HAV904V: Cell Fate & Plasticity

Coordinators: Francois Fagotto and Alenka Copic (CRBM)

October 13-24, afternoons + 22 October Minisymposium “Cell Membranes and Cytoskeleton”

Final exam (January): Analysis of data from scientific article + questions on the lectures

Prerequisite: Cell Molecular Biology (Master 1)

The detailed schedule will be posted on this Master BS site

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Central theme:

From molecules to cells to complex organisms: a Cell Biology perspective

Cellular mechanisms involved in determination, differentiation and function of different cell types

How do cells adhere and move in very regulated ways to build and maintain sophisticated body structures (tissues and organs)

When things go wrong: Tissue-specific pathologies and cancer

When cells get old (senescence)

+ Completing the toolkit of the perfect Cell Biologist:

From basic to highly sophisticated cell and molecular approaches

Critical interpretation of results

Moving beyond simple loss- and gain-of-function experiments

Think "out of the box" to extract biological significance

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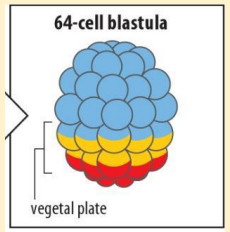
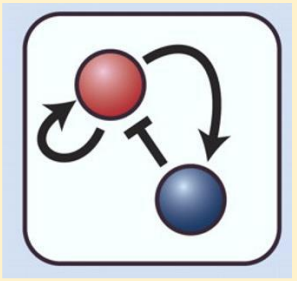
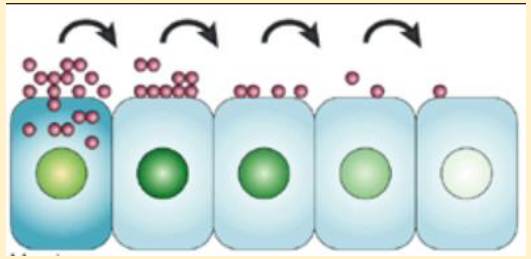
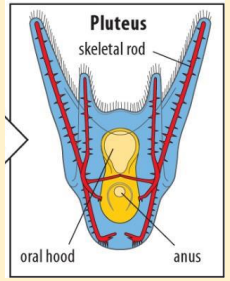
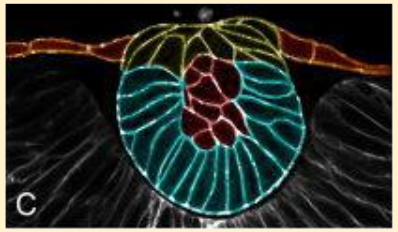
General lecture: Introduction to cell fate determination



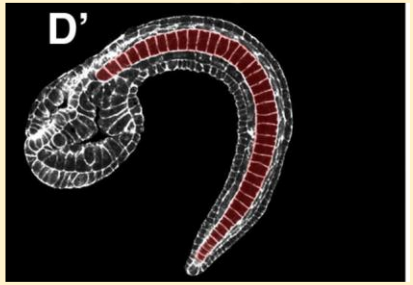








fish eye

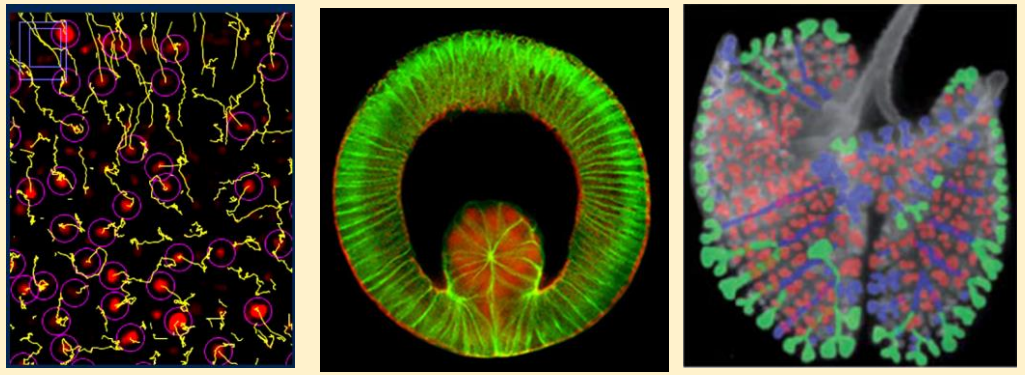


ascidian larval axis

All you need to know about cell fate: morphogens, induction, commitment, competence and more…

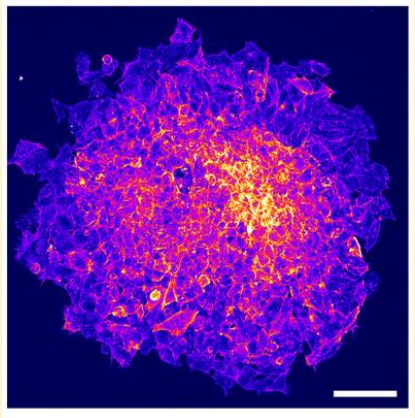
Principles + examples at the cellular and molecular level

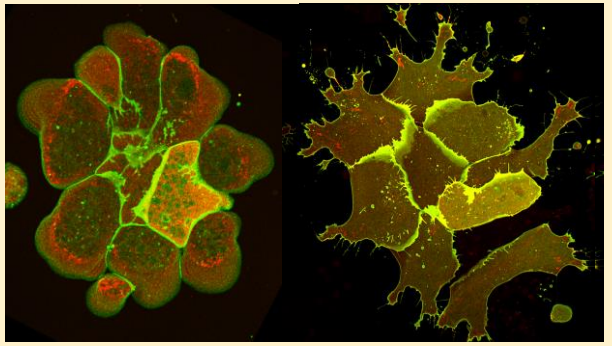
General lecture: Introduction to morphogenesis



Cellular mechanisms that shape tissue and organisms

General lecture: Epithelial to mesenchymal transition





Making cell “invasive” in embryos and in cancer

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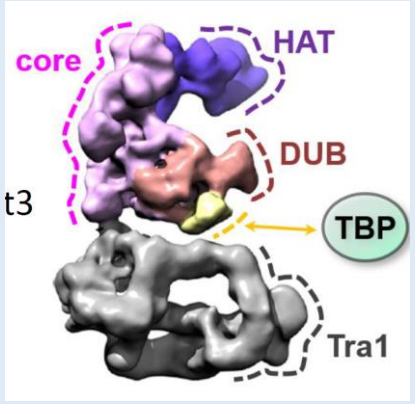
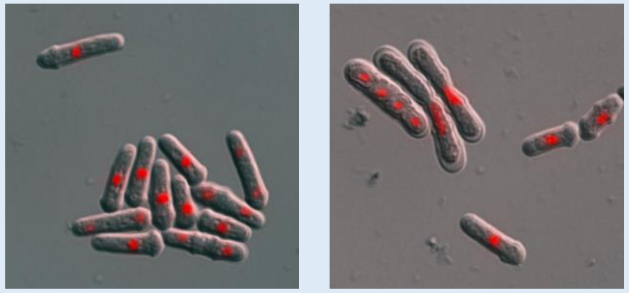
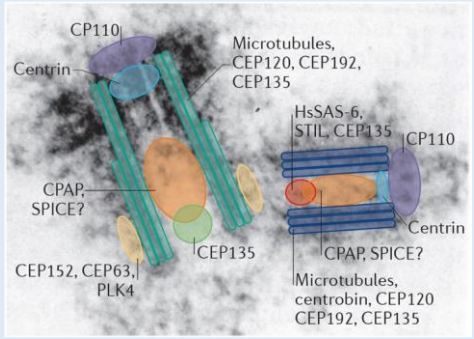
Gene expression regulation during cellular differentiation

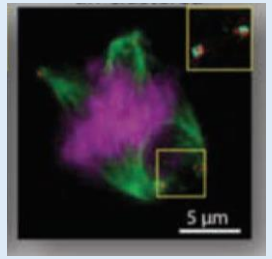




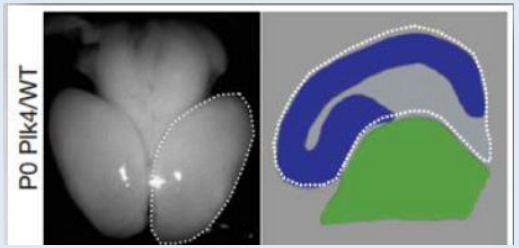
Combining yeast genetics and biochemistry to tackle basic question in transcriptional regulation

Centrosomes, asymmetric cell division, kidney formation (and pathologies)

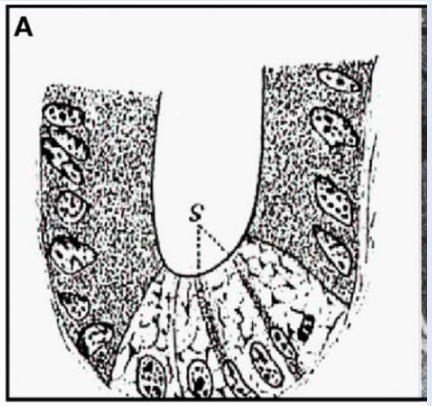




Aneuploidy -> cancer



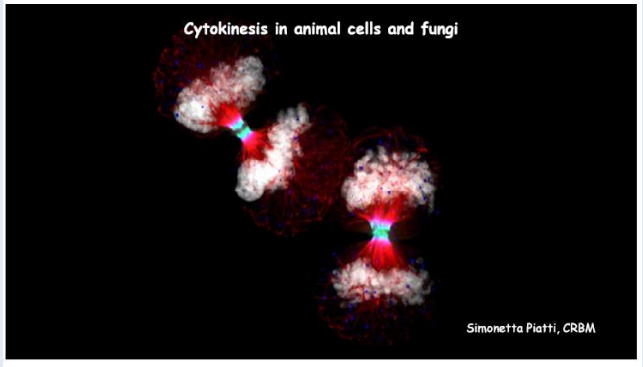
Intestinal stem cell maintenance, differentiation and plasticity

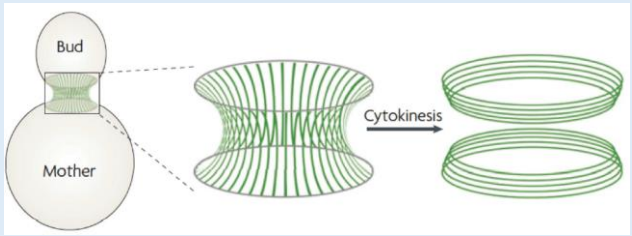


Hand-drawn crypts
"S": small cells
(Paneth 1887)

Control of cytokinesis

How to separate two daughter cells?
Actomyosin ring, septins and other tricks …





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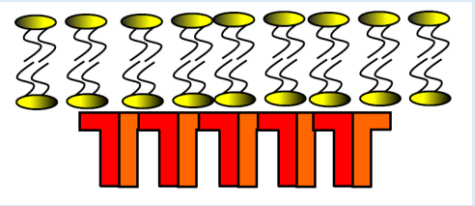
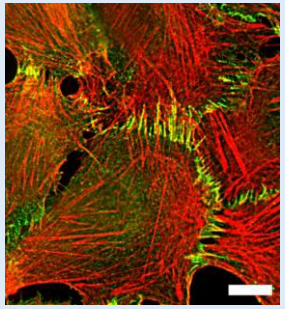
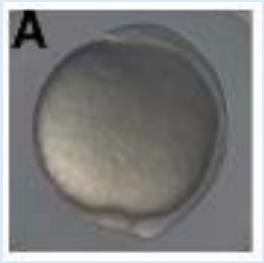
Integrin- and cadherin-mediated adhesion and signalling

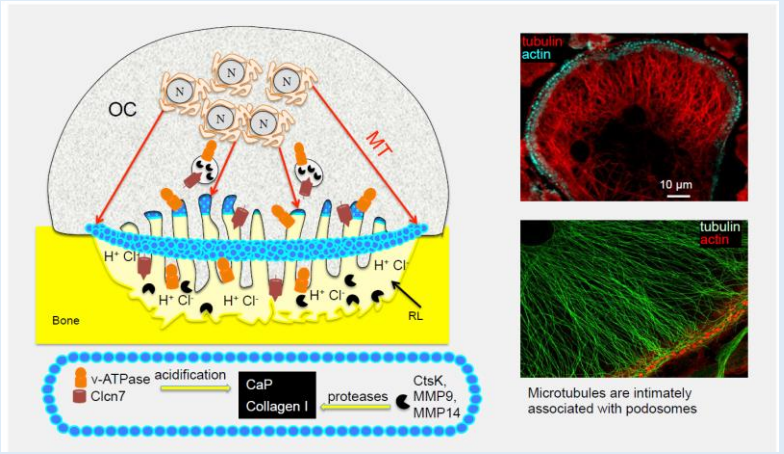


From membrane microdomains to embryonic development (and cancer)



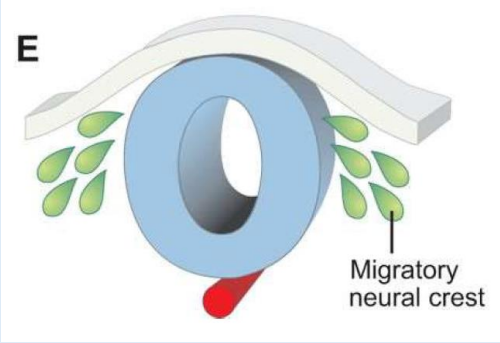


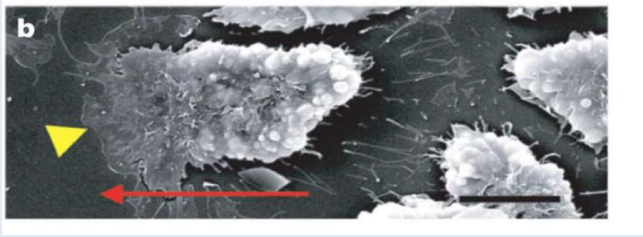
Physiopathology of osteoclasts



How cells eat bone and why?

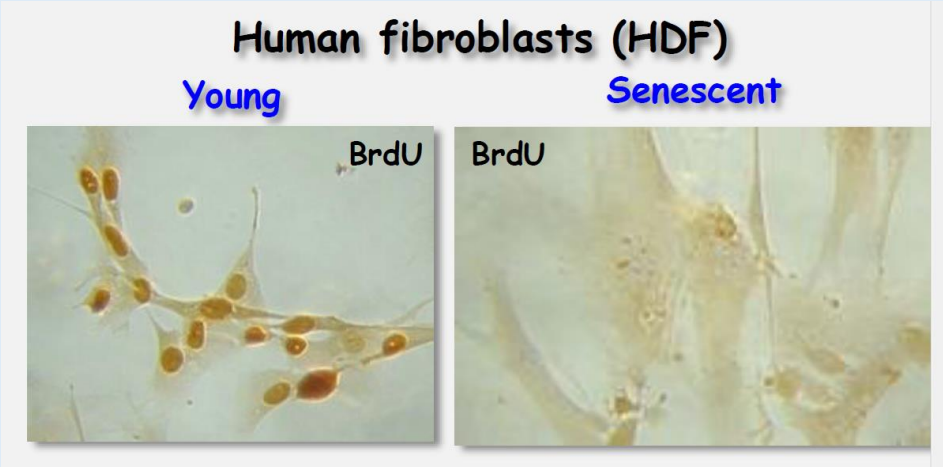
Neural crests





Crazy cells that migrate far away and can build any type of tissue…

Cellular senescence, ageing and cancer



What makes cells getting old?

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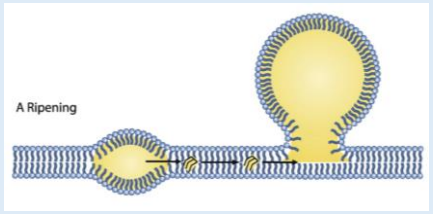
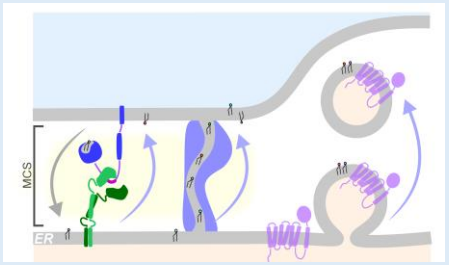
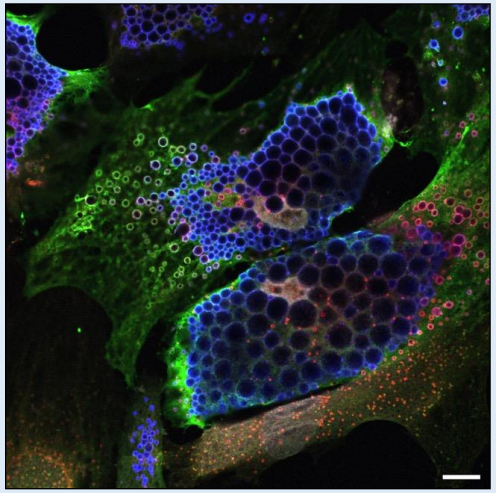
Lipids synthesis, transport and adipogenesis

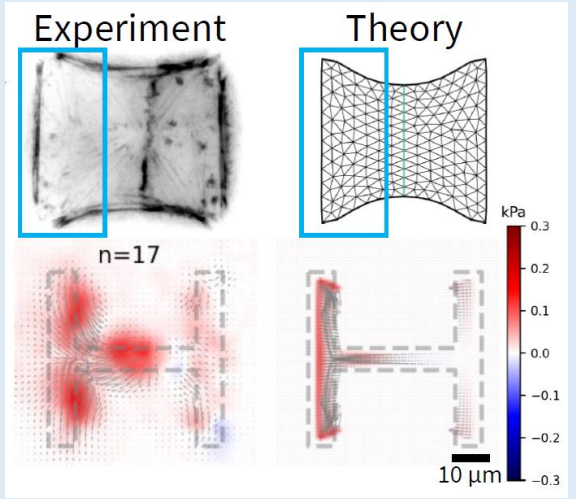






Making membranes but also different types of fat

Introduction to (simple) biophysics



Invasive cancer cells get softer: How do we know it, how can we play with forces…

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… and discovering a new universe by diving deeper into cellular and supramolecular structures