

Second Reporting Colloquium of the DFG Priority Programme SPP 1313 “Bio-Nano-Responses” Fulda, February 15 - 17, 2010

Programme

Monday, February 15, 2010

14.00 – 14.10

Welcome and Introduction

R. Zellner, Essen; T. Hotopp, Bonn (DFG)

14.10 – 14.30

SPP 1313: Achievements, Events and Coordination

R. Zellner, Essen

14.30 – 15.30

Chairman: R. Zellner, Essen

PARCEL (Impact of Metals and Semiconductor NPs on Model Membranes and Cells from the Human Blood System)

1. Overview of PARCEL (Th. Basché, Mainz)
2. Non-specific interactions of CdSe-ZnS core-shell QDs with cells and model membranes: The effect of surface functionalisation (Th. Basché, Mainz)
3. Quantitative cytotoxicity of metal and semiconductor NPs in selected cells derived from the human blood compartment (I. Hilger, Jena)
4. New motility assays based on acoustic resonators and impedance analysis addressing the toxicity of QDs and metallic NPs (A. Janshoff, Göttingen)
5. Cellular uptake of metallic NPs studied by optical and electron microscopy (C. Sönnichsen, Mainz)
6. Discussion

15.30 – 16.00 **NANOFATE (Interactions of Hydrophobic and Hydrophilic Semiconductor Quantum Dots with Cell Model Systems for Liver and Adipose Tissue)**

1. Overview of NANOFATE (U. Beisiegel, Hamburg)
2. Synthesis of semiconductor nanocrystals in aqueous and organic solvents for biological and medical application (A. Eychmüller, Dresden)
3. Interactions of semiconductor QDs with cell model systems (U. Beisiegel, Hamburg)
4. Discussion

16.00 – 16.30 **Coffee break**

Chairman: G. U. Nienhaus, Karlsruhe

16.30 – 17.30 **NANO-SELECT (Nanoparticles Containing Selective Probes: Interaction Mechanisms of NPs with Cell Membranes, Intracellular Uptake, and Transport)**

1. Overview of NANO-SELECT (E. Rühl, Berlin)
2. Preparation and characterization of NPs (E. Rühl / C. Graf, Berlin)
3. Uptake of NPs by single cells (V. Haucke, Berlin)
4. Interaction of NPs with tumor cells (A. Jordan, Berlin)
5. Penetration of NPs through skin (A. Vogt / J. Lademann, Berlin)
6. Discussion

17.30 – 18.30 **NPBIOMEN (Bioactivity and Cellular Uptake of Distinct NPs in Human Endothelial Cells)**

1. Overview of NPBIOMEN (A. Wixforth, Augsburg)
2. Synthesis of SiO₂, TiO₂ and ZnO NPs labelled with perylene-diimide fluorescent dyes (A. Reller, Augsburg)
3. Surface acoustic waves as actuators and sensors: NP – membrane interaction and uptake under flow (A. Wixforth / M. Schneider, Augsburg)
4. Characterisation of fluorescence properties and morphology of labelled NPs for live cell imaging of NP – cell interactions (C. Bräuchle, München)
5. Characterisation of bioactivity and cytotoxic effects of perylene coupled SiO₂ NPs in human endothelial cells (St. Schneider, Mannheim)
6. Discussion

19.00 **Dinner**

20.30 – 22.00 Meeting of the SPP 1313 Steering Committee

20.30 – 22.00 Informal get-together of SPP 1313 reviewers

Tuesday, February 16, 2010

Chairman: H. Bockhorn, Karlsruhe

9.00 – 9.45

NANO-Ag (Tailored Silver NPs in Biological Environments: Interactions with Phase Boundaries, Biomolecules and Cells)

1. Overview of NANO-Ag (M. Epple, Essen)
2. Synthesis and characterization of silver NPs (M. Epple, Essen)
3. Interactions of NPs with phase boundaries, membranes and proteins (R. Zellner / L. Treuel, Essen)
4. Exposure of nano-silver to human mesenchymal stem cells and leukocytes (M. Köller, Bochum)
5. Discussion

9.45 – 10.45

PARENTRY (How Particles Enter the Body: Investigating Particle-Barrier Interactions at the Intestinal Mucosa)

1. Overview of PARENTRY (A. Gebert, Lübeck)
2. Tailor-made QDs (H. Weller, Hamburg)
3. Intravital imaging of NPs in large tissue volumes (G. Hüttmann, Lübeck)
4. NP entry routes in the living mouse intestine (A. Gebert, Lübeck)
5. NPs at the intestinal mucosa before and after epithelial uptake (A. Frey, Borstel)
6. Discussion

10.45 – 11.15

Coffee break

Chairman: H. Weller, Hamburg

11.15 – 12.15

BIONEERS (Biological Influence of Nanoparticles on Exposed Epithelial Respiratory Surfaces)

1. Overview of BIONEERS (R. Stauber, Mainz)
2. Physico-chemical characterization, fractionation and rational modification of NPs (M. Maskos, Mainz)

3. Interaction of NPs with lipid-peptide monolayers at the air-water interface and their penetration through the alveolar surfactant (H. J. Galla, Münster)
4. Interaction of NPs with epithelial and endothelial cells of the alveolo-capillary barrier (C. J. Kirkpatrick, Mainz)
5. Transcriptional activation and intracellular trafficking of NPs in epithelial and endothelial lung cells (R. Stauber, Mainz)
6. Discussion

12.15 – 14.00

Lunch break

Chairman: E. Rühl, Berlin

14.00 – 15.00

NanoBioTox (Health Effects of Manufactured Nanoparticles: Molecular and Cellular Biology and Toxicology)

1. Overview of NanoBioTox (W. Kreyling, München)
2. Engineered NPs with specific surface and marker properties for protein and cell interaction studies (W. Parak, Marburg)
3. Biophysical interactions of engineered NPs with selected proteins and effects on cellular uptake (G.U. Nienhaus / C. Röcker, Karlsruhe / Ulm)
4. Interactions of engineered NPs with serum proteins *in vitro* and biokinetics *in vivo* (W. Kreyling / M. Semmler-Behnke, München)
5. Interactions and uptake of engineered NPs by lung cells (P. Gehr / B. Rothen-Rutishauser, Bern)
6. Discussion

15.00 – 16.00

NANO-SYNCC (Nanoparticles: Synthesis, Characterisation and Cellular Effects)

1. Overview of NANO-SYNCC (H. R. Paur, Karlsruhe)
2. Oxidic NPs for the investigation of cellular effects of NPs (H. Bockhorn, Karlsruhe)
3. Generation and characterisation of monomeric and agglomerated airborne NPs (H. Saathoff, Karlsruhe)
4. Deposition of NPs on cells via the air/liquid interface with defined efficiency (H. R. Paur, Karlsruhe)
5. Interactions of NPs with cellular signalling networks (C. Weiss / S. Diabaté, Karlsruhe)
6. Discussion

16.00 – 16.30

Coffee break

Chairperson: U. Beisiegel, Hamburg

16.30 – 17.30

NanoCellInteract (Interaction of Nanoparticles with Cellular Compartments and Proteins)

1. Overview of NanoCellInteract (K. Landfester, Mainz)
2. Synthesis and characterization of NPs with different characteristic properties (K. Landfester, Mainz)
3. High performance fluorescence microscopy of polymeric NPs interacting with cells (G. U. Nienhaus, Karlsruhe)
4. Effects of functionalized core-shell NPs on cell signalling and function in inflammatory and immune cells (T. Simmet, Ulm)
5. Influence of the NPs onto type of uptake, apoptosis and differentiation of cells (V. Mailänder, Mainz)
6. Discussion

17.30 – 18.00

DotTox (Cytotoxicity of Quantum-Dot NPs in Contact to Animal Cells: Internalization, Targeting and Compartment-Specific Cytotoxicity)

1. Overview of DotTox (J. Wegener, Regensburg)
2. Functionalisation of QDs and the induction of neuronal differentiation of progenitor cells (E. K. Sinner, Mainz)
3. Nanoparticle-mediated cell fusion monitored electrically (J. Wegener, Regensburg)
4. Discussion

19.00

Dinner

Wednesday, February 17, 2010

Chairman: R. Zellner, Essen

9.00 – 12.00

Superordinate and Integral Aspects of SPP 1313

1. **Survey of NP synthesis in SPP 1313** (H. R. Paur, Karlsruhe)
2. **Survey of biological methods and systems** (I. Hilger, Jena)

3. Survey of NP characterisation methods (K. Landfester, Mainz;
E. Rühl, Berlin)

4. Future activities of SPP 1313
(R. Zellner, Essen)

**5. Initiation procedure and DFG requirements of the second
phase of SPP 1313 (2011-2013)**

(T. Hotopp, Bonn)

12.00

End of Colloquium and Adjourn