ANNOTATION FOR UNDERGRADUATE THESIS

"Nonlinear optical microscopy of sensory proteins with time resolution"

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As a result of the work, an extensive experimental base was created for measuring the lifetime of fluorescence and nonlinear optical microscopy. A time-resolved fluorescence microscopy technique was implemented on the basis of a Ti: Sapphire femtosecond pulse generator as a pump during one- and two-photon excitation. A universal platform for multimodal scanning microscopy has been created. The spatial resolution was D_{PSF} = 0.64 μm, and the use of the technique of time-correlated photon counting provided a time scan with a step of 25 ps.

The work is devoted to measuring the dependence of the fluorescence lifetime of sensory proteins SypHer, HyPer, and NemR on target factors (acidity, level of hydrogen peroxide, etc.). The range of relative changes in the fluorescence lifetime does not exceed 10% for each protein in the physiological range, which allows us to develop recommendations for improving the technique of manufacturing sensory proteins of this family.