



Biological Responses
to Nanoscale Particles

SPP1313

International Conference on
“Biological Responses to Nanoscale Particles”

University of Duisburg-Essen, Essen, Germany
September 11-15, 2011

Programme

Programme and List of Abstracts

Note: In this list of contents only the affiliation of the speaker is given

Sunday, Sept. 11

16.00 - 18.00 **Registration**

18.00 - 20.30 **Welcome reception**

Monday, Sept. 12

09.00 - 09.40 **Opening session and welcome addresses**

Session I: Interactions of NPs with Biomolecules, Membranes and Cells – Part A

Chair: R. Zellner

09.40 - 10.40 **Plenary lecture I:**

“Mechanisms of Biological Interaction of Nanoparticles with Applications to Intracellular Accumulation and Blood-Brain Barrier”

K. A. Dawson, *University College Dublin, IRL*

10.40 – 11.00

Coffee Break

11.00 - 11.30 **“Chemical and Mechanical Impact of Silica Nanoparticles on the Phase Transition Behaviour of Phospholipid Membranes in Theory and Experiment“ (Invited lecture)**

C. Westerhausen, F. Strobl, R. Herrmann, A. T. Bauer, S. W. Schneider, A. Reller, A. Wixforth, M. F. Schneider

C. Westerhausen, *University of Augsburg, D*

11.30 - 11.50 **“On the Interaction of TiO₂ Nanoparticles with a Blood-Brain Barrier : A Reversibility of Damages?”**

E. Brun, A. Mabondzo

E. Brun, *CEA Gif-sur-Yvette, F*

11.50 - 12.10 **“Role of Physicochemical Characteristics in the Uptake of TiO₂ Nanoparticles by Fibroblasts”**

Z. E. Allouni, P. J. Høl, M. A. Cauqui, N. R. Gjerdet, M. R. Cimpan

Z. E. Allouni, *University of Bergen, N*

12.10 - 12.30 **“Role of Cell Cycle on Nanoparticle Uptake”**

C. Aberg, J. A. Kim, A. Salvati, K. A. Dawson

C. Aberg, *University College Dublin, IRL*

12.30 - 13.30

Lunch

Session II: Interactions of NPs with Biomolecules, Membranes and Cells – Part B

Chair: I. Hilger

- 13.30 - 14.30 **Plenary lecture II:
“Making Nanomaterials Bio-Compatible”**
V. Colvin, *Rice University, Houston, TX, USA*
- 14.30 - 15.00 **“Quantitative Fluorescence Microscopy of Nanoparticles Interacting with Proteins and Cells” (Invited lecture)**
G. U. Nienhaus, *KIT Karlsruhe, D, and University of Illinois, Urbana, IL, USA*

15.00 – 15.30 Coffee Break

Chair: W. Kreyling

- 15.30 - 15.50 **“Nanosized CuO Changes the Fatty Acid Composition of Protozoan Membranes”**
M. Mortimer, K. Juganson, K. Kasemets, A. Kahru
M. Mortimer, *Laboratory of Molecular Genetics, Tallinn, EST*
- 15.50 - 16.10 **“Role of Hydrophilicity in the Interaction of Fibrinogen with Nanoparticles”**
A. Maruccio, E. Carella, F. Turci, I. Fenoglio, B. Fubini, G. Ceccone, F. Rossi, L. O’Neill, H. J. Byrne
A. Maruccio, *University of Torino, I*
- 16.10 - 16.30 **“Effect of Surface Modification of 5 nm Au Nanoparticles on the Composition of the Protein Corona Following Incubation with Mouse Serum or Bronchoalveolar Lavage Fluid”**
B. D. Johnston, M. Schäffler, C. Pfeiffer, A. Wenk, N. Haberl, S. Hirn, G. Pilar Riviera, J. M. Montenegro Martos, W. Parak, W. G. Kreyling
B. D. Johnston, *Helmholtz Center Munich, D*
- 16.30 - 17.00 **“Impact of Nanoparticles on Cellular Dynamics and Mechanics” (Invited lecture)**
A. Janshoff, J. Rother, M. Tarantola, C. Rosman, C. Sönnichsen, Th. D. Schlad, W. Tremel
A. Janshoff, *University of Göttingen, D*
- 17.00 - 17.20 **“A Biophysical Insight on Nanoparticle-Cell Interaction”**
P. C. Ke, R. Chen, T. Ratnikova, R. Schurr, E. Salonen, I. Vattulainen
P. C. Ke, *Clemson University, SC, USA*
- 17.20 - 17.40 **“Cellular Uptake of Nanoparticles Studied on an *in vitro* Co-Culture Model of the Alveolar Capillary Barrier”**
J. Kasper, M. I. Hermanns, C. Bantz, S. Utech, O. Koshkina, M. Maskos, R. E. Unger, C. J. Kirkpatrick
J. Kasper, *University Medical Center, Mainz, D*
- 17.40 - 18.10 **“Proteomic Profiling of the Nanoparticle/Protein Corona: A Critical Determinant of the Bio-Nano Response” (Invited lecture)**
R. Stauber, H. J. Galla, C. J. Kirkpatrick, M. Maskos
R. Stauber, *Mainz Screening Center, Mainz, D*

18.10 - 19.30 Dinner

19.30 - 21.30 **Poster Session I**

Tuesday, Sept. 13

Session III: Biological Impacts of NPs – Part A

Chair: V. Stone

- 09.00 - 10.00 **Plenary lecture III:
“Size Dependent Cytotoxicity of Ligand Stabilized Gold Nanoparticles”**
U. Simon, *RWTH Aachen University, D*
- 10.00 - 10.30 **“Bioactivity of Nanosilver: More Than a Simple Story” (Invited lecture)**
C. Greulich, M. Köller
C. Greulich, *University of Bochum, D*
- 10.30 - 10.50 **“Size-Dependent Cytotoxicity and Cellular Uptake of Tri-Block Copolymer Nanoparticles”**
S. Bhattacharjee, K. Fytianos, D. Ershov, J. van der Gucht, A. T. M. Marcelis, H. Zuilhof, I. M. C. M. Rietjens, G. M. Alink
S. Bhattacharjee, *Wageningen University, NL*
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- 10.50 – 11.30 Coffee Break
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- 11.30 - 11.50 **“Size Effect of Fluorescent Nanoparticles on Uptake by Macrophages and *in vitro* Toxicity”**
L. Leclerc, W. Rima, J. Pourchez, D. Boudard, V. Forest, V. Bin, P. Mowat, P. Perriat, P. Grosseau, D. Bernache-Assollant, M. Cottier
L. Leclerc, *Ecole Nationale Supérieure des Mines de Saint-Etienne, F*
- 11.50 - 12.10 **“Internalisation and Transcytosis of SiO₂ Nanoparticles by Lung Epithelial Cells”**
S. Vranic, R. Guadagnini, K. Moreau, F. Marano, A. Baeza-Squiban, S. Boland
S. Vranic, *University Paris Diderot, F*
- 12.10 - 12.30 **“Cytotoxicity and Membrane Interactions of Amorphous Silica Nanoparticles”**
Q. Mu, N. S. Hondow, L. Krzeminski, A. P. Brown, K. L. M. White, N. N. Daskalakis, A. W. M. Hay, M. N. Routledge, L. J. C. Jeuken
Q. Mu, *University of Leeds, UK*
- 12.30 - 12.50 **“Inflammatory and DNA Damaging Properties of Nanoparticles in the Intestine”**
R. P. F. Schins, J. Kolling, A. W. Boots, D. van Berlo, I. Förster, C. Albrecht, K. Gerloff
R. P. F. Schins, *IUF Düsseldorf, D*

12.50 - 14.00 Lunch

Chair: G. Schmid**14.00 - 14.20 “Assessment of the *in vitro* Toxicological Profile of Amorphous Silica Nanoparticles and Study of their Intracellular Fate”**

C. Uboldi, F. Broggi, G. Giudetti, J. Ponti, D. Gilliland, F. Rossi

C. Uboldi, *European Commission – JRC Ispra, I***14.20 - 14.40 “Nanoparticle Effects on Cell Survival, Function and Oxidative Stress *in vitro* and *in vivo*”**

B. K. Gaiser, A. Keramanizadeh, K. Fytianos, S. Hirn, A. Wenk, W. Kreyling, V. Stone

B. K. Gaiser, *Heriot-Watt University, Edinburgh, UK***14.40 - 15.00 “Mechanism of Long Term Toxicity of Functionalized Polystyrene Nanoparticles”**

C. Loos, G. U. Nienhaus, V. Mailänder, K. Landfester, Th. Simmet, T. Syrovets

C. Loos, *University of Ulm, D*

15.00 – 15.30Coffee Break

Session IV: Synthesis and Characterisation of NPs

15.30 - 16.30 Plenary lecture IV:**“Functional Nanoscale Particles from Polymers and Proteins”****R. Nolte**, *Radboud University Nijmegen, NL***16.30 - 17.00 “Ligand-Free Metal and Alloy Nanoparticles for Toxicological Studies” (Invited lecture)****S. Barcikowski**, *University of Duisburg-Essen, D***17.00 - 17.20 “Functionalization of Silica Nanoparticles for Physiological Media and Cells”**

C. Graf, Q. Gao, C. N. Noufele, W. Ruan, I. Schütz, V. Haucke, E. Rühl

C. Graf, *FU Berlin, D*

17.20 – 19.00Free Time

19.00 - 23.00Conference Dinner

Wednesday, Sept. 14

Session V: Biological Impacts of NPs – Part B

Chair: P. Gehr

09.00 - 10.00 **Plenary lecture V:
“New Materials with an Old Hazard: Nanofibres, Asbestos and the Pleura”**
K. Donaldson, *University of Edinburgh, UK*

10.00 - 10.30 **“The Liver as Central Organ for the Uptake and Processing of Nanoparticles” (Invited lecture)**
P. Nielsen, A. Eychmüller, H. Weller, H. Hohenberg, J. Heeren
P. Nielsen, *University Hospital Hamburg-Eppendorf, D*

10.30 - 11.00 **“Particles in the Maze of the Gut” (Invited lecture)**
A. Frey, *Research Center Borstel, D*

11.00 – 11.30 Coffee Break

11.30 - 11.50 **“Dependence of Particle Size and Surface Charge on Biodistribution of Gold Nanoparticles after Intratracheal Instillation”**
S. Hirn, M. Semmler-Behnke, C. Schleh, A. Wenk, M. Schäffler, J. Lipka, B. D. Johnston, N. Haberl, S. Takenaka, N. G. Schmid, U. Simon, W. G. Kreyling
S. Hirn, *Helmholtz Center Munich, D*

11.50 - 12.10 **“Penetration and Storage of Nanoparticles in the Skin”**
J. Lademann, H. Richter, S. Schanzer, M. Meinke, W. Sterry, A. Patzelt
J. Lademann, *Charité Hospital Berlin, D*

12.10 - 12.30 **“Microvascular Distribution and Effects of Surface-Modified Quantum Dots in Postischemic Tissues”**
M. Rehberg, C. Ferreira-Leite, K. Mildner, J. Horstkotte, D. Zeuschner, F. Krombach
M. Rehberg, *Ludwig-Maximilians-University Munich, D*

12.30 - 12.50 **“Biological Impact of SiO₂ Nanoparticles on A549 Cells Exposed at the Air-Liquid Interface”**
A. Comouth, H. Saathoff, S. Diabate, A. Panas, H.-R. Paur, S. Mülhopt, C. Weiss
A. Comouth, *KIT Karlsruhe, D*

12.50 - 13.10 **“Cellular Reactivity of Carbon Nanotubes with Alveolar Epithelia and Macrophages: Importance of Physicochemistry”**
S. Sweeney, P. Ruenaroengsak, A. J. Thorley, D. Berhanu, E. Valsami-Jones, T. D. Tetley
S. Sweeney, *Imperial College London, UK*

13.10 - 13.30 **“Impact of Nanoparticles Accumulating in the Lysosome”**
A. Salvati, F. Wang, L. Yu, K. A. Dawson
A. Salvati, *University College Dublin, IRL*

13.30 - 14.30 Lunch

Chair: J. Lademann

14.30 - 15.30 **Plenary lecture VI:**
“Clinical MRI Cell Tracking Using Magnetic Nanoparticles: The First 5 Years“
J. W. M. Bulte, *Johns Hopkins, Baltimore, MD, USA*

15.30 - 15.50 **“Interactions of Silica Nanoparticles with Lung Epithelial Cells: Cytotoxicity and Intracellular Uptake”**
 H. Peuschel, S. Schübbe, C. Schumann, T. Müller, C. Cavelius, A. Kraegeloh
H. Peuschel, *INM Saarbrücken, D*

15.50 – 16.20 Coffee Break

Session VI: Imaging and Diagnostics

16.20 - 16.50 **“Nanoparticles for Probing the pH in Intracellular Vesicles and Detection of Acidification of Endosomes” (Invited lecture)**
 V. Mailänder, S. Lerch, K. Landfester
V. Mailänder, *Max-Planck-Institute for Polymer Research, Mainz, D*

16.50 - 17.10 **“Propidium Iodide Labelling of Nanoparticles as a Novel Tool for the Identification and Quantification of Cellular Binding and Uptake”**
 N. Daum, A. Neumeyer, M. Bukowski, M. Veith, C. M. Lehr
N. Daum, *Helmholtz Institute for Pharmaceutical Research, Saarbrücken, D*

17.10 - 17.30 **“Localization of Nanoparticles Inside Cells: Application of High Resolution Fluorescence Microscopy”**
 A. Kraegeloh, S. Schübbe, C. Schumann, T. Müller, H. Peuschel, M. Koch, C. Cavelius
A. Kraegeloh, *INM Saarbrücken, D*

17.30 - 17.50 **“Characterization of the Oxidative Properties of Nanoparticles by Electron Spin Resonance Spectroscopy”**
 B. Hellack, C. Nickel, B. Stahlmecke, C. Albrecht, R. P. F. Schins, T. A. J. Kuhlbusch
B. Hellack, *IUTA Duisburg, D*

17.50 - 18.10 **“Quantification and 3D Reconstruction of Nanoparticle Uptake Events at the Single Cell Level”**
 A. A. Torrano, J. Blechinger, C. Bräuchle
A. A. Torrano, *Ludwig-Maximilians-University, Munich, D*

18.10 - 18.40 **“Uptake of Functionalized Nanoparticles into Cells and Skin Probed by Spectroscopy, Microscopy and Tomography” (Invited lecture)**
 C. Graf, J. Lademann, A. Vogt, M. Meinke, F. Rancan, A. Jordan, V. Haucke, A. D. Gruber, L. Mundhenk, E. Rühl
E. Rühl, *FU Berlin, D*

18.40 – 20.00 Dinner

20.00 - 22.00 **Poster Session II**

Thursday, Sept. 15

Session VII: Assessment of NPs

Chair: H. R. Paur

09.00 - 10.00 **Plenary lecture VII:**

“Hazard Identification of Engineered Nanomaterials: Matter of Dosimetry”

G. Oberdörster, *University of Rochester, NY, USA*

10.00 - 10.20 **“In silico Modelling of Biological Effects of Nanoparticles”**

D. Winkler, F. Burden, V. Epa, T. Le

D. Winkler, *CSIRO Clayton, AU*

10.20 - 10.40 **“Inlivetox: Design and Development of a Systemic Model for Nanotoxicity”**

N. Ucciferri, E. Collnot, M. Favre, B. Gaiser, S. Hirn, T. Sbrana, J. Susewind, A. Ahluwalia,
W. G. Kreyling, C. M. Lehr, V. Stone, M. Liley

N. Ucciferri, *University of Pisa, I*

10.40 - 11.00 **“Metrics, Dose and Dose Concept: The Need for a Proper Dose Concept in Risk Assessment of Nanoparticles”**

M. Simko, *Austrian Academy of Sciences, Vienna, A*

11.00 – 11.30

Coffee Break

Chair: R. Zellner

11.30 - 13.00 **Conference Resumee and General Discussion**

13.00 - 14.00

Lunch

Adjourn