COINS Seminar #42

【Date】Mar./5/2019（Tue.）16 : 00～17 : 15（Registration Open at 15 : 30）
【Venue】Innovation Center of NanoMedicine (iCONM) 3F 3001
【Registration】URL: https://www.cis-trans.jp/coins_seminar42/index.html

Title : Single Cell Time-Lapse Imaging on Micro-Arrays
- transfection kinetics, apoptosis and cell migration

Abstract :

Automated time-lapse microscopy in combination with micro-patterned surfaces allows for efficient high-throughput monitoring of fluorescent reporter signals at the single-cell level. We show that measurement of individual gene expression traces yields access to mRNA translation efficiency, mRNA lifetime and delivery delay times and hence provides an assay to improve RNA-based gene delivery systems. Secondly, I will demonstrate how single cell time courses of fluorescent markers assess event time correlations and reveal the order of events in apoptotic signaling cascades. Finally, an outlook is given on how micro-arrays can be exploited to characterize migratory phenotypes of benign and malignant cells.

Leonhardt, C., ⋯ J.O. Rädler. “Single-Cell mRNA Transfection Studies: Delivery, Kinetics and Statistics by Numbers.” *Nanomedicine: Nanotechnology, Biology and Medicine* 10, no. 4 (2014): 679–88.

Ferizi, M., ⋯ C. Rudolph, C. Plank, and J.O. Rädler. “Stability Analysis of Chemically Modified mRNA Using Micropattern-Based Single-Cell Arrays.” *Lab on a Chip* 15, no. 17 (2015): 3561–71.

Murschhauser, A. ⋯ K.A. Dawson, J.O. Rädler. "A high-throughput microscopy method for single-cell analysis of event-time correlations in nanoparticle-induced cell death" *Communications Biology, 2019.*

Brückner D.B. ⋯ J.O. Rädler, C.P. Broedersz. "Stochastic Nonlinear Dynamics of Confined Cell Migration in Two-State Systems" *Nature Physics 2019.*

Speaker : Prof Joachim O. Rädler

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Dr. Joachim Rädler studied physics in Bonn, Cambridge (UK) and at the Technische Universität München. In 1993 he received his PhD degree in biophysics under the guidance of Prof. Erich Sackmann. As a post-doctoral fellow at UC Santa Barbara he elucidated with Prof. Cyrus Safinya the liquid crystalline structure of cationic lipid-DNA complexes using small angle X-ray scattering. After a junior group position at the Technische Universität München and senior group leadership at the Max Planck Institute for Polymer Research he became full professor at the Ludwig-Maximilians Universität in 2001.

<Award>

Rädler is member of the Center for NanoScience and the research area nanomedicine within the NanoInitiative Munich. He served as Spokesman International Doctorate Program Nanobiotechnology and coordinator of the Marie-Curie Training Network "Colloidal and Interfacial Properties of Synthetic Nucleic Acid Complexes". Currently he is spokesperson of the collaborative research center „Nanoagents“.

<Key words>
soft matter physics, biological physics, nanomedicine

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