

Editorial

Nanobioactive Structures for Drug Targeting and Delivery

Nowadays, the applications of nanotechnology in the biomedical field are gaining more and more importance to solve major challenges concerning diagnosis, treatment and prevention. The rapid diagnosis using specific nano-sensors or other nano-based devices could contribute to the implementation of an early and targeted treatment in an initial stage of disease. Moreover, nano-carriers have significantly improved the therapeutic regimens, by increasing drugs bioavailability, target site specificity, patient compliance, cost-effectiveness, assuring the sustained and controlled release and reducing the toxicity and side-effects. This special issue selected some reviews with the aim to present the newest and most important directions concerning the application of nanotechnology for the improvement of chronic diseases diagnosis and drug delivery, with a particular focus on tumoral cells tracing and cancer treatment.

Paul Cătălin Balaure *et al.*, report a state-of-the art review of the most relevant achievements in the field of smart synthetic polymer nanocarriers with a special emphasis on the outstanding potential of these nanovehicles to be used as multifunctional devices capable to deliver their cargo to a specific targeted area in the human body and to release it in a well controlled fashion. Stimuli-responsive nano-drug delivery systems are presented according to the endogenous (pH, redox potential, enzymes) or exogenous (temperature, light, magnetic field) nature of the stimuli.

Chun-Ting Lee *et al.* introduced the readers in the applications of vinca alkaloids as a drug delivery system and in the combined therapy. **Oguzhan Gunduz** *et al.*, summarized the existing types of mesoporous silica, methods of modifying their surfaces and their main applications, for the removal of the organic and heavy metal ions (Pb, Cd, Zn, Ar, Cr etc.) from the wastewater and as carriers for the controlled release of drugs used in chemotherapy, such as cisplatin, carboplatin and oxalilplatin, paclitaxel, camptothecin, irinotecan, rapamycin, doxorubicin etc. **Meng-Shiue Lee** *et al.* review the implantable drug-delivery systems in current research with a focus on applications and chip performance as well as the comparison of passive and active delivery systems. **Yung-Sheng Lin** *et al.* discuss about the applications of four common nano-carriers (e.g. liposomes, nanoparticles, dendrimers and carbon nanotubes) for the encapsulation and delivery in active forms of antimicrobial substances. **Roxana Cristina Popescu** *et al.* presented the applications of gold nanoparticles in the cancer treatment and immunization by nano-vaccines. The interest for this type of nanoparticles is given by their ability to penetrate blood vessels and tissue barriers and to be directed to a specific cell by means of specifically functionalized molecules. Moreover, AuNPs possess special properties which make them useful in the concomitant cancer diagnostic (medical imaging) and treatment (tumor ablation by photothermal activation). **Hsu-Chao Hao** *et al.* paper gives an overview about the recent progress in the identification of circulating tumour cells (CTC); the developed approach has a simple workflow and scalable multiplexing, properties which make it ideal for further development of CTC biomarkers.

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