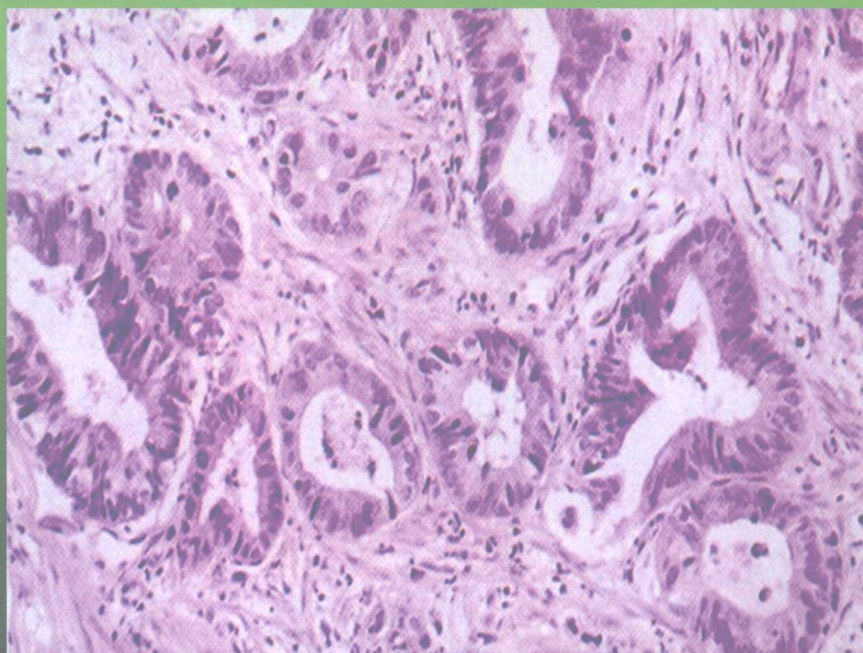


医学教育改革系列教材



Guide Book for Laboratory of Abnormal Human Morphology

Chief Editor Liang Li





Guide book for **Laboratory of Abnormal Human Morphology**

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Foreword

Global developments in medicine and health shape trends in medical education. And in China education reform has become an important focus as the country strives to meet the basic requirements for developing a medical education system that meets international standards. Significant medical developments abroad are now being incorporated into the education of both domestic and international medical students in China, which includes students from Hong Kong, Macao and Taiwan that are taught through mandarin Chinese as well as students from a variety of other regions that are taught through the English language. This latter group creates higher demands for both schools and teachers.

Unfortunately there is no consensus as to how to improve the level and quality of education for these students or even as to which English language materials should be used. Some teachers prefer to directly use original English language materials, while others make use of Chinese medical textbooks with the help of English language medical notes. The lack of consensus has emerged from the lack of English language medical textbooks based on the characteristics of modern medical education in China.

In fact, most Chinese teachers involved in medical education have already attained an adequate level of English language usage. However, English language medical textbooks that reflect the culture of the teachers would in fact make it easier for these teachers to complete the task at hand and would improve the level and quality of medical education for international students. In addition, these texts could be used to improve the English language level of the medical students taught in Chinese. This is the purpose behind the compilation and publishing of this set of English language medical education textbooks.

The editors in chief are mainly experts in medicine from Capital Medical University (CCMU). The editorial board members are mainly teachers of a variety of subjects

from CCMU. In addition, teachers with rich teaching experience in other medical schools are also called upon to help create this set of textbooks. And finally some excellent scholars are invited to participate as final arbiters for some of the materials.

The total package of English medical education textbooks includes 63 books. Each textbook conforms to five standards according to their grounding in science; adherence to a system; basic theory, concepts and skills elucidated; simplicity and practicality. This has enabled the creation of a series of English language textbooks that adheres to the characteristics and customs of Chinese medical education. The complete set of textbooks conforms to an overall design and uniform style in regards to covers, colors, and graphics. Each chapter contains learning objectives, core concepts, an introduction, a body, a summary, questions and references that together serve as a scaffold for both teachers and students.

The complete set of English language medical education textbooks is designed for teaching overseas undergraduate clinical medicine students (six years), and can also serve as reference textbooks for bilingual teaching and learning for 5-year, 7-year and 8-year programs in clinical medicine.

We would like to thank the chief arbiters, chief editors and general editors for their arduous labor in the writing of each chapter. We would also like to acknowledge all the contributors. Finally, we would like to acknowledge Higher Education Press. They have all provided valuable support during the many weekends and evening hours of work that were necessary for completing this endeavor.

President of Capital Medical University
Director of English Textbook Compiling Commission
Zhaofeng Lu
August 1st, 2011

Preface

This guide book is one of experimental teaching of basic medicine series. It is applied for international students of clinical medical major and any students who are interested in this subject.

In this guide book, the content is divided into 3 parts. Part I is general pathology, which focuses on the fundamental cellular and tissue responses to pathologic stimuli. Part II deals with diseases of organ systems, and examines the particular responses of specialized organs. Part III concerns infectious diseases, and focuses on some traditional infectious diseases, in particular the epidemic diseases which are currently seen. At the end of each chapter we provide a typical clinical case with general medical record including clinical symptoms, results of physical examination, lab examination and pathological examination. The self-assessment is used to test how much you have mastered. The color pictures in the attachment will help the students to master the pathological features of each lesion.

The central idea of this book is to realize optimum recombination of abnormal human morphology teaching content and embody the bridge role of this subject between clinical practice and basic science. In each chapter observation of normal organs and tissue are provided for identifying the lesions. Depictions of gross and micro findings of each pathological organ are given for understanding the pathological features. Finally, the case analysis is useful for the students to improve the ability of comprehensive analysis. In this book the subject knowledge is integrated from normal to abnormal, from macro to micro, from basic to clinical. By using this guide book, the students will apply what they have learned from the textbooks to the experimental study as well as the future clinical practice.

I express my special thanks to my coauthors, without their cooperation, this book could never be finished. I am very grateful to Professor Encong Gong of Dept of Pathology, Peking University whose knowledge has been freely utilized in the preparation of this book. I am also deeply indebted to Mr. Shan Gao, an American expert, for his helpful criticisms to the manuscript.

Last but not least, the authors welcome comments and suggestions from the faculty, students and other readers, and this will help us make improvement in the next edition.

Liang Li
July 2011, Beijing

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Techniques for Study and Guidelines for Pathology Laboratory

Introduction

The study of abnormal human morphology, known as Pathology, is the study of suffering. It is a discipline that bridges clinical practice and basic science, and it involves the investigation of underlying cause of disease as well as the mechanisms which result in signs and symptoms of illness present in the patient. To master the structural and functional changes that occur in cells, tissues, and organs, pathologists first identify changes in the gross or microscopic appearance (morphology) of cells and tissues. This pathology laboratory class will play an important role in the process of pathological teaching. Observation of pathological organs macroscopically and histologically in this class will help students master the basic knowledge of pathology and engender ability for independent thinking, analyzing and solving problems by themselves.

Techniques for Study

The technique for study of human morphology consists of observing the gross appearance of pathological organs, histological slides and watching videos.

Observation of gross appearance:

1. First identify an organ and its architectural features.
2. Observe the shape, size and color of the organ, and determine whether it is normal or not.
3. Observe external surface and cut surface, noting whether it is smooth, transparent, while evaluating its color, and texture.
4. Identify foci of disease, including its distribution and location, quantity, size, color, shape and the relationship between the focus of disease and the adjacent tissue. In the case of hollow organs (viscera), you should pay attention to the organ wall because it can become thicker or thinner. You should also determine whether the inner wall is smooth or rough, is there any pustule, and note the color, character, and dimension or capacity of both the lesion and the intracavitary aspect of the organ. Finally, note whether there are any adhesions on the parietal wall.

(Notice: The organs used for this laboratory have been fixed in formalin, and their color, size, and firmness are different from the fresh/unfixed ones.)

Observation of histological slides:

1. First, before using a microscope, observe the shape and the color of the tissue section on the glass slide macroscopically and see if you can define the area of pathologic change.

2. Microscopic observation

1) The low power lens is mainly used to inspect the overall structure of the tissue, and to observe the changes in histological structure, identifying the location and nature of the lesion, and its association with the adjacent tissue. You should develop a method for observation like the following: observing from upward to downward, and from left to right. For hollow organs, you should observe from inside to outside, but for solid organs, from outside to inside.

(Notice: You should not use the high power lens at the beginning of your observation.)

2) The high power lens is mainly used to observe the fine structure and morphological changes of the tissue and cells.

Description, Diagnostic Principles and Drawing Pictures

The description of the specimen should be genuine. Never compose descriptions with subjective views or feelings, and do not transcript your description from the book. The description should be concise, masterable and well organized. From part to whole, from inside to outside, from upward to downward.

The format for writing a diagnosis is like this: the name of the organ or the tissue + the pathological change. For example, heart infarction, brain abscess, chronic pulmonary congestion.

Drawing pathological pictures is very important. The procedure should be as follows: first observe the pathological changes with a microscope, identifying typical or characteristic areas. You can choose either low magnification or high magnification images, and combined pictures (using both low and high magnification) are recommended. Color the cytoplasm and the mesenchyme with a pink pencil, and use a violet pencil for the nucleus. Your picture should be situated in the round frame, and the illustration should be located on the right side of the frame. Write the descriptions and diagnosis below the pictures (see the appendix). You must finish your drawing work during the class period.

(Note: You may use the pictures in the textbook as a reference, but do not copy these pictures without microscopic observation.)

Guidelines for Laboratory Work

1. Take care of microscopes, specimens, pathological slides, computers and other laboratory instruments and material, especially care with the glass slides, as they are very valuable. If they are damaged or destroyed, they cannot easily be replaced.

2. Read the laboratory instructions before class. Review the relevant theories and master the requirements and objectives of each class.

3. Keep the classroom quiet, pay attention to the material.

4. Keep the classroom clean.

5. Obey the laboratory rules and regulations.

(Liang Li 李良)

Part *I*

General Pathology

Chapter

1

Cell Adaptation, Injury and Repair

AIMS

1. To master the types of cell and tissue adaptation and morphological features of atrophy.
2. To master the morphological features of cell swelling and hyaline degeneration.
3. To master morphological features, types and outcomes of cell necrosis.
4. To master the morphological features and functions of granulation tissue.

CONTENTS

Gross Specimen	Tissue Section
Brown atrophy of heart	Cardiac atrophy
Pressure atrophy of kidney	Cellular swelling in renal tubular cells
Pressure atrophy of sternum	Hyaline degeneration of splenic small arteries
Hyaline degeneration of connective tissue	Granulation tissue
Fatty degeneration of liver	Fatty degeneration of hepatocytes
Splenic infarction	
Brain abscess	
Dry gangrene of foot	
Caseous necrosis of lymph node	
Cavity in pulmonary tuberculosis	
Organization of splenic infarction	
Skin ulcer	

OBSERVATION OF NORMAL ORGANS AND TISSUES

1. Heart

▪ Gross findings

The heart is roughly the size of a fist and weighs 250 to 300 g in women and 300 to 350 g in men. The left ventricle normally has a wall of 0.8 to 1.2 cm thickness.

▪ Micro findings

Each myocardial cell has a central nucleus and many myofibrils, which has a sarcomere as their integral unit. The cells are bound to each other by intercellular junctions called intercalated disks. These junctions allow the individual myofibers to function as one unit(Figure 1).

2. Kidney

▪ Gross findings

The kidneys are located retroperitoneally in the upper dorsal region of the abdominal cavity. Each adult kidney weighs 120 to 150 g and is covered by a thin capsule of connective tissue. The size is about 10 cm×6 cm×4 cm. On cut section the kidney reveals two zones; the reddish brown cortex and the lighter medulla.

▪ Micro findings

Each kidney is composed of glomeruli, renal capsule, juxtaglomerular apparatus and renal tubules. The renal tubule begins as renal capsule and consists of the proximal convoluted tubule, loop of Henle, distal convoluted tubule and collecting duct(Figure 2).

3. Spleen

▪ Gross findings

The spleen is dark red and its size is about 12 cm×7 cm×3 cm, weighing about 150 g. It is surfaced by a connective tissue capsule.

▪ Micro findings

Red pulp and white pulp are seen. White pulp consists of numerous lymphocytes. The weakly stained central region is called the germinal center. The red pulp lies between the zones of white pulp, and some lymphocytes and trabecula of connective tissue can be seen.

OBSERVATION OF PATHOLOGICAL ORGAN AND TISSUE

▪ Gross findings

1. Brown atrophy of heart

The heart is smaller, firmer and darker than the normal. On the surface

the coronary arteries are tortuous(Figure 3).

2. Pressure atrophy of kidney

The kidney is enlarged with roughened surface. On the cut surface, there is significant dilatation of the renal pelvis. The renal cortex is shrunk-en and it is difficult to distinguish the corticomedullary junction(Figure 4). The explanation is as follows; as a result of chronic intermittent or incom-plete obstruction of urinary flow, the renal pelvis undergoes dilatation. The renal parenchyma which becomes compressed atrophy forms into a large flu-id-filled cystic organ.

3. Pressure atrophy of sternum

Specimen 1 is a heart from the patient who had syphilitic heart disease, and an aneurysm can be seen in the aorta. Specimen 2 is the sternum, the ar-ea of the sternum where the aorta is located has become obviously thinned.

4. Hyaline degeneration of connective tissue

The pleura is thickened, gray white and translucent.

5. Fatty degeneration of the liver

The liver is enlarged with blunted edges, a tense capsule, and is bright yellow, soft and greasy. This is also referred to as fatty liver.

6. Splenic infarction

There is a grayish-white or grayish-yellow, irregular area on the surface of the spleen. The infarction is roughly wedge-shaped and sharply demarca-ted, with the top toward the hilum of the spleen, and the base is on serosal surface. It is pale and firm with a red hyperemic rim.

7. Brain abscess

On the coronal cut surface of the brain, a round and regular cavity is lo-cated just below the surface, and the contents of the cavity has been drained away.

8. Dry gangrene of foot

The skin of the lesion shows shrinkage, and is dry and brown-black. The necrotic area is fairly well demarcated from the healthy tissue (Figure 5).

9. Caseous necrosis of lymph node

Many lymph nodes are fused together. On the cut surface, the necrotic foci are yellow-white, soft and cheesy, and differ in size. Some necrotic foci are confluent(Figure 6).

10. Cavity in pulmonary tuberculosis

A regular cavity can be seen in the lung. The wall of the cavity is cov-ered with caseous necrosis. The peripheral tissue consists of fibrosis which is greyish white.

11. Organization of splenic infarction

Grayish white fibrotic connective tissue are formed around the infarc-tion of spleen. Some of the connective tissue appears to be homogenous and translucent, and the texture is firm.

12. Skin ulcer

The necrotic tissue is separated from the normal tissue and demon-