

Part I Nanotechnologies: Synthesis, Application and Characterization of Nanomaterials

Nanotechnologies advancements to provide a perspective on recent developments in the synthesis, application, and characterization of NMs.

Part II Nanotoxicology: Concepts and Methodologies for Toxicity Evaluation of Nanomaterials

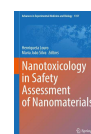
Assessment of NMs' toxic properties.

Comprises both reviews and original data on the toxicity of several NMs, spanning from metal-based NMs (e.g., titanium dioxide, cerium oxide, silver, and iron) to nanocelluloses.

Some chapters that address innovative methodological approaches in nanotoxicology, including next-generation in vitro approaches that are physiologically relevant and, as such, that generate results more comparable to those produced in vivo and the use of omics-based methodologies, for example, transcriptomics, epigenomics, and proteomics.

Part III Towards the Risk Assessment and Regulation of Nanomaterials

Assessment and management of risks associated with exposure to NMs and their implications in the regulatory framework, as well as occupational exposure to nanomaterials.



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<p>Part I Nanotechnologies: Synthesis, Application and Characterization of Nanomaterials</p> <p>1 Challenges in Nanomaterial Characterization – From Definition to Analysis 3 José A. M. Catita</p> <p>2 Trends in the Design and Evaluation of Polymeric Nanocarriers: The <i>In Vitro</i> Nano-Bio Interactions 19 Ana Bettencourt and Lídia M. Gonçalves</p> <p>3 LipNanoCar Technology – A Versatile and Scalable Technology for the Production of Lipid Nanoparticles 43 Vera L. R. Esgueira, Clara P. A. Lopes, Ana Catarina A. dos Santos, Fátima Pinto, Sílvia A. Sousa, Dragana P. C. de Barros, Jorge H. Leitão, and Luis P. Fonseca</p> <p>4 Dermal Delivery of Lipid Nanoparticles: Effects on Skin and Assessment of Absorption and Safety 83 Fátima Pinto, Luis P. Fonseca, and Dragana P. C. de Barros</p> <p>5 Targeting Cancer by Using Nanoparticles to Modulate RHO GTPase Signaling 115 Paulo Matos, Joana F. S. Pereira, and Peter Jordan</p> <p>6 Nanocelluloses: Production, Characterization and Market 129 Paulo J. T. Ferreira and Ana F. Lourenço</p>	<p>Part II Nanotoxicology: Concepts and Methodologies for Toxicity Evaluation of Nanomaterials</p> <p>7 Nanocelluloses – Nanotoxicology, Safety Aspects and 3D Bioprinting 155 Gary Chinga-Carrasco, Jennifer Rosendahl, and Julia Catalán</p> <p>8 New “Omics” Approaches as Tools to Explore Mechanistic Nanotoxicology 179 Célia Ventura, Vukosava Torres, Luis Vieira, Bruno Gomes, António Sebastião Rodrigues, José Rueff, Deborah Penque, and Maria João Silva</p> <p>9 Epigenetic Mechanisms in Understanding Nanomaterial-Induced Toxicity 195 Manosij Ghosh, Lode Godderis, and Peter Hoet</p> <p>10 Cellular and Molecular Mechanisms of Toxicity of Ingested Titanium Dioxide Nanomaterials 225 Adriana Vieira, Ana Gramacho, Dora Rolo, Nádia Vital, Maria João Silva, and Henriqueta Louro</p> <p>11 Nanomaterial-Induced Extra-Pulmonary Health Effects – the Importance of Next Generation Physiologically Relevant <i>In Vitro</i> Test Systems for the Future of Nanotoxicology 259 Ali Kermanizadeh and Gwynndaf Roberts</p> <p>12 <i>Drosophila</i> as a Suitable <i>In Vitro</i> Model in the Safety Assessment of Nanomaterials 275 Eşref Demir, Fatma Turna Demir, and Ricard Marcos</p> <p>13 Toxicological Aspects of Iron Oxide Nanoparticles 303 Natalia Fernández-Beríoñez, Carla Costa, Fátima Brandão, João Paulo Teixeira, Eduardo Pásaro, Vanessa Valdiglesias, and Blanca Laffon</p> <p>14 Hazard Assessment of Benchmark Metal-Based Nanomaterials Through a Set of <i>In Vitro</i> Genotoxicity Assays 351 Nádia Vital, Mariana Pinhão, Naouale El Yamani, Elise Rundén-Pran, Henriqueta Louro, Maria Dušinská, and Maria João Silva</p>
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Part III Towards the Risk Assessment and Regulation of Nanomaterials

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