3D *ex vivo* imaging and characterization of cell death

Fluorescent Markers • Tissues & Organs • Light Sheet • Automatic Detection • Spatial Distribution Analysis • Cardiovascular

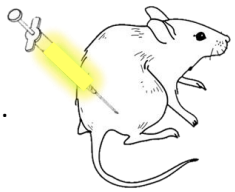
YOUR NEEDS

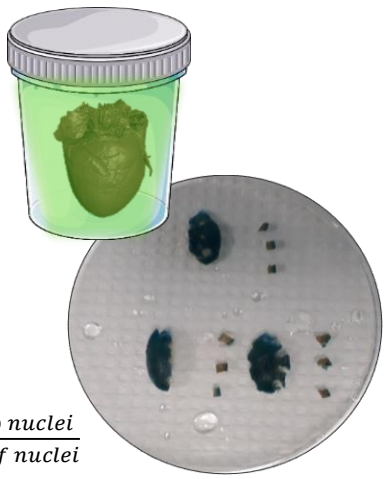
- Study of cell death in any organ
- Preclinical study of treatment efficacy

OUR SOLUTIONS

- Light sheet microscopy after clearing of *ex vivo* samples
- Automated 3D image processing to count necrotic cells in organs

General Procedure





Prior to sample collection by Imactiv-3D:

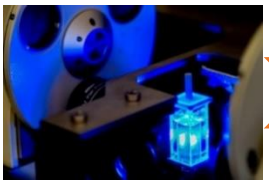
- *In vivo* animal perfusion to label necrotic nuclei (PI).
- Formalin fixation of extracted sample.

Image acquisition:

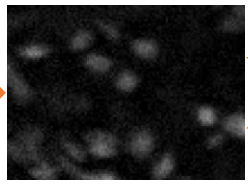
- Staining of *ex vivo* samples with nuclear dye to label all cells (DRAQ5).
- Biopsies of 2.5-mm-diameter regions of interest.
- Clearing of samples and 3D light sheet microscopy.

Image processing and joint analysis of both fluorescence channels:

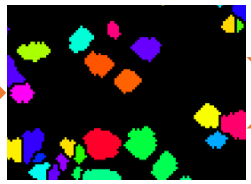
- 3D image restoration based on denoising and pre-segmentation.
- 3D refined segmentation and quantification.
- Quantitative analysis of necrosis rate as the ratio: $\frac{number\ of\ necrotic\ (PI)\ nuclei}{total\ number\ (DRAQ5)\ of\ nuclei}$



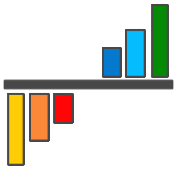
Light sheet microscopy



Raw data



Segmentation

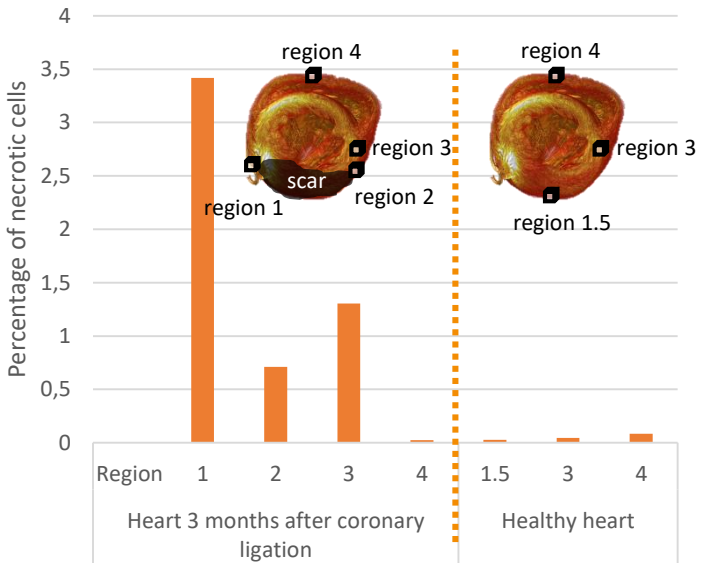


Quantitative characterization

Application example: Quantification of necrosis after myocardial infarction.

in collaboration with SERVIER

- Definition of regions of interest depending on their distance to the infarct scar. In this study, 21 regions were explored (triplicate in each region).
- Analysis of necrotic nuclei percentage in healthy and post-infarct rat hearts.
- Regions near the scar showed much more necrotic cells (regions 1 to 3) than the control region (region 4) and than all regions in the healthy heart.



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