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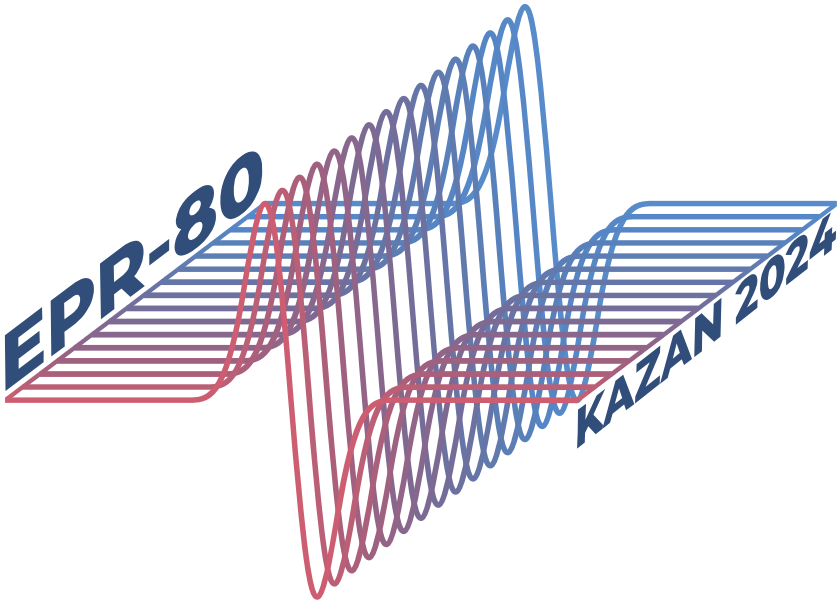

BOOK OF ABSTRACTS

VISUALISATION of the SURFACE of ISOLATED NERVOUS SYSTEM of a GRAPE SNAIL with FLUORESCENT NANOPROBES

L.A. Nurtdinova[1], V.G. Nikiforov[1], A.V. Leontyev[1], A.G. Shmelev[1], D.K. Zharkov[1], R.M. Gataullina[1], E.O. Mitushkin[1], A. N. Solodov[1], R. R. Zairov[2], A.R. Mustafina[2], V. V. Andrianov[1,3], L. N. Muranova[3], Kh. L. Gainutdinov[1,3]

[1]FRC Kazan Scientific Center of RAS, Kazan, Russia
[2]Arbuzov IOPC FRC Kazan Scientific Center of RAS, Kazan, 420029, Russia
[3]Kazan Federal University, Institute of Fundamental Medicine and Biology, Kazan, 420008, Russia

One of the key tasks in biomedicine is visualization, which involves the remote recording of the positions of probes embedded in biological samples using optical methods. This technique enables not only the visualization of individual organs but also facilitates the application of luminescent probes for purposes such as drug delivery and targeted exposure to specific areas of biological tissue.

The following hydrophilic particles were evaluated as luminescent probes: $[Ru(dipy)_3]^{2+}@SiO_2$, $NaYF_4$:Yb,Er coated with L-cysteine, $NaYF_4$:Yb,Er encased in a SiO_2 shell, and $NaYF_4$:Yb,Ho coated with PEI polymer. The first set, $[Ru(dipy)_3]^{2+}@SiO_2$ particles, measuring 50 nm, operates via downconversion, exhibiting a broad emission band in the visible spectrum when excited by a laser at 405 nm. In contrast, fluoride particles, $NaYF_4$:Yb,Er and $NaYF_4$:Yb,Ho, 200 nm in size function as upconversion systems with Er^{3+} and Ho^{3+} ions emitting when stimulated by laser radiation at 980 nm. Utilizing these particles, mapping of the surfaces of living tissues in the isolated nervous system of the grape snail was performed. Their locations within a three-dimensional coordinate system were determined using optical confocal microscopy with a lateral resolution of 10 μm. This approach not only provides detailed morphological analysis of individual tissue sections but also allows for precise exposure of the tissue at the cellular level. Additionally, a series of demonstration experiments were conducted to assess local temperature on the surfaces of individual neurons using the generated 3D surface models.

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