中山醫學大學九十九學年度碩士在職專班入學招生考試試題

生化暨生物科技研究所碩士在職專班

新聞稿

考試科目：生物化學　　時間：80 分鐘

※請注意本試題共(4)張，如發現頁數不足，應當場請求補齊，否則缺頁部份概以零分計算。 第（ 1 ）頁

本試題共四大題，總分 100 分。

第一大題共 25%

一、 單一選擇題：(每題 2 分) (20%)

1. 在人體中有關氨基酸代謝，下列那一個氨基酸碳骨架無法代謝(catabolism)出 pyruvate?
   (A)tyrosine　(B)glycine
   (C)tryptophan　(D)cysteine
2. 威爾剛(viagra)在人體的作用主要是活化 eNOS 使得下列那一個胺基酸被分解而釋放出 NO?
   (A)alanine　(B)methionine
   (C)arginine　(D)histidine
3. 在人體中有關氨基酸碳骨架代謝，下列那一個氨基酸代謝物可能導致結石(草酸鈣)形成?
   (A)hydroxyproline (Hyp)　(B)hydroxylysine (Hyl)
   (C)proline　(D)tyrosine
4. Neonatal jaundice（新生兒黃疸） 指的是新生兒肝臟中那一個酵素缺乏導致 bilirubin diglucuronide 無法有效合成?
   (A)UDP-glucose dehydrogenase　(B)UDP-glucuronosyl transferase
   (C)microsome heme oxygenase　(D)ferrochelatase
5. 下列那一個氨基酸是人體可以生合成(biosynthesis)，其合成量平常時是足夠，但在懷孕過程中是不足的，因而歸屬在必須氨基酸?
   (A)histidine　(B)tyrosine
   (C)proline　(D)arginine
6. 下列那一個反應是生化上所稱的脂肪酸氧化反應，可產生大量的 ATP？
   (A)α-oxidation　(B)β-oxidation
   (C)lipogenesis　(D)lipolysis
7. 下列那一個 enzyme 的功能並不是粒線體上 fatty acid transport 成員?
   (A)acyl-CoA synthase　(B)CPT-II
   (C)carnitine acylcarnitine translocase　(D)CPT-I
8. 有關脂肪酸代謝下列那一個敘述有誤?
   (A)carnitine 代謝，可影響 lipid transport 至 mitochondria
   (B)choline 合成受阻可影響多種 phospholipids biosynthesis
   (C)ceramide 是由 linoleyl-CoA + serine 衍生而來
   (D)ceramide-Glc 衍生而來的 glycolipids 統稱 gangliosides

9.人類無法在 saturated fatty acids 從 carboxylic end 算起那些位置進行不飽和化(以 C18 為例)？

(A)12　　(B)9

(C)5　　(D)4

10.Prostanoids (PGs) 是ω-3，6 ecosanoids 經由那一個 enzyme 作用後衍生而來?

(A)AMPK　　(B)cyclooxygenase pathway

(C)lipoxygenase pathway　　(D)phospholipase

二、簡答題：

1. 請寫出 5 個氨基酸名稱及其碳骨架代謝產物為何。(5%)

第二大題共 25%

選擇題：(第 1-11 題每題 2 分，第 12 題 3 分) (25%)

1. In prokaryotic translation， where the initiation codon interacts with the anticodon of f-Met-tRNAfmet， what is the sequence of the anticodon?(A) 5'-AUG-3' (B) 5'-UAC-3' (C) 5'-CAU-3' (D) 5'-GUA-3'
2. Given the following codons: Phe (UUU， UUC)， Pro (CCU， CCC， CCA， CCG)， and Lys (AAA， AAG)， identify a possible sequence of nucleotides in the DNA template strand for a mRNA coding for the sequence Phe-Pro-Lys.
   (A) AAA-CCC-UUU (B) CTT-GGG-GAA (C) AAA-ACC-TTT (D) GAA-CCC-CTT
3. The Antibiotic that inhibits protein synthesis by premature chain termination and which structurally resembles amino acyl tRNA is
   (A) tetracycline (B) Chloramphenicol (C) Puromycin (D) Erythromycin
4. Attenuation of the trp operon occurs when:
   (A) there is an abundance of glucose.
   (B) the repressor protein binds to the operator denying RNA polymerase access to the structural genes.
   (C) a hairpin loop plus poly U sequence mimics the normal signal for termination of transcription.
   (D) there is an alteration of the availability of the promoter site for polymerase binding.
5. Which of the following mutations would have the greatest negative impact on the protein product of a gene?
   (A) a base-pair substitution
   (B) a deletion of three bases near the middle of the gene
   (C) a single base insertion near the start of the coding region of the gene
   (D) a single base deletion close to the end of the coding region of a gene

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6. Repression of lac operon by glucose is due to
(A) inactivation of repressor (B) activation of CAP (C) inhibition of lactose uptake (D) inhibition of an enzyme involved in cAMP synthesis

7. Facilitated diffusion differs from active transport because in facilitated diffusion
(A) the substance move with a concentration gradient (B) the substance moves against a concentration gradient (C) a membrane protein is involved in the transport (D) ATP is required

8. How does glucokinase differ from hexokinase? (A) Hexokinase only transfers a phosphate from Pi to glucose, while glucokinase can use Pi. (B) Glucokinase only transfers a phosphate from ATP to glucose, while hexokinase can use Pi. (C)Glucokinase requires a higher concentration of glucose to achieve saturation. (D) Glucokinase is only found in the muscle tissue, while hexokinase is found elsewhere

9. Fructose-2，6-bisphosphate is an allosteric effector of which of the following enzymes?
(A) fructose-1，6-bisphosphatase and phosphofructokinase (B) triosephosphate isomerase (C)phosphofructokinase (D)fructose-1，6-bisphosphatase

10. A second messenger is
(A) a substance that brings about a desired effect in a cell as a result of a hormone binding to its receptor on the cell surface
(B) a hormone that acts on a target cell， not one of the releasing factors or trophic hormones that act on specific endocrine glands
(C) a hormone that affects the DNA of the target cell
(D) a specialized form of mRNA

11. Skeletal muscle glycogen is not a source of blood glucose because skeletal muscle does not contain
(A) glucose 6-phosphate dehydrogenase.
(B) glucose 6-phosphatase
(C) phosphoglucomutase.
(D) phosphorylase

12. A metabolic function of the pentose phosphate pathway is:
(A) to act as a source of ADP biosynthesis.
(B) to generate NADPH and pentoses for the biosynthesis of fatty acids and nucleic acids.
(C) to participate in oxidation-reduction reactions during the formation of H_2O.
(D) to provide intermediates for the citric acid cycle.

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1. 請簡述電子傳遞鏈所需的分子及其參與的順序? (8 分)

2. 請簡述 Watson and Crick Model 的 DNA 特性為何? (7 分)

3. 請簡述 DNA 複製過程中雙股的差異性? (5 分)

4. 請簡述真核細胞及原核細胞其基因表現過程的差異性。(5 分)

第四大題共 25%

一、 選擇題：(每題 2.5 分) (10%)

1. 酵素活性比(specific activity)為蛋白質中酵素所佔的量，常用來當作判定何種指標?
   (A)酵素純度 (B)反應速率 (C)酵素活性單位
2. 當反應有競爭性的抑制劑(competitive inhibitor)加入時 Vmax 值將
   (A)變大 (B)不變 (C)變小
3. 下列哪一個敘述是正確的?
   (A)酵素催化反應之初速度與受質濃度無關 (B)當受質濃度飽和時，酵素催化反應速度與酵素濃度成正比 (C)競爭抑制型之結果是 Km 變小但 Vmax 不變 (D)競爭型抑制劑結合位置並非酵素之活性中心
4. 下列敘述何者錯誤?
   (A) insulin receptor 為 tyrosine kinase receptor，位在細胞膜上 (B) insulin 會促進進食後血液中血糖濃度降低 (C) 細胞自己分泌 growth factor 再由自己細胞上的接受器（receptor）接收進而調控自己的方式稱為 autocrine (D) 賀爾蒙（hormone）經由血液循環調控細胞的方式稱為 paracrine

二、 問答題：

1.Glutathione（GSH）是細胞中之主要 peptide，其組成之三種胺基酸分別為哪三種?(6%)

2.哪些胺基酸屬於硫胺基酸(sulfur-containing amino acids)? (4%)

3.請舉例說明 Gαs protein 的調控(5%)