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## 3<sup>rd</sup> Italian-Swedish Workshop on NanoBioMaterials

- From safety assessment to biomedical uses -

Turin, Italy, March 22-23, 2018



Venue: Circolo della Stampa, Palazzo Ceriana Mayneri, Corso Stati Uniti 27, Torino

### Scientific Committee:

**Enrico Bergamaschi**, *Department of Sciences of Public Health and Pediatrics, University of Turin*

**Antonio Pietroiusti**, *University of Rome Tor Vergata, Rome*

**Bengt Fadeel**, *Karolinska Institutet, Stockholm*

**Enrico Pira**, *head Occupational Medicine, Department of Sciences of Public Health and Pediatrics, University of Turin*

**Ivana Fenoglio**, *Department of Chemistry, University of Turin*

**Luisa Campagnolo**, *University of Rome Tor Vergata, Rome*

**Veruschka Leso**, *Federico II University, Naples*

**Paolo Gasco**, *Nanovector, Turin*

**Lang Tran**, *Institute of Occupational Medicine, Edimburgh, UK*

### Presentation

Following the previous successful meetings on health impacts of nanomaterials (Rome, 2010 and Stockholm, 2013), the 3<sup>rd</sup> Workshop of Italian and Swedish scientists will focus on (nano)biomaterials – from safety assessment to biomedical uses. The scientific aim of this 2-days workshop is to provide up-to-date information on material characteristics, their application and potential adverse health effects mainly dealing with (nano)biomaterials (NBM), as well to highlight current and future biomedical applications including targeted drug delivery systems and regenerative medicine.

The main lectures of the workshop, given by leading Italian and Swedish scientists are intended to give the audience a comprehensive and critical overview of the state-of-the-art, integrated by current data based on the personal experience of the speakers in each respective field. The goal is also to reinforce a platform for common initiatives of Italian and Swedish researchers in the field of nanoscience and biomaterial safety and health and also between these groups and industry.

The participation of the speakers is sponsored in part by the European Commission funded H2020 Project BIORIMA (\*), which is devoted to the comprehensive assessment of hazards and benefits from NBM, and will run for 4 years, with 41 consortium partners including several international institutes ([www.biorima.eu](http://www.biorima.eu)). The project aims to develop an integrated risk management framework for nano-biomaterials used in advanced therapeutic medicinal products and medical devices. The BIORIMA risk management framework is a structure upon which the validated tools and methods for materials, exposure, hazard and risk identification/assessment and management are allocated plus a rationale for selecting and using them to manage and reduce the risk for specific nano-biomaterials used in medical applications.

(\*) The BIORIMA project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 760928



## March 22

**08:30 Opening remarks:** Lang Tran (BIORIMA), Enrico Bergamaschi [UNITO] + Research delegate [UNITO]

**09.00 Session I: NANOMATERIALS & BIONANOMATERIALS; chair: Marco Monopoli, Ivana Fenoglio**

- 1: Carbon-based nanomaterials: From Nanosafety to Nanomedicine**, Bengt Fadeel, Karolinska Institutet, Stockholm, SE
- 2: Synthesis, redox properties and biocompatibility of elemental carbon nanoparticles for near-infrared (NIR) activated-PDT/PTT.** Ivana Fenoglio, Ida Kokalari, Arianna Marucco Department of Chemistry, University of Turin, IT
- 3: Understanding the interactions between coated magnetic nanoparticles and living systems by systematic variation of nanoparticle morphology and chemistry.** Alessandro Ponti, Institute of Molecular and Technology Sciences (ISTM), National research Council, Milan, IT
- 4: Bottom-up design of polymeric theranostic nanoparticles for cancer treatment.** Gianluca Ciardelli, Department of Mechanical and Aerospace Engineering (DIMEAS), Politecnico di Torino, IT
- 5: SETNanoMetro" Shape-engineered TiO<sub>2</sub> nanoparticles for metrology of functional properties: setting design rules from material synthesis to nanostructured devices.** Gianmario Martra, Interdept. Centre "Nanostructured Interfaces and Surfaces " – NIS, Department of Chemistry, University of Turin, IT

**10.40 Coffee Break**

**11.00 Session I: NANOMATERIALS & BIONANOMATERIALS; chair: Adriele Prina-Mello, Magda Blois**

- 6: Understanding the nanomaterial biological fate** Marco Monopoli, Royal College of Surgeons in Ireland, IE
- 7: Engineering biological fate of nanomaterials.** Daniela Guarnieri, Pier Paolo Pompa, Nanobiointeractions & Nanodiagnosics, Italian Institute of Technology, Genua, IT
- 8: Geometry and bio-nano interaction**, Paolo Bigini, Nanobiology Unit, Department of Biochemistry and Molecular Pharmacology, Istituto di Ricerche Farmacologiche "Mario Negri" – IRCCS, Milan, IT
- 9: Silica coating for the control of nano-reactivity.** Anna Luisa Costa, Magda Blois, Institute for Ceramic Materials Technology, National Research Council, Faenza, IT
- 10. Characterization in nanomedicine: Lesson learnt from the EUNCL (European Nanomedicine Characterisation Laboratory) and REFINE Project.** Adriele Prina-Mello, Trinity Translational Medicine Institute-Dept. of Clinical Medicine, School of Medicine and AMBER / CRANN, Trinity College Dublin, Ireland

**12.40: General Discussion**

**13.00: Lunch**

**14.00 Session II: NANOBIOMATERIALS FOR MEDICINE, chair: Muhammet Toprak, Simonetta Geninatti Crich**

- 1. Neurodegenerative diseases: from bench to bed.** Nicola Mercuri, Laboratory of Experimental Neurology, Santa Lucia Foundation and University of Rome Tor Vergata, IT
- 2: Engineered nanomaterials as X-ray fluorescence contrast agents** Muhammet Toprak, Royal Institute of Technology, SE
- 3: Nanoparticles for Therapy and Diagnosis of Alzheimer's Disease.** Giulio Sancini, School of Medicine and Surgery, University of Milano-Bicocca, IT
- 4: Solid lipid nanoparticles: new approaches for drug delivery at blood-brain barrier/glioblastoma interface.** Chiara Riganti, Luigi Battaglia, Iris Chiara Salaroglio, Elena Gazzano, Elisabetta Aldieri, Dept. Of Oncology, University of Turin, IT
- 5: A comprehensive understanding of molecular transport within nanoporous materials in biomedical applications.** Pietro Asinari, Multi-scale Modeling Lab - SMaLL, Politecnico di Torino, IT

**15.40 Coffee Break**

**16.00 Session II: NANOBIOMATERIALS FOR MEDICINE, chair: Bengt Fadeel, Giulio Sancini**

- 6: Nature inspired approach to generate bio active materials and control nanosafety issues.** Anna Tampieri, Institute for Ceramic Materials Technology, National Research Council, Faenza, IT
- 7: A theranostic approach using nanosized Gd/Boron Neutron Capture Therapy of tumours.** Simonetta Geninatti Crich, Dept of Molecular Biotechnology and Health Sciences, University of Turin, IT



**8: Metal Oxide Particles Interactions with Proteins – from Chemical Bonding to Possible Applications in Nanomedicine.** Vadim Kessler, Swedish University of Agricultural Sciences, SE

**9: Platinum nanoparticles in nano biomedicine,** Giuseppe Bardi, Italian Institute of Technology, Genua, IT

**10: Inhalation of peptide-loaded nanoparticles improves heart failure.** Michele Miragoli, Dept. of Medicine and Surgery, University of Parma, IT

**17.40: General discussion**

**18.00 Social event: sightseeing followed by a dinner [“La Tampa” Circolo dei Lettori restaurant]**

## March 23

**9.00 Session III: SAFETY AND REGULATORY ASPECTS OF NANO-BIOMATERIALS, chair: Antonio Pietroiusti, Ivo Iavicoli**

**1: Developmental toxicity of nano-biomaterials,** Luisa Campagnolo, University of Rome Tor Vergata, IT

**2: Systems biology approaches for nanomaterial hazard and risk assessment** Harri Alenius, Karolinska Institutet, Stockholm, SE

**3: Efficacy tests and regulatory issues in pre-clinical research on peripheral nerve regeneration** Stefano Geuna, Dept. of Clinical and Biological Sciences, University of Turin

**4: Biological responses of 3D human airway tissue after chronic repeated exposure to aerosolized graphene oxide** Luisana Di Cristo, Italian Institute of Technology, Genua, IT [short talk]

**5: Transcriptomics approaches to explore graphene oxide interactions with lung cells,** Sourav Mukherjee, Karolinska Institutet, Stockholm, SE [short talk]

**10.30 Coffee Break**

**10.50 Session III: SAFETY AND REGULATORY ASPECTS OF NANOBIMATERIALS, chair: Enrico Pira, Anna Shvedova**

**6: Hazard classification and contextualization of engineered nanomaterials using systems biology approaches.** Dario Greco, Faculty of Medicine and Life Sciences, Institute of Biosciences and Medical Technology, University of Tampere, Finland

**7: Advanced tools for nanomaterial grouping and data quality curation for nano regulation.** C.P. Carnovale, Stefania Sabella, Italian Institute of Technology, Genua, IT

**8: Risk management strategies for nanomaterial workers: limits, opportunities and future research needs.** Ivo Iavicoli, Veruschka Leso, University of Naples Federico II, IT

**9: A Safety-by Design approach for ENM toxicity mitigation: Lessons from the EU Project SANOWORK.** Ovidio Bussolati, Massimiliano Bianchi, Dept. of Medicine and Surgery, University of Parma, IT

**10: From risk management of nanomaterials to new opportunities for protecting worker's health.** Sergio Iavicoli, Antonella Mansi, Fabio Boccuni, Dept. of Occupational and Environmental Medicine, Epidemiology and Hygiene, Italian Workers Compensation Authority (INAIL), Rome, IT

**12.40: General Discussion**

**13.00 Lunch**

**14.30 Satellite meetings [specific rooms]**

**16:00 General conclusions: Facing the issues of nanobiomaterials safety and their biomedical applications**

**Rapporteurs: Giuseppe Marcello Cacace (ISMEC-CNR, IT) & Anna Shvedova (NIOSH, USA)**

**16:30: CONCLUDING REMARKS : Bengt Fadeel/Enrico Bergamaschi/Antonio Pietroiusti**

**Post Meeting: Coffee Break and informal discussion**



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