國立中山大學九十四學年度碩士班招生考試試題

科目：生物化學【生醫所碩士在職專班】

1. 試說明蛋白質主要的4種二次結構為何? 並描述其基本構造。(十分)
2. 何謂蛋白質二維電泳? 其原理為何。(十分)
3. 如何測量酵素之 K_M 及 V_{MAX}? (十分)
4. 描述影響 membrane fluidity 之因子。(十分)
5. Ubiquitin mediated protein destruction 之機制為何? (十分)
6. Membrane G protein 的基本構造及分類? 並請說明 G protein 傳遞訊號之機轉。(十分)
7. 請說明 IgG, IgA, IgM 的結構及功能。(十分)
8. 比較 Ion channel, ion pump 及 Gap junction，並說明其調節離子進出之機轉。(十分)
9. 解釋名詞 (二十分，每小題2分)
   (1) Edman degradation
   (2) Chromosome walking
   (3) Patch clamp technique
   (4) LDL (low density lipoprotein particles)
   (5) cDNA microarray
   (6) PCR
   (7) Allosteric enzyme
   (8) RNA editing
   (9) Ames test
   (10) Small G protein

國立中山大學九十四學年度碩士班招生考試試題

科目：細胞分子生物學【生醫所碩士在職專班】

I. Single choice (75%)

1. What is the correct order of these mitotic stages?
A. prophase-metaphase- telophase- anaphase- cytokinesis
B. prophase- cytokinesis- metaphase- telophase- anaphase
C. anaphase- prophase- metaphase- telophase- cytokinesis
D. prophase-metaphase- anaphase- telophase- cytokinesis

2. Ubiquitin are involved in which of the following cellular process?
A. DNA synthesis
B. DNA degradation
C. protein synthesis
D. protein degradation

3. Which of the following organelles is most important in providing energy to the cell?
A. mitochondria
B. centrosome
C. nucleus
D. peroxisome

4. Which of these must infect a living host to reproduce?
A. bacteria
B. virus

5. Name the period of rapid growth in a bacterial culture when the cells divide every few minutes.
A. mitosis
B. replication
C. log phase
D. apoptosis

6. Chemotaxis in *E coli* depends on what flagella characteristic?
A. length
B. thickness
C. rotation
D. number

7. What bacterial structure does penicillium weaken?
A .nucleosome
B. ribosome
C. endospore
D. cell wall

8. Given good growing conditions, bacteria in log phase may double as often as every…
A. 24 hours
B. 6 hours
C. 2.5 hours
D. 20 minutes

9. What organelle in animal cells contains H_2O_2?
A. vacuole
B. peroxisome
C. mitochondrial
D. nucleus

10. Which of these organelles is NOT found in animal?
A. chloroplasts
B. cytosol
C. secretory vesicles
D. nucleus

11. Name the membrane valves that open and close for potassium efflux and sodium influx.
A. ion channels
B. vacuoles
C. capillaries
D. cytokines

12. What technique can be used to measure cell activity like a change in membrane potential
A. ion channel
B. apoptosis
C. patch clamp
D. phagocytosis

13. When a sodium channel opens and sodium rushes into a myocyte (heart cell), the cell membrane becomes…
A. polarized
B. depolarized
C. paralyzed

14. What role does the cytoskeleton play in a living cell?
A. maintaining cell shape
B. movement
C. contraction
D. all of these

15. What is another for programmed cell death?
A. necrosis
B. oxidative burst
C. diapedesis
D. apoptosis

16. Where are ribosomes produced in a eukaryotic cell?
A. endoplasmic reticulum
B. vacuole
C. centrosome
D. nucleolus

17. The endoplasmic reticulum is an extension of which of these membranes?
A. cell membrane
B. outer nuclear membrane
C. inner nuclear membrane

18. The animal cell centriol is a ring of how many groups of microtubules?
A. 9
B. 12
C. 36
D. 48

19. Which is the smallest of these four
A. bacterium
B. red blood cell
C. virus
D. lymphocyte

20. In HIV infection, reverse transcription describes which of the following?
A. converting viral DNA into RNA
B. converting viral RNA into DNA
C. converting proteins into viral RNA

21. What HIV protein helps insert the HIV provirus into the host's DNA?
A. transcriptase
B. integrase
C. protease

22. What is an important mechanism white blood cells use to kill bacteria, fungi and other invading pathogen?
A. asphyxiation
B. oxidative activity
C. fright
D. drowning

23. Which of these cell types can play a primary role in attacking and killing cancer cells?
A. red blood cells
B. cytotoxic T cell
C. platelet

24. Name the process a cell such as a neutrophil or a macrophage uses to ingest its prey.
A. halitosis
B. chemotaxis
C. botulism
D. phagocytosis

25. Which protein CAN find in extra cellular matrix?
A. collagen
B. actin
C. ubiquitin
D. keratin

II. Answer the following questions (25%)

1. (a) What are polylinkers? (5%)
   (b) How they were used in RNA recombination? (7%)

2. (a) What is transcription? (5%)
   (b) How do genetic informations are passed from DNA through transcription to protein? (8%)