

## **STUDY GUIDE: Animal growth and development**

### **KEY TERMS**

|                    |                   |                        |
|--------------------|-------------------|------------------------|
| fertilization      | endoderm          | determinate cleavage   |
| zygote             | mesoderm          | indeterminate cleavage |
| pronucleus         | inducer           | differentiation        |
| cleavage           | organizer         | determination          |
| gray crescent      | morphogenic field | dorsal lip of the      |
| morphogenesis      | notochord         | blastopore             |
| blastocoel         | yolk              | induction              |
| blastula           | blastodisc        | instructive inducers   |
| gastrula           | epiblast          | permissive inducers    |
| gastrulation       | hypoblast         | pattern formation      |
| animal hemisphere  | neurulation       | limb bud               |
| vegetal hemisphere | morphogenesis     | growth cone            |
| blastopore         | gray crescent     | homeotic gene or       |
| archenteron        | totipotent        | mutation               |
| ectoderm           | chimera           |                        |

### **HUMAN DEVELOPMENT AND BIRTH**

|                |                         |           |
|----------------|-------------------------|-----------|
| fetus embryo   | placenta                | labor     |
| uterus         | allantois               | lactation |
| myometrium     | chorion                 | relaxin   |
| cervix         | yolk sac                | oxytocin  |
| amniotic fluid | chorionic gonadotropin, |           |
| amniocentesis  | or HCG                  |           |
| umbilical cord | parturition             |           |

### **QUESTIONS**

1. Describe the events triggered by the penetration of an animal egg by the sperm, and discuss the process of fertilization. Explain what happens to prevent more than one sperm from fertilizing the egg.
2. Using diagrams, describe the principal events occurring during the cleavage stages of the animal embryos. Indicate whether the embryos increase in size during cleavage, and explain how the amount of yolk in the egg affects the cleavage pattern.
3. Using diagrams, point out the morula, gastrula, blastula, ectoderm, endoderm, mesoderm, archenteron, blastopore, and neural folds.
4. Name the three primary cell layers, and indicate which primary cell layer gives rise to each of the following adult structures or tissues:  
fingernails hair  
brain lining of digestive tract  
notochord nerve cord  
lungs muscle  
liver skin (epithelial portion)  
connective tissue bone  
blood

5. Define metamorphosis, and explain the adaptive significance of the larval stage. Distinguish between complete and gradual metamorphosis in insects.
6. Outline the events that occur between the time an egg is fertilized in the oviduct and the birth of the baby. In doing so, use the following terms: corpus luteum, oxytocin, placenta, oviduct, progesterone, luteinizing hormone (LH), human chorionic gonadotropin (HCG), uterine lining, follicle-stimulating hormone (FSH), lactation, estrogen, and implantation.
7. Contrast the embryonic membranes in a human with those of a reptile or a bird. Specify which of the following are present in both: amnion, chorion, shell, allantois, placenta, yolk sac.
8. Explain what is meant by embryonic induction, using an example the role of the dorsal lip of the blastopore in a salamander or the role of optic vesicles in the induction of lenses in a frog or mammalian eye.
9. Cite evidence to indicate that cells have positional information to ensure proper pattern formation.
10. Why do cells with identical sets of genes develop into such widely different types of cells?