Emerging trends in nano- and microencapsulation science: hallmarks of the 22nd International Symposium on Microencapsulation

Fabio Rocha Formiga^{1,2} · Bruno Sarmento^{3,4}

Accepted: 6 October 2020 / Published Online: 23 October 2020
© Controlled Release Society 2020

Nano- and microencapsulation is at the cutting edge of modern drug delivery research and formulation development towards pharmaceutical, biotechnology, food and engineering applications [1]. From this perspective, the International Symposium on Microencapsulation (ISM) has been a well-established series of international symposia, which are usually held every two years. This special issue contains a number of contributions associated to the 22nd edition of ISM, held between 25 and 27 September 2019 in Salvador, Bahia, Brazil. The symposium was co-hosted by the Oswaldo Cruz Foundation (FIOCRUZ) together with the Federal University of Bahia (UFBA).

The main focus of this conference was to establish a discussion forum for the community of scientists, technicians and students in the microencapsulation and the next generation of this field – nanotechnology. A pre-symposium event, the international course “Emerging Trends in Nanobiotechnology & Nanomedicine” offered plenty of networking opportunities and knowledge for young researchers and students. With over 250 attendees and more than 170 submitted abstracts, the scientific program of 22nd ISM included plenary lectures and parallel sessions with keynote speakers from Brazil, Argentina, Portugal, Spain,

France, Italy, Denmark and Turkey. In addition to present new findings, they discussed various aspects shaping the future of the nano- and microencapsulation science.

This special issue includes carefully selected, high quality contributions related to the field of nano and microencapsulation. These articles cover a plethora of topics, reflecting the wide interest for use of nano- and microparticles for delivery and targeting of biopharmaceuticals, antiparasitics, anti-inflammatory and anticancer drugs. Of note, new drug delivery systems such as liquid crystalline nanodispersions, DNA polymer films and cubosomes have been explored. Still, an interface between drug delivery and biomaterials is highlighted in manuscripts focusing natural products and otolith scaffolds. Special emphasis is dedicated to drug and vaccine delivery in treatment and prevention of neglected tropical diseases, as presented by Prof. Sevda Şenel (University of Hacettepe, Turkey). In an elegant strategy, inhalable starch/carrageenan microparticles were developed for simultaneous delivery of anti-tuberculosis drugs, as presented by the research team led by Prof. Ana Grenha (University of Algarve, Portugal). The manuscript authored by Prof. Juan Irache and colleagues (University of Navarra, Spain) describes zein nanoparticles coated with a polymer conjugate of Gantrez® and thiamine as a smart formulation able to enhance the intestinal absorption of insulin.

Other big ideas featured in this special issue focus on nano- and microparticles and their role in cancer diagnosis and treatment. For a case in point, Aline de Souza et al. (Federal University of Ouro Preto, Brazil) developed PLA-PEG nanospheres for peptide-mediated targeting to colorectal cancer detection by combining phage display technique and nanoprecipitation. In turn, an interesting research performed by Prof. A.C. Tedesco and his team (University of São Paulo, USP, Brazil) assessed the efficacy of DNA polymer films as a drug delivery system for photodynamic therapy of mucosal cancer. Ferreira et al., from the São Paulo State University, UNESP, Brazil,

✉ Fabio Rocha Formiga
fabio.formiga@fiocruz.br

Bruno Sarmento
bruno.sarmiento@ineb.up.pt

¹ Instituto Aggeu Magalhães, Fundação Oswaldo Cruz (FIOCRUZ), Recife/PE, Brazil

² Programa de Pós-Graduação Em Biologia Celular E Molecular Aplicada, Universidade de Pernambuco (UPE), Recife/PE, Brazil

³ i3S – Instituto de Investigação e Inovação em Saúde & INEB – Instituto de Engenharia Biomédica, Universidade Do Porto, Porto, Portugal

⁴ CESPU, Instituto de Investigação E Formação Avançada Em Ciências E Tecnologias da Saúde, Gandra, Portugal

elaborated mucoadhesive chitosan-PLGA nanoparticles to co-deliver alpha-cyano-4-hydroxycinnamic acid (CHC) and the monoclonal antibody cetuximab (CTX) into the brain, by nasal administration. Thus, these authors reported a novel therapeutic possibility for glioblastoma treatment.

The importance of designing and developing robust formulations for nasal administration is illustrated by Manoel Ortiz et al., from the Federal University of Rio Grande do Sul, Brazil. They report a microagglomerate powder of budesonide-loaded lipid-core nanocapsules with improved efficacy in asthmatic mice. As potential solutions for treatment of neglected tropical diseases, nanoparticulate drug delivery systems may provide novel mechanisms for targeted drug delivery within the host. In this sense, the article by Matos and colleagues presents the development of nanoemulsions containing amphotericin B (AmB) to treat cutaneous leishmaniasis. This study performed in the Federal University of Rio de Janeiro, Brazil, demonstrated lower cytotoxicity and higher in vitro anti-leishmanial effect of AmB-nanoemulsions in comparison with free AmB.

A very important parallel event during the ISM symposium was the establishment of the CRS Brazilian Local Chapter (Instagram and Twitter: [@brazilcrs](#)), of high relevance for the Drug Delivery and Translational Research, mobilizing students, young scientists, professors and industry members interested in Controlled Release Science. Opportunely, the E-book of the 22nd ISM is now available for download on the website of the CRS Brazilian Local Chapter (<https://brazilcrs.com>).

This special issue would not have been possible without the significant role of reviewers, even with disruption caused

by the COVID-19 pandemic in their agenda. We would also like to acknowledge the editorial assistance provided by Springer staff. Specially, we would like to thank Prof. Maria José Alonso, Editor-in-Chief, for agreeing to host a special issue from the 22nd ISM in Drug Delivery and Translational Research. We hope that this issue may have broad appeal to the readership of DDTR, providing relevant information and stimulating novel ideas.

The series of international symposia continues rethinking the nano- and microencapsulation field for tomorrow. The 23rd ISM is planned to be held in Ferrara, a cultural UNESCO World Heritage Site in Italy, coordinated by Prof. Gaia Colombo (Chair), from the University of Ferrara. Originally scheduled to be held on September 2021, the Local Organizing Committee decided to postpone the 23rd ISM to 2022 due to the uncertainty associated with COVID-19. Until then, we hope it is safe for us to meet again.

Reference

1. Clogston JD, Hackley VA, Prina-Mello A, Puri S, Sonzini S, Soo PL. Sizing up the next generation of nanomedicines. *Pharm Res.* 2020;37:6. <https://doi.org/10.1007/s11095-019-2736-y>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.