

Evolutionary developmental biology of bitterling fish Yi, W.

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PROPOSITIONS

Accompanying the PhD thesis

"Evolutionary developmental biology of bitterling fish"

- The wing-like yolk sac extensions of the rosy bitterling are evolutionary novelties (Chapter 1).
- 2. Character-based staging series are the foundation of comparative developmental research (Chapter 2).
- 3. The brain is a water tube filled with cerebrospinal fluid (Chapter 3).
- Because of developmental heterochrony, the phylogenetic stage does not exist, even between two closely related species such as the zebrafish and the rosy bitterling (Chapter 4).
- 5. The expression of molecular markers maps out the process of the brain regionalization.
- In vivo time-lapse observation of the developing embryo and microCT scanning to construct 3D models of morphogenesis are the best methods to systematically study the embryonic development of a species.
- 7. Knowing what you are seeing is the first as well as the final step of the anatomical way of seeing.
- 8. The dynamic and complex process of embryonic development provides opportunities for evolving endless forms.
- 9. Cunningham's idea (1891), that the protoplasm during development is nourished and grows at the expense of the yolk, is simply stating the obvious.
- 10. The science of cosmology shows us that we are all stardust.
- 11. Human beings are born with the ability to create models.
- 12. Extending working hours in the lab at the expense of lunchtime can lead to unpredictable experimental mishandling and errors.