臺北醫學大學 90 學年度第 2 學期 期中 期末 考試 命(試)題紙

系級	科目	授課教師	考試日期	學號	姓名
么二	生物化學	陳建福	91年6月20日第 節		

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Answer ALL questions, as there is no penalty for wrong answers. (26%)

( ) 1 The hormone epinephrine (also known as adrenaline) is derived from which amino acid? (A) phenylalanine (B) glycine (C) tyrosine (D) histidine (E) arginine

( ) 2 When glutamate dehydrogenase generates α-ketoglutarate from glutamate, which of the following molecules is utilized? (A) NAD^+ (B) $NADP^+$ (C) NADH (D) NADPH (E) none of the above

( ) 3 Urea is the byproduct of which enzymatic reaction? (A) arginosuccinate synthetase (B) arginase (C) arginosuccinase (D) ornithine transcarbamoylase (E) carbamoyl phosphate synthetase I

( ) 4 Which of the following enzymes catalyzes the initial reaction in polyamine biosynthesis? (A) carbamoyl phosphate synthetase I (B) aspartate transcarbamoylase (C) thymidylate synthase (D) serine hydroxymethyltransferase (E) ornithine decarboxylase

( ) 5 What is the cellular role of ubiquitin? (A) protein translocation (B) protein folding (C) protein degradation (D) calcium binding protein (E) electron transport

( ) 6 Nitric oxide is synthesized by NO synthase from what? (A) lysine (B) glutamine (C) arginine (D) asparagine (E) tryptophan

( ) 7 Which of the following compounds does NOT contribute any carbons directly to purine biosynthesis? (A) lysine (B) glycine (C) glutamine (D) CO_2 (E) tetrahydrofolate

( ) 8 What is (are) the biochemical and genetic symptoms of Lesch-Nyhan syndrome? (A) insufficient ATP in bloodstream (B) deficiency of HGPRT enzyme (C) elevated serum uric acid levels (D) A and C (E) B and C

( ) 9 During the biosynthesis of dTMP, which of the following is the immediate precursor of dTMP? (A) TMP (B) TDP (C) dUMP (D) UMP (E) UDP

( ) 10 The chemotherapeutic drug methotrexate reduces DNA synthesis by inhibiting: (A) ribonucleotide reductase (B) dihydrofolate reductase (C) glutathione reductase (D) HMG-CoA reductase (E) thioredoxin reductase

( ) 11 Which of the following enzyme activity in serum is an indicator of liver damage? (A) malate dehydrogenase (B) dihydrofolate reductase (C) thymidylate synthase (D) PRPP synthetase (E) alanine aminotransferase

( ) 12 The two enzyme catalyzed reactions that utilize cobalamin (from Vitamin B_{12}) as a cofactor are the ones converting: (A) methylmalonyl-CoA to succinyl CoA and homocysteine to methionine (B) aspartate to oxaloacetate and glutamate to γ-aminobutyric acid (GABA) (C) tryptophan to serotonin and tyrosine to 3,4-dihydroxyphenylalanine (DOPA) (D) norepinephrine to epinephrine and lysine to trimethyllysine (E) valine to α-ketoisovaleric acid and α-ketoisovaleric acid to isobutyryl COA

( ) 13 Uric acid is: (A) a highly water-soluble pyrimidine analog (B) a rather insoluble pyrimidine analog (C) a highly water-soluble purine analog (D) a rather insoluble purine analog (E) none of the above

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一、在 *E. coli* DNA polymerases 中哪一個 polymerase 合成 DNA 的速度最快？_____

哪一個 polymerase 具有 5' → 3' exonuclease 的活性？_____**(2 points)**

二、在真核生物（Eukaryotic）的 DNA polymerase - α, β, γ, δ, ε 中，**(2 points)**

哪一個是 DNA 合成時主要的 DNA polymerase？_____

哪一個 DNA polymerase 主要是擔任粒腺體 (mitochondria) DNA 的合成？_____

三、_____ 請由下列選項中選擇與 Klenow fragment 有關的特性 ？**(複選；2 points)**

(A) DNA polymerase I small fragment (B) DNA polymerase I large fragment
(C) DNA polymerase I N-terminal fragment (D) DNA polymerase I C-terminal fragment
(E) contains the 5'-exonuclease domain (F) contain 3'- exonuclease domain
(G) contain the polymerase domain

四、_____*E. coli* DNA replication 過程中何者會與 *oriC* 區域結合形成 initial complex？**(1 points)**

（A）DnaA（B）DnaB（C）DnaT（D）Tus（E）PriC（F）primase

五、_____ 真核生物 DNA 複製過程中 RNA primer 是由下列何酵素將其移除？**(1 points)**

（A）RNase A（B）DNase I（C）RNase H1（D）DNA polymerase I（E）DNA ligase

六、_____ Reverse transcriptase 具有下列哪些特性？**(複選；2 points)**

（A） DNA-directed RNA polymerase activity （B）DNA-directed DNA polymerase activity （C） RNA-directed DNA polymerase activity（D）RNase H activity（E)具有 proof reading 的功能

七、RNA polymerase holoenzyme 其組成包括 $\alpha_2\beta\beta'\sigma$: **(2 points)**

_____ β' subunit 功能為何？ _____ σ subuni 功能為何?

（A）binds the NTP substrates （B）DNA binding （C）interacts with σ （D）recognizing promoters （E） assembly of the enzyme

八、_____ 下列何種技術可用來鑑定 Promoter 序列？ **(1 points)**

(A) yeast two hybrids （B） Northern hybridization （C） Western blotting （D） DNA footprinting （E） Southern hybridization

九、_____ 原核生物 promoter 常見的兩個保守序列 (two consensus sequence elements) 為何？(複選；2 points)

（A） Pribnow box （B） upstream element （C）-35 region TTGACA （D） TATA box
（E） Shine-Dalgarno sequence

十、_______ 原核生物 RNA polymerase σ subunit 會辨識 promoter -10 and -35 elements, 請問下列何者會辨識 UP element.? **(2 points)**
(A) the C-terminal domains (CTD) of the β units (B) the C-terminal domains (CTD) of the β' units (C) the C-terminal domains (CTD) of the α units (D) the C-terminal domains (CTD) of the σ units (E) the C-terminal domains (CTD) of the ρ units

十一、_______ 原核生物 RNA transcription initiation 的抑制劑 rifampicin，會與下列那一個 RNA polymerase 的 subunit 結合，使 RNA transcription 過程終止？(2 points)
(A) α (B) β (C) β' (D) σ (E) ρ

十二、真核生物的 RNA polymerase 可分為三種：分別為 RNA polymerase I、RNA polymerase II 與 RNA polymerase III。(2 points)
何者主要是轉錄 mRNA 基因____________ 何者主要分佈在 Nucleolus 中_________

十三、___________ 下列哪些物質是屬於原核生物核糖體 (ribosome)的組成？**(複選)** **(2points)**
(A) 40S small subunit (B) 16 S rRNA (C) 18S rRNA (D) 5.8S rRNA (E) 23S rRNA (F) 5S rRNA (G) 28S rRNA

十四、__________ 原核生物蛋白質合成啟始過程 (peptide chain **initiation**) 必須有下列何者參與？**(複選)** **(2 points)**
(A) mRNA (B) 30S and 50S ribosomal subunits (C) initiation factors (D) ATP (E) a specific charged tRNA, f-Met-$tRNA_f^{Met}$ (H) GTP

十五、原核生物的核糖體 (ribosome)組成中 _________ 具有與 ribosome-binding site (Shine-Dalgarno sequence) 結合能力。**(2 points)**

十六、_________________ 原核生物蛋白質合成過程中，合成 300 蛋白質必須消耗多少能量？**(2 points)**

十七、_________ 原核生物蛋白質合成過程中，主要的能量來源是水解下列何物質所提供？**(1 points)**
(A) NADH (B) ATP (C) GTP (D) ADP (E) AMP (F) GDP

私立臺北醫學院 90 學年度第 2 學期 期中/期末 考試 命(試)題紙

系級	科目	授課教師	考試日期	學號	姓名
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I. Single choice (18%)

1. Glycolysis
   (a) requires molecular oxygen to generate energy (b) does not require molecular oxygen to generate energy
   (c) is inhibited by oxygen (d) rate is increased in the presence of oxygen
2. The final product in phase I of glycolysis is
   (a) fructose-1,6-bisphosphate (b) glyceraldehydes-3-phosphate (c) pyruvate (d) glucose-6-phosphate
3. How many reactions in the glycolytic pathway consume or produce ATP?
   (a) 2 (b) 3 (c) 4 (d) 6
4. Pyruvate in humans can be converted to
   (a) acetyl-CoA (b) lactate only (c) ethanol only (d) acetyl-CoA and lactate
5. Both hexokinase and glucokinase are found in the liver. Glucokinase has a Km value of 10 mM, with the Km value for hexokinase being less than 1 mM. The data are consistent with which of the following statement?
   (a) glucokinase acts on glucose at low levels (b) glucokinase acts on glucose only at very high concentrations
   (c) glucokinase plays a major role in glucose metaboism at low glucose levels (d) hexokinase acts on glucose only at high levels of glucose
6. Phosphofructokinase is an enzyme that regulates the rate of glycolysis. Which of the following statements is characteristic of this enzyme?
   (a) phosphofructokinase is not an allosteric enzyme (b) citrate increases the activity of phosphofructokinase
   (c) AMP increases the activity of phosphofructokinase (d) phosphofructokinase activity is a function of free energy
7. An enzyme not involved in the regulation of glycolysis is
   (a) hexokinase (b) triose phosphate isomerase(c) pyruvate kinase (d) phosphofructokinase
8. The glycolytic enzyme influenced by the hormone glucagons is
   (a) triose phosphate isomerase (b) pyruvate kinase (c) hexokinase (d) lactate dehydrogenase

9. Indicate the cellular location of the following glycolysis _____

私立臺北醫學院 90 學年度第 二 學期 期中/期末 考試 (命試) 題紙

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公衛 二 (30 %)

1. ( ) Fatty acid was degraded by (a) CoASH addition (b) carboxylation (c) methylation (d) beta-oxidation (e) glycolysis
2. ( ) The first step of fatty acid synthesis is catalyzed by (a) fatty acid synthase (b) acetyl-CoA carboxylase (c) citrate synthase (d) Isomerase (e) reductase
3. ( ) The steroid hormones are converted from (a) triacylglycerol (b) protein (c) cholesterol (d) phospholipid (e) acetyl-CoA
4. ( ) Which form of energy compound is used in synthesis of glycerol-phospholipid (a) ATP (b) NADH (c) NADPH (d) CTP (e) GTP
5. ( ) Which compound is the key substrate in cholesterol synthesis (a) acetyl-CoA (b) HMG-CoA (c) mevalonate (d) cholic acid (e) acetoacetate
6. ( ) The respirator stress syndrome is induced by which compound deficiency (a) ganglioside (b) galactosidase (c) dipalmitoylphosphotidylcholine (d) ceramidase (e) sphingomyelin
7. ( ) Which compound is the source of acetyl-CoA at fatty acid synthesis from mitochondria (a) pyruvate (b) fatty acid (c) citrate (d) oxaloacetate (e) manoyl-CoA
8. ( ) Which is called " good cholesterol" (a) chylomicron (b) VLDL (c) LDL (d) IDL (e) HDL
9. ( ) Cholesterol is transported from circulation to peripheral tissue by which lipoprotein (a) chylomicron (b) VLDL (c) LDL (d) IDL (e) HDL
10. ( ) The lovastatin is the inhibiter to which protein (a) acetyl-CoA carboxylase (b) phosphodieasterase (c) HMG-CoA lyase (d) HMG-CoA reductase (e) fatty acyl-CoA synthase
11. ( ) Which protein in mitochondria outer-membrane is necessary in process of fatty acyl-CoA transport from cytosol to matrix of mitochondria (a) carnitine acyltransferase I (b) carnitine acyltransferase II (c) translocase (d) NADH dehydrogenase (e) thiolase
12. ( ) How many molecules of NADPH is needed in steric acid (C18:0) synthesis (a) 13 (b) 14 (d) 15 (e) 16
13. ( ) Which molecular is the proton final acceptor in electron transport (a) complex IV (b) Fe-S center (c) cytochrome c (d) O2 (e) ubiquinone
14. ( ) How many ATP will be converted by malate-asparate shuttle (a) 1 (b) 2 (c) 3 (d) 4 (e) 5
15. ( ) The cyanide is the inhibitor in which complex in electron transport (a) I (b) II (c) III (d) IV (e) V (ATP synthase)