

## Investigation 15.A: Comparing Embryonic Structures

**Question:** How do embryonic structures of humans and other animals compare?

### Safety Precautions

Handle microscope equipment and slides carefully.

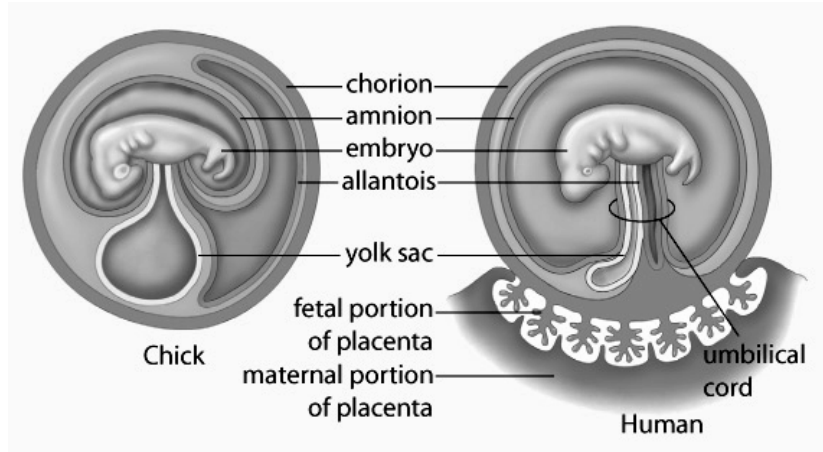
### Materials

- prepared slides showing stages of development of an animal from zygote to embryo (e.g., sea star or sea urchin)
- microscope or microviewer

### Procedure

#### Part 1: Observing Embryonic Structures

1. Obtain and set up a microscope or microviewer and the slides you will be viewing.
2. Sketch the main features that you observe in each slide. Add labels to identify all the features that you recognize.



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<b>HANDOUT</b>		

3. Answer Analysis questions 1–4.

### **Part 2: Comparing Extra-embryonic Structures**

1. Examine the diagrams of extra-embryonic membranes of an embryonic chick and an embryonic human.
2. a) Identify the extra-embryonic membranes that human and chicken embryos have in common.

b) What similarities and differences do you observe in the structure of these membranes? Describe or sketch your observations.

3. Answer Analysis questions 5 and 6.

### **Analysis**

1. On which slide or slides do you observe evidence that cleavage has occurred?



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5. In birds, the extra-embryonic membranes have the following functions:
- allantois: transports, in combination with the chorion, oxygen to the embryo and removes carbon dioxide produced by the embryo; also stores nitrogenous wastes and absorbs calcium from the shell to make it available for bone formation
  - amnion: a fluid-filled sac that provides protection from physical shock and enables the embryo to move freely and safely
  - chorion: see allantois
  - yolk sac and yolk: stores nutrient-rich yolk and absorbs nutrients from it so that they are available for nourishing the embryo via blood vessels in the sac membrane
- How do the functions of the extra-embryonic membranes in birds compare with their function in humans?

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4. a) Think about the place (the environment or location) in which human development takes place. Based on the place (environment or location) in which the following animals develop, predict whether they would form a placenta, and give reasons to justify your prediction.

- frog
- turtle
- sea star
- pike
- crow

- b) Identify the extra-embryonic membranes from which the placenta forms and explain how their function, modified in humans, relates to their function for chicken embryos.