QUESTIONS FOR FORMATIVE FEEDBACK

Yr1 Sem1 Wk2: Human embryology and congenital abnormalities.

Answers, with feedback on what to learn from mistakes, appear in the accompanying file.

Lecture 1

1-1. Which of the following four statements (not all of which are necessarily true) BEST DESCRIBES the reason that most complex animals, including humans, reproduce sexually;

a) Sexual reproduction means that one sex is specialized for nurturing young

b) Sexual reproduction increases genetic heterogeneity in a population

c) Sexual requires fewer resources than asexual reproduction

d) Sexual reproduction maximises number of offspring

1-2 Which of the following five statements BEST DESCRIBES the function of a Leydig cell?

a) Support of a developing ovarian follicle

b) Production of androgenic hormones

c) Contraction of sperm ducts to move sperm passively out of the testis

d) Making cytoplasmic bridges to support a developing sperm cell

e) Making leuteinising hormone (LH).

1-3 To which of the following structures to sperm FIRST travel when they leave the epididymis?

a) Testis

b) Vas deferens

c) Seminal Vesicle

d) Prostate Gland

e) Bulbourethral gland.

Lecture 2

2-1 A technician at a fertility clinic is investigating a semen sample from an adult man. She finds the volume of the ejaculate to be 3.4mls and calculates the total number of spermatozoa as 4.42 x 10^8. Calculate, and identify from the list below, the concentration of spermatozoa in terms of spermatozoa/ml.

a) $1.5x10^9$

b) $1.3x10^8$

c) $7.7x10^7$

d) $4.4x10^8$

e) $3.4x10^8$

2-3 How much larger does the embryo get during the first four rounds of cleavage division?

a) It remains the same size

b) 2 x larger

c) 4 x larger

d) 8x larger

e) 16x larger

Lecture 3

3-1 An ultrasound scan of a pregnant woman reveals the presence of twins who share a chorionic cavity but each have their own amniotic cavity. Which ONE of the following BEST DESCRIBES these twins:
a) dizygotic, formed by release of two oocytes in the same menstrual cycle
b) monozygotic, formed by entry of two spermatozoa into one oocyte
c) monozygotic, formed by separation of cells at the two-cell stage
d) monozygotic, formed by formation of two separate inner cell masses
e) monozygotic, formed by the production of two primitive streaks in the epiblast.

3-2 Which ONE of the following BEST DESCRIBES the process of gastrulation:
a) differentiation of the cleavage stage embryo into trophectoderm and inner cell mass
b) passage of epiblast cells through the node/primitive streak to produce the endodem and mesoderm
c) involution of cells along the dorsal midline to produce the neural tube
d) patterning of somite cells by signals from the notochord

3-3 Which ONE of the following statements about the human notochord is FALSE:
a) it derives from the endoderm layer

b) is is a source of SHH
c) it is the precursor of the spinal cord
d) it forms shortly after gastrulation

3-4 Which ONE of the following cell types does NOT migrate within the embryo?
a) neural crest cell
b) primordial germ cell
c) notochord cell

Lecture 4

4-1 Which ONE of the following statements BEST DESCRIBES the direct action of thalidomide on development of a human fetus:
a) thalidomide inhibits the growth of new blood vessels
b) thalidomide reduces the production of Growth Hormone
c) thalidomide reduces the sensitivity of long bones to Growth Hormone
d) thalidomide causes foetal transfusion system

4-2 Which ONE of the following statements about human growth is FALSE
a) Most cells respond to insulin-like growth factor rather than directly to Growth Hormone
b) Skin grows in response to tension
c) Growth hormone is made by the growth zone of bones
d) Low sensitivity to Growth Hormone (Laron Syndrome) produces a small but essentially Vitruvian body

Lecture 5

5-1 Which ONE of the folloiwing statements about primordial germ cells (PGCs) is FALSE:
a) PGCs enter the body from the yolk-sac
b) PGCs are the only cells in the male embryo whose descendents can give rise to sperm
c) PGCs are the only cells to attempt to activate the transcription of SRY
d) PCGs are diploid

5-2 Which ONE of the following statements BEST DESCRIBES the phenotype of an X,Y human with complete androgen insensitivity:
a) External appearance basically male, testes in scrotum
b) External appearance basically male, testes in pelvis
c) External appearance basically female, testes in pelvis
d) External appearance basically female, ovaries in pelvis
e) External appearance changes from female to male at puberty

Questions that span more than one lecture in week 2

Wk2-1 Which ONE of the following tissues does NOT derive from endoderm?
a) Oesophageal epithelium
b) Intestinal epithelium
c) Lung epithelium
d) Testis epithelium
e) Liver epithelium

Wk 2-2 Which ONE of the following statements about the ovary is FALSE:
a) The embryonic gonad becomes ovary in the absence of SRY
b) The adult ovary contains germ-line stem cells
c) Between birth and puberty, the ovary contains primordial follicles
d) The ovary is not directly connected to the oviduct/fallopian tube

Wk 2-3 Which ONE of the following statements about human embryonic development is FALSE
a) The head-tail axis is pre-patterned in the oocyte
b) The embryo secretes a hormone that maintains the uterine lining
c) The adult body derives entirely from the epiblast
d) Normal embryos always form the same number of somites
e) The placenta includes embryo-derived tissue

Wk 2-4 A pair of twin girls are born, but it is obvious that one is smaller than the other. Which ONE of the following statements CANNOT be correct:
a) they are monozygotic twins showing fetal transfusion syndrome
b) they are monozygotic twins, one of which has Laron syndrome
c) they are dizygotic twins, one of whom has a genotype encouraging faster growth than the other