

Introduction

Application of fluorescence imaging can help to detect and differentiate tumor cells. Their characteristic features are increased concentration of NADH, changes of the redox ratio (FAD/NADH) and accumulation of porphyrins. In order to correctly interpret the experimental data and determine the effect of each of the fluorophores in the total signal, it is necessary to create optical phantoms to model a typical interaction of optical radiation with biological tissue.

The aim of research

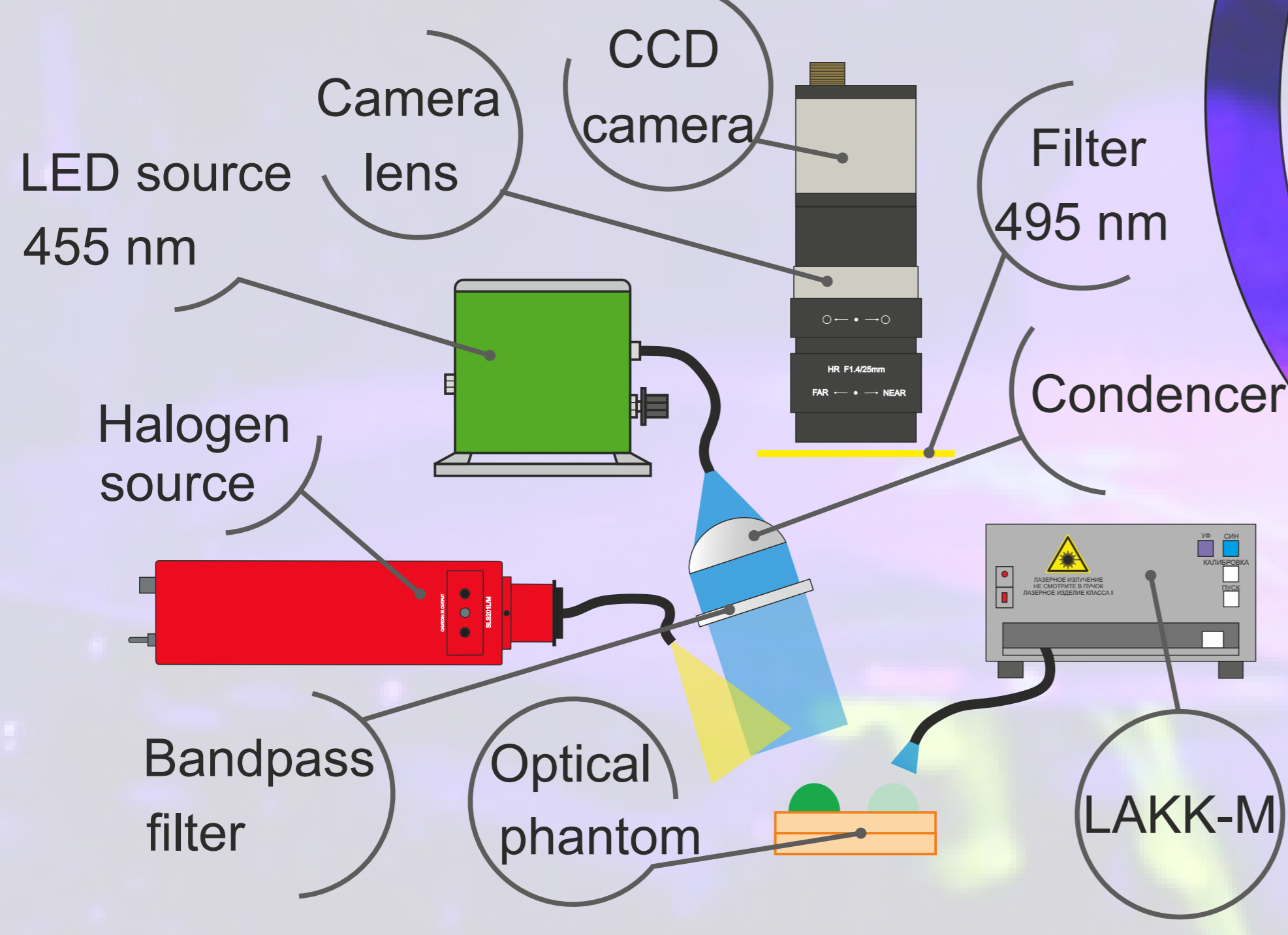
Development of optical phantom imitating the fluorescence properties of biological tissue, which can be used to calibrate the fluorescence imaging system.

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Tissue mimicking phantoms for fluorescence imaging

Experimental equipment



The concept



1% riboflavin solution (26.57 μM/g) was diluted in water in certain ratios

Recording of images using CCD camera

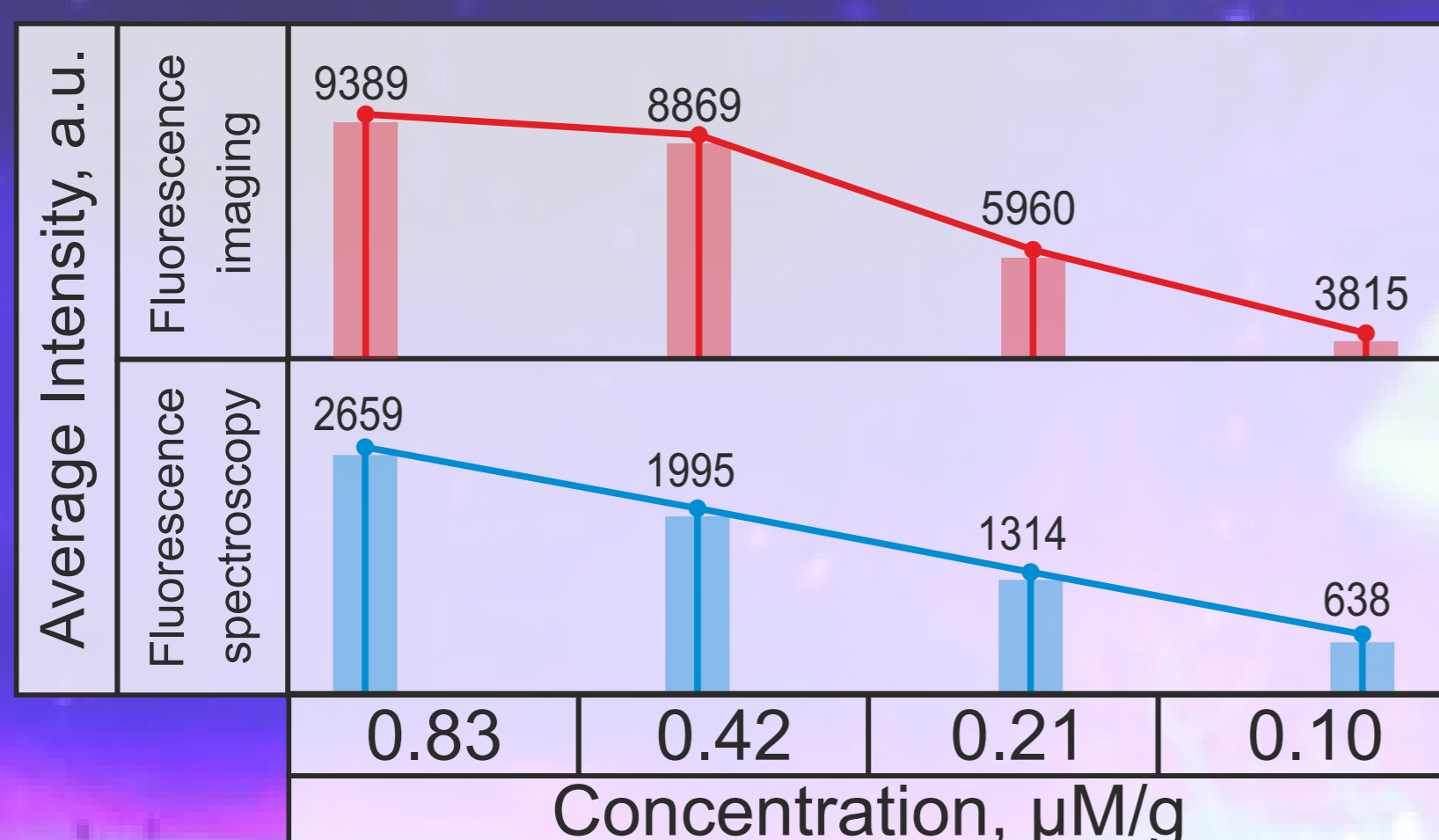
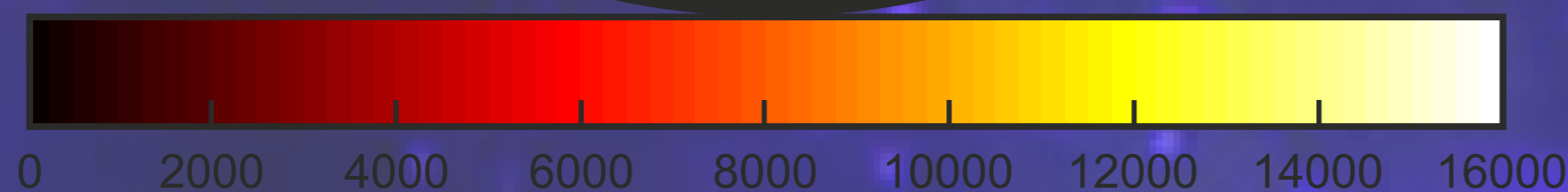
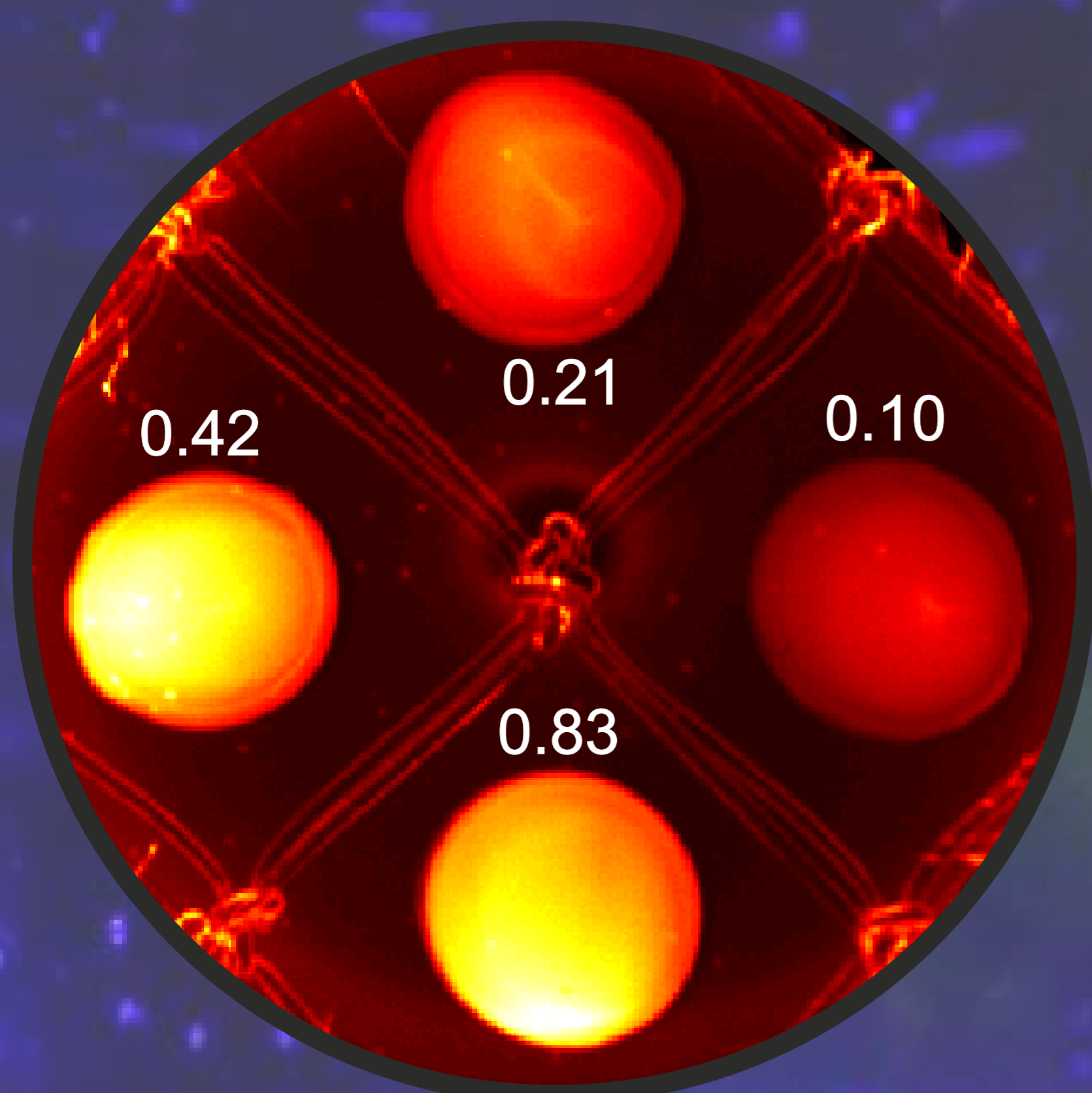
Cutting off source radiation with the filter

Recording of fluorescence spectra using LAKK-M

Riboflavin was applied with a micropipette

A two-layer gelatin model simulated the fluorescence of skin collagen

The result was processed on PC



Results

The results of fluorescence imaging and fluorescence spectroscopy showed changes in fluorescence intensities proportionally to riboflavin concentrations in the drops.

Conclusion

- 1 The phantom seems promising for practical application.
- 2 The future research will be aimed at simulating a content of other fluorophores for validation of devices for fluorescence imaging of tumor boundaries.

Acknowledgments

The work has been funded by the RFBR according to the research project 18-02-00669.

Andrey Dunaev also acknowledges funding from the Academy of Finland (grant 326204).