

Materials Horizon Journal

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报告人简介、报告题目及摘要:



Prof. Martina Stenzel

University of New South Wales, Australia

Editorial Board Chair of *Materials Horizons*

Martina Stenzel studied chemistry at the University of Bayreuth, Germany, before completing her PhD in 1999 at the Institute of Applied Macromolecular Chemistry, University of Stuttgart, Germany. She then started working as a postdoctoral Fellow at the UNESCO Centre for Membrane Science and Technology at the University of New South Wales (UNSW), Sydney, Australia, before being appointed as lecture in 2002 at the same University. In 2012 she was promoted to full Professor and is now UNSW Scientia Professor and ARC (Australian Research Council) Laureate Fellow. In 2018 she was elected as Fellow of the Australian Academy of Science. Her research interest is focused on the synthesis of functional polymers nanoparticles and their use as drug delivery carriers.

Talk Title: From small to big – glycopolymer nanoparticles on the nano and microscale

Abstract: Nanomedicine is a field of interesting interest. Rapid development of nanotechnology has allowed the incorporation of multiple therapeutic, sensing and targeting agents into nanoparticles. Most commercially available nanoparticles use poly(ethylene glycol) PEG as hydrophilic coatings. However, materials based on sugars such as polymers with pendant carbohydrates, coined glycopolymers, are attractive alternatives. Carbohydrates play a pivotal role in many biological processes and by using glycopolymers we mimic naturally occurring events. The presence of carbohydrates on the surface on nanoparticles can therefore help the uptake of these nanoparticles into mammalian cells. In this presentation, we look into a range of nanoparticles based on glycopolymers, ranging from ultrasmall nanometer sizes nanoparticles to large micron-sized 2D platelets and discuss how these particles can be used in drug delivery applications.

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Dr. Guoping Chen is Group Leader of National Institute for Materials Science (NIMS) and Professor of University of Tsukuba, Japan. He received his Ph.D. from Kyoto University in 1997 majoring in Biomaterials and did postdoctoral research until 2000. He became Researcher in 2000 and Senior Researcher in 2003 at Tissue Engineering Research Center, National Institute for Advanced Industrial Science and Technology, Japan. He moved to Biomaterials Center, NIMS as Senior Researcher in 2004 and was promoted to Group Leader in January, 2007. He served as Principal Investigator and Unit Director of Tissue Regeneration Materials Unit from April, 2011 to March, 2015; Principal Investigator, Field Coordinator and Unit Director of International Center for Materials Nanoarchitectonics, NIMS from April, 2015 to March, 2017. He concurrently joined the Joint Doctoral Program in Materials Science and Engineering, University of Tsukuba as Professor in 2013. His research interests include tissue engineering and regenerative medicine, polymeric porous scaffolds, photothermal scaffold, nanobiomaterials, biomimetic biomaterials, nano/micro-patterning and surface modification.

Talk Title: Design and Fabrication of Multi-functional Scaffolds for Biomedical Applications

Abstract: Porous scaffolds can serve as not only templates to control cell functions for regeneration of functional tissue and organs, but also carriers to load therapeutic drugs and nanoparticles for therapeutic applications. Some multi-functional scaffolds of biodegradable polymers and extracellular matrices have designed and fabricated for biomedical applications. The first type is porous scaffolds prepared by using pre-

prepared ice particulates. The method could precisely control the porous structures of scaffolds of natural polymers. Scaffolds with open and interconnected porous structures were prepared to facilitate cell seeding and migration. The method was also used to create the micropatterned pore structures in scaffolds. The micropatterned porous scaffolds were used for muscle tissue engineering. The second type of scaffolds is composite scaffolds of synthetic polymers and natural polymers. Collagen sponges or microsponges were incorporated in the pores or openings of mechanically strong PLLA or PLGA porous skeletons to form the composite structures. The PLLA or PLGA skeletons provided high mechanical strength, while the collagen sponges and microsponges facilitated cell interaction. The third type is biomimetic ECM scaffolds prepared by using cell culture technology. The method was used to prepare ECM scaffolds from different types of cultured cells. The composition of the ECM scaffolds was dependent on the cell type and phenotype that were used to prepare the scaffolds. The method was also used to prepare autologous ECM scaffolds that were prepared from patients' own cells. The autologous ECM scaffolds had excellent biocompatibility. Furthermore, stepwise tissue-mimicking ECM scaffolds were prepared by controlling the stepwise differentiation of stem cells. Matrices and scaffolds mimicking the stepwise osteogenesis, chondrogenesis and adipogenesis were prepared. These porous scaffolds were used for 3D culture of fibroblasts, myoblasts, chondrocytes and bone marrow-derived MSCs for tissue engineering of dermis, muscle, cartilage and bone. The fourth type is photothermal scaffolds prepared by hybridization of photothermal agents such as gold nanoparticles and black phosphorus nanosheets with biodegradable polymers. The photothermal scaffolds possessed high photothermal conversion capacity and could ablate breast cancer cells under near infrared laser irradiation. The photothermal scaffolds also facilitated adipogenic differentiation of human mesenchymal stem cells. The photothermal scaffolds should be useful for both photothermal ablation of breast cancer cells and breast tissue engineering.

Dr. Michaela Muehlberg

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Dr Michaela Muehlberg is Executive Editor for the RSC's Materials & Nano portfolio including Materials Horizons, Journals of Materials Chemistry A, B and C, and Nanoscale Horizons and Nanoscale. She has been with the Royal Society of Chemistry since 2014 working on a variety of RSC journals including RSC Advances, Chemical Communications and Faraday Discussions. Previous to that she studied chemistry at the Free University of Berlin, Germany and Université Paris-Sud, France, and obtained a PhD in bioorganic chemistry from the Free University of Berlin, Germany and the Leibniz-Forschungsinstitut für Molekulare Pharmakologie (FMP), Germany.

Talk Title: Publishing with the RSC

Abstract: An introduction to the Royal Society of Chemistry and a quick guide on the publishing process and what to be aware of when writing your research article.