

生物化學 試題

一、單選題（每題 2 分，答錯不倒扣）

1. Which type of higher order structure (analogous to the levels of structure in proteins) if any, is absent in mRNA ?
 - (a) primary
 - (b) secondary
 - (c) tertiary
 - (d) quaternary
 - (e) all of the above level of structure are present in mRNA
2. Which one feature is common to transcription, reverse transcription, and DNA replication ?
 - (a) Process is semiconservative.
 - (b) Newly synthesized polymer strands are complementary to a template.
 - (c) DNA is the final product.
 - (d) Process is involved in gene expression.
 - (e) The only enzymes involved are polymerases.
3. Gluconeogenesis takes place predominantly in the
 - (a) muscles
 - (b) brain
 - (c) heart
 - (d) pancreas
 - (e) liver
4. Which of the following transport processes does not require a transport protein ?
 - (a) Passive diffusion
 - (b) Active transport
 - (c) Facilitated transport
 - (d) Secondary active transport
 - (e) Counter transport
5. Phospholipids with short or unsaturated fatty acyl chains
 - (a) decrease membrane fluidity
 - (b) increase membrane fluidity
 - (c) cause biomembranes to become thicker
 - (d) allow hydrophilic molecules to diffuse across the lipid bilayer
6. Binding of epinephrine to β -adrenergic receptors
 - (a) leads to an increase in cAMP
 - (b) causes muscle cells of the intestine to constrict
 - (c) causes arteries to relax
 - (d) leads to repression of adenyl cyclase

7. All of the following statements about nitric oxide are true except
- (a) Nitric oxide is synthesized by nitric oxide synthase from arginine and oxygen.
 - (b) Nitric oxide is a gas.
 - (c) Nitric oxide activates the soluble form of guanylate cyclase.
 - (d) Nitric oxide has a half-life of greater than five minutes in tissues.
 - (e) Nitric oxide causes vasodilation.
8. Multiple integrin forms arise from ?
- (a) differential splicing of mRNA precursors.
 - (b) differential splicing of proteins.
 - (c) variations in proteolytic processing
 - (d) multiple genes
9. Hydroxyproline is important in the formation of stable collagen polymers within cells. The formation of hydroxyproline require
- (a) vitamin A
 - (b) vitamin B
 - (c) vitamin C
 - (d) vitamin D
 - (e) vitamin E
10. The intracellular organelle involved in the triggering cascade for apoptosis is
- (a) chloroplast
 - (b) mitochondrion
 - (c) nucleolus
 - (d) Zellweger's body
 - (e) lysosome

二、複選題：（一個或一個以上答案，不倒扣，每題 4 分）

1. 若日糧中缺乏維生素 B1，影響下列哪些酵素活性？

- (a) citrate synthase
- (b) pyruvate dehydrogenase
- (c) isocitrate lyase
- (d) α -ketoglutarate dehydrogenase

2. 酵素藉由哪些方法增加酵素性？

- (a) 改變反應的自由能
- (b) 抑制逆反應的速率
- (c) 改變反應的平衡常數
- (d) 降低活化能
- (e) 選擇性地促進正反應的速率

3. 在肝臟的脂肪酸 β -oxidation

- (a) 必須為偶數碳數的脂肪酸才能進行 β -oxidation
- (b) 主要產物為 acetyl-CoA
- (c) 需要 TCA cycle 同時進行才能產生 ATP
- (d) 將脂肪酸裂解產生 CO_2 和 H_2O
- (e) 主要發生在 mitochondrial matrix

4. 下列何者是 dATP 重新合成途徑的中間代謝物？

- (a) Adenine
- (b) Adenosine
- (c) dAMP
- (d) AMP
- (e) cAMP

5. catecholamine

- (a) 是衍生自 tyrosine
- (b) 包括 dopamine, epinephrine & norepinephrine
- (c) 當過量時可導致高血壓
- (d) 抑制肝醣分解作用
- (e) 抑制葡萄糖分解作用

三、問答題：（每題 20 分）

1. 請說明 post-transcriptional modifications 以及 post-translational modifications。
2. 如果有一未知物質 A，已經初步檢測，得知物質 A 可能為核酸，則請擬出一研究策略完成其定序。
3. 說明何謂 cell cycle 以及決定其不同關鍵的 check points 為何。