

نموذج أجابة للمستوى الأول علم الحيوان/ كلية العلوم.

اسم الأمتحان:- حيوان عام ١٠٠ ح.
تاريخ الأمتحان:- ٢٠١٧/١/٣ م.؛ العاشرة صباحا.
الزمن :- ساعة.
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Question (1):

Explain in detail about two items of the following -:

- Formation of the mesoderm and coelom in case of Amphioxus. (8 marks)
- Types of fertilization and parthenogenesis (8 marks).
- Development of the ovum (Oogenesis). (8 marks).

Question (2):

Write a detailed account about the followings: - (10 marks)

- 1- Cell theory.
- 2- General characters of epithelial tissues.

Question (3):

With labeled diagrams, give a brief explanation about these items: - (10 marks)

- 1- White blood cells (leucocytes).
- 2- Ultrastructure and function of cell membrane.

Question (4):

Complete and choose the correct answers of the following sentences: - (12 marks)

- 1- The inner membrane of mitochondria is folded giving a large number of

.....

- a) Shelves. b) Ridges. c) Cristae. d)

All are correct.

- 2- The chemical nature of Golgi apparatus is

- a) Proteins. b) Lipids. c) Lipoproteins. d)

All are wrong.

- 3- An organelle essential for protein synthesis is

- a) Rough endoplasmic reticulum. b) Smooth endoplasmic reticulum.

- c) Centrosome. d) Lysosome.

- 4- The suicide bags in the cell are known as

archentron , but later on , they become separated from it and are left as paired hollow blocks of cells referred as mesodermal somites. This process of mesodermal somite formation occurs at first in the anterior two pairs of somites. Then, it proceeds posteriorly until 14 or 15 pair of somites are formed.

Formation of the coelom:

As the development proceeds , each mesodermal somite grows rapidly and its cavity becomes central. The somite proceeds in the ventral direction until it meets the mesodermal somite of the other side in the mid-ventral of the body, thus separating the gut from the ectoderm.

During this growth ,the mesodermal somite becomes divided into two parts by a horizontal septum. The upper part is gradually referred to as "epimere" while the lower one is called "hypomere". In the epimere , the outer layer becomes thin and is called the dermal plate while the inner layer is thicker and called the myotome and its cavity is called the myocoel. Later on the dermal plate gives rise to the connective tissues of the skin and the cells of the myotome become elongated into striated muscle cells as well as the myocoel becomes greatly reduced. In this manner the myotomes form the muscle segments of the body and by their contraction the body movements can be produced.

In the hypomere , the outer layer is very thin and lies under the ectoderm and is called the somatopleure . Its inner layer is also thin and lies next to the gut . It is called the splanchnopleure .As development proceeds the midventral wall which separated the right and left sides splanchnocoels disappears so that the two cavities of the right and the left sides become continuous. Then the transverse septa separating the splanchnocoels of the successive somites disappear and at the end a larger continuous cavity is formed in the body. This cavity is called the coelom.

Answer of the first question (partB)

Types of fertilization and parthenogenesis:

Fertilization is the process in which two gametes or germ cells, an egg from the female and a sperm from the male, unite to form the zygote . Fertilization may be internal or external.

- A) External fertilization is almost limited to aquatic animals. In this case, both kinds of gametes are shed into the surrounding medium, and the sperm cells swim or are carried with water

currents to the egg cells. Nearly all aquatic invertebrates, most fishes with the exception of sharks and many amphibians perform external fertilization. Such animals are known to release great numbers of eggs and sperms to account for the losses expected among these cells in water.

B) Internal fertilization occurs in most terrestrial animals including vertebrates and invertebrates. In this case, the egg cells remain within the genital system of the females until they are fertilized by the sperms introduced by the male during copulation.

Following fertilization, the fertilizing eggs of some animals such as birds, most insects and many aquatic invertebrates pass outside of the body to complete their development. In this case the females lay the eggs from which the young eventually hatch. Such animals are said to be oviparous i.e. egg-laying.

In a second category of animals such as mammals, which are described as viviparous animals, living young develop from the eggs retained within the mother's body, particularly in the uterus, and nourished by the blood stream until they reach a certain stage of development at which at which they are born.

A third group of animals, identified as the ovo-viviparous animals, produce eggs that are incubated and hatched within the mother's body. In this case, the developing young receives nourishment from the nutrient materials stored in the eggs, and there is no organic connection between the developing foetus and the mother. Examples of such animals are sharks and lizards.

Parthenogenesis:

In some animals, eggs can be stimulated to develop within fertilization by the process known as parthenogenesis. Some species e.g. arthropods have been found which apparently consist solely of females that reproduce parthenogenically.

In other species, parthenogenesis occurs for several generations, then some males are produced which develop and mate with the females. The queen honey bee is fertilized by a male just once during her life time "nuptial life". The sperms are stored in a pouch within the genital tract. If sperms are released from the pouch as she lays eggs, fertilization occurs and the eggs develop into females including queens and workers. If the eggs are not fertilized, they develop into males.

Answer of the first question (partC)

Oogenesis:-

Oogenesis, or development of the ova takes places in the ovary . This process is more or less similar to that of spermatogenesis and consists of the usual three successive periods.

A)Multiplication period:

The primordial germ cells of the germinal epithelium surrounding the ovary multiply by repeated mitotic divisions given rise to a large number of small cells (the oogonia) each one contains the diploid number of chromosomes $2N$. Oogonia are usually accumulated in dense aggregates or nests of oogonia lying in the peripheral region of the ovary.

B)Growth period:

The oogonia undergo a considerable increase in size, as they store nutritive materials, and form the primary oocytes, each still containing the diploid number of chromosomes $2N$.

C)Maturation period:

In the vertebrates, this period generally takes place after the primary oocytes have been released from the ovary, and its completion is frequently stimulated by the entry of spermatozoz during fertilization. The primary oocyte divides by meiosis, which includes first and second meiotic divisions. In the first meiotic division, the primary oocyte divides into two unequal cells; a large cell known as the secondary oocyte and a smaller one known as the first polar body. The secondary oocyte contains the haploid number of chromosomes N . The first polar body contains N chromosomes enclosed in a small nucleus surrounded by a very thin layer of cytoplasm. The second meiotic division splits the secondary oocyte unequally into a large ootid and much smaller second polar body, while the first polar body divides into two small second polar bodies; each of the ootids and second polar bodies contains N chromosomes. The second polar bodies then disintegrate while the ootid undergoes differentiation to form the mature ovum or egg. Thus, unlike the primary spermatocytes, each primary oocyte gives finally one mature ovum.

Q2: Write a detailed account about the followings: -

(10 marks)

1- Cell theory.

- 1- Cells are organisms and animals as well as plants are aggregates of these organisms arranged in accordance with definite laws.**

- 2- The cell is a mass of protoplasm enclosed in a membrane and contain one or more nuclei.
- 3- The cell is the unites of structure and function of all living organisms.

2-General characters of epithelial tissues.

- 1- Originate from any one of the three germ layers (ectoderm, mesoderm and endoderm).
- 2- Scanty Matrix (intercellular substance).
- 3- Rest on Basement membrane
- 4- Regeneration. The cells forming the epithelial tissues have the ability to divide continuously.
- 5- Polarization. Their cells possesse basal and apical regions.
- 6- Blood vessels and nerve fibers are absent.

Q3: With labeled diagrams, give a brief explanation about these items: - (10 marks)

1- White blood cells (leucocytes).

- These are fewer than the red blood Cells.
- w. b. c. being about 7000 - 10000 /mm³ of blood.
- They are nucleated and lacking hemoglobin.

According to the presence or absence of granules in their cytoplasm, they are divided into two types:-

A- Agranulocytes

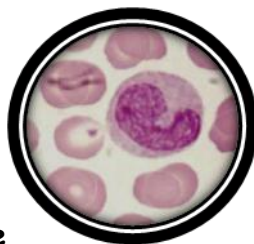
- lacking cytoplasmic granules.
- formed in lymph glands and including the following forms:

I -Macrococytes or Monocytes:

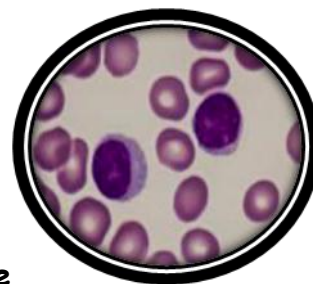
These are large cells, containing small horseshoe - shaped nucleus surrounded by wide cytoplasmic area.

II -Lymphocytes :

These are small cells, containing large nucleus surrounded by narrow cytoplasmic area.



monocyte



lymphocyte

B- Granulocytes:

These are leukocytes possessing cytoplasmic granules and formed in bone marrow. They includes the following forms:

I -Acidophils:

-Where cytoplasmic granules take up acidic stains.

-Each cell contains two lobed (bi-lobed) nucleolus connected together by thin chromatin thread.

II -Basophiles:

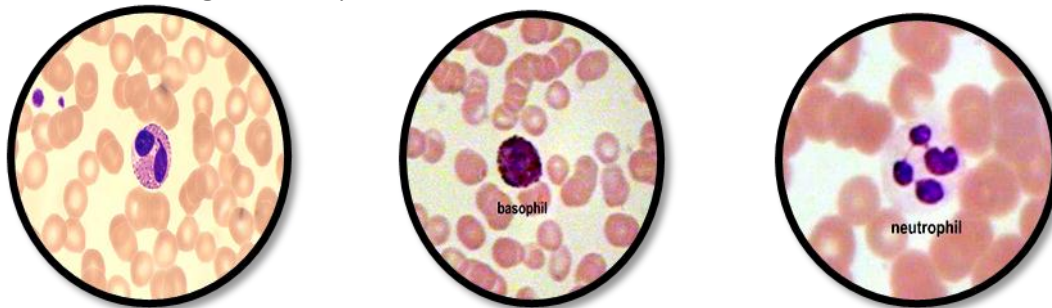
-Where the cytoplasmic granules take up basic stains.

-Each cell contains S-shaped nucleus.

III -Neutrophils:

-Where the cytoplasmic granules take up neutral stains.

- Each cell containing nucleus formed of 3-5 lobes (multi-lobed) connected together by a thin chromatin thread.



2- Ultrastructure and function of cell membrane.

Plasma membrane :

Daneilli (1954) suggested the Trilaminar (three-layered) structure (Lipoprotein.)

There are minute pores through the PM. Selective permeability of Plasma Membrane.

Function of Plasma Membrane :

a) Provide mechanical support and structural integrity of the cell.

b) Control the flow of substances in and out of the cell.

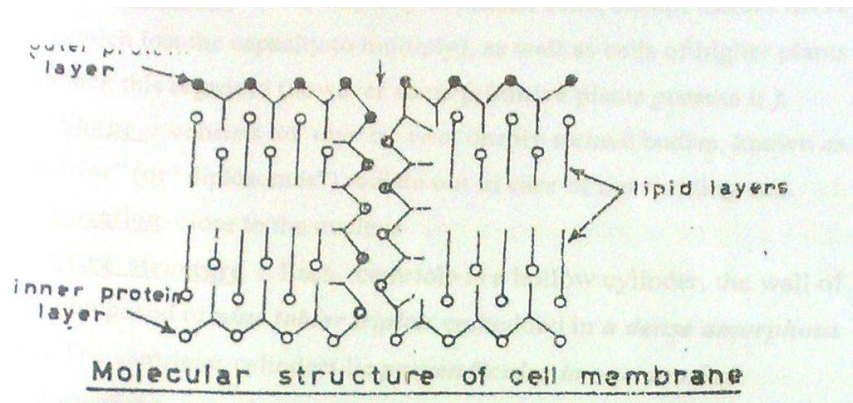
c) Mechanisms that regulate diffusion of substances:

1- Simple Diffusion.

2- Carrier-mediated transport.

3- Phagocytosis.

4- Pinocytosis .



Q4: Complete and choose the correct answers of the following sentences: - (12 marks)

1- The inner membrane of mitochondria is folded giving a large number of

- a) Shelves. b) Ridges. c) Cristae. d)

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2- The chemical nature of Golgi apparatus is

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3- An organelle essential for protein synthesis is

- a) Rough endoplasmic reticulum. b) Smooth endoplasmic reticulum.

- c) Centrosome. d) Lysosome.

4- The suicide bags in the cell are known as

- a) Endosome. b) Ribosome. c) Centrosome. d)

All are wrong.

5- Ultra-structurally, The nucleus is formed of nuclear envelop (Karyotheca), nuclear sap (Karyolymph),chromatin andnucleolus.

6- are the most abundant tissue and connect the other body tissues.

- a) Epithelial tissues. b) Connective tissues. c) Muscular tissues. d) Nervous tissues.

7- The central nervous system is formed of thebrain..... andspinal cord.....

8- Skeletal and Cardiac muscles are

