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Jena, 11. Januar 2019

EINLADUNG

Am Montag, **21. Januar 2019**, sprechen um **16:00 Uhr**
im Hörsaal des ZAF, Philosophenweg 7, 07743 Jena

Herr Prof. Dr. Wolfgang Parak
und
Dr. Neus Feliu

Universität Hamburg
Fachbereich Physik und Chemie, CHyN

zu Themen

***“Degradation of nanoparticles effects their colloidal properties and
interaction with cells”***

and

***“Nanoparticles for cell tracking applications: Some basic
considerations”***

Alle Interessenten sind herzlich eingeladen.

gez. Prof. Dr. Ulrich S. Schubert

Es handelt sich um eine Veranstaltung des SFB 1278 - POLYTARGET

Nanoparticles For Cell Tracking Applications: Some basic considerations

Neus Feliu

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Nanomaterials offer promising opportunities for a wide range of applications including medicine. Their novel properties make them excellent imaging and diagnostic agents. However, nanoparticles could be potentially harmful for humans and environment. To understand the possible effects of nanoparticles exposed to biological systems, a detail association of such effects to the physicochemical properties of the nanoparticles is needed. Therefore, we will provide an overview of the common denominators to evaluate the nanosafety research, and discuss the potential use of an advanced system based on nanoparticle-based imaging labels to monitor stem cells non-invasively in vivo. A deeper understanding in these areas will help to improve the development of nanomaterials for future medical applications.

References:

N. Feliu, D. Docter, M. Heine, P. del Pino, S. Ashraf, J. Kolosnjaj-Tabi, P. Macchiarini, P. Nielsen, D. Alloyeau, F. Gazeau, R. H. Stauber, W. J. Parak, "In vivo degeneration and the fate of inorganic nanoparticles", *Chemical Society Reviews* 45, 2440-2457 (2016).

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Neus Feliu is Research Associate and Group Leader at the University of Hamburg. She holds a Bachelor of Science in Chemistry degree from the University of Barcelona, Spain and a Master in Chemical Science and Engineering degree from the Royal Institute of Technology, Stockholm, Sweden. She has obtained her PhD in Medical Sciences at the Karolinska Institutet, Stockholm, Sweden. She then has held several PostDoctoral positions at the Karolinska Institutet and also at the Kuban State Medical University, Krasnodar, Russian Federation. With Marie Curie and VINNMER fellowship she continued her research at Karolinska Institutet and the Philipps Universität Marburg. In 2017 she moved to the Universität Hamburg, where she leads a team of 6 PhD students. Her interest lies in the biological characterization of nanomaterials, involving nanotoxicity. Her group also studies biological applications of colloidal nanoparticles, for example for the purpose of labelling, sensing, and delivery. She is involved as guest editor in several journals.

Wolfgang Parak

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Degradation of nanoparticles effects their colloidal properties and interaction with cells

Composite nanoparticles comprising an inorganic core and an organic shell, which provides water-solubility can be enzymatically degraded. This is relevant for particles that are endocytosed by cells. As enzymes can be specifically present in certain intracellular compartments degradation can depend on the intracellular location of particles. Degradation can be tuned by different surface chemistries, to make particles labile in one environment or stable in other environments.

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M. Chanana, P. Rivera Gil, M. A. Correa-Duarte, L. M. Liz-Marzán. W. J. Parak, "Physicochemical Properties of Protein-Coated Gold Nanoparticles in Biological Fluids and Cells before and after Proteolytic Digestion", *Angewandte Chemie International Edition* **52**, 4179–4183 (2013).

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Wolfgang Parak is Professor at the University of Hamburg. He has studied physics and obtained his PhD in Munich. After a postdoctoral fellowship at Berkeley he returned to Munich to start his own group. Before moving to the University of Hamburg he spent 10 years as professor at the Philipps University Marburg. Wolfgang Parak is also Associate Editor of ACS Nano. The research of Wolfgang Parak is dedicated towards the development of new surface chemistries of inorganic nanoparticles and towards the characterization of their physicochemical properties. In particular, the development of an amphiphilic polymer coating is nowadays used by many different groups worldwide. Nanoparticles with such high colloidal stability are the bases of experimentally correlating their physicochemical properties with their interaction with cells (involving uptake and cytotoxicity), which has been the research topic of the Parak group for the last 17 years. The group also uses polymeric polyelectrolyte capsules fabricated by layer-by-layer assembly for biological applications (*in vitro* sensing and delivery).