

The group of mono- and di-metal-complexes with the Gd and Pd ions in cyclen and Pd and Cu in chlorin macrocycle was obtained on the basis of the conjugates synthesized. The spectral properties of the metal complexes obtained, the generation of singlet oxygen, and other physico-chemical characteristics vital for the creation of efficient theranostic agents in oncology were studied.

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### References

1. Grin M.A., Brusov S.S., Khrenova M.K., Smirnov A.S., Mironov A.F. Conjugates of natural chlorins with cyclen as chelators of transition metals // *Mendeleev Commun.* 2017. Vol.338-340.

## OPTICAL METHODS OF PROCESSING BIOMEDICAL IMAGE OF RETINAL MACULAR REGION OF THE EYE

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**Purpose** of the work is to improve the efficiency of medical diagnosis of the eye disease by creating new technology edge in optical coherence tomograms macular area of the retina of the eye.

**Methods.** Optical coherence tomography is the method of ophthalmic studies which allows to receive the image of optically transparent eye tissues with high spatial resolution. To receive the tomograms, the optical coherence tomography device STRATUS OCT 3000 (Carl Zeiss) had been used, which has the following features: diagnostics of pathologies of the bottom of the fundus, the early diagnosis of glaucoma tracking pathology of retina and optic nerve in the dynamics, the fundus picture, optical coherence tomography of the anterior part of the eye.

**Results and discussion.** For the determination of the contour in the tomogram of the retina macular area, there had been carried out a number of transformations on of the above image as follows. Preliminary analysis of the images of cellular structures during histological studies

allows to make a conclusion that most of the images in the process of their formation (photography, scanning, etc.), are influenced by a number of negative factors that lead to the appearance of fuzzy and noisy areas. Vertical limits of the output image correspond to the pixels with high modulus values on the final image. Therefore, the different filters are filters which find the edges.

The above allows to state that the application of our processing technology to the tomogram of retina macular area of an eye allows to achieve the better efficiency in contour determination.

**Conclusions.** The results are essential for the determination of the small sized changes in the macular area of an eye retina. It allows the expert to evaluate the degree of the visual acuity as well as to trace the dynamics of the pathological changes, which is especially important in the modern ophthalmology.

### References

1. Pavlov S.V., Vassilenko V.B., Saldan I.R., Vovkotrub D.V., Poplavskaya A.A. et al. Methods of processing biomedical image of retinal macular region of the eye // Proc. SPIE 9961. Reflection, Scattering, and Diffraction from Surfaces V 2016. 99610X (September 26, 2016).
2. Romanyuk O.N., Pavlov S.V., Melnyk O.V., Romanyuk S.O., Smolarz A. et al. Method of anti-aliasing with the use of the new pixel model // Proc. SPIE 9816. Optical Fibers and Their Applications 2015. 981617 (December 18, 2015). DOI: 10.1117/12.2229013.
3. Romanyuk S.O., Pavlov S.V., Melnyk O.V. New method to control color intensity for antialiasing // Control and Communications (SIBCON). 2015 International Siberian Conference (May 21-23, 2015). DOI: 10.1109/SIBCON.2015.7147194.

## THE EFFECTS OF LASER RADIATION ON LIVING ORGANISMS

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Laser medical technologies are widely used in therapy, diagnostics and pharmacy. They are distinguished by their diversity, complexity and multidimensionality of acting factors. However, there are some doubts about sufficient evidences of modern therapeutic laser technologies from the standpoint of evidence-based medicine. This determines the interest in research and discussion about mechanisms of the laser radiation interaction with biological tissues and living organisms.