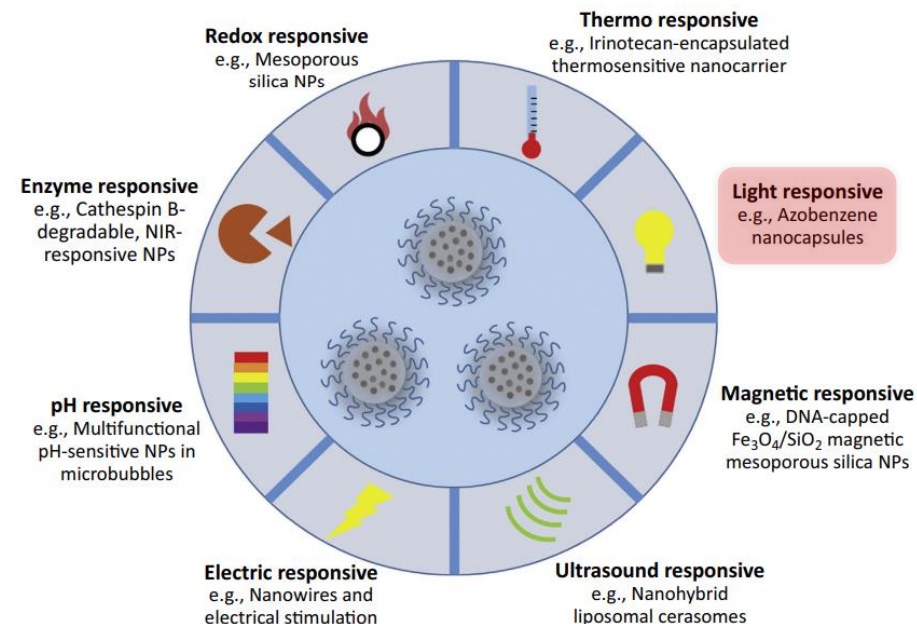
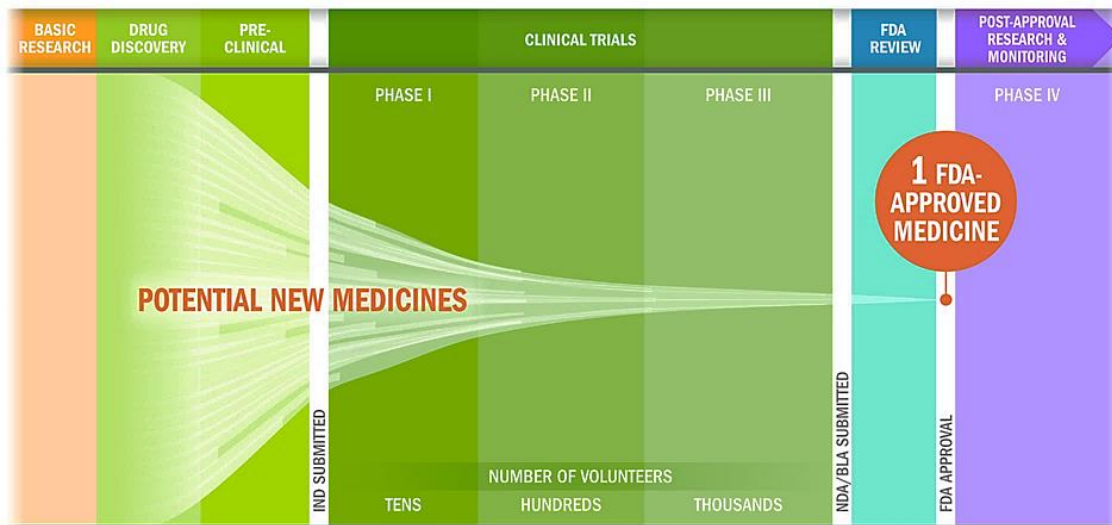


# Cell thermometry as a simple and convenient technique to monitor influence of light-responsive drug delivery systems on cells



*Oleksii Peltek<sup>1</sup>, Eduard Ageev<sup>1</sup>, Mikhail Zyuzin<sup>1</sup>*

<sup>1</sup>ITMO University



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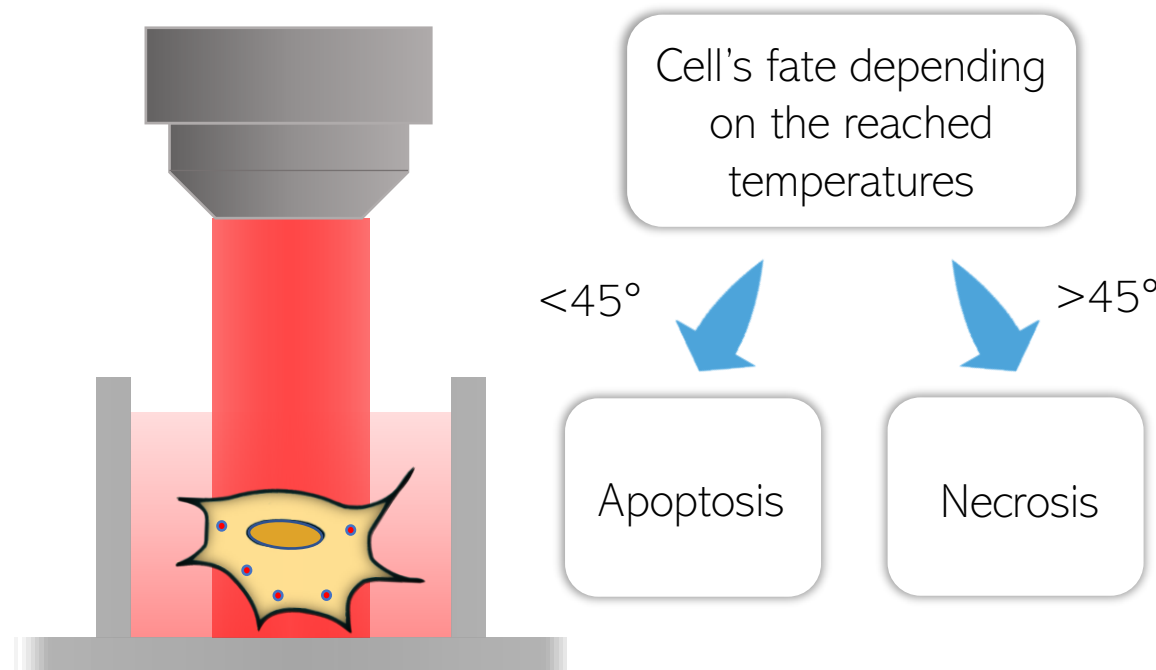
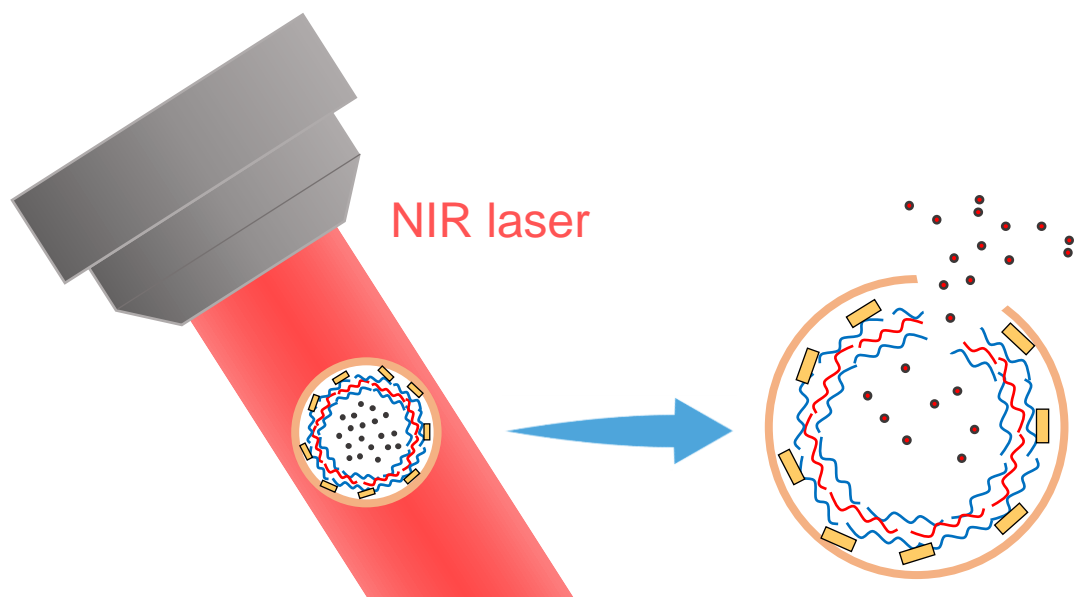
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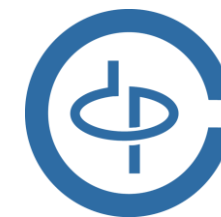
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Drug carrier synthesis and characterization

Fluorescent lifetime-based measurements

Fluorescent lifetime-based measurements

Estimation of temperatures reached during irradiation

Cell viability after NIR irradiation

Temperature dependent cell death

Changes in cell metabolism



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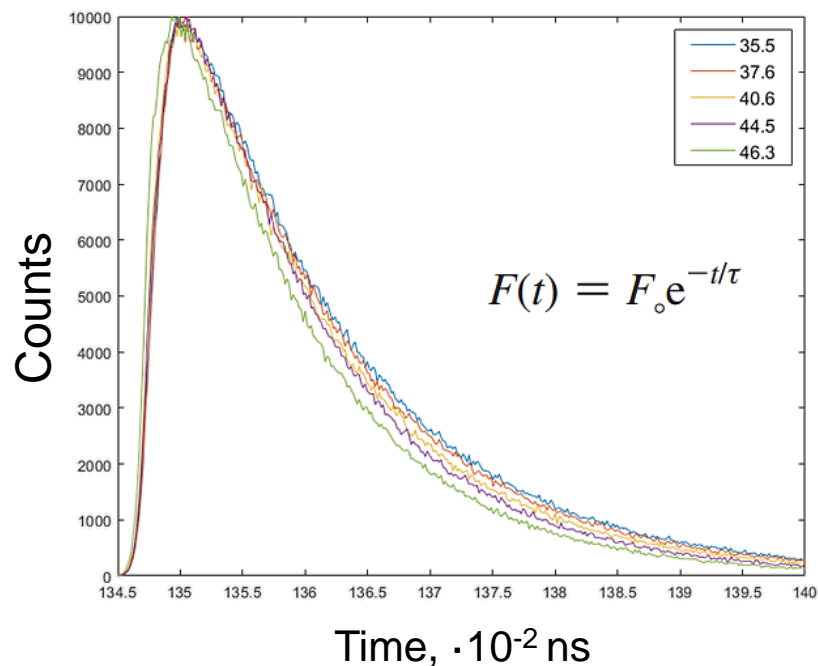
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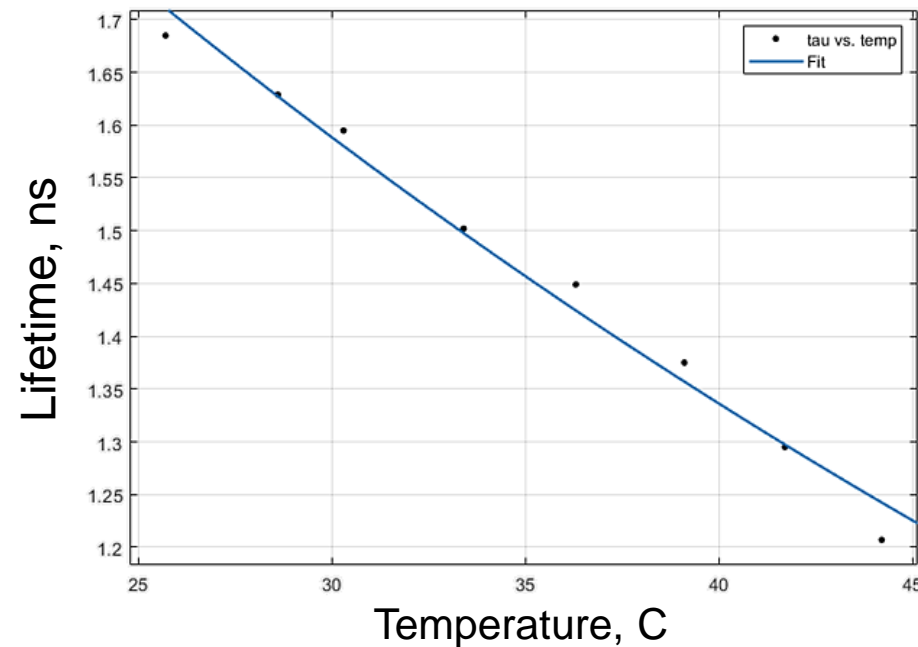
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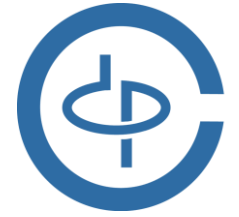


Dependence of RhB lifetime on the temperature of the solution



Calibration curve for further temperature estimations

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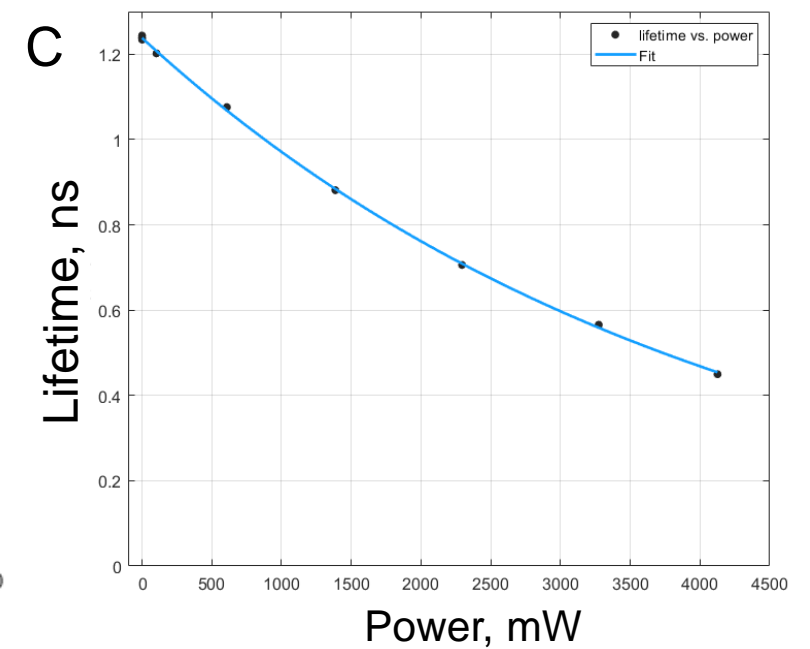
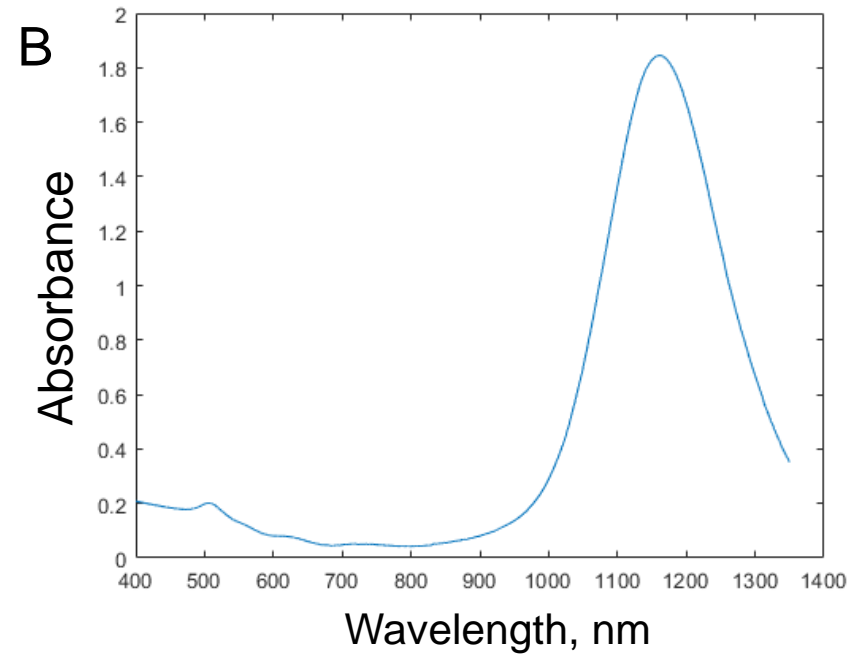
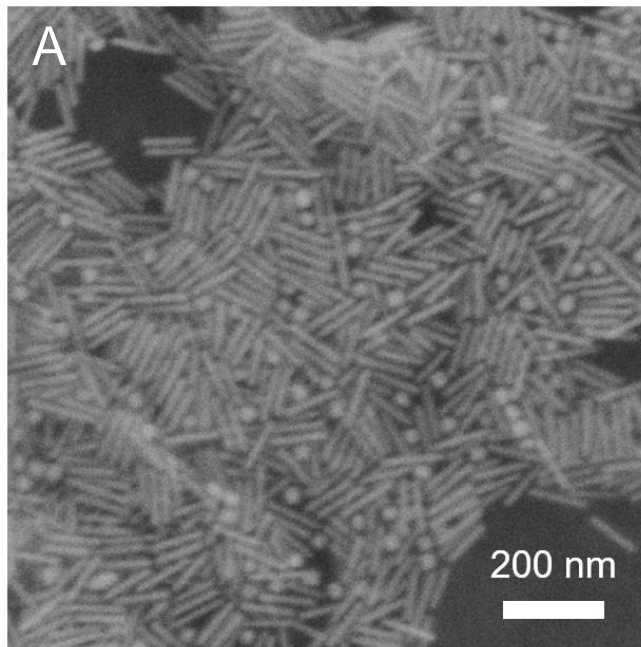
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Characterization of gold nanorods (Au NRs). **A**. SEM images of Au NRs. **B**. Absorbance spectrum of Au NRs. **C**. Lifetime measurements of Au NRs + RhB solution under NIR irradiation.

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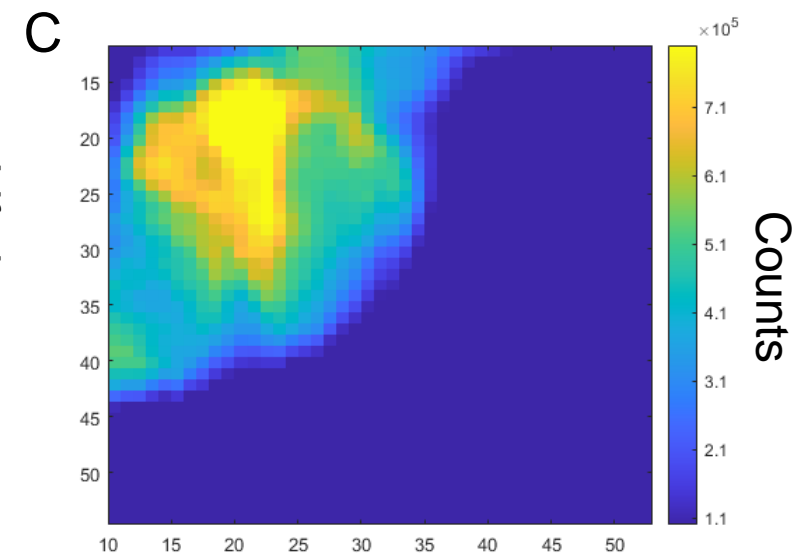
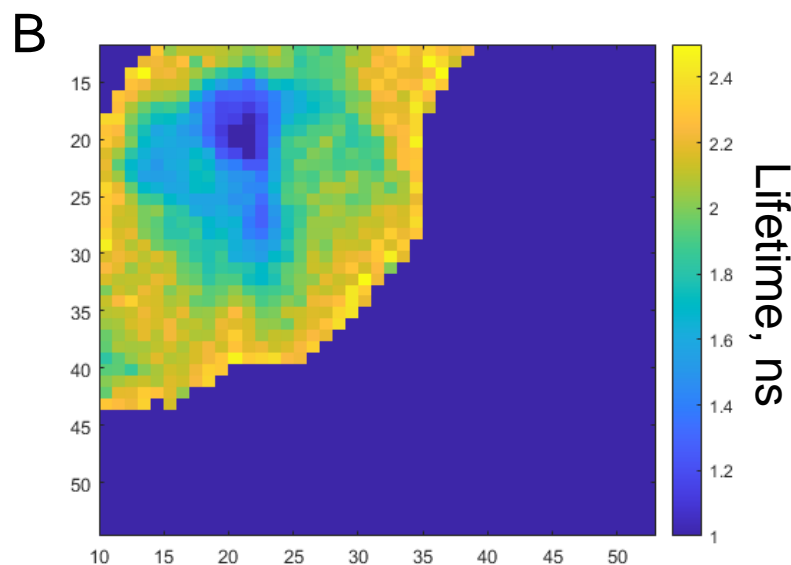
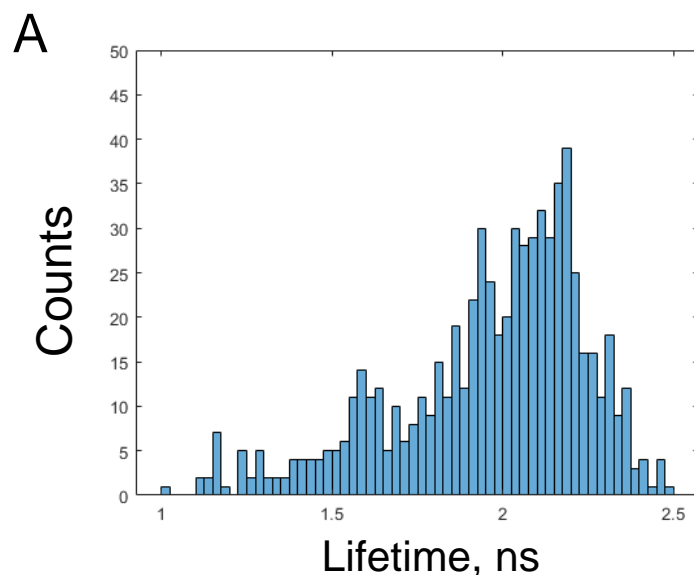
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Lifetime measurements performed on the living cancerous cell. **A.** Lifetime histogram of the cell. **B.** Lifetime mapping obtained using custom setup. **C.** Fluorescent intensity measurements.

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In this work potential application of fluorescent lifetime measurements for temperature estimation in relation to drug delivery was explored for the first time. The calibration curves for further use as reference for intracellular measurements were obtained. Drug carriers were synthesized and characterized. Measured the temperature increase of Au NRs under NIR irradiation through the lifetime registration.

The presented results reflect up-to-date progress related to the lifetime measurements of cancer cells. This is a part of a bigger project, which additionally includes intensity-based methods for cellular temperature estimation.

If you have any questions or suggestions regarding this work, please, don't hesitate to contact me:

[peltek.oleksii@gmail.com](mailto:peltek.oleksii@gmail.com)

Thank you for your attention!

