

Editorial

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A warm welcome to the final issue of this third volume of *Bioinspired, Biomimetic and Nanobiomaterials* (BBN) before the winter season starts – at least in the northern hemisphere. Our journal has greatly advanced over the last year as we are now listed by the major indexing organisations, including Web of Science, and we are expecting an impact factor for the journal in June 2015. Furthermore, a survey of paper download rates already shows prosperous development for BBN.

We recently experienced a change in the editorial office. Sohini Banerjee was the Managing Editor from the establishment of BBN three years ago. She has now left ICE publishing to promote her career in another publishing environment. On behalf of the board members and our readers, I would like to thank Sohini Banerjee for all her work, effort and time she committed to BBN. She supported the journal, BBN, with a tremendous amount of energy. It was a pleasure developing the journal together with her.

I would also like to welcome Dr Sarah Brown, who took over the duties as Managing Editor for BBN. During the short time she has been managing the journal, we have already had intense discussions and competent exchanges on the publication issues, which will further advance BBN. It is great to have her on board, and I am really looking forward to the progress of BBN with her as Managing Editor.

The content of the present fourth issue of the third volume covers contributions from all areas of biological and biomaterials research. This issue includes studies on biological structures, which exhibit special properties and shine light on new functional characteristics. The other presented topics are related to drug delivery and innovative approaches for the application of biopolymer-based scaffolds for various applications.

The first paper provides a new viewing angle on biological optical systems. The authors investigated the wings of a dragon fly¹. The wings of the studied species exhibit a blue to purple colour in nature. The authors showed that the surface of dragonflies carries a submicron multilayer system. The different colours of the wings are attributed to a nanoscale multilayer interference system. These findings are supported by a finite-difference time-domain simulation. The combination of experiments and simulation is an extremely practical tool to validate postulations related to the development of new materials. It shows that optical devices from organic (bio)polymeric compounds might be readily fabricated.

The controlled application of drugs is still a profoundly challenging matter. The correct dosage of a drug has to be released from a system in order to maintain a therapeutic level and not provoke toxic events. The main goal of research in this field is to achieve a sustained release of the drug. Ghaith and Connolly² use a standard and renowned mesoporous silica system (SBA-15) obtained from sol-gel processing to study drug release. The authors address differently treated silica-based SBA-15, the properties of which were altered by either calcination or chemical functionalisation. The release characteristics of ciprofloxacin hydrochloride monohydrate, an important antibiotic pharmaceutical drug, distinctly show that chemical modification of mesoporous silica provides an improved control. The results should initiate further research on the chemical modification of drug-delivery systems.

The following two papers are dedicated to the use of biopolymer compounds for the fabrication of scaffold materials in various fields of application. The first contribution³ introduces the application of a rapid prototyping technique as an attractive method of preparing scaffolds by melt extrusion of PLA-HA composite. The fabrication of scaffolds by melt extrusion was made possible by using compatibilisers (i.e. polyacrylic acid and maleic anhydride). Bone-forming stem cells were seeded onto the scaffold and their proliferation behaviour was studied. The compatibilisers do not elicit any negative effect on cell viability and proliferation. In addition, they demonstrate successful application of desktop melt-extrusion rapid prototyping technique for fabricating PLA-based biocomposite, which permits the extrusion of composite without any additional preparation steps of filament or any other precursor forms. The fabricated scaffolds show an enhanced hydrophilicity and biodegradability and could trigger extensive research in this field.

The second paper dealing with biopolymer scaffolds examines the challenging and important field of cardiac deficiencies (i.e. ischaemic heart disease where a cardio patch implantation is intended to replace the degraded tissue)⁴. The real challenge here, which probably applies for any biomaterial, is to generate a material with similar structural and functional features, or that mimics the original delicate cardiac tissue. The authors of this paper focus on the use of silk as natural delicate protein-based biopolymer as a structural component together with collagen as the main representative extracellular matrix. The idea is to generate hydrogels from these two biopolymer components and the basic film-forming properties of this novel type of material as biomimetic materials for cardiac tissue are discussed.

The final contribution to our present issue reports on manufacturing a unidirectional porous hydroxylapatite, which exhibits a structure with unidirectional and interconnected pores by application of a freeze-casting method⁵. The resulting samples exhibit satisfactory strengths, which are not usual for these types of compounds. The authors investigate the important osteoconductive capacity and bioresorbable property of this material in a long-term animal model (canines for three years). The unidirectional porous hydroxylapatite is bioresorbable and facilitates bone regeneration after several years of implantation. As the authors note, this study has to be extended to increase the number and size of samples in order to improve the data. Despite this, their work distinctly shows the benefits of anisotropically structure implant materials facilitation bone reconstruction.

Finally, I want to introduce a new type and section of publications to our readers. With this issue we are implementing a section on reviews of recently published scientific books related to our field, to which I have made the initial contribution. This section will appear whenever we obtain a book review. So, I invite you to discuss recent publications and submit your book review to our editorial office. Please consult our Managing Editor Dr Sarah Brown before you submit your book review. Please note that BBN publishes its most recent articles ahead of print on its Virtual

Library homepage (<http://www.icevirtuallibrary.com/bbn>). This enables the community to quickly access fresh content.

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REFERENCES

1. Liu, D.; Gu, J.; Li, Z. *et al.* The study on the dragonfly's wings and the structural colors. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, *3*(4), 193–198.
2. Ghaith, E.-S.; Connolly, S. Evaluation of mesoporous SBA-15 for the controlled delivery of ciprofloxacin hydrochloride. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, *3*(4), 199–207.
3. Nainar, S. M. M.; Begum, S.; Ansari, M. N. M. *et al.* Effect of compatibilizers on in vitro biocompatibility of PLA–HA bioscaffold. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, *3*(4), 208–216.
4. Yeelack, W.; Benjakul, S.; Meesane, J. A mimicked collagen layer/silk fibroin film as a cardio patch scaffold. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, *3*(4), 217–227.
5. Noguchi, H.; Sakane, M.; Watanabe, A. *et al.* A novel unidirectional porous hydroxyapatite in canines. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, *3*(4), 228–234.