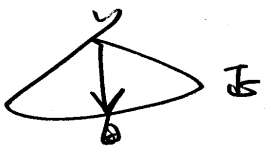
～11 版序～

114年的後西醫已順利結束。每間學校的出題廣度、深度及比重各有不同，要如何準備及掌握各校的命題要點，這正是本書從第一版出書至今所抱持的目的。筆者憑藉多年的教學經驗以及詳細的解析說明，讓同學們知道答案怎麼選，為什麼這選項可以選或不能選，理由說明全部告訴您，希望藉由考古題的分析演練，提供更完整的學習指引。同學們可以透過考古題來練就自己對題目的掌握、判定，進而了解自己所學的情況，厚植自己的應試實力。

今年四所學校的考題難易度，清華試題一如往常仍然是內容之廣度及深度且令人有難以呼吸的感受。試題分布主要在基礎生化學、分子生物學及動物生理學三個部分，皆有一定的難度；中興題目簡單，雖然題目分布極為不平均，光動物生理學部分出了32題，但簡單不刁鑽，同學作答上應該可以得心應手。中山試題的分布還算平均，命題重要章節大多落在動物生理學，高達38題，難易適中。高醫試題則如同往常難易適中，命題重點落於遺傳學、分子生物學、動物生理學及生物分類學。

不知不覺本書已經進入了第11個年頭，在同學間已建立了信任與口碑，每位同學對本書的愛好及建議更加深了筆者的責任，能寫出比坊間同性質的書籍更正確、豐富及詳細的解答，筆者自信已經達成同學的期望，願本書能讓同學過關斬將，榜上有名。



2025.07 謹誌

～自序～

本書收集高雄醫學大學學士後西醫的歷屆考題，111年新增清華、中興及中山三校試題，並逐題附以答案解析，將簡單正確的考題方向及解題技巧展現給同學，讓同學不僅知其然，更知其所以然！從“作”中學來知悉命題重點及考試方向，節省備考時間，讓應試實力倍增。

基本上而言，學士後西醫的普通生物學試題大約可分成二種命題型式：

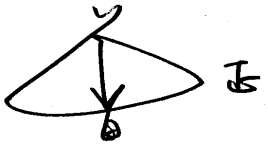
㈠傳統考法：考題簡單明確，答案明顯，只要具備基本概念即可作答。

㈡活用、跨章節式考法：題目變化較多，會跨章節其至超出課本以外的命題。

同學可以發現，幾乎90%以上的考題可在生物教科書發現，而10%是出題老師阻止考生獲得滿分所設下的障礙而已。故同學想要考上，必須加強90%以上的課內重點，而非追求那10%的課外教材，甚至作一些大學入學指考試題，甚至更誇張的去作奧林匹亞生物競試的題目，根本是錯誤的準備方向。

希望本書的出版，能帶給同學最正確的應考態度及準備方向！

祝福各位同學，考場得意，一舉中第！



111年 清華普通生物學試題精解

1. Which of the following descriptions about brown algae is **NOT** correct?
   (A) They are the smallest and least complex algae.
   (B) They are multicellular and mostly marine.
   (C) They contain chlorophylls and carotenoids in their plastids for photosynthesis
   (D) Some species, such as Japanese "kombu", are eaten as human food.
   (E) Their cell walls contain gel-forming polysaccharides called algin.

答案：(A)

⏭解析：

brown algae的特色為：

(1) 最大型及最複雜的藻類。

(2) 多細胞且大部分為海洋生。

(3) 質體含carotenoids。

(4) 可食的，例如kombu。

(5) 其細胞壁含有algin。

故本題正確答案為(A)。

2. Which of the following descriptions about fungi is **NOT** correct?
   (A) They are a group of eukaryotic organisms that includes yeasts, molds, and mushrooms.
   (B) They are incapable of photosynthesis.
   (C) Fungal membranes contain a unique steroid called ergosterol, which is a drug target of athlete's foot treatment.
   (D) Mycorrhizal fungi form symbiotic relationships only with legumes.
   (E) Fungal cell walls are made of chitin.

答案：(D)

⏭解析：

fungi的特性有：

(1) 真核生物，包括yeasts、molds及mushrooms。
(2) 細胞壁為chitin。
(3) 不行光合作用，為吸收異營的生物。
(4) 菌根真菌係為真菌與被子植物根部的共生關係（而豆根植物根部則會與根瘤菌共生形成根瘤）。
(5) ergosterol為fungi細胞膜的固醇，用以調節膜的流體性，利用ergosterol inhibitor可用來抑制真菌膜上的ergosterol以殺死真菌（ex：治療香港腳）。

故本題最正確答案為(D)。

3. Which of the following descriptions about methicillin-resistant *Staphylococcus aureus* (MRSA) is **NOT** correct?
   (A) *Staphylococcus aureus* is a type of bacteria found on healthy people's skin
   (B) *Staphylococcus aureus* causes lung infection and other infection
   (C) People with MRSA skin infections often can get swelling, warmth, redness, and pain in infected skin.
   (D) MRSA strains are resistant to all aminoglycosides including kanamycin and gentamicin.
   (E) The resistance of MRSA strains is caused by the acquisition of the *mecA* gene implicated in the biosynthesis of bacterial cell wall.

答案：(D)

⏭解析：

MRSA的特性：

(1) 為金黃色葡萄球菌的特異株，對methicillin、penicillin及penicillin-like抗生素有抗藥性。
(2) 最通常是引起皮膚感染，但亦會引發肺炎及其它組織感染。
(3) MRSA對於β-lactams有抗性是因其獲得了一個mobile genetic element－staphylococcal cassette chromosome (SCC)，它攜帶著mecA gene，阻止β-lactams抑制該菌的細胞壁合成。
(4) MRSA株對β-lactams類抗生素有抗性，而非對於aminoglycosides類抗生素有抗性。

故本題最佳答案為(D)。

112年 中興普通生物學試題精解

1. Which of the following amino acid residues has a side chain that can form hydrogen bonds to other molecules?
(A) Leucine (B) Threonine (C) Alanine (D) Glycine

答案：(B)

⏭解析：

Amin acid	Side chain
Leucine	CH_3 CH_3 \ / CH | CH_2
Threonine	CH_3 | H – C – OH
Alanine	CH_3
Glycine	H

故只有Threonine可與其它分子形成氫鍵。

2. Which amino acid displays a free amino group in the tetrapeptide ALA-HIS-ARG-THR?
(A) ALA (B) HIS (C) ARG (D) THR

答案：(A)

⏭解析：

此四肽分子中，具free amino group的胺基酸為Alanine；具free carboxyl group的胺基酸為Threonine。

3. Which of the following amino acid substitutions would be least likely to have a detrimental effect on protein folding and function?

(A) Glu changes to Gln (B) Trp changes to Thr
(C) Lys changes to Asp (D) Leu changes to Val

答案：(D)

⏭解析：
對蛋白質折疊及功能影響最小的胺基酸取代的突變首推同性質的胺基酸的取代（稱為中性突變）；選項中以(D)Leu → Val（因二者皆含有不帶電之大型分支側鏈的非極性胺基酸，二者胺基酸淨電荷亦皆為零）的取代所造成的不利影響最小。

4. Vitamin C (ascorbic acid) prevents scurvy because
(A) it is involved in the formation of the proper β-sheet structure of collagen
(B) it is important in hydroxylation of prolines and lysines in the primary structure of collagen
(C) it encourages the formation of disulfide linkages in collagen
(D) it is an unusual amino acid found in the primary structure of collagen

答案：(B)

⏭解析：
壞血病（scurvy）是因缺乏維生素C所引起的疾病，係因維生素C主要參加膠原蛋白的合成，因procollagen的Prolines及Lysines殘基的hydroxylation需維生素C參加，如此才能形成mature collagen。

5. Which of the following amino acid residues would most likely be found in the interior of a globular protein?
(A) Isoleucine (B) Arginine (C) Aspartic acid (D) Threonine

答案：(A)

⏭解析：
存在於球狀蛋白內側的胺基酸主要由疏水性殘基組成（亦即非極代胺基酸構成），其中以(A) Isoleucine疏水性最高，(B)(C)(D)皆為極性胺基酸。

6. Quaternary structure of proteins is associated with
(A) the overall shape of the polypeptide chain
(B) simple proteins with only one subunit

114年 中山普通生物學試題精解

1. Why aren't insect tracheae associated with capillary beds?
   (A) Insect capillaries are found only around the gut.
   (B) Insects have external gills associated with hemolymph vessels.
   (C) Insects use an air sac respiratory system.
   (D) Insects have an open circulatory system.
   (E) All of the above.

答案：(D)

⏭解析：

昆蟲的循環系統為開放式循環系統，並不存在微血管；而且氧氣並非由循環系統運輸而是由氣管系統供應許多高代謝率昆蟲所需的氧氣，故昆蟲的呼吸表面並不與微血管床結合。

2. During the generation of an action potential, which of the following best explains the absolute refractory period at the molecular level?
   (A) The K^+ channels remain open, preventing the membrane from reaching the threshold potential.
   (B) The Na^+ channels are inactivated, preventing further depolarization despite strong stimuli.
   (C) The Na^+/K^+-ATPase pump is actively hyperpolarizing the membrane, inhibiting depolarization.
   (D) The relative permeability of Na^+ remains high, preventing K^+ efflux from dominating.
   (E) The lipid bilayer of the membrane is temporarily impermeable to all ions.

答案：(B)

⏭解析：

Na^+通道在falling phase及undershoot的早期仍然維持失活的狀態，因此，若第二個去極化刺激（即便是更強的刺激）在此過程中發生，它將無法激發一個新的動作電

位，此第二個動作電位無法被引發的“downtime”稱為absolute refractory。

3. Which of the following best explains why a neuron receiving a simultaneous excitatory postsynaptic potential (EPSP) and inhibitory postsynaptic potential (IPSP) may fail to reach the threshold for an action potential?
   (A) The IPSP causes a transient inactivation of voltage-gated Na^+ channels, making depolarization impossible.
   (B) The inhibitory synapse stabilizes the membrane potential at a level too positive to allow Na^+ channel activation.
   (C) The summation of EPSP and IPSP results in a net change in membrane potential that may be insufficient to reach the threshold.
   (D) The presence of an IPSP leads to immediate degradation of neurotransmitters, reducing excitatory drive.
   (E) The inhibitory synapse actively removes Na^+ from the postsynaptic cell, counteracting the excitatory input.

答案：(C)

⏭解析：

EPSP及IPSP等突觸後電位屬於graded potential，若透過加成作用（summation），則突觸後電位的累積便可激發動作電位產生；相反的，若太小而無法激發突觸後神經元的動作電位；其效果則是在閾值以下（below threshold level）。

4. Which of the following is a fundamental physiological difference between cardiac and skeletal muscle that prevents tetanic contractions in cardiac muscle?
   (A) Cardiac muscle lacks functional T-tubules, preventing rapid excitation-contraction coupling.
   (B) Cardiac muscle action potentials involve L-type Ca^{2+} channels, prolonging depolarization and refractory periods.
   (C) The sarcoplasmic reticulum in cardiac muscle lacks ryanodine receptors, preventing sustained Ca^{2+} release.
   (D) The pacemaker activity of cardiac muscle ensures a fixed contractile frequency, preventing summation.
   (E) Cardiac muscle myosin has a significantly lower ATPase activity, preventing

107年 高醫普通生物學試題精解

一、**單選題**：第1.～16.題，每題1分，共計16分。

1. _____ are membrane protrusions that facilitate the absorption of nutrients. What is the name of these protrusions and what cytoskeletal element forms their internal skeleton?
   (A) Microvilli, microtubules (B) Microvilli, actin filaments
   (C) Microvilli, intermediate filaments (D) Villi, microtubules
   (E) Villi, actin filaments

答案：(B)

⏭解析：
小腸上皮細胞的微絨毛（microvilli）可促進養分吸收，其內部細胞骨架之組成為肌絲或肌動蛋白絲（actin filaments）。

2. What causes a differentiating B cell to become committed to producing only one species of antibody molecule?
   (A) DNA rearrangements in the genome
   (B) RNA rearrangements in the genome
   (C) protein rearrangements in the genome
   (D) DNA rearrangements in the mitochondria
   (E) RNA rearrangements in the mitochondria

答案：(A)

⏭解析：
B細胞基因組中的DNA重排會造成抗體之多樣性產生，每次的重排便會產生一種特定的抗體分子，抗體分子的基因是位於核中基因組，而非在粒線體中。

3. Which of the following about neuron is **incorrect**?
   (A) It is a polarized cell.
   (B) Peripheral nervous system includes autonomic and somatic nervous systems.
   (C) The generation of action potential is related to the electrochemical gradient across the plasma membrane.
   (D) Myelin sheath is a protein-rich substance that surrounds the axon of some neurons, forming an electrically insulating layer.
   (E) Neurofilaments are intermediate filaments found in neurons.

答案：(D)

⏭解析：
神經元的髓鞘是由膠細胞的細胞膜組成，故其成分由20% proteins、80% lipids（包括磷脂、糖脂、膽固醇）構成，其功能是作為神經纖維的絕緣層。

4. In the life cycle of an angiosperm, which of the following cells or tissues are diploids?
   (A) generative cells
   (B) microsporocyte
   (C) antipodal cells
   (D) tube cells
   (E) polar nuclei of the embryo sac

答案：(B)

⏭解析：
被子植物中的小孢子母細胞為2n，會經成數分裂形成小孢子－屬於孢子體；其餘組成為配子體（為1n）。

5. The black dots that cover strawberries are actually individual fruits from a flower with multiple carpels. The fleshy and tasty portion of a strawberry derives from the receptacle of the flower. Therefore, a strawberry is _____.
   (A) both an aggregate fruit and an accessory fruit
   (B) both a multiple fruit and an accessory fruit
   (C) both a multiple fruit and an aggregate fruit
   (D) both a simple fruit and an aggregate fruit
   (E) both a simple fruit and an accessory fruit

答案：(A)