HAV904V: Cell Fate & Plasticity

Coordinators: Francois Fagotto and Alenka Čopič (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 the Master BS website

HAV904V: Cell Fate & Plasticity `

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

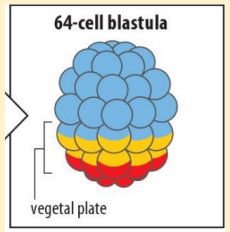
Critical interpretation of results

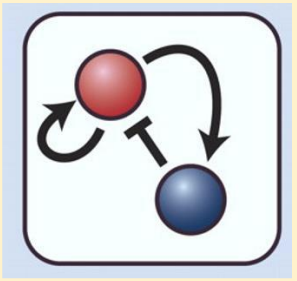
Moving beyond simple loss- and gain-of-function experiments

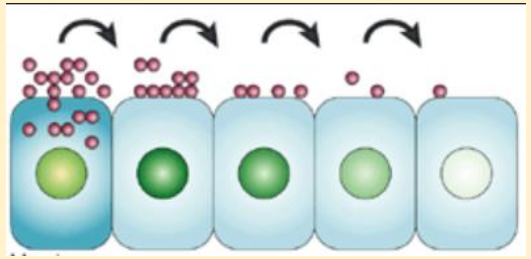
Think "out of the box" to extract biological significance

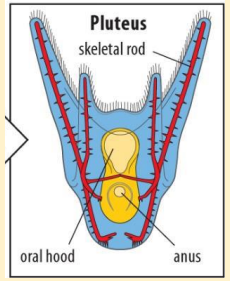
HAV904V: Cell Fate & Plasticity

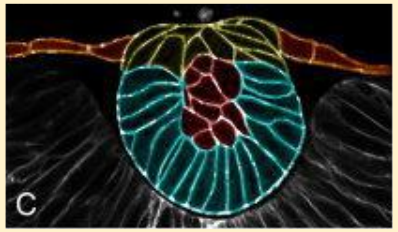
General lecture: Introduction to cell fate determination



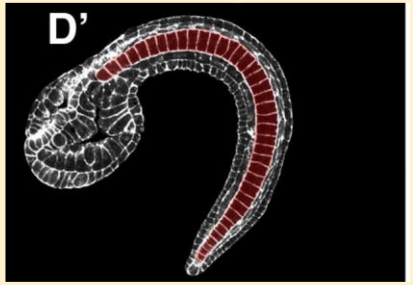








fish eye

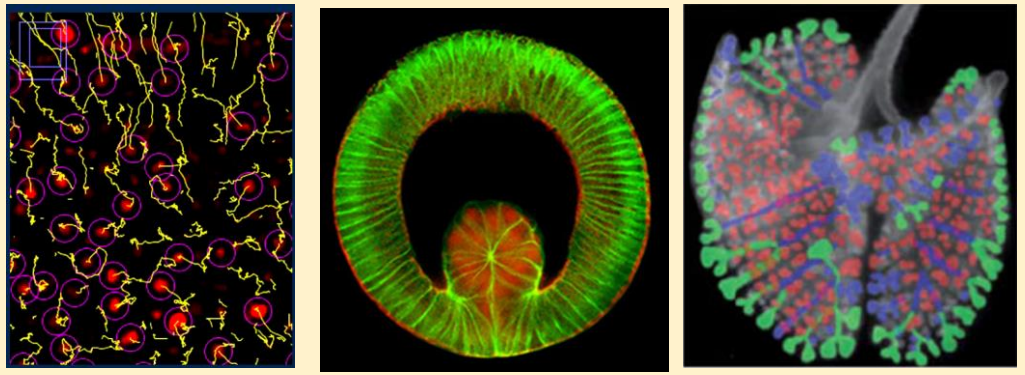


ascidian larval axis

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

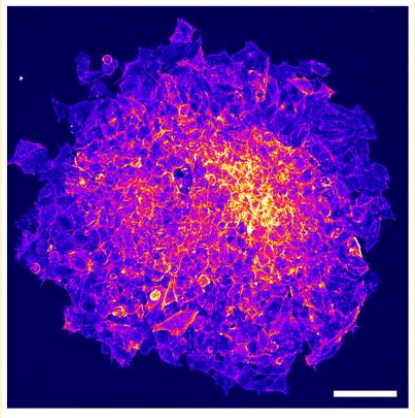
Principles + examples at the cellular and molecular level

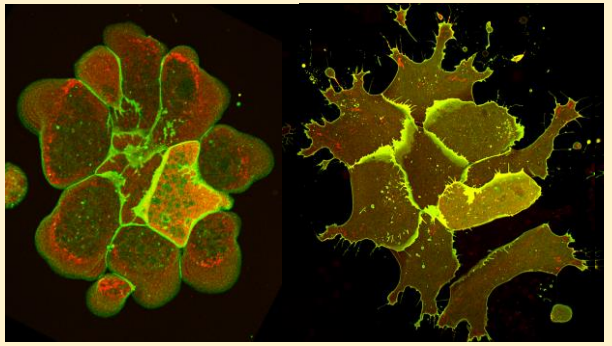
General lecture: Introduction to morphogenesis



Cellular mechanisms that shape tissue and organisms

General lecture: Epithelial to mesenchymal transition



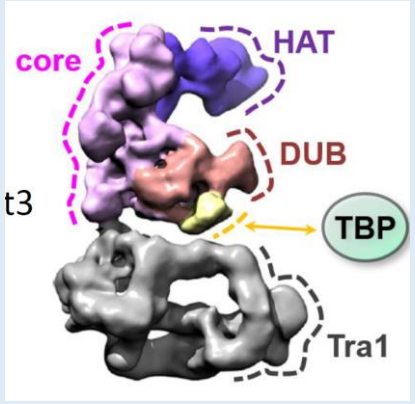


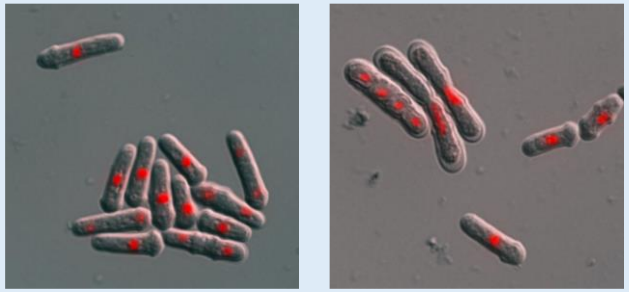
Making cell “invasive” in embryos and in cancer

HAV904V: Cell Fate & Plasticity

Gene expression regulation during cellular differentiation

Dominique Helmlinger

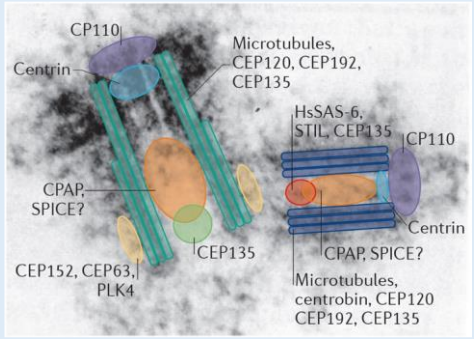


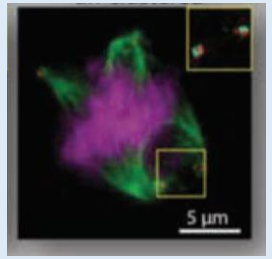


Combining yeast genetics and biochemistry to tackle basic question in transcriptional regulation

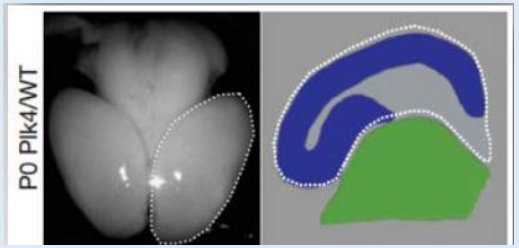
Centrosomes, asymmetric cell division, kidney formation (and pathologies)

Benjamin Vitre (Delaval team)



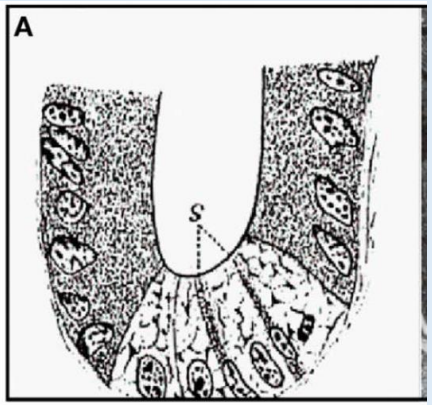


Aneuploidy -> cancer



Intestinal stem cell maintenance, differentiation and plasticity

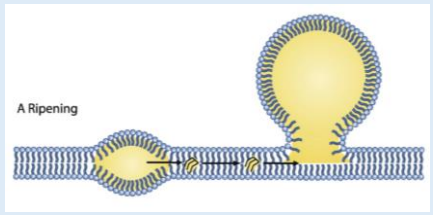
Nathalie Coutry

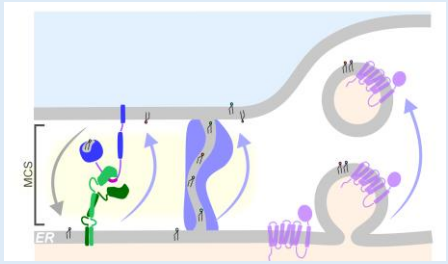


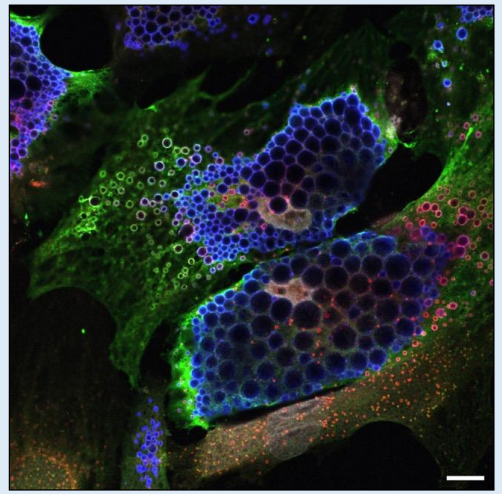
Hand-drawn crypts
"S": small cells
(Paneth 1887)

Lipids synthesis, transport and adipogenesis

Alenka Čopič





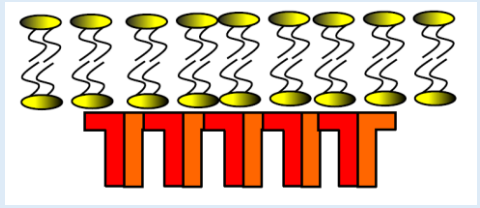


Making membranes but also different types of fat

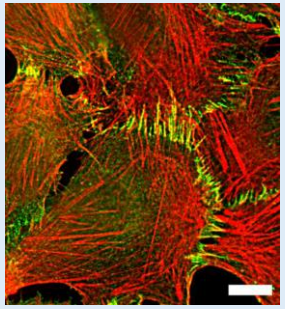
HAV904V: Cell Fate & Plasticity

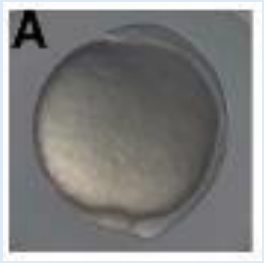
Integrin- and cadherin-mediated adhesion and signalling

Stéphane Bodin



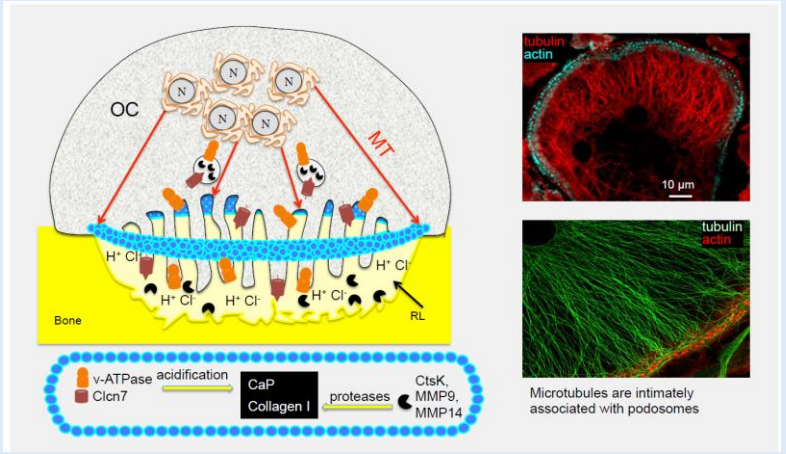
From membrane microdomains to embryonic development (and cancer)





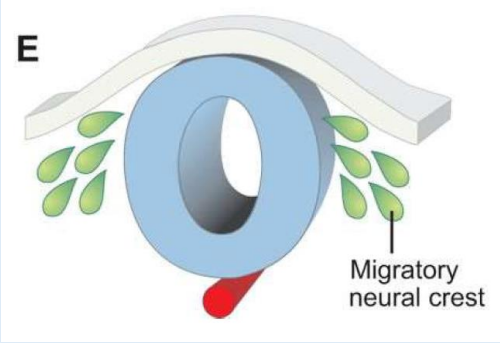
Physiopathology of osteoclasts

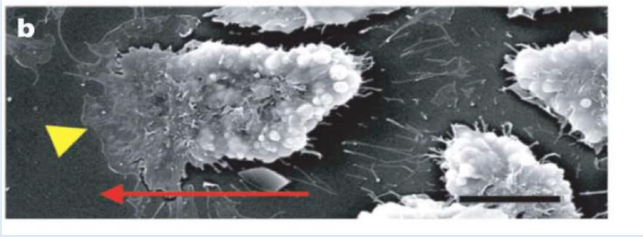
Anne Blangy



How cells eat bone and why?

Neural crests (TBA)

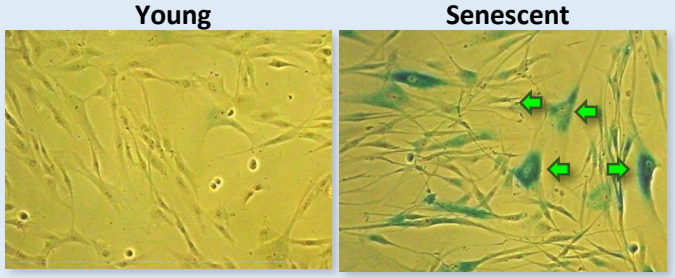




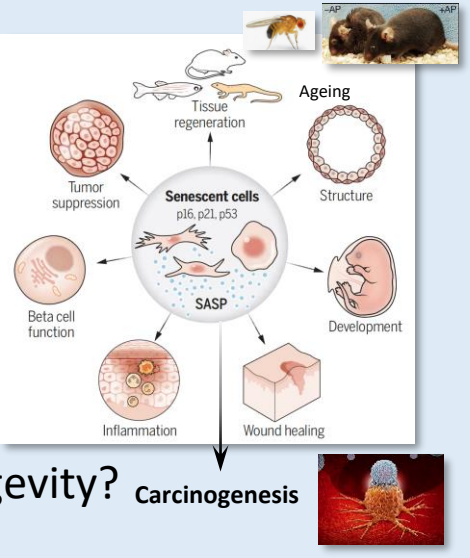
Crazy cells that migrate far away and can build any type of tissue…

Cellular senescence, ageing & cancer

Vjekoslav Dulić



Human dermal fibroblasts (HDF)



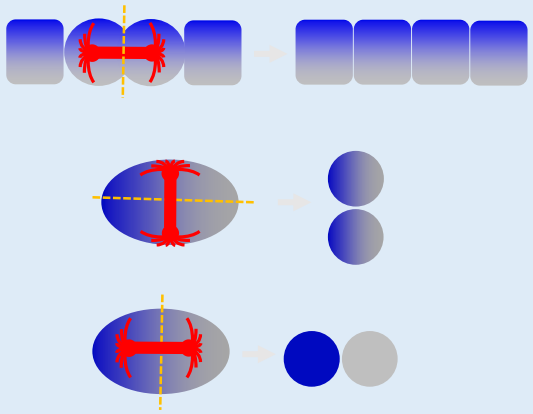
Why cells become senescent…

…and how it affects health and longevity?

HAV904V: Cell Fate & Plasticity

Spindle positioning, orientation and symmetry/asymmetry of cell division

Dimitris Liakopoulos



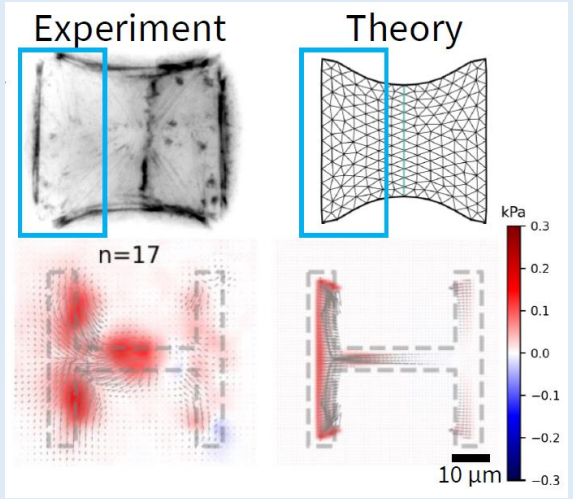
oriented cell division:
->organ morphogenesis
tissue homeostasis

symmetric cell division
-> equal cells

asymmetric cell division
->cell differentiation
->stem cell division

Introduction to (simple) biophysics

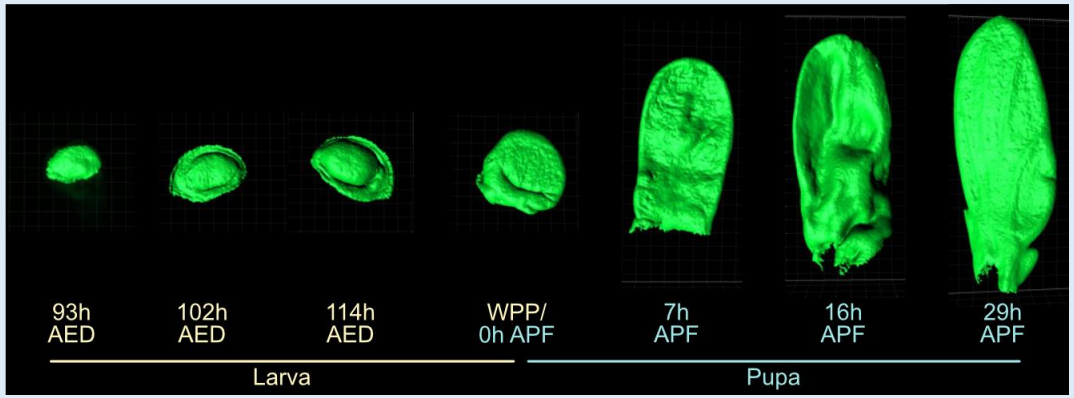
Francois Fagotto



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

Control of cell and tissue growth

Adeline Payet (Boulan team)



HAV904V: Cell Fate & Plasticity

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