

FOREWORD

We are pleased to present the Vol. 2, No. 2 issue of the *Journal of Innovative Optical Health Sciences* (JIOHS), which focuses on new developments in photon migration and small animal imaging. New ways are being explored in the fields of photon migration and small animal imaging to investigate the accurate modeling of photon propagation in small animal volumes and novel imaging techniques for studying molecular changes in living animals. The research is expected to have a major impact on cancer detection, individualized treatment, and drug development, as well as our understanding of how cancer arises. The ultimate goal is to use the imaging techniques to detect cancers and monitor their response to therapy in human patients. This special issue on photon migration and small animal imaging includes 10 contributed papers.

Native photon-tissue interactions can give intrinsic optical imaging contrast and have allowed the disease studies. S. Jacques, one of the pioneers in the field of tissue optics, presented the basics of spectral imaging and analysis. T. Yun *et al.* investigated the propagation of polarized light in fibrous tissues by using Monte Carlo method, providing an anisotropy model to reveal the orientation of cylindrical structure in fibrous tissues and polarization imaging parameters. T. Li and S. Wang studied the optical characteristics when the light crosses the 3D air flow field in the Moire chromatography technique. In the fourth article, an image reconstruction approach based on 2-layered BP neural network for near-infrared optical tomography was reported by T. Li *et al.*, allowing the fast reconstruction of tissue optical properties. Following that, B. Yuan presented a computational model for rapid laminar optical tomography by applying delta-P1 approximation.

The following is more focused on small animal imaging. Z. Xu and J. Bai proposed a non-stop dynamic sampling mode for fluorescence tomography to improve the speed of optical measurement. Then, X. Liu *et al.* demonstrated that a near-infrared fluorescence (NIRF) probe, Cy5.5-d-glucosamine, can detect arthritic tissues in living mice, showing potential for the assessment of anti-inflammatory treatments. Optical imaging instrumentation allows for high-sensitivity noninvasive imaging of diffuse light and molecular parameters. A catheter-based optical diffusion and fluorescence probe was reported by C. Du *et al.* to study the functional changes in living rat brain. Using a near-infrared light flood-illumination imager, X. Yao *et al.* observed transient intrinsic optical signals of stimulus-evoked retinal activity in isolated intact frog eye. The special issue then ends with an article by F. Zhou *et al.* investigating the role of Bax in the mitochondrion-mediated apoptosis induced by Photofrin-PDT by using the GFP-Bax plasmid.

The papers in this issue showcase the current technology in photon migration and small animal imaging by capturing the new developments and applications for noninvasive measurements in entire animals. The editors would like to thank all authors and reviewers for their dedicated efforts that have made this special issue possible.

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