

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?