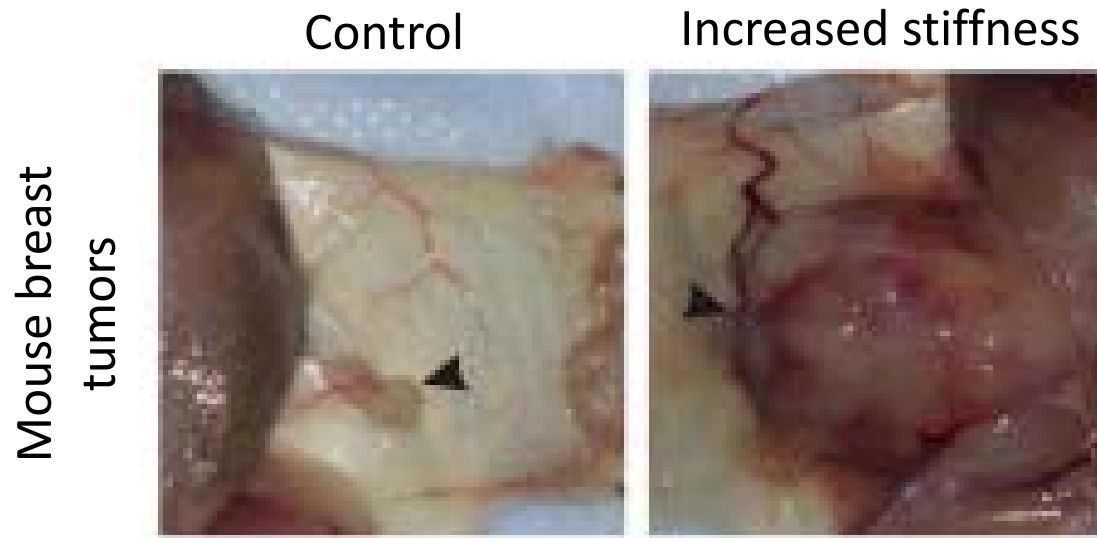


Sensing the matrix: transducing mechanical signals from integrins to the nucleus

Pere Roca-Cusachs

Universitat de Barcelona

**Institute for Bioengineering of
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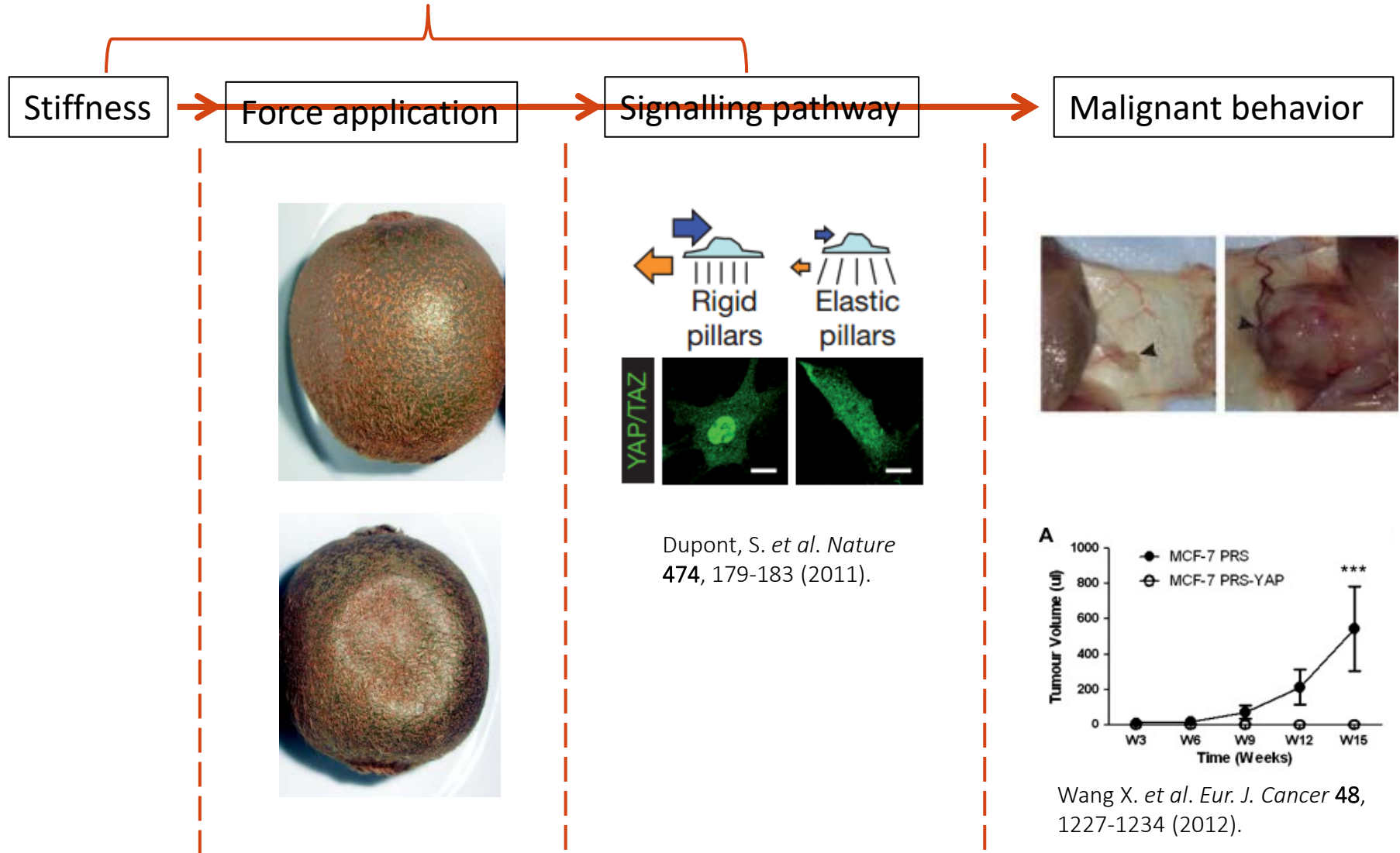
Levental et al., *Cell* 139:891-906, 2009

Mechanical factors are important in:

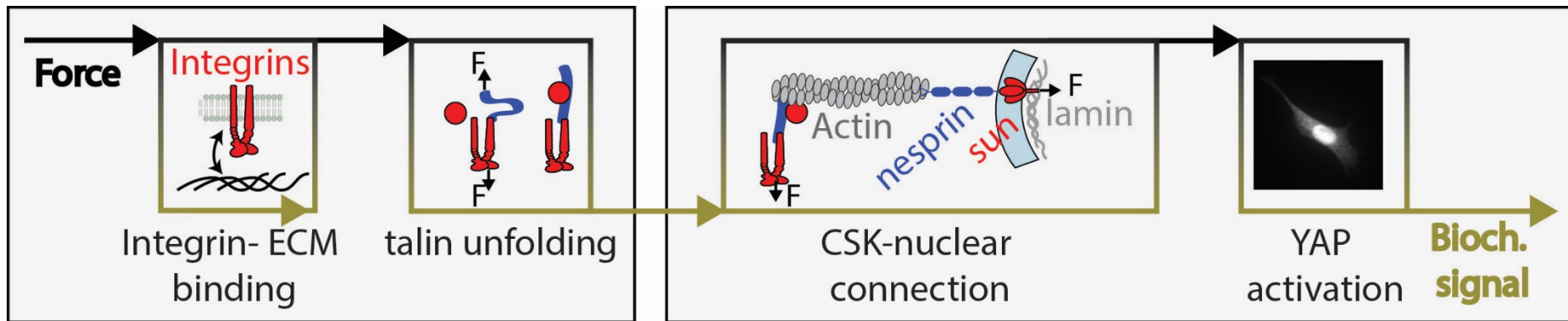
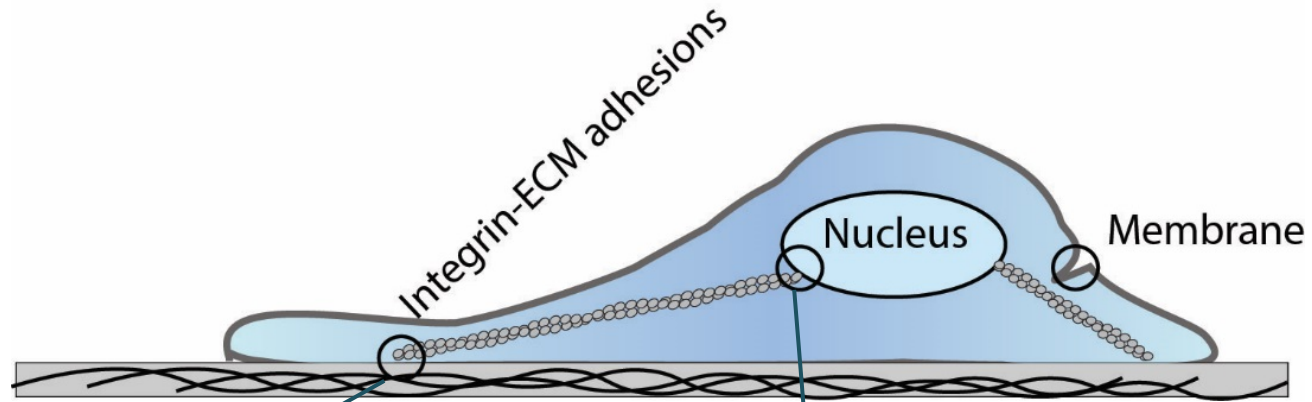
- Most solid tumors
 - Development
 - Wound healing
 - ...

How does a cell measure tissue rigidity?

What is the sensing mechanism?



How mechanosensing works



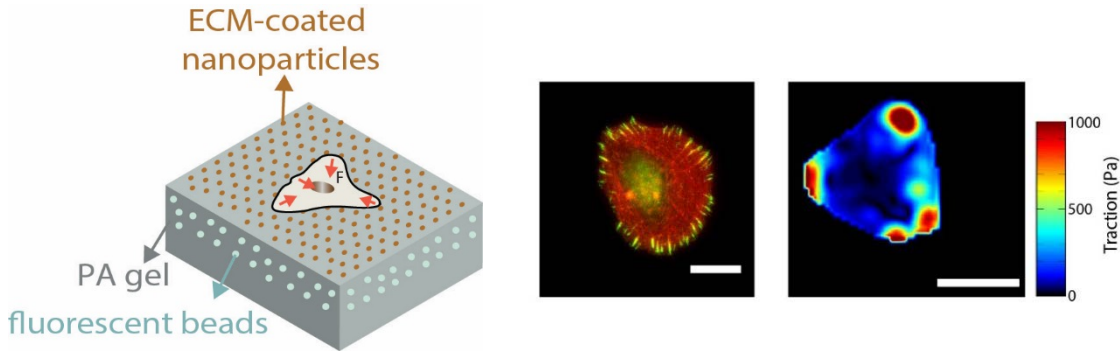
Elosegui-Artola,
Nat Mater 2014

Elosegui-Artola,
Nat Cell Biol 2016

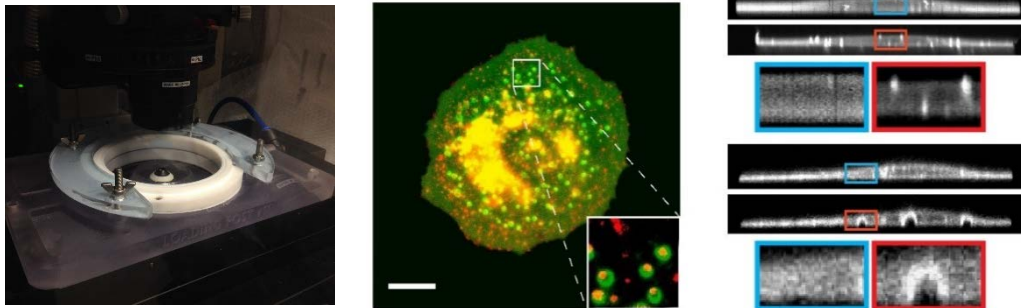
Elosegui-Artola, *Cell* 2017

Experimental / computational approach

Traction Force Microscopy

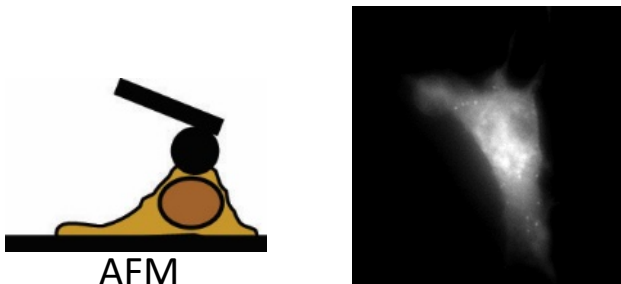


Cell stretch



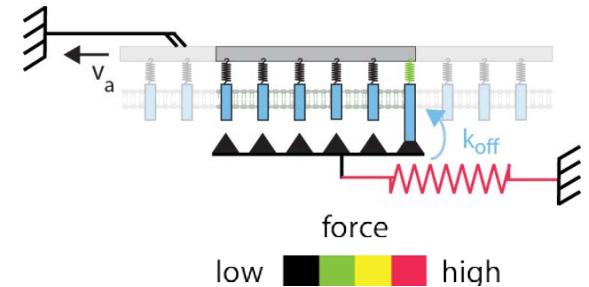
Stretch system

AFM



Combined with:

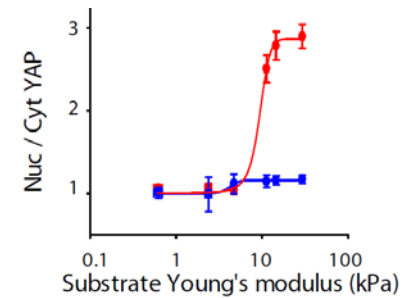
- Advanced Microscopy
- Molecular Biology
- Computational Modelling (clutch models)



We study the role of:

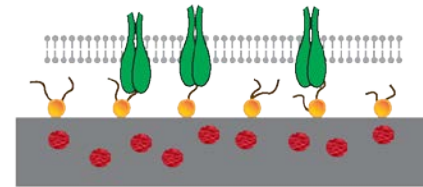
Matrix Rigidity

Elosegui-Artola et al, *Nat Mat* 2014
Nat Cell Biol 2016
Cell 2017



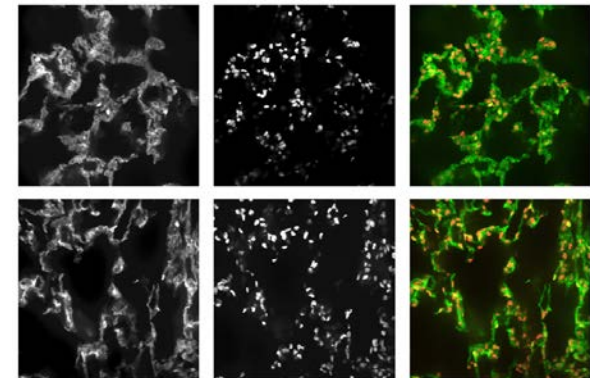
Matrix Ligand density

Oria et al., *Nature* 552:219-224 (2017)



Stretch in vitro and in vivo

González-Tarragó et al., *submitted*



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Sergi Garcia-Manyes (King's College)

Isaac Almendros (UB)
Timo Betz (U. Münster)
Johanna Ivaska (U. Turku)



Y

Invited speakers:

- Guillaume Salbreux
- Buzz Baum
- Marija Plodinec
- Andrew Ewald
- Peter Friedl
- Christina Scheel

Workshops on:

- Traction Microscopy
- Cancer Biology
- Biomechanical Modelling
- Chemistry of adhesion
- Single molecule mechanics



MECHANO·CONTROL
Mechanical control of biological function

Mechanobiology of Cancer Summer School



17-20th September, Eco-Resort La Cerdanya, Prullans

<https://events.ibecbarcelona.eu/mechanobiology-of-cancer-summer-school>