Photonics and Nanotechnology in Biophysics and Biomedical Research

We are delighted to present a collection of six papers in this special section of the *Journal of Biomedical Optics* on the use of photonics and nanotechnology in biophysics and biomedical research. Three of these papers are related to the use of optical nanomaterials for imaging and phototherapeutic applications. Specifically, Bahmani et al. investigated the effect of polyethylene glycol (PEG) coating on the resulting uptake of optical polymeric nanocapsules by human spleen macrophages *in vitro*. The investigators report that PEGylation delays the uptake of these nanocapsules by at least six hours, providing a potentially effective strategy to increase the circulation time of these nanocapsules for *in vivo* imaging and phototherapeutic applications.

Sarkar et al. investigate the effects of various types of carbon nanotubes on the resulting optical properties of a breast tumor phantom. They report that multiwalled carbon nanotubes induce the greatest relative increase in optical absorption of the phantom within the 800- to 1100-nm wavelength range, as compared to single-walled carbon nanotubes and single-walled carbon nanohorns.

The third paper on optical nanomaterials by Agarwal et al. describes the utility of gold nanorods for dual photoacoustic and nuclear imaging, particularly in relation to monitoring antirheumatic drug delivery. The investigators demonstrate the effectiveness of these nanoconstructs for drug-delivery monitoring and imaging in a rat model.

Two papers in this special section are related to the use of optical tweezers in studying the biophysics of cells and macromolecules. Banerjee et al. present a review article on the use of optically trapped beads to probe biophysical phenomena and utilize the concept of robotic gripping to describe different experimental setups. Difato et al. report a study where they have employed holographic optical tweezers in conjunction with an ultraviolet laser microdissector to quantify the tension release in partially ablated neurites.

Finally, Chen et al. utilize multiphoton microscopy to study the morphology and quantity of collagen and elastin in keloid disease. Their results provide insight into the molecular mechanisms involved during the developmental process of keloid.

We hope that this collection of papers will be of interest to the biophotonics community in general, and the researchers in nanotechnology and biophysics in particular. We thank the researchers for their outstanding contributions.

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Special Section Guest Editors