

臺北醫學大學 九十二 學年度第 一 學期 期中考 試 (命題) 紙

系級	科目	授課教師	考試日期	學號	姓名
醫一	普通生物學	楊良友	92年1月15日第 節		

※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Department of Medicine
 Instructor: Dr. Liang-Yo Yang

General Biology Final Exam 2003

This final exam consists of three parts of multiple choice questions. Please choose the **ONE AND ONLY ONE BEST ANSWER FOR EACH QUESTION**. Parts I, II, and III contain 22, 22 and 10 multiple choice questions, respectively. Each question in Part I is worth 2 points. Questions in Part II are worth 3 points each. Part III are composed of 10 one-point questions. **Please remember to write down your name and student ID on at least the first and final pages of this exam. Please fill in your answer in the table provided on the last page of this exam.** I wish you all do well in this final exam. Have a great Chinese New Year and enjoy your winter break.

- Jenner successfully used cowpox virus as a vaccine against a different virus that causes smallpox. Why was he successful even though he used viruses of different kinds?
 - Cowpox and smallpox are antibodies with similar immunizing properties.
 - The immune system responds nonspecifically to antigens.
 - All of the below are true.
 - There are some antigenic determinants common to both pox viruses.
 - The cowpox virus made antibodies in response to the presence of smallpox.
- What is the primary effect that an oil spill would probably have on frogs?
 - They will die because the toxins will build up in their blood.
 - They will survive by remaining hidden beneath the water.
 - They will die because they will not be able to respire across their skin.
 - Survival or death will be dependent upon the genetic makeup of each individual frog.
 - They will survive because they have a natural secretion that will repel the oil.
- If a molecule of CO₂ released into the blood in your left toe travels out of your nose, it must pass through all of the following structures *except*
 - right ventricle.
 - right atrium.
 - alveolus.
 - trachea.
 - pulmonary vein.
- All of the following statements about antibodies are true *except*:
 - Plasma B cells are responsible for the production of antibodies.
 - Antibodies bind with foreign cells and destroy them.
 - Antibodies are immunoglobulin proteins.
 - Antibodies act as signals to blood complement proteins or phagocytes.
 - The structure of antibodies includes both a constant and a variable region.
- Cows are able to survive on a diet consisting almost entirely of cellulose because

臺北醫學大學 九十二學年度第 一 學期 期中考試 (命題) 題紙

系 級	科 目	授 課 教 師	考 試 日 期	學 號	姓 名
醫一	普生	楊良友	93年1月15日第 節		
*①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。 ②每張試題卷務必填寫(學號)、(姓名)。					

- A) the cow's saliva has enzymes capable of digesting cellulose.
 B) cows are autotrophic.
 C) cows have cellulose-digesting, symbiotic microorganisms in their rumens.
 D) the cow, like the rabbit, reingests its feces.
 E) cows can manufacture all 15 amino acids out of sugars in the liver.
- 6) Human plasma proteins include which of the following?
 I. fibrinogen
 II. hemoglobin
 III. immunoglobulin
 A) I only
 B) II only
 C) I and III only
 D) II and III only
 E) I, II, and III
- 7) Most of the carbon dioxide carried by the blood in humans is carried as
 A) carbonic acid in the erythrocytes.
 B) bicarbonate attached to hemoglobin.
 C) CO₂ attached to hemoglobin.
 D) CO₂ dissolved in the plasma.
 E) bicarbonate ions in the plasma.
- 8) If, during protein starvation, the osmotic pressure on the venous side of capillary beds drops below the hydrostatic pressure, then
 A) most carbon dioxide will be bound to hemoglobin and carried away from tissues.
 B) hemoglobin will not release oxygen.
 C) fluids will tend to accumulate in tissues.
 D) the pH of the interstitial fluids will increase.
 E) plasma proteins will escape through the endothelium of the capillaries.
- 9) Which of the following are necessary to produce monoclonal antibodies?
 A) fibroblasts
 B) plasma cells
 C) myeloma cells
 D) macrophages
 E) Both B and C are necessary.
- 10) Tidal volume in respiration is analogous to what measurement in cardiac physiology?
 A) heart rate
 B) cardiac output
 C) stroke volume
 D) systolic pressure
 E) diastolic pressure

臺北醫學大學 九十二 學年度第 一 學期 期中考試 (試) 命題紙

系級	科目	授課教師	考試日期	學號	姓名
醫一	普生	楊良友	93年1月15日第 節		
※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。 ②每張試題卷務必填寫(學號)、(姓名)。					

- 11) Hormones that affect the pancreas include
 - A) enterogastrone.
 - B) gastrin.
 - C) CCK.
 - D) secretin.
 - E) both C and D.
- 12) All of the following are functions of the mammalian kidney *except*
 - A) production of urea as a waste product of protein catabolism.
 - B) water reabsorption.
 - C) filtration of blood.
 - D) regulation of salt balance in the blood.
 - E) excretion of nitrogenous waste.
- 13) Each indication below is a clinical characteristic of inflammation *except*
 - A) redness.
 - B) pain.
 - C) edema.
 - D) increased blood flow.
 - E) decreased temperature.
- 14) Which of the following is an example of countercurrent flow?
 - A) the flow of air within the primary bronchi of a human and the flow of blood within the pulmonary veins
 - B) the flow of water across the skin of a frog and the flow of blood within the ventricle of its heart
 - C) the flow of fluid out of the arterial end of a capillary and the flow of fluid back into the venous end of that same capillary
 - D) the flow of water across the gills of a fish and the flow of blood within those gills
 - E) the flow of blood in the dorsal vessel of an insect and the flow of air within its tracheae
- 15) Cyanide acts as a mitochondrial poison by blocking the final step in the electron transport chain. What will happen to human red blood cells if they are placed in an isotonic solution of cyanide?
 - A) The cells will be unaffected.
 - B) The cell shape will be maintained but the mitochondria will be poisoned.
 - C) The cells will not be able to carry oxygen.
 - D) The cells will lyse as the cyanide concentration increases inside the cell.
 - E) As a protective mechanism, the cells will switch to anaerobic metabolism.
- 16) Which of the following glandular secretions involved in digestion would be most likely to be released initially as inactive precursors?
 - A) protein-digesting enzymes
 - B) carbohydrate-digesting enzymes
 - C) fat-solubilizing bile salts

臺北醫學大學 九十二學年度第 一 學期 期中考試 (試) 題紙

系 級	科 目	授 課 教 師	考 試 日 期	學 號	姓 名
醫一	普生	楊良友	92年1月15日第 節		
※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。 ②每張試題卷務必填寫(學號)、(姓名)。					

- D) acid-neutralizing bicarbonate
E) hormones such as gastrin
- 17) If a person were suffering from edema, which of the following conditions would reduce it?
 A) lower blood pressure
 B) a prolonged starvation diet
 C) decreased plasma protein production by the liver
 D) an obstruction in the lymphatic system
 E) enlarged clefts between capillary endothelial cells due to damage or inflammation
- 18) How does the digestion and absorption of fat differ from that of carbohydrates?
 A) Fat absorption occurs in the stomach, whereas carbohydrates are absorbed from the small intestine.
 B) Processing of fat does not require any digestive enzymes, whereas the processing of carbohydrates does.
 C) Carbohydrates need to be emulsified before they can be digested, whereas fats do not.
 D) Most absorbed fat first enters the lymphatic system, whereas carbohydrates directly enter the blood.
 E) Fat must be worked on by bacteria in the large intestine before it can be absorbed, which is not the case for carbohydrates.
- 19) A red blood cell is in an artery in the left arm of a human. How many capillary beds must this cell pass through before it is returned to the left ventricle of the heart?
 A) one B) two C) three D) four E) five
- 20) Which of the following statements about humoral immunity is *correct*?
 A) It primarily defends against fungi and protozoa.
 B) It primarily defends against bacteria and viruses that have already infected cells.
 C) It protects the body against cells that become cancerous.
 D) It is mounted by lymphocytes that have matured in the bone marrow.
 E) It is responsible for transplant tissue rejection.
- 21) Which of the following is an example of positive feedback in the immune system?
 A) Cells release a cytokine that stimulates these cells to divide and release more of the cytokine.
 B) Memory cells proliferate and produce antibodies.
 C) Large antigens with many repeating antigenic determinant sites can stimulate B cells without the aid of T cells.
 D) Cytotoxic cells release substances that attract macrophages.
 E) Both A and B are examples of positive feedback in the immune system.
- 22) Hormones involved in the production of urine include all of the following *except*
 A) atrial natriuretic factor.
 B) aldosterone. C) ADH. D) secretin. E) angiotensin.

臺北醫學大學 九十二學年度第 一 學期 期中考試 (試) 題紙

系 級	科 目	授 課 教 師	考 試 日 期	學 號	姓 名
醫一	普生	楊良友	93年1月15日第 節		

※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Department of Medicine
 Instructor: Dr. Liang-Yo Yang

General Biology Final Exam 2003

Part II. There are 22 multiple choice questions and each question is worth 3 points. Please choose ONE AND THE ONLY ONE BEST ANSWER for each question.

03-TMU Biology & Medicine (Med One by Mike Chiueh)

23. Which nervous system in the brain is preferentially undergoing degeneration in Parkinson's disease?

- A. midbrain A9 nigrostriatal dopaminergic neurons
- B. midbrain serotonergic neurons
- C. forebrain cholinergic neurons

24. The following drugs are known to cause parkinsonism (extrapyramidal motor dysfunction). Most of the drug-induced parkinsonism is reversible after stopping treatment. Please name the neurotoxin that causes irreversible parkinsonism in some of drug abusers.

- A. Anti-psychotic drugs
- B. Narcoleptics or narco-analgesics
- C. MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)

25. There are several major biological functions of brain dopamine that can be revealed following the administration of centrally active drugs. Please name those drugs?

- A. DL-DOPA or L-DOPA: precursor for the biosynthesis of dopamine
- B. (+)-Amphetamine: dopamine releasing agent
- C. pramipexole: dopamine receptor agonist
- D. All of the above

26. It is known that black melanin pigments are formed following the mixing of dopamine, iron and oxygen. In the human midbrain which dopamine neurons contain black neuromelanin pigments and are undergoing progressive age-dependent neurodegeneration.

- A. A9 Nigrostriatal neurons
- B. A10 mesolimbic neurons

27. To replace the passive learning and the orthodox teaching of the past, the future integrative college training at TMU should be focused on the following skills.

- A. Critical thinking
- B. Problem solving
- C. Life-time learning
- D. All of the above

28. 下列哪一事實是對於證實 progesterone 對於動脈平滑肌細胞的增生具有直接的抑制作用之最有力的證據?

5 of 9

臺北醫學大學 九十二學年度第 一 學期 期中考試 (試) 題紙

系級	科目	目	授課教師	考試日期	學號	姓名
醫一	普生		楊良友	93年1月15日第 節		

※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Department of Medicine

General Biology Final Exam 2003

Instructor: Dr. Liang-Yo Yang

- (A) 更年期前女性之心血管疾病患病率較同年齡男性為低
- (B) 更年期後女性之心血管疾病患病率與同年齡男性相似
- (C) 更年期後有服用 progesterone 的女性之心血管疾病患病率較同年齡男性為低
- (D) 動脈平滑肌細胞上具有 progesterone receptor

29. 下列哪一實驗是證實 progesterone 對於動脈平滑肌細胞的增生具有直接的抑制作用之最好方法？

- (A) epidemiology
- (B) animal study
- (C) cell culture
- (D) molecular biology

30. 人體實驗中很難得到證實 progesterone 對心血管疾病具有保護作用的直接證據的主要原因是

- (A) 人體的 genetic background 差異性大
- (B) 很難在人體進行試驗條件的改變 (manipulation)
- (C) 人體的壽命太長
- (D) 人是很不合作的研究對象

31. 下列何者為研究免疫細胞對於動脈粥腫硬化影響的最好動物模式？

- (A) Carotid artery transplantation
- (B) Balloon-injured carotid artery
- (C) ApoE deficiency mouse
- (D) Aneurysm clip-induced injury of carotid artery

32. 目前的研究結果顯示，下列何者可能與 estrogen 的心血管保護作用最無關？

- (A) 降低血液之 LDL 濃度
- (B) 直接抑制動脈平滑肌細胞的增生作用
- (C) 造成血管擴張
- (D) 增高血液之 HDL 濃度

期終考題 (Topic: Theory and Application of DNA microarray in biomedical research)，有五題，一題 3 分，共 15 分

33. 在 DNA microarray 的訊號物質現多選擇螢光物質，而少用放射線同位素及酵素呈色，其中下列敘述何者錯誤？

- (1) 放射線同位素的使用，有害於操作人員健康，並造成環境污染。
- (2) dynamic range: 呈色 < 螢光

臺北醫學大學 九十二學年度第 一 學期 期中考試 (命題) 題紙

系級	科目	授課教師	考試日期	學號	姓名
醫一	普生	楊良友	93年1月15日第 節		
※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。 ②每張試題卷務必填寫(學號)、(姓名)。					

Department of Medicine
Instructor: Dr. Liang-Yo Yang

General Biology Final Exam 2003

- (3) 靈敏度: 放射線同位素 < 呈色
- (4) 訊號物質若選擇螢光物質，則 DNA 不可微陣列在 nitrocellulose membrane 表面

34. 在 DNA microarray 的製程方面，其中下列敘述何者錯誤？

- (1) DNA 無法直接固著在玻璃片或塑膠片上，必須藉一層表面塗劑才可。
- (2) DNA spot 的直徑可藉打點針的針尖大小來控制。
- (3) 必須先製備 DNA 探針後，才能藉機械手臂陣列在玻璃片表面。
- (4) DNA spot 之密度，可藉機械手臂在 X 軸或 Y 軸移動的間距來控制。

35. 下列課題非 DNA microarray 可研究之範疇？

- (1) mRNA 表現分析。
- (2) genomic DNA 之 deletion 或 amplification。
- (3) point mutation 之偵測。
- (4) protein 的轉譯後修飾 (post-translational modification)。

36. 製作出第一片 DNA microarray 的作者為何人？

- (1) Patrick Brown 等人。
- (2) Craig Venter 等人。
- (3) Francis Collins 等人。
- (4) Eric Lander 等人。

37. 下列課題是 DNA microarray 可應用之範疇？

- (1) 癌症分型
- (2) 腫瘤細胞之染色體 DNA 變化
- (3) 基因突變之偵測
- (4) 致病菌之致病基因的發現
- (5) 以上皆是

38. Which of the following scientists was awarded for Nobel Prize because of his contribution in unveiling the interaction between the tumor viruses and the genetic material of the cell? (A) Torsen N. Wiesel (B) Joseph E. Murray (C) Howard Temin (D) J. Michael Bishop (E) None of the above

39. Roger W. Sperry was awarded Nobel Prize in Medicine because he discovered that

- (A) the left and right cerebral hemisphere are highly specialized and each has different and distinct functions.
- (B) the mechanisms underlying how the visual cerebral cortex analyzes visual stimuli and how the visual image is formed.
- (C) the cellular origin of retroviral oncogenes comes from normal cells.
- (D) there was a biological force preventing transplantation between individuals.

臺北醫學大學 九十二學年度第 一 學期 期中考試 (試) 題紙

系 級	科 目	授 課 教 師	考 試 日 期	學 號	姓 名
醫一	普生	楊良友	93年 1 月 15 日第 節		

※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Department of Medicine
 Instructor: Dr. Liang-Yo Yang

General Biology Final Exam 2003

(E) None of the above statements is correct.

40. Which of the following scientists illustrated programmed cell death by using *C. elegans* and was awarded Nobel Prize in medicine?

(A) Sydney Brenner (B) Michael S. Brown (C) Joseph L. Goldstein (D) John E. Sulston (E) A and D

41. Which of the following drugs or factors can reduce the blood cholesterol level?

(A) Compactin (B) Mevinolin (C) decrease of LDL receptor (D) A, B, and C (E) A and B

42. Which of the following scientists discovered the c-AMP dependent protein kinases that are involved in various cellular reactions and won Nobel Prize in 1992?

(A) David Baltimore (B) Timothy Hunt (C) Edmond H. Fischer (D) Leland Hartwell (E) Two of the above

43. Which of the following diseases is (are) NOT induced by prion protein?

(A) Scrapie (B) CJD (C) BSE (D) Myasthenia gravis (E) Two of the above

44. Paul Nurse received Nobel Prize because he

(A) discovered that the prion protein is the cause of several CNS-related diseases.
 (B) discovered the transposable elements in gene
 (C) discovered the neurotransmitter nitric oxide
 (D) discovered the functions of cdc genes in regulation of cell cycle
 (E) None of the above statements is correct.

Part III. There are 10 questions in this part of exam and each question is worth 1 point.

45. If we wish to preserve natural ecosystems, we should do all we can to preserve their (1) biological diversity (2) climate (3) bear (4) predator..... ()

46. In a controlled experiment in a coastal ecosystem, an investigator removed a key predator (Pilaster). Finally, the number of species in that ecosystem (1) increase (2) decrease (3) no change (4) increase and then decrease..... ()

47. (1) predation (2) coevolution (3) cooperation (4) chemical defense is able to reduce competition in natural communities and increase biodiversity..... ()

臺北醫學大學 九十二學年度第 一 學期 期中考試 (命題) 題紙

系級	科目	授課教師	考試日期	學號	姓名
醫一	普生	楊良友	92年1月15日第 節		

※①請注意本試題共 九 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。

Department of Medicine

General Biology Final Exam 2003

Instructor: Dr. Liang-Yo Yang

48. Species richness on islands is a dynamic equilibrium between colonization and (1) extinct (2) predation (3) competition (4) habitat..... ()

49. Exotic species often cause great damage to local environment due to the lack of their (1) habitat (2) prey (3) niche (4) predator..... ()

50. One of the most serious environmental problems in the future is the loss of (1) biodiversity (2) deer (3) fish (4) pine tree..... ()

51. E. O. Wilson has calculated that as much as (1) 1% (2) 50% (3) 5% (4) 25% of the world's species may be lost during the next 50 years..... ()

52. There is an intensive investigation of (1) soil (2) organisms (3) oil (4) water for new drugs to fight cancer and other diseases, or as sources of antibiotics..... ()

53. There are about (1) 40% (2) 2% (3) 15% (4) 5% of freshwater fish species extinct in the last fifty years..... ()

54. All the organisms that live together in a place are called a (1) population (2) community (3) ecosystem (4) biosphere..... ()

Part I: Each question is worth 2 points (44 points)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22								

Part II: Each question is worth 3 points (66 points)

23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42
43	44								

Part III: Each question is worth 1 point (10 points)

45	46	47	48	49	50	51	52	53	54
----	----	----	----	----	----	----	----	----	----