Embryology Job Interview Questions And Answers

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Embryology Interview Questions And Answers Guide.

Question - 1:

What is the function of the umbilical cord?

Ans:

The umbilical cord is a set of blood vessels that connect the fetus with the placenta. In the fetus, one extremity of the cord inserts into the center of the abdominal wall (the later scar of this insertion is the umbilicus).
The function of the umbilical cord is to allow the transport of substances, nutrients, gases, and residuals, between the fetus and the mother's body.

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Question - 2:

What are the endocrine functions of the placenta?

Ans:

The placenta has endocrine function since it secretes the hormones progesterone and estrogens that maintain the endometrium (internal covering of the uterus) and prevent menses during pregnancy. The placenta also secretes other important hormones for pregnancy regulation.

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Question - 3:

Is there exchange of cells between the mother and the fetus through the placenta?

Ans:

Under normal conditions, there is no passage of cells across the placenta during gestation. The placenta has a smooth mucosa separating the richly vascularized region in contact with the mother's endometrium from the umbilical cord in contact with the fetal blood. This barrier is known as placental barrier. Although permeable to some substances (selective permeability), the placental barrier forbids the passage of cells.
Image Diversity: umbilical cord placental barrier

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Question - 4:

What are the main substances transferred from the mother to the fetus through the placenta and from the fetus to the mother?

Ans:

From the mother to the fetus the main transferred substances through the placenta are water, oxygen, nutrients, and antibodies. From the fetus to the mother, metabolic wastes including urea (nitrogen waste), and carbon dioxide are transferred.

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Question - 5:

In which type of animals does the placenta exist? What is its main function?

Ans:

True placenta is present in placental mammals.
The placenta is formed from the chorion of the embryo and from the mother's endometrium. Its main function is to allow the exchange of substances between the fetus and the mother's body.
Image Diversity: placenta placental mammals

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Question - 6:

What is the chorioallantois membrane present in the embryonic development of reptiles and birds? How does this membrane participate in the energetic metabolism of the embryo?

Ans:

The chorioallantois membrane is formed by juxtaposition of some regions of the chorion and the allantois. Since it is porous, the chorioallantois membrane allows the passage of gases between the embryo and the exterior thus making aerobic cellular respiration possible.

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Question - 7:

Why can the amnion also be considered an adaptation to terrestrial life?

Ans:

The amnion is also an adaptation to dry land since one of its functions is to prevent desiccation of the embryo.

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Question - 8:

What is the difference between amnion and chorion?

Ans:

Amnion is the membrane that covers the embryo. Chorion is the membrane that covers the amnion, the yolk sac, and the allantois. The space delimited by the chorion and the amnion is called amniotic cavity and it is filled with aminiotic fluid. The amniotic cavity has the functions of preventing desiccation of the embryo and of protecting it against mechanical shocks.
Image Diversity: amnion chorion

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Question - 9:

Why can the allantois be considered an adaptation to terrestrial life?

Ans:

The allantois is an adaptation to dry land because in embryos of oviparous terrestrial beings, like reptiles and birds, the metabolic residuals cannot be immediately excreted to the aquatic surrounds (as fishes and amphibian larvae do). It was necessary then the appearing of a structure capable of storing the embryonic excretes until hatching.

View All Answers

Question - 10:

Which is the extra embryonic membrane whose function is to store nitrogen wastes of the embryo? Is this function present in placental mammalian embryos?

Ans:

The allantois is the extra embryonic membrane whose function is to store excretes of the embryo.
In placental mammals, the allantois is present but it does not exert that function since the embryonic wastes are collected by the mother's body through the placenta.
Image Diversity: allantois

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Question - 11:

How is the yolk sac formed? What is the function of the yolk sac?

Ans:

The yolk sac is formed from the covering of the vitellus by some cells originated from the primitive gut.
The yolk sac stores vitellus, the main nourishment source of nonplacental embryos.
Image Diversity: yolk sac

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Question - 12:

Are the extra embryonic membranes the same in all vertebrates?

Ans:

The presence of each extra embryonic membrane varies according to the vertebrate class.
In fishes and amphibians, only the yolk sac is present. In reptiles and aves besides the yolk sac, there are also the amnion, the chorion and the allantois. In placental mammals besides all these membranes, the placenta is present too.

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Question - 13:

What are the extra embryonic membranes present in vertebrates?

Ans:

The extra embryonic membranes that may be present in vertebrates are the yolk sac, the amnion, the chorion, the allantois and the placenta.

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Question - 14:

What are extra embryonic membranes?

Ans:

Extra embryonic membranes are membranous structures that appear paralleling the embryo and play important roles in the embryonic development. They form from the embryo but do not become part of the individual organism after its birth.

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Question - 15:

What is polyembryony?

Ans:

Polyembryony is the phenomenon in which a single embryo in its initial embryonic stage divides itself forming many new individuals of the same sex and genetically identical. This is the way, for example, in which reproduction takes place in armadillos of the genus Dasypus. Polyembryony is an example of natural "cloning".

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Question - 16:

What are twins? Genetically what are the two types of twins that can be generated?

Ans:

Twins are simultaneously generated (within the mother's uterus) offspring. Twins classify according to zygosity as monozygotic or as dizygotic twins.
Monozygotic twins, also known as identical twins, are those originated from one single fertilized ovum (therefore from one single zygote); monozygotic twins are genetically identical, i.e., they have identical genotypes and are necessarily of the same sex. Dizygotic twins, also known as fraternal twins, are those generated from two different ova fecundated by two different sperm cells; so they are not genetically identical and they are not necessarily of the same sex.
Image Diversity: twins

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Question - 17:

From which germ layer do the liver and the pancreas originate? What are other organs and tissues made from that germ layer?

Ans:

The liver and the pancreas are originated from the endoderm. Also from endodermal origin are the epithelia of the airway, the epithelia of the bladder, of the urethra and of the GI tube (excepted of the mouth and anus), the alveolar cells of the lungs and the thyroid and parathyroid glands.

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Question - 18:

From which germ layer do blood cells originate? What are other organs and tissues made from that germ layer?

Ans:

Blood cells have mesodermal embryonic origin. Other organs made from mesoderm are covering serous membranes like the pericardium, the peritoneum and the pleura, muscles, cartilages, dermis, adipose tissue, kidneys, ureters, bladder, urethra, gonads, blood and lymph vessels, bones.

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Question - 19:

From which germ layer do the epidermis and the nervous system originate? What are other organs and tissues made from that germ layer?

Ans:

Epidermis and nervous system have the same embryonic origin: the ectoderm. The epidermal appendages (like nails, hair, sweat glands, and sebaceous glands), the mammary glands, the adenohypophysys, the cornea, the crystalline lens and the retina are also derived from ectoderm.

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Question - 20:

What are histogenesis and organogenesis?

Ans:

Histogenesis is the process of tissue formation in the embryonic development. Organogenesis is the process of organ formation. Before histogenesis and organogenesis the primitive embryonic structures have been already formed: germ layers, neural tube, notochord, coeloms, somites.

View All Answers

Question - 21:

What are somites?

Ans:

Somites are differentiated portions of mesodermal tissue longitudinally distributed along the embryo. The somites originate the muscle tissue and portions of the connective tissues.
Image Diversity: somites

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Question - 22:

After the neurula stage and from its ventral portion to the dorsal how can the morphology of the embryo be described?

Ans:

In a schematic longitudinal section of the embryo after the neurula stage, the outermost layer of cells is the ectoderm. In the ventral region comes the archenteron tube formed of endodermal cells. In both sides of the embryo, coeloms delimited by mesoderm are present. In the central region above the archenteron and in the middle of the coeloms there is the notochord. In the dorsal region just above the notochord lies the neural tube.

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Question - 23:

What are pleura, pericardium, and peritoneum?

Ans:

Pleura are the membrane that covers the lungs and the inner wall of the chest; pericardium is the membrane that covers the heart; peritoneum is the membrane that covers most organs of the gastrointestinal tract and part of the abdominal cavity. All these membranes delimit coeloms (internal cavities).
Image Diversity: pleura pericardium peritoneum

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Question - 24:

What is the germ layer from which the coeloms originate?

Ans:

The coeloms are originated from mesoderm.

View All Answers

Question - 25:

What is coelom? To which structures do coeloms give birth? Are all animals coelomate?

Ans:

Coeloms are cavities delimited by mesoderm. Coeloms originate the cavities where the internal organs of the body are located, like the pericardial cavity, the peritoneal cavity, and the pleural cavity. Besides coelomate animals, there are acoelomate animals, like platyhelminthes, and pseudocoelomate animals, like nematodes.
Image Diversity: coelom

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Question - 26:

What is notochord? How is this structure formed?

Ans:

Notochord is a rodlike structure that forms the supporting axis of the embryo and gives birth to the vertebral column in vertebrates. It is formed by differentiation of mesodermal cells.

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Question - 27:

How does the embryo turn from gastrula into neurula? How is the neural tube formed? What is the embryonic origin of the nervous system in vertebrates?

Ans:

The neurula stage is characterized by the appearing of the neural tube along the dorsal region of the embryo. The growing of mesoderm in that region induces the differentiation of ectodermal cells just above. These cells then differentiate forming the neural tube. Therefore, the origin of the nervous system is the ectoderm (the same germ layer that gives birth to the skin).
Image Diversity: neurula

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Question - 28:

How are animals classified according to the germ layers present in their embryonic development?

Ans:

Cnidarians are diploblastic, i.e., they present only endoderm and ectoderm. With the exception of poriferans, all remaining animals are triploblastic. Poriferans do not present differentiated tissue organization and so they do not classify regarding germ layers (although sometimes they are mentioned as diploblastic).

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Question - 29:

What is the cell division process directly related to the embryonic growth?

Ans:

The embryonic growth depends directly on mitosis. Through this type of cell division, the zygote divides itself giving birth to a series of cells that by mitosis too compose differentiated tissues and organs until the formation of a complete individual.

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Question - 30:

What is the function of the vitellus in the vertebrate egg? How are these eggs classified according to the amount of vitellus within them?

Ans:

Vitellus (yolk) is the nutritive material that accumulates in the cytoplasm of the egg (zygote) with the function of nourishing the embryo. According to the amount of vitellus in them, the vertebrate eggs are classified as oligolecithal (little yolk), centrolecithal, or heterolecithal (more yolk diffusely distributed) and telolecithal (more yolk concentrated in one end of the egg).

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Question - 31:

What are the animal pole and the vegetal pole of the vertebrate egg?

Ans:

The animal pole of a telolecithal egg is the portion of the egg with little vitellus, it is opposite to the vegetal pole that is the region where the yolk is concentrated.
Image Diversity: animal and vegetal poles

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Question - 32:

What are the four initial stages of the embryonic development?

Ans:

The four initial stages of the embryonic development are the morula stage, the blastula stage, the gastrula stage, and the neurula stage.

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Question - 33:

What is the cell division during the first stage of the embryonic development called? How is this stage characterized?

Ans:

The cell division in the first stage of the embryonic developments is called cleavage, or segmentation. In this stage, mitosis occurs from the zygote forming the new embryo.

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Question - 34:

What are the cells produced in the first stage of the embryonic development called?

Ans:

The cells that resulted from the cleavage (the first stage of the embryonic development) are called blastomeres. In this stage the embryo is called morula (similar to a "morus", mulberry).
Image Diversity: morula

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Question - 35:

After the morula stage what is the next stage? What is the morphological feature that defines that stage?

Ans:

After passing the morula stage in which the embryo was a compact mass of cells, the next stage is the blastula stage. In the blastula stage, the compactness is lost and an internal cavity filled with fluid appears inside, the blastocele.
Image Diversity: blastula

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Question - 36:

After the blastula stage what is the following stage of the embryonic development? How is the passage from blastula to the next stage called?

Ans:

The blastula turns into gastrula in a process known as gastrulation.
Image Diversity: gastrula

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Question - 37:

What is gastrulation? How during gastrulation are the first two germ layers formed? Which are these germ layers?

Ans:

Gastrulation is the process through which a portion of the blastula wall undergoes invagination inside the blastocele forming a tube called archenteron (primitive intestine). The cells of the inner side of the tube form the endoderm (germ layer) and the cells of the outer side form the ectoderm (another germ layer). It is the beginning of the tissue differentiation in the embryonic development.

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Question - 38:

What are the archenteron and the blastopore? What is the stage of the embryonic development in which these structures are formed? What are the destinations of the archenteron and of the blastopore?

Ans:

Archenteron is the tube formed during gastrulation by means of invagination of the blastula wall inside the blatocele. It is the origin of the gastrointestinal tract. Blastopore is the opening of the archenteron to the exterior. The blastopore gives birth to one of the extremities of the digestive tube: the mouth in protostome beings, or the anus in deuterostome beings.

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Question - 39:

How is the mesoderm (third germ layer) of triploblastic animals formed?

Ans:

The mesoderm appears from differentiation of endodermal cells that cover the dorsal region of the archenteron.

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Question - 40:

What are the three types of germ layers that form tissues and organs in animals?

Ans:

The three germ layers are the ectoderm, the mesoderm, and the endoderm.
Image Diversity: germ layers

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