Polytarget
Polymer-based Nanoparticle Libraries for Targeted Anti-inflammatory Strategies
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SPOKESPERSON
Prof. Dr. Ulrich S. Schubert
Laboratory of Organic and Macromolecular Chemistry (IOMC)
Friedrich Schiller University Jena
Humboldtstr. 10
07743 Jena

DEPUTY SPOKESPERSON
Prof. Dr. Michael Bauer
Center for Sepsis Control and Care (CSCC)
Jena University Hospital (JUH)
Am Klinikum 1
07747 Jena

COMMITTEE
apl. Prof. Dr. Michael Gottschaldt
Laboratory of Organic and Macromolecular Chemistry (IOMC)
Friedrich Schiller University Jena
Humboldtstr. 10
07743 Jena

PD Dr. Stephanie Höppener
Jena Center for Soft Matter (JCSM)
Friedrich Schiller University Jena
Philosophenweg 7
07743 Jena

Prof. Dr. Oliver Werz
Institute of Pharmacy (IP)
Friedrich Schiller University Jena
Philosophenweg 14
07743 Jena

CONTACT
Friedrich Schiller University Jena
Jena Center for Soft Matter (JCSM)
Prof. Dr. Ulrich S. Schubert
apl. Prof. Dr. Michael Gottschaldt
Philosophenweg 7
07743 Jena
Phone: +49 3641 9-48200
Fax: +49 3641 9-48202
E-Mail: ulrich.schubert@uni-jena.de
michael.gottschaldt@uni-jena.de
The goal of the CRC PolyTarget is the development of new strategies for the treatment of infection-triggered inflammatory states, centered on a rational design of tailor-made nanoparticulate drug carriers. Pharmacologically active nanoparticles based on functional synthetic polymers and (modified) biopolymers are utilized and characterized to address the fundamental questions of targeted nanomedicine from the bottom up. Based on the establishment of polymer libraries and a detailed molecular and morphological characterization of the nanoparticles, structure-property relationships are studied to optimize the nanoparticles with respect to their biological and pharmaceutical function.

**Projects**

**Core—Project Area A (Felix Schacher)**

A01 Tailor-made multifunctional polymers and nanoparticles with optimized compatibility between biodegradable core and encapsulated drug (U. S. Schubert, M. Sierka)

A02 Tailored nanoparticles with two-step release pattern: New tool for drug delivery (T. Heinze, T. Heinzel)

A03 Photo-triggered swelling and release from core-shell-corona micelles (B. Dietzek, F. Schacher, K.-D. Jandt)

A04 Dual inhibitors of prostaglandin E2 synthase-1 and 5-lipoxygenase as anti-inflammatory payloads in nanoparticles (O. Werz, U. S. Schubert)

A05 Targetable nanoparticles for efficient translocation across gastrointestinal barriers (A. Stallmach, J. Brendel)

A06 Controlling the degradation behavior of polymeric nanoparticles by structurally tailored thermal properties (K.-D. Jandt, U. S. Schubert)

**Shell—Project Area B (Dagmar Fischer)**

B02 Macromolecular prodrug nanoparticles for antimicrobial therapy (A. Brakhage, C. Guerrero-Sanchez)

B03 Guanidinium-containing nanoparticles for gene delivery (K. Peneva, D. Fischer)

B04 In-depth monitoring of surface characteristics and structural changes in block copolymer nanoparticles using tip-enhanced Raman spectroscopy (V. Deckert, F. Schacher)

**Medium—Project Area C (Britta Qualmann)**

C01 Raman spectroscopic characterization of the linkage- and interaction mechanism of nanoparticles and drugs with hepatic stellate cells (J. Popp, S. Schubert, M. Bauer)

C02 Exploiting polymer-based delivery systems for anti-inflammatory indirubin-6BI GOE derivatives in in vitro and in vivo proof-of-principle studies (D. Fischer, O. Werz)

C03 Selective targeting of hepatocytes using multifunctional block copolymer micelles to restore critical cellular signaling functions (M. Bauer, B. Qualmann, F. Schacher)

C04 Investigation of cellular uptake mechanisms by dual TEM and superresolution fluorescence imaging (R. Heintzmann, S. Höppener)

**Z-Projects**

Z01 JCSM research platform for synthesis, formulation, and advanced physico-chemical and biological characterization of nanocarriers (C. Guerrero-Sanchez, I. Nischang, S. Höppener, S. Lorkowski, M. T. Figge)

Z02 Integrated Research Training Group (B. Dietzek, S. Schubert, O. Werz)

Z03 Central tasks of the Collaborative Research Center (U. S. Schubert, M. Bauer, D. Fischer)