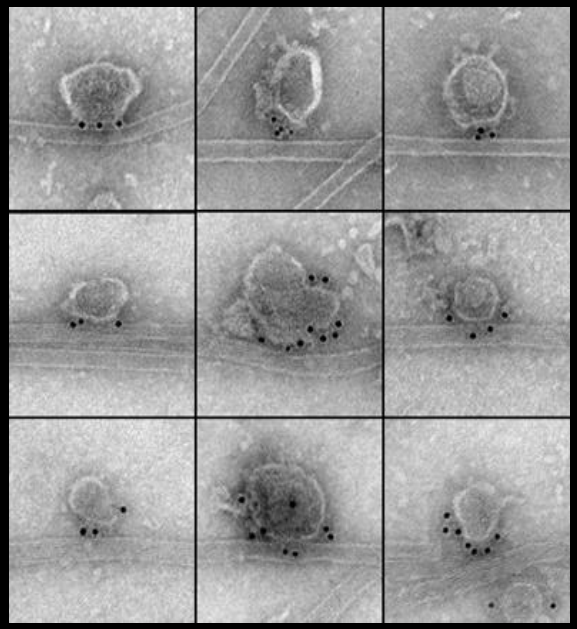
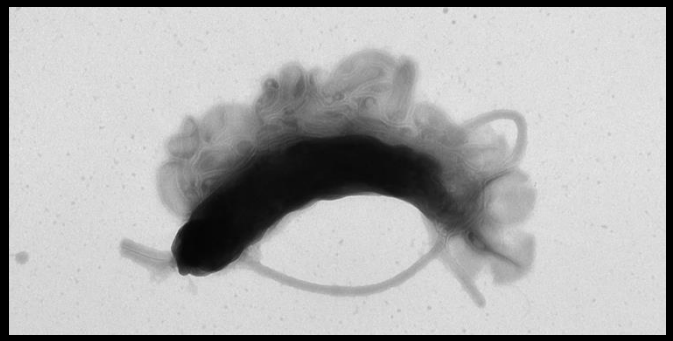
Motor Proteins, APP, Electron Microscopy, and Expedition: Species ID

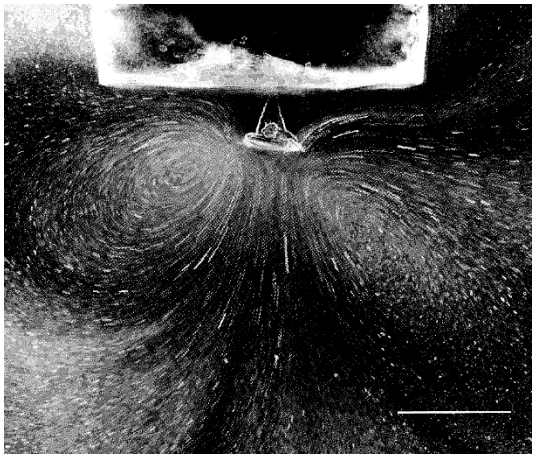


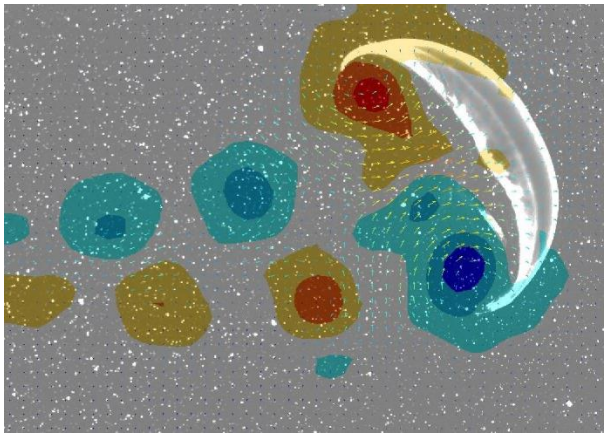


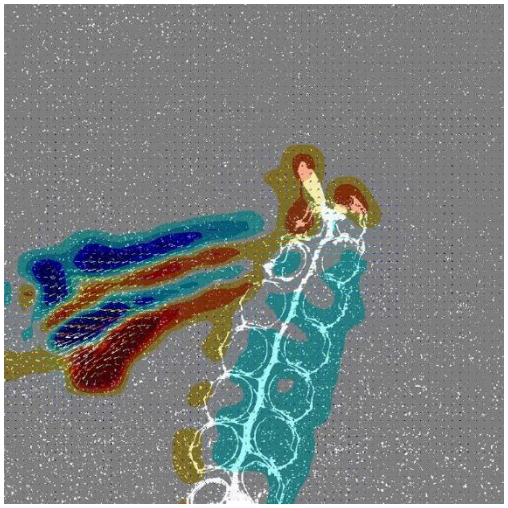
Joe DeGiorgis 508.292.4605 jdegiorg@providence.edu

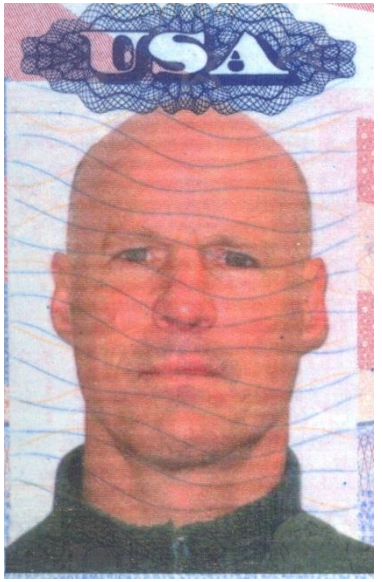
Animal-Fluid Interactions

High speed imaging and fluid analysis









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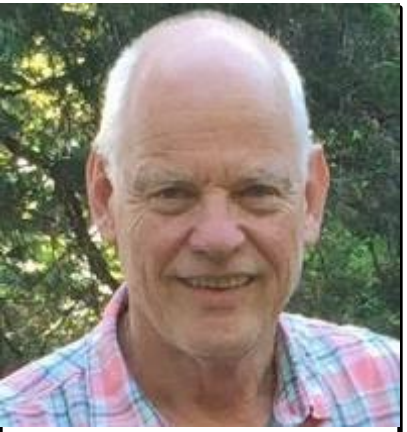
costello@providence.edu

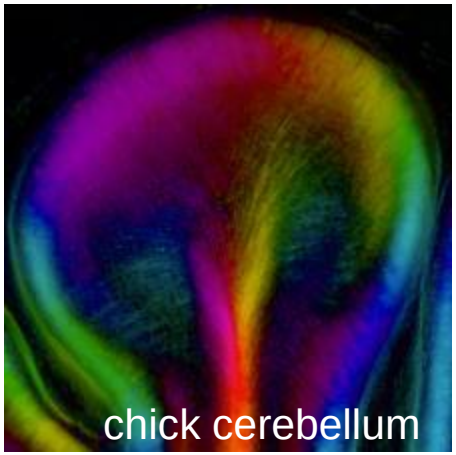
Architectural Dynamics in Living Cells, Tissues, and Whole Organisms



Rudolf Oldenbourg
Lillie 110
rudolfo@mbl.edu

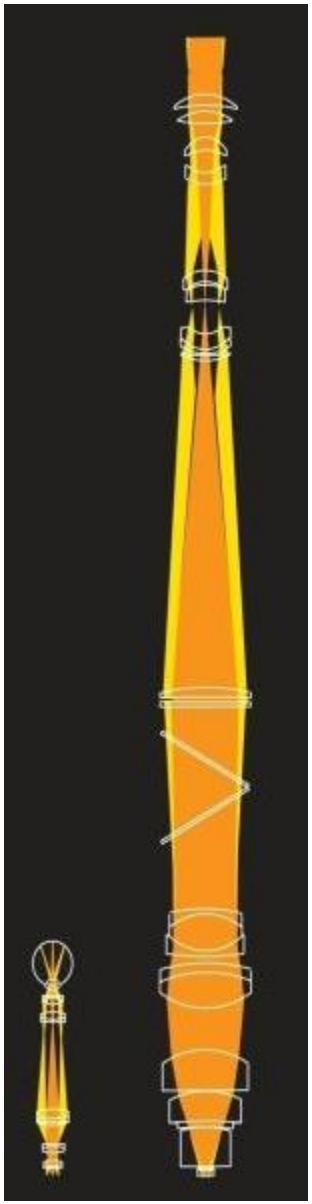
by Jim LaFountain

LC-PolScope



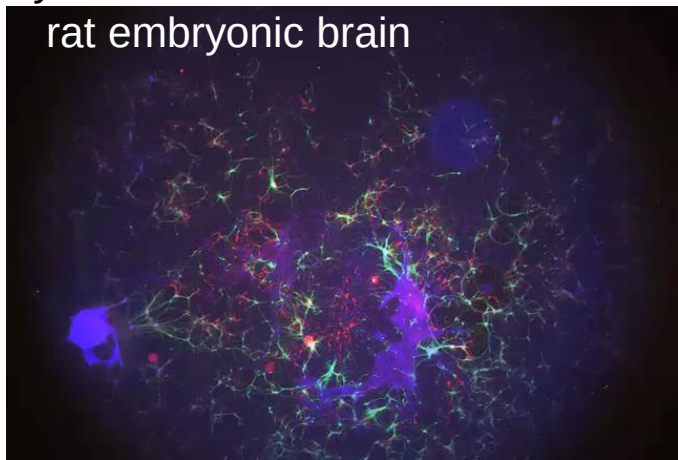
by Maki Koike-Tani

Mesolens



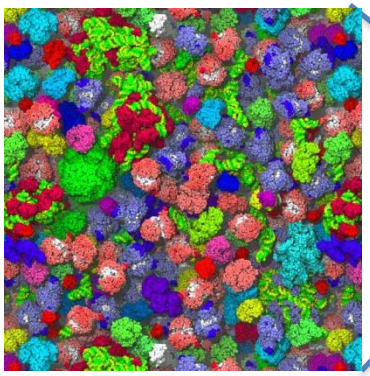
5 x 5 x 3 mm^3 
@ 0.5 µm resolution

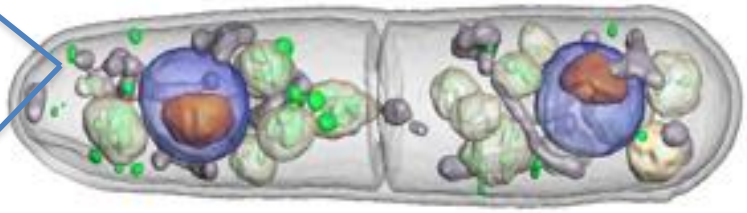
by Brad Amos and Gail McConnell



Morphogenesis of a Cell

Fred Chang UC San Francisco





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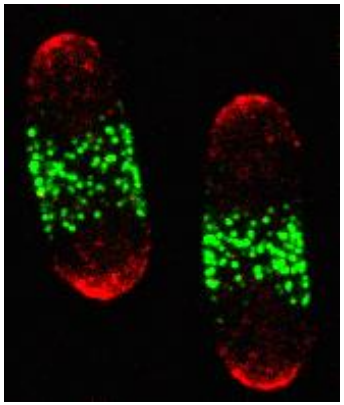
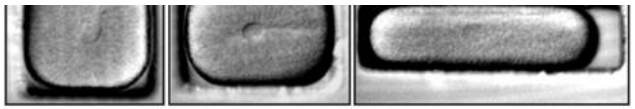
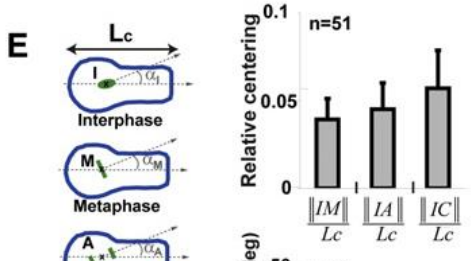
fred.chang@ucsf.edu

fission yeast
S. pombe



sea
urchin





How do molecules and mechanical properties specify cell shape and size?

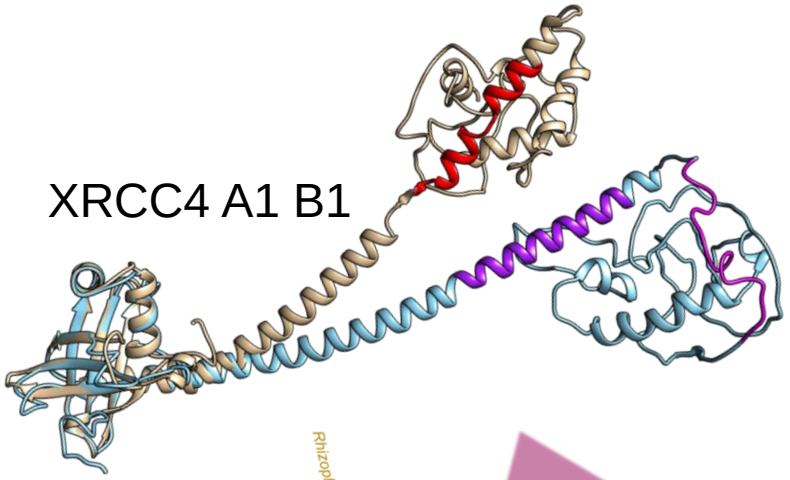
Cytokinesis, microtubules, cell growth, cell size control, cell mechanics
Nature of cytoplasm

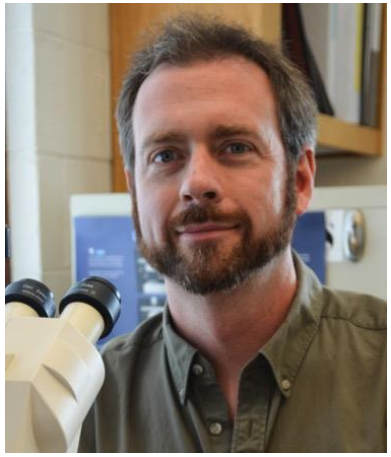
How do cells know how big they are?

Genetic Novelty in DNA Repair

Genome Evolution in Response to Stress

XRCC4 A1 B1





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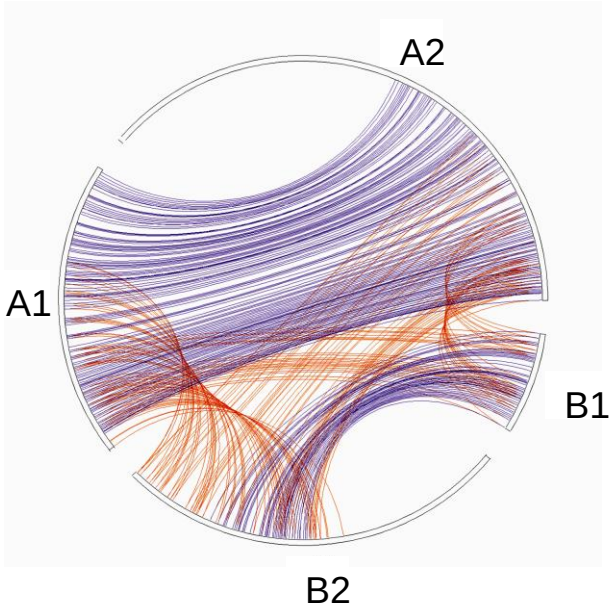
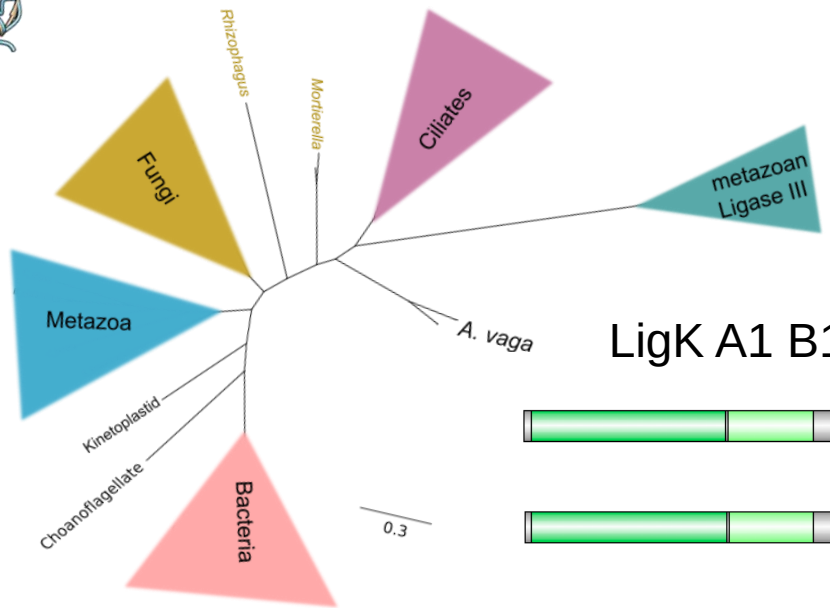
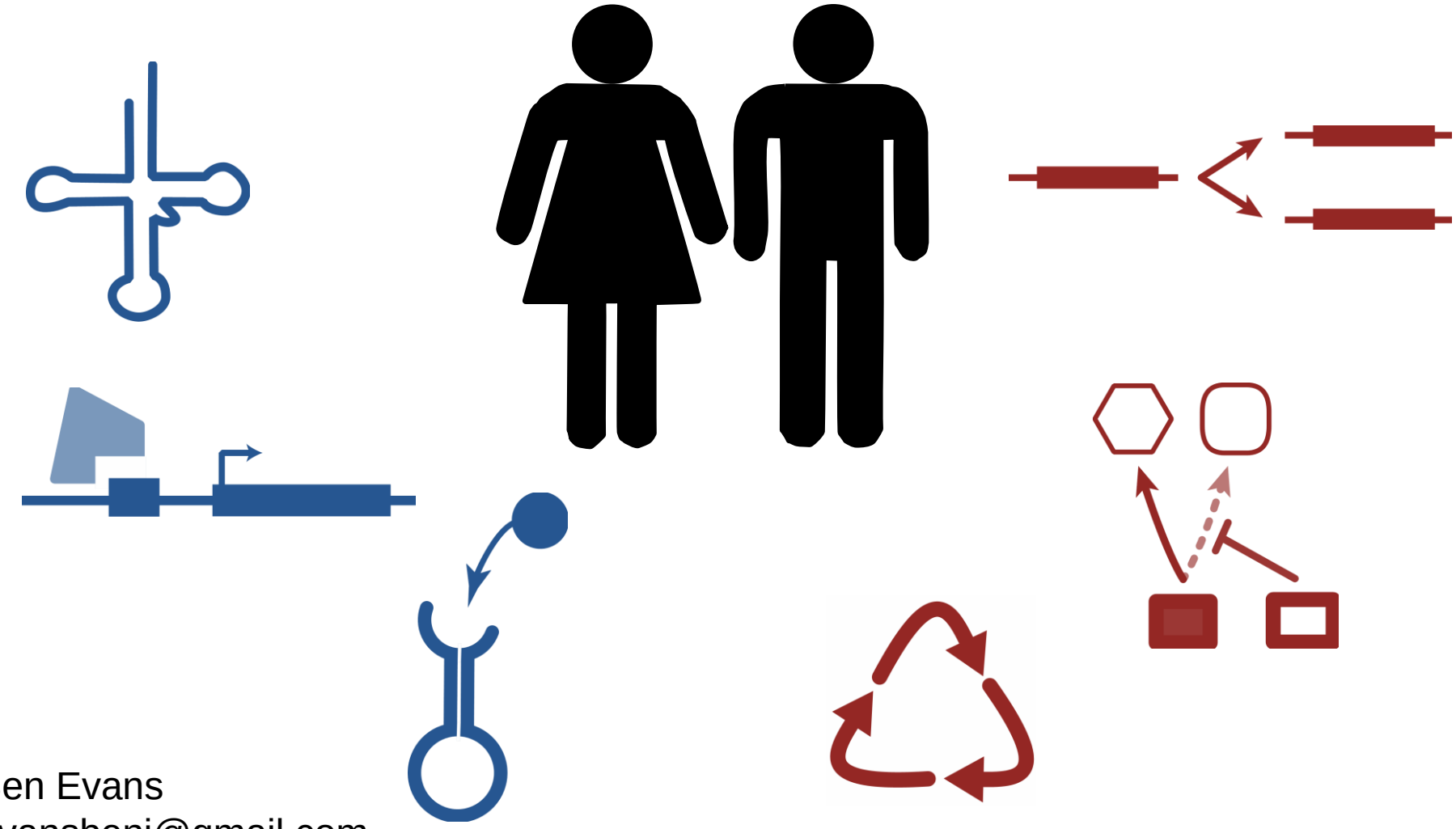




LigK A1 B1

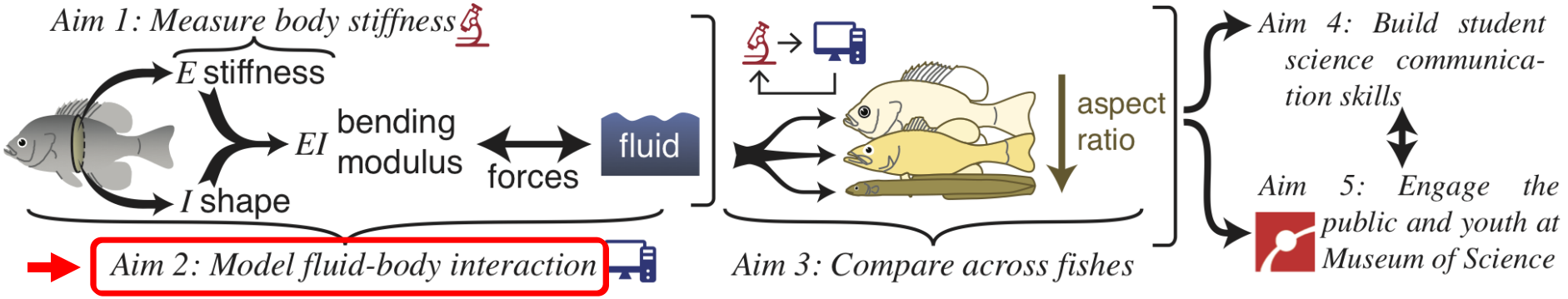
How do fundamentally important features evolve?

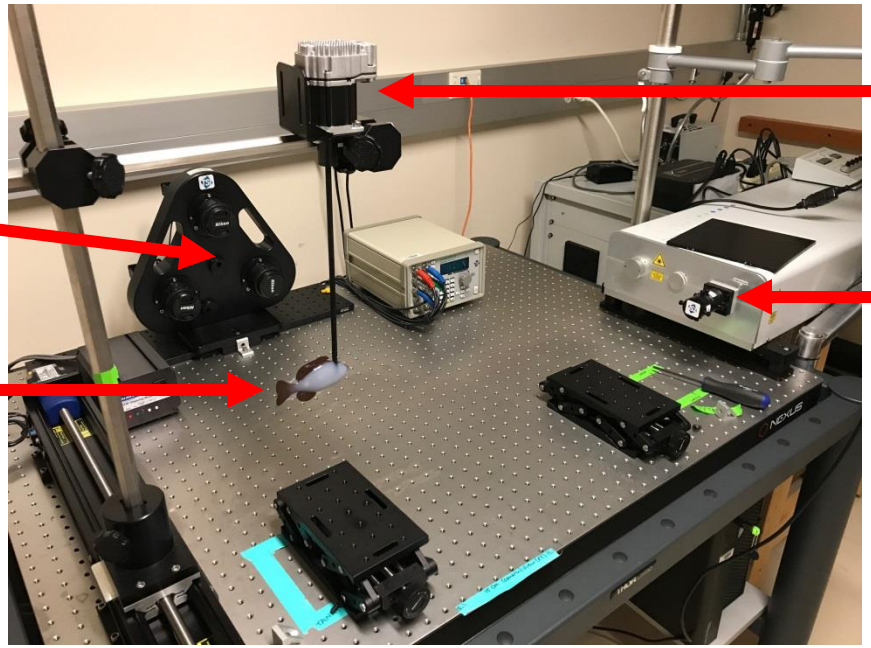


Ben Evans
evansbenj@gmail.com

How does body shape and stiffness affect swimming performance in fishes?

Fluid-structure interaction and flow visualization





Thanks to Jack Costello and Sean Colin

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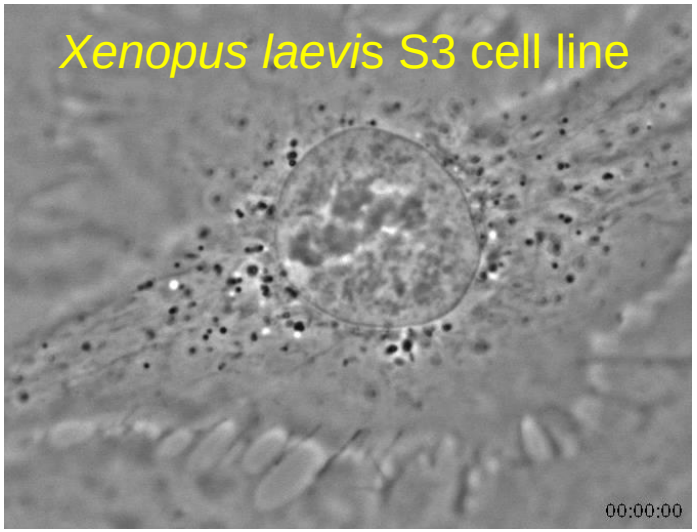
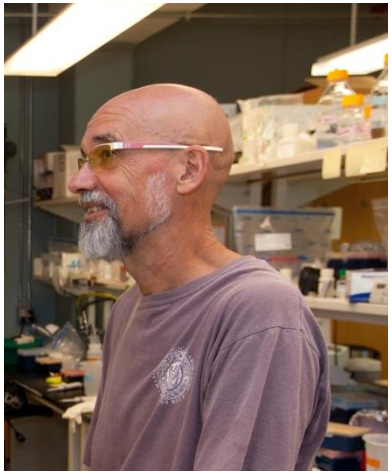
New methods to make mutants in frogs, etc



- 2015: 1 *X. laevis* and 4 *X. tropicalis* cell lines
- Normal ploidy
- 2017: Gene editing in cell lines (CRISPR)
- Transfer nucleus to egg
- Mutant animals without breeding



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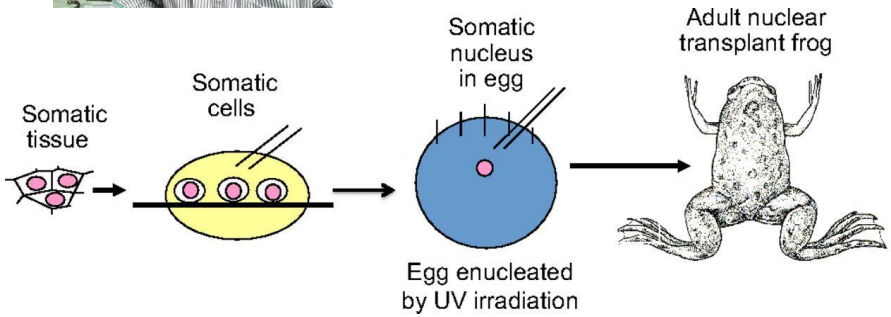
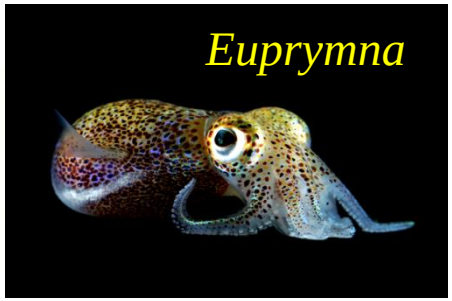
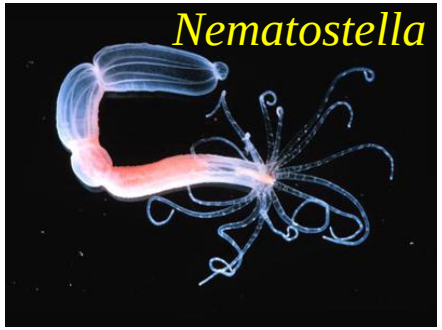
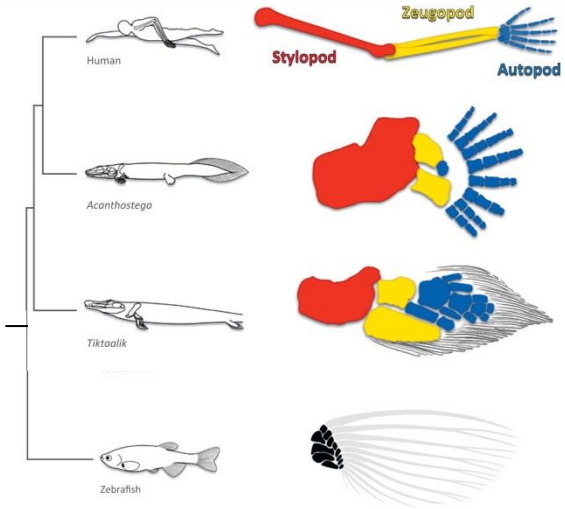
John Gurdon
2012 Nobel Prize in Physiology or Medicine

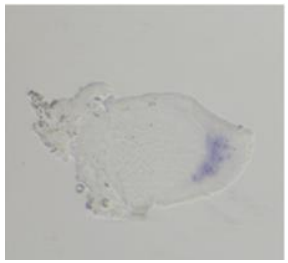


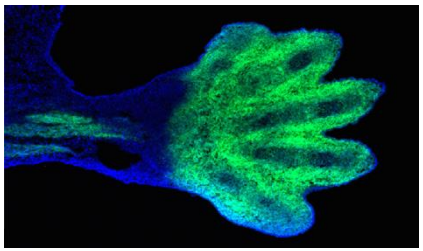


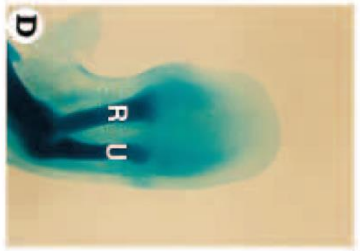


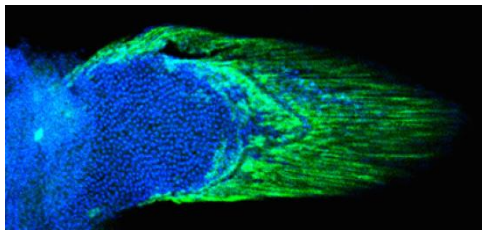
Finding Your Inner Fish











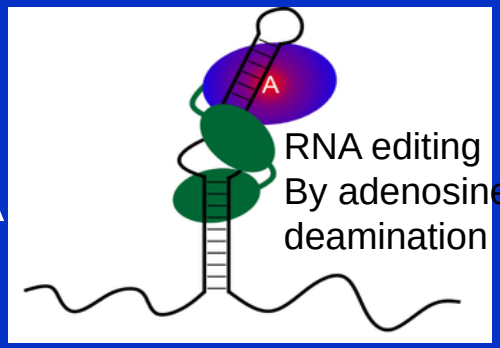
Neil Shubin, University of Chicago

Manipulation of biological information within RNA

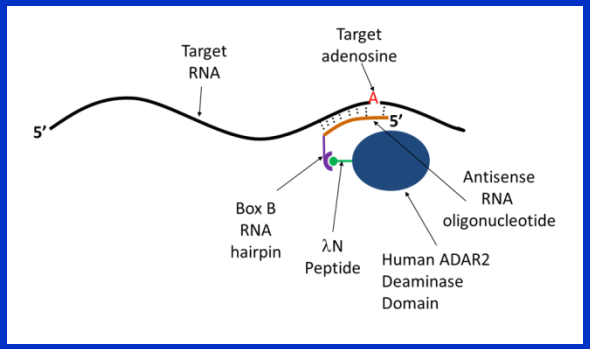
DNA

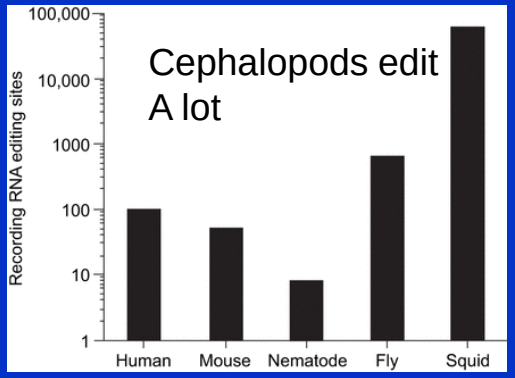
RNA

Protein



Site-directed
RNA editing

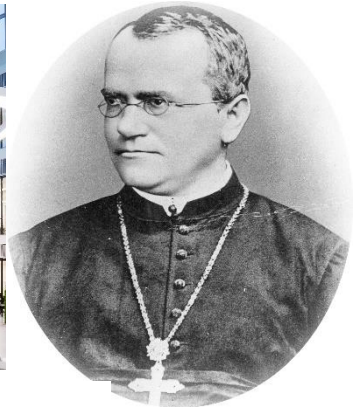




Genetically
tractable
Marine models

Josh Rosenthal
Rowe 411

RNA modification and innate immunity



GE & NE Africa

Mary O'Connell
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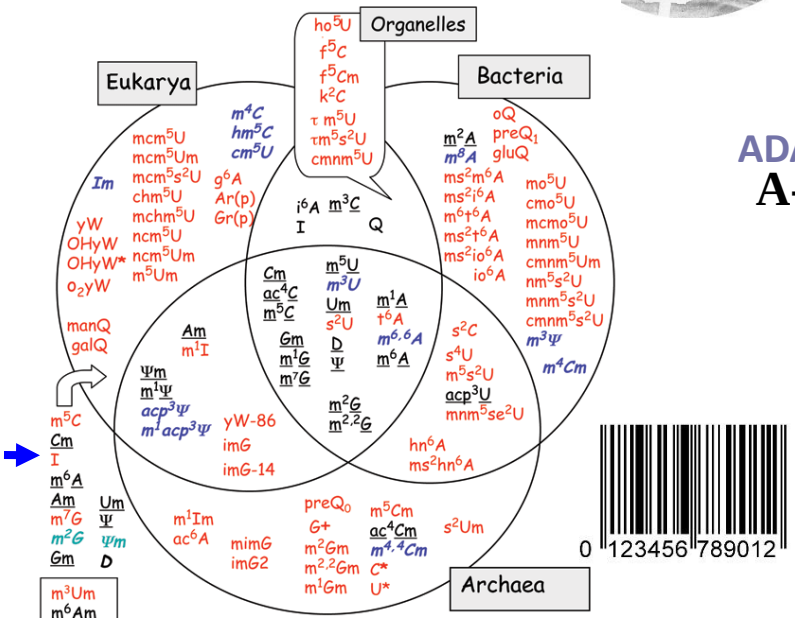
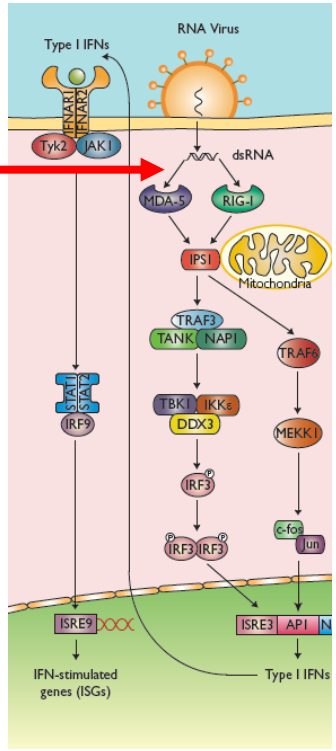
mary.oconnell@ceitec.muni.cz

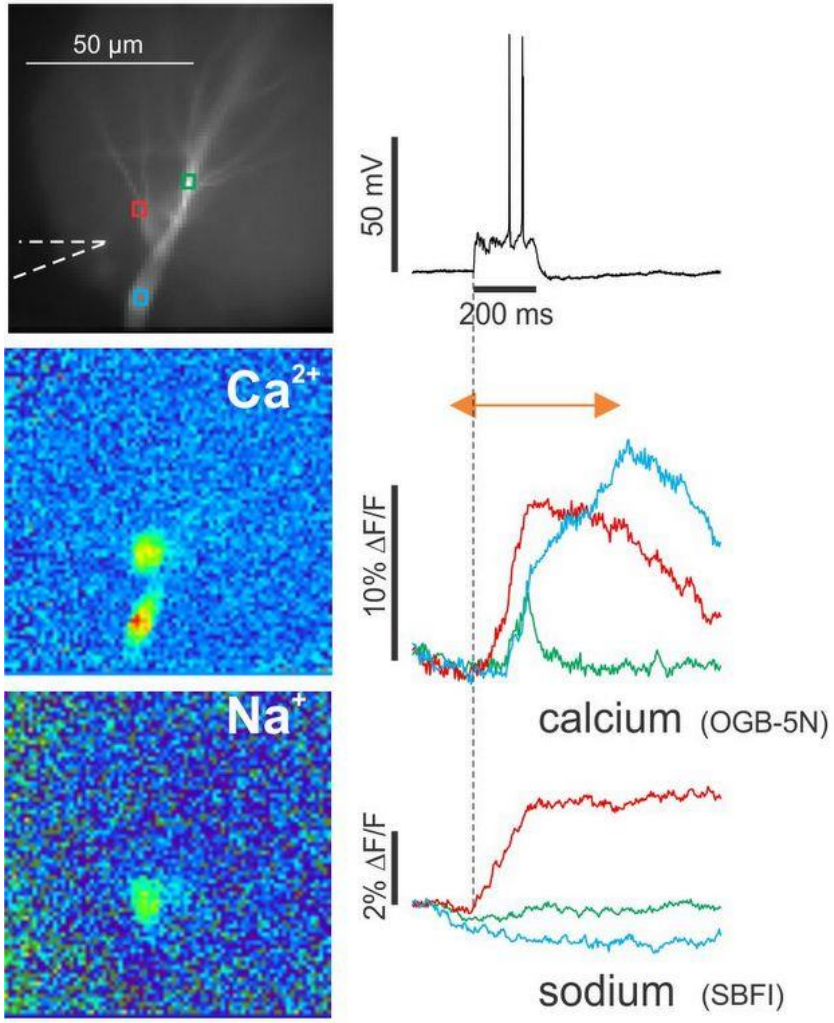


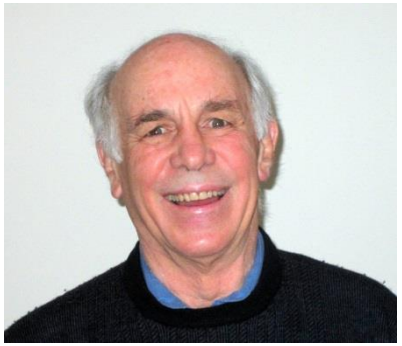
ADAR1
A-I



Imaging of dendritic function

Simultaneous sodium-calcium imaging





Bill Ross
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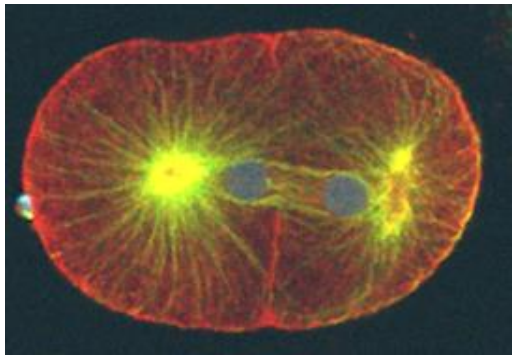
ross@nymc.edu

Asymmetric cell division

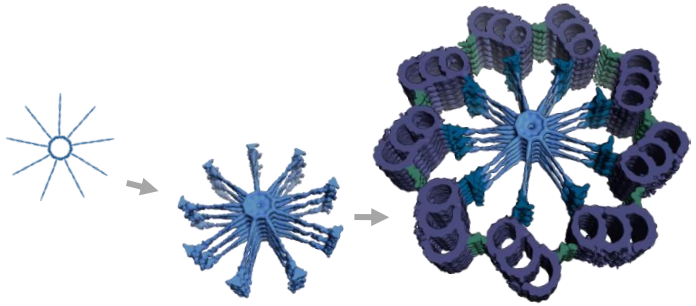


C. elegans embryo

Pierre Gönczy
Whitman fellow, Lillie 104
pierre.gonczy@epfl.ch

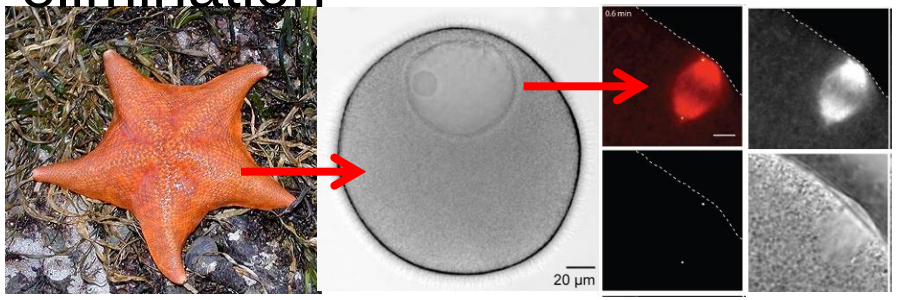
Swiss Federal Institute of Technology
Lausanne, Switzerland (EPFL)

Centriole assembly



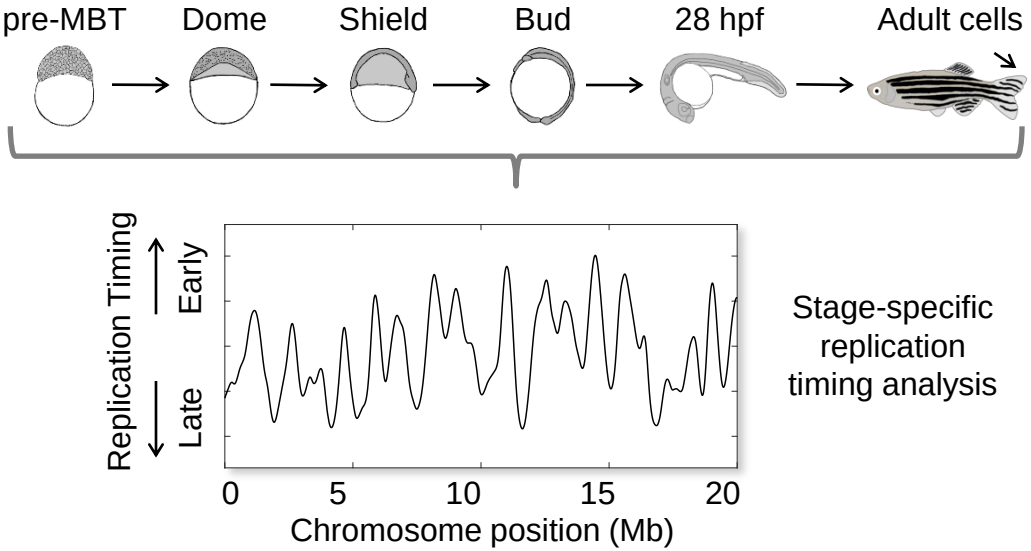
SAS-6 self-assembly

@MBL: Centriole elimination



Joana Borrego Pinto and Marie Pierron

Establishing and Stabilizing Developmental Programs Through DNA Replication



Stage-specific replication timing analysis

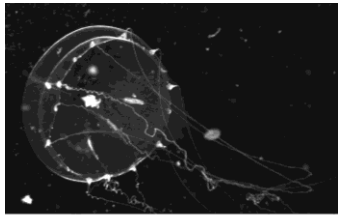
Chris Sansam
Rowe 210
Chris-Sansam@omrf.org

1. Mechanisms and Functions?
2. Cell lineage variation?
3. Cell-to-cell variation?

Ciona intestinalis

Why Ascidians?
1.Studied for >100 years.
2.Small genomes
3.Can obtain thousands of embryos
4.Easy genetic manipulation

Wound Healing in Clytia hemisphaerica



Jocelyn Malamy
The University of Chicago
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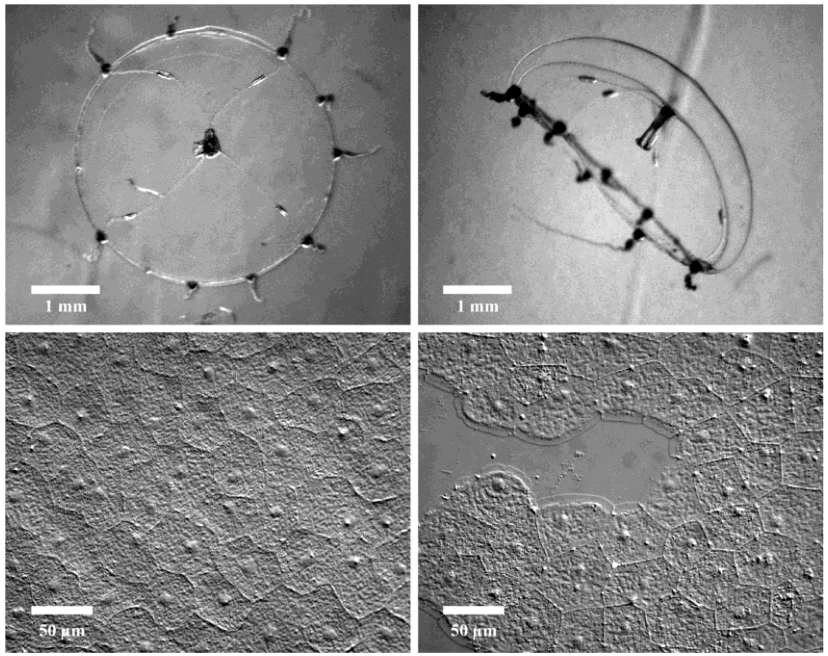
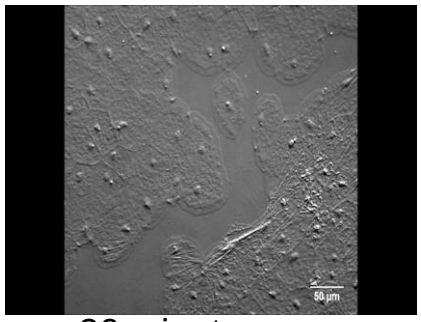
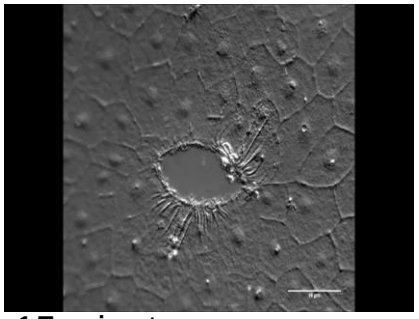
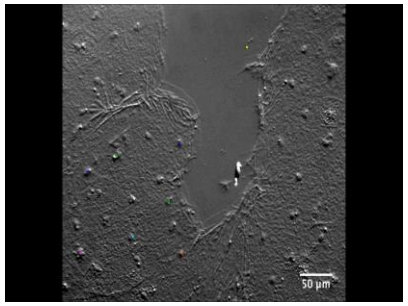




20 minutes



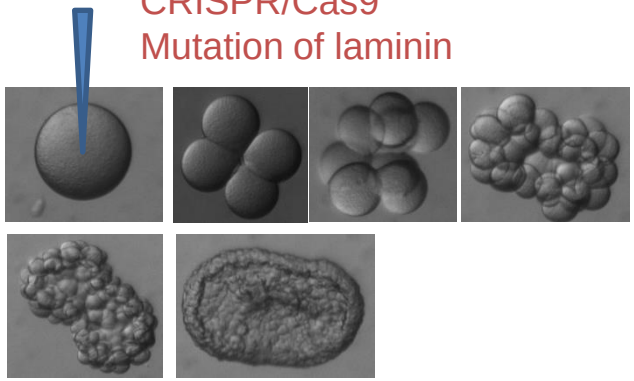
15 minutes



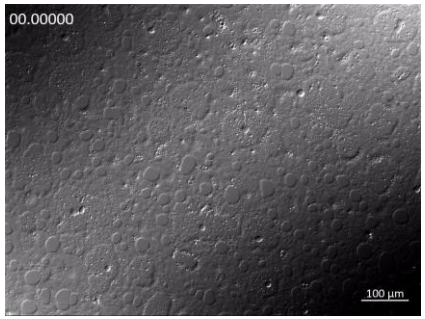
16 minutes

32 minutes

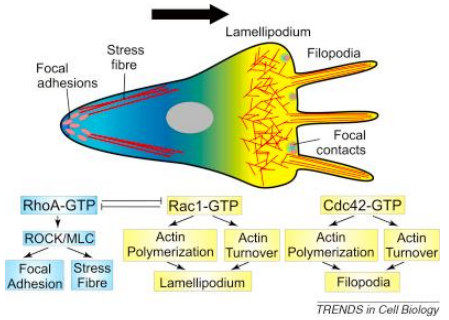
Goal 1:
CRISPR/Cas9
Mutation of laminin



Goal 2: Analysis of single-cell wounds



Goal 3: Analysis of the role of Rho GTPases



The Stuff Genomes are Made of: Mobile Genetic Elements, Transposon Domestication, Foreign DNA and Genome Defense

Irina Arkhipova
Resident scientist
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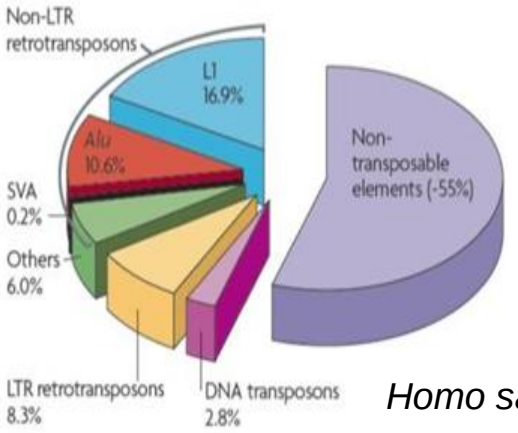
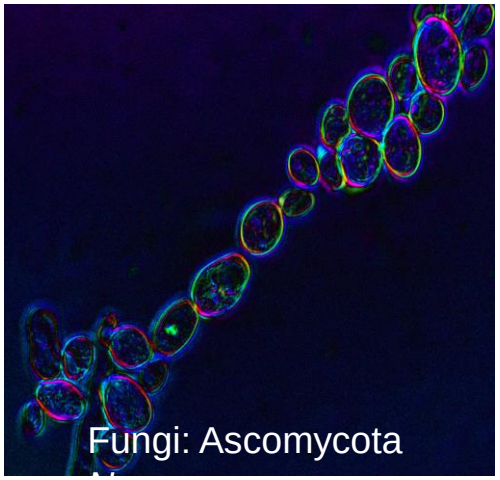
Bay Paul Center, Lillie 337, MBL

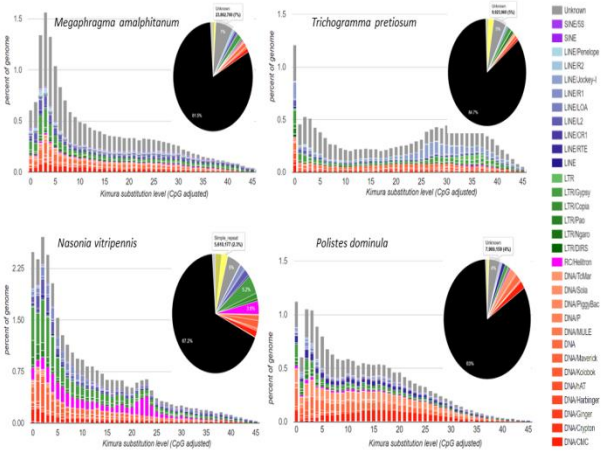
Rotifera: Bdelloide
Adineta vag

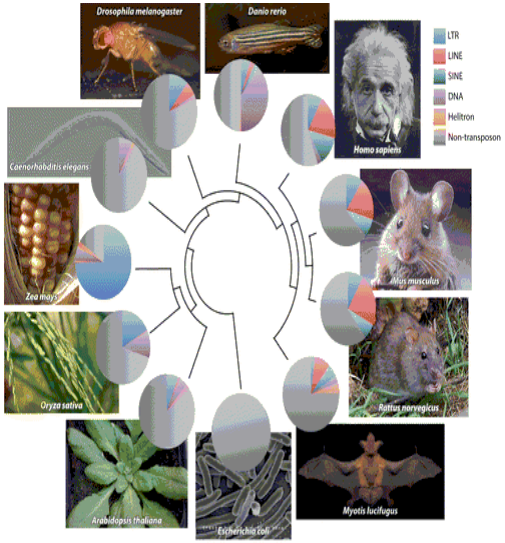


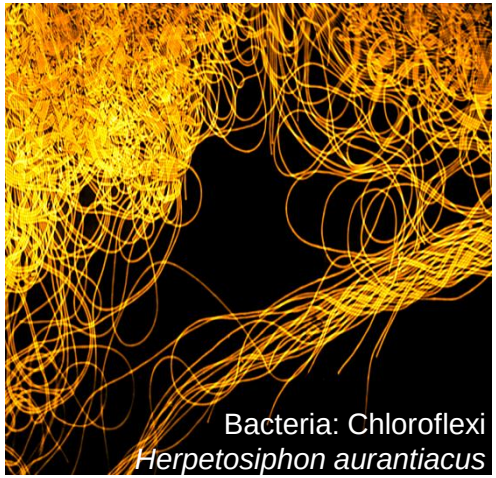
Homo sapiens



Fungi: Ascomycota







Bacteria: Chloroflexi
Herpetosiphon aurantiacus

Photomicrography: M. Shribak, MBL

All stressed out

The response to ER and epigenetic stress causes disease

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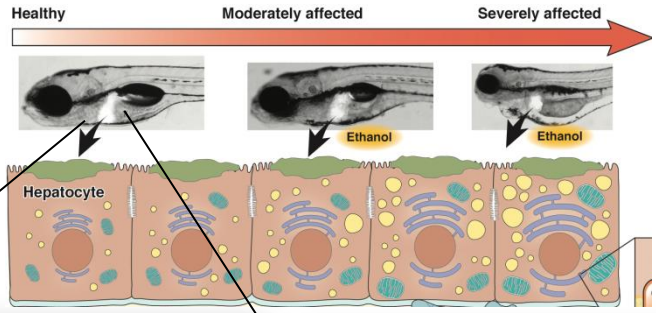
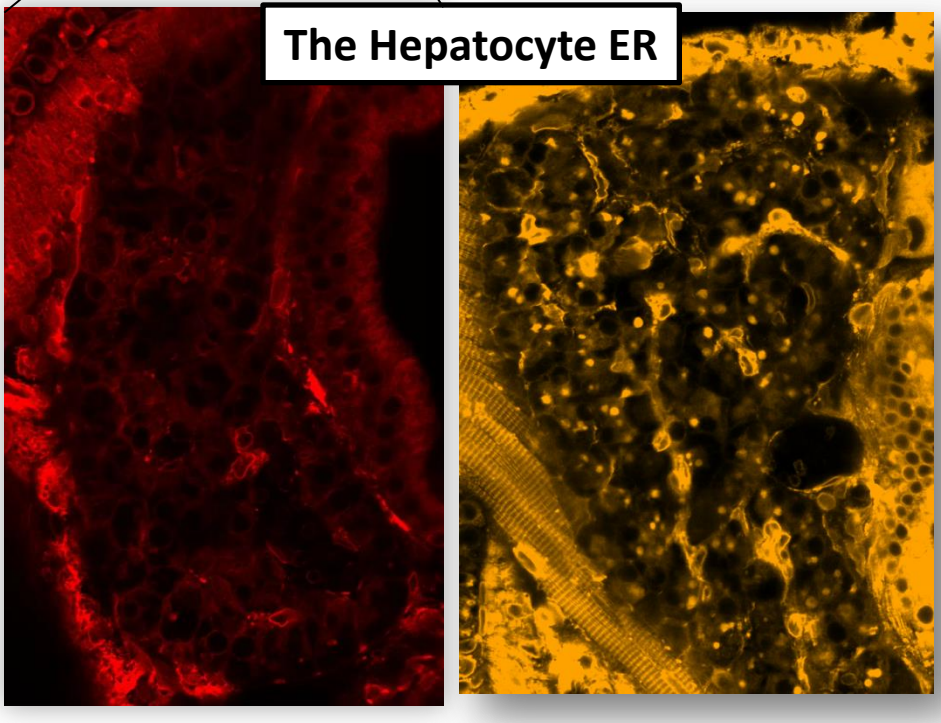
How does endoplasmic reticulum stress fatty liver?



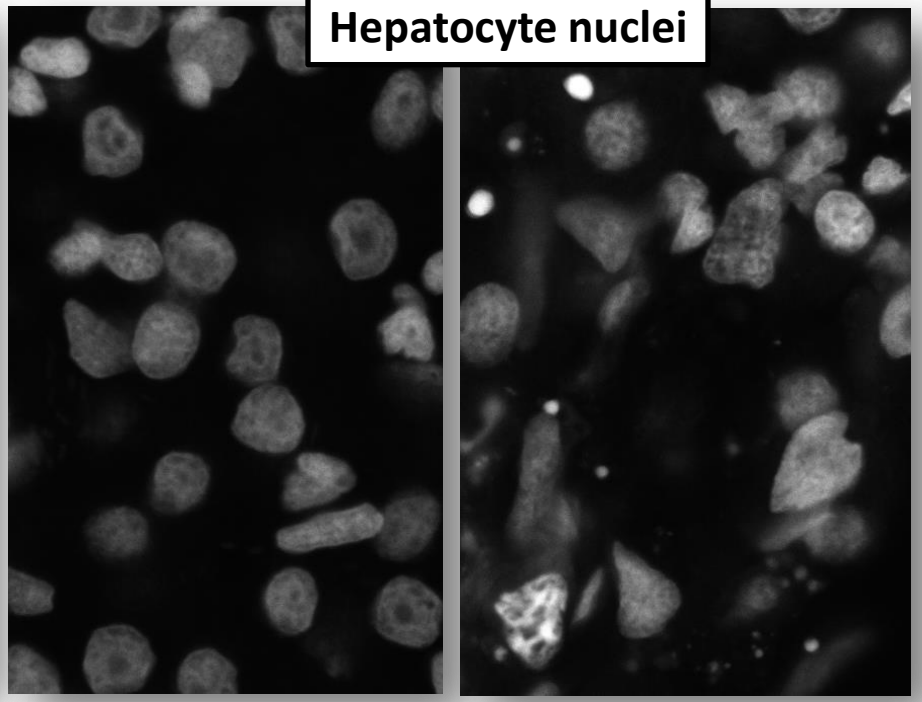
How does epigenetic stress cause cell cycle defects and cell death?

The Hepatocyte ER



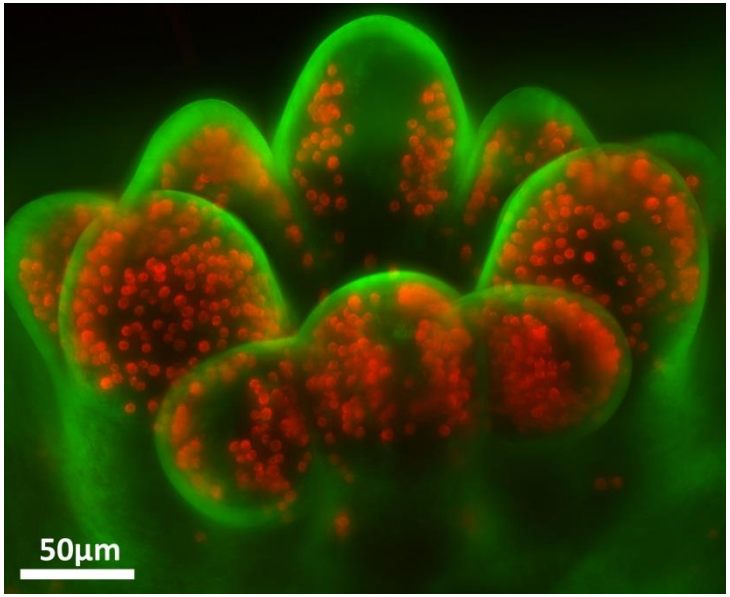
Healthy **Stressed**

Hepatocyte nuclei



Healthy **DNA hypomethylation**

A light-sheet microscope
for large *and/or* photosensitive samples



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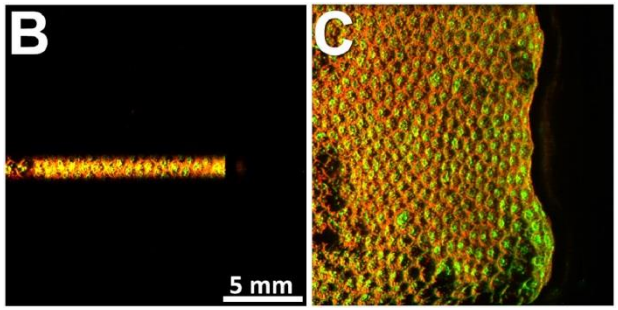

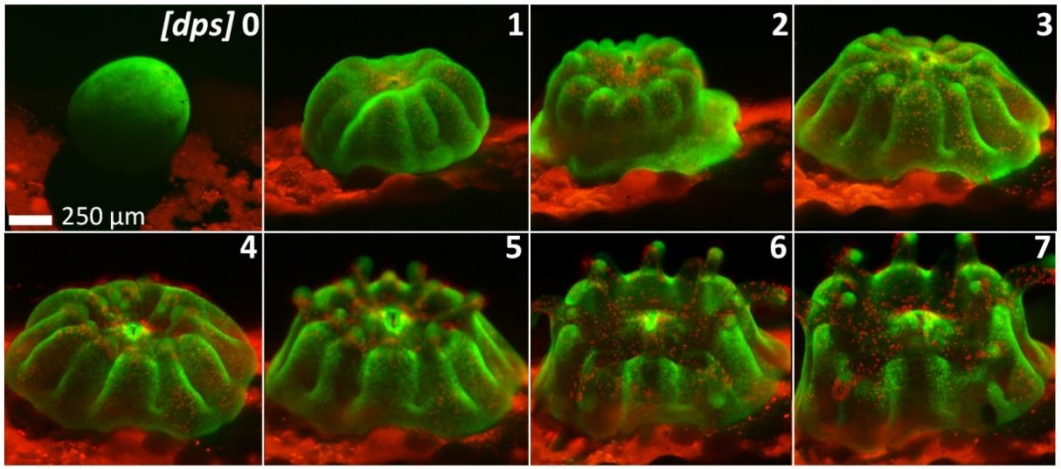

Rapid Adaptive Coloration

Visual perception, sensorimotor system, skin bio-photonics

200 – 800ms camouflage change – visually guided

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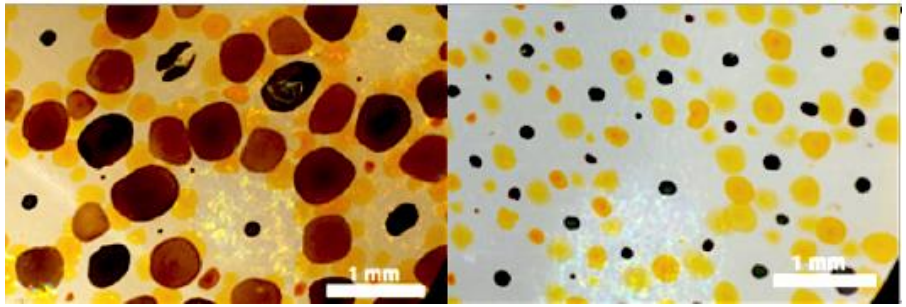
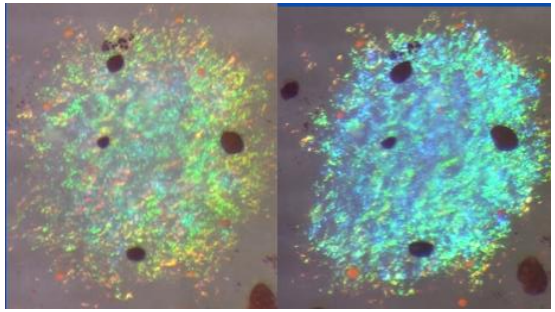
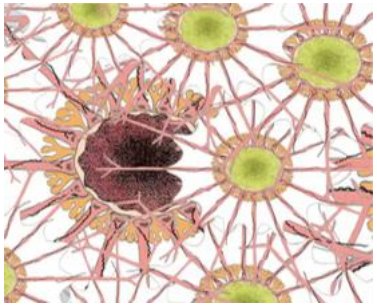
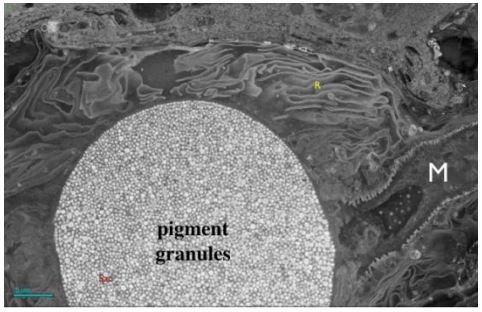
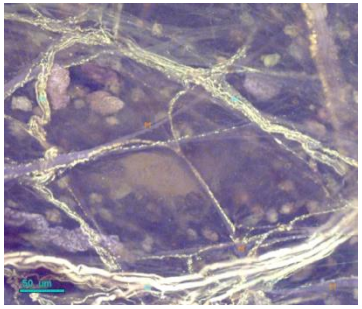




Neural control of skin pigments and reflectors

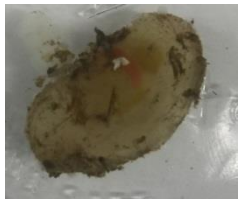


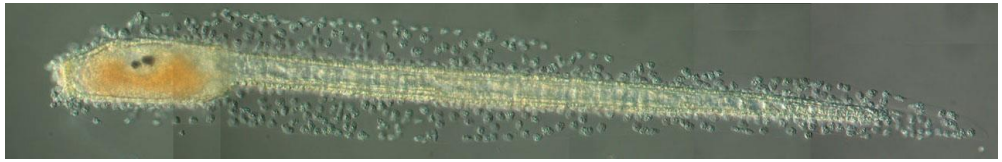


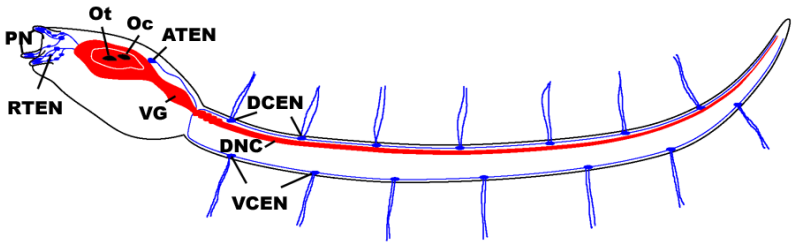


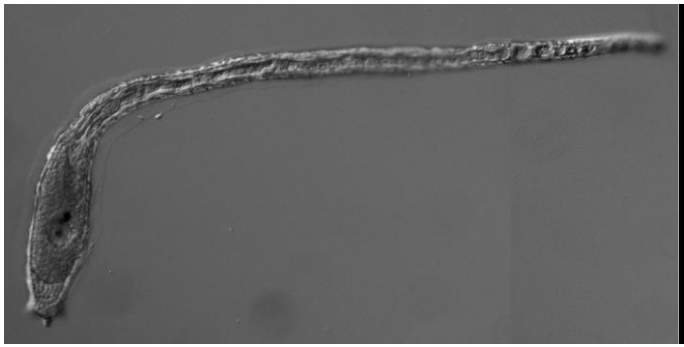
Imaging of ultrastructure

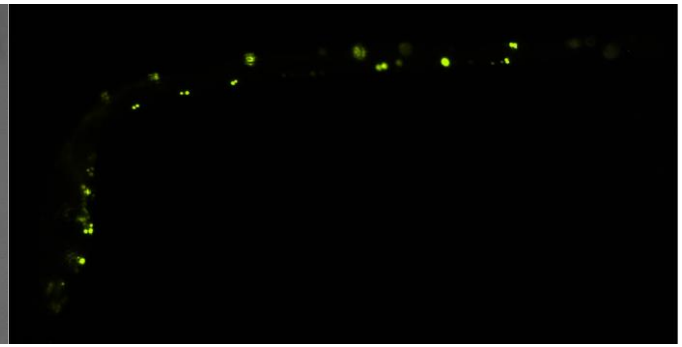
Development of the ascidian peripheral nervous system

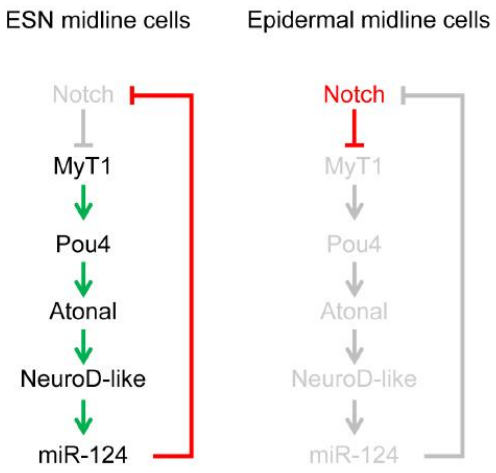












Gene regulatory networks, genomics, bioinformatics, high resolution imaging, CRISPR-Cas9, Notch signaling, transgenics, knock-ins/outs

San Diego State University

Bob Zeller; rzeller@mail.sdsu.edu; Embryology (2nd floor Loeb)