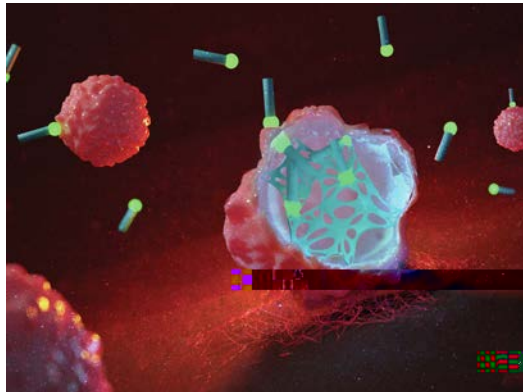


Materials Talking to Cells

Wouldn't it be existing if we could design soft materials that could actively integrate into cells or tissue and stimulate cellular responses? Can we envision materials instructing cells to grow, proliferate or induce apoptosis? How would such materials look like and would we be capable of learning the language of cells and translate them into communicating materials? In this presentation, Prof. Tanja Weil will first discuss how to create structurally precise polymeric nanostructures by applying the DNA origami technique. Then, She will present the identification of bioactive peptide nanostructures stimulating neuronal cell growth without growth factors or concentrating virions at the cellular membrane, which is attractive for applications in regenerative medicine and gene therapy. The controlled formation of peptide nanostructures within the cytoplasm by chemical cascade reactions provides new avenues as metabolic inhibitors for cancer therapy. Ultimately, this field requires a materials revolution to design soft materials resembling certain features of living matter so that they could communicate and stimulate desired cellular processes such as those required for regeneration or cancer therapy, among others.





Prof. Dr. Tanja Weil studied chemistry (1993–1998) at the TU Braunschweig (Germany) and the University of Bordeaux I (France) and completed her PhD at the MPI for Polymer Research (MPIP) under the supervision of K. Müllen. In 2003, she received the Otto Hahn Medal of the Max Planck Society. From 2002 to 2008 she managed different leading positions at Merz Pharmaceuticals GmbH (Frankfurt) from Section Head Medicinal Chemistry to Director of Chemical Research and Development. In 2008 she accepted an Associate Professor position at the National University of Singapore. Tanja Weil joined Ulm University as Director of the Institute of Organic Chemistry III / Macromolecular Chemistry in 2010. Since 2017, she has been appointed as one of the Directors of the Max Planck Institute for Polymer Research in Mainz. She has received competitive funding at both national and international level including a Synergy Grant of the European Research Council (ERC) and she serves in many advisory boards and steering committees: Tanja is a member of the Senate of the German Research Foundation, of the Senate of the Leibniz Association and of the Leibniz evaluation panel and the Kuratorium of Angewandte Chemie. She served the journal ACS Nano as Associate Editor (2018-2020) and she is Associate Editor of J. Am. Chem. Soc. Since 2021. Her scientific interests focus on innovative synthesis concepts to achieve functional macromolecules and hybrid materials to solve current challenges in biomedicine and material science.