
Wednesday, June 11, 2008

08:30 - 13:30 **Registration**

Educational Course **Nanoparticles in medicine: particle design, inhalation administration, therapeutic approaches**

09:00 - 09:15 **Introduction to the course**
Michael Bur, Saarland University, Germany

09:15 - 10:15 **Inhalation of nanoparticles – physical aspects**
Wolfgang Koch, Fraunhofer ITEM, Germany

10:15 - 11:15 **Material and formulation considerations for pulmonary administration of therapeutic nanoparticles**
Erik Rytting, University of Marburg, Germany

11:15 - 12:15 **Pulmonary cell culture models to study safety and efficacy of therapeutic aerosols**
Michael Bur, Saarland University, Germany

12:15 - 12:30 **Discussion and open questions**
Michael Bur, Saarland University, Germany

12:30 - 13:30 **Registration / poster mounting**

13:30 - 13:40 **Opening address to the 11th International Inhalation Symposium**
Uwe Heinrich, Symposium President, Fraunhofer ITEM, Germany

Plenary Session I **Standardization, physico-chemical characteristics, and cell-particle interactions**
Chairpersons: David Mark, Health and Safety Laboratory, UK; Jan Knebel, Fraunhofer ITEM, Germany

13:40 - 13:45 **Chairman's introduction to the session**

13:45 - 14:15 **European and international standardization progress in the field of engineered nanoparticles**
Gérard Rivière, European Committee for Standardization and Research (CEN-STAR), Belgium

14:15 - 14:45 **Physico-chemical characterization of nanoparticles in the light of toxicological effects**
Volkmar Richter, Fraunhofer IKTS, Germany

14:45 - 15:05 **Laser-generated pure nanoparticulate reference material**
Stephan Barcikowski, Laser Zentrum Hannover e. V., Germany

- 15:05 - 15:25** **Dissolution behavior of a nanoparticle in a nanoscale volume of solvent: thermodynamic and kinetic considerations**
Wolfram Vogelsberger, Friedrich Schiller University Jena, Germany
- 15:25 - 15:45** **Characterization of nanoparticle size and state prior to nanotoxicological studies**
Patrick Hole, NanoSight Ltd., UK
- 15:45 - 16:05** **Engineered nanoparticles induce a pulmonary surfactant dysfunction after surface area cycling *in vitro***
Carsten Schleh, Fraunhofer ITEM, Germany
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16:05 - 16:35 ***Break***

- 16:35 - 17:05** **Endocytic pathways: gateways for the cellular internalization of nanoparticles**
Arwyn T. Jones, Cardiff University, UK
- 17:05 - 18:05** **Nanoparticle-bio-interactions: controlled design and cellular response**
Lutz Mädler, University of Bremen, Germany, and Andre Nel, UCLA Medical Center, USA (combined presentation)
- 18:05 - 18:35** **Towards a structure/activity relationship for nanoparticle toxicity**
Ken Donaldson, University of Edinburgh Centre for Inflammation Research, ELEGI Colt Laboratory, UK
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Thursday, June 12, 2008

Plenary Session II **Potential sources of human exposure, pulmonary delivery, and lung deposition evaluation**
Chairpersons: Hillel Koren, U. S. Environmental Protection Agency, USA;
Wolfgang Koch, Fraunhofer ITEM, Germany

09:00 - 09:05 **Chairman's introduction to the session**

09:05 - 09:35 **Facing the key workplace challenge: assessing and preventing exposure to nanoparticles**
Kaarle Hämeri, Finnish Institute of Occupational Health and University of Helsinki, Finland

09:35 - 10:05 **Problems and experience of measuring worker exposure to manufactured nanoparticles**
David Mark, Health and Safety Laboratory, UK

10:05 - 10:35 **Workplace exposure characterization at a TiO₂ nanoparticle production site**
Markus Berges, BGIA – BG Institute for Occupational Health and Safety, Germany

10:35 - 11:05 **Break**

11:05 - 11:25 **Nanoparticle release from powders - physico-chemical characteristics and standardization**
Michael Stintz, Technical University of Dresden, Germany

11:25 - 11:45 **Charge-based personal aerosol samplers**
Martin Fierz, University of Applied Sciences Northwestern Switzerland, Switzerland

11:45 - 12:15 **Extended applications of an on-line lung-deposited nanoparticle surface area monitor**
Heinz Fissan, University of Duisburg-Essen, Germany

12:15 - 13:15 **Lunch**

13:15 - 14:35 **Poster Session**

Plenary Session III **Pulmonary and systemic toxicity**
Chairpersons: Günter Oberdörster, University of Rochester, USA; Otto Creutzenberg, Fraunhofer ITEM, Germany

14:35 - 14:40 **Chairman's introduction to the session**

- 14:40 - 15:10** **Local and vascular health effects associated with the pulmonary deposition of engineered-manufactured nanomaterials: research challenges and preliminary findings**
Kevin Dreher, U. S. Environmental Protection Agency, USA
- 15:10 - 15:30** **Extrapulmonary effects of inhaled ultrafine carbon particles in mice**
Tobias Stöger, Helmholtz Zentrum München, Germany
- 15:30 - 15:50** **Thrombogenic effects of nano-sized carbon particles *in vivo***
Fritz Krombach, Walter Brendel Center of Experimental Medicine, Ludwig Maximilians University Munich, Germany
- 15:50 - 16:20** **The *in vitro* interaction of lung epithelial cells and microvasculature endothelial cells with metal oxide nanoparticles**
Ian M. Kennedy, University of California Davis, USA
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16:20 - 16:50 ***Break***

- 16:50 - 17:20** **Clastogenic and aneugenic effects of multi-wall carbon nanotubes in epithelial cells**
Julie Muller-Bondue, Solvay S. A. and Catholic University of Louvain, Unit of Industrial Toxicology, Belgium
- 17:20 - 17:40** ***In vitro* immunomodulatory effects of metallic, uncoated, monodispersed nanoparticles in the low nanometer range**
Gertie Janneke Oostingh, University of Salzburg, Austria
- 17:40 - 18:00** **Mechanisms of nano-sized carbon particle induced cardiovascular impairments in spontaneously hypertensive rats**
Swapna Upadhyay, Helmholtz Zentrum München, Germany
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Friday, June 13, 2008

Plenary Session IV

Use in therapy and diagnosis

Chairpersons: Andre Nel, UCLA Medical Center, USA; Jens Hohlfeld, Fraunhofer ITEM, Germany

- 09:00 - 09:05** **Chairman's introduction to the session**
- 09:05 - 09:35** **Respiratory nanomedicines – opportunities for improving drug delivery across the air-blood barrier**
Claus-Michael Lehr, Saarland University, Germany
- 09:35 - 10:05** **Controlled release formulations for pulmonary drug delivery: Utilization of nanosuspensions and nanostructured dry powders**
Régis Cartier, Boehringer Ingelheim Pharma GmbH & Co. KG, Germany
- 10:05 - 10:25** **Nanoparticle-induced cell culture models for protein aggregation diseases**
Anna von Mikecz, IUF at the Heinrich Heine University Düsseldorf, Germany

10:25 - 11:45 ***Poster Session***

11:45 - 13:00 ***Lunch***

13:00 - 15:00 ***Sightseeing program - two alternatives:***
a) Boat ride around the lake Maschsee
b) Hannover Townhall including a visit to the panorama platform

15:00 - 15:30 **The design of novel poly(vinyl alcohol) fluorescently labeled nanoparticles suitable for drug delivery and inhalation toxicokinetics**
Stuart Jones, King's College London, UK

15:30 - 16:00 **Advances in pulmonary nanotherapeutics**
Justin S. Hanes, The John Hopkins University Baltimore, The Institute for NanoBioTechnology (INBT), USA

16:00 - 16:10 ***Awarding of prizes for the best two posters presented***

16:10 - 16:35 ***Break***

Plenary Session V **Mechanisms of toxicity and hazard evaluation**
Chairpersons: Kevin Dreher, U. S. Environmental Protection Agency, USA; Uwe Heinrich, Fraunhofer ITEM, Germany

16:35 - 16:40 **Chairman's introduction to the session**

16:40 - 17:10 **Comparative pulmonary response to inhaled nanostructures: considerations on test design and endpoints**
Jürgen Pauluhn, Bayer HealthCare AG, Germany

17:10 - 17:40 **Screening assays for predicting nanoparticle toxicity**
Günter Oberdörster, University of Rochester, USA

19:00 ***Dinner reception for all participants of the symposium at the Hotel Courtyard by Marriott Hannover Maschsee***

Saturday, June 14, 2008

**Plenary Session V
(continued)**

Mechanisms of toxicity and hazard evaluation

Chairpersons: Kevin Dreher, U. S. Environmental Protection Agency, USA; Uwe Heinrich, Fraunhofer ITEM, Germany

09:00 - 09:30

Engineered nanoparticle respiratory exposure and potential risk for cardiovascular toxicity

Petia Simeonova, National Institute for Occupational Safety and Health Centers for Disease Control and Prevention, USA

09:30 - 10:00

Recognition determines toxicity: studies on immune recognition of engineered nanomaterials

Bengt Fadeel, Institute of Environmental Medicine, Karolinska Institute, Sweden

10:00 - 10:30

Nanomaterials - cell interactions: how carbon nanotubes affect cell physiology

Peter Wick, EMPA, Swiss Federal Laboratories for Materials Testing and Research, Switzerland

10:30 - 10:50

Translocation of inhaled 20-nm iridium or carbon nanoparticles from the lungs of rats to blood

Wolfgang Kreyling, Helmholtz Zentrum München, Germany

10:50 - 11:20

Break

11:20 - 11:50

Role of nanoparticle surface reactivity on pulmonary hazard effects and development of a base set of toxicity assays as a component of nanoparticle risk management

David Warheit, DuPont Haskell Global Centers for Health and Environmental Sciences, USA

11:50 - 12:10

Development of a short-term inhalation test in the rat using nano-titanium dioxide as a model substance

Lan Ma-Hock, BASF SE, Germany

12:10 - 12:30

Carcinogenicity of inhaled nanoparticles

Markus Roller, BMR - Advisory Office for Risk Assessment, Germany

12:30 - 12:40

Closing remarks

Uwe Heinrich, Symposium President, Fraunhofer ITEM, Germany

End of Symposium