

Vědecký proces



Mgr. Pavel Tomancak PhD

- undergrad 1990-1995 Masaryk University in Brno (molecular biology)
 - PhD 1995-2000 European Molecular Biology Laboratory EMBL (molecular genetics)
 - post-doc 2000-2005 University of California at Berkeley (genomics with Gerald M. Rubin)
 - independent 2005-2013 Research Group Leader @ Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)
2013-present Senior Permanent Research Group Leader @ MPI-CBG (imaging based genomics)
 - since 2016 EMBO member
- 60 peer reviewed papers, 10915 citations according to GoogleScholar, h-index 31

Vědecký proces

Položit si správnou vědeckou otázku

Shromáždit odpovídající tým a získat finanční prostředky na výzkum

Udělat vědu

Publikovat výsledky

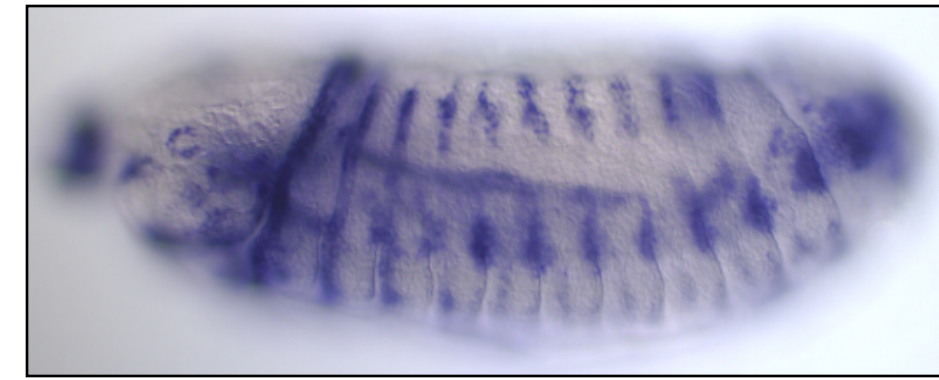
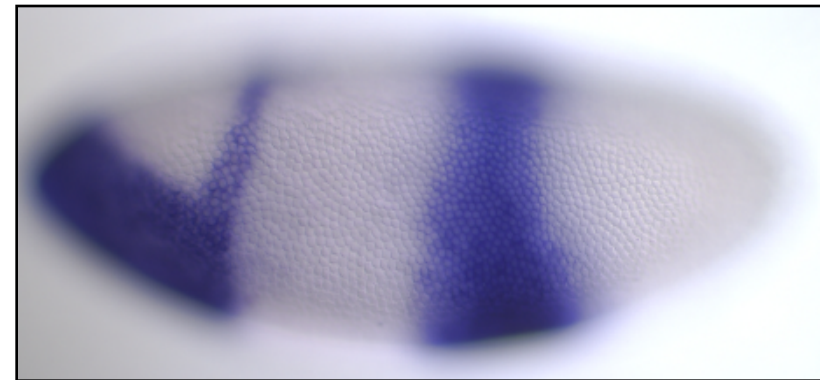
Pozorovat impakt objevů a odrazit se od nich k dalším otázkám

Genom

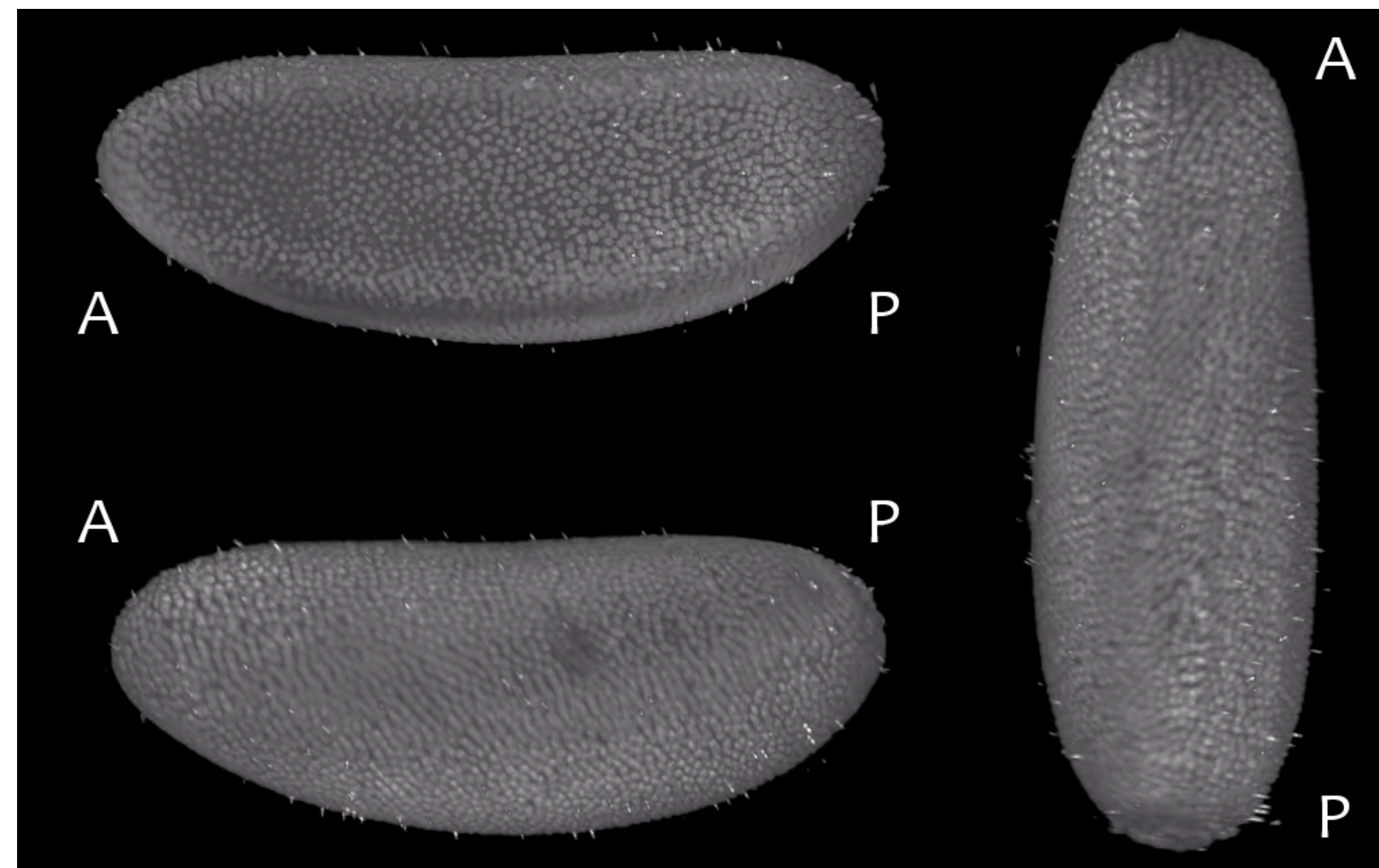
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ATAATTGCCGTGTAGGTTGG
```

Informace

Genová exprese



Vývoj



Buněčné chování

Vzory genové exprese na RNA úrovni

~8500 genes
~100,000 images

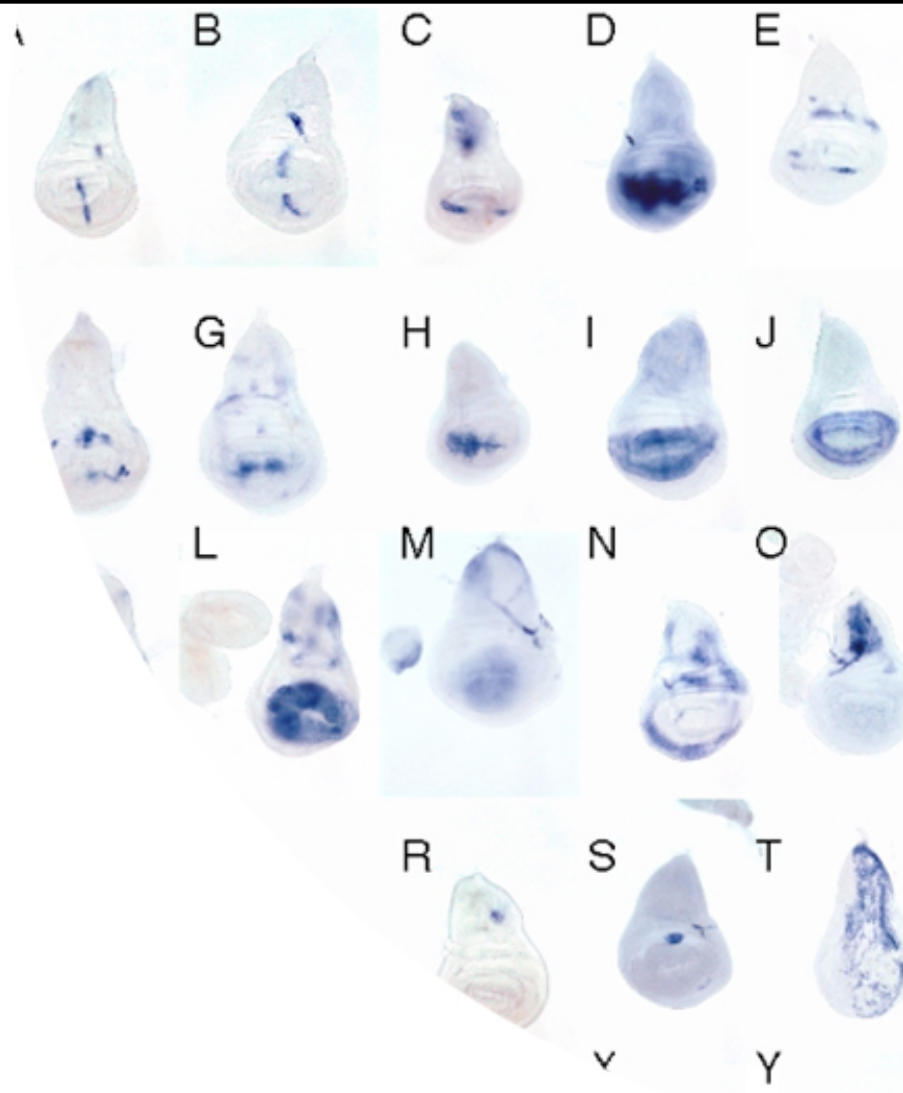
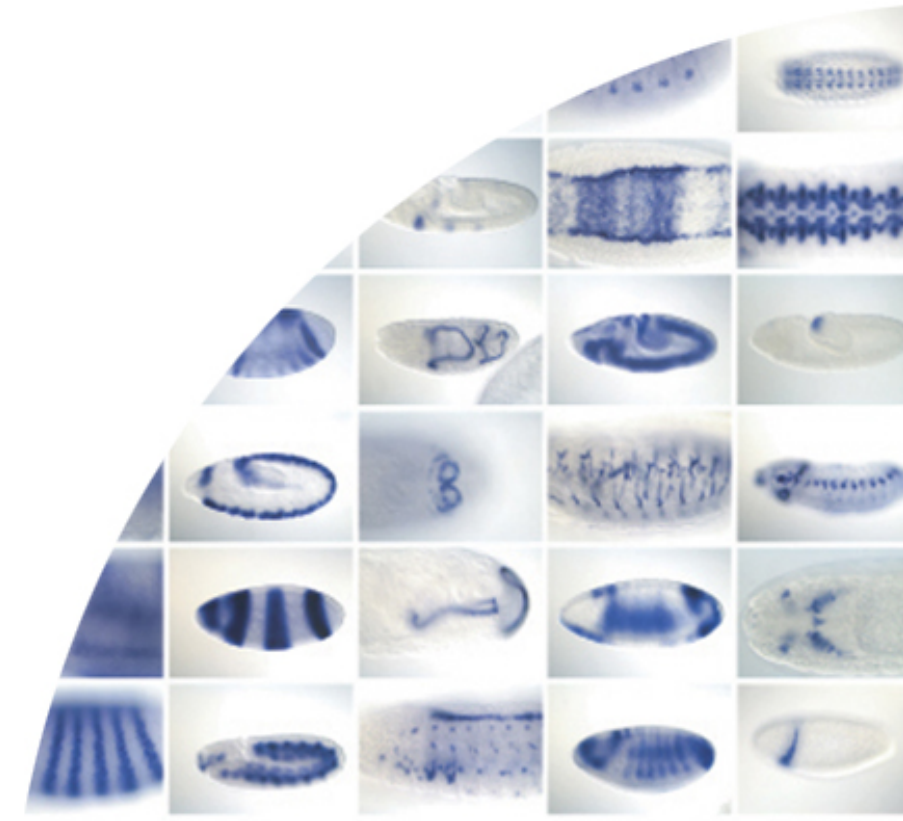
embryo

<https://insitu.fruitfly.org/cgi-bin/ex/insitu.pl>

gene
expression

imaginal
discs

~6000 genes
~50,000 images



~5000 genes
~60,000

embryo

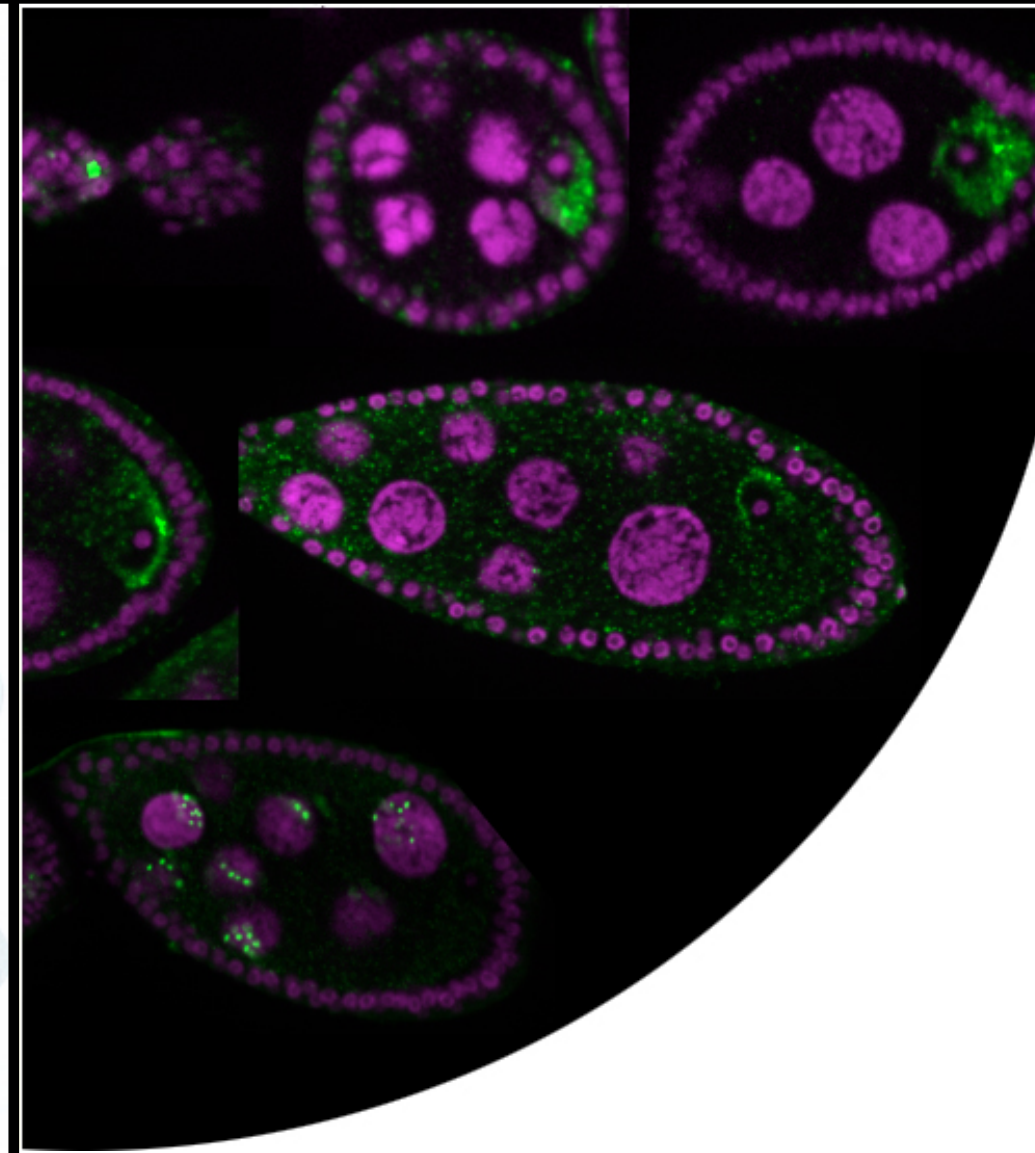
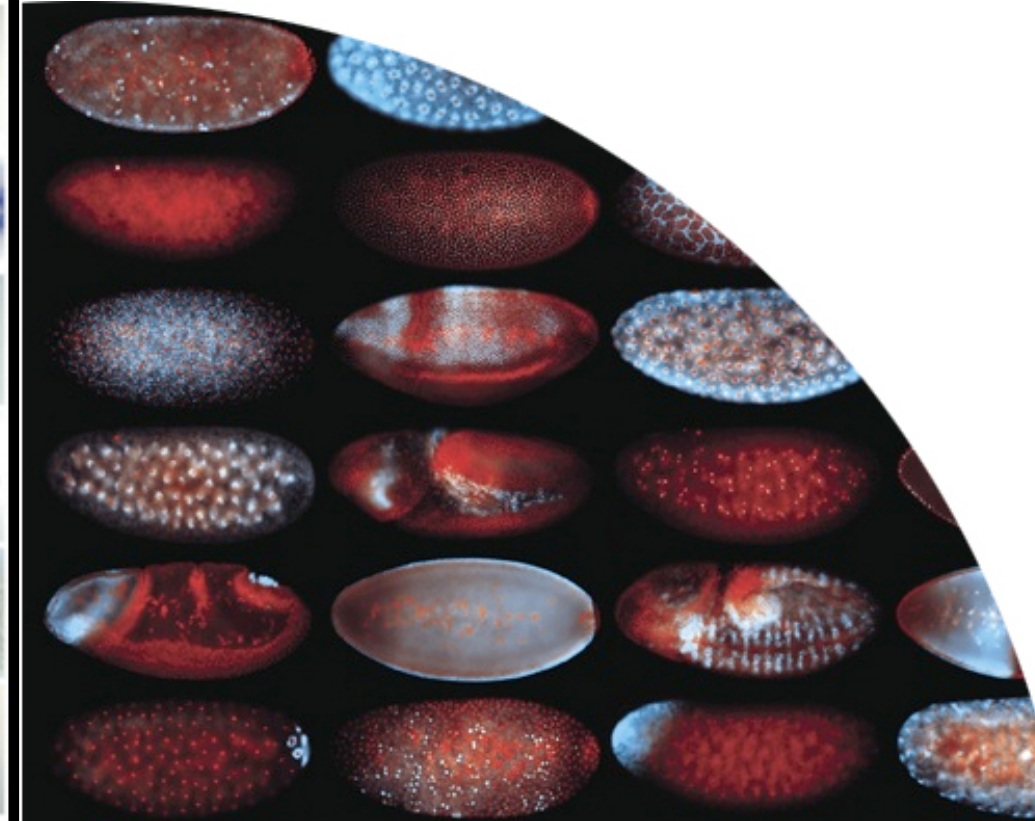
<https://fly-fish.cabr.utoronto.ca/>

RNA
localization

Ovaria

<http://tomancak-srv1.mpi-cbg.de/DOT/main>

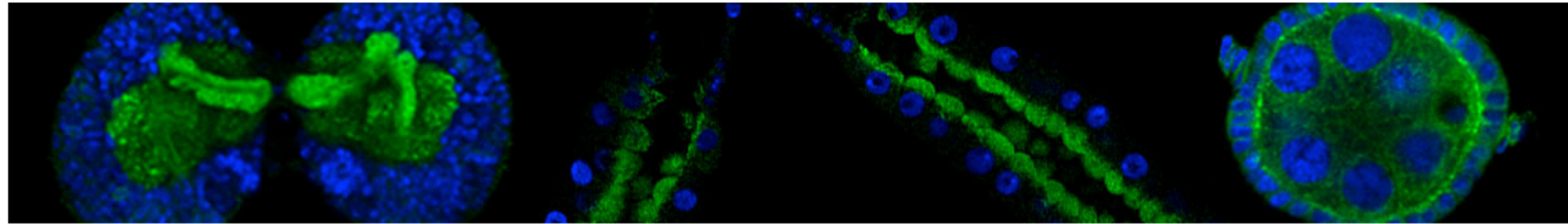
~6000 genes
~40,000 3D image stacks



Welcome to FLYtRAB

The database to explore *Drosophila* Rab protein cell type expression and subcellular localization across diverse tissues.

Dunst et al., Endogenously tagged rab proteins: a resource to study membrane trafficking in Drosophila., Developmental Cell 33, 351-365. May 4, 2015



Rab proteins in Fruit flies

DNA sequence analysis identified 33 genes ^[1, 2, 3] encoding Rab proteins in *Drosophila melanogaster*. 23 of these are orthologues of vertebrate Rabs ^[1, 3, 4] and almost all give rise to only one protein isoform ^[23] Rabs control specific steps in intracellular lipid and protein traffic ^[5, 6, 7]. Hence, Rabs represent not only valuable identification marks for organelles ^[8, 9, 10, 11, 12] and membrane compartments ^[13, 14, 15, 16, 17], but serve as logical targets for manipulation of specific intracellular transport routes ^[18, 19, 20, 21].

The endogenous YFP-Rab-Fly stock collection

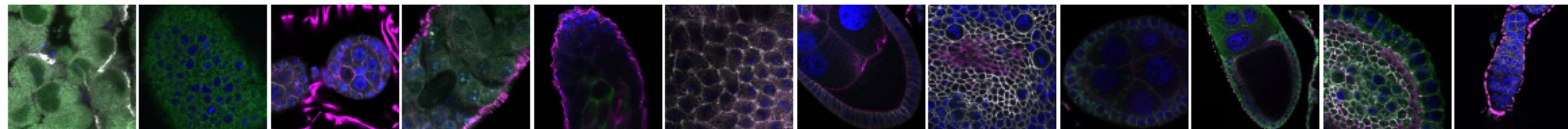
We have established a genetic resource that allows systematic, direct and controlled access to the Rab machinery in *Drosophila melanogaster*. Using homologous recombination, we targeted all functional genomic rab loci, fusing an YFP4xMyc tag to the N-terminal end of each Rab protein. The resultant rab alleles are viable and do not show obvious phenotypes. The common YFP-tag enables systematic and quantitative Rab mRNA and protein detection in vivo, and available genetic knock-down tools directed against GFP efficiently reduce YFP-Rab protein levels.

Available open source data

We imaged all YFP-Rab proteins with subcellular resolution in larval Fat bodies, Salivary glands, Wing discs, CNS and adult Ovaries and Testes ^[24, 25]. These organs comprise over 20 different cell types and we used controlled vocabulary to annotate the acquired images, describing features such as tissue and cell type specific expression, morphology and subcellular localisation.

The open access FLYtRAB database provides direct access to [CATMAID](#) ^[22], a free online platform that enables the user to view and download all 3D image data from the FLYtRAB library. In addition, FLYtRAB enables users to search for annotation terms linked to stored image data.

Some random images from our database (reload to see more)



http://rablibrary.mpi-cbg.de/cgi-bin/rab_overview.pl



The Image Data Resource (IDR) is a public repository of image datasets from published scientific studies, where the community can submit, search and access high-quality bio-image data.

[Cell - IDR](#)[Tissue - IDR](#)

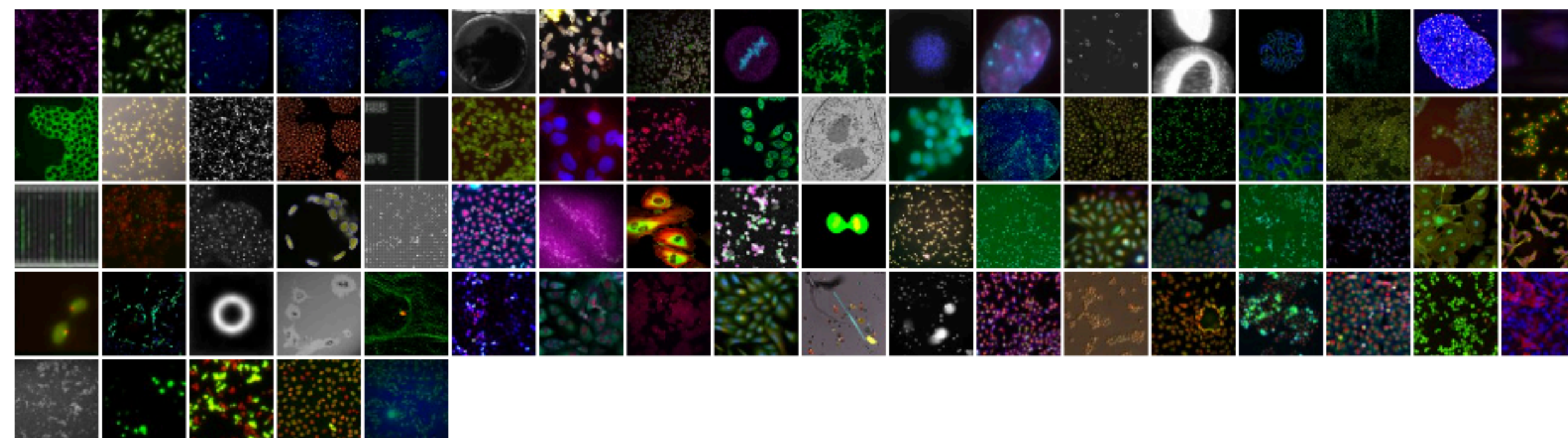
Choose search field (optional) ▾

Search for anything...

77 Studies

7,687,215 Images

138 TB

Group Studies by type 

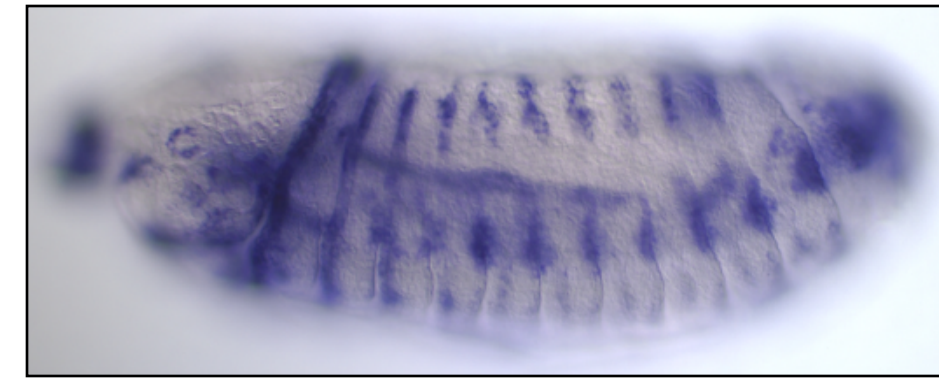
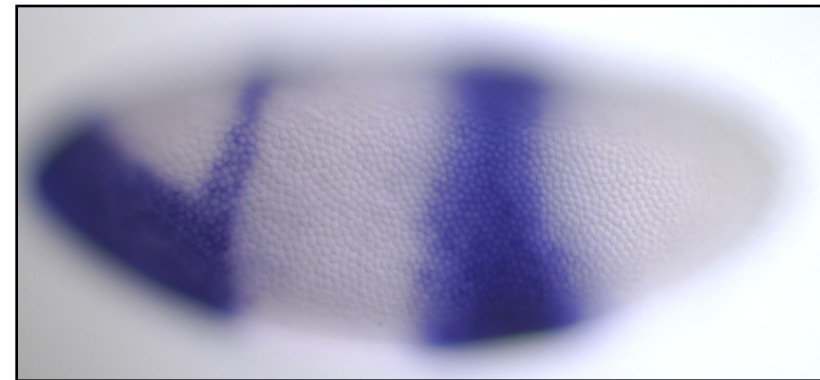
<https://idr.openmicroscopy.org/>

Genom

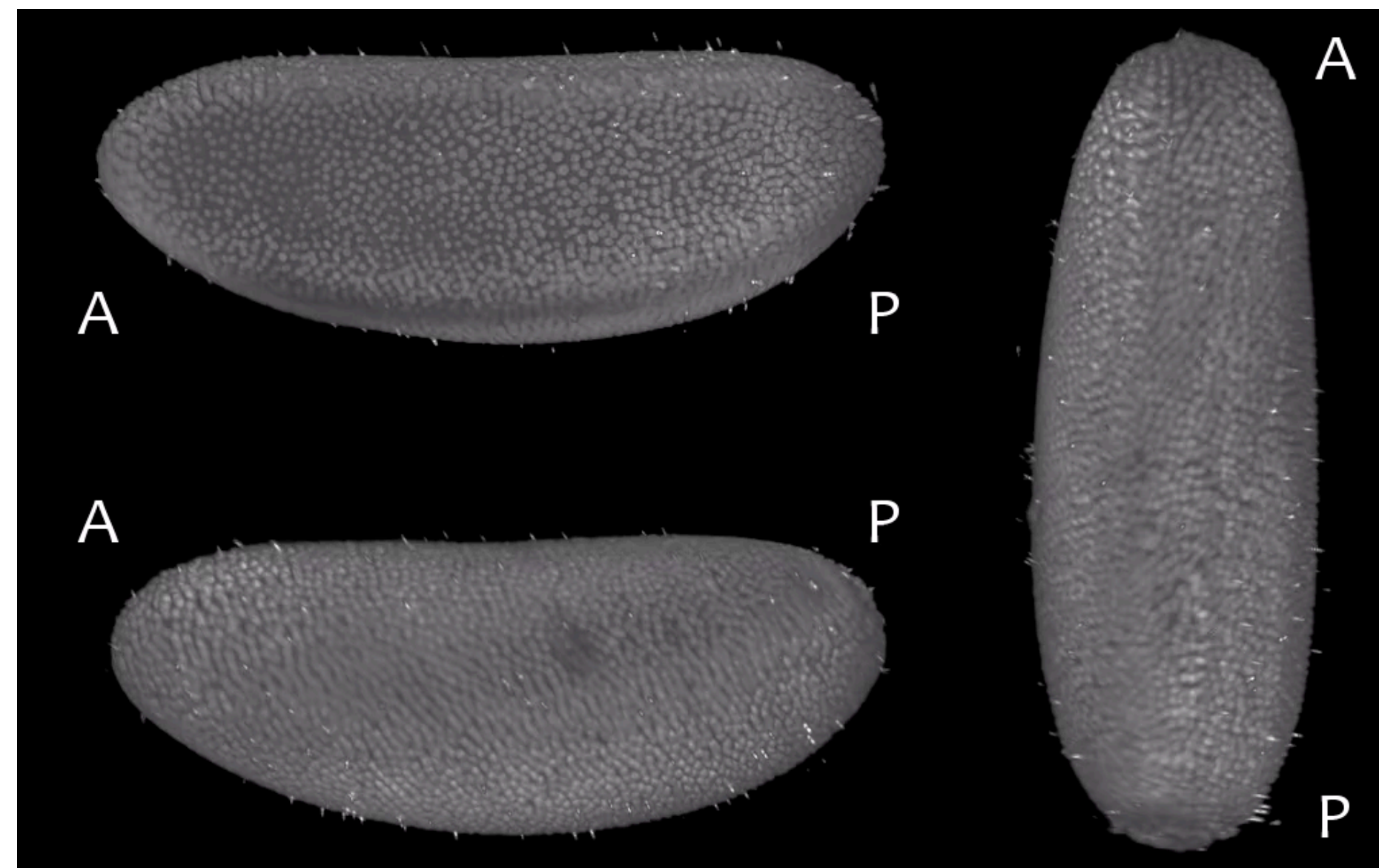
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Informace

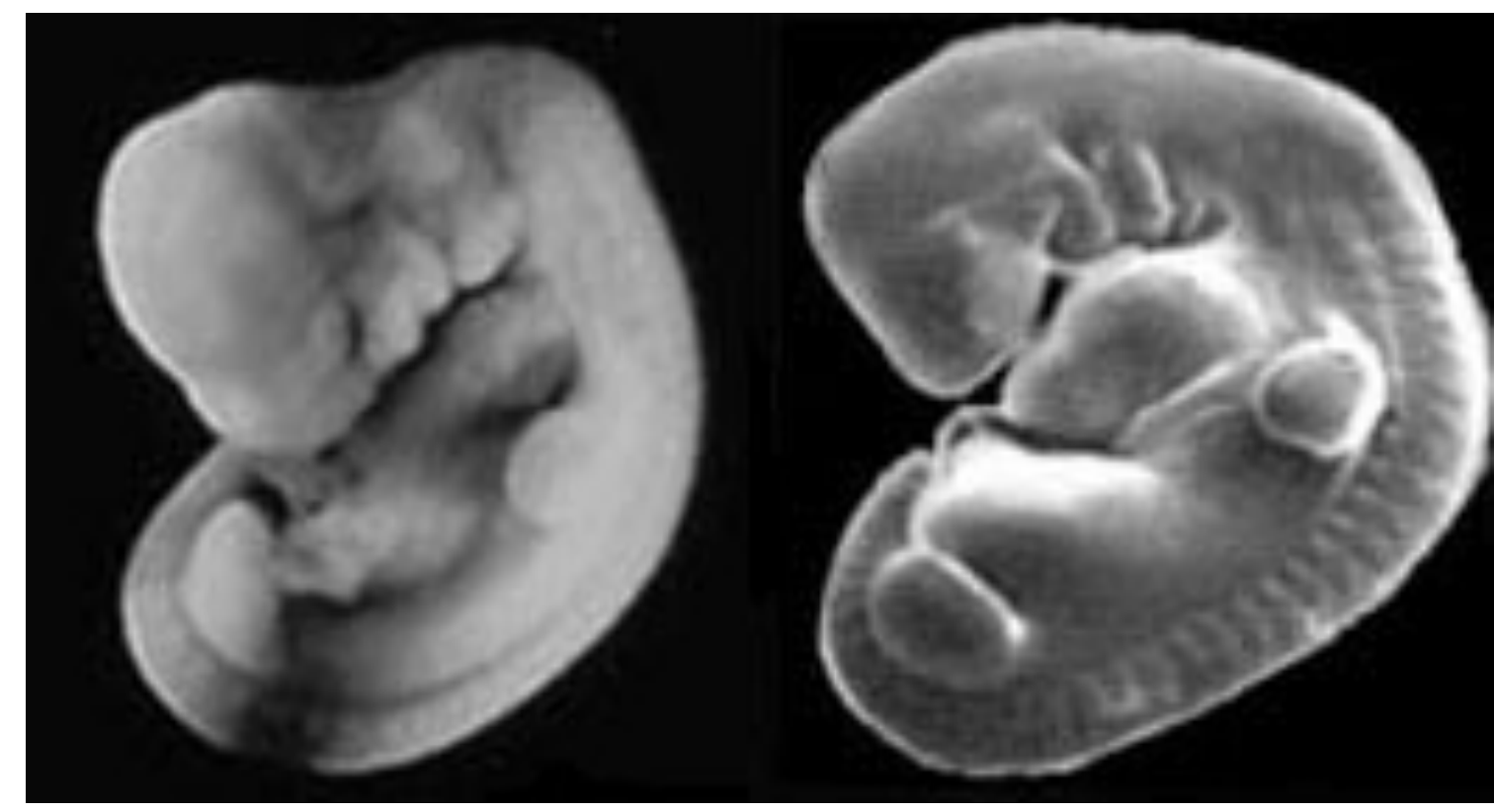
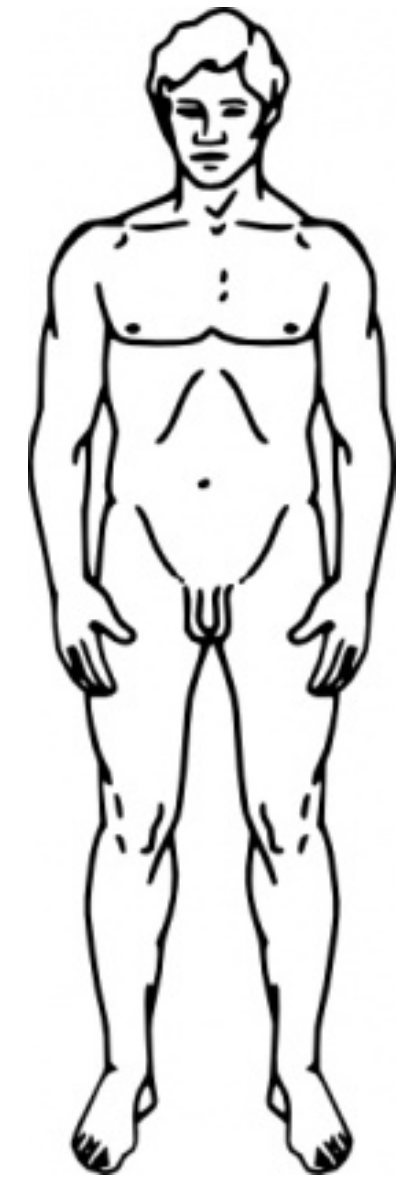
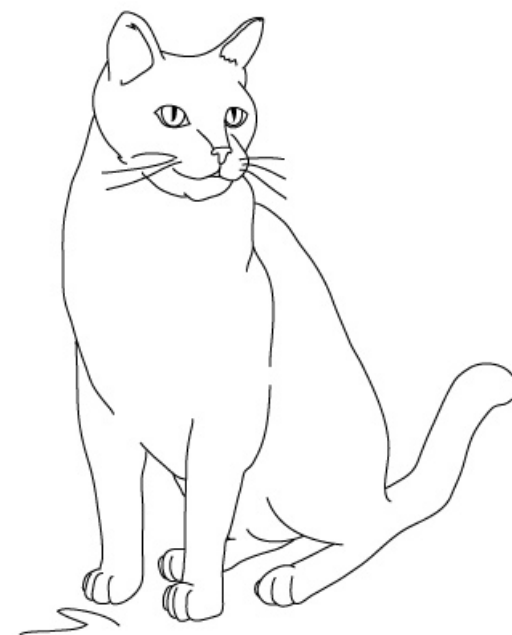
Genová exprese



Vývoj

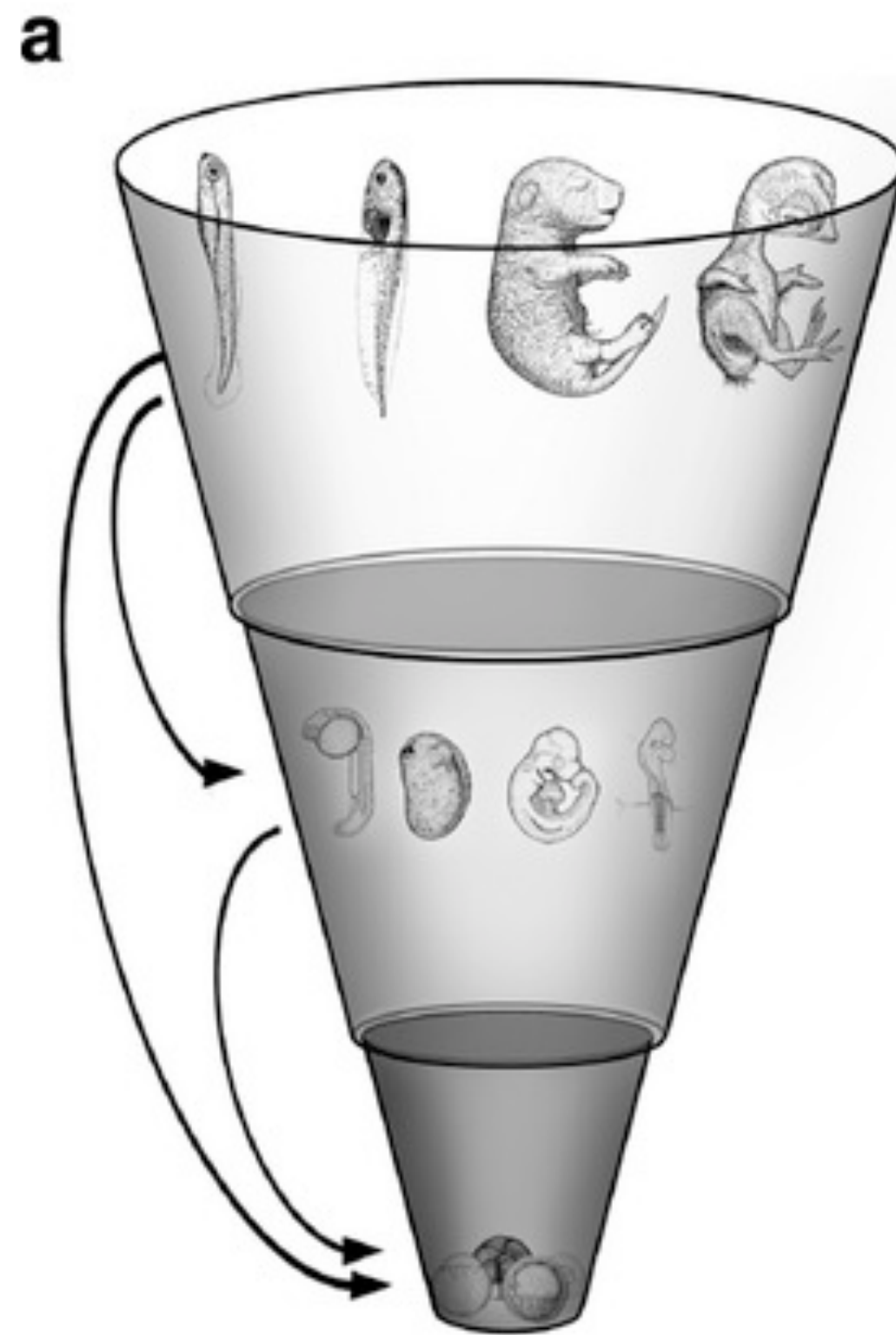


Buněčné chování



Zákony embryologie

Carl Ernst von Baer
(1828)



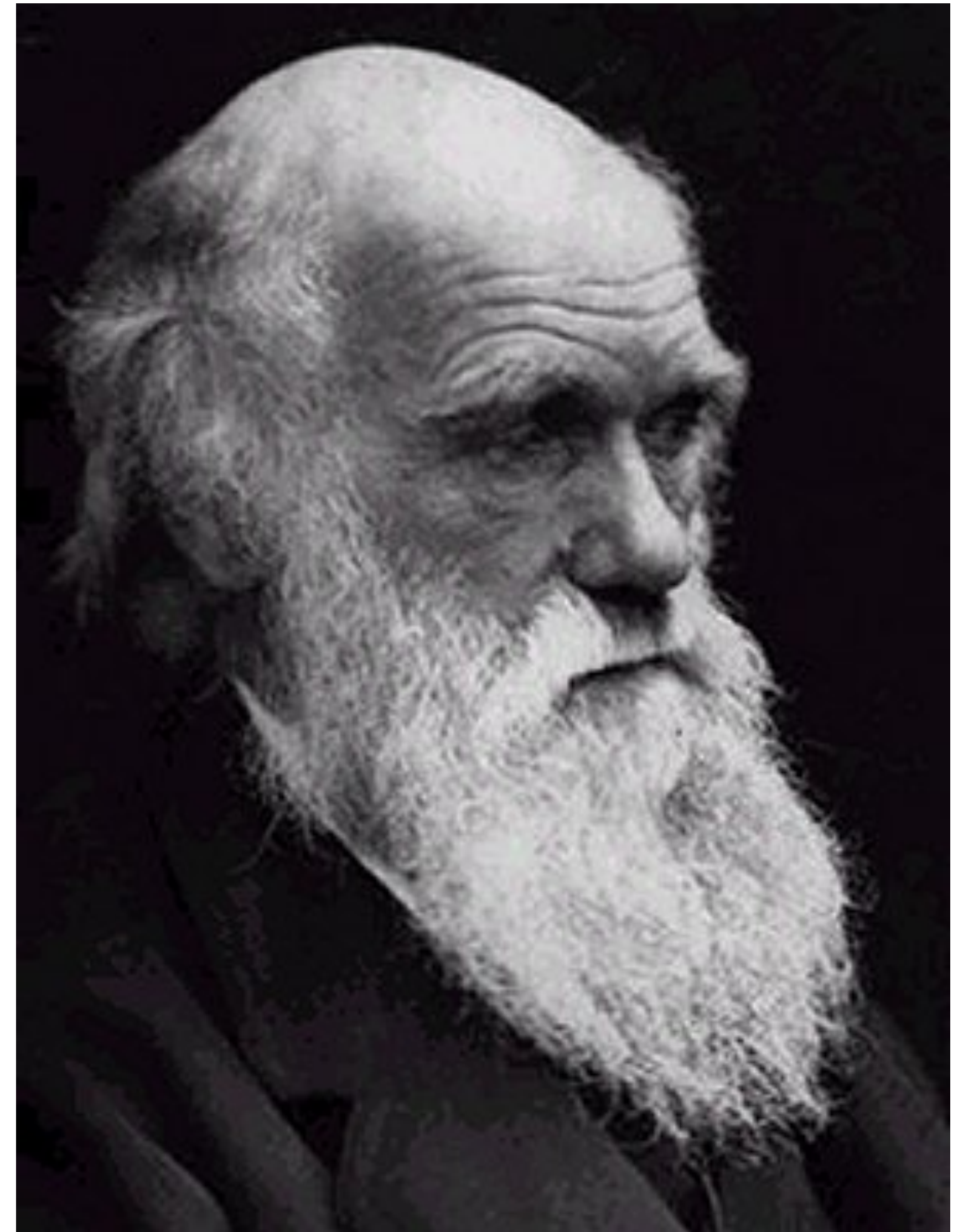
Obecné znaky se objevují ve vývoji dříve než ty **speciální**

Teorie evoluce přírodním výběrem

Považoval **rannou podobnost
embryí** za argument pro
společný původ druhů.

Přírodní výběr pracuje s
dospělými jedinci a proto je
rozmanitost embryonálních
stádií omezená

Charles Darwin
(1859)

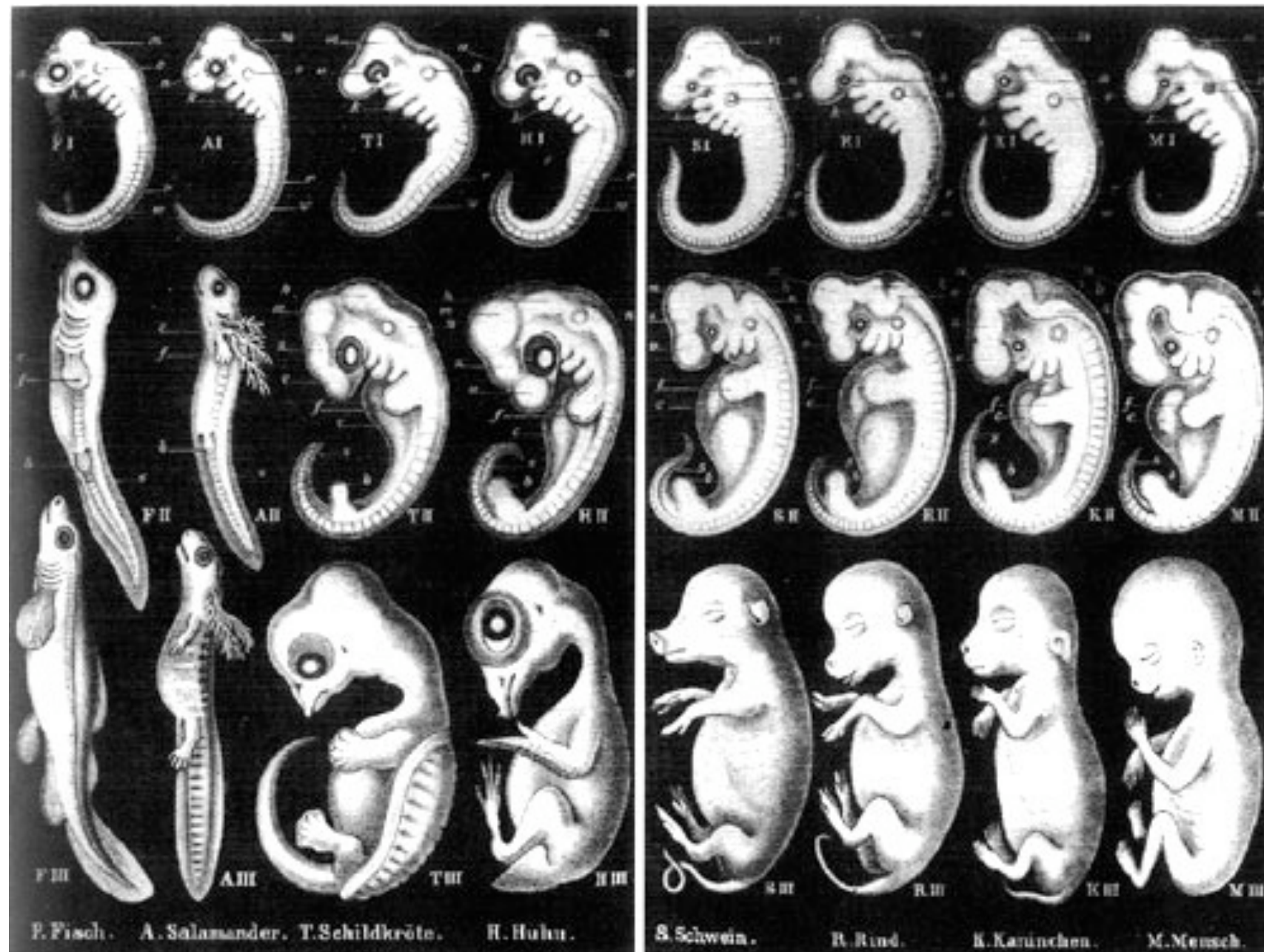


Biogenetický Zákon

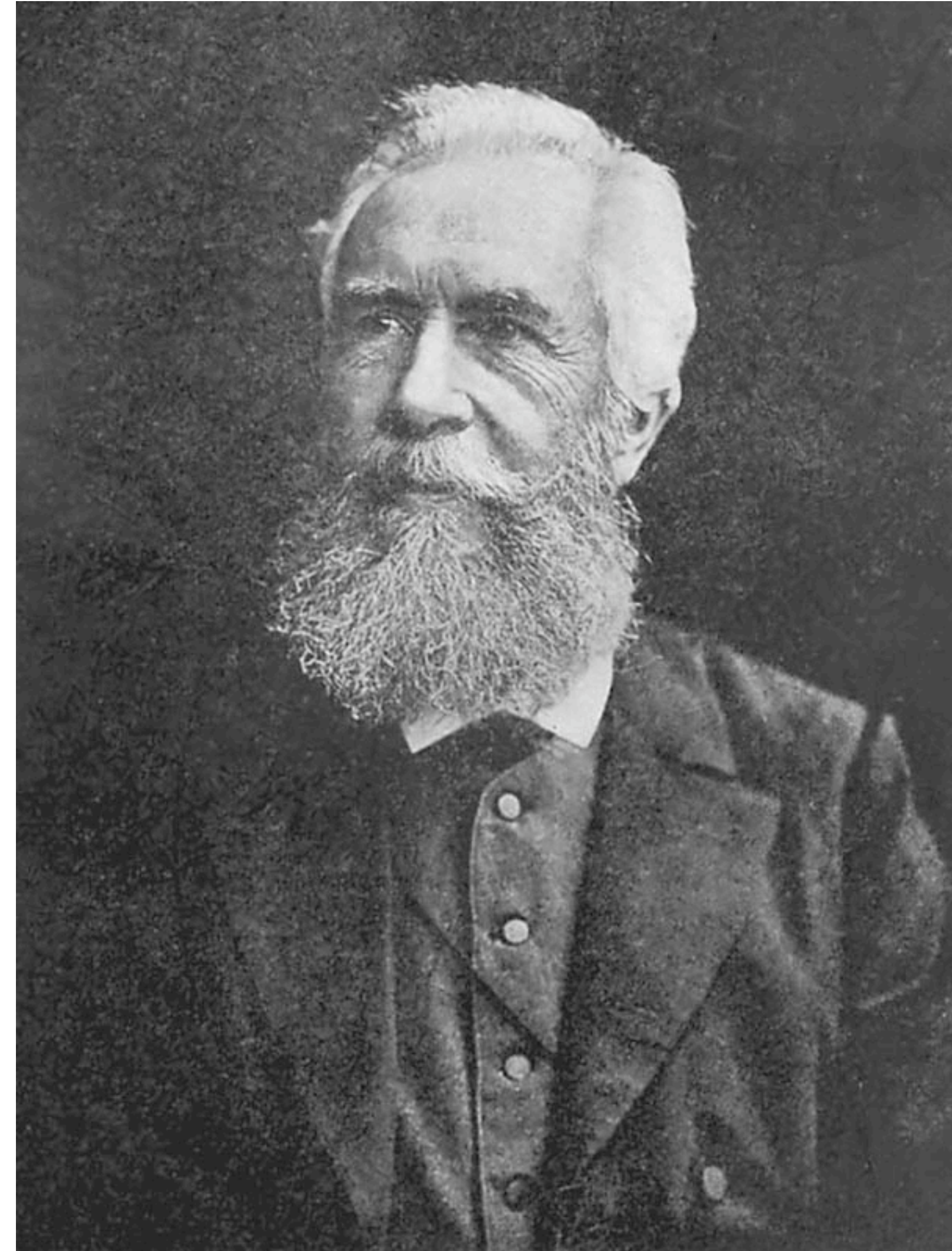
Ontogeze

rekapituluje

Fylogenezi



Ernst Haeckel
(1868)



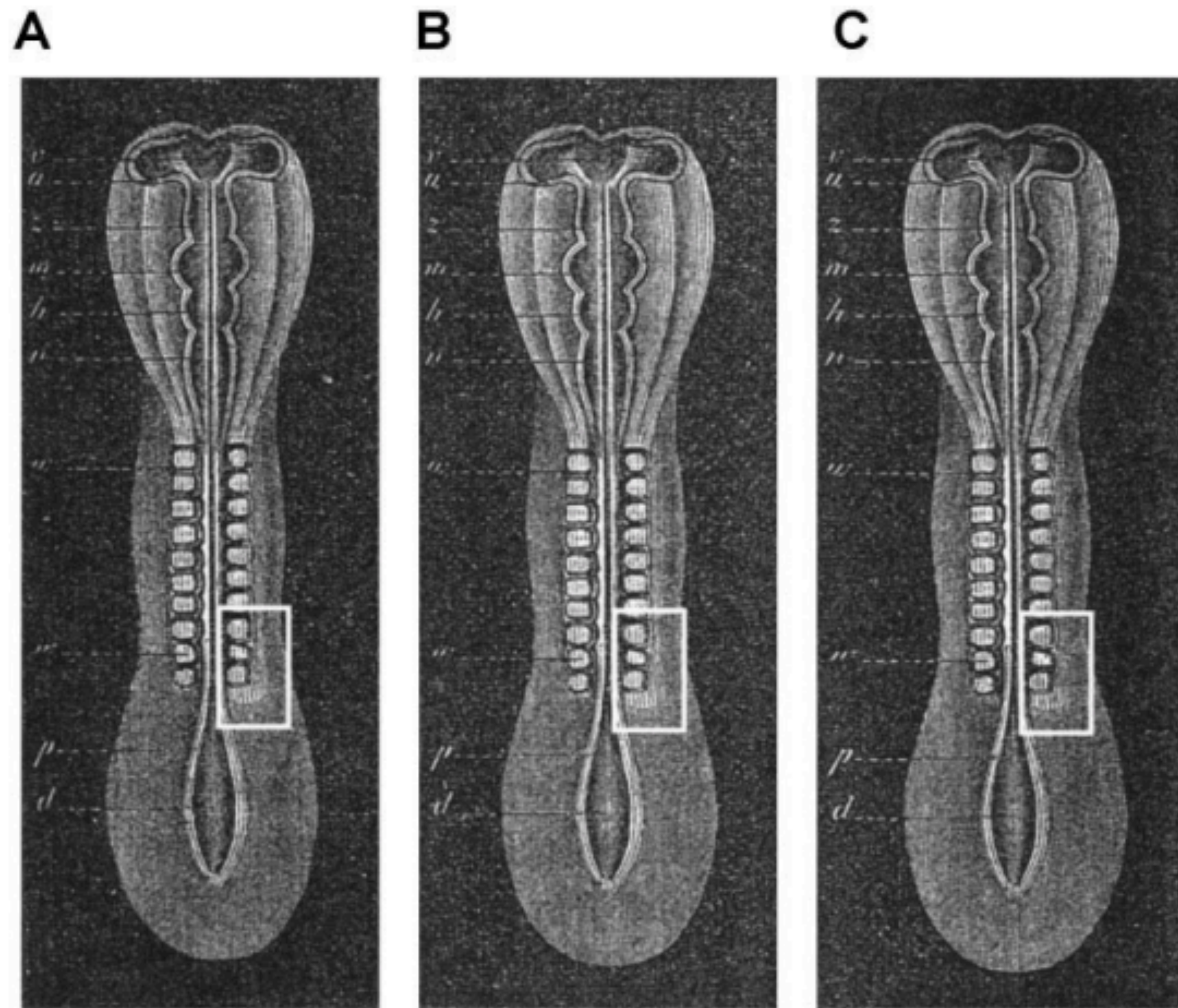
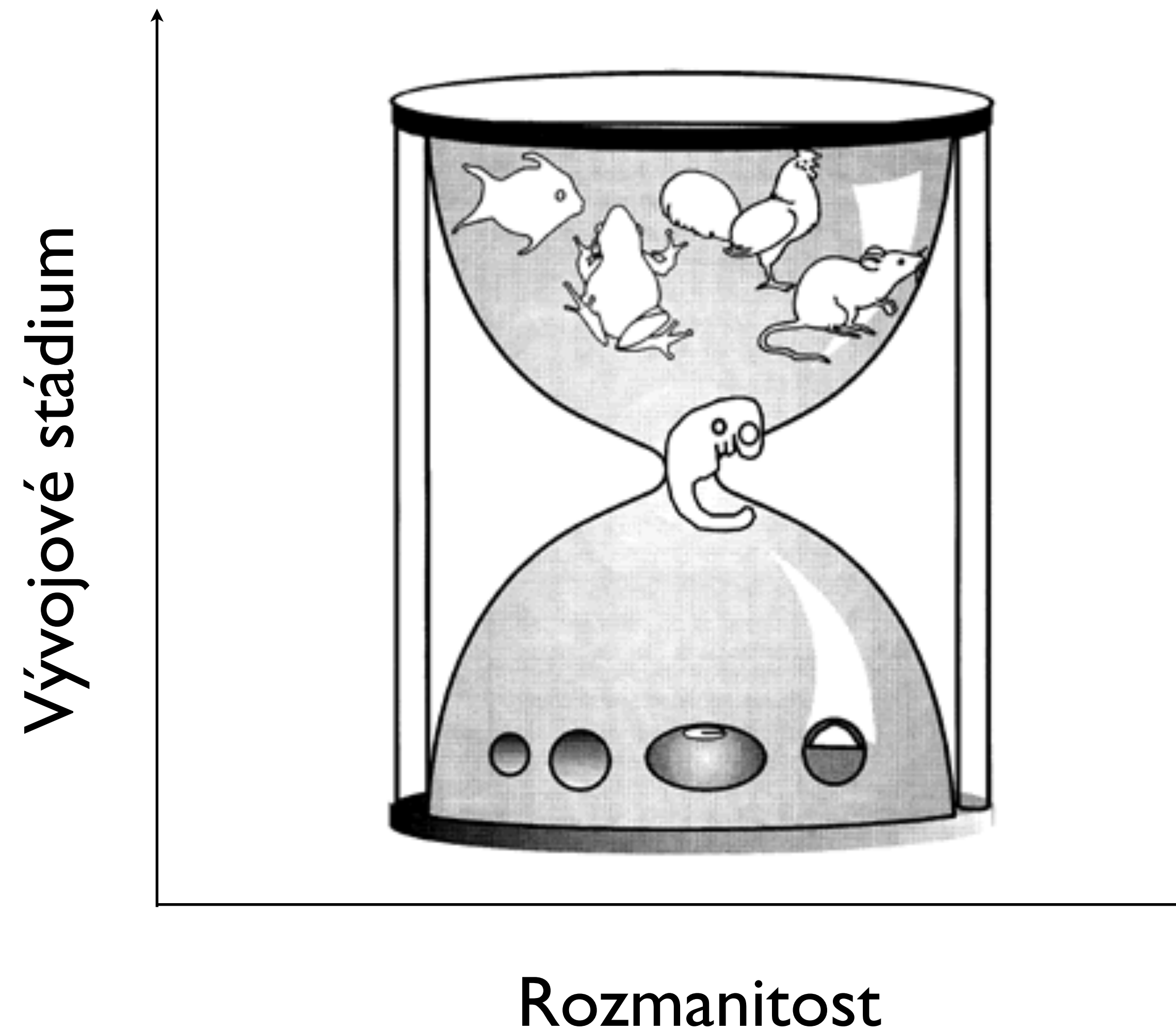


Fig. 1. Drawings from the first edition of *Natürliche Schöpfungsgeschichte* (Haeckel, 1868). Mid-somite embryos, supposedly of dog (A), chicken (B) and turtle (C) Figs 9–11, respectively, in the original. The woodcuts are identical, sharing the same irregularities in the somite series (e.g. boxed area, added by us). See Rüttimeyer (1868), Gursch (1981), Rager (1986). Digital scan courtesy of Kurt Stüber, Köln.

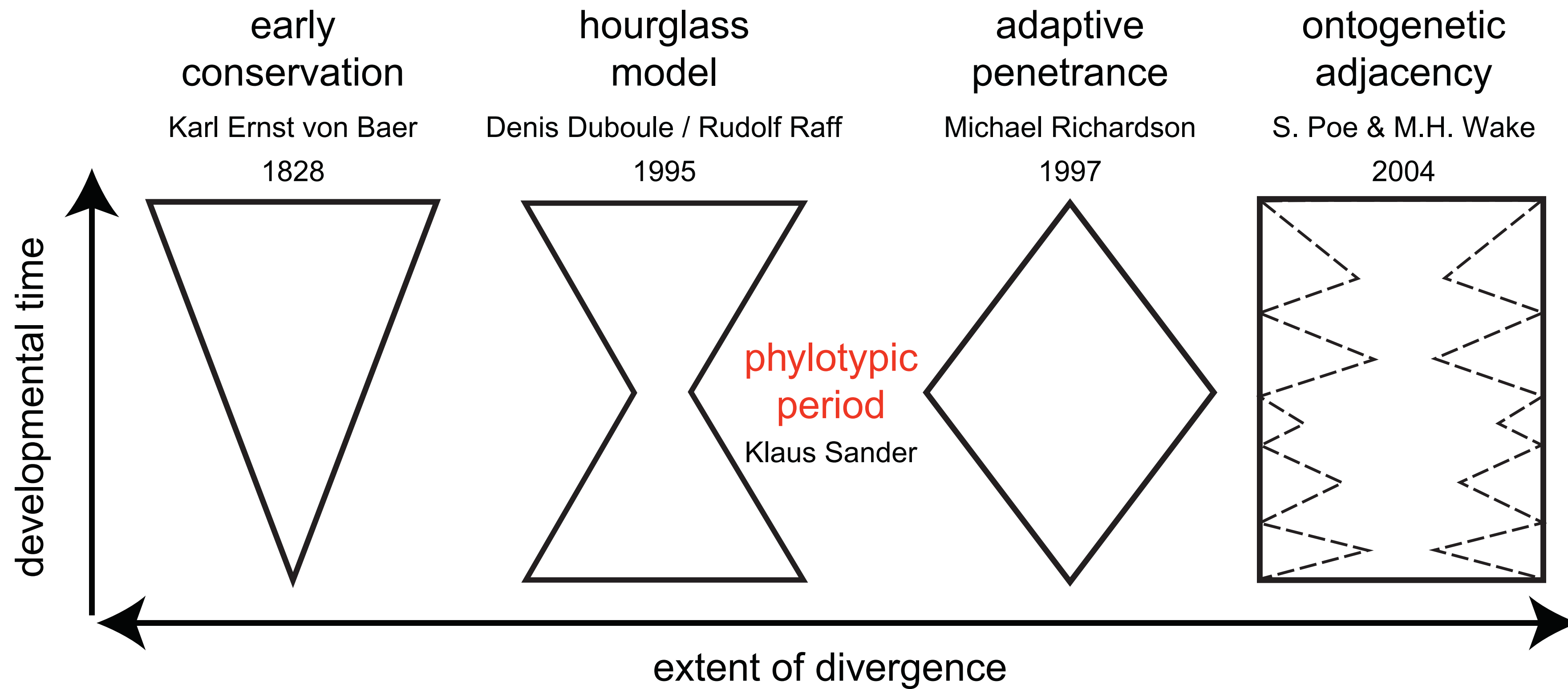
Model přesýpacích hodin v evoluci morfologie

Denis Duboule

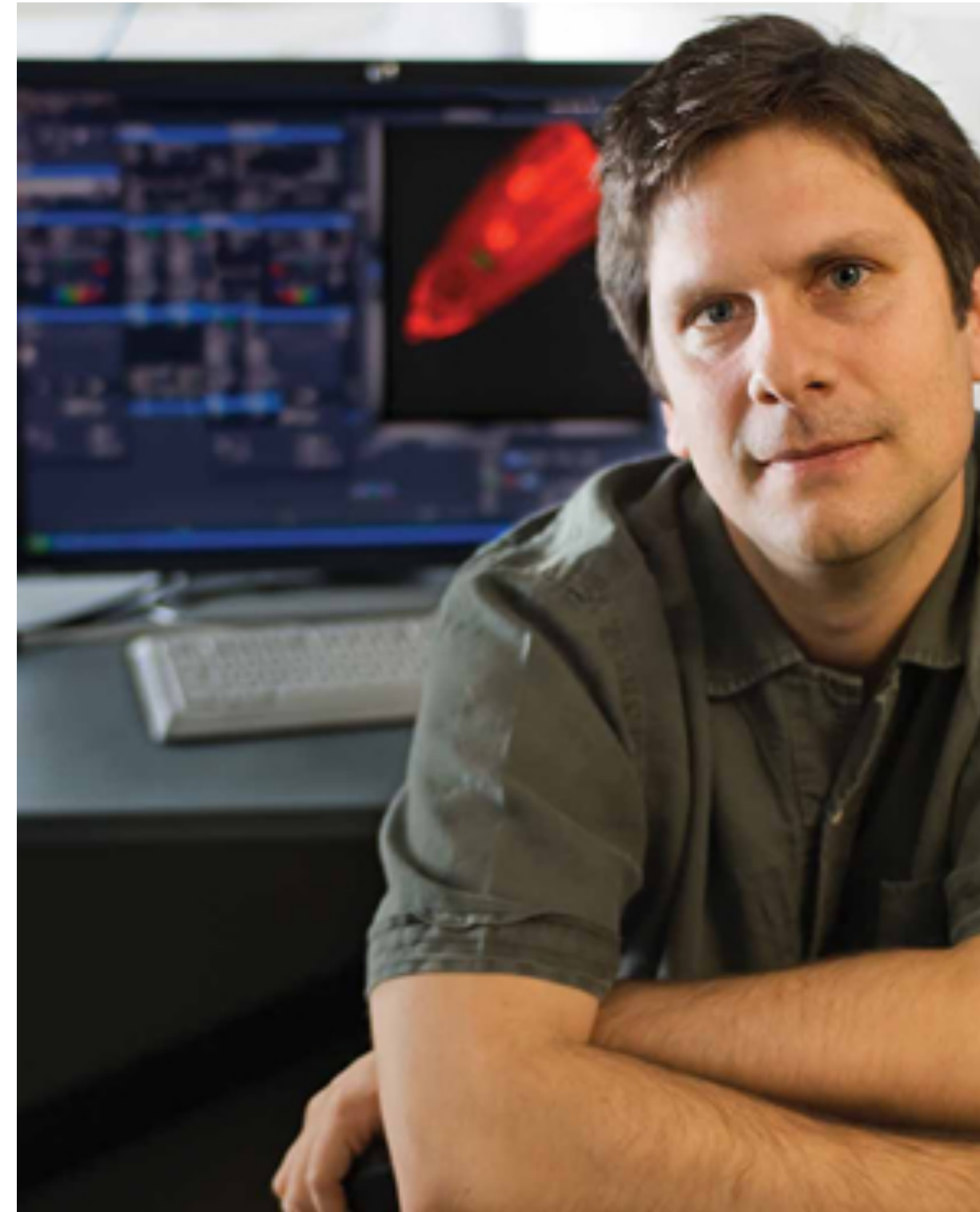
Rudolf Raff



Modely vysvětlující relativní konzervaci embryí



Quantitative evo-devo



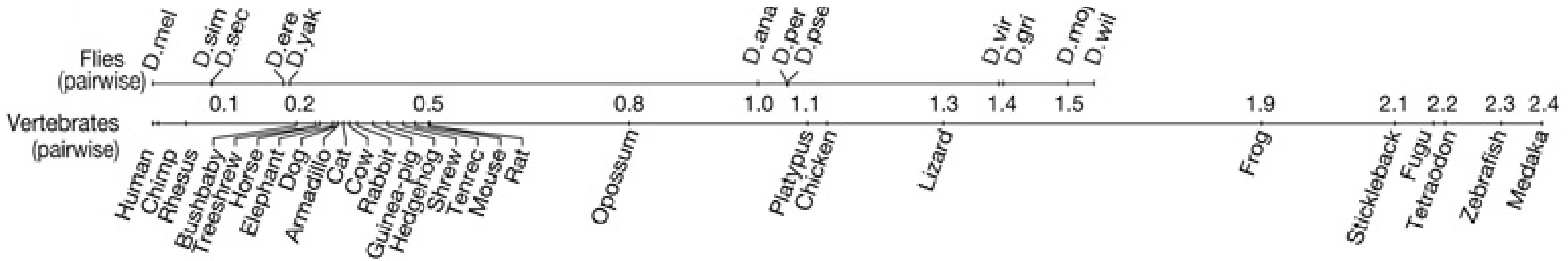
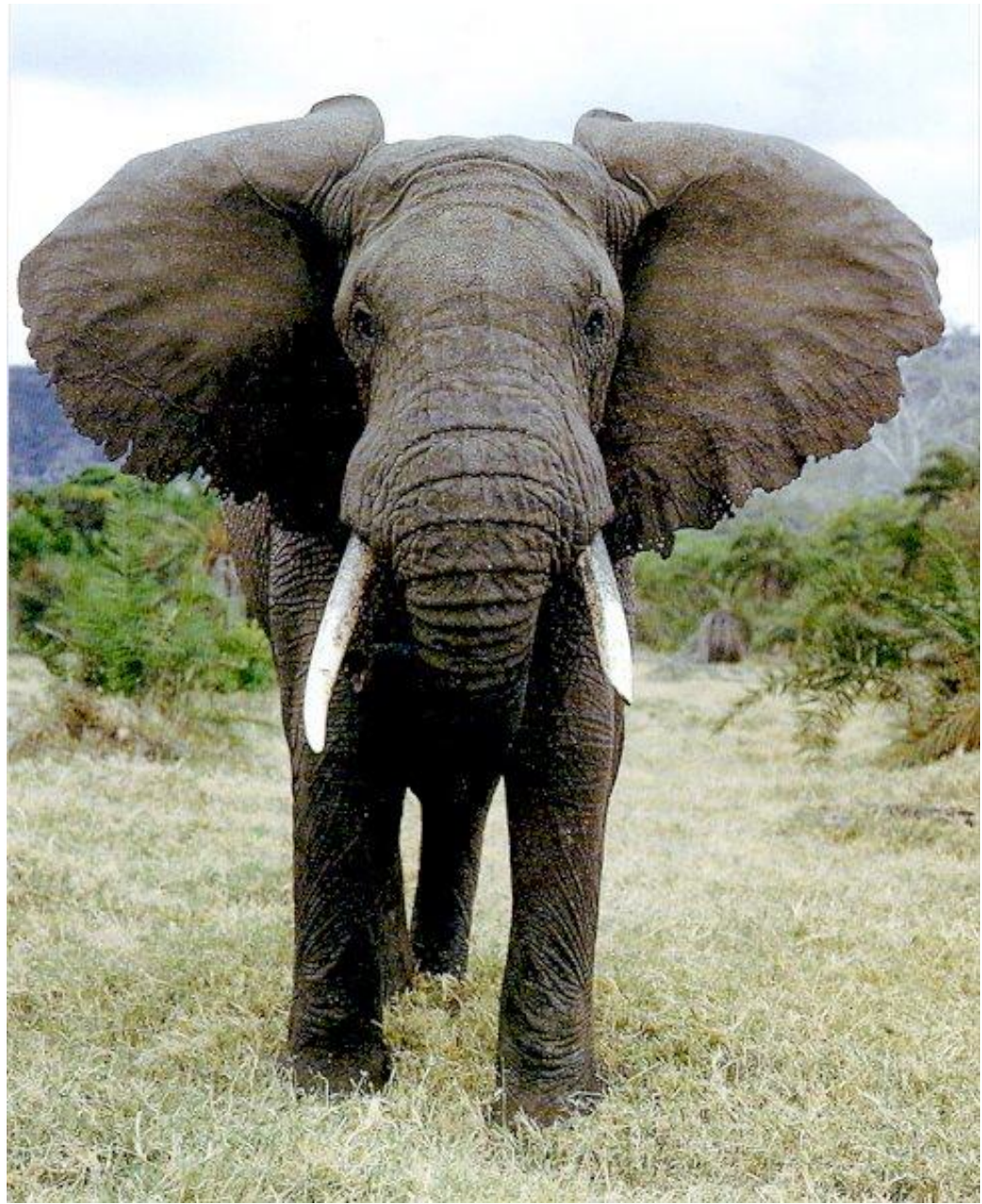
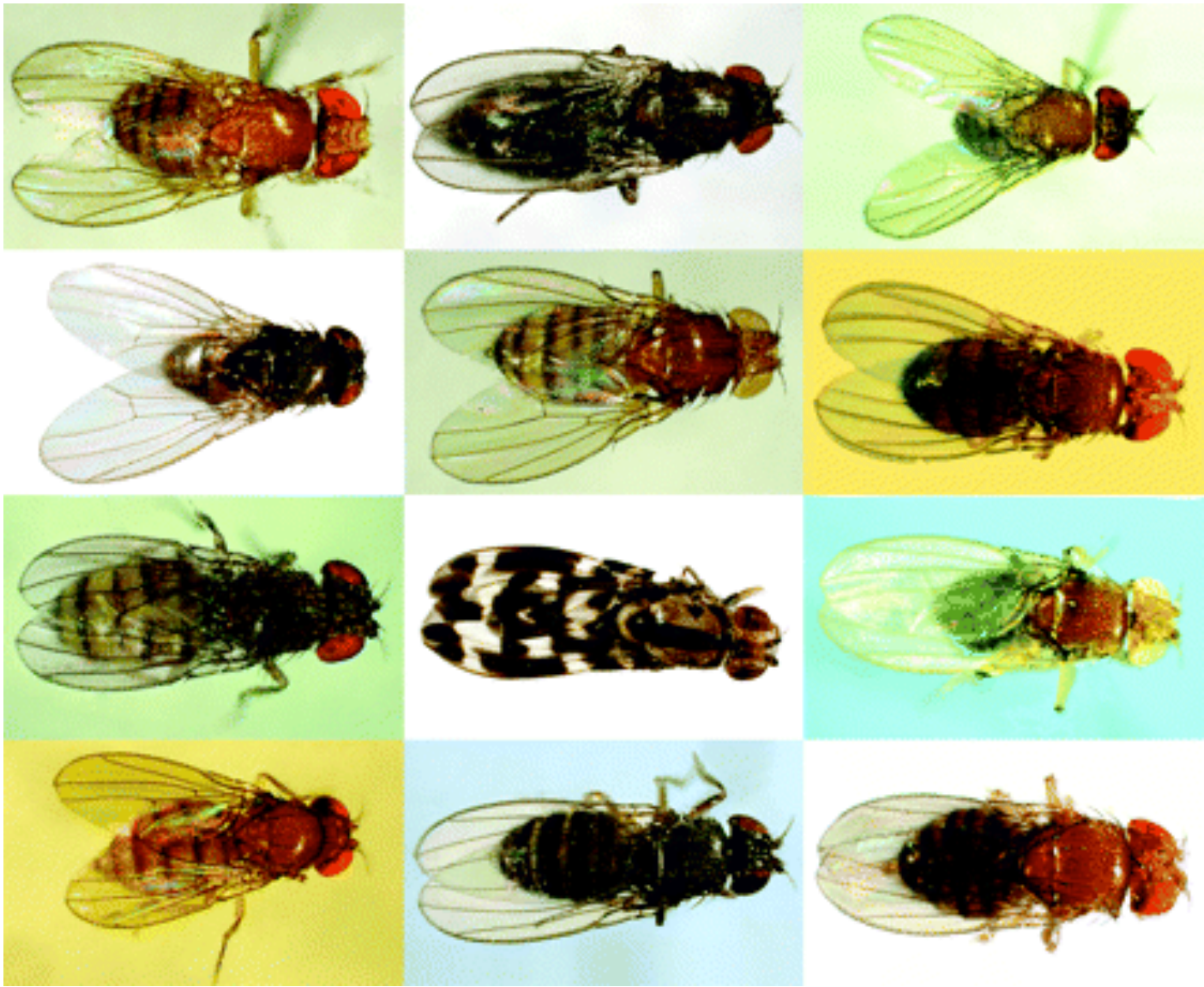
**Uwe Ohler
Duke University**

Evolution theory

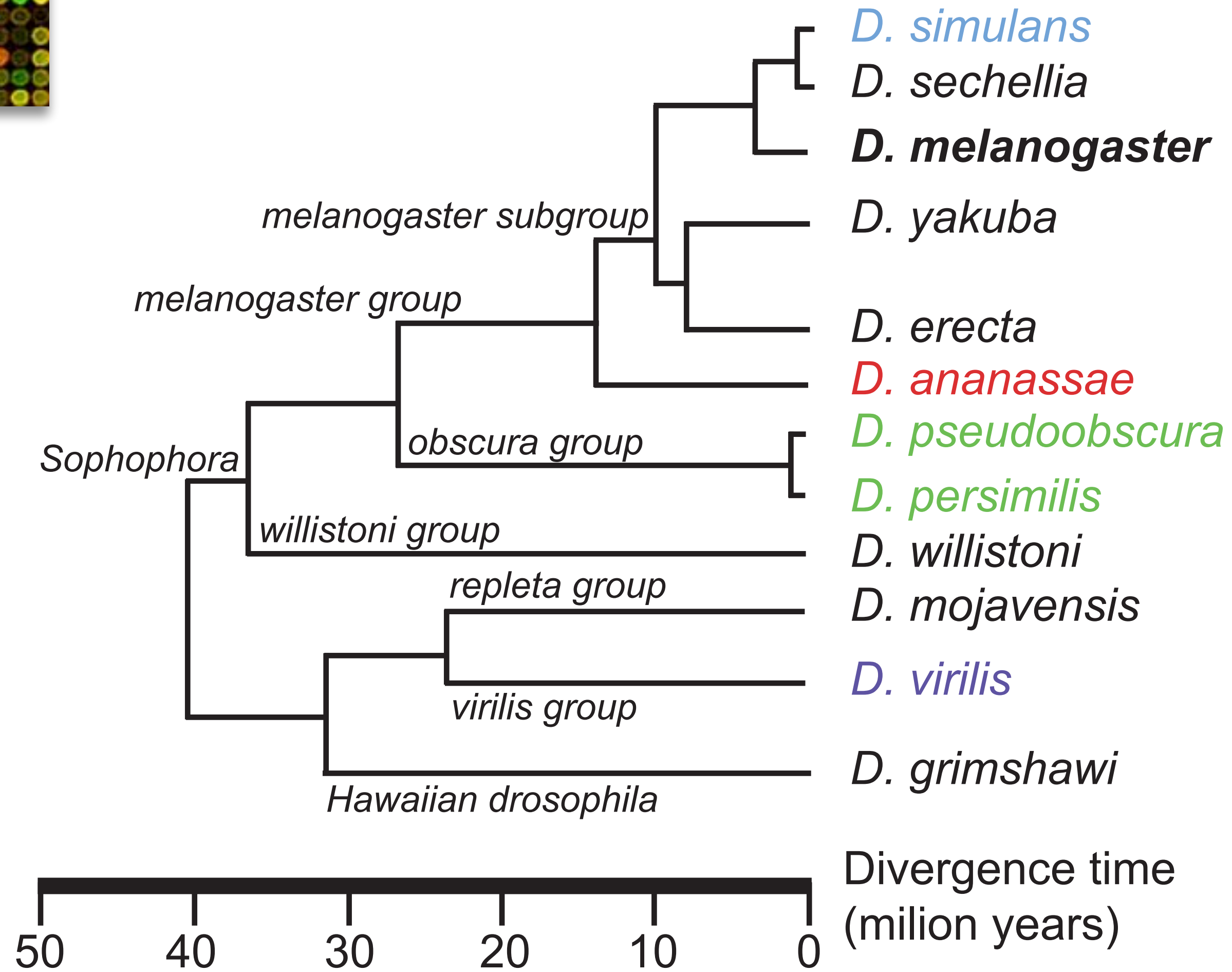
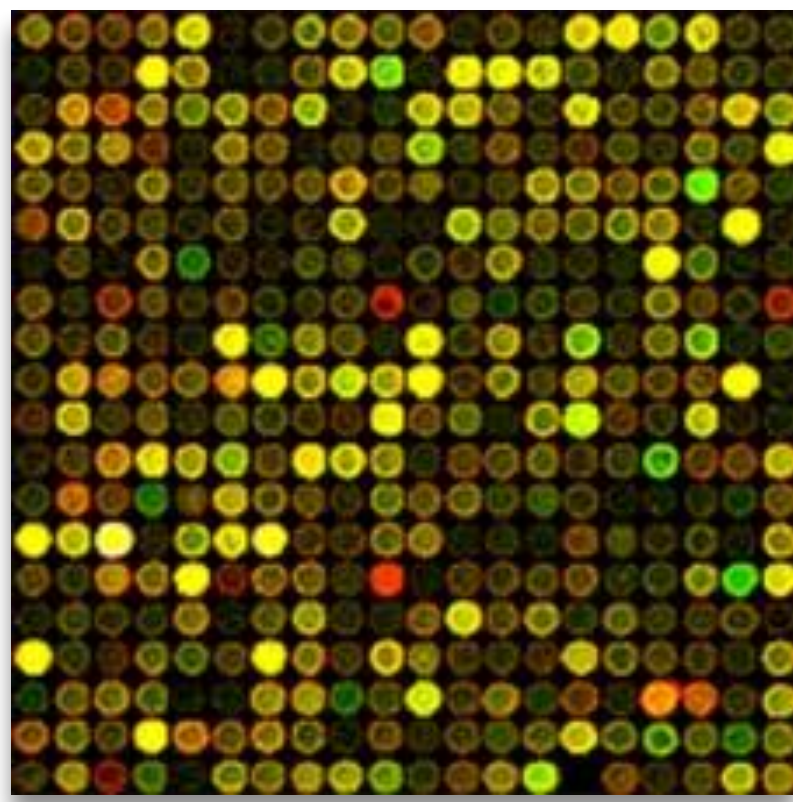


**Casey Bergman
University of
Manchester**

Drosophila jako model pro studium modelu přesýpacích hodin



Komparativní měření genové exprese

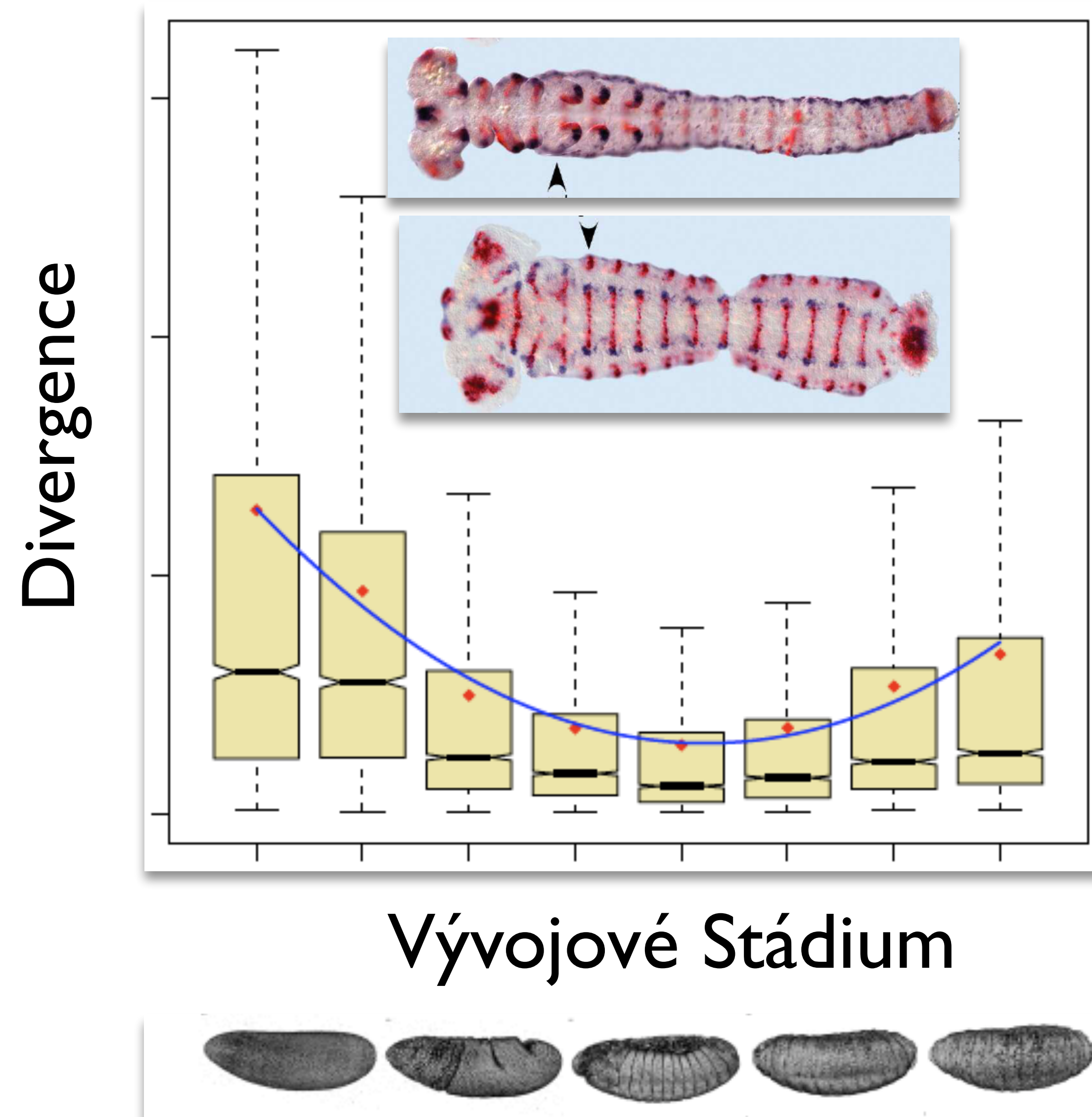


Karolina Varga

Diversita genové exprese rekapituluje model přesýpacích hodin



Alex Kalinka



Jasný paper pro Nature, že?....

2010 July submitted to **Nature** one Friday desk rejected

2010 August submitted to **Nature Genetics** desk rejected

2010 August submitted to **Science** desk rejected

Advisor: Rating 4 of 10 (with 10 representing a potential breakthrough)

This paper attempts to revisit the hourglass model of development using a genomic approach. Although it is hard to judge the strength of the signal they get, I do not think that this is particularly novel or interesting. I am also concerned by the fact that the authors use species that exhibit very similar types of development (they are all *Drosophila*) while the hourglass model is mostly useful to compare highly divergent species: the signal might simply be noise.

I do not think that there is enough depth here to justify further evaluation.

2010 August pre-submission inquiry to **Current Biology** desk rejected

2010 August submitted to **PLoS Biology**

We appreciate the interest of your comprehensive analysis of the gene expression in different species of *Drosophila* during mid-embryogenesis stages. **Your results showing that these morphologically similar stages among different animal phyla or 'hourglass' correlate with genes that are subjected to a similar selection to conserve patterns of gene expression are interesting.** At this stage, however, I regret we are not persuaded that the novel insights of the manuscript provide the strength of advance that we are striving to achieve for PLoS Biology.

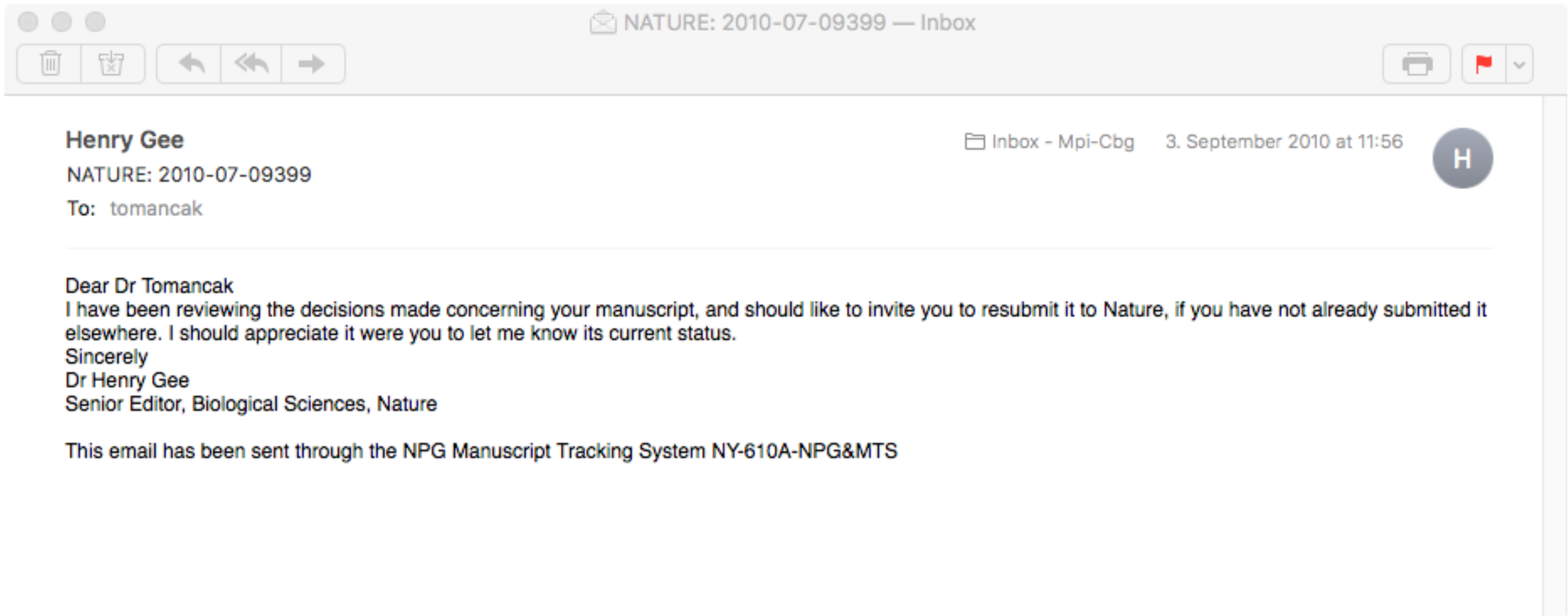
While we cannot consider your manuscript for publication in PLoS Biology, we very much appreciate your wish to present your work in one of PLoS's open-access publications, and we would like to suggest that you consider submitting it to one of the other PLoS journals. Full details of all the other PLoS journals are available at <http://www.plos.org/journals/>. **In particular, we would encourage you to consider submitting to PLoS ONE.** PLoS ONE is different from other journals in that it aims to publish in all areas of science and medicine; it is a unique rapid publishing forum that exploits the full potential of the web to make the most of every piece of research.

I'M NOT ANGRY

**JUST
DISAPPOINTED**



Potom dostanu tento email...



Kdo je Henry Gee?

Not logged in Talk Contributions Create account Log in



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The Free Encyclopedia

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Henry Gee

From Wikipedia, the free encyclopedia

For the Dean of Gloucester, see Henry Gee (priest).

Henry Ernest Gee (born 24 April 1962 in London, England)^[*citation needed*] is a British paleontologist, evolutionary biologist and senior editor of the scientific journal *Nature*.^{[1][2][3]}

Contents [hide]

- Early life and education
- Career
 - 2.1 Books
- References

Early life and education [edit]

Gee attended Sevenoaks School as a boarder.^[*citation needed*] He then^[*when?*] attended the Michael Hall School.^[4]

Gee earned his Bachelor of Science degree at the University of Leeds and completed his PhD at the University of Cambridge in 1990^[5] as a postgraduate student of Fitzwilliam College, Cambridge. His doctoral research investigated the evolution of bison in Britain in the Ice Age.^{[5][4]}

Career [edit]

Gee joined *Nature* as a reporter in 1987 and is now Senior Editor, Biological Sciences.^[6] He has published a number of books, including ^{[7][8][9]} *In Search of Deep Time* (1999),^{[10][11]} *A Field Guide to Dinosaurs* (illustrated by Luis Rey) (2003) and *Jacob's Ladder* (2004).

The Accidental Species, a book on human evolution, was published by the University of Chicago Press in October 2013.^{[12][13]} According to Stephen Cave, (author of *Immortality: The Quest to Live Forever and How It Drives Civilisation*), Gee writes, "persuasively," that "our obsession with our uniqueness is folly... We... believe we are so exceptional... that we are the pinnacle of evolution. But this is a misunderstanding: we are just one twig in the thicket, and we could easily have never sprouted at all."^[14]

In addition to his professional activities, Gee is a blues musician and a noted Tolkienist.^[13] He was the editor of *Mallorn*, the journal of the Tolkien Society, for nine issues (2008–13).^[6] His SF trilogy *The Sigil*, previously available in draft form online, was published by ReAnimus Press in August and September 2012.

On 17 January 2014, Gee revealed the identity of pseudonymous science blogger, Dr. Isis on Twitter.^[15] Dr. Isis was an open critic of the scientific journal *Nature*, where Gee is a senior editor. *Nature* released a statement on the matter.^[16]

Books [edit]

Gee's publications^[17] include"

Henry Gee



Henry Gee (2008)

| | |
|--------------------------------|---|
| Born | Henry Ernest Gee <div>April 24, 1962 (age 57)</div> London ^{[<i>citation needed</i>]} |
| Residence | Cromer |
| Nationality | British |
| Education | Sevenoaks School <div>Michael Hall school</div> |
| Alma mater | University of Leeds (BSc) <div>University of Cambridge (PhD)</div> |
| Awards | European Science Fiction Society's Best Publisher Award (2005) |
| | Scientific career |
| Fields | Paleontology <div>Evolutionary biology</div> |
| Institutions | <i>Nature</i> |
| Thesis | <i>Bovidae from the Pleistocene of Britain</i> (1990) |

Události nabraly rychlý spád

Posíláme zpět do Nature

Henry Gee posílá paper na peer review

Dostáváme čtyři poměrně příznivé posudky 27. září

Posíláme revizi 13. října

Publikace je akceptována 20. října


Co se stalo?

nature > letters > article

nature

Letter | Published: 08 December 2010

Gene expression divergence recapitulates the developmental hourglass model

Alex T. Kalinka, Karolina M. Varga, Dave T. Gerrard, Stephan Preibisch, David L. Corcoran, Julia Jarrells, Uwe Ohler, Casey M. Bergman & Pavel Tomancak 

Nature **468**, 811–814(2010) | [Cite this article](#)

901 Accesses | **213** Citations | **57** Altmetric | [Metrics](#)

nature > letters > article

 **nature**

Letter | Published: 08 December 2010

A phylogenetically based transcriptome age index mirrors ontogenetic divergence patterns

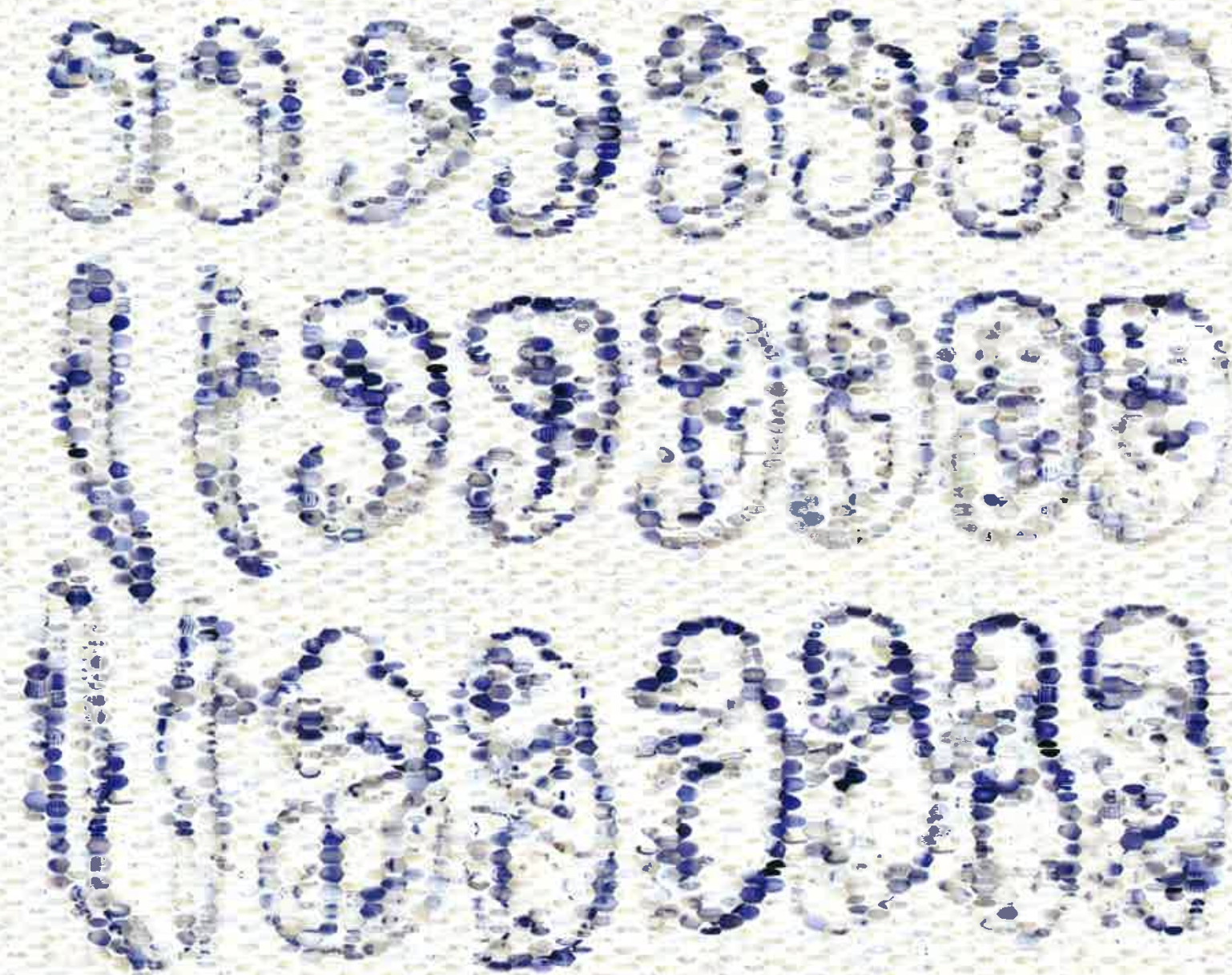
Tomislav Domazet-Lošo  & Diethard Tautz

Nature **468**, 815–818(2010) | [Cite this article](#)

728 Accesses | **199** Citations | **30** Altmetric | [Metrics](#)

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE



HOURGLASS FIGURES

Confirmation of developmental convergence updates classic of early embryology for the genomics age **PAGES 768, 811 & 815**

FOOD SCIENCE

A TASTE OF THINGS TO COME

Would you eat lab-grown beefsteak?

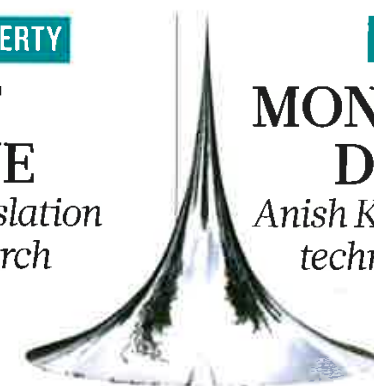
PAGE 752

INTELLECTUAL PROPERTY

PATENT MEDICINE

How the right legislation can boost research

PAGE 755



SCULPTURE

MONUMENTAL DESIGNS

Anish Kapoor's fusion of technology and art

PAGE 762

NATURE.COM/NATURE

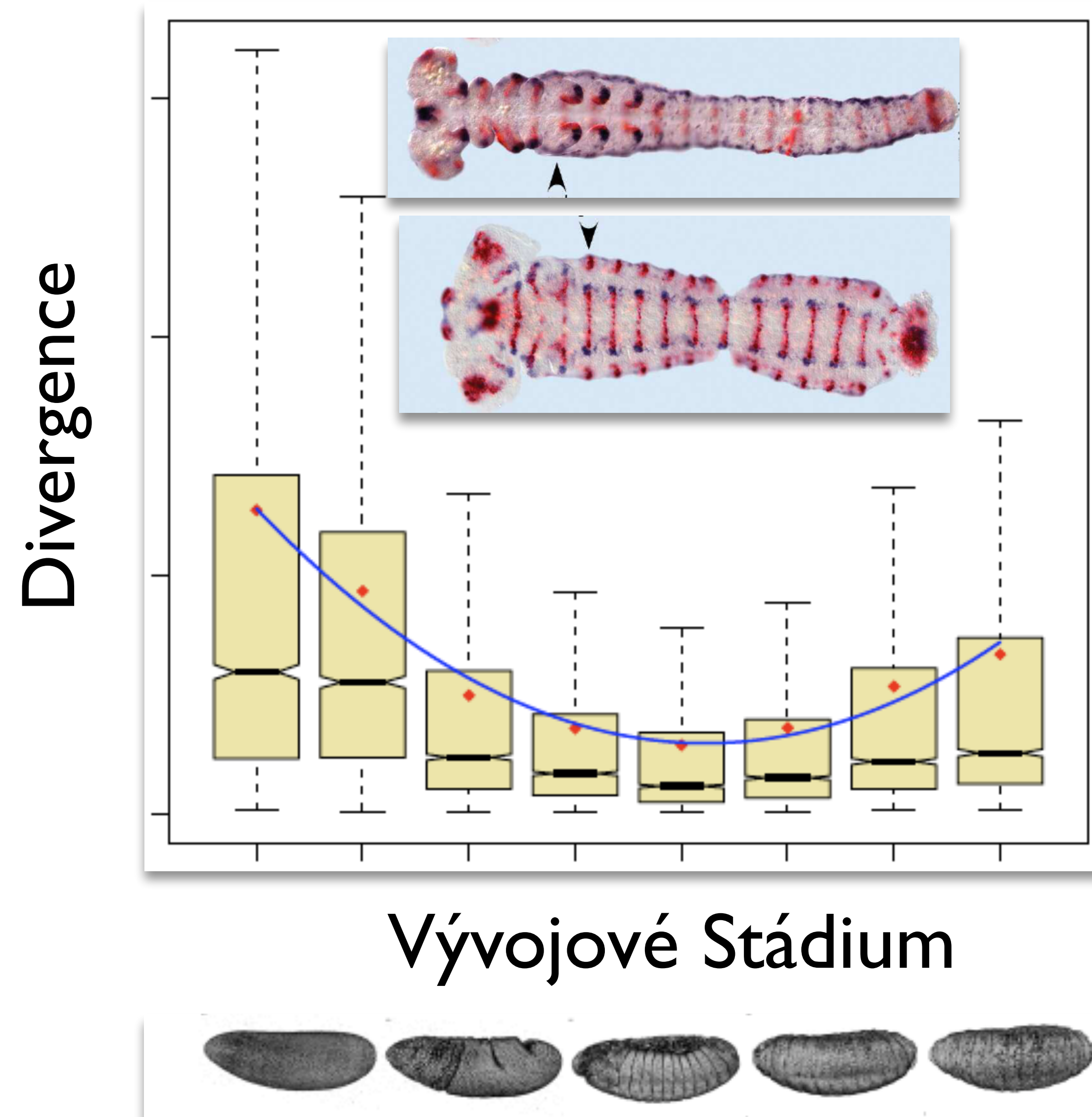
9 December 2010

from PLoS One
to the cover of Nature

Diversita genové exprese rekapituluje model přesýpacích hodin



Alex Kalinka



Ohlas článku byl obrovský

Prud'homme B, Gompel N. (2010) *Evolutionary biology: Genomic hourglass. Nature* 468:768-9

Casci T. (2010) *Development: Hourglass theory gets molecular approval. Nat Rev Genet.* 2010

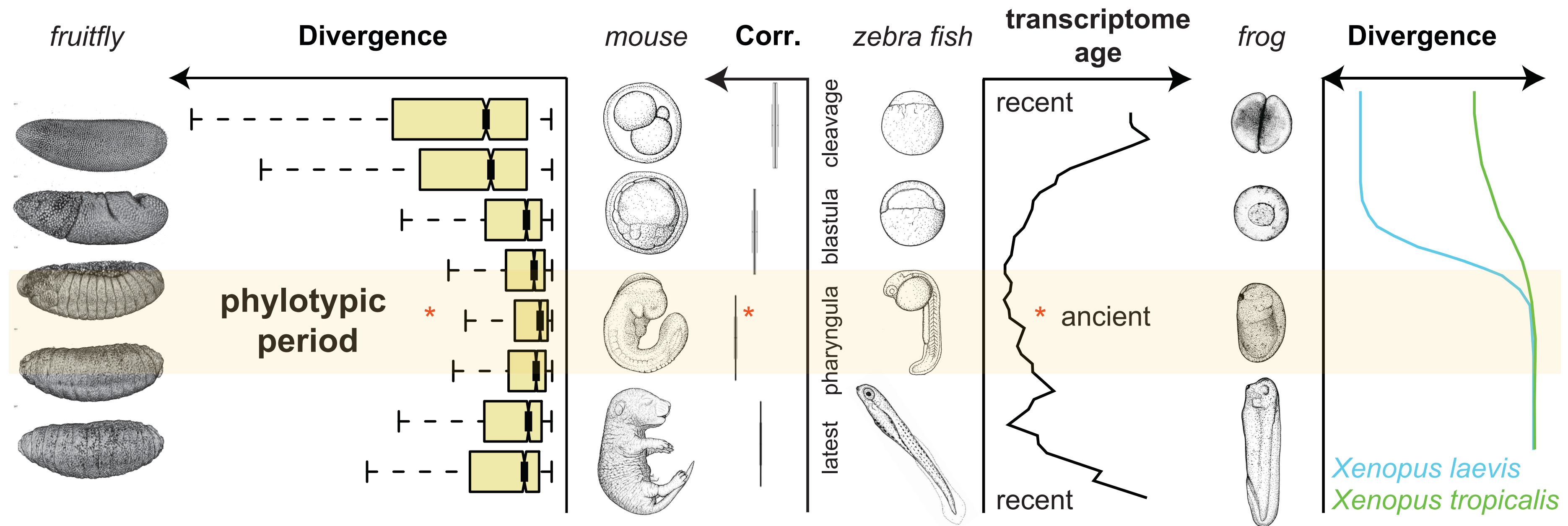
Faculty of 1000: 2011. F1000.com/7774958 (FFa 8)

International Press: Frankfurter Allgemeine Zeitung, Discovery News, MSNBC; Evolution blogs: *Pharyngula*, *Panda's thumb*, *Why Evolution Is True*; Czech newspapers: iDnes, Literarni Noviny, 21 století

Discovery Institute - Intelligent Design think tank

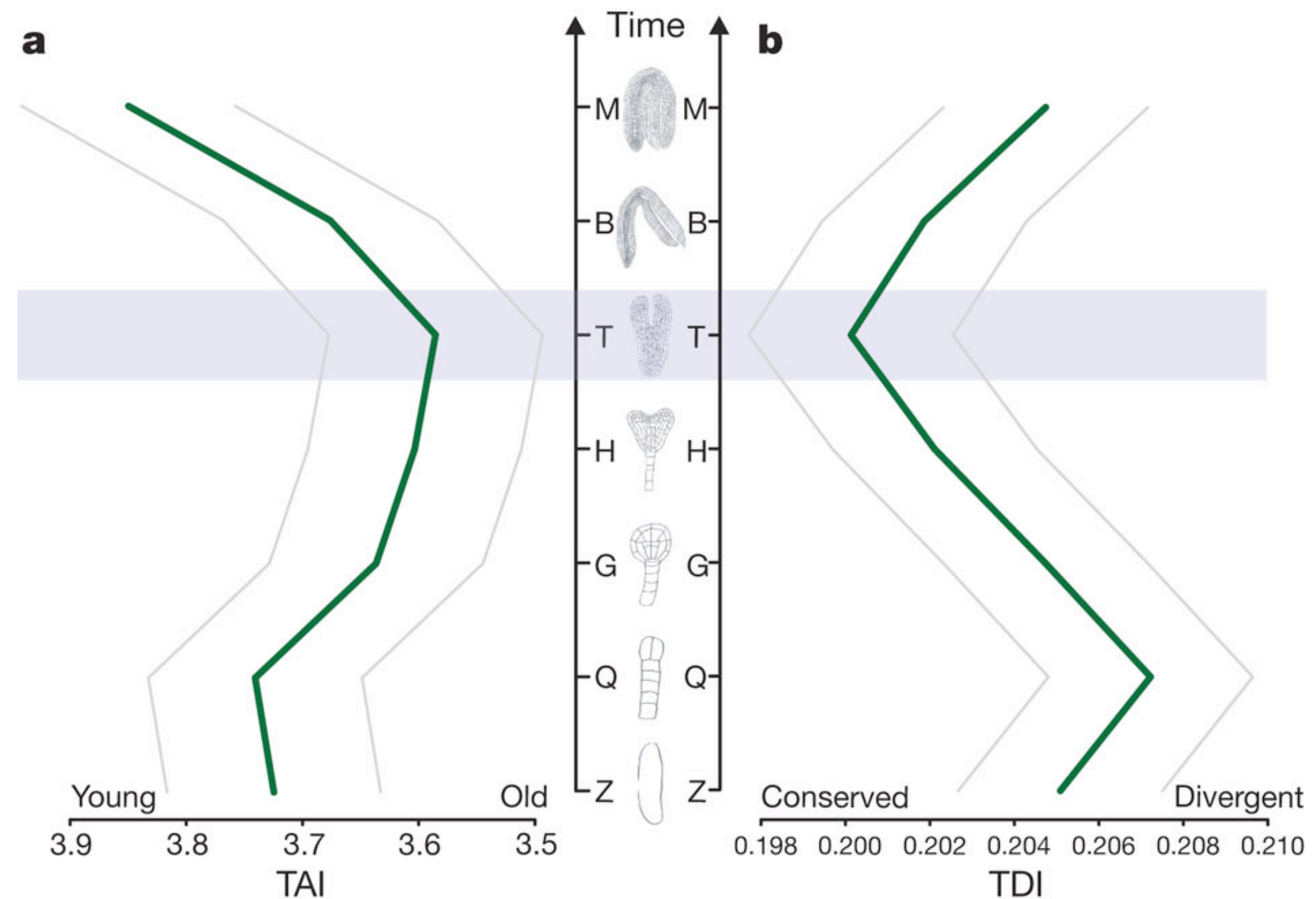
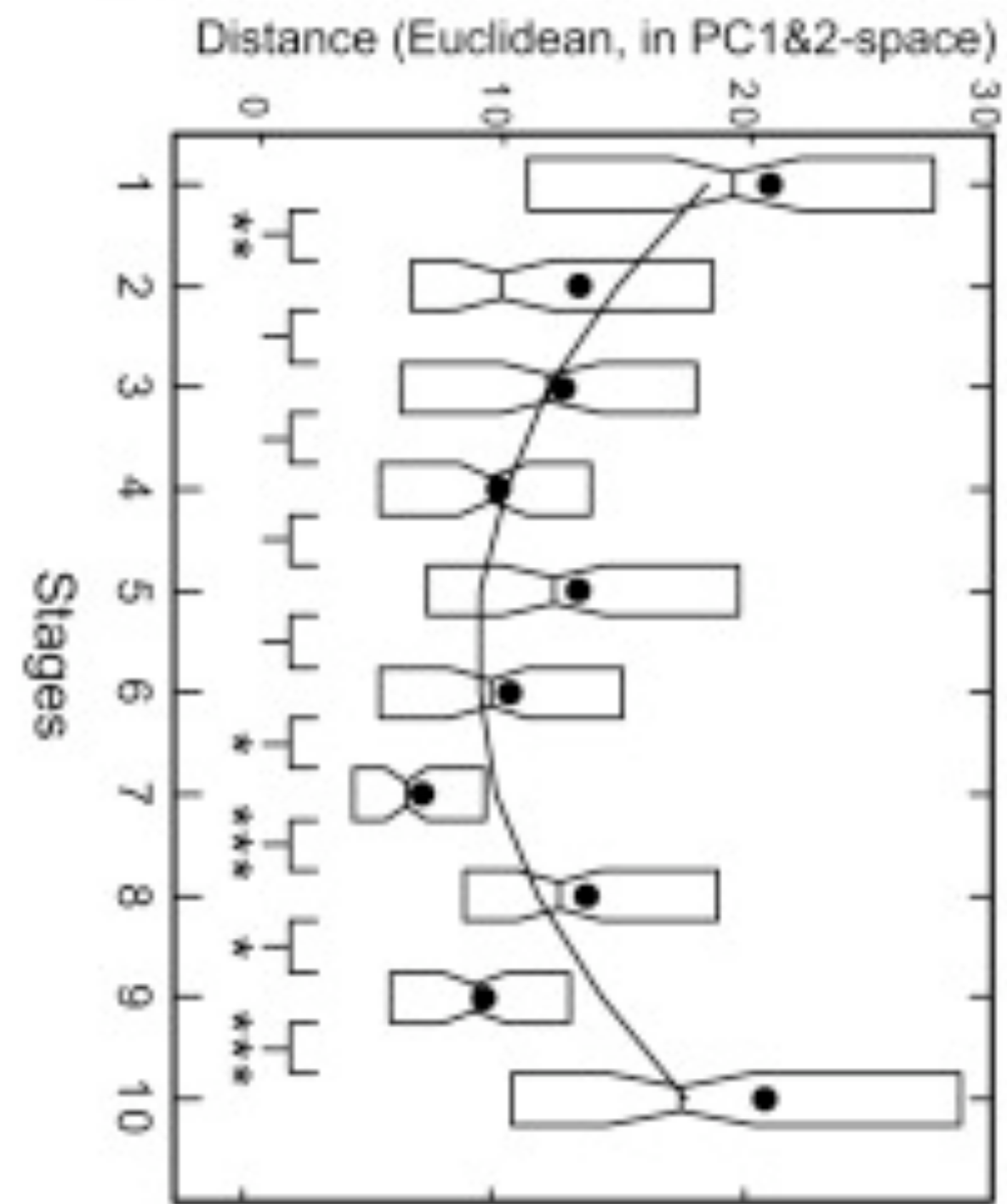
Stephen Matheson - Quintessence of Dust (<http://sfmatheson.blogspot.com/2010/12/its-just-stage-phylogenetic-stage-part-i.html>)

Najednou je model přesýpacích hodin všude



Yanai, I. *et al* (2011) Mapping gene expression in two *Xenopus* species: evolutionary constraints and developmental flexibility. *Dev. Cell* 20, 483-496.

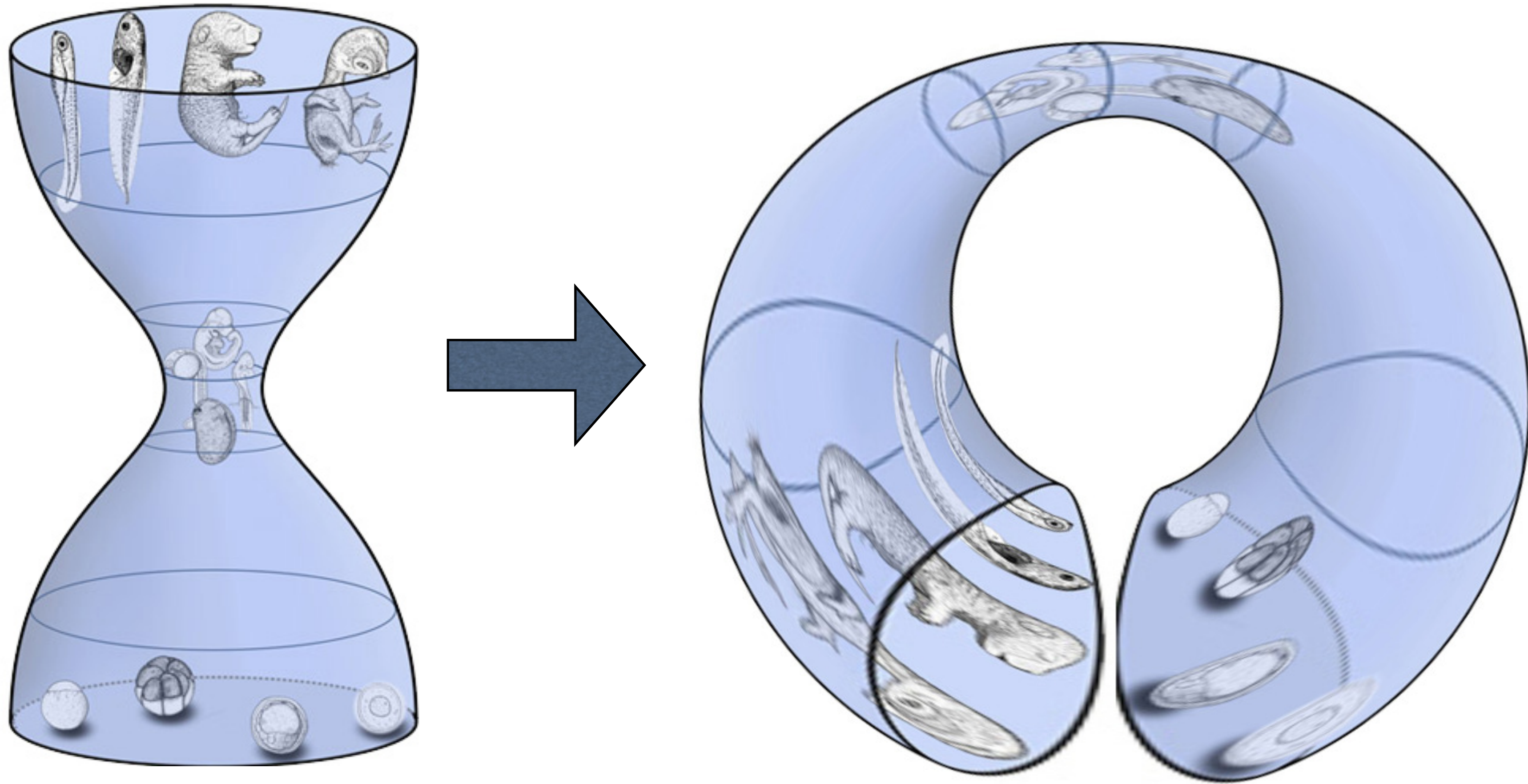
Najednou je model přesýpacích hodin všude



Plants



Marcel Quint et al. A transcriptomic hourglass in plant embryogenesis *Nature* 490, 98–101



drawing from Irie, N. and Kuratani, S. (2011). *Nat. Commun.*

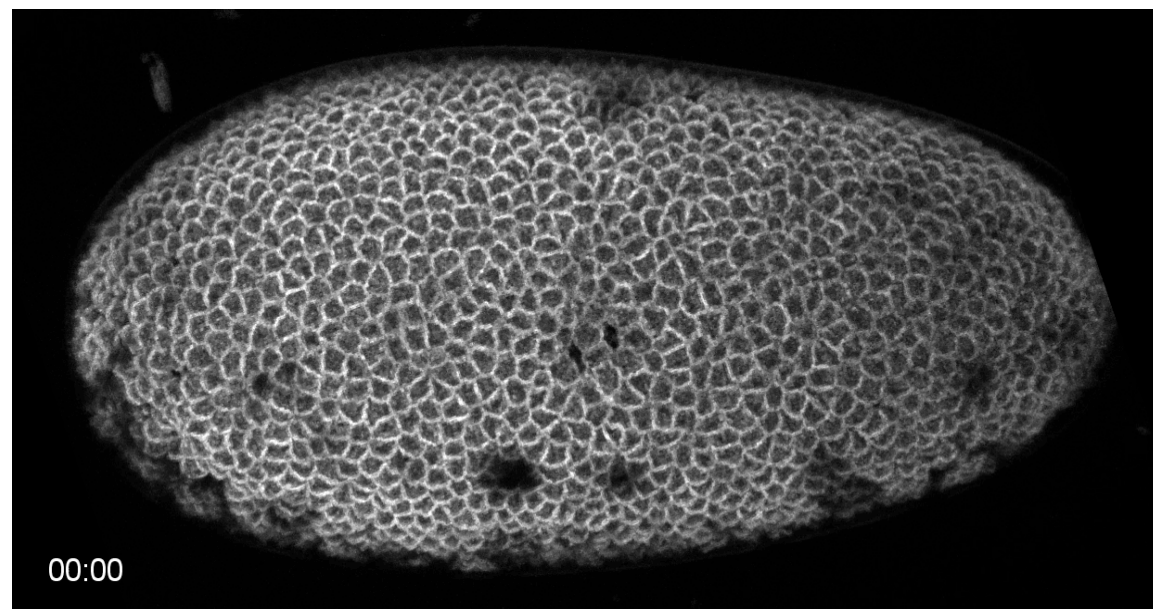


Model přesýpacích hodin u hmyzu

short
germband

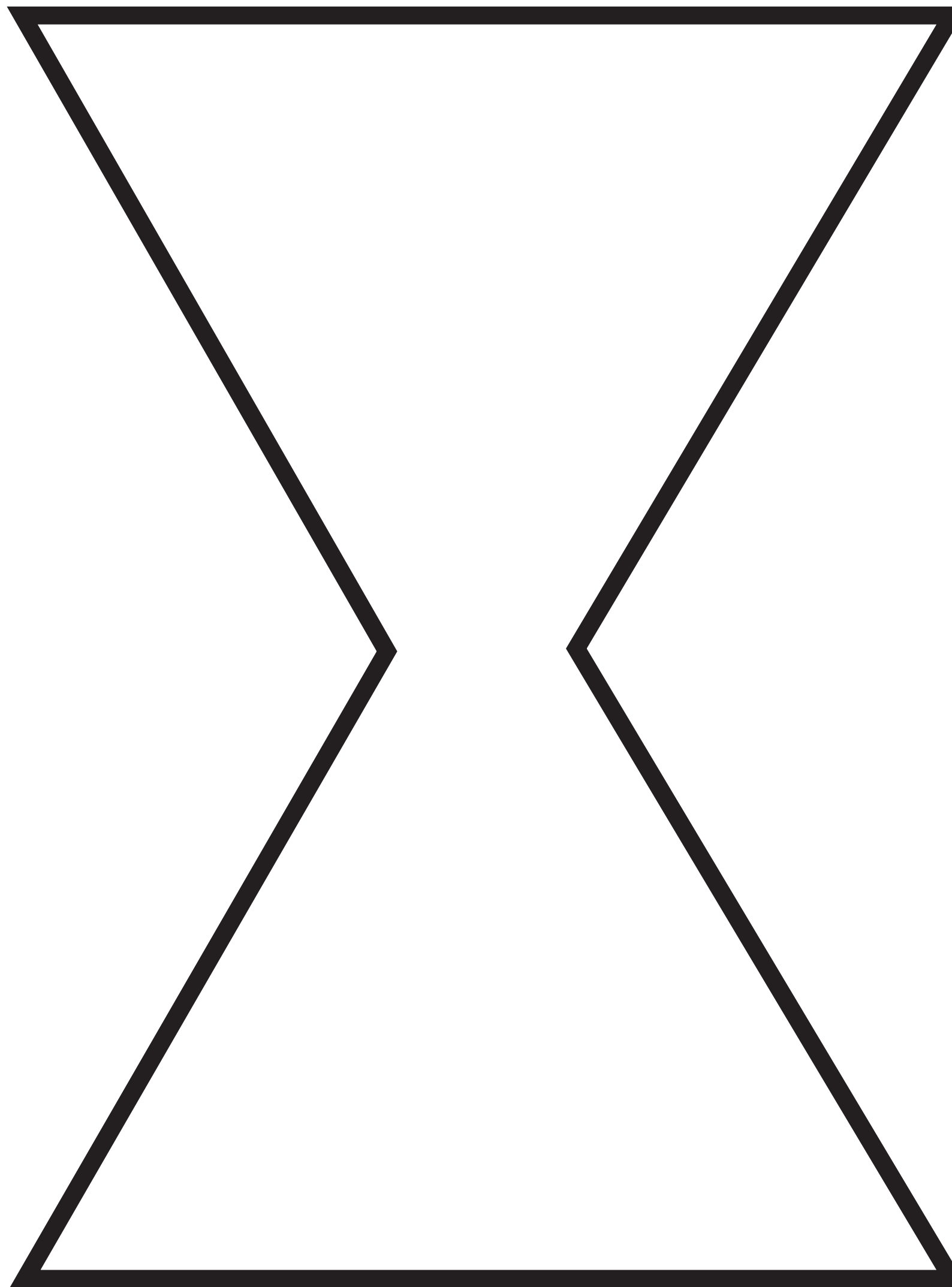
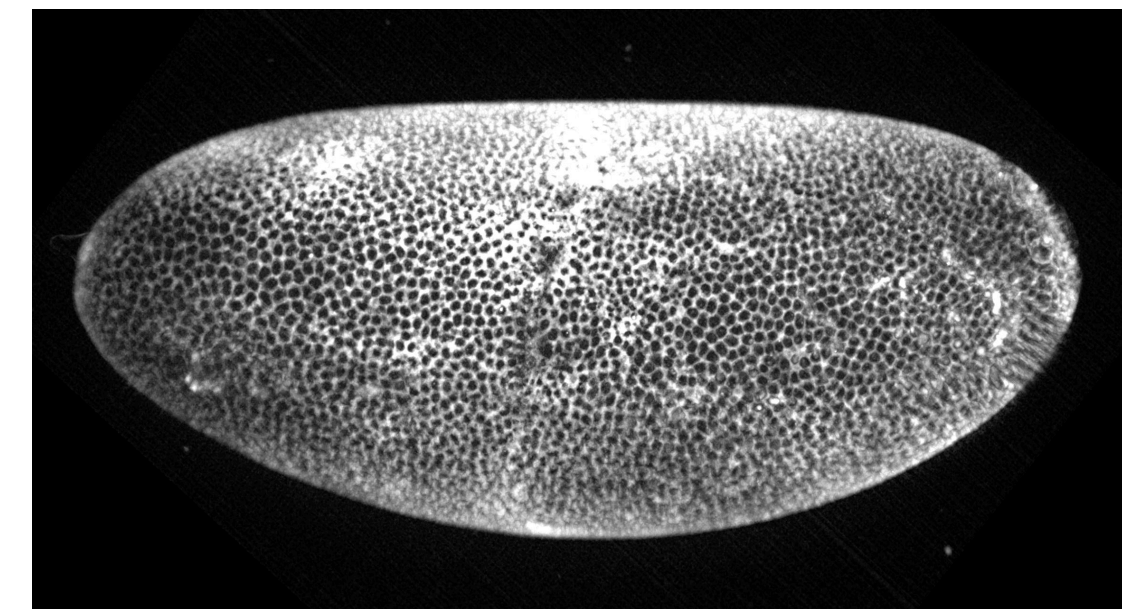
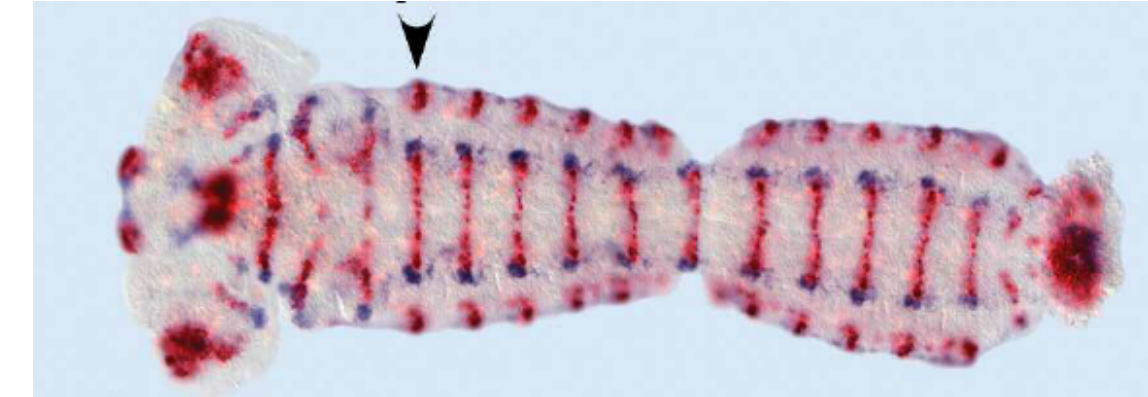


Tribolium

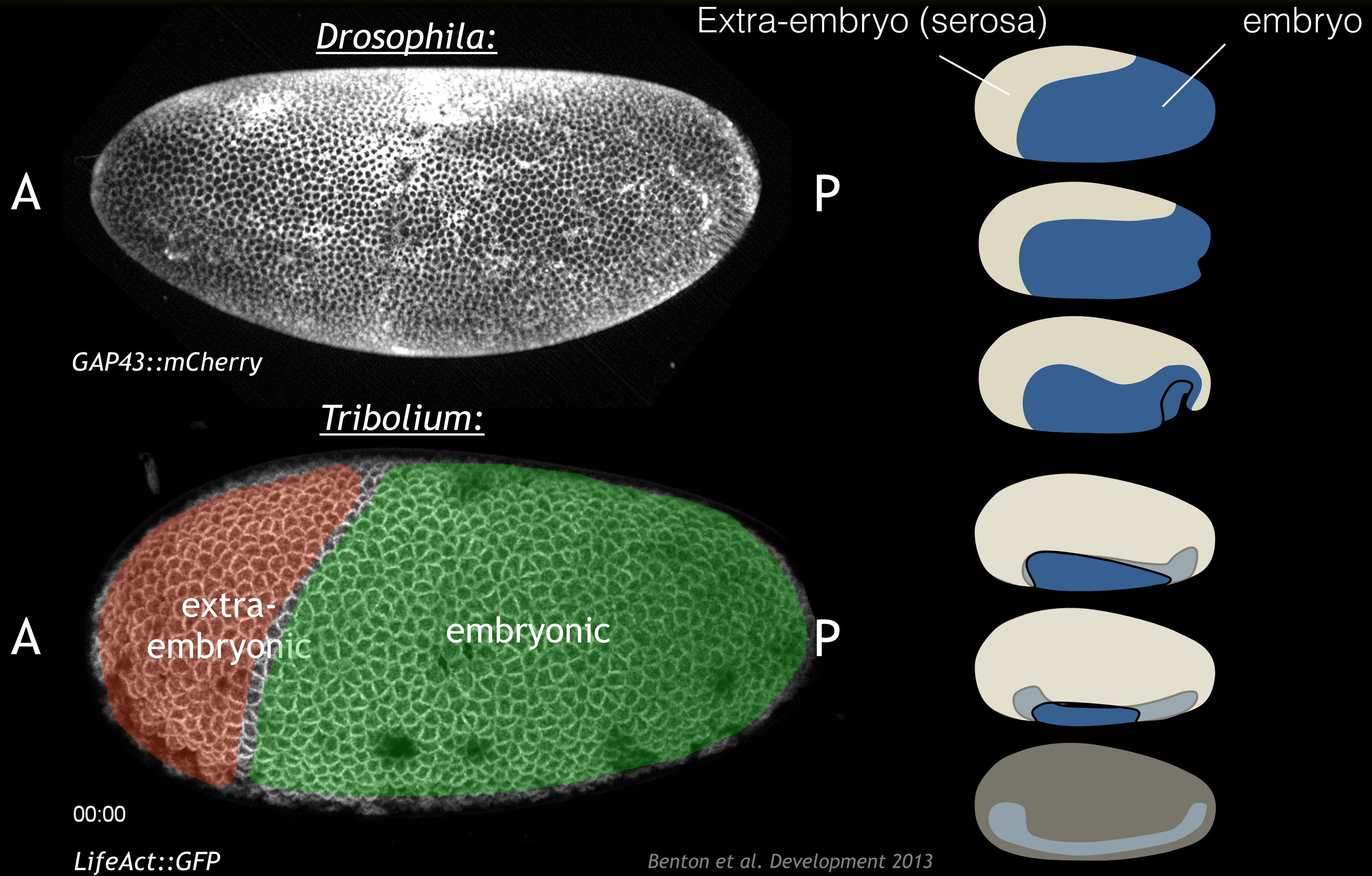
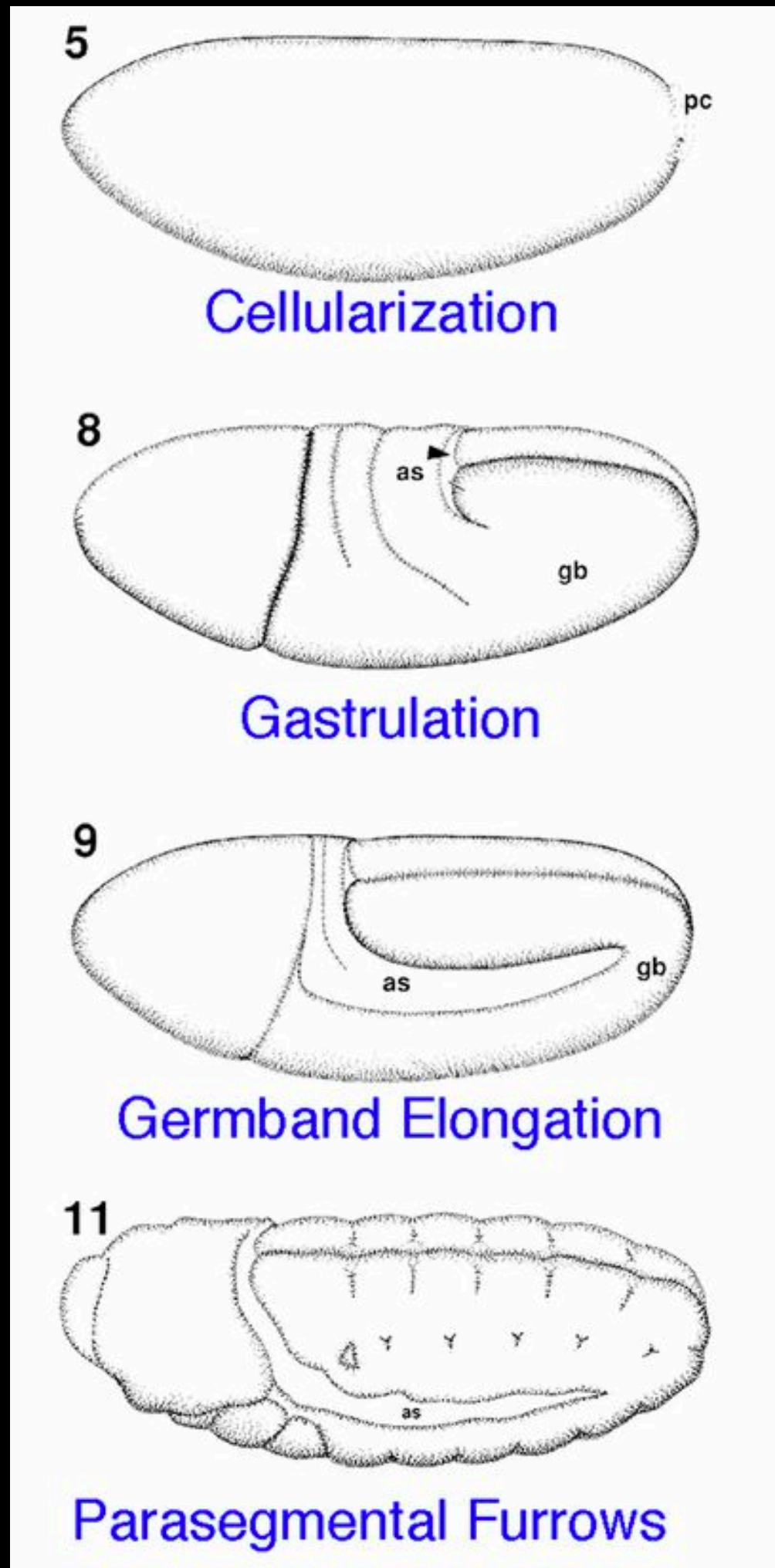


Drosophila

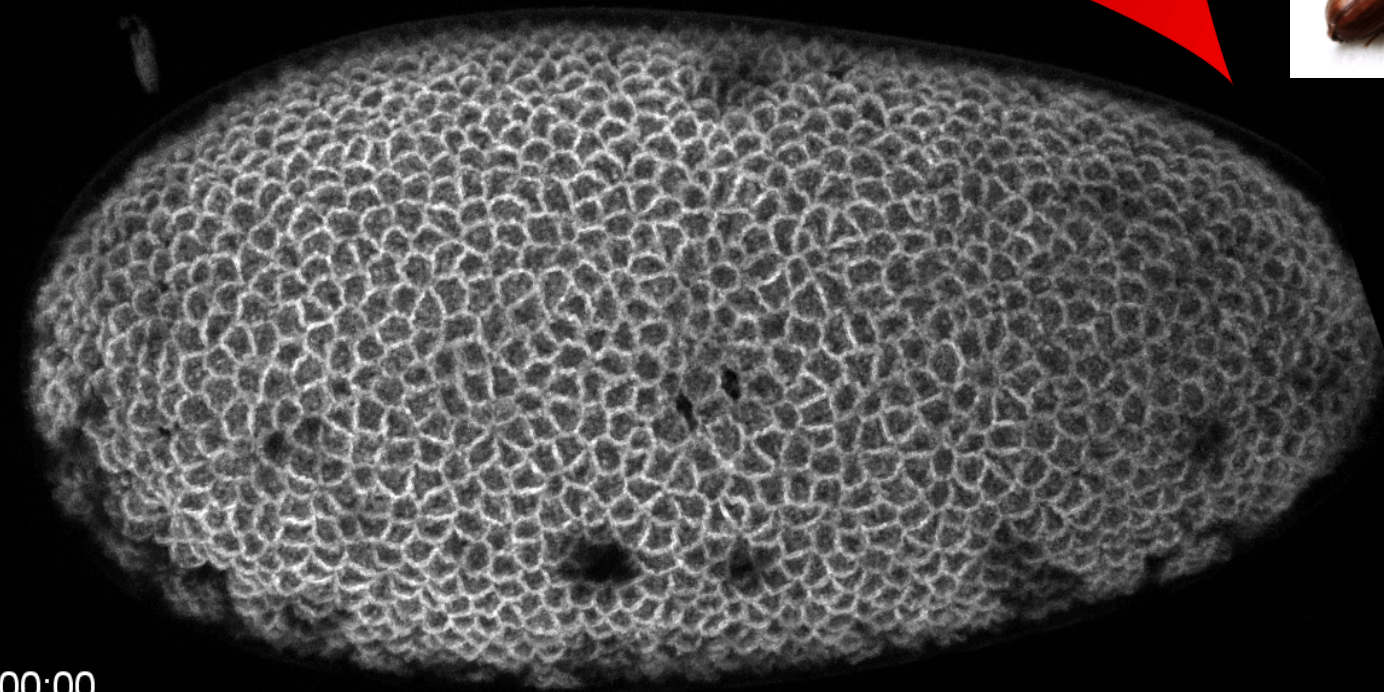
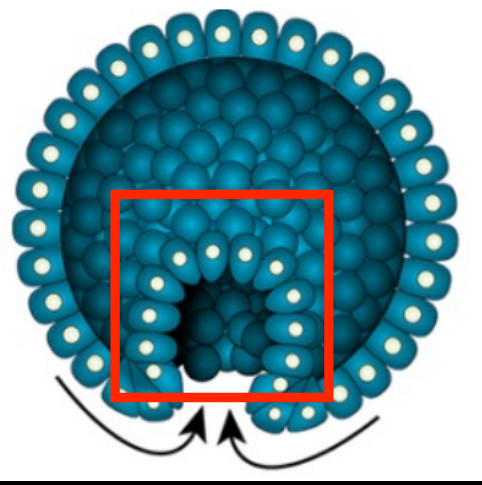
long
germband



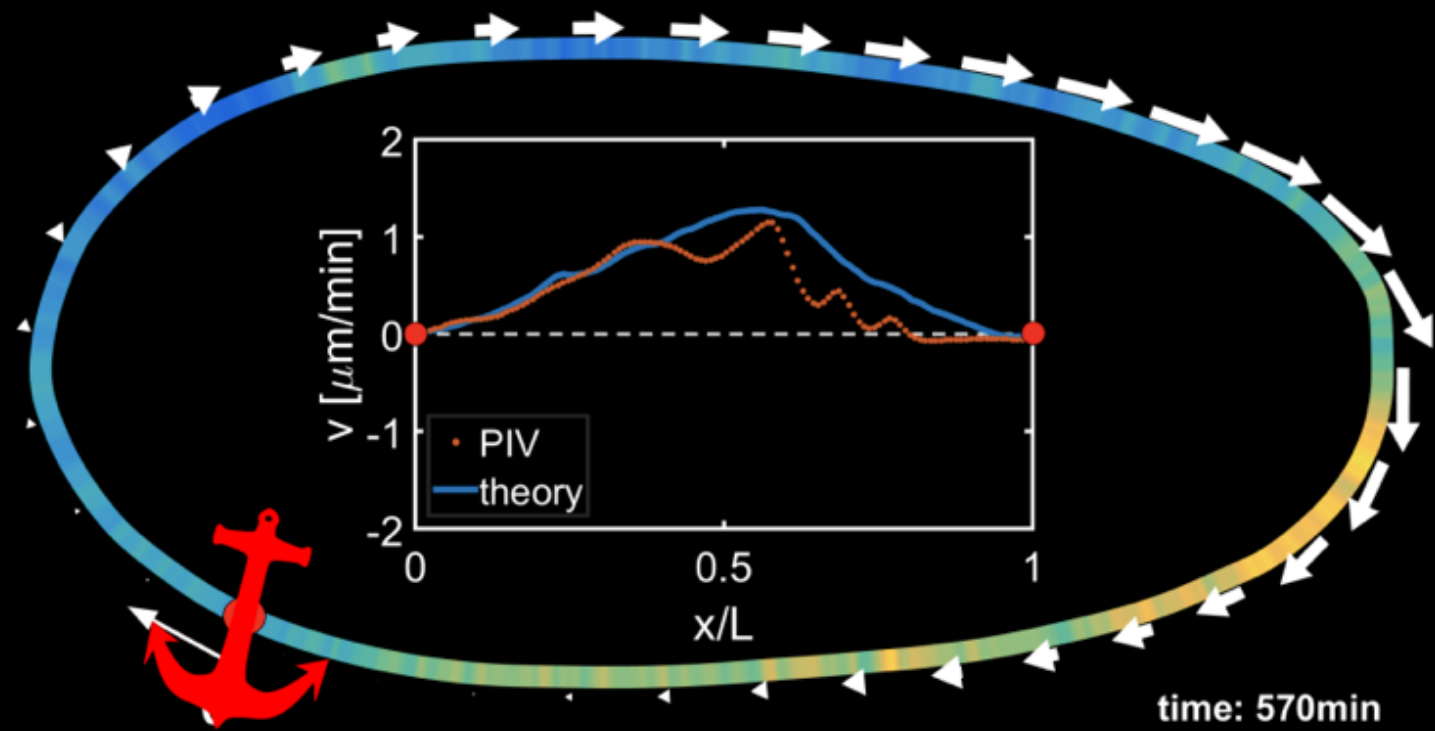
Gastrulace u hmyzu



Vliv napojení buněk a skořápky na morfogenezi

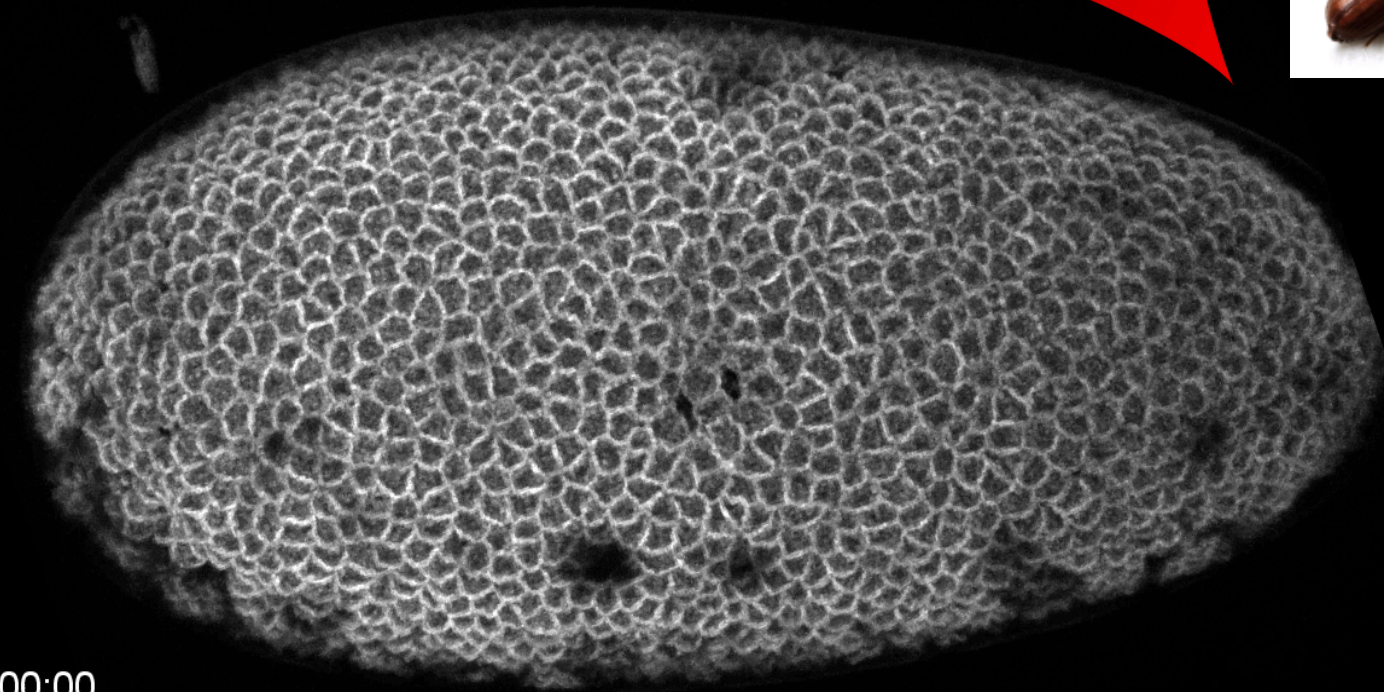
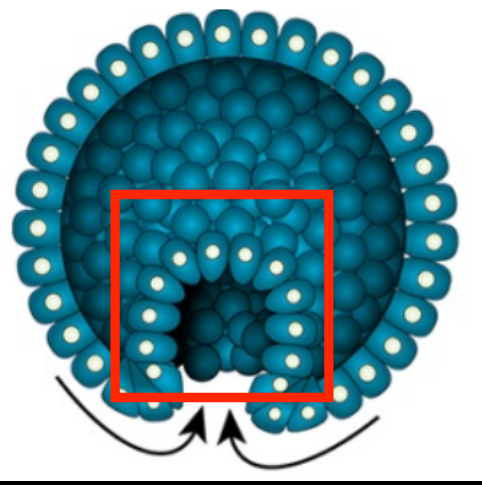


modelování

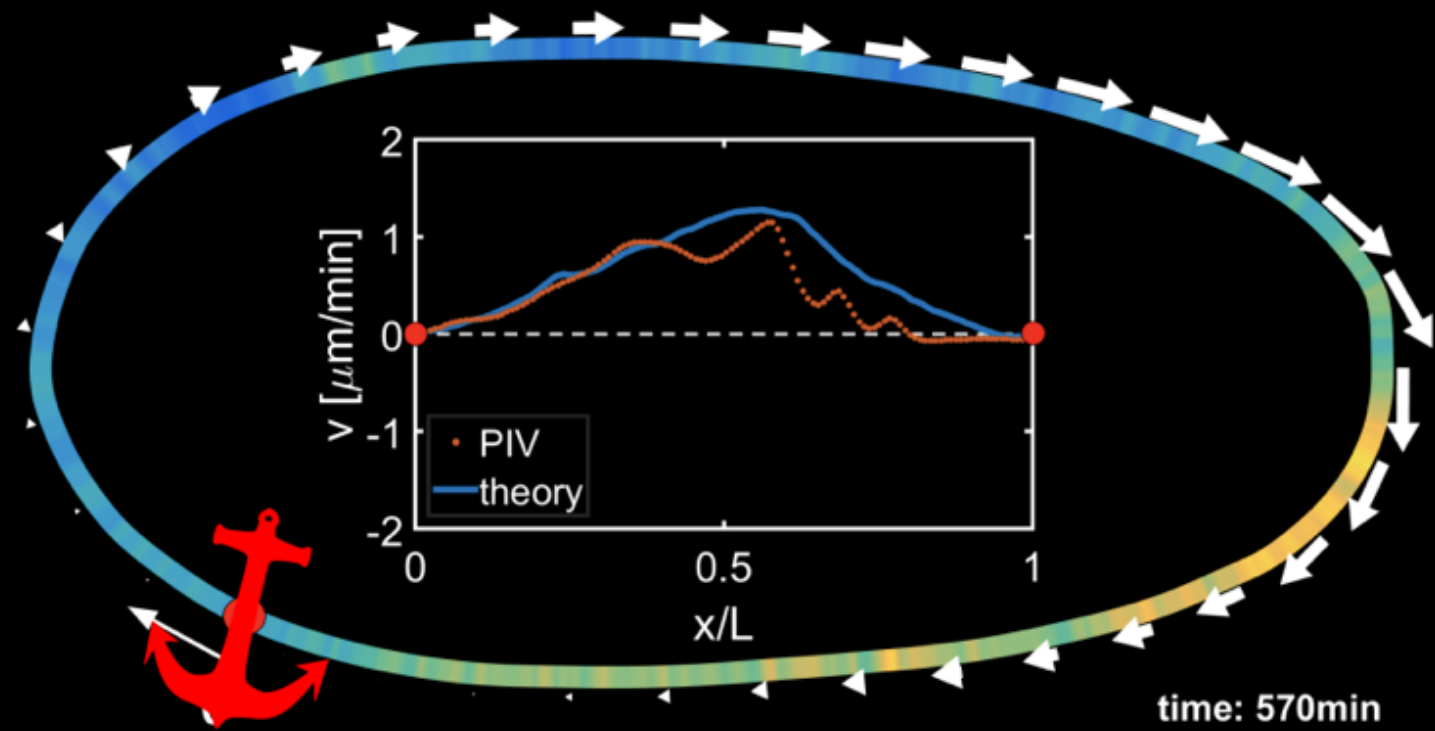


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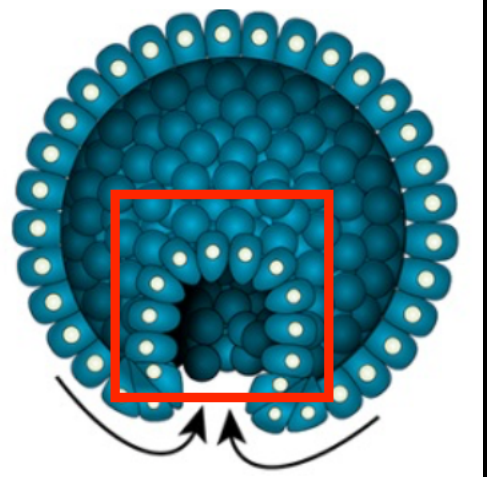
Vliv napojení buněk a skořápky na morfogenezi



modelování



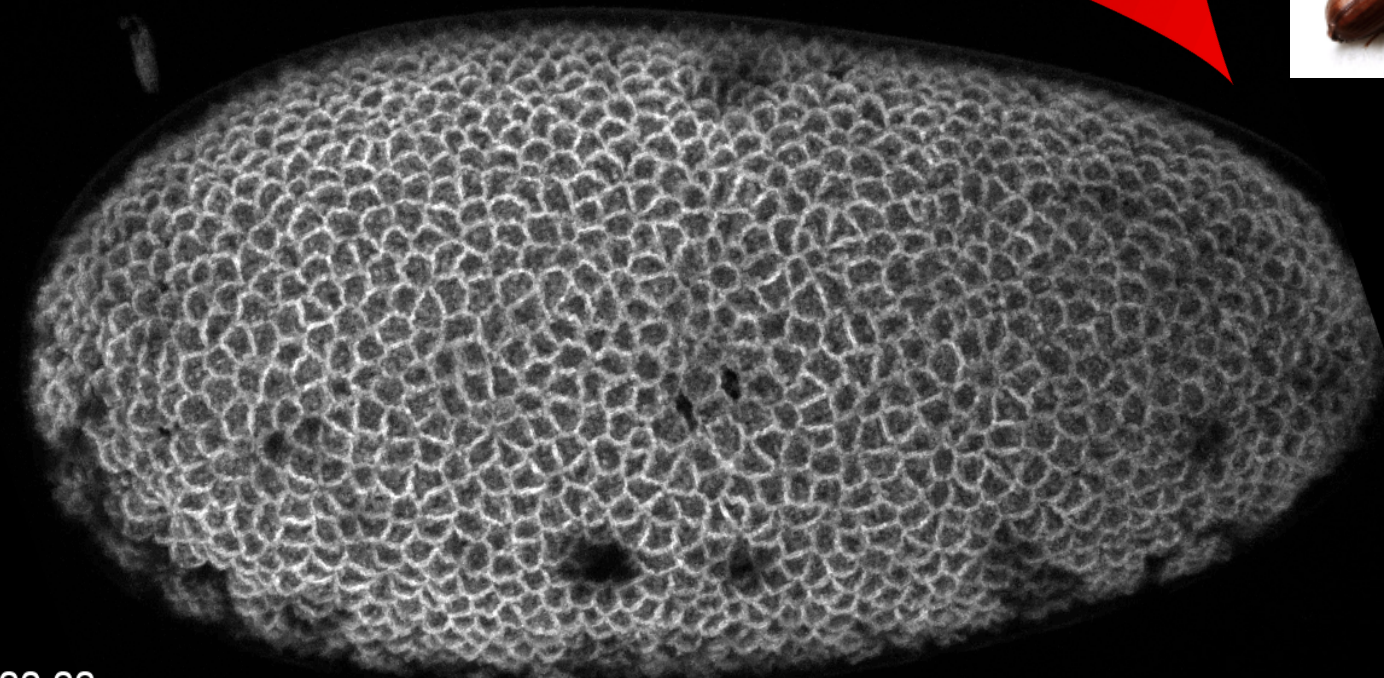
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Vliv napojení buněk a skořápky na morfogenezi

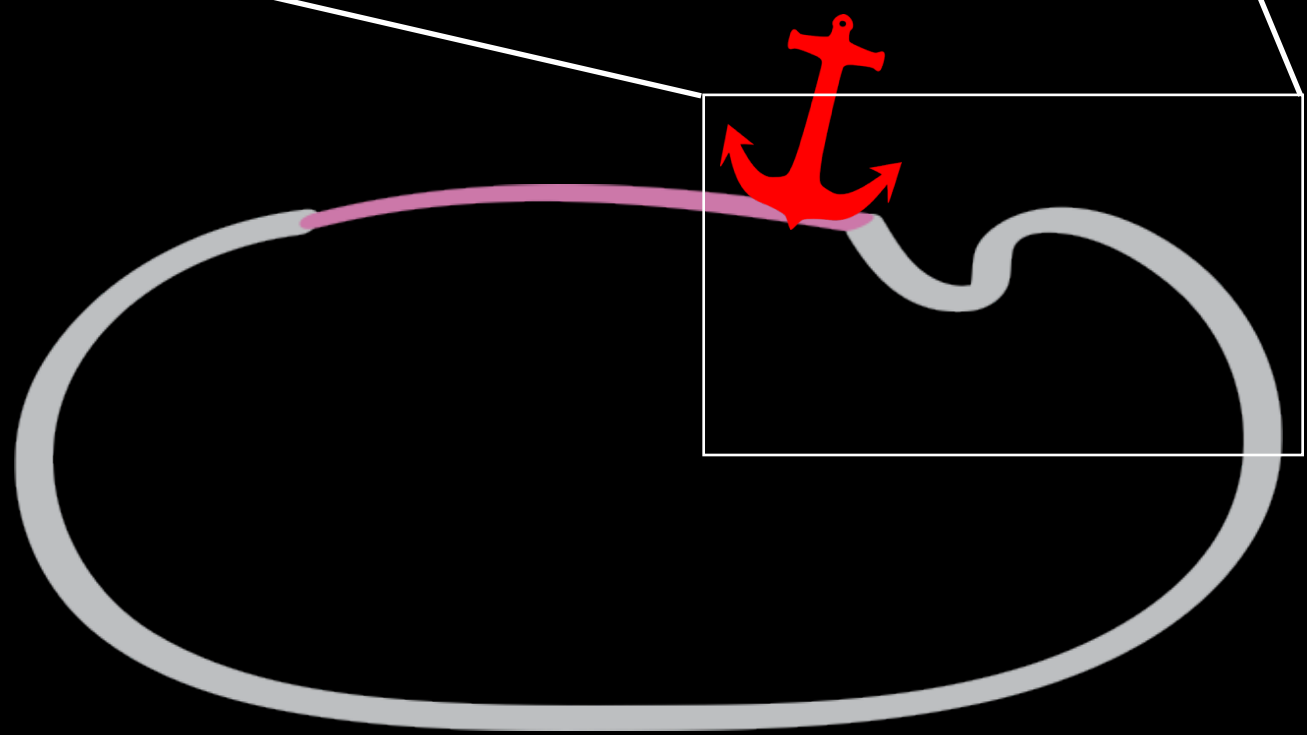
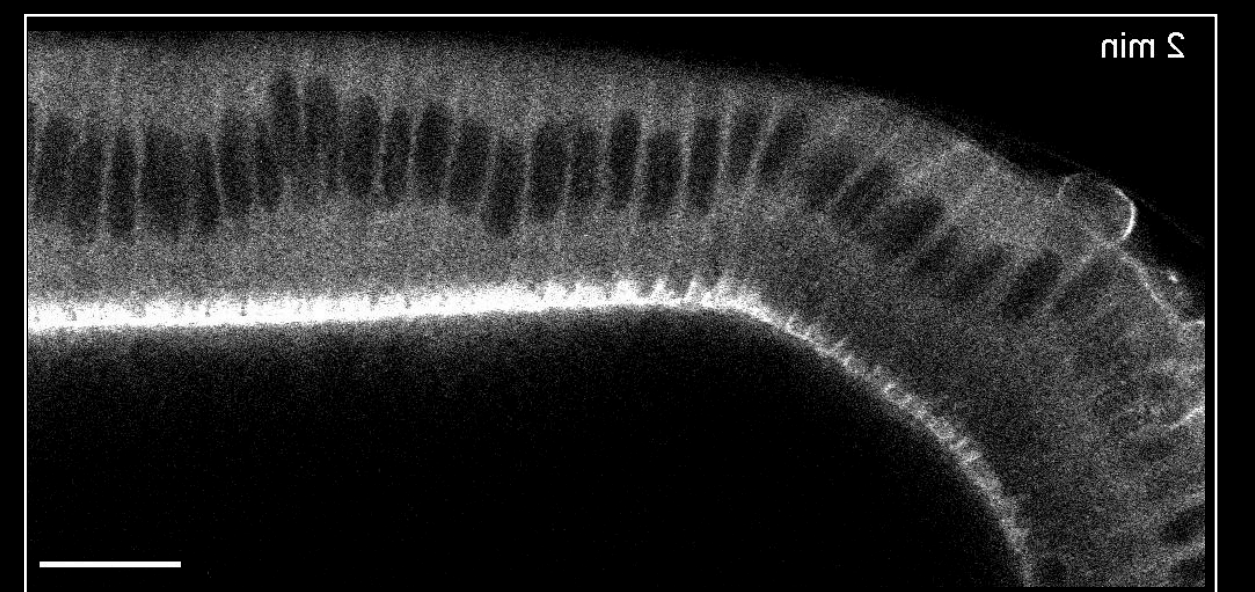
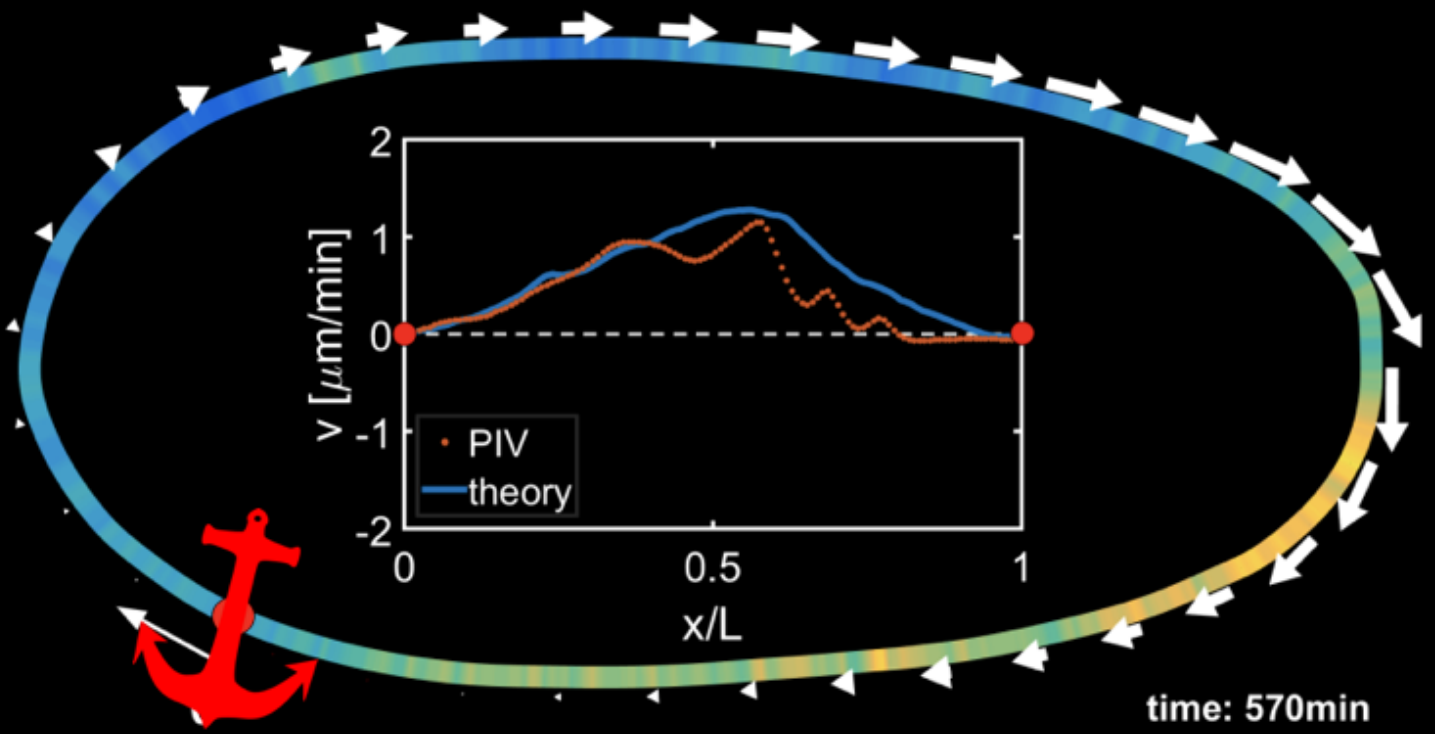


fruit fly embryo



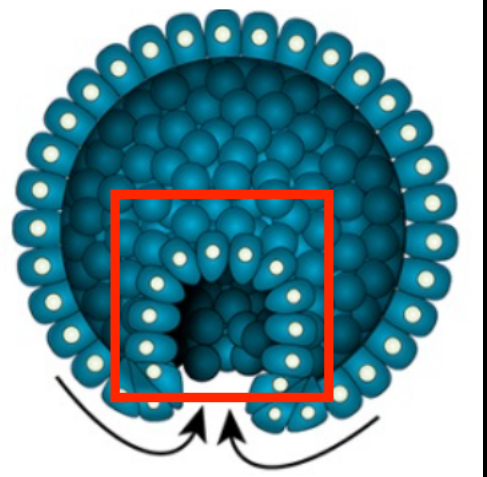
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modelování



= **Integrins**

embryo extra-embryo

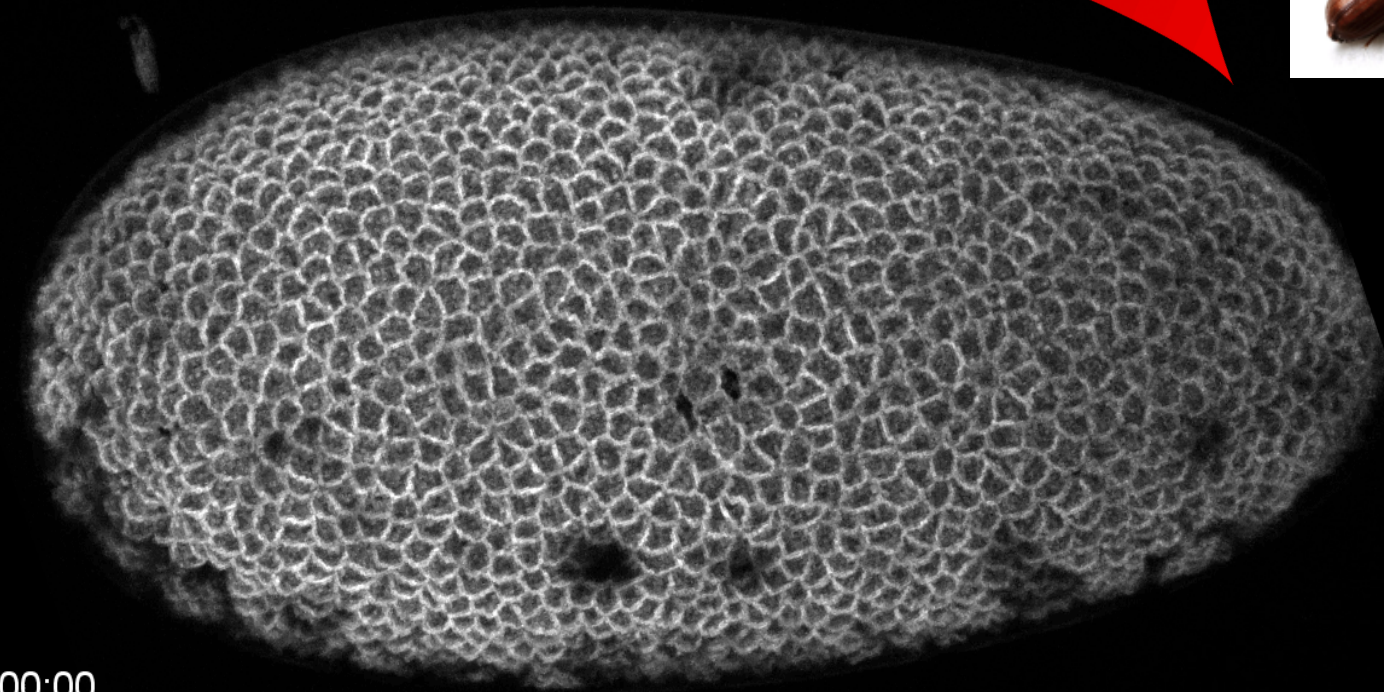


Vliv napojení buněk a skořápky na morfogenezi

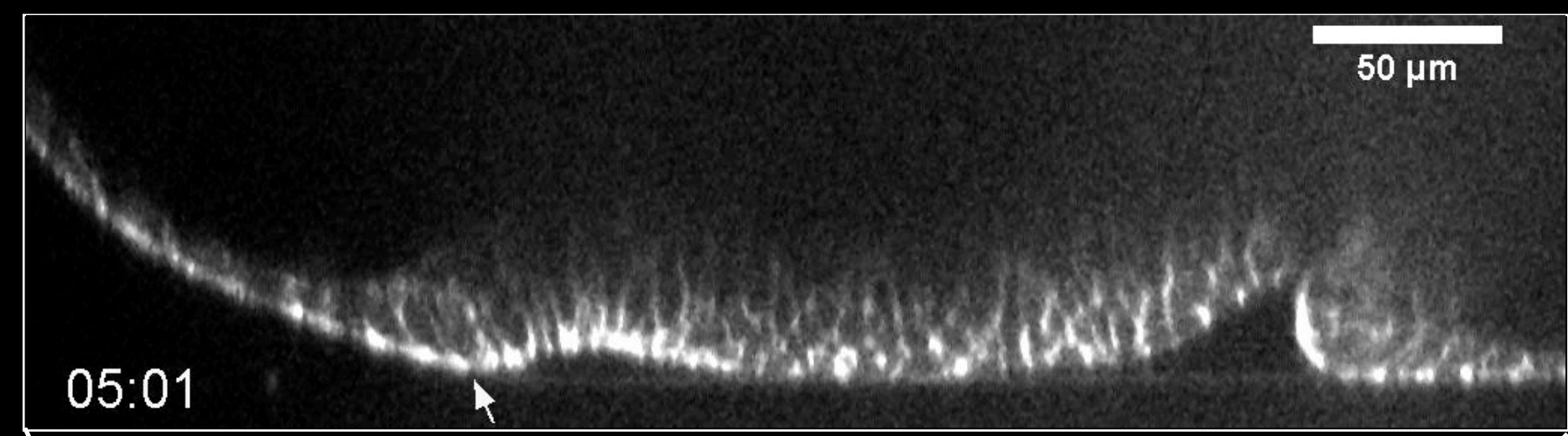


beetle embryo

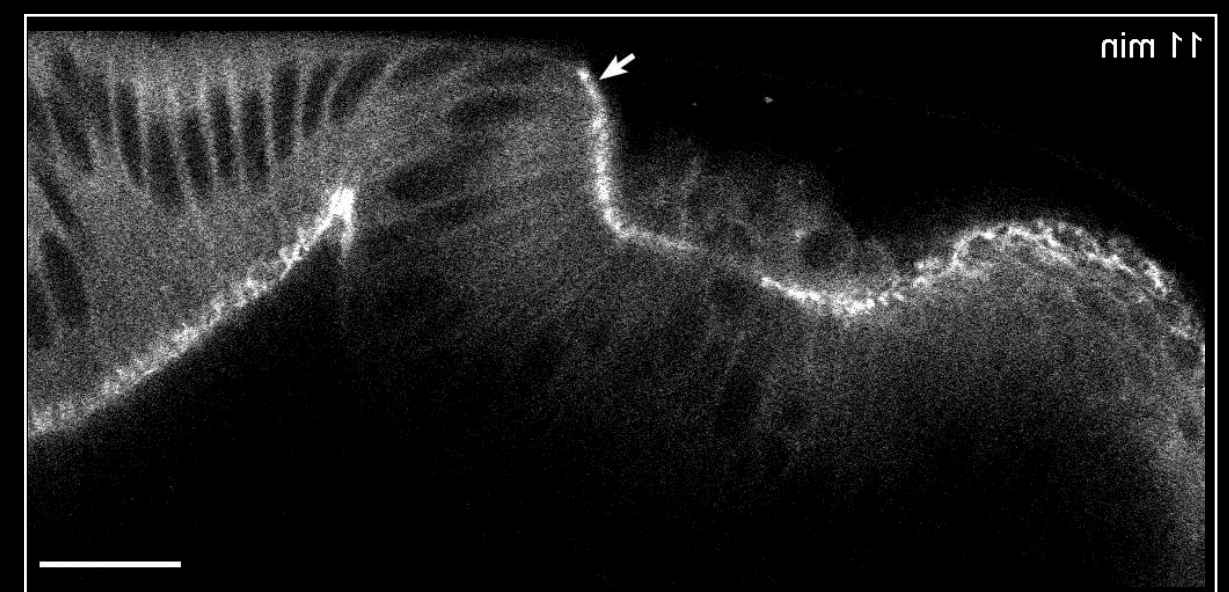
fruit fly embryo



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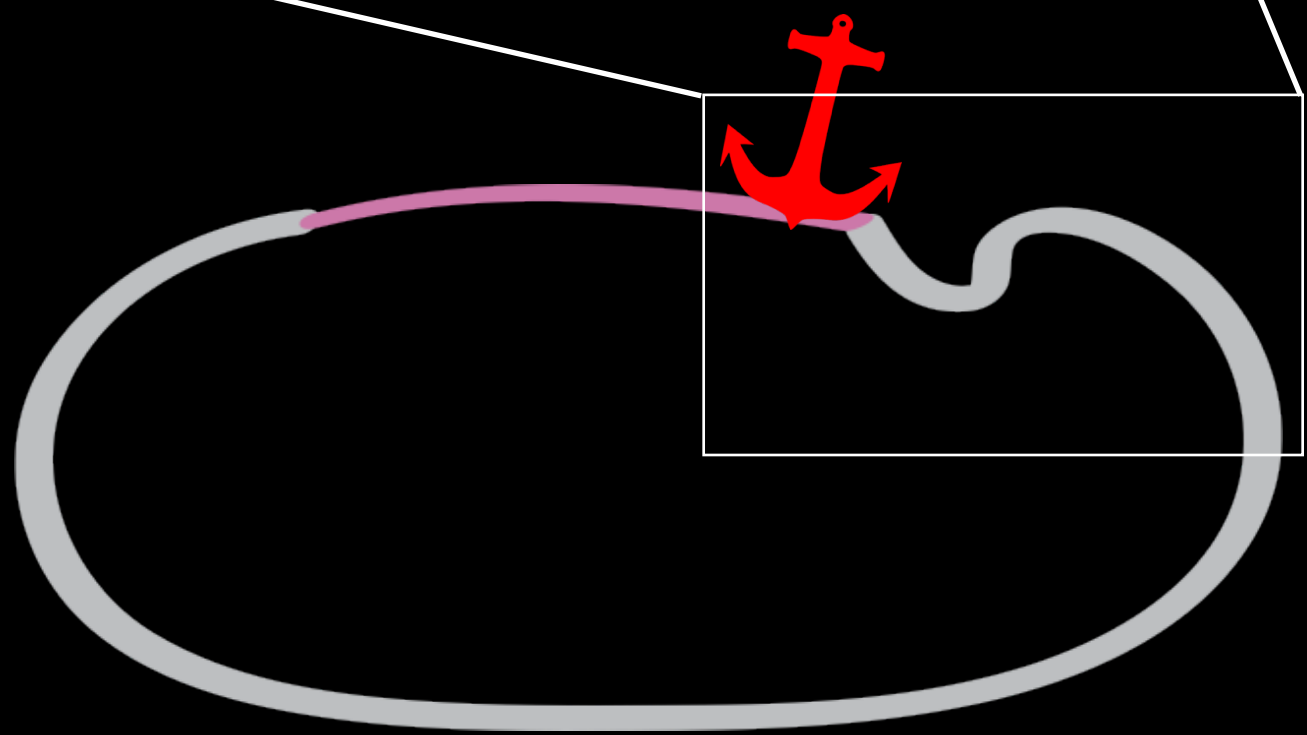
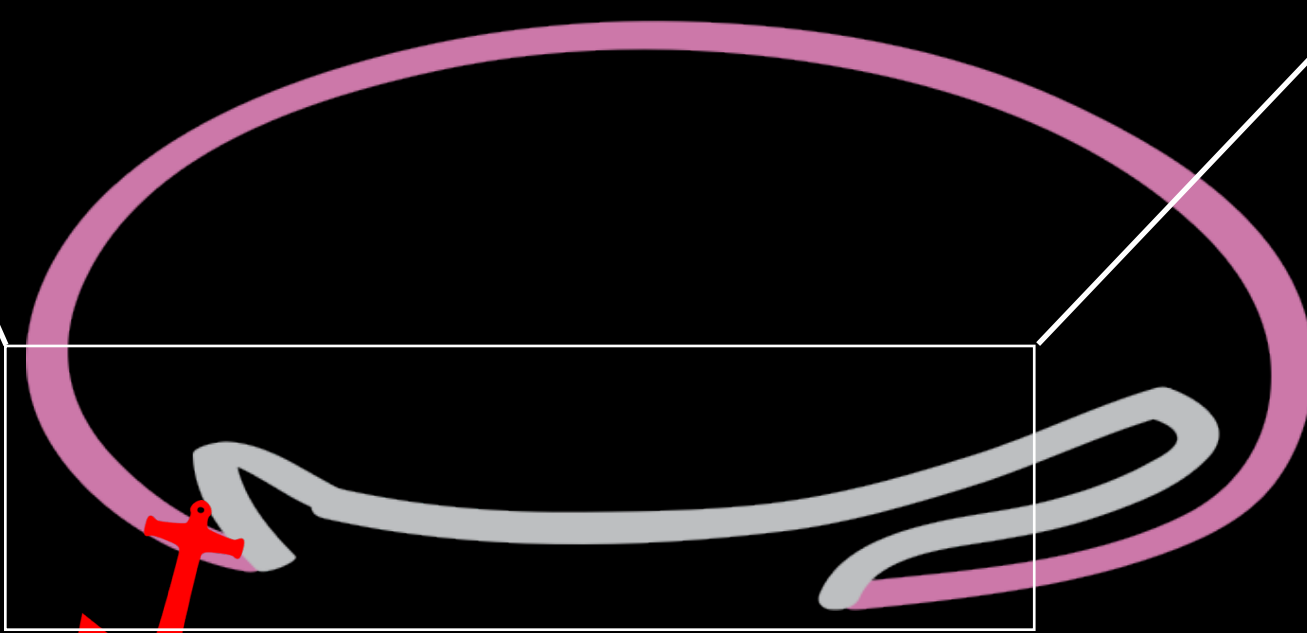
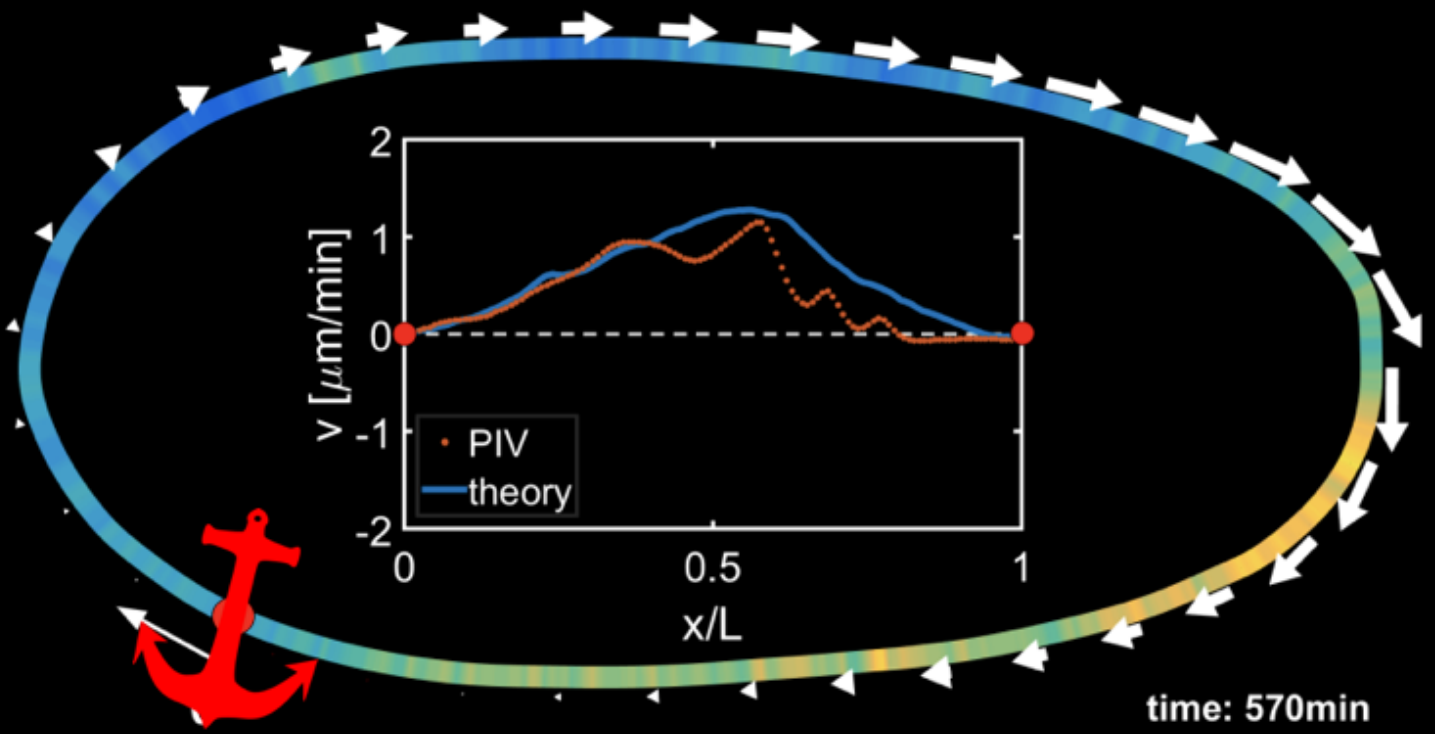


05:01



nim ↑↑

modelování



= **Integrins**

embryo extra-embryo