高雄醫學大學 100 學年度研究所招生考試試卷 系所: 醫學檢驗生物技術學系碩士班
科目: 生物化學

一、解釋名詞： 20% (每題二分)

1. SNP
2. RNA interference
3. Entropy
4. plasmalogen
5. mannitol
6. Cellular senescence
7. proteomic
8. isozyme
9. uncoupling agent
10. cyclin

二、配對題 20%

1)_____ Glucose is removed from the blood and phosphorylated by the _____ enzyme glucokinase.
2)_____ Urea and other waste products are excreted by the _____.
3)_____ The liver and muscle are metabolically linked by the _____.
4)_____ The endocrine glands secrete _____.
5)_____ Epinephrine binding to the _____ receptor causes an increase in [Ca^{2+}].
6)_____ The protein _____ was the first G protein–coupled receptor to be structurally analyzed at the atomic level.
7)_____ Insulin binds to a receptor that possesses _____ activity.
8)_____ A phosphatase activated by Ca^{2+}, _____, is essential for *T* cell proliferation.
9)_____ Following prolonged starvation, _____ are used as fuel by the brain.
10)_____ A strain of genetically obese mice lack the protein _____.

A) α-adrenergic
B) calcineurin
C) Cori cycle
D) pancreas
E) leptin
F) phosphatase
G) liver
H) hormones
I) rhodopsin
J) ketone bodies
K) kidney
L) tyrosine kinase

三、選擇 10%

1. What is the overall net charge on the peptide lys-lys-ser-glu at pH 7.0?
A) +2 B) +1 C) 0 D) -1 E) -2

2. The K_M can be considered to be the same as the dissociation constant K_S for E + S binding if:
   A) this statement cannot be completed because K_M can never approximate K_S.
   B) ES $\rightarrow$ E + P is fast compared to ES $\rightarrow$ E + S.
   C) the turnover number is very large.
   D) $k_2 << k_{-1}$.
   E) k_{cat}/K_M is near the diffusion-controlled limit.
3. The energy that is released by the hydrolysis of ATP by actin is used for:
   A) actin filament assembly. B) actin filament disassembly. C) actin-myosin assembly.
   D) actin-myosin disassembly. E) muscle contraction.
4. Which of the following is (are) the result of insulin binding to its receptor?
   A) MAPK activation, which alters gene expression via Fos and Jun.
   B) PI3K activation leading to an increase in glucose transport.
   C) Histone dephosphorylation resulting in decreased expression of glycogen synthase.
   D) A and B
   E) A, B, and C
5. The nitrogen atom added to IMP to form AMP is from ____, and to form GMP is from _____.
   A) Asp, Phe
   B) Gln, Phe
   C) Asp, Gln
   D) Gly, Asp
   E) Gln, Asp

四、簡答題：20 %（每題 4 分）

1. Please draw the structure of the peptide Ala–His–Met.
2. What is the aetiology of β-thalassemia?
3. What kind of membrane proteins are cytochrome *c* and cytochrome oxidase?
4. What are the terminal electron acceptors in aerobic and anaerobic organisms?.
5. The first step in pyrimidine biosynthesis is the formation of the molecule ___?___

五、問答題 30%（每題 5 分）

1. What is meant by the statement "*muscle carbohydrate metabolism serves only muscle*"?
2. Explain why globin alone or heme alone is not effective as an oxygen carrier.
3. Why is it essential for survival that bacterial cells be surrounded by a cell wall?
4. What are the possible metabolic fate(s) of glucose-6-phosphate?
5. Describe the characteristics of glucokinase. How does it differ from other hexokinases?
6. What is the function of the GTP (or GDP) bound to tubulin?