

全国高等学校配套教材

英文版

病理生理学 复习与自测

Pathophysiology
Review and Self-Assessment

主 编 谢可鸣 王小川 钱睿哲



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PREFACE

In recent years, more and more Chinese students have been going abroad to study, while many foreign students tend to choose China for their destinations where they can get higher medical education or pursue advanced studies. Faced with new situations, some domestic medical schools or universities are now providing foreign students with specialized lessons and examinations in English.

Bilingual teaching mode, under which both Chinese and English were used in teaching and examinations of the specialized courses, are being gradually spread in different subjects of some universities, particularly in the courses for long schooling (7-year's or 8-year's schooling) students as well as postgraduates.

Pathophysiology, as an important pre-clinical course, mainly deals with altered functions in individuals due to disease. It is the study on the mechanisms of development and evolution of diseases caused by etiological factors and also dedicates the relationships between functional alterations and clinical manifestations in some pathological processes and syndromes. It is concerned with broad knowledge of multiple subjects of medicine. During the bilingual or English teaching processes of pathophysiology, many medical students, no matter where they come from, more or less feel some degree of difficulty in both learning this course and getting a higher score in the examination, although they have considerably made their efforts to learn the contents in textbooks. Many students hope the teachers can provide them with study guide including learning objectives, essential concepts and terms, questions and answers and so on, so that they can understand what is important and can assess themselves to see whether they have indeed understood and mastered main pathophysiological knowledge. Besides, some teachers, who are giving bilingual or English pathophysiological lessons, also hope to have this kind of book written in English for the reference.

On account of the above-mentioned reasons, proposed by Medical School of Soochow University, a motion to compile jointly an English book playing a guiding role in learning pathophysiology is immediately supported by our colleagues engaged in pathophysiological speciality of domestic 19 higher medical schools in different areas. Relying on efforts made by all of us contributors, who have the years' teaching careers in the field of pathophysiology, this book is now presented to its readers.

The contents in this book are compiled on the basis of Chinese or bilingual (written in English) pathophysiology textbooks, which are mainly published by People's Medical Publishing House of China. This book can be an important complement to pathophysiological bilingual or English courses of most medical schools or universities. We

expect that domestic and oversea medical undergraduates and postgraduates will find the book helpful for review and self-assessment of main concepts and knowledge of pathophysiology. This book will be useful for those who are preparing for the clinical professional certificate examinations. The book can also offer a good reference for teachers of pathophysiology and other related subjects of medicine.

We are especially grateful to professor Wang Jianzhi, at Tongji Medical College, Huazhong University of Science and Technology, and professor Jin Huiming, at Shanghai Medical College, Fudan University, for their valuable review. Some colleagues friendly offer their Chinese pathophysiology exercise questions of chapter 5, chapter 6, chapter 9 and chapter 15 for our reference, we want sincerely to acknowledge them: associate Prof. Chen Weiya, at Hangzhou Normal University; Prof. Deng Songhua, at Anhui Medical University; associate Prof. Hao Gang, at Capital Medical University; and associate Prof. Li Yuehua, at Nanjing Medical University. We are heartily thankful to all the other contributors of this book for their hard work to make this book available.

Xie Keming
Wang Xiaochuan
Qian Ruizhe

INSTRUCTIONS

The most information on which the questions in this book are based can be found in the pathophysiology textbooks. These textbooks have been programmed by Ministry of Public Health and written in Chinese as well as English, especially those newly published by People's Medical Publishing House. The minority of the contents is written according to the information of other domestic and abroad-related textbooks. The main reference books have listed in the end of this book.

The contents of this book are composed of 20 chapters. We arrange the sequence of these chapters after referring to those of Chinese pathophysiology textbooks published by People's Medical Publishing House for 8-year' and 5-year' schooling students. Every chapter or its section includes three parts: part A, part B and part C.

Part A presents readers with a short list of learning objectives, which is classified as three levels according to different degree of importance of those contents in a chapter. These objectives clearly identify for the student what information should be mastered, what content should be familiar with and what understood.

Part B gives 6 types of pathophysiology questions for reader's self-assessment:

Type I is multiple choice question of type A. Each question in this part is followed by five answers marked A, B, C, D and E. From those answers, readers are to choose the best. Fill in the bracket at the end of each question with a corresponding letter presenting the best answer.

Type II is multiple choice question of type X. In this part, readers will be given some questions to read. Each question is followed by five answers respectively marked A, B, C, D and E. From those answers, readers are to choose one or more correct answers. The correct result for one question may be just one answer, or all five answers or random combination of those given answers.

Type III is true or false question. In this part, readers will be given some statements to read. Each statement, becoming a question, may be correct or wrong. Readers are required first to decide whether the statement is true or false and then fill in the following bracket with T for true or F for false.

Type IV is term explanation question. Readers are required to explain those listed later concepts, terms and abbreviations concisely.

Type V can be also named short questions or concise questions and need to be answered briefly. Readers can answer them with an outline or a concise or brief description.

Type VI is the question to be elucidated in detail. This type of question can also be

2 INSTRUCTIONS

named long question and need readers give complete and detailed answer or elucidation about it.

Part C offers readers reference answers to the questions listed in part B and related explanations. For some answers in preceding three types of questions, further explanations are given. If an asterisk “*” is placed next to the capital letter representing the correct selection, further explanation about that selection will be given below.

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Chapter 1

Introduction of Pathophysiology and Conspectus of disease

Xie Keming

Section One Introduction of Pathophysiology

Part A Learning Objectives

- *To master the main task and character of pathophysiology and the concept of basic pathological process*
- *To be familiar with the major contents and research methods of pathophysiology and its status and roles in medical educations*
- *To understand the concept of evidence-based medicine and the developmental concise history of pathophysiology*

Part B Questions for Self-Assessment

I Multiple choice questions of type A(1~7)

1. What is pathophysiology? ()
 - A. It is a subject to study on the laws of life activities of healthy individuals
 - B. It is a subject to study on the morphology of healthy individuals
 - C. It is a subject to study on the laws of life activities of unhealthy individuals
 - D. It is a subject to study on the morphological changes of unhealthy individuals
 - E. It is a subject to tell you the knowledge about the clinical manifestations, diagnosis and therapeutics of diseases
2. Which is the main task of pathophysiology? ()
 - A. To study on the types of causative factors and the imposed manners
 - B. To study on the manners of compensation and their modulation in the insulted bodies during some diseases
 - C. To study on abnormal cellular morphological changes in diseased bodies
 - D. To study on the mechanisms and laws of occurrence, development and outcome of diseases
 - E. To study on symptoms and signs of diseases
3. "Conspectus of disease" mainly discuss ()
 - A. The causes and conditions of diseases
 - B. The changes of functions and metabolisms in diseased bodies

- C. The mechanisms and laws of occurrence, development and outcome of diseases
- D. The mechanisms of basic pathological processes
- E. The common rules by which diseases occur and develop
- 4. Which one of the following *does not* belong to basic pathological process? ()
 - A. Heart failure
 - B. Shock
 - C. Hypoxia
 - D. Fever
 - E. Metabolic acidosis
- 5. Which one of the following belongs to basic pathological process? ()
 - A. Coronary heart disease
 - B. Uremia
 - C. Diabetes
 - D. Disorders of water and sodium metabolism
 - E. Lung cancer
- 6. Which one of the following is the most important method applied to pathophysiological research on diseases? ()
 - A. Animal experiments
 - B. Clinical observations
 - C. Epidemiological investigations
 - D. Immunohistochemistry methods
 - E. Morphological observations
- 7. Which one of the following abnormalities can be clinically named as a syndrome? ()
 - A. Acute appendicitis
 - B. Hypocalcemia
 - C. Hypotonic hypoxia
 - D. Heart failure
 - E. Breast cancer (mastocarcinoma)

II Multiple choice questions of type X(8~12)

- 8. Which content listed below does pathophysiology deal with? ()
 - A. Etiology
 - B. Pathogenesis
 - C. Basic pathological process
 - D. Pathophysiology of organs and systems
 - E. The morphology of pathological tissues
- 9. Which item of the following *does not* belong to basic pathological process? ()
 - A. Hypokalemia
 - B. Hepatic encephalopathy

- C. Metabolic acidosis
 - D. Uremia
 - E. Hypoxia
10. What character does pathophysiology possess? ()
- A. It belongs to a subject of preclinical(or basic) medicine.
 - B. It is an integrated, borderline discipline.
 - C. It is a bridge subject linking preclinical medicine to clinical medicine.
 - D. It is a theoretical subject.
 - C. It is an experimental subject.
11. Which of the following can be known as a syndrome ()
- A. Respiratory failure
 - B. Heart failure
 - C. Hepatic failure
 - D. Renal failure
 - E. Fever
12. Which of the following is included in the general methods of pathophysiological research? ()
- A. Animal experiments
 - B. Clinical observations
 - C. Epidemiological investigations of diseases
 - D. Research on the new methods of polymerase chain reaction (PCR)
 - E. Researches on disease therapeutics

III True or false questions(13~18)

13. Hypoxia belongs to a basic pathological process, because it can be found not only in the diseases of respiratory system but also in those of other systems. ()
14. The pathophysiology of organs and systems mainly deals with the pathogenesis and laws of exact diseases. ()
15. It is impossible that two or more kinds of basic pathological processes can coexist in a certain disease simultaneously. ()
16. The objective of pathophysiology is to study on the changes of physiological functions in patients. ()
17. Pathophysiology is an integrated subject that only involves physiology and pathology. ()
18. Same syndrome can be encountered in the different patients suffered from different diseases. ()

IV Term explanations(19~21)

19. pathophysiology
20. pathological process

21. evidence-based medicine

V Questions to be answered briefly(22~26)

22. What is the major task of pathophysiology?
23. Which contents are covered in the subject of pathophysiology?
24. Please give an example to explain what pathological process is.
25. Which basic pathological processes may occur in the wounded person with acute severe hemorrhage?
26. What are the principal research methods in pathophysiology?

VI Questions to be elucidated in detail(27~29)

27. Try to compare the similarities and differences between pathophysiology and physiology or pathology.
28. Why is pathophysiology thought of as "philosophy in medicine"?
29. What is a disease model? Why can't the research results obtained from animal experiments be directly applied to clinical instances?

Part C Reference Answers to Questions and Related Explanations

I Multiple choice questions of type A

1. C 2. D 3. E 4. A 5. D 6. A 7. D*

Explanations

7. The pathophysiology of organs and systems mainly deals with common dysfunctions, structural and metabolic abnormalities of some important organs or systems in the course of diseases. These abnormalities are shared by a group of diseases involving same organ or system and clinically known as syndromes, such as heart failure, respiratory failure and so on.

II Multiple choice questions of type X

8. ABCD 9. BD 10. ABCDE 11. ABCD 12. ABC

III True or false questions

13. T* 14. F 15. F 16. F 17. F 18. T

Explanations

13. Hypoxia is a kind of basic pathological process. Some diseases in different systems can bring about hypoxia and the latter often become a direct factor to lead to death of patients. The same pathological process can be found in different diseases. Several different pathological processes may occur in one disease.

IV Term explanations

19. Pathophysiology is a science to study on the mechanisms and laws of occurrence and

development of diseases.

20. Basic pathological process means some shared series abnormal changes of function, metabolism and morphology presented in a group of diseases. For example, hypoxia, fever, shock and cellular apoptosis and so on are basic pathological processes.
21. Evidence-based medicine means that all the medical researches and decisions should be made on the basis of scientific achievements. This kind of medicine is based on scientific proofs and it takes the practice as its core.

V Questions to be answered briefly

22. The major tasks of pathophysiology are to explore the essence of diseases so as to offer theoretical and experimental basis for the prevention and treatment of diseases by following efforts: ① researching on the general laws and mechanisms of occurrence and development of diseases; ② elucidating the changes of function and metabolism in insulted individuals and underlying mechanisms; ③ giving corresponding experimental therapy in accordance with causative factors and pathogenesis of diseases then analyzing curative effect and their mechanisms.
23. The major contents of pathophysiology cover following four respects: ① conspectus of disease; ② basic pathological processes; ③ pathophysiology of systems; ④ pathophysiology of concrete diseases. The former three parts are included in the teaching contents of pathophysiology.
24. Basic pathological process means some shared series abnormal changes of function, metabolism and morphology presented in a group of diseases. For example, hemorrhage may occur in those patients suffered from severe trauma, gastric ulcer, vein rupture of esophageal varix owing to hepatic cirrhosis, or under the conditions of childbirth of pregnancy woman and so on. A large amount of bleeding in a short time can result in a basic pathological process, hemorrhage shock. As a result, the microcirculation in these patients will undergo successively the alternations of ischemic hypoxia stage, stagnant hypoxia stage and microcirculatory failure stage, simultaneously accompanied by series aberrant changes of function and metabolism. Although the causes leading to hemorrhage may be different, the pathological processes induced by them are alike.
25. Those pathological processes such as stress responses, hemorrhage shock, disseminated intravascular coagulation, hypoxia, and so on may occur in the patients with acute severe hemorrhage.
26. The principal research methods in pathophysiology include animal experiments, clinical observations and epidemiological investigations of diseases.

VI Questions to be elucidated in detail

27. Both pathophysiology and physiology are the sciences to research on life activities in the bodies, but the objects on which pathophysiology researches are patients or

unhealthy animals and those physiology researches on are healthy bodies. Although the objects pathophysiology and pathology research are the same, the former puts the research stress on the changes of function and metabolism and the latter emphasizes particularly on morphological abnormalities.

28. Because the development of diseases has some objective laws itself, that could be elucidated more correctly by dialectical viewpoints, such as the viewpoint of that everything can be invariably divided into two parts, the viewpoint of the struggle, identity and transformation of contradictions, etc. pathophysiology is thought of as "philosophy in medicine" by some scholars.
29. Up to now, an accurate definition of disease model has not been found yet. A disease model can also be named as an animal model of human disease. In medical research it is a necessary procedure to develop an animal model for further experimentation in vivo or in vitro. In this type of model, some experimental animal will be induced artificially to produce certain pathological changes close to those of relevant human disease so as to meet the needs of observations and experimental studies. Animal experimentation is a main method for research on disease laws in pathophysiology. After all, there are significant differences in morphology and physiological features and so on between human beings and other species of animals. Besides, with the highly developed nerve system, languages, thought and working abilities, human beings have the duality of both biological and sociological nature. Because of the reasons mentioned above, it is obvious that not all human diseases can be developed in same manners in experimental animals. It is after being compared with clinical information, analyzed and integrated that all those research results from experimentation using animals can be used for clinical reference and offered as the basis of exploring causes, pathogenesis, treatment and prevention of a disease.

Section Two Conspectus of Disease

Part A Learning Objectives

- *To master the concepts of health, sub-health and disease*
- *To master the general rules in occurrence and development of diseases and the concepts of complete and incomplete recovery*
- *To master the concept and criteria of brain death*
- *To be familiar with the common causative factors and their characteristics in leading to diseases*
- *To be familiar with the predisposing and precipitating factors of diseases*
- *To be familiar with the fundamental mechanisms underlying diseases and the general outcomes of diseases*

Part B Questions for Self-Assessment**I Multiple choice questions of type A (1~31)**

1. Which one of the following definitions about health is the most appropriate? ()
 - A. Health means having no disease
 - B. Health indicates physical healthiness
 - C. Health indicates psychological wellness
 - D. Health indicates a state of complete well-being socially
 - E. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity
2. Which one of the following descriptions about the concept of disease is the most appropriate? ()
 - A. Disease is referred as an uncomfortable feeling of body
 - B. Disease is referred as aberrant manifestation of deregulated homeostasis caused by harmful agents
 - C. Disease is referred as an abnormal life process
 - D. Disease is referred as a disorder of inner environment
 - E. Disease is referred as the manifestation of cellular damage of involved tissues and organs
3. The content of etiological research deals with ()
 - A. The contributing factors in the onset and development of diseases
 - B. The reversal rule of cause and result
 - C. The rule of homeostasis disruption
 - D. The rule of damage and anti-damage
 - E. The rule of outcome of disease evolution
4. Which one of the following descriptions about the concept of etiology is correct? ()
 - A. The factors that cause the occurrence of diseases
 - B. The factors that not only lead to disease but also determine the specificity of disease
 - C. The intrinsic factors that bring about disease
 - D. The extrinsic factors that result in disease
 - E. Both intrinsic and extrinsic factors that lead to disease
5. Which one of the following descriptions is *incorrect*? ()
 - A. Generally speaking, every disease has its cause
 - B. Causative factor is indispensable to the onset of a disease
 - C. Causative factor are the factors that determine the specificity of disease
 - D. Without a corresponding cause, the disease will not occur
 - E. A causative factor may promote or inhibit the development of corresponding disease.
6. Which one of the following descriptions is *incorrect*? ()
 - A. Cause is necessary for a disease to be induced and disease will not occur without the

effect of causative factor

- B. The relative stability of internal environment in the body with a disease has been disrupted
 - C. The onset of a disease definitively brings about the functional, metabolic and structural alternations of the body
 - D. Disease may manifest specific symptoms, signs and aberrant social behaviors
 - E. The predisposing and precipitating factors together determine whether a disease occurs or not
7. Which one of the following factors *does not* belong to cause? ()
- A. Genetic mutations.
 - B. Noise
 - C. Drug poisoning
 - D. Age and sex
 - E. Hypersensitivity reaction
8. The factors that can intensify the roles of causative factors and promote the occurrence and development of disease are referred as ()
- A. Risk factor of disease
 - B. Cause of disease
 - C. Predisposing factor of disease
 - D. Precipitating factor of disease
 - E. Extrinsic factor of disease
9. The causative factor of sickle cell anemia belongs to ()
- A. Biological agent
 - B. Genetic factor
 - C. Congenital factor
 - D. Nutritional factor
 - E. Immune factor
10. The causative factor leading to hypersensitivity reaction (anaphylaxis) to penicillin belongs to ()
- A. Biological agent
 - B. Physical and chemical agent
 - C. Congenital factor
 - D. Nutritional imbalance
 - E. Immune factor
11. The causative factors of burn and frostbite belong to ()
- A. Biological agent
 - B. Physical and chemical agent
 - C. Nutritional imbalance
 - D. Genetic factor
 - E. Congenital factor

12. Which one of the following is *not* related to the causative roles of biological agents? ()
- A. The virulence of pathogens
 - B. The amount of pathogens invading the host body
 - C. The invasiveness of pathogens
 - D. The ability of pathogens to resist or escape from host's attack
 - E. The metabolic reliance of pathogens on oxygen
13. The contents that pathogenesis studies are ()
- A. The causes of disease occurrence
 - B. The predisposing factor of disease
 - C. The precipitating factors of disease occurrence
 - D. The manifestations of homeostatic disturbances
 - E. The general rules and common mechanisms underlying the occurrence and development of diseases
14. Generally speaking, the direction in which a disease develops relies on ()
- A. The quantity and intensity of causative factor
 - B. Whether the precipitating factors exist or not
 - C. The strength contrast between damage and anti-damage factors
 - D. The body's resistance to a disease
 - E. The body's ability to maintain homeostasis
15. Which one is correct about the damage and anti-damage reaction in a disease? ()
- A. The struggle between them goes through the whole process of a disease and becomes the basis of various clinical manifestations of the disease
 - B. It orients the development of a disease and determines the outcome
 - C. They struggle and correlate with each other and their roles in the development of disease can be reversed
 - D. It is the basic power to promote the development of a disease
 - E. It is the important content of etiology
16. Which one is *incorrect* about the role of cause-effect alternation? ()
- A. The role of cause and effect can be alternated or transformed mutually
 - B. Although original cause has not existed, the role of cause-effect alternation can continue promoting the development of disease
 - C. It is an important form for a disease's development
 - D. It often leads to a vicious circle
 - E. The role of cause-effect alternation and the vicious circle in a disease cannot be interrupted
17. Which one *does not* belong to the fundamental mechanisms for diseases? ()
- A. Aging mechanism
 - B. Neutral mechanism