

Expert Opinion

Conference report on particles 2010 focusing on particle-based advances in medical/biochemical diagnostic, pharmaceutical and drug delivery application in particle technology

Helmuth Möhwald

*Max Planck Institute of Colloids and Interfaces, Department of Interfaces, Science Park
Potsdam-Golm, Potsdam, Germany*

Keywords: drug delivery, medical/biochemical diagnostic, nanoparticles, particle technology

Expert Opin. Drug Deliv. (2010) 7(11):1247-1249

There has been tremendous progress in recent years in preparing micro- and nanoparticles with controlled properties as regards interactions, release, mechanics, stability and biocompatibility, and much potential is expected in application in pharmacy and medicine. However, there are also tremendous obstacles to bridging between various sciences and technologies up to the level of the clinician. This cross-talk and cooperation between the many disciplines involved and elaboration of the most prospective opportunities were the main tasks of Particles 2010, held in Orlando, Florida, 22 – 25 May 2010.

It assembled 400 participants from all continents and was organized by Particles Conference of Rochester, NY, under the General Chair of John Texter. The theme returned to that of previous meetings of this annual series in 2002 and 2006, and the intended and needed interdisciplinarity papers from MD clinicians were mixed with those from physicists, chemists and materials scientists, also including contributions from companies specializing in characterization, production and application of particles.

Altogether 227 oral papers were presented in 4 – 5 parallel sections in an intense 3-day, 3-evening program. In addition 91 posters were presented, permanently on display, and the best posters of each evening were presented the Plasma Chem Prize (Plasma Chem GmbH, Berlin).

After the traditional Saturday evening opening mixer, the technical program commenced Sunday morning with a plenary lecture by Haruma Kawaguchi of Kanagawa University on Stimuli Responsive Coloring Particles. This lecture illustrated diverse ways of preparing stimuli responsive particles, mostly hydrogels. Both thermal and photo-activated responsiveness were illustrated. The second plenary lecture on Monday morning was delivered by Helmuth Möhwald of the Max Planck Institute for Colloids and Interfaces on Nanocarriers with Controlled Release for Materials and Biosciences (Figure 1). Möhwald discussed encapsulation using layer-by-layer methods and making such nanocapsules photoresponsive by including metallic nanoparticles in the encapsulating shells. He also discussed ultrasonic, thermal, pH, redox and salt stimuli-induced release mechanisms. Jim Adair of Penn State University delivered the final plenary on Targeting Tumors with Hybrid Nanoparticles. He spoke mostly about his calcium phosphosilicate nanocomposite particle platform going into clinical trials to fight breast and pancreatic cancers.

informa
healthcare

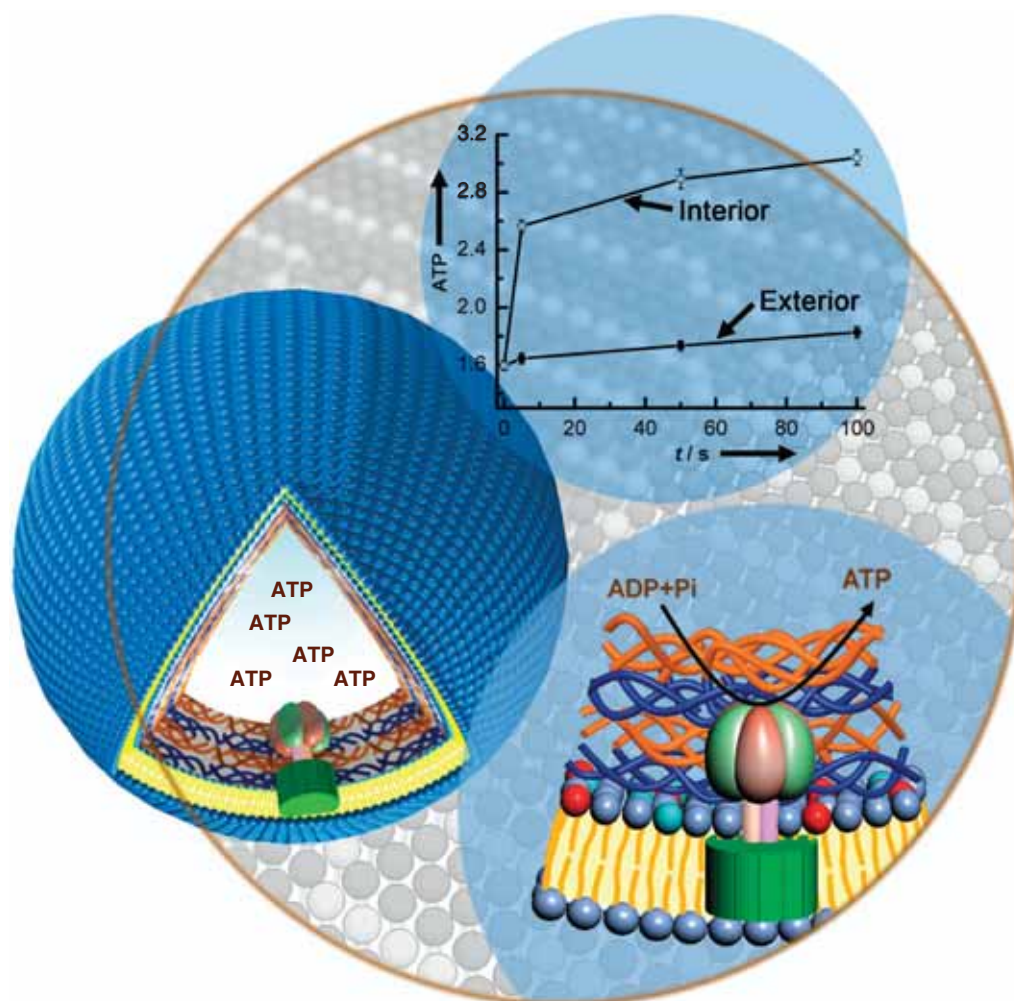


Figure 1. The figure shows a capsule with a wall consisting of a polyelectrolyte multilayer stabilizing a lipid bilayer with the membrane protein ATPase incorporated. Bottom right: a close look at the capsule wall with a chemical gradient across the wall converted into ATP synthesis. Top: the time dependence of ATP production inside and outside the capsules.

Reproduced with permission from Li Duan, Qiang He, Kewei Wang, et al. Adenosine triphosphate biosynthesis catalyzed by FoF1 ATP synthase assembled in polymer microcapsules. *Angew Chem Int Ed* 2007;46:6996-7000. Copyright © Wiley-VCH Verlag GmbH & Co. KGaA.

The symposia spanned a wide array of topics, and included 3 full days of nanoparticle and hydrogel synthesis, 2.5 days on diagnostics testing, 1.5 days on encapsulation and release, full days on particle characterization, gene and siRNA delivery, targeting, and particle toxicology, and half-days on general papers, inhalation, surface modification, vaccine delivery, and oral and transdermal delivery.

A very wide range of papers were presented that ranged from advanced materials to targeted nanoparticles for cancer therapy, and this interdisciplinarity remains the strength of this conference series. An interesting addition at this event was a record number of clinical physicians at the podia, with more than a half-a-dozen, in comparison with only one at the 2001 conference. Among these Omid Farokhzad of Harvard and Mass General Hospital gave a stimulating

keynote lecture on technical and start-up aspects of nanoparticle delivery in current practice and clinical trials.

It is probably unfair to ask for the one highlight of the conference in terms of science or applications. This is not to be expected, as the field is difficult and diverse. Many 'small' steps therefore have to be combined, and applications in terms of delivery and diagnostics are also manifold. Therefore, one may better ask for progress, and this was obvious from the contributions. In terms of the objective to stimulate cross-disciplinary cooperation, this was definitely achieved. Also contributing to this was the friendly and open atmosphere that was created by Melanie Martin and her team. Owing to this the conference series, selecting different topics around particles, has acquired a firm place for scientists in the field. The format, annually

choosing different topics but every 4 years returning to a previous one, appears optimum, and I, like other colleagues, look forward to seeing the progress in this specific topic in 2014.

Affiliation

Helmuth Möhwald
Professor,
Director Department of Interfaces,
Max Planck Institute of Colloids and Interfaces,
Science Park Potsdam-Golm,
14424 Potsdam, Germany
E-mail: Helmuth.Moehwald@mpikg.mpg.de

Declaration of interest

The author states no conflict of interest and has received no payment in preparation of this manuscript.