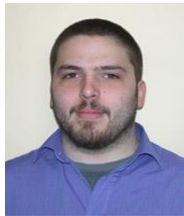


Team

Mechanotransduction: from cell surface to nucleus



**Nicolas
AUDUGÉ**
IR CNRS



**Philippe
GIRARD**
MCF P5



**Nicolas
BORGH**
CR CNRS



**Maïté
COPPEY**
DR émérite INSERM



**Charlène
GAYRARD**
Doctorante

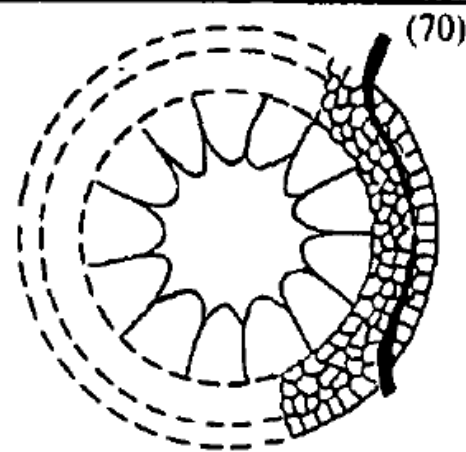


**Théophile
DÉJARDIN**
Postdoc

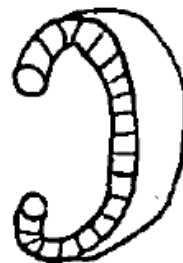
Mechanical stresses and morphological patterns in amphibian embryos

By L. V. BELOUSSOV¹, J. G. DORFMAN¹ AND
V. G. CHERDANTZEV¹

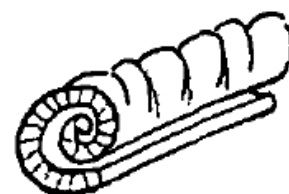
From the Department of Embryology, Moscow State University



~ sec

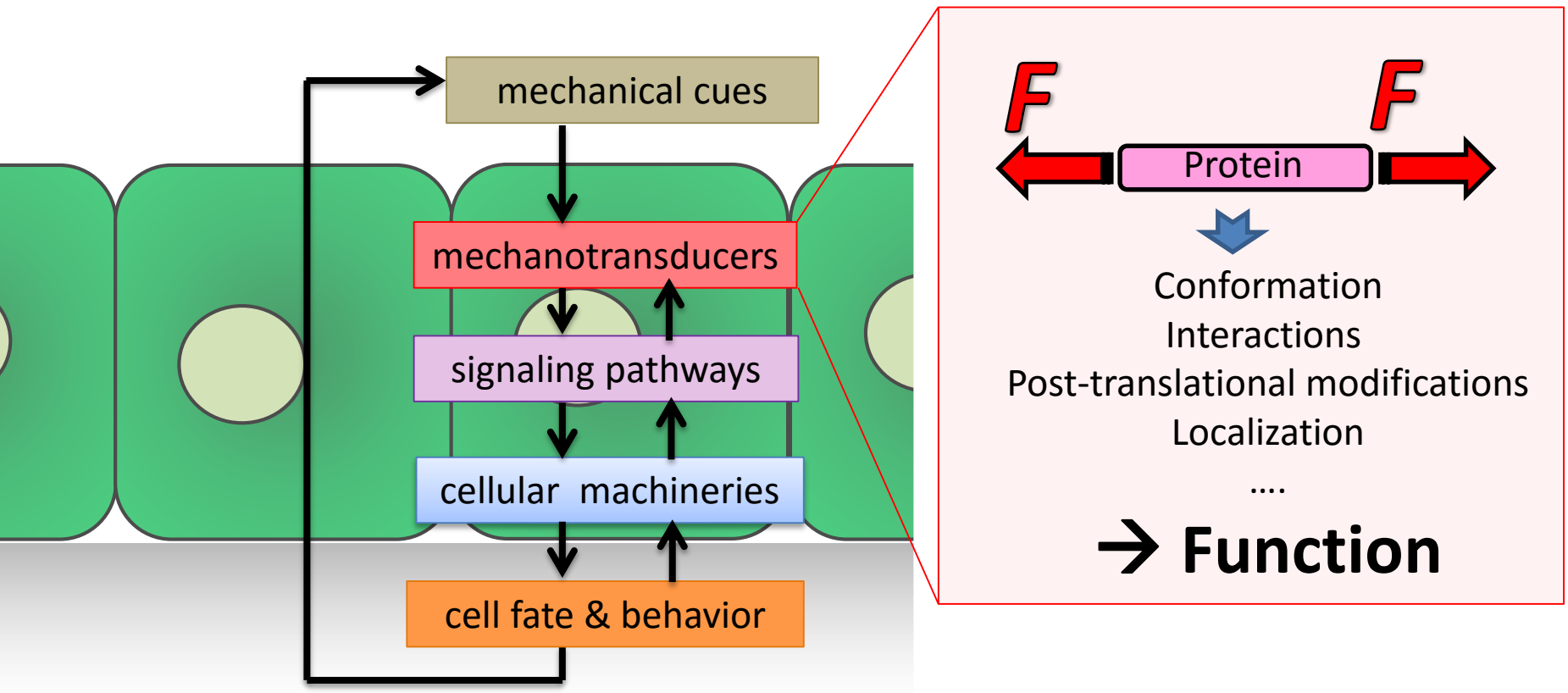


~ min

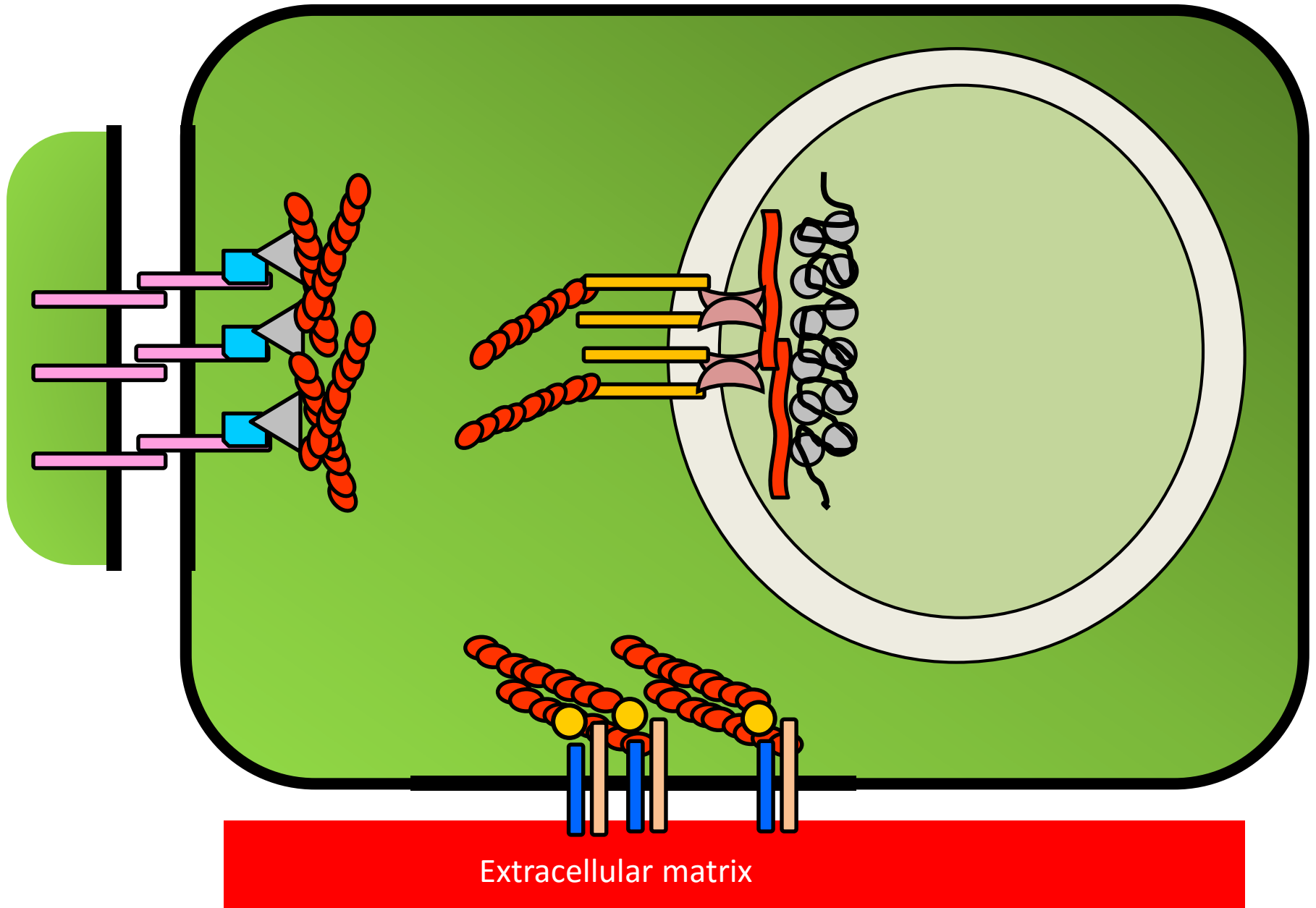


½ hr

Mechanotransduction paradigm

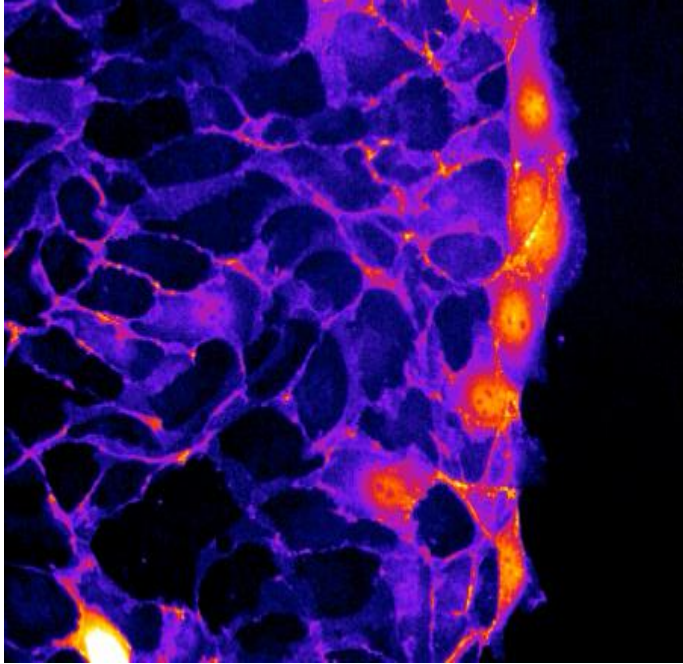


What mechanotransducers? How do they work?

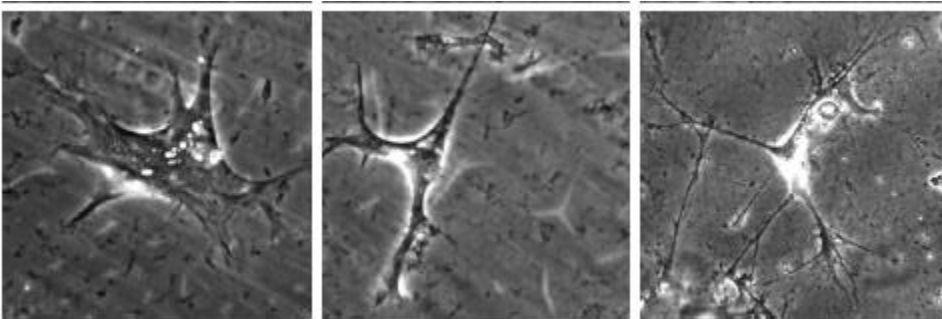


Systems

Cells



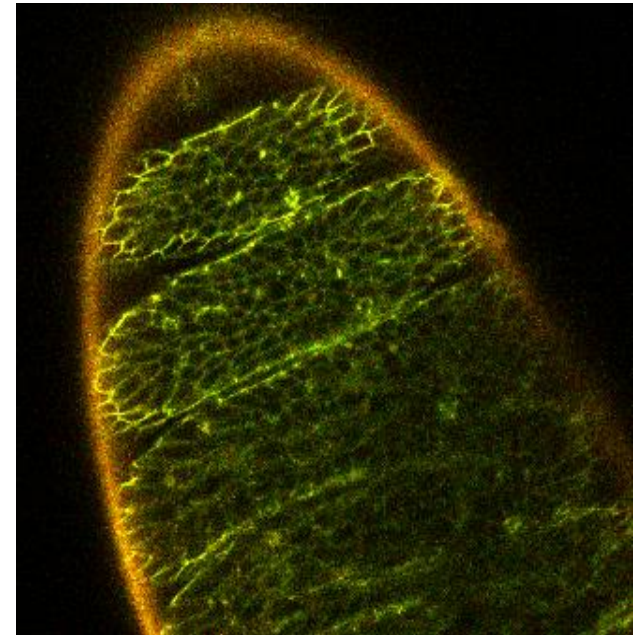
Cell lines



Stem cells

Organisms

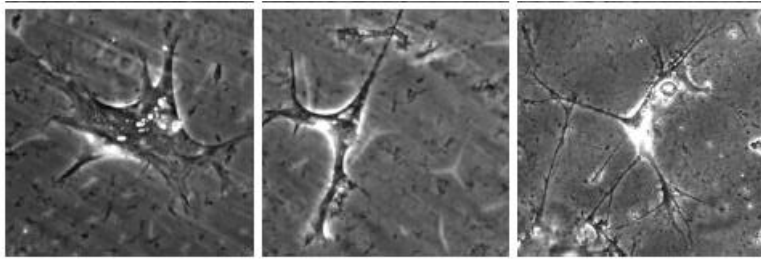
(coll A. Guichet IJM)



Drosophila

Manipulation tools

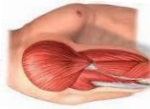
Compliant or stretchable substrates



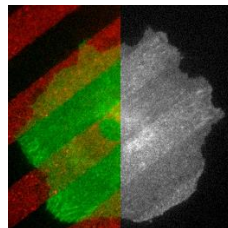
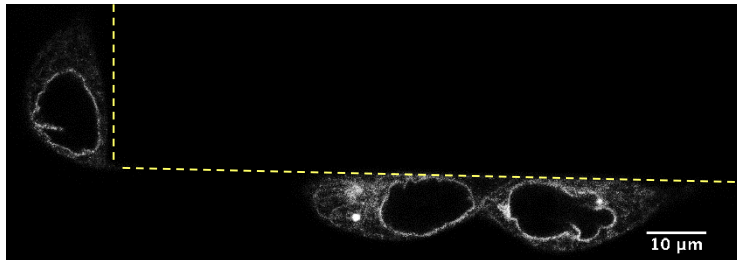
34kPa

11kPa

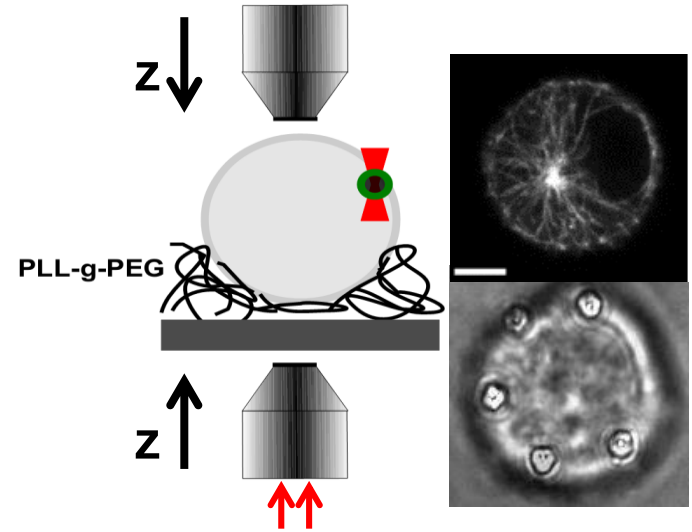
0.2kPa



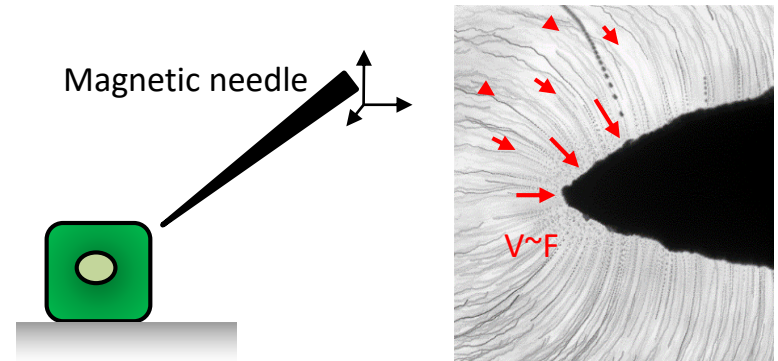
2/3D adhesive & topographic constraints (soft lithographic tools)



Optical tweezers



Magnetic tweezers

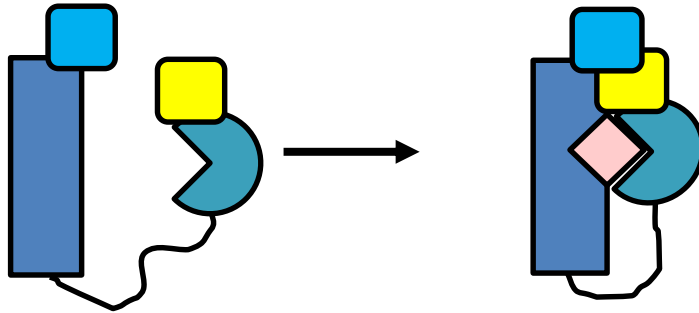


+ genetic & pharmacological perturbations

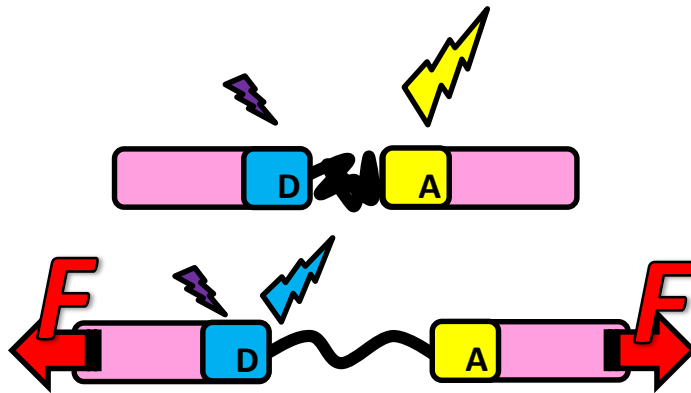
Observation tools

Genetically encoded biosensors

Enzymatic activity



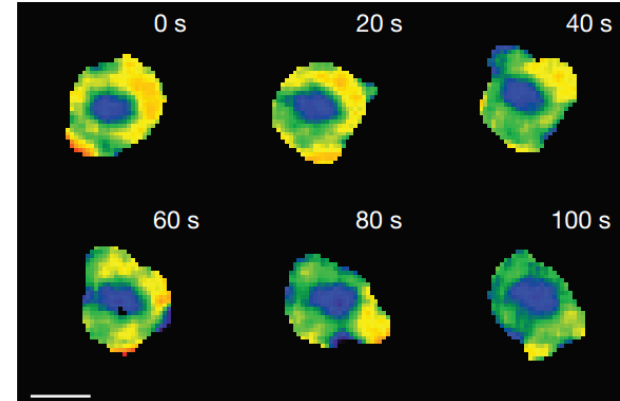
Molecular tension



Transcriptional activity

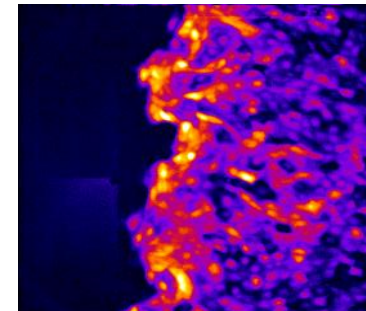
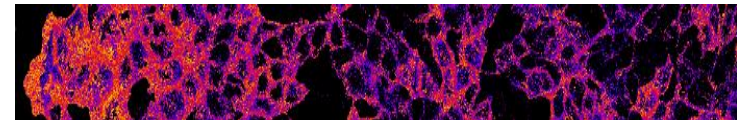


Rac activation, 'tumbling', WT



Kardash et al., NCB 2009

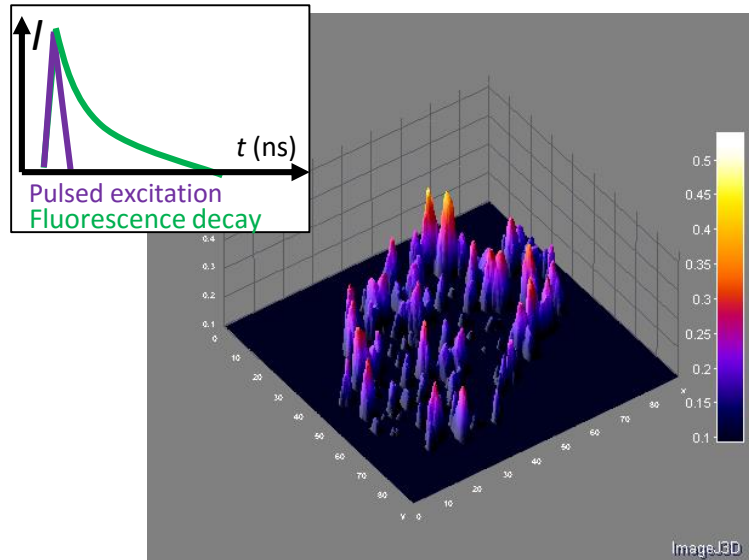
Tension
←
FRET
→



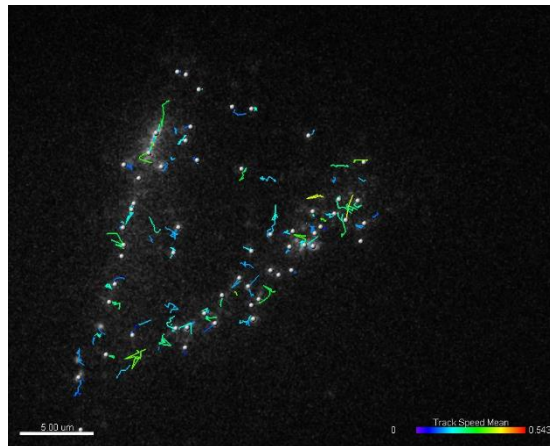
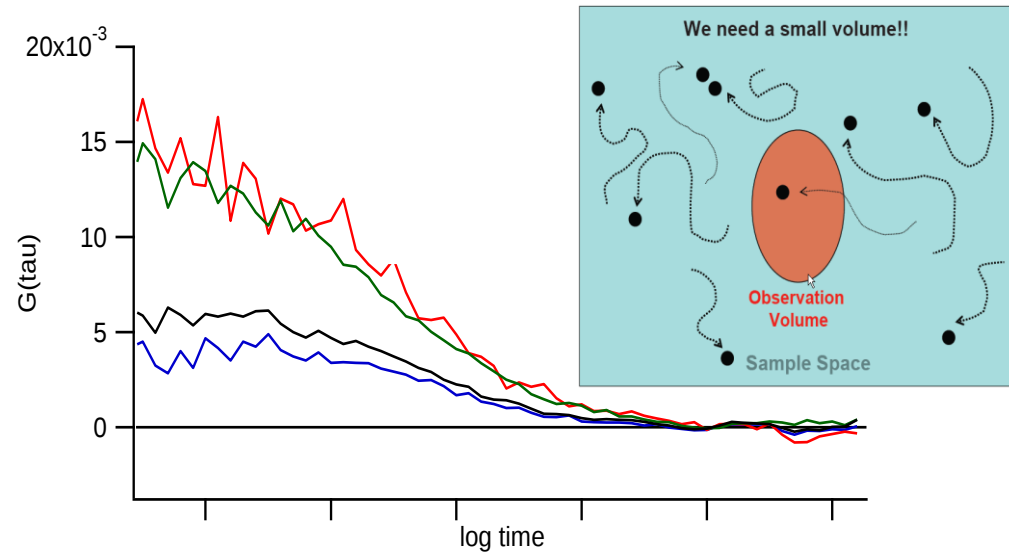
Observation tools

Fluorescence spectroscopies

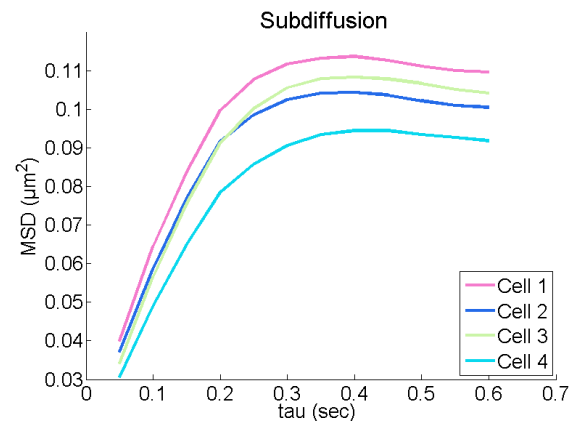
Fast Fluorescence Lifetime Imaging



Fluorescence Cross-Correlation Spectroscopy

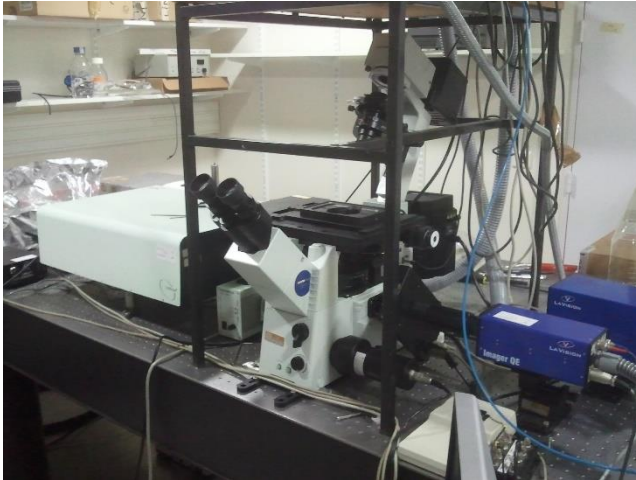


Single Particle Tracking



Tool & expertise transfer

Fast FLIM-FRET: TriMScope

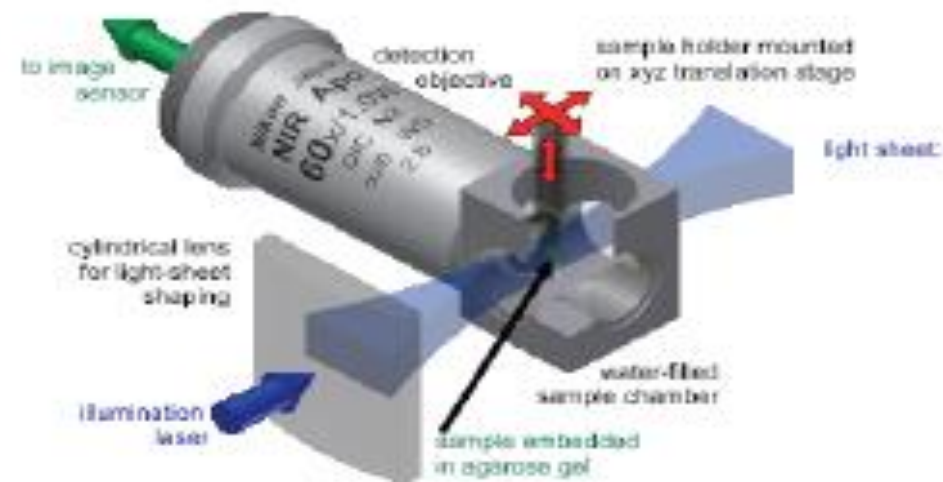
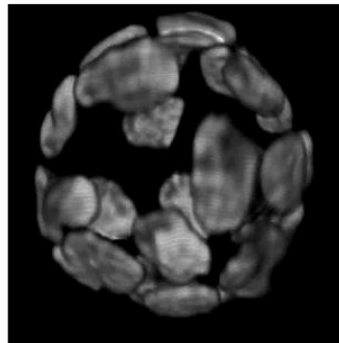


FCS/FCCS/FRET: Microtime



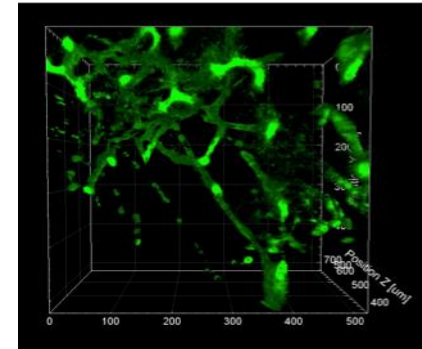
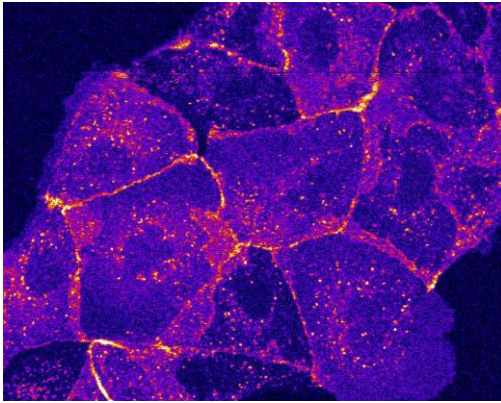
N. Audugé

- Digital Scanning Light-Sheet Microscope
- Home-made set-up (P.Girard)
- 3D Imaging
- high axial resolution



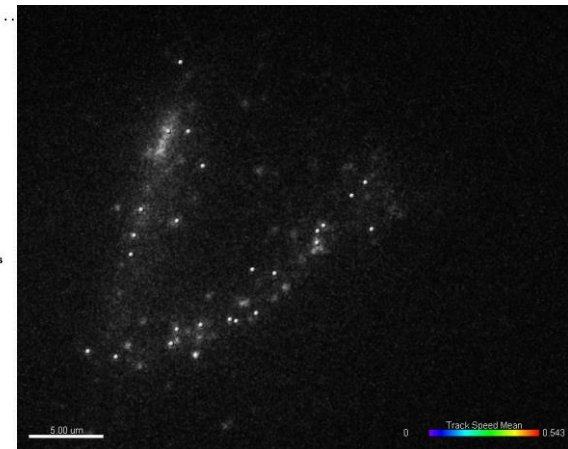
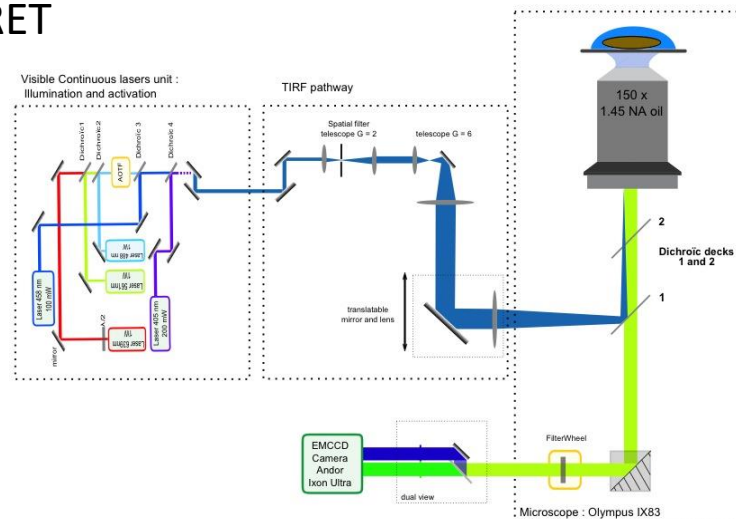
2-photon microscope (LaVision)

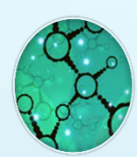
- 3 laser lines, 5 detectors, live animal imaging
- multicolor
- SHG, THG
- photoablation



TIRF/PALM/dSTORM/smFRET

- 5 laser lines, dual view
- Homemade (O. Blanc)





FRANCE-BIOIMAGING



5 Regional Nodes
1 Transversal Node
10 Imaging Core Facilities (9 IBiSA)



Associated R&D labs
in all Nodes

360 people in FBI perimeter, 140 in FBI-Teams, 166 working on core facilities/services (2014)

3000 Users (average/year)



ACCESS



France-BioImaging

A National Research Infrastructure for Biological Imaging

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[New Contrasts And In Depth Imaging](#)
[Spinning Disk Confocal](#)
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[FCS/PCCS](#)
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[SuperCLEM](#)
[Photomanipulation & Optogenetics](#)
[Spectral Imaging](#)

OPEN POSITIONS

- Post Doc – Super-resolution microscopy for nanoscale and biology with applications to the nuclear pore complex
- Imaging specialist – Biomedical Center of the Ludwig-Maximilians-Universität München
- Bioimage Analyst – Core Facility Imaging of the CECAD, University of Cologne
- Post-Doc position on cellular membrane biology – Institut Curie
- Engineer in computer science for microscopy
- Post doc position : Thermal characterization by thermooptical and photorefraction
- Scientific Project Manager – EMBL, Germany

FRET/PLIM

Based On MP- SP8 (Leica)+PicoQuant

Site: PICT Curie
Node: Paris-Centre

Type of work : Functional Imaging
Comments : 2P-antiviral-imaging/Hetero-FRET/Homo-FRET/temperature/CO2

December 11, 2014

FRET/PLIM

Phase Modulation FLIM/Spinning Or TIRF/Based On Nikon And Lambert Inst.

Site: PICT Curie
Node: Paris-Centre

Type of work : Functional Imaging
Comments : TIRF/Spinning disk/ temperature

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FRET/PLIM

TCSPC On SP5 (Leica)

Site: PICT Curie
Node: Paris-Centre

Type of work : Functional Imaging
Comments : Becker&Hickl Chameleon XR / temperature/CO2

December 11, 2014

ADVANCED LIGHT MICROSCOPY

Leica SP2

Site: Bordeaux Imaging Center
Node: Bordeaux

Type of work : Functional Imaging
Comments : TCSPE, 4 laser lines, 2 in FCS, 2 in FLIM, Femto III, Temperature

December 11, 2014

FLUORESCENCE SPECTROSCOPY IN MICROSCOPY

FLIM-F-FLIM

Site: Imagerie – Institut Jacques Monod
Node: Paris-Centre

System : Open Informations : IM website
Options : Laser lines (mW); Objectives : x na Temperature: CO2; Detector: Microscope; Home Made with La Vision Biotech
Comments : //...

[CONTINUE READING](#)

December 9, 2014

FCS/PCCS

Microtime 200 PicoQuant

Site: Imagerie – Institut Jacques Monod
Node: Paris-Centre

System : Open Informations : IM website
Options : Laser lines (mW); Objectives : x na Temperature: CO2; Detector: Microscope; PicoQuant Comments : //

December 9, 2014

ADVANCED LIGHT MICROSCOPY

Zeiss, LSM 710 Spectral

Site: Imagerie – Institut Jacques Monod
Node: Paris-Centre

System : Open Informations : IM website
Options : Laser lines (mW); Objectives : x na Temperature: CO2; Detector: Microscope; Zeiss Comments : Intensity-Based FRET, RICS, FCS, TICS, Acceptor...

[CONTINUE READING](#)

December 9, 2014

ADVANCED LIGHT MICROSCOPY

Zeiss, LSM 780 Spectral

Site: Imagerie – Institut Jacques Monod
Node: Paris-Centre

System : Open Informations : IM website
Options : Laser lines (mW); Objectives : x na Temperature: CO2; Detector: Microscope; Zeiss Comments : Intensity-Based FRET, RICS, FCS, TICS, Acceptor...

[CONTINUE READING](#)

December 9, 2014

FRANCE-BIOIMAGING aims to develop and to promote innovation in biological imaging and allow access to as many. The infrastructure is organized around five regional nodes and a transverse node dedicated to computer science for data processing in imaging with all relevant strengths of the various sites and the INRIA-Rennes Institute. The consortium includes 10 imaging facilities associated with several research and development laboratories in the field of microscopy and biological imaging. [Learn More](#)

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