Biology 340
Comparative Embryology
Lecture 1
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Class Logistics; Course Scope

Introduction

It is important to understand that this course will stress the evolution of ontogenies.

ONTOGENY – complete life cycle of an organism from conception to death.

Evolution is not a study of adult organisms. Adult organisms don not give rise to adult organisms. Rather, a reproductively mature adult gives rise to zygote(s).

Evolution and natural selection act on the entire ontogeny of an organism, and many of the defining characters of taxa are non-adult characters.

We will focus on:

1. Function of embryos themselves.

2. Evolution of ontogenies in multicellular metazoans.

We may divide ontogenetic development – particularly that of animalis – into a number of phases:

1. Gametogenesis
2. Fertilization
3. Cleavage
4. Gastrulation
5. Organogenisis
6. Growth and Histological Development
7. (In some animals) Metamorphosis

In this course we will be concentrating primarily on stages 3-5, though we will occasionally add to this various new stages depending on the type of animal we might be discussing.

EGGS – Amount and distribution of yolk

Because the amount and distribution of yolk in an egg are important factors in shaping the early developmental phases, it is important to have an appreciation of the different kinds of *ova* (eggs; singular – ovum).

Microlecithal Egg – a small or nonexistant amount of yolk, which is evenly distributed if present. (Sometimes called isolecithal.)

Mesolecithal Egg – a moderate amount of yolk.

Macrolecithal Egg – a large amount of yolk. The large mass of yolk is usually located toward one end of the egg, the vegetal pole.

The asymmetrical distribution of yolk in mesolecithal and macrolecithal eggs is also known as telolecithal.

FATE MAPS

Staining studies have indicated that different parts of a fertilized egg are destined to give rise to certain materials of the adult organism in normal development.

This allows us to visualize a “fate map” – a representation of what parts of the fertilized egg will give rise to what embryological tissues, and ultimately adult structures.

EMBRYOLOGICAL GERM LAYERS/TISSUES

Plants don't demonstrate true germ layers. In fact, they don't demonstrate true tissues nor organs in many cases (with the exception of reproductive organs). However, in animals, particular structures can be demonstrated to be derived from particular embryological tissues or "*germ layers*".

ENDODERM – generally gives rise to lining of gut tube.

ECTODERM – generally gives rise to outer skin (epidermis) and all or part of nervous system.

MESODERM – pretty much the rest of the organism.