

授課老師:周淑娥

授課時間:每週一下午 15:00-17:00(2 小時)

教科書:

Campbell N. A., Reece J. B., and Mitchell L.G. Biology 8th ed. Benjamin/Cummings. 2008.

課程講義網址: <http://memo.cgu.edu.tw/shu-er/>

整體教學目標:

本科目是屬於基礎醫學預備科，提供醫學系學生進入基礎醫學課程的基本課程，幫助學生由高中階段進階致大學的生命課程。

A. 主要介紹生命科學基礎概念：

1. 能了解生物學之基本概念、原理及法則。
2. 能了解生物體構造與機能，以了解生物生存法則，認識生物對於人類之貢獻與影響，進而能了解人類在生命世界中的地位與責任。
3. 探討生物之遺傳演化與環境之相互關係，以了解遺傳方式及演化過程以及自然平衡之重要性。
4. 能了解生物學為研究醫學之基本之知識。
5. 培養學生之科學態度，以及運用科學方法解決問題之能力。

B. 訓練學生閱讀英文習慣。

C. 訓練學生獨立操作能力，培養研究觀察能力，養成科學實驗精神，以多樣物種為觀察研究材料，不侷限於人體，讓學生了解生物彼此關聯，培養宏遠觀點，是學生進入生命科學領域入門課程。

教學方法:

1. 講解式的教學模式，並利用各種相關教具和視聽媒體，使內容具體化。
2. 發現式的學習，由提示的問題和線索中，自行尋找解決問題之途徑。
3. 探討式教學，強調科學方法之運用，達到科學技能訓練。

中文課程簡介:

生物教學涵蓋範圍不但生物醫學課程，特別注重全面式教學，舉凡演化概念、生物多樣性介紹、以及生態概念都溶入課程中，希望培養學生用物圈的理念，有民胞物與的思想與做法對待生命

第一週(2009.02.23)

授課主題: Chapter 27: Bacteria and Archaea

大綱:

- A. Structural and functional adaptations contribute to prokaryotic success
- B. Rapid reproduction, mutation, and genetic recombination promote genetic diversity in prokaryotes
- C. Diverse nutritional and metabolic adaptations have evolved in prokaryotes
- D. Molecular systematics is illuminating prokaryotic phylogeny
- E. Prokaryotes play crucial roles in the biosphere
- F. Prokaryotes have both harmful and beneficial impacts on humans

第二週(2009.03.02)

授課主題: Chapter 9: Cellular Respiration: Harvesting Chemical Energy

大綱:

- A. Catabolic pathways yield energy by oxidizing organic fuels
- B. Glycolysis harvests chemical energy by oxidizing glucose to pyruvate
- C. The citric acid cycle completes the energy-yielding oxidation of organic molecules
- D. During oxidative phosphorylation, chemiosmosis couples electron transport to ATP synthesis
- E. Fermentation and anaerobic respiration enable cells to produce ATP without the use of oxygen
- F. Glycolysis and the citric acid cycle connect to many other metabolic pathways

第三週(2009.03.09)

授課主題: Chapter 10: Photosynthesis

大綱:

- A. Photosynthesis converts light energy to the chemical energy of food
- B. The light reactions convert solar energy to the chemical energy of ATP and NADPH
- C. The Calvin cycle uses ATP and NADPH to convert CO₂ to sugar
- D. Alternative mechanisms of carbon fixation have evolved in hot, arid climates

第四週(2009.03.16)

授課主題(I): Chapter 41: Animal Nutrition

大綱:

- A. An animal's diet must supply chemical energy, organic molecules, and essential nutrients
- B. The main stages of food processing are ingestion, digestion, absorption, and elimination
- C. Organs specialized for sequential stages of food processing form the mammalian digestive system
- D. Evolutionary adaptations of vertebrate digestive systems correlate with diet
- E. Homeostatic mechanisms contribute to an animal's energy balance

授課主題(II): Nobel prize report (1) RNA interference----The 2006 Nobel Prize in Physiology or Medicine

第五週(2009.03.23)

授課主題: Nobel prize report (2) The Nobel Prize in Physiology or Medicine 2002 ---- for their discoveries concerning programmed cell death

第六週(2009.03.30)

Midterm Exam I

第七週(2009.04.06)

授課主題: Chapter 43: The Immune System

大綱:

- A. In innate immunity, recognition and response rely on shared traits of pathogens
- B. In acquired immunity, lymphocyte receptors provide pathogen-specific recognition
- C. Acquired immunity defends against infection of body cells and fluids
- D. Disruptions in immune system function can elicit or exacerbate disease

第八週(2009.04.13)

授課主題: Chapter 44: Osmoregulation and Excretion

大綱:

- A. Osmoregulation balances the uptake and loss of water and solutes
- B. An animal's nitrogenous wastes reflect its phylogeny and habitat
- C. Diverse excretory systems are variations on a tubular theme
- D. The nephron is organized for stepwise processing of blood filtrate
- E. Hormonal circuits link kidney function, water balance, and blood pressure

第九週(2009.04.20)

授課主題: Chapter 45: Hormones and the Endocrine System

大綱:

- A. Hormones and other signaling molecules bind to target receptors, triggering specific response pathways
- B. Negative feedback and antagonistic hormone pairs are common features of the endocrine system
- C. The endocrine and nervous systems act individually and together in regulating animal physiology
- D. Endocrine glands respond to diverse stimuli in regulating metabolism, homeostasis, development, and behavior

第十週(2009.04.27)

授課主題: Nobel Prize report (3) The Nobel Prize in Chemistry 2004, "for the discovery of ubiquitin-mediated protein degradation"

第十一週(2009.05.04)

授課主題: Nobel Prize report (4) The Nobel Prize in Physiology or Medicine 2005 for their discovery of the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease

第十二週(2009.05.11)

Midterm Exam II

第十三週(2009.05.18)

授課主題(I): Chapter 46: Animal Reproduction

大綱:

- A. Both asexual and sexual reproduction occur in the animal kingdom
- B. Fertilization depends on mechanisms that bring together sperm and eggs of the same species
- C. Reproductive organs produce and transport gametes
- D. The timing and pattern of meiosis in mammals differ for males and females
- E. The interplay of tropic and sex hormones regulates mammalian reproduction
- F. In placental mammals, an embryo develops fully within the mother's uterus

授課主題(II): Chapter 47: Animal Development

大綱:

- A. After fertilization, embryonic development proceeds through cleavage, gastrulation, and organogenesis
- B. Morphogenesis in animals involves specific changes in cell shape, position, and adhesion
- C. The developmental fate of cells depends on their history and on inductive signals

第十四週(2009.05.25)

授課主題: Chapter 48: Neurons, Synapses, and Signaling

大綱:

- A. Neuron organization and structure reflect function in information transfer
- B. Ion pumps and ion channels maintain the resting potential of a neuron
- C. Action potentials are the signals conducted by axons
- D. Neurons communicate with other cells at synapses

第十五週(2009.06.01)

授課主題: Chapter 49: Nervous Systems

大綱:

- A. Nervous systems consist of circuits of neurons and supporting cells
- B. The vertebrate brain is regionally specialized
- C. The cerebral cortex controls voluntary movement and cognitive functions
- D. Changes in synaptic connections underlie memory and learning
- E. Nervous system disorders can be explained in molecular terms

第十六週(2009.06.08)

授課主題: Nobel Prize report (5) The Nobel prize in Physiology or Medicine 2008 for their discovery Human papilloma viruses causing cervical cancer and human immunodeficiency virus

第十七週(2009.06.15)

授課主題: Nobel Prize report (6) The Nobel Prize in Physiology or Medicine 2000--- for their discoveries concerning signal transduction in the nervous system. (II)

第十八週(2009.06.22)

Final exam