DEAR READERS!

Optical bioimaging technologies such as optical coherence tomography, confocal and multiphoton microscopy, including fluorescence lifetime imaging microscopy, Raman spectroscopy, and diffuse optical spectroscopy are currently the most popular research methods in biology and medicine. The combination of diagnostic and therapeutic applications of light opens the way for new developments in biomedical engineering.

The special issue of "Fluorescence for Biomedicine", based on the talks presented at the Russian conference with international participation "FluoBiomed-2024", includes 12 publications describing the latest advances in optical technologies for interrogations of biological tissues both healthy and with pathology.

The first group of articles reveals the possibilities of optical metabolic imaging of tumor cells based on the measurements of the time-resolved fluorescence signals (Pominova D.V. et al., Ryabova A.V. et al., Yuzhakova D.V. et al.). The second group of articles focuses on the tumor therapy — sonodynamic therapy using porous silicon (Osminkina L.A. et al.) and theranostics based on nanoparticles (Peltek O. et al.). The special issue also presents a study that uses a multimodal approach (Raman microspectroscopy and scanning ion-conducting microscopy) to explore neurons in Parkinson's disease (Morozova K.I. et al.), a study on building up individual maps of brain tumors using diffusion-kurtosis magnetic resonance imaging (Pogosbekyan E.L. et al.), as well as studies using confocal microscopy: an investigation of the migration of regulatory T lymphocytes into the tumor during the dynamic growth of glioblastoma (Yanysheva E.P. et al.) and a study of the mechanisms of the cytoprotective effect of sodium fumarate in modeling acute hypoxia *in vitro* (Vinokurov A.Yu. et al.). It is not possible to discuss modern optical imaging methods without artificial intelligence technologies — this is the subject of a comparative analysis of algorithms for the segmentation of three-dimensional OCT images of human skin using neural networks (Shishkova V.A. et al.). A summary of the main achievements of scientists is presented in the reviews on tissue engineering and 3D bioprinting (Revokatova D.P.) and on optical diffusion tomography for investigation of the rare endogenous fluorophores (Bylinskaya K.A. et al.).

We hope that the presented articles will inspire researchers to further develop optical methods and their application in biomedicine and clinics.

Sincerely,
Editors of the special issue

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