JOINT EVENT Ch **31st Nano Congress for Future Advancements**

13th Edition of International Conference on **Nanomedicine and Advanced Drug Delivery**

August 29-30, 2019 London, UK

Diagnostics and therapy using iron oxide nanoparticles- The SEON-concept

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Nanoparticles offer promising new possibilities for a multiplicity of medical applications including therapy and diagnosis of various diseases. Especially iron oxide nanoparticles provide a broad application spectrum as contrast agents, magnetic transporters, or heat carriers in hyperthermia treatment. While particles used for imaging should circulate for extended periods of time in the vascular system, nanoparticles designed for use as drug carriers should be efficiently taken up by the target cells. Importantly, nanoparticles for medical (and several other) applications must be biocompatible, meaning that after contact with cells no adverse effects are elicited. To translate basic findings into clinical trials several requirements such as detailed synthesis and characterization of the nanoparticles, nanotoxicological testings, *ex vivo* models to simulate *in vivo* conditions for appropriate adjustment of the necessary parameters and pre-clinical animal studies have to be addressed. These results are of pivotal importance to start with respective GMP production and approval, which is essential for translating these products into clinical trials (scheme). SEON (Section of Experimental Oncology and Nanomedicine) addresses these issues with a special focus on drug delivery in oncology (1,2,3,4,5,6) and their promising potential applications in cardiovascular (7,8), regenerative medicine (9), imaging (1,10) and infections (11). The aim is the translation of the preclinical results into clinical trials and the respective steps necessary to gain this ambitious object.



The SEON concept - from bench to bedside

Recent Publications

 Unterweger H, Dézsi L, Matuszak J, Janko C, Poettler M, Jordan J, Bäuerle T, Szebeni J, Frey T, Boccaccini AR, Alexiou C, Cicha I: Dextran-coated superparamagnetic iron oxide nanoparticles for magnetic resonance imaging: evaluation of size-dependent imaging properties, storage stability and safety. Int. J. Nanomedicine 13:1899-1915, 2018

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- 2. Zaloga J, Feoktystov A, Garamus CM, Karawacka W, Ioffe A, Brückel T, Tietze R, Alexiou C, Lyer S: Studies on the adsorption and desorption of mitoxantrone to lauric acid/albumin coated iron oxide nanoparticles. Colloids Surf B Biointerfaces 161:18-26, 2018
- 3. Lugert S, Unterweger H, Mühlberger M, Janko C, Draack S, Ludwig F, Eberbeck D, Alexiou C, Friedrich RP: Cellular effects of paclitaxel-loaded iron oxide nanoparticles on breast cancer using different 2D and 3D cell culture models. Int. Journal Nanomedicine 14:161-180, 2018
- 4. Zaloga J, Poettler M, Leitinger G, Friedrich RP, Almer G, Lyer S, Baum E, Tietze R, Heimke-Brinck R, Mangge H, Dörje F, Lee G, Alexiou C: Pharmaceutical formulation of HSA hybrid coated iron oxide nanoparticles for magnetic drug targeting. Eur J Pharm Biopharm 101: 152-62, 2016
- 5. Lyer S, Tietze R, Unterweger H, Zaloga J, Singh R, Matuszak J, Poettler M, Friedrich RP, Duerr S, Cicha I, Janko C, Alexiou C: Nanomedical innovation: the SEON-concept for an improved cancer therapy with magnetic nanoparticles. Nanomedicine (Lond.) 10:3287 304, 2015

Biography

Christoph Alexiou in the year 2000 received his degree as an ENT-Physician and 2002 he changed to the ENT-Department in Erlangen, Germany, where he performed his postdoctoral lecture qualification (Habilitation). He is working there as an assistant medical director in the clinic and leads the Section for Experimental Oncology and Nanomedicine (SEON). Since 2009 he owns the Else Kröner-Fresenius-Foundation-Professorship for Nanomedicine at the Universityhospital Erlangen. He receives grants from the European Union, German Research Community (DFG), Ministry of Education and Science (BMBF) and Bavarian State Ministry of the Environment and Consumer Protection and is a member of the Executive Board of the European Technology Platform for Nanomedicine (ETPN). His research is addressing the emerging fields of Diagnosis, Treatment and Regenerative Medicine using magnetic nanoparticles and the translation from basic research into clinical trials and published >150 papers in peer reviewed journals. He received for his research several national and international renowned awards.

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