

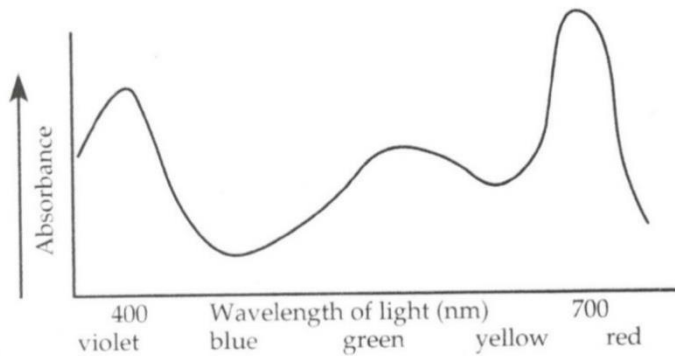
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1. 在細胞中，分解代謝路徑和合成代謝路徑通常都是串聯，因為
Catabolic and anabolic pathways are often coupled in a cell because
 - (a) 分解代謝路徑的中間體在合成代謝路徑中使用。
the intermediates of a catabolic pathway are used in the anabolic pathway.
 - (b) 兩種路徑都使用相同的酶。
both pathways use the same enzymes.
 - (c) 從一條路徑中釋放的自由能去驅動另一條路徑。
the free energy released from one pathway is used to drive the other.
 - (d) 分解代謝路徑的活化能可以在合成代謝路徑使用。
the activation energy of the catabolic pathway can be used in the anabolic pathway.
 - (e) 它們的酶由相同的活化劑和抑製劑所控制。
their enzymes are controlled by the same activators and inhibitors.
2. 細胞核膜中的毛孔提供下列何種的移動
The pores in the nuclear envelope provide the movement of
 - (a) 蛋白質進入細胞核。proteins into the nucleus.
 - (b) 將核糖體亞基送出細胞核外。ribosomal subunits out of the nucleus.
 - (c) 將 mRNA 送出細胞核外。mRNA out of the nucleus.
 - (d) 酶進入細胞核。enzymes into the nucleus.
 - (e) 以上皆是。all of the above.
3. 促進擴散在經過細胞膜時需要_____並移動溶質_____其濃度梯度。
Facilitated diffusion across a cellular membrane requires _____ and moves a solute _____ its concentration gradients.
 - (a) 能量和運輸蛋白質..... 降低
energy and transport proteins down
 - (b) 能量和運輸蛋白質.....起來（對抗）
energy and transport proteins up (against)
 - (c) 能量.....起來
energy up
 - (d) 運輸蛋白質.....降低
transport proteins down
 - (e) 運輸蛋白質.....起來
transport proteinsup

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4. 下面是一種不知名顏料分子的吸收光譜，這種顏料對你來說可能是什麼顏色？

Below is an absorption spectrum for an unknown pigment molecule. What color would this pigment appear to you?



- (a) 紫色 violet
(b) 藍色 blue
(c) 綠色 green
(d) 黃色 yellow
(e) 紅色 red
5. 一個細胞含有 22 個常染色體和 Y 染色體的細胞將會是
A cell that has 22 autosomes and a Y chromosome would be
- (a) 一個精子 a sperm
(b) 一個雄性體細胞 a male somatic cell
(c) 一個雄性卵子 a male ovum
(d) a 或 b either a or b
(e) a 或 c either a or c

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6. B 型血的母親有兩個孩子，一個是 A 型血，另一個是 O 型血。她的丈夫是 O 型血。從這些信息中可以得出以下何種結論？

A mother with type B blood has two children, one with type A blood and one with type O blood. Her husband has type O blood. Which of the following could you conclude from this information?

- (a) 丈夫不可能是任何一個孩子的父親。
The husband could not have fathered either child.
- (b) 丈夫可能是兩個孩子的父親。
The husband could have fathered both children.
- (c) 丈夫一定是 O 型血孩子的父親，並且可能是 A 型血孩子的父親。
The husband must be the father of the child with type O blood, and could be the father of the child with type A blood.
- (d) 丈夫可能是 O 型血孩子的父親，但不是 A 型血孩子的父親。
The husband could be the father of the child with type O blood, but not the child with type A blood.
- (e) 母親和丈夫都不可能是 A 型血孩子的親生父母。
Neither the mother nor the husband could be the biological parents of the child with type A blood.

7. 外溫動物 _____。

Ectotherms _____.

- (a) 不產生代謝熱。do not produce metabolic heat.
- (b) 無法調節體內的溫度。are unable to internally regulate body temperature.
- (c) 能自行控制其身體的溫度。are able to control their body temperature.
- (d) 身體溫度低於任何恆溫動物的溫度。will have body temperature below any endotherm.
- (e) 以上皆是。all of the above.

8. 以下那一項催化肽鍵的形成？

Which of the following catalyzes the formation of a peptide bond?

- (a) RNA 聚合酶 RNA polymerase
- (b) 肽基转移酶 peptidyl transferase
- (c) mRNA
- (d) 氨酰-tRNA 合成酶 aminoacyl-tRNA synthetase
- (e) 蛋白質核糖體酶 protein ribosomal enzyme

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9. 細菌利用何種作用抵抗病毒感染

Bacteria defend against viral infection through the action of

- (a) 自行生產的抗生素。antibiotics that they produce.
- (b) 利用限制性核酸酶去切斷外源 DNA。restriction nucleases that chop up foreign DNA.
- (c) 自己的 R 質粒。their R plasmids.
- (d) 逆轉錄酶。reverse transcriptase.
- (e) 利用游離體將病毒 DNA 摻入細菌染色體內。episomes that incorporate viral DNA into the bacterial chromosome.

10. 酵母在基因工程中變得非常重要是因為它

Yeast has become important in genetic engineering because it

- (a) 有 RNA 剪接機械的能力。
has RNA splicing machinery.
- (b) 具有可以進行基因工程的質粒。
has plasmids that can be genetically engineered.
- (c) 允許真核基因的調控和表達的研究。
allows the study of eukaryotic gene regulation and expression.
- (d) 可以在實驗室中容易而快速地生長。
grows readily and rapidly in the laboratory.
- (e) 以上皆可。
all of the above.

11. 以下那一項最不可能形成化石？

Which of the following is **least** likely to form a fossil?

- (a) 一種軟體陸地生物，如小毛蟲。
a soft-bodied land organism such as a slug
- (b) 具有貝殼的海洋生物，如蚌。
a marine organism with a shell such as mussel
- (c) 埋在泥層中的維管植物。
a vascular plant embedded in layers of mud
- (d) 淡水蛇 a freshwater snake
- (e) 人 a human

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12. 無脊椎動物包括

Invertebrates include

- (a) 除脊椎動物門外的所有動物。
all animals except the phylum Vertebrata.
- (b) 所有沒有骨幹的動物。
all animals without backbone.
- (c) 只有使用靜水骨架的動物。
only animals that use hydrostatic skeletons.
- (d) 側生動物，輻射動物和原口動物的成員，但不是後口動物的成員。
members of the parazoa, radiata, and protostomes, but not of the deuterostomes.
- (e) 在寒武紀爆炸中而進化的所有動物。
all of the animals evolved in the Cambrian explosion.

13. 以下那一項與其氣體交換機制是**錯誤**配對？

Which of the following is **incorrectly** paired with its gas exchange mechanism?

- (a) 兩棲動物---皮膚和肺
amphibians --- skin and lungs
- (b) 肺魚---鰓和肺
lungfishes --- gills and lungs
- (c) 爬行動物---肺
reptiles --- lungs
- (d) 骨魚---鰾
bony fishes --- swim bladder
- (e) 哺乳動物---同時有隔膜的肺
mammals --- lungs with diaphragm

14. 具有那種 _____ 色素的植物預計可以生活在更深層次的海洋中。

Plants with _____ pigment would be expected to live at deeper levels in the ocean.

- (a) 只有葉綠素 only chlorophyll
- (b) 棕色 brown
- (c) 藍綠色 blue-green
- (d) 紅色 red
- (e) 綠色 green

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15. 下面那一種不是木質部汁液在高大的樹木中向上移動的主要因素？
Which of the following is not a major factor in the movement of xylem sap up a tall tree?
- (a) 蒸騰作用 transpiration
 - (b) 胞間連絲 plasmodesmata
 - (c) 附著力 adhesion
 - (d) 凝聚力 cohesion
 - (e) 張力 tension
16. 花器官是從下列何種改良後進化而來
Flower organs have evolved from modified
- (a) 葉 leaves
 - (b) 枝條 branches
 - (c) 孢子囊 sporangia
 - (d) 孢子體 sporophytes
 - (e) 韌皮部 phloem
17. 脊椎動物的間質液
The interstitial fluid of vertebrates
- (a) 是細胞內的內部環境。
is the internal environment within the cells.
 - (b) 浸泡細胞，並提供營養和廢物的交換。
baths cells and provides the exchange of nutrients and wastes.
 - (c) 補充血漿。
makes up the plasma of blood.
 - (d) 環繞單細胞的和扁平的薄動物。
surrounds unicellular and flat, thin animals.
 - (e) 在外溫動物中比恆溫動物中更少。
is less abundant in ectotherms than in endotherms.
18. 不完全的蛋白質是
Incomplete proteins are
- (a) 缺乏必需維生素。lacking in essential vitamins.
 - (b) 一種營養不良的原因。a cause of undernourishment.
 - (c) 在肉，蛋和奶酪中發現。found in meat, eggs, and cheese.
 - (d) 缺乏一種或多種必需氨基酸。lacking in one or more essential amino acids.
 - (e) 過度烹飪蔬菜的結果。a result of overcooking vegetables.

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19. 下面所列那一項**不是**參與非特異性防禦機制

All of the following are involved with nonspecific defense mechanisms **except**

- (a) 發炎反應。the inflammatory response.
- (b) 漿細胞。plasma cells
- (c) 抗菌蛋白質，如溶菌酶。antimicrobial proteins such as lysozyme.
- (d) 吸引吞噬細胞的趨化因子。chemokines that attract phagocytes.
- (e) 嗜鹼性粒細胞，嗜中性粒細胞，嗜酸性粒細胞和自然殺手細胞 (natural killer cells)。basophils, neutrophils, eosinophils, and natural killer cells.

20. 下列那一項不是屬於進入鮑曼的膠囊的濾液？

Which of the following is not part of the filtrate entering Bowman's capsule?

- (a) 水，鹽和電解質 water, salt, and electrolytes
- (b) 葡萄糖 glucose
- (c) 尿素 urea
- (d) 血漿蛋白質 plasma proteins
- (e) 氨基酸 amino acids

21. 下列何種激素與其分泌來源是配對**錯誤**？

Which one of the following hormone is **incorrectly** paired its origin?

- (a) 釋放荷爾蒙 --- 下丘腦
releasing hormones --- hypothalamus
- (b) 生長激素 --- 垂體前葉
growth hormone --- anterior pituitary
- (c) 孕激素 --- 卵巢
progestins --- ovary
- (d) TSH (促甲狀腺激素) --- 甲狀腺
TSH (thyroid-stimulating hormone) --- thyroid
- (e) 鹽皮質激素 --- 腎上腺皮質
mineralocorticoids --- adrenal cortex

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22. 何種激素會刺激睪丸曲細精管精子的產生？

Which hormone stimulates the production of sperm in the seminiferous tubules of the testes?

- (a) 雌激素 (estrogen)
- (b) 黃體激素 (progesterone)
- (c) LH (促黃體激素 luteinizing hormone)
- (d) FSH (卵泡刺激素 follicle-stimulating hormone)
- (e) HCG (人絨毛膜促性腺激素 human chorionic gonadotropin)

23. 運動神經元的功能是攜帶神經衝動

The function of motor neurons is to carry impulses

- (a) 從脊髓到大腦。from the spinal cord to the brain.
- (b) 從小腦到大腦。from the cerebellum to the cerebrum.
- (c) 從感覺受體到脊髓。from sensory receptors to the spinal cord.
- (d) 從中樞神經系統 (CNS) 到效應器 (肌肉和器官)。from the CNS to effectors (muscles and organs).
- (e) 中間神經元和 PNS (外周神經系統) 之間。between interneurons and the PNS.

24. 房室結的主要功能是要

The main function of the AV (atrioventricular) node is to

- (a) 啟動心跳。initiate the heartbeat.
- (b) 調整心跳的頻率。set the rhythm of the heartbeat.
- (c) 傳送訊號去收縮從右心室至右心房。send the signal to contract from the right ventricle to the right atrium.
- (d) 傳送訊號去收縮從右心至左心。send the signal to contract from the right heart to the left heart.
- (e) 延遲訊號去收縮從右心至左心。delay the signal to contract from the right heart to the left heart.

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25. 在 2 型糖尿病中

In type 2 diabetes

- (a) 胰島素仍然產生，但細胞中的目標組織不再反應，因此血糖水平不會降低 Insulin is produced, but cells in the target tissues no longer respond as well, so blood glucose levels are not brought down.
- (b) 朗格漢斯胰島中的 α 細胞不再能夠產生胰高血糖素，因此血糖水平波動很大 The alpha cells in the islets of Langerhans are no longer able to produce glucagon, so blood glucose levels fluctuate wildly.
- (c) 肌肉無法分解糖原，導致疲勞，無力和肌肉萎縮 Muscles are unable to break down glycogen, leading to fatigue, weakness and muscle wasting.
- (d) 胰島素不再產生，因此肌肉和肝臟不再能夠攝取葡萄糖且產生高血糖症 Insulin is no longer produced, so the muscles and liver can no longer take up glucose and hyperglycaemia result.
- (e) 肝臟無法產生糖原，因此身體無法儲存葡萄糖，導致血糖水平大幅波動 The liver is unable to make glycogen, so the body is unable to store glucose, leading to large swings in blood glucose levels.