



DAMIETTA UNIVERSITY
FACULTY OF SCIENCE
ZOOLOGY DEPARTMENT



FINAL TERM EXAM.
January 2025



Zoology and Chemistry 4 th Level		Fundamentals Developmental Biology (426 Z)	
Date: 5/1/2025	Time: 2 Hours	Marks: 90	الإمتحان في 3 صفحات

Answer the Following Questions

Question One: Fill in the blanks with suitable statements.....(20 Marks).

1. The components of inductive interaction are and
2. Signalling molecules can be delivered to target cells by means of long-range forms such as and signaling.
3.and stimulate the growth of the skeletal elements in the juvenile body.
4.is necessary for PGC motility and survival.
5. Thedeveloped into the uterus, oviducts, cervix, and upper portion of the vagina.
6. is the process by which cells become structurally and functionally specialized.
7.are stimulated by lipophilic ligands including steroids, thyroid hormones, and retinoic acid.

Question Two: Determine which of the following statements are FALSE or TRUE.....(20 Marks).

- 1) The IP3 binds to an IP3 receptor (IP3R) in the endoplasmic reticulum and opens Ca channels which admit Ca ions into the cytoplasm.
- 2) Winged helix proteins have a 100 amino acid winged helix domain which forms another type of DNA-binding region and are known as "Fox" proteins.
- 3) Fgf9 is required for maintaining Sox9 expression in the presumptive Sertoli cells and directs their formation into tubules.

- 4) XX mice lacking estrogens in the developing gonad undergo a partial sex reversal, forming testicle-like structures.
- 5) The cadherins are cell-surface glycoproteins that interact mainly with components of the extracellular matrix.
- 6) In birds, frogs, and fish, Sox9 appears to be activated by the dosage of the transcription factor Sry.
- 7) Ovotestes can be generated when the *Sry* gene is activated later than normal.
- 8) T-box factors differ from most others because they do not have a specific activation or repression domain.
- 9) Izumo protein is critical in sperm-egg fusion.
- 10) Notochord acts as a primary organizer in stimulating the development of brain and spinal cord.

Question Three: Choose the one best answer to the following statements.(20 Marks).

1. Any of the following not testis-specific markers?
(a) Rspo1. (b) Sox9. (c) testosterone-producing enzymes. (d) AMH.
2. Classification of biological signal molecules are based on all the following **EXCEPT**...
(a) Biological function. (b) Physical nature of the signaling molecule
(c) Mode and range of signaling. (d) Chemical nature of the signaling molecule.
3. All the following proteins are expressed by germ cells to suppress gene expression **EXCEPT**.....(a) Vasa. (b) Nanos. (c) Sfl. (d) Tudor.
4. Which of the following developmental functions of homeodomain proteins is **INCORRECT**?
(a) Engrailed in *Drosophila* segmentation. (b) Cdx proteins in right-left patterning.
(c) Goosecoid in the vertebrate organizer. (d) Cdx proteins in anteroposterior patterning.
5. All the following are functions of Zinc-finger proteins **EXCEPT**.....
(a) Krüppel in the early *Drosophila* embryo. (b) Krox20 in the rhombomeres of the hind brain.
(c) WT-1 in the kidney. (d) Pax3 in the developing somite.
6. Which of the following pairs of germinal layers and organs is/are **CORRECTLY** matched?
(a) Ectoderm- eye. (b) Endoderm-heart. (c) Mesoderm-brain. (d) Ectoderm-ovary.

7. Which enzyme of the following that released by cortical granule exocytosis is CORRECT?
 (a) Serine protease. (b) Cysteine protease. (c) Aspartic protease. (d) Threonine protease.
8. Gametes are derived from thecells, which enter the embryonic gonads.
 (a) Primary gametocyte. (b) Secondary gametocyte.
 (c) Primordial germ. (d) Gametid.
9. All the following are functions of LIM-1 domain EXCEPT.....
 (a) Lim-1 in the organizer. (b) Ecdysone receptor.
 (c) Islet-1 in motor neurons. (d) Apterous in the *Drosophila* wing.
10. Which of the following tissues does NOT belong to splanchnic mesoderm?
 (a) Heart. (b) Blood cells. (c) Pericardium. (d) Endothelium of blood vessels.

Question Four: Answer the following question..... (30 Marks).

1. What are the biological function of signal molecules?(6 Marks).
2. Summarize the wide range of controlling signal systems.(5 Marks).
3. List the consequences of cell signaling.....(6 Marks).
4. Summarize the functions of the Sox9 protein.(7 Marks).
5. Give examples of developmental processes in which this epithelial-mesenchymal transition is active.(6 Marks).

With Best Wishes

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