

# 義守大學 100 學年度 學士後中醫學系 入學招生考試試題

|                                                                                                             |            |      |          |        |     |
|-------------------------------------------------------------------------------------------------------------|------------|------|----------|--------|-----|
| 考試科目                                                                                                        | 生物學 (含生理學) | 考試日期 | 100/6/19 | 頁碼/總頁數 | 1/6 |
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選擇題 (單選題，共 50 題，每題 2 分，共 100 分。答錯 1 題倒扣 0.5 分，倒扣至零分為止。未作答時，不給分亦不扣分)

- The liver is involved in detoxification of many poisons and drugs. Which of the following structures is primarily involved in this process and therefore abundant in liver cells?  
(A) Transport vesicles (B) smooth ER (C) Golgi apparatus (D) Nuclear envelope
- Which of the following is a protein synthesized at specific times during the cell cycle that associates with a kinase to form a catalytically active complex?  
(A) PDGF (B) MPF (C) protein kinase (D) cyclin
- The hormone primarily responsible for setting the basal metabolic rate and for promoting the maturation of the brain is  
(A) TSH. (B) thyroxine. (C) ACTH. (D) cortisol.
- Which of the following cells of the pancreas secrete insulin?  
(A) exocrine cells (B) alpha cells (C) beta cells (D) delta cells
- A biologist discovers two populations of wolf spiders whose members appear identical. Members of one population are found in the leaf litter deep within the woods. Members of the other population are found in the grass at the edge of the woods. The biologist decides to designate the members of the two populations as two separate species. Which species concept is this biologist most closely utilizing?  
(A) phylogenetic (B) ecological (C) Physiological (D) morphological
- Which group includes members that are important primary producers in ocean food webs, causes red tides that kill many fish, and may even be carnivorous?  
(A) ciliates (B) apicomplexans (C) dinoflagellates (D) brown algae
- The blastopore denotes the presence of an endoderm-lined cavity in the developing embryo, a cavity that is known as the  
(A) archenteron. (B) blastula. (C) coelom. (D) blastocoel.
- What type of specialized junction connects epithelial cells lining the renal tubules?  
(A) tight junctions (B) desmosomes (C) gap junctions (D) intercalated disks
- In both males and females, gonadotropin secretion by the anterior pituitary is stimulated by  
(A) GnRH. (B) FSH. (C) GHRH. (D) androgens.
- The corpus luteum is maintained for the first 10 weeks of pregnancy by  
(A) progesterone. (B) estrogen. (C) hCG. (D) LH.
- Which of the following is an autoimmune disease in which myelinated neurons become the target of the immune response?  
(A) rheumatoid arthritis (B) myasthenia gravis (C) multiple sclerosis (D) diabetes mellitus
- The reason older persons are more sensitive to sun exposure and more likely to get sunburned is that with age  
(A) glandular activity declines. (B) skin thickness decreases.  
(C) melanocyte activity declines. (D) vitamin D<sub>3</sub> production declines.

背面還有試題

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13. Glucose diffuses slowly through artificial phospholipid bilayers. The cells lining the small intestine, however, rapidly move large quantities of glucose from the glucose-rich food into their glucose-poor cytoplasm. Using this information, which transport mechanism is most probably functioning in the intestinal cells?
  - (A) simple diffusion
  - (B) phagocytosis
  - (C) active transport pumps
  - (D) facilitated diffusion
  
14. The structure of a protein that contains two or more polypeptides is the
  - (A) primary structure.
  - (B) secondary structure.
  - (C) tertiary structure.
  - (D) quaternary structure.
  
15. A man with Klinefelter syndrome (47, XXY) is expected to have any of the following *except*:
  - (A) lower sperm count.
  - (B) possible breast enlargement.
  - (C) increased testosterone.
  - (D) female body characteristics.
  
16. Ketoacidosis in untreated diabetes mellitus is due to
  - (A) excessive fat catabolism.
  - (B) hypoventilation.
  - (C) excessive fluid loss.
  - (D) excessive eating and obesity.
  
17. If humans have 2,900 Mb, a specific member of the lily family has 120,000 Mb, and a yeast has ~13 Mb, why can't this data allow us to order their evolutionary significance?
  - (A) Size matters less than gene density.
  - (B) Size does not compare to gene density.
  - (C) Size does not vary with gene complexity.
  - (D) Size is comparable only within phyla.
  
18. Drinking alcohol makes you urinate more frequently because
  - (A) alcohol contains caffeine.
  - (B) alcohol inhibits the release of ADH and therefore causes excessive urinary water loss.
  - (C) alcohol inhibits the release of renin, a hormone that increases water reabsorption in the kidneys.
  - (D) alcohol causes more water to filter from the blood into the kidneys.
  
19. Celery stalks that are immersed in fresh water for several hours become stiff and hard. Similar stalks left in a salt solution become limp and soft. From this we can deduce that the cells of the celery stalks are
  - (A) hypotonic to both fresh water and the salt solution.
  - (B) hypertonic to both fresh water and the salt solution.
  - (C) hypertonic to fresh water but hypotonic to the salt solution.
  - (D) hypotonic to fresh water but hypertonic to the salt solution.
  
20. Which kind of metabolic poison would most directly interfere with glycolysis?
  - (A) an agent that reacts with oxygen and depletes its concentration in the cell
  - (B) an agent that binds to pyruvate and inactivates it
  - (C) an agent that closely mimics the structure of glucose but is not metabolized
  - (D) an agent that blocks the passage of electrons along the electron transport chain
  
21. In cats, black fur color is caused by an *X-linked* allele; the other allele at this locus causes orange color. The heterozygote is tortoiseshell. What kinds of offspring would you expect from the cross of a black female and an orange male?
  - (A) Tortoiseshell females; tortoiseshell males
  - (B) Black females; orange males
  - (C) Orange females; orange males
  - (D) Tortoiseshell females; black males

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22. A young animal has never had much energy. He is brought to a veterinarian for help and is sent to the animal hospital for some tests. There they discover his mitochondria can use only fatty acids and amino acids for respiration, and his cells produce more lactate than normal. Of the following, which is the best explanation of his condition?
- (A) His mitochondria lack the transport protein that moves pyruvate across the outer mitochondrial membrane.
  - (B) His cells cannot move NADH from glycolysis into the mitochondria.
  - (C) His cells contain something that inhibits oxygen use in his mitochondria.
  - (D) His cells lack the enzyme in glycolysis that forms pyruvate.
23. The frequency of heterozygosity for the sickle cell anemia allele is unusually high, presumably because this reduces the frequency of malaria. Such a relationship is related to which of the following?
- (A) Mendel's law of independent assortment
  - (B) Mendel's law of segregation
  - (C) Darwin's explanation of natural selection
  - (D) Darwin's observations of competition
24. The enzyme telomerase solves the problem of replication at the ends of linear chromosomes by which method?
- (A) causing specific double strand DNA breaks that result in blunt ends on both strands
  - (B) causing linear ends of the newly replicated DNA to circularize
  - (C) adding numerous short DNA sequences such as TTAGGG, which form a hairpin turn
  - (D) adding numerous GC pairs which resist hydrolysis and maintain chromosome integrity
25. When DNA is compacted by histones into 10 nm and 30 nm fibers, the DNA is unable to interact with proteins required for gene expression. Therefore, to allow for these proteins to act, the chromatin must constantly alter its structure. Which processes contribute to this dynamic activity?
- (A) DNA supercoiling at or around H1
  - (B) methylation and phosphorylation of histone tails
  - (C) hydrolysis of DNA molecules where they are wrapped around the nucleosome core
  - (D) accessibility of heterochromatin to phosphorylating enzymes
26. Which of the following is **correct** for both prokaryotic and eukaryotic gene expression?
- (A) After transcription, a 3' poly-A tail and a 5' cap are added to mRNA.
  - (B) Translation of mRNA can begin before transcription is complete.
  - (C) RNA polymerase binds to the promoter region to begin transcription.
  - (D) The mRNA transcript is the exact complement of the gene from which it was copied.
27. Which of the following is a **correct** statement about nitrogen fixation in root nodules?
- (A) The plant contributes the nitrogenase enzyme.
  - (B) The process is relatively inexpensive in terms of ATP costs.
  - (C) Leghemoglobin helps maintain a low O<sub>2</sub> concentration within the nodule.
  - (D) The bacteria of the nodule are autotrophic.
28. In animals, embryonic stem cells differ from adult stem cells in that
- (A) embryonic stem cells are pluripotent, and adult stem cells are totipotent.
  - (B) embryonic stem cells are totipotent, and adult stem cells are pluripotent.
  - (C) embryonic stem cells have more genes than adult stem cells.
  - (D) embryonic stem cells have fewer genes than adult stem cells.

背面還有試題

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29. Which of the following best describes siRNA?
- (A) a short double-stranded RNA, one of whose strands can complement and inactivate a sequence of mRNA
  - (B) a single-stranded RNA that can, where it has internal complementary base pairs, fold into cloverleaf patterns
  - (C) a double-stranded RNA that is formed by cleavage of hairpin loops in a larger precursor
  - (D) a molecule, known as Dicer, that can degrade other mRNA sequences
30. Which of the following series best reflects what we know about how the flu virus moves between species?
- (A) An avian flu virus undergoes several mutations and rearrangements such that it is able to be transmitted to other birds and then to humans.
  - (B) The flu virus in a pig is mutated and replicated in alternate arrangements so that humans who eat the pig products can be infected.
  - (C) A flu virus from a human epidemic or pandemic infects birds; the birds replicate the virus differently and then pass it back to humans.
  - (D) An animal such as a pig is infected with more than one virus, genetic recombination occurs, the new virus mutates and is passed to a new species such as a bird, the virus mutates and can be transmitted to humans.
31. Biofuels are mainly produced by:
- (A) plants that convert hemicellulose into gasoline.
  - (B) the breakdown of cell wall biopolymers into sugars that can be fermented.
  - (C) the genetic engineering of ethanol generating genes into plants.
  - (D) plants that are easy to grow in arid environments.
32. A plant will recognize a pathogenic invader
- (A) if it has many specific plant disease resistance (*R*) genes.
  - (B) when the pathogen has an *R* gene complementary to the plant's antivirulence (*Avr*) gene.
  - (C) when the pathogen secretes *Avr* protein.
  - (D) if it has the specific *R* gene that corresponds to the pathogen molecule encoded by an *Avr* gene.
33. All of the following are responses of plants to cold stress *except*:
- (A) the production of a specific solute "plant antifreeze" that reduces water loss.
  - (B) excluding ice crystals from the interior walls.
  - (C) conversion of the fluid mosaic cell membrane to a solid mosaic one.
  - (D) an alteration of membrane lipids so that the membranes remain flexible.
34. Processing of filtrate in the proximal and distal tubules accomplishes what important function?
- (A) sorting plasma proteins according to size
  - (B) converting toxic ammonia to less toxic urea
  - (C) maintaining a constant pH in body fluids
  - (D) regulating the speed of blood flow through the nephron
35. Your bone cells, muscle cells and skin cells look different because
- (A) they contain different numbers of genes.
  - (B) different genes are active in different kinds of cells.
  - (C) they are present in different organs.
  - (D) each cell contains different kinds of genes.

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36. In vertebrate animals, spermatogenesis and oogenesis differ, in that
- (A) oogenesis begins at the onset of sexual maturity, whereas spermatogenesis happens in embryonic development.
  - (B) oogenesis produces four haploid cells, whereas spermatogenesis produces only one functional spermatozoon.
  - (C) cytokinesis is unequal in oogenesis, whereas it is equal in spermatogenesis.
  - (D) spermatogenesis is not completed until after fertilization occurs, but oogenesis is completed by the time a girl is born.
37. Biologists have discovered how to put together a bacteriophage with the protein coat of phage T2 and the DNA of phage lambda. If this composite phage was allowed to infect a bacterium, the phages produced in the host cell would have
- (A) a mixture of the DNA and proteins of both phages.
  - (B) the protein and DNA of phage lambda.
  - (C) the protein of phage T2 and the DNA of phage lambda.
  - (D) the protein of phage lambda and the DNA of phage T2.
38. Which of the following hormones have antagonistic (opposing) effects?
- (A) growth hormone and epinephrine
  - (B) glucagon and thyroxine
  - (C) ACTH and cortisone
  - (D) parathyroid hormone and calcitonin
39. Which of these statements about edema is false?
- (A) Edema may be caused by blockage of lymphatic vessels.
  - (B) Edema may be caused by high blood pressure.
  - (C) Edema may be caused by increased plasma protein.
  - (D) Edema may be caused by leakage of plasma protein into tissue fluid.
40. Which of these statements about gamma interferon is false?
- (A) It stimulates the immune system to attack infected cells and tumors.
  - (B) It is produced by almost all cells of the body.
  - (C) It is a polypeptide regulator.
  - (D) It can be produced in response to viral infections.
41. Which of these statements about intrinsic factor is false?
- (A) It helps prevent pernicious anemia.
  - (B) It is secreted by the pancreas.
  - (C) It promotes absorption of vitamin B<sub>12</sub> in the intestine.
  - (D) It is a polypeptide.
42. Which of the following would tend to reduce the concentration of lactic acid that accumulates in a muscle cell as a result of contractile activity?
- (A) increasing the diameter of the cell
  - (B) increasing the number of mitochondria in the cell
  - (C) decreasing the oxygen supply to the cell
  - (D) increasing the concentration of glycolytic enzymes.

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43. Which of these statements about fat digestion and absorption is false?  
(A) Triglycerides are resynthesized from monoglycerides and fatty acids in the intestinal epithelial cells.  
(B) Triglycerides are hydrolyzed by the action of pancreatic lipase.  
(C) Triglycerides, as particles called chylomicrons, are absorbed into blood capillaries within the villi.  
(D) Emulsification by bile salts increases the rate of fat digestion.
44. Moment-to-moment changes in total peripheral resistance are normally due to changes in  
(A) the viscosity of blood.  
(B) the radius of certain blood vessels in the systemic circuit.  
(C) the lengths of blood vessels in the systemic circuit.  
(D) the cardiac output.
45. The motor end plate is  
(A) the specialized region of an effector organ innervated by an autonomic postganglionic neuron.  
(B) the specialized synaptic terminal of autonomic postganglionic neurons.  
(C) the specialized synaptic terminal of the motor neuron.  
(D) the specialized region of skeletal muscle innervated by a motor neuron.
46. Which of the following is most likely to cause a decrease in the stroke volume of the left ventricle?  
(A) an increase in end-diastolic volume  
(B) an increase in the activity of sympathetic nerves to the heart  
(C) an increase in mean arterial pressure  
(D) an increase in end-diastolic pressure
47. Lymphatic capillaries differ from blood capillaries in that  
(A) lymphatic capillaries are not connected to any other vessels.  
(B) lymphatic capillaries have a lower permeability to water.  
(C) lymphatic capillaries have a lower permeability to small solutes.  
(D) lymphatic capillaries are blind ended.
48. If arterial pressure is elevated, baroreceptor signals trigger which of the following responses?  
(A) an increase in epinephrine secretion  
(B) a rise in vasopressin secretion  
(C) a fall in plasma angiotensin II levels  
(D) increased activity in sympathetic vasoconstrictor nerves
49. In respiring tissues, a rise in blood  $P_{CO_2}$  causes all of the following except  
(A) a rise in the concentration of carbaminohemoglobin.  
(B) an increase in the affinity of hemoglobin for oxygen.  
(C) an increase in the hydrogen ion concentration.  
(D) a rise in bicarbonate concentration.
50. Which of the following is not true about helper T cells?  
(A) They secrete antibodies.  
(B) When activated, they secrete IL-2 and other cytokines.  
(C) They are subject to infection by HIV.  
(D) They function in both cell-mediated and humoral immune responses.