DENOËL M. 2008. Costs and benefits of facultative paedomorphosis in newts and salamanders across varied environments. 2nd meeting of the European Society for Evolutionary Developmental Biology (Symposium: Adaptive developmental plasticity), Ghent, Belgium. Abstract book: 68-69.

3.4.C1

Acoels share a unique stem cell system with rhabditophoran flatworms

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Up to now, the phylogenetic position of acoel flatworms remains unclear. Molecular phylogenetic analyses placed the Acoela either as a sister group of the Bilateria or showed a kinship to the deuterostomes or Lophotrochozoa. This is in strong contrast with the classical morphological data, which suggest Acoels being member of the phylum Platyhelminthes.

Using the evolutionary conserved stem cell marker piwi, we show the high similarity of the stem cell system of Platyhelminthes and Acoela in 1) adults, during 2) postembryonic development, 3) regeneration, 4) starvation and 5) irradiation. We see the similar stem cell distribution and morphology, the way of homeostasis and epidermal cell renewal, comparable piwi expression dynamics during different biological processes as arguments for a close phylogenetic relationship of platyhelminth and acoel flatworms. We therefore consider the phylogenetic position of the Acoela as currently unresolved. This work was supported by an FWF grant 18099 to P. Ladurner (Austria) and a predoctoral FWO grant to K. De Mulder (Belgium).

4.2.S2

Costs and benefits of facultative paedomorphosis in newts and salamanders across varied environments

Mathieu Denoël, University of Liège (Belgium), mathieu.denoel@ulg.ac.be

Facultative paedomorphosis in newts and salamanders is a polyphenism that results in the coexistence of two morphs: the paedomorphs that retain gills at the adult stage and the metamorphs that loose them at metamorphosis. The existence and maintenance of these alternative developmental pathways can be explained by proximate and ultimate causes. The aim of this study is to show the complexity and adaptive value of this pattern. Depending on species differentiation and environmental features, varied and sometimes contrasted costs

and benefits can be associated with the exhibition of each morph. In permanent and deep lakes, the dimorphism can allow an efficient resource partitioning with gape-limited planktonivorous paedomorphs living in open waters and metamorphs foraging on big prey close from the surface. Paedomorphs can get advantage of their status in such places, but when higher productive temporary habitats are at proximity, metamorphs can get more benefits in moving out of water after breeding. But such temporary waters can be sometimes inhabited by paedomorphs. When the pond dries, paedomorphs can then reach close water bodies in moving through subterranean waters or even on land. However, the main pattern remains the metamorphosis into the alternative morph when habitat deteriorates. There is thus a double fork in the development choice: first in the larval stage before morph acquisition and then after this establishment. Metamorphosis of paedomorphs can happen in both permanent and temporary habitats but is more strongly associated with high risk habitats. This appears in the age structure with contrasted developmental modes: progenesis in which maturity is reached earlier in the paedomorphs than in metamorphs favoring then a rapid turn-over of the population, and neoteny when similar slow gonadal development is observed in the two morphs. This disparity can explain the broad habitat range and success of paedomorphs but recent environmental changes are altering the pattern. Because of their life habits, paedomorphs are particularly vulnerable to alien species introduction, such as fish. Their decline is already well marked with a large number of important populations now extirpated in Europe and North America. The apparently well adapted and fascinating polyphenism could then let soon place to a more tolerant monomorphism.

4.3.S2

Calling the Two-Step: Mesenchyme, Epithelia and the Control of Head Pattern

Michael J. Depew, King's College London, Guy's Hospital London (UK), michael.depew@kcl.ac.uk

Craniogenesis, the process of manifesting a functionally integrated vertebrate head - including the brain, skull and jaws - involves both planar and vertical dialogues among the cephalic epithelia and mesenchyme. The investigation of similarities and differences in the initiation, orchestration and elaboration of

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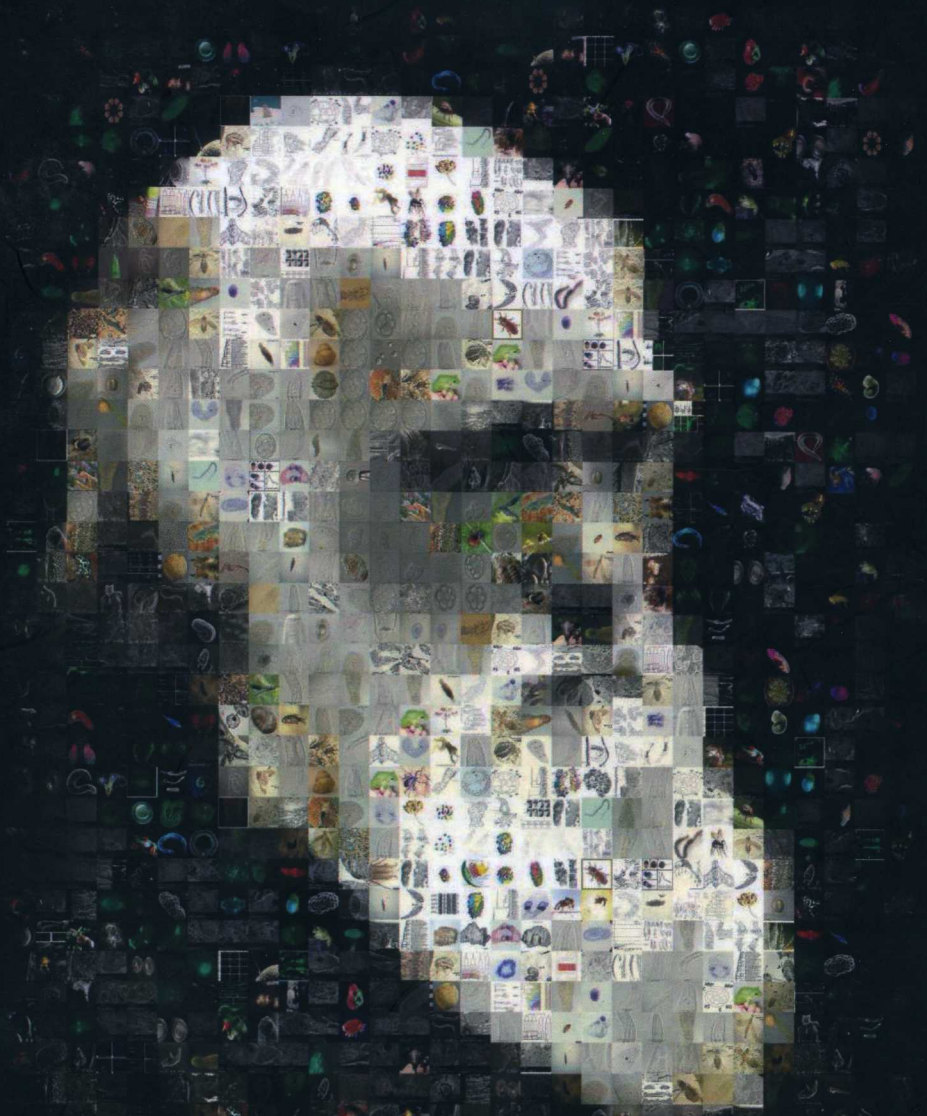

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Symposium session (4.2.S1): Canalization, robustness and developmental stability
Organizers: Vincent Debat and Tom Van Dooren
Chair: Tom Van Dooren

10.55-11.20 **Environmental and evolutionary variability of a robust developmental system: Caenorhabditis vulval cell fate patterning**
Christian Braendle* and Marie-Anne Félix (France)

11.20-11.45 **Robustness and evolutionary capacitance: on the drift between adaptation and constraint**
Vincent Debat* (France) and Tom Van Dooren* (The Netherlands)

11.45-12.10 **Estimation and exploitation of genetic differences in environmental variance in animal breeding**
Han A. Mulder*, Piter Bijma, Roel F. Veerkamp, William G. Hill (The Netherlands)

12.10-12.35 **The ontogeny of fluctuating asymmetry: developmental accommodation of muscle activity in the mammalian mandible**
Rebecca Young*, Alexander Badyaev (United States)

12.35-14.00 Lunch break

Afternoon

Plenary session in Auditorium 1 (see session 4.1.P2)

Symposium session (4.2.S2): Adaptive developmental plasticity
Organizers: Caspar Breuker and Melanie Gibbs
Chair: Caspar Breuker

14.55-15.20 **Adaptive Developmental Plasticity: the Role Played by Environmental, Genetic and Maternal Cues**
Olof Leimar (Sweden)

15.20-15.45 **Constraints on the evolution of adaptive phenotypic plasticity in plants**
Mark van Kleunen (Switzerland)

15.45-16.15 Coffee/tea break

16.15-16.40 **Costs and benefits of facultative paedomorphosis in newts and salamanders across varied environments**
Mathieu Denoël (Belgium)

16.40-17.05 **Correlated evolution of phenotypic plasticity: A search for genetic mechanisms**
Jacintha Ellers (The Netherlands)

17.05-17.10 Break

Contributed session (4.2.C2): Adaptive developmental plasticity
Chair: Melanie Gibbs