

中國醫藥大學九十七學年度研究所碩士班暨碩士在職專班入學招生考試試題

所別：環境醫學研究所

科目：分子細胞生物學

考生注意：答案必須寫在答案卷上，否則不予計分。



單選題 (每題 4 分，共 25 題)

- ( ) 1. The complete genetic make-up of an organism is its:  
A) genome.  
B) chromosome.  
C) phenotype.  
D) genotype.
- ( ) 2. DNA microarrays are used to:  
A) measure gene expression  
B) genotype individuals  
C) screen for drug toxicity  
D) all of the above
- ( ) 3. RNA interference (RNAi) regulates which of the following processes:  
A) DNA replication  
B) RNA synthesis  
C) protein production  
D) all of the above
- ( ) 4. A \_\_\_\_\_ organism is genetically modified with genes from another species.  
A) transformed B) transgenic C) genomic D) dominant
- ( ) 5. A chart consisting of paired chromosomes that is used by geneticists to detect abnormalities is called a:  
A) pedigree. B) phenotype. C) karyotype. D) gene pool.
- ( ) 6. Telomeres are:  
A) short chromosomes.  
B) the site where chromatids join.  
C) chromosome tips.  
D) proteins that wrap around DNA in chromosomes.
- ( ) 7. Which sequence illustrates the steps of signal transduction?  
A) first messenger to receptor molecules to second messenger to cellular response  
B) receptor molecules to first messenger to second messenger to cellular response  
C) first messenger to second messenger to receptor molecules to cellular response  
D) first messenger to second messenger to cellular responses to receptor
- ( ) 8. Apoptosis refers to:  
A) programmed cell death.  
B) programmed cell division.  
C) uncontrolled mitosis.  
D) inflammation.
- ( ) 9. A point mutation alters:  
A) a single base.  
B) 3 bases.  
C) an amino acid.  
D) a chromosome arm.
- ( ) 10. Which sequence correctly describes the order of events in the cell cycle?  
A) S to G<sub>1</sub> to G<sub>2</sub> to mitosis  
B) mitosis to G<sub>1</sub> to G<sub>2</sub> to S  
C) G<sub>1</sub> to G<sub>2</sub> to S to mitosis  
D) G<sub>1</sub> to S to G<sub>2</sub> to mitosis
- ( ) 11. A retrovirus is given a functional version of a gene that a patient lacks, and used to infect the patient's cells growing in culture. Skin is grown from the altered cells, and grafted onto the patient. If all works

well, the graft will:

- A) be viewed as immunologically foreign and destroyed.
- B) be accepted and secrete the inserted gene's protein product.
- C) turn on the abnormal gene in surrounding cells.
- D) be accepted, but not express the introduced gene.

- ( ) 12. If the sequence of one strand of a DNA molecule is 5' ATGGCAT 3', the sequence of the complementary strand is:
- A) 5' ATGGCAT 3'.
  - B) 3' ATGGCAT 5'.
  - C) 5' TACCGTA 3'.
  - D) 3' TACCGTA 5'.
- ( ) 13. In humans, DNA in the nucleus winds around proteins called:
- A) histones.
  - B) histiosomes.
  - C) karyosomes.
  - D) ribosomes.
- ( ) 14. The polymerase chain reaction is used to:
- A) create millions of copies of an interesting piece of DNA.
  - B) speed the rate of DNA replication.
  - C) make more copies of DNA polymerase.
  - D) copy DNA into RNA.
- ( ) 15. In a molecule of DNA, purine bases form \_\_\_\_\_ bonds with pyrimidine bases.
- A) phosphate
  - B) hydrogen
  - C) disulfide
  - D) phosphodiester
- ( ) 16. The sugar-phosphate backbone of DNA is held together by:
- A) phosphate bonds.
  - B) hydrogen bonds.
  - C) disulfide bridges.
  - D) phosphodiester linkages.
- ( ) 17. Automated PCR machines are dependent on a heat stable \_\_\_\_\_.
- A) DNA ligase
  - B) helicase
  - C) primase
  - D) DNA polymerase
- ( ) 18. RNA interference (RNAi) is controlled by:
- A) siRNAs only.
  - B) RNA complementary to messenger RNA only.
  - C) chemically modified RNA.
  - D) "a" and "b".
  - E) "b" and "c".
- ( ) 19. Compared to other techniques, an siRNA is said to \_\_\_\_\_ expression.
- A) "knock down"
  - B) "knock out"
  - C) "knock in"
  - D) all of the above
- ( ) 20. A coding portion of a gene is called a(n):
- A) intron.
  - B) domain.
  - C) exon.

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D) promoter.

- ( ) 21. Multiple proteins can be produced from a single gene by:
- A) intron shuffling.
  - B) exon shuffling.
  - C) chain switching.
  - D) production of pseudogenes.
- ( ) 22. What percent of the human genome actually encodes proteins?
- A) 0.5
  - B) 1.5
  - C) 5.0
  - D) 10
- ( ) 23. Pseudogenes are:
- A) not transcribed.
  - B) transcribed but not translated.
  - C) transcribed and translated.
  - D) rare in the human genome.
- ( ) 24. Mutational hot spots occur where the DNA is:
- A) unwound and stretched.
  - B) repetitive or symmetrical.
  - C) highly coiled.
  - D) bound by RNA polymerase.
- ( ) 25. A mutation that changes the third position in a CUU codon to a C would:
- A) profoundly change the protein's conformation.
  - B) result in a frameshift mutation.
  - C) shorten the protein.
  - D) have no effect on the protein.