Evolution of Animal Form & Function

Dr Alex Badyaev

Lecture 8

2020

Research proposal  

20 points (1/3 writing)

The research proposal will be no more than one page long but no less than 1/2 page long) and should contain the following:

1) Briefly identify your project and the question to be investigated
   What is your question?  
   (5)

2) Tell us why you think this question is interesting and worth pursuing
   Why is it interesting? Why do we care?  
   (5)

3) Explicitly state the hypotheses and predictions that you plan to examine
   What do you plan to do to address the question and why?  
   (5)

4) Tell us how you plan to evaluate these hypotheses and what kind of data or information you plan to gather
   How do you plan to test the hypotheses?  
   (5)

5) Tell us briefly about what is being done in this area - this is to be based on the literature survey summarized in the reference list.

Reference list:  

20 points total

SEPARATE PAGE!

1) Reference lists should be at least 10 (ten) original scientific articles on the topic, listed in the alphabetical order of the authors and in format similar to the list of papers in your syllabus.

References can only be to the published scientific work (e.g., no references to the online publications, Web pages, CDs, etc will be allowed unless justified).

2) In parentheses state what the paper is about:


Oral presentation  

10 points

3-5 minutes presentation introducing your question and approach (proposal). You may use dry erase board or overhead transparencies, or PowerPoint slides (will need those a day before).
Proposal talks:

1) If using computer presentation for talks (PowerPoint, PDF, etc):
   Send to TA by 5pm the day before!
   Recommend no more than 3-4 slides, unless needed.

2) Practice timing!
   3 min talks + 2 min for questions/
   Follow the structure to cover all items.

Important – the proposal will not be graded without this!

Co-authorship statement. On the title page of your project paper please write the following:

“We agree that the following members have contributed equally to the preparation of this report”.

ALL members of the group should sign their names under this statement.
Which came first, the chicken or the egg?

How to answer?

Essentially – which one is an evolutionary novelty?

can be simply answered phylogenetically – “eggs” far preceded “the chickens”,

but there is actually an interesting part in it. Why

Aristotle

(384 – 322BC)

Why egg anyway? What was wrong with just a chicken?
Which came first, the chicken or the egg?

The Hourglass Model

Exceptional similarity = Phylotypic stage

The bottleneck of hourglass

Huge diversity

WHY?

1) Most conserved/fundamental functions.
2) Least exposed to selection (located between non-congruent diversifications).
3) Mutations that affect phylotypic stage are least likely to be adaptive. Thus this stage is conserved.
4) Being stuck in the middle – a consequence of hierarchy.
5) A consequence of integration needed for effective regulation
6) Does not have to be congruent at different levels of organization
7) Phyla-specific body plans cannot unfold before certain (late) developmental stage.
8) Eggs and early embryos are actually “adult” (maternal) traits and should be on top. Should start at the middle! Key developmental genes expressed there….
Gametogenesis - the process by which the sperm and the egg are formed

- Germ cells – provide the material continuity of life; mitotic ancestors of your germ cells once resided in the gonads of reptiles, fish, etc

- In most animals – early developmental separation of germ and somatic cells

- In most animals – the germ cells do not arise from the gonad itself

their precursors – the Primordial Germ Cells arise elsewhere and migrate into developing gonads