

Part I. Question 1 to 10, please choose the answer closest to the underlined word or phrase. One Answer Only. 2 points each.

1. Leaders of the world's largest economies are close to an agreement to tackle the global financial crisis.
(A) fight (B) meditate (C) forbid (D) deal with
2. I think people realize the economy seemingly fell off the cliff.
(A) inclined (B) caught up (C) help up (D) slumped
3. In the future, globalization is going to be increasingly driven quickly to its processes and technologies, and start to march forward.
(A) directed (B) motivated (C) forced (D) manipulated
4. The home team kicked off the season with an easy win.
(A) interrupted (B) commenced (C) avoided (D) complicated
5. The use of stem cells is controversial - opponents object on the grounds that it is unethical to destroy embryos in the name of science.
(A) adversaries (B) allies (C) forerunners (D) associates
6. Slumdog Millionaire is about a Mumbai teen who grew up in the slums, becomes a contestant on the Indian version of "Who Wants To Be A Millionaire?"
(A) asylum seeker (B) gangster (C) youngster (D) homeless
7. Critical listening is a difficult kind of listening because it requires you to both interpret and evaluate the message.
(A) understand (B) integrate (C) intrigue (D) compose
8. He is worried about a potential quiz tomorrow.
(A) possible (B) actual (C) providential (D) surprising
9. These two girls prefer to have intimate conversation one-on-one
(A) personal (B) secret (C) intelligent (D) discreet
10. His position was contrary to that of the teacher's
(A) puzzling (B) opposite (C) compatible (D) foreseeable

Part II. Question 11-15, please choose the answer that best completes the sentence. Question 16-20, please choose the best answer to fill each of the numbered blanks in the passage.

In many countries, it is considered 11 to appear naked or even half-naked on a public beach. However, some places often have a few 12 beaches that are designated as nudist or "clothing optional" beaches, where uninhibited people can fully 13 themselves to the sun. Other countries, especially those where 14 are hot and attitudes are 15, impose no restrictions at all, so people may sunbathe topless or nude even on the public beaches.

11. (A) inappropriate (B) interesting (C) conservative (D) considerate
12. (A) inclusive (B) executive (C) secluded (D) acceptable
13. (A) demonstrate (B) expose (C) lie down (D) externalize
14. (A) seawater (B) cuisine (C) fashion (D) climates
15. (A) strict (B) sincere (C) liberal (D) general

There are many different forms of potential economic stimulus and they work in different ways. Tax cuts for individuals generally encourage short-term spending. Tax cuts for companies encourage both spending and investment. Expenditures on public works create contracts for firms and provide short- to medium-term 16. Investments in research and development take a longer-term approach 17 the theory 18 in the future (and thus provide jobs) if they have the money to make intelligent investments in their operations

now. Finally, some forms of economic stimulus seek to make investments that will pay off in the long run 19 for everybody. An example is investing in the U.S. energy grid. 20, a one-time outlay could make energy costs for both individuals and businesses less expensive for decades to come.

16. (A) opportunities of employment (B) employment opportunities
 (C) employing opportunities (D) employment in opportunities
17. (A) under (B) in (C) of (D) on
18. (A) business is going to be thrive (B) which business is going to be thrive
 (C) that business will thrive (D) business thrives
19. (A) with cheaper consumption (B) in making cheaper consumption
 (C) by consuming cheaply (D) by making consumption cheaper
20. (A) Theoretic concern (B) Theoretical (C) Being theoretic (D) Theoretically

Part III. Reading Comprehension. In this part, you will read several passages. Each one is followed by one question or a number of questions. Question 21 – 40, you should choose the ONE best answer to each question. 2 points Each.

Question 21-25

The importance of strength in many sports is undeniable. It is so important that many university and professional teams now hire a specialized coach who only attends to the development of strength in athletes. It is interesting to note that no such specialist is hired to attend to the other components of physical fitness. We have yet to see a cardiovascular coach, a coach who attends to developing fitness of the heart and blood vessels, hired by universities or professional teams. This situation raises the question of the relative importance of each of these two components, strength training and cardiovascular training, to the other. Does the strength coach develop the cardiovascular system by prescribing a program to increase muscle fiber?

It is theoretically possible to design a weight-lifting program in which the resistance is so low and the repetitions so numerous that it provides the cardiovascular benefits of a running program. Therefore, if you view weights as a way to overload muscles, you can imagine a continuum of programs that emphasize cardiovascular benefits on the one extreme and strength on the other. The practical truth of the matter is that most coaches are primarily concerned with pure strength. Therefore, the athlete has to work on the end of the weight-overload continuum that promotes little, if any, cardiovascular benefit. In fact, one study has found that a high-intensity strength program reduced mitochondrial density (density of the cellular structures that produce energy in the muscle fiber) per unit of muscle. The athletes increased muscle mass, so they did not eliminate mitochondria presumably, but the fact remains that the oxidative capacity, the ability to use oxygen in the synthesis of energy, was not promoted. Oxidative capacity would usually improve in programs that stress cardiovascular conditioning. Neither increased blood flow nor increased mitochondrial density (both indicators of oxygen extraction) occur with strength training.

Obviously, there is nothing wrong with training athletes to gain strength, but in most strength programs cardiovascular improvements are not made. Therefore, for athletes, who require both strength and cardiovascular conditioning, both components must be trained independently.

21. What is the main point of the passage?
- (A) College and professional teams do not need specialized coaches.
 (B) Strength training should be replaced by cardiovascular training.
 (C) Cardiovascular training is more difficult than strength training.
 (D) Athletes need both strength and cardiovascular training.

22. Under which of the following conditions can a weight-lifting program provide cardiovascular benefits?
- (A) When the weights are very heavy
 - (B) When the weights are lifted very slowly
 - (C) When lifting a heavy weight overtires the muscles
 - (D) When light weights are lifted a large number of times
23. Why does the author mention running?
- (A) To give an example of the benefits of strength training
 - (B) To demonstrate what a typical weight program includes
 - (C) To give an example of an activity that provides cardiovascular conditioning
 - (D) To demonstrate the importance of oxygen extraction
24. Which of the following is an important direct result of cardiovascular training?
- (A) Improved oxidative capacity
 - (B) Increased muscle fiber
 - (C) Decreased mitochondrial density
 - (D) Increased body weight
25. Which of the following policies would the author be most likely to support?
- (A) Sports teams should increase their strength-training programs.
 - (B) All athletes should be able to choose the kinds of training they prefer.
 - (C) Sports teams should provide improved cardiovascular training.
 - (D) All athletes should avoid strength training in order to avoid injury.

Question 26-31

It is in search of adequate food supplies that cetaceans, marine mammals such as whales and dolphins, travel the oceans. They live in a world that is largely hidden from humans. Yet their range is three times as large as ours, since oceans occupy about three-quarters of the Earth's surface. They travel through well-marked ocean zones, **each** with its own characteristic marine life. They glide through the water, periodically rising to the surface to breathe. The sea may be raging but cetaceans are untroubled by the greatest storms; indeed they are more at home in rough than in calm seas.

Indirectly, however, their life is greatly influenced by wind. The eastward rotation of the Earth produces the **prevailing** trade winds, blowing east to west at the equator. These winds drag the surface waters and all they contain in a westerly direction. Warmed by its passage through the tropics, the wind-driven water is deflected against the westward continents, turning southwest in the Southern Hemisphere and northwest in the Northern Hemisphere.

In the Southern Hemisphere, the warm flow of tropical water under the west-going equatorial trade wind produces a genial climate along the eastern shores of Australia, South America, and South Africa. But there is open ocean to the south. Here the current is driven eastward unimpeded by land before the almost incessant westerly gales of this zone. The huge mass of water moves fast, chilled by water from the Antarctic Region, but **laden** with masses of plankton.

This cold, swift current is **split** when it strikes the southwestern extremities of the three southern continents. The northern portion of this water is diverted by the southwest coast of South America to sweep northward toward the equator. Known as the Humboldt Current, this current is rich in plankton on which cetaceans feed. Part of this same cool eastward-flowing current, enriched with water from higher latitudes, is similarly diverted north along the southwest coast of South Africa. This is the Benguela Current, where many cetaceans come to feed.

26. The passage answers which of the following questions?
- (A) What is the main difference between cetaceans and other marine life?

- (B) How far do most cetaceans travel in a year?
(C) How often do cetaceans need to breathe?
(D) What winds and ocean currents affect cetaceans?
27. The word **each** in paragraph 1 refers to a
(A) cetacean (B) surface (C) range (D) zone
28. The word **prevailing** in the passage is closest in meaning to
(A) arctic (B) blowing (C) dominant (D) energetic
29. The word **laden** in paragraph 3 is closest in meaning to
(A) balanced (B) filled (C) touched (D) wrapped
30. The word **split** in paragraph 4 is closest in meaning to
(A) stopped (B) divided (C) opened (D) surrounded
31. What do paragraphs 3 and 4 primarily discuss?
(A) The water currents in the Southern Hemisphere
(B) The trade winds in the Southern Hemisphere
(C) The three continents in the Southern Hemisphere
(D) The large area of open ocean in the Southern Hemisphere.

Question 32-36

Doris Lessing received her Nobel Prize in 2007. Her novel *The Golden Notebook* is considered a feminist classic by some scholars, but notably not by the author herself, who later wrote that its theme of mental breakdowns as a means of healing and freeing one's self from illusions had been overlooked by critics. She also regretted that critics failed to appreciate the exceptional structure of the novel. As she explains in *Walking in the Shade*, Lessing modeled Molly, to an extent, on her good friend Joan Rodker, the daughter of the author and publisher John Rodker.

Lessing does not like the idea of being pigeon-holed as a feminist author. When asked why, she replies:

What the feminists want of me is something they haven't examined because it comes from religion. They want me to bear witness. What they would really like me to say is, 'Ha, sisters, I stand with you side by side in your struggle toward the golden dawn where all those beastly men are no more.' Do they really want people to make oversimplified statements about men and women? In fact, they do. I've come with great regret to this conclusion.

- Doris Lessing, *The New York Times*, 25 July, 1982[8]

32. Doris Lessing is a Nobel Prize winner in
(A) Feminism. (B) Literature. (C) Sociology. (D) Peace.
33. According to Doris, what feminists want from her is
(A) exceptional structure. (B) fighting against men.
(C) creative ideas about men and women. (D) healing power from battles between men and women.
34. Doris Lessing does not particularly like the idea of being **pigeon-holed** as a feminist; pigeon-holed here means
(A) categorized (B) wholesale (C) viewed (D) completed
35. Which of the following statements is **FALSE**?
(A) Critics often neglect the theme of mental breakdowns as a self-freeing power.
(B) She models a heroine on her friend in one of her books.
(C) Her book *The Golden Book* is particularly considered a feminist one by Lessing.
(D) Lessing thinks critics understand her work very well.
36. Generally speaking, Lessing's attitude towards being considered a feminist is
(A) accepting (B) disappointed (C) welcomed (D) patient

Question 37-40

In recent years, many Taiwanese have won awards at international film festivals. However, many theater owners don't consider even prize-winning Taiwanese films to have much commercial potential in their home market. Their viewpoint is generally confirmed by the largely empty seats at showings of locally produced movies. The market share for local films is only about two percent, while more than 95 percent of the market is taken by Hollywood blockbusters. The dominance of American-made films in Taiwan has continued for the past ten years, but the government is proposing some solutions. It is hoped that some legal changes and few promotional projects will help Taiwan's struggling film industry.

One proposal is to give individuals or companies a tax deduction for money spent to produce a film. The idea is that the tax deduction would encourage investments in new films. There are also plans to provide financial support not only for film production, but also for marketing.

37. Which of the following could be a title for this passage?

- (A) The international Movie Industry and Taiwanese Films
- (B) Trends in Taiwanese Moviegoing Habits
- (C) Prize-Winning Taiwanese Films
- (D) A Helping Hand for the Taiwanese Film Industry

38. Which of the following statements is true about Taiwanese films in general?

- (A) They have been commercially successful both locally and abroad.
- (B) Most production of local films has been moved to Hollywood.
- (C) They have won many international awards, but little response from local audiences.
- (D) They have found little success anywhere in the world.

39. What does the passage imply is the main reason that Taiwanese films do not have a large local audience?

- (A) Taiwanese audiences dislike prize-winning films, thinking them "arty."
- (B) American films are superior in quality.
- (C) The Taiwanese film industry is not supported well enough financially.
- (D) Ticket prices for local films are too high.

40. How is the government attempting to help the local film industry?

- (A) By limiting the number of foreign films that local theater owners can show.
- (B) By encourage lower ticket prices for local films.
- (C) By establishing schools for training local filmmaking talent.
- (D) By helping to make creating and promoting local films more affordable.

Part IV. Essay. 20 points.

Do you think that technology alienate people from one another? Why or Why not? Please write a well-structured essay in 150 to 200 words discussing your opinions.

一、問答題:(每題 10%)

1. 如果某人有長期血糖過高的症狀出現, 你覺得有哪些可能的原因?
2. 病人有某種蛋白質(如蛋白激酶)功能的缺失時, 他的問題可能出自於哪幾個層面的異常? 分別如何做確認?
3. 試舉例說明 ion channel 活化的機制與功能
4. 以骨骼肌受刺激後引起收縮為例, 說明 Nerve-Muscle junction 與 muscle contraction 之機制
5. 試舉例說明基因選殖(gene clone), 基因降減(gene knock-down), 及基因過度表現(gene overexpression)在生理及醫學研究的應用
6. 請列舉出你研讀生理學時, 一直無法理解的問題
7. 試述人體酸鹼平恆的調節
8. 舉例說明細胞外的刺激如何經由活化 receptor 引起細胞內訊息傳遞, 並進而調控 gene transcription

二、根據下列的研究背景與結果, 請試著以英文及中文寫出你的 (Conclusion) 結論 (20%)

[Background]: The neuroprotective effects of 17 beta -estradiol have been shown in models of central nervous system injury, including ischemia, brain injury, and more recently, spinal cord injury (SCI). Recent epidemiological trends suggest that SCIs in elderly women are increasing; however, the effects of menopause on estrogen-mediated neuroprotection are poorly understood.

[Objective]: The objective of this study was to evaluate the effects of 17beta-estradiol and reproductive aging on motor function, neuronal death, and white matter sparing after SCI of post- and pre-menopausal rats.

[Materials & Methods]: Two-month-old or 1- year-old female rats were ovariectomized and implanted with a silastic capsule containing 180 microg/mL of 17beta-estradiol or vehicle. Complete crush SCI at T8-9 was performed 1 week later. Additional animals of each age group were left ovary-intact but were spinal cord injured. Locomotor test was performed. Spinal cords were collected on post-SCI days 1, 7, and 21, and processed for histological markers.

[Result]: Administration of 17beta-estradiol to ovariectomized rats improved recovery of hind-limb locomotion, increased white matter sparing, and decreased apoptosis in both the post- and pre-menopausal rats. Also, ovary-intact 1-year-old rats did worse than ovary-intact 2-month-old rats.

[Conclusion]:

[結論]:

1. 寫出兩種存在蛋白質中之 **uncommon amino acids** 的名稱 並說明其如何出現在蛋白質分子中? (4 分)
2. 生化學上如何決定一特定酵素是受異位調節的 **allosteric enzyme**. 請就酵素特性及動力學說明之 (4 分)
3. 敘述 **proteoglycan** 及 **glycoprotein** 構造特性及角色的不同.(4 分)
4. 人類疾病 **beriberi** 起因於 **thiamine** 缺乏. 症狀嚴重的病人其血液及尿液 **pyruvate** 濃度很高. 請解釋起因於那一種酵素催化反應的異常所致? (4 分)
5. 說明 **snoRNAs** 的角色及作用機轉.(4 分)
6. **Brown adipose tissue** 存在一種內生性的 **uncoupling agent** 稱 **thermogenin**, 其角色及作用機轉為何? (4 分)
7. 生化學上欲分離溶液中之 **DNA-binding protein (protein X)**, 另有三種蛋白質 (**A, B, C**) 存在溶液中, 這些蛋白質性質如下:

| | pi (isoelectric point) | Size M_r | Bind to DNA? |
|-----------|------------------------------|---------------|-----------------|
| protein A | 7.4 | 82,000 | yes |
| protein B | 3.8 | 21,500 | yes |
| protein C | 7.9 | 23,000 | no |
| protein X | 7.8 | 22,000 | yes |

請就下列三種不同情形設計蛋白質分離技術(6 分)

- (a) protein X 與 protein A 分離?
 - (b) protein X 與 protein B 分離?
 - (c) protein X 與 protein C 分離?
- 8 檢查報告發現某病人尿中 **ketone bodies** 太高, 此人可能是何種疾病? 代謝發生何種異常才使 **ketone bodies** 貯積? (6 分)
 9. 說明 **histone acetylation** 及 **methylation** 與基因活性的關連性如何?(6 分)
 10. **Nuclear proteins** 具有何特殊序列? 細胞運用何種途徑將 **nuclear proteins** 傳送至細胞核中?(6 分)
 11. **Telomerase** 如何參與染色體 **telomeres** 之 **T loop** 的形成? (6 分)
 12. **Carbamoyl phosphate synthetase I** 是一個 **mitochondrial enzyme** 而 **carbamoyl phosphate synthetase II** 則位於 **cytosol**, 請比較兩者在生化代謝上的角色(6 分)

13. 那一類的 hormones 經由 nuclear receptors 發揮功能? 此種 receptors 構造特徵為何? 舉一例說明其典型的作用模式. (6 分)
14. 請分別敘述下列兩種酵素 Thymidylate synthase 和 dihydrofolate reductase 之催化反應並解釋其常做為抗癌藥物發展之 target enzymes 的分子機轉(6 分)
15. 敘述 fatty acids 在肝臟中五種可能的命運 (fates) (8 分)
16. 請敘述 epinephrine 釋放到血液後引發的 signal transduction, 引起 glycogen phosphorylase 活化, 調節 glycogen 代謝的一連串作用機制. (8 分)
17. 下列 signaling molecule (a) 至(d) 是由右列那一個 amino acid precursor 所合成 (每一個 precursor 可能用一次以上或完全不用), 請填號碼至空格內. (4 分)

| <u>Signal Molecule</u> | <u>Amino Acid Precursor</u> |
|------------------------|-----------------------------|
|------------------------|-----------------------------|

- | | |
|------------------------------------|-------------------|
| ----- (a) auxin | (1) histidine |
| ----- (b) epinephrine | (2) glutamic acid |
| ----- (c) γ -amino butyrate | (3) tyrosine |
| ----- (d) serotonin | (4) tryptophan |
| | (5) arginine |

18. 由右列選取最直接的一個酵素或蛋白質配合左列各種 DNA damage type 或 repair step (8 分)

- | | |
|-------------------------------|--|
| ___ base loss | (a) Rec A protein |
| ___ cytosine deamination | (b) AP endonuclease |
| ___ binds to GATC sequences | (c) mutH protein |
| ___ binds to mismatch in DNA | (d) DNA polymerase I |
| ___ DNA synthesis in gaps | (e) uracil N-glycosylase |
| ___ seals nicks | (f) mutS-mutL complex |
| ___ O^6 -methylguanine | (g) ABC excinuclease |
| ___ direct chemical reversal | (h) DNA photolyase |
| of pyrimidine dimer formation | (i) O^6 -methylguanine methyltransferase |
| | (j) DNA ligase |

一、解釋名詞：(20%)

1. Loss of heterozygosity
2. Wobble hypothesis
3. Complementation test
4. Crossing-over
5. Cistron
6. Satellite DNA
7. Heterochromatin vs. euchromatin
8. Chaperone
9. Imprinting
10. Operon

二、選擇題：(單、複選皆有，複選者有註明)：(20%)

1. 請問下列哪一條 PCR primer 的 annealing 溫度最高? 1) TACCTTAAGCAATGTCA
2) AGCCTGCCACAGCGTCG 3) TTATGACTTGAATACTG 4)
GACCTCATATGACATAG
2. (複選)請問下列哪幾種 DNA 的突變會造成蛋白質序列的改變? 1) silent mutation 2)
frameshift mutation 3) nonsense mutation 4) missense mutation
3. (複選)請問下列哪些物種有細胞核? 1) *Saccharomyces cerevisiae* 2) *Escherichia coli*
3) *Homo sapiens* 4) Viroid 5) Prion
4. (複選)真核細胞的遺傳物質會存在於哪些位置? 1) centrosome 2) chloroplast 3)
mitochondria 4) nucleus 5) ribosome
5. (複選)分光光度計(spectrophotometer)可用來作核酸定量，其原理何者為真? 1)
DNA 可吸收 260 nm 波長 2) RNA 可吸收 260 nm 波長 3) DNA 可吸收 280 nm 波
長 4) RNA 可吸收 280 nm 波長 5) protein 可吸收 280 nm 波長
6. 下列分子由大到小排列應為：1) cosmid > phagemid > BAC > YAC 2) BAC > YAC
> cosmid > phagemid 3) YAC > BAC > cosmid > phagemid 4) phagemid > cosmid >
YAC > BAC
7. (複選)下列哪些為蛋白質轉譯(translation)時會使用的序列 1) Shine-Dalgarno
sequence 2) Kozak sequence 3) IRES 4) Okazaki fragment
8. 在人類細胞中，下列哪一個不是 termination codon? 1) UAG 2) UUG 3) UAA 4)
UGA
9. 下列哪一個分子不是 DNA 複製時所需? 1) DNA polymerase 2) helicase 3) DNA
ligase 4) primase 5) TBP
10. DNA 複製時的正確性主要由何分子控制? 1) DNA polymerase 2) helicase 3)
DNA ligase 4) primase 5) TBP

三、配合題：(10%)

各種代表性物種的基因組(genome)大小。請從右列(in base pair)中選擇適合的答案。

- | | |
|--|-----------------------|
| _____ A. <i>Caenorhabditis elegans</i> | (1) 1.0×10^6 |
| _____ B. <i>Drosophila melanogaster</i> | (2) 4.2×10^6 |
| _____ C. <i>Escherichia coli</i> | (3) 1.3×10^7 |
| _____ D. <i>Homo sapiens</i> | (4) 8.0×10^7 |
| _____ E. <i>Saccharomyces cerevisiae</i> | (5) 1.4×10^8 |
| | (6) 1.2×10^9 |
| | (7) 3.3×10^9 |

四、問答題：(50%)

1. 請說明 gene, allele, genotype, phenotype 間之關係為何? (8%)
2. 請說明 siRNA, shRNA, microRNA, antisense RNA 在功能、構造、作用方式、及來源方面的異同。(10%)
3. 請畫出 gene structure in human genome, 和其所轉錄(transcription)出之 RNA structure, 以及蛋白質產物間之結構與序列對應關係。(接下題)(8%)
4. 接續上題, 請自基因開始到其產物功能, 闡述真核細胞基因表現有哪些不同層次的調控方式。(兩題可同時作答, 也可分開作答)(12%)
5. 配置 0.5 M 之氯化鈉(NaCl, molecular weight: 58.5)溶液 1 公升, 請問 1) 需用多少公克氯化鈉? 2) 此氯化鈉溶液以重量體積比表示應為? 3) 此溶液含有多少莫耳數(mole)之氯化鈉? (6%)
6. 試管內有 3.3 μg 之 5 kilo-base pair 的 plasmid, 請列式計算出試管內共有多少個 plasmid 分子? (assuming the average molecular weight of nucleotide: 330) (6%)

問答題: 100%

一、請敘述下列藥物之作用機轉、臨床用途: 30 %

- | | |
|------------------|--------------------|
| (1) Sildenafil; | (9) Beclomethasone |
| (2) Amyl nitrate | (10) Cromolyn |
| (3) Bosentan | (11) Buspirone |
| (4) Icatibant | (12) Amantadine |
| (5) Latanoprost | (13) Clozapine |
| (6) Omalizumab | (14) Loxapine |
| (7) Montelukast | (15) Trazodone |
| (8) Terbutaline | |

二、請比較 Aspirin, Celecoxib, Diclofenac, Piroxicam 在作用機轉及副作用之異同點。(10%)

三、請比較 Methotrexate, cyclophosphamide, cyclosporine, Chloroquine, Adalimumab 在作用機轉及副作用之異同點。(15%)

四、Bevacizumab, Trastuzumab, Cetuximab, Gemtuxumab, Rituximab 在臨床用途、作用機轉之異同點。(15%)

五、Simvastatin, Mevalonate, Fenofibrate, Niacin, Ezetimibe 在臨床用途、作用機轉之異同點。(15%)

六、將以下英文翻譯成中文，並以圖解表示作用機轉。(15%)

Familial hypercholesterolemia is an autosomal dominant trait. Although levels of LDL tend to increase through childhood, the diagnosis can often be made on the basis of elevated umbilical cord blood cholesterol. In most heterozygotes, cholesterol levels range from 260 to 500 mg/dL. Triglycerides are usually normal, tendon xanthomas are often present, and arcus corneae and xanthelasma may appear in the third decade. Coronary disease tends to occur prematurely. In homozygous familial hypercholesterolemia, which can lead to coronary disease in childhood, levels of cholesterol often exceed 1000 mg/dL and early tuberous and tendinous occur. These patients may also develop elevated plaque-like xanthomas of the aortic valve, digital webs, buttocks, and extremities.

Defects of LDL receptors underlie familial hypercholesterolemia. Some individuals have combined heterozygosity for alleles producing nonfunctional and kinetically impaired receptors. In heterozygous patients, LDL can be normalized with combined drug regimens (Shown in your Figure). Homozygotes and those with combined heterozygosity whose receptors retain even minimal function may partially respond to niacin, ezetimibe, or reductase inhibitors.

Your Fig. can indicate sites of action of HMG-CoA reductase inhibitors, niacin, ezetimibe, and resins used in treating hyperlipidemias. LDL receptor (R) are increased by treatment with resins and HMG-CoA reductase inhibitors.

(注: xanthomas 黃色瘤) (tendinous: 腱性的)