

Název: The characterization and in vivo visualization of
cytostatic drugs, doxorubicin, the application
into the tissue

Školitel: Iva Blažková

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Reg.č.projektu: CZ.1.07/2.3.00/20.0148

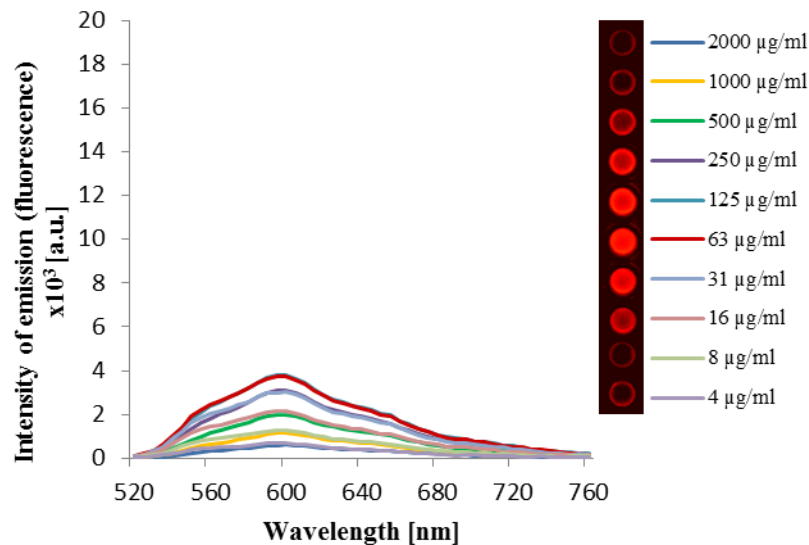
●Název projektu: Mezinárodní spolupráce v oblasti "in vivo" zobrazovacích technik



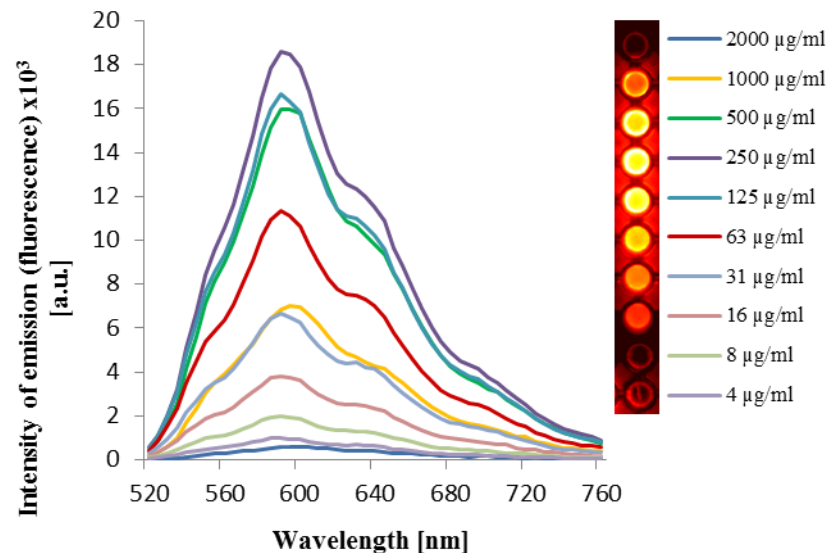
Fluorescence properties

- doxorubicin, epirubicin, ellipticin and/or daunorubicin

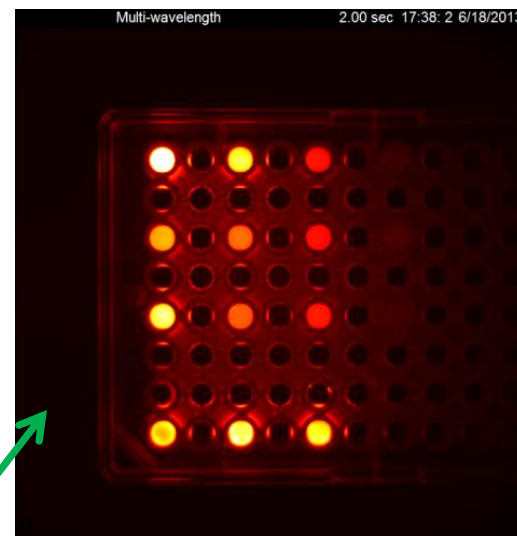
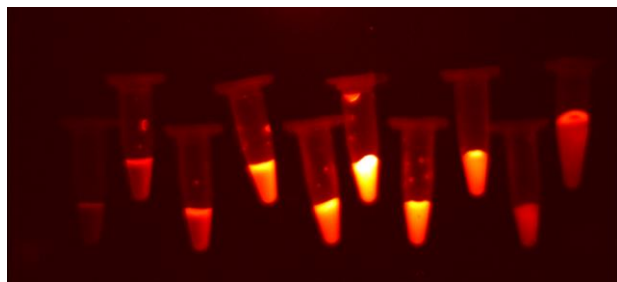
A Doxorubicin dissolved in water



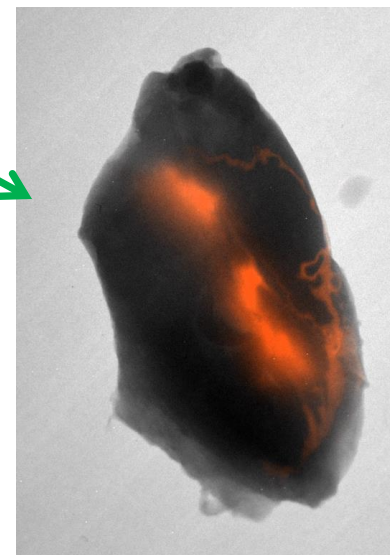
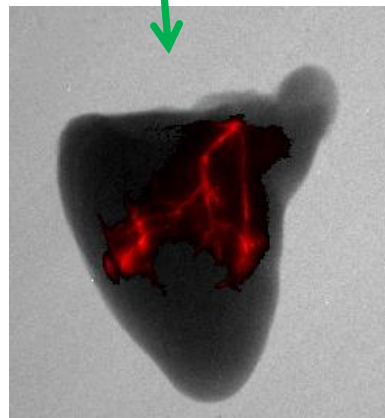
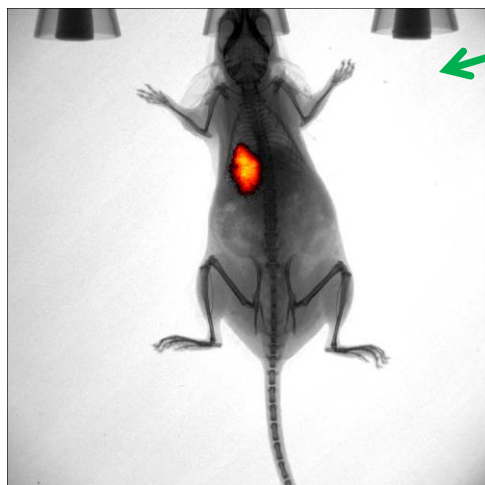
B Doxorubicin dissolved in methanol



- Fluorescence quenching
- Solvent effect (methanol, ethanol, DMSO, glycerol)



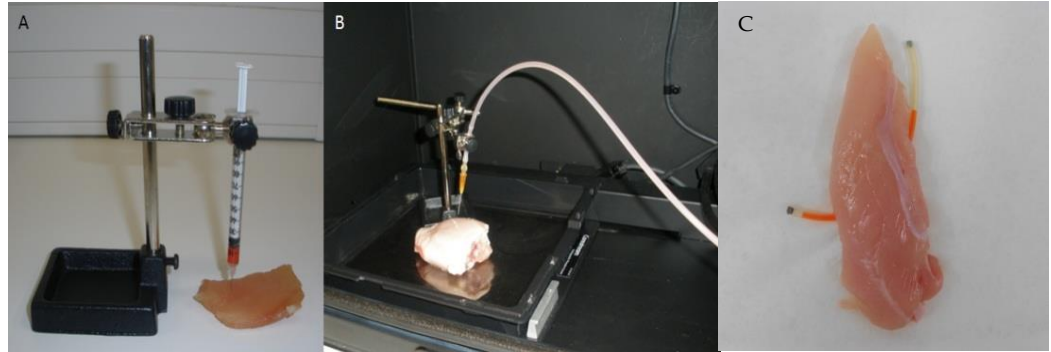
The detection of doxorubicin is possible in different environment



The application of the doxorubicin into the tissue

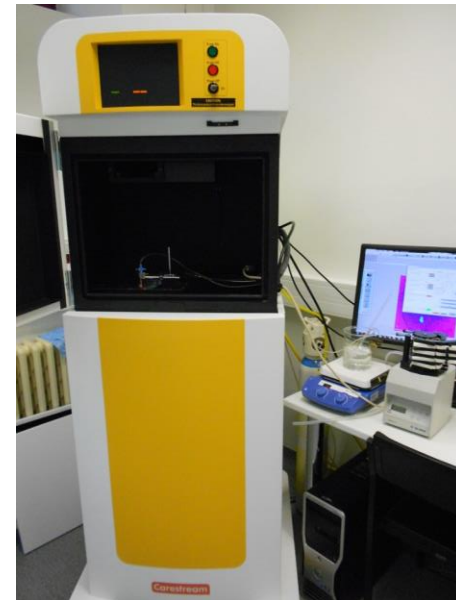
- The application:

- **Injection**
- **Infusion**
- **Tube with doxorubicin**

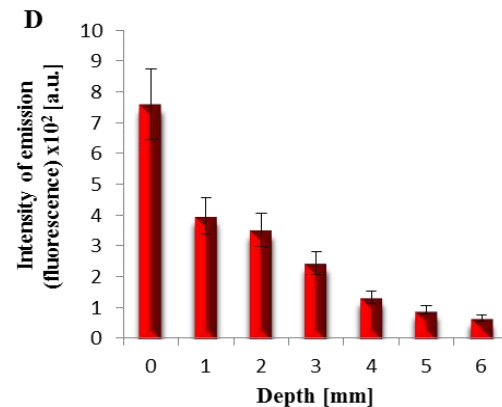
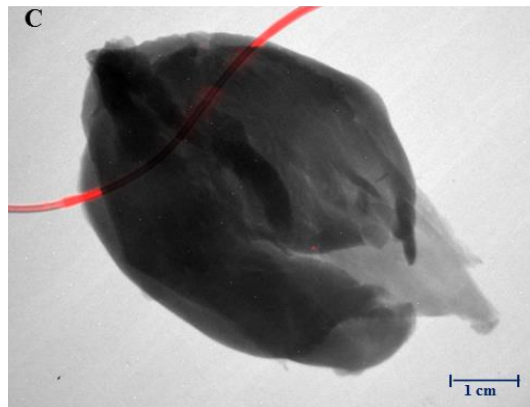
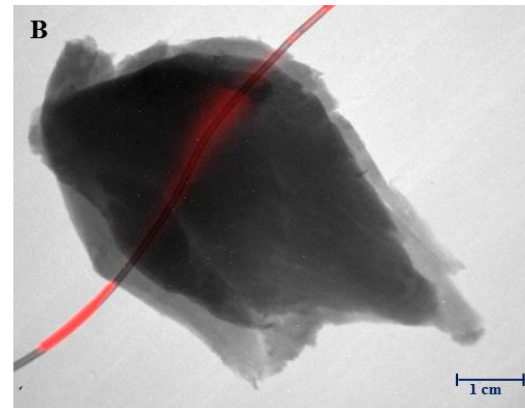
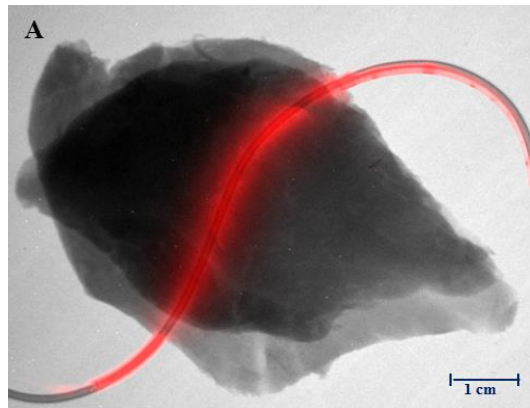


- Intensity of the fluorescence of the doxorubicin in the tissue depends on:

- **the concentration and the solvent**
- the volume (mass of dox)
- the depth



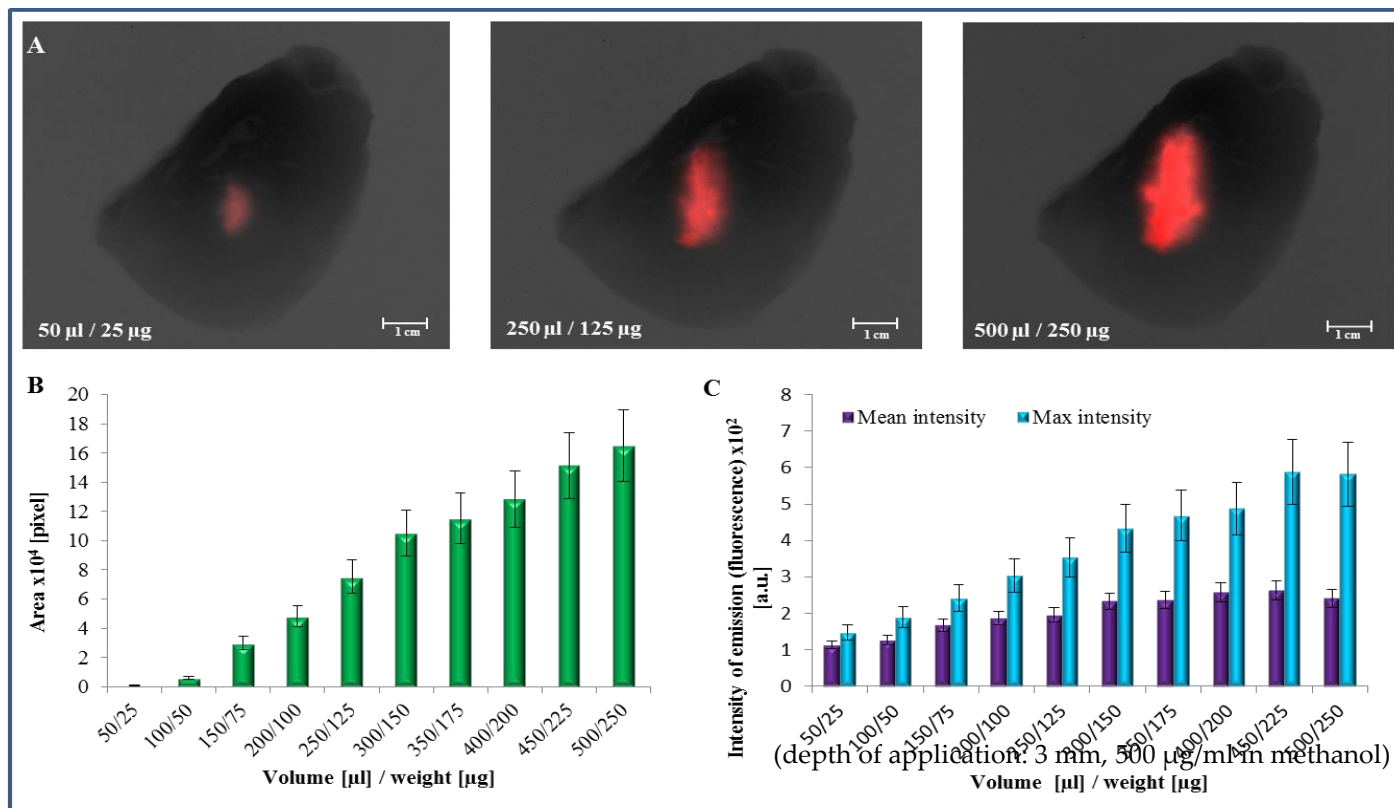
Determination of the maximal detectable depth



500 µg/ml in methanol, Teva Pharmaceuticals

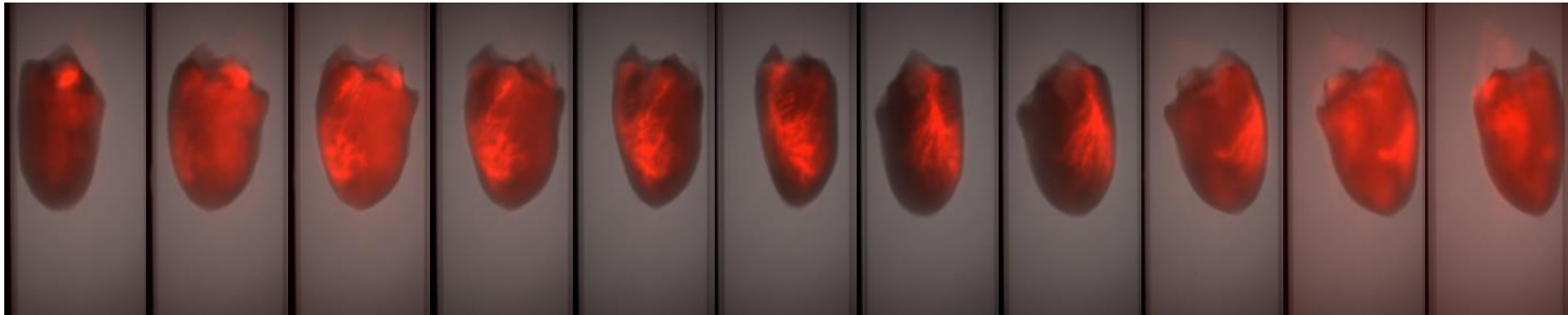
- Doxorubicin was detectable up to a depth of 6 mm
- (fluorescence intensity was decreasing in average by 116 a.u. per 1 mm of the tissue depth)

The distribution of doxorubicin applied into the muscle tissue



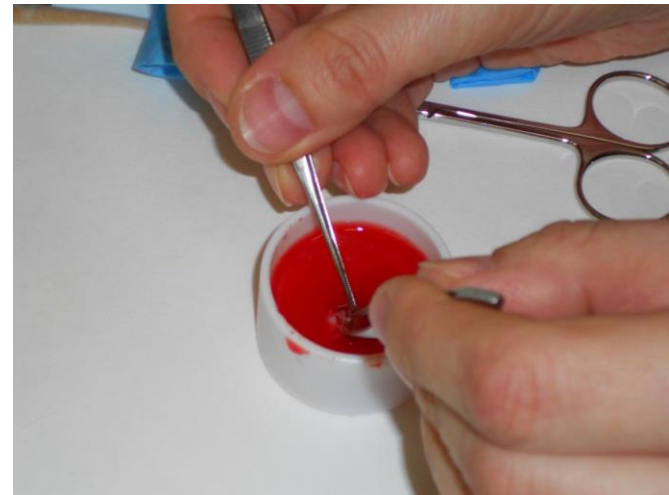
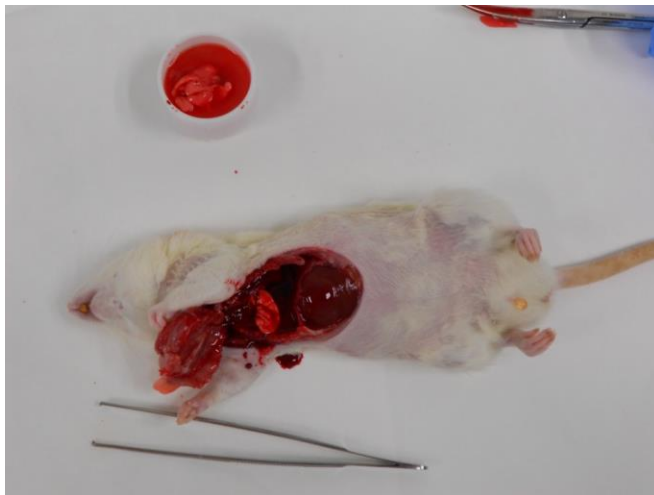
- the spatial distribution occurs almost immediately
- the increase in the average intensity within the area was not so significant in comparison with the maximum signal (average increase 19 a.u./25 µg compared to 55 a.u./25 µg)
- signal intensity is slightly increased due to distribution in the z-axis (downwards, i.e. to the detector) for 3.8%.

Heart with doxorubicin

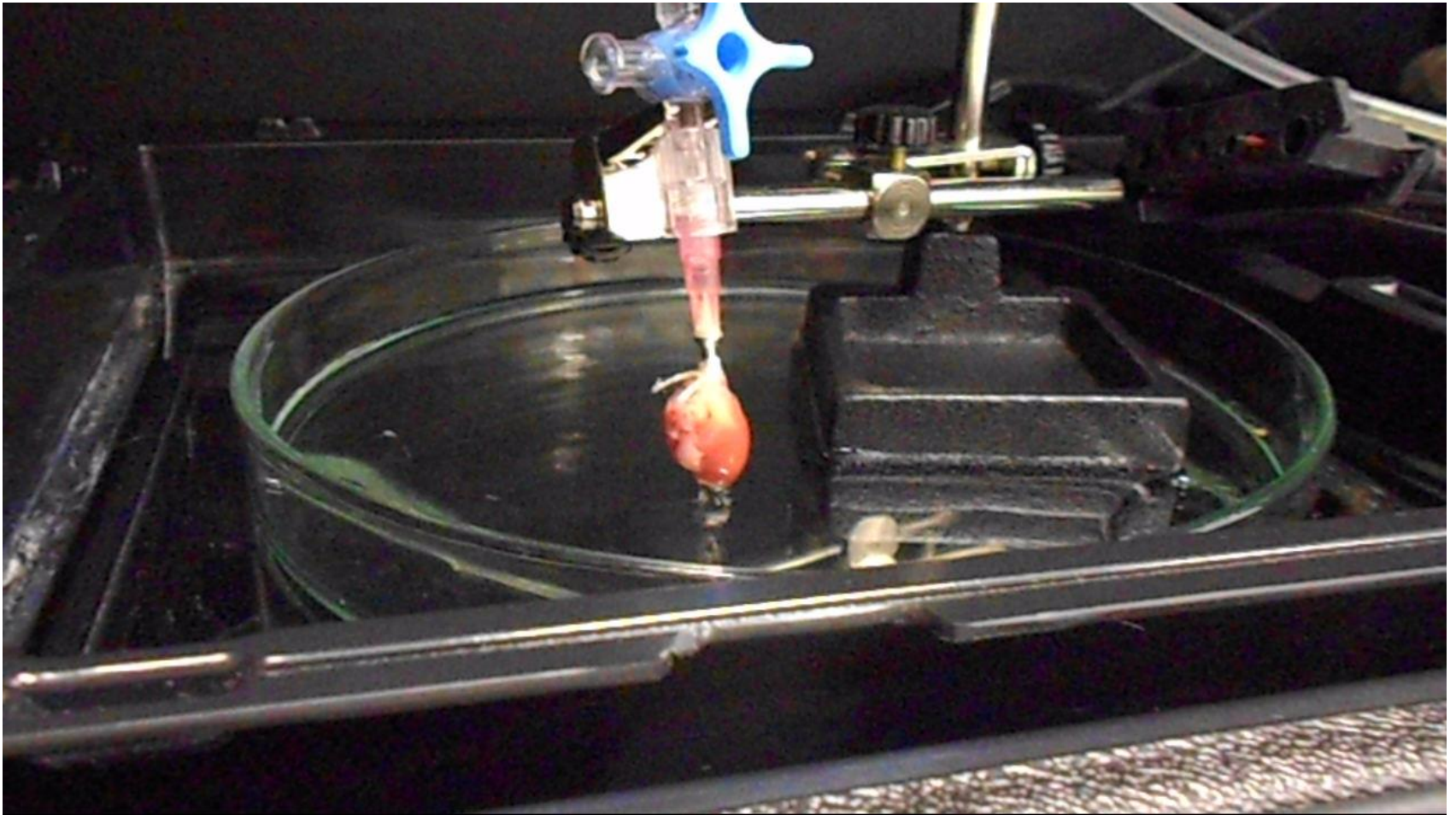


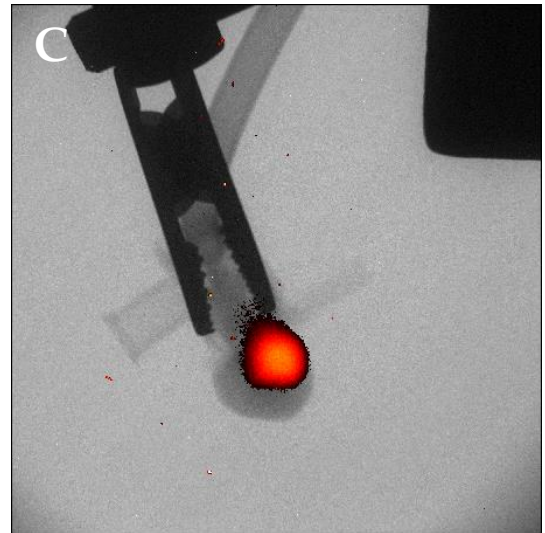
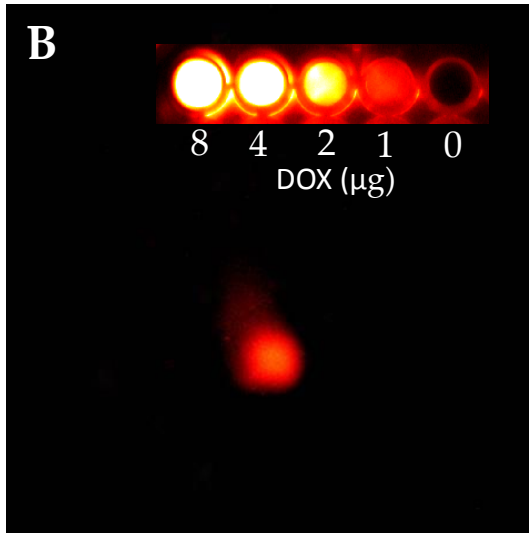
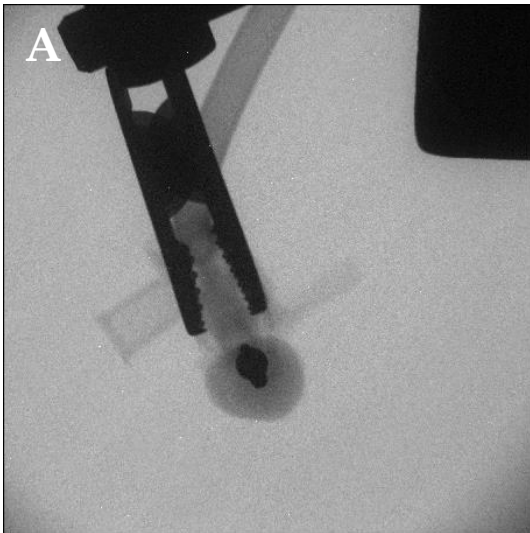
100ul doxo (500ug/ml), left ventricle

Ex – vivo heart

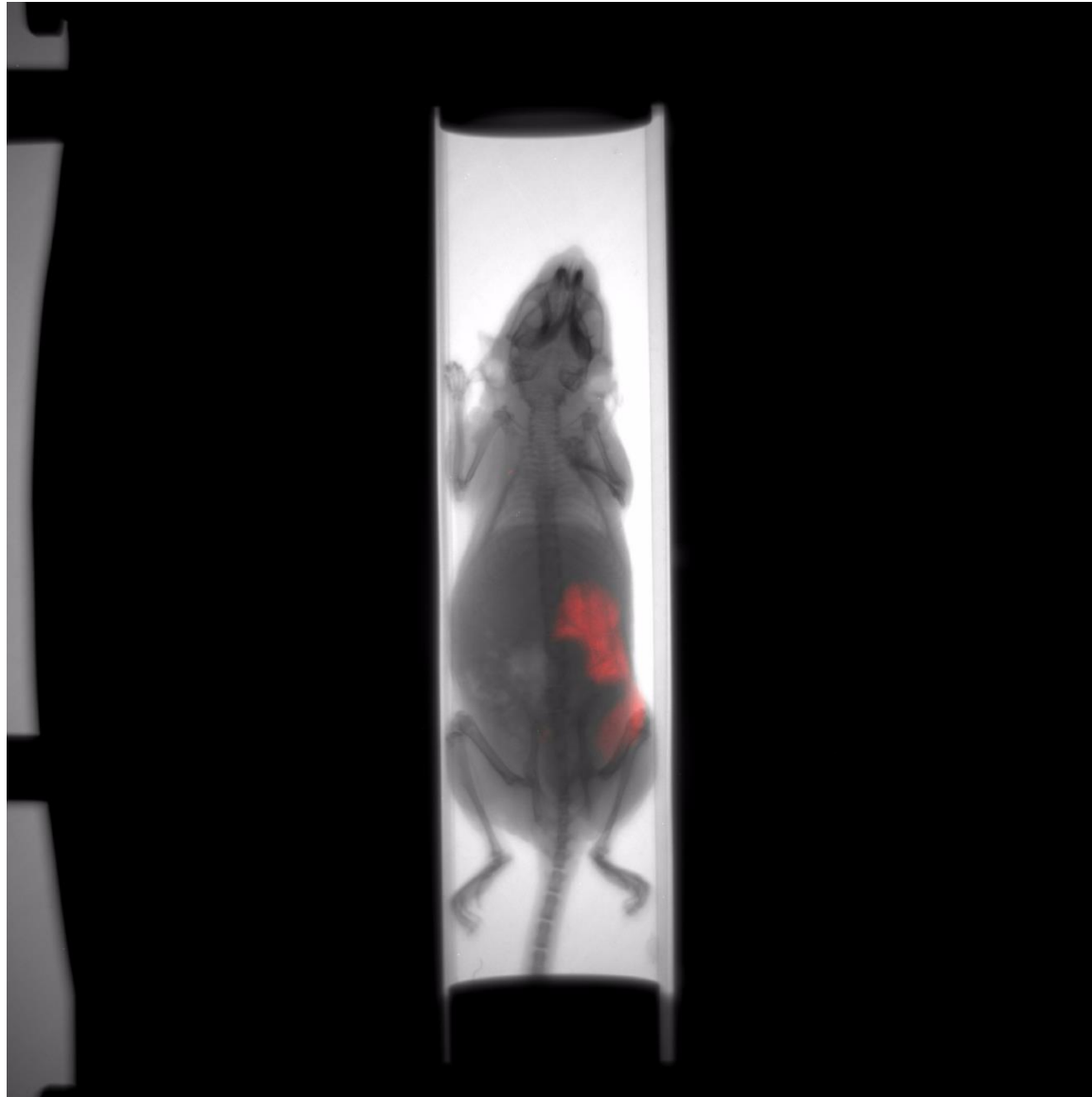


Beating heart





Mouse with doxorubicin



Conclusin

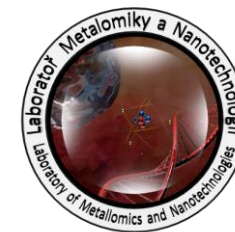
- fluorescent properties of certain drugs such as doxorubicin, epirubicin, ellipticin and/or daunorubicin offer the possibility of *in vivo* tracking and monitoring of the therapeutic action
- Doxorubicin fluorescence intensity could be used to monitor the behaviour of this drug in the living organism, but still only to a depth of about 1 cm.

Acknowledgement



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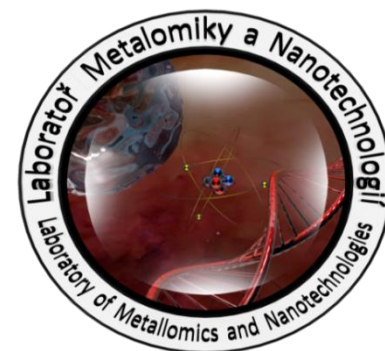
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ



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Thank you for your attention!

Mendel
University
in Brno



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