基础医学专业英语

Professional English of Basic Medicine

主编 崔澂 战庆臣

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崔　澂　战庆臣　主编

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前　言

凡事皆有缘起。编辑本书的缘起则始于长期的医学专业英语教学。

专业英语教学在以往非英语专业高等教育教学中为选修科目，很少受到关注。新《大学英语教学大纲》规定：高等院校非英语专业学生必须修读专业英语，教学时数应不少于100学时。之后，在各高校的课程安排中，专业英语被列为非英语专业学生的必修课目，医学专业学生也是如此。接受教学任务之后，我们决定从已出版的医学专业英语图书中进行综合、比较、选择，然而在遴选过程中发现，尽管已出版的医学英语类的图书教材不下百种，但该类图书或专业内容未能紧跟医学前沿发展，或编写体例简单，或偏重于某单一学科，或偏重于某单一能力培养（以阅读材料汇编类的图书居多），与我们培养高素质通科医学人才目标的教学要求尚有一定距离，于是便产生了编写本书的想法。

在多年实践教学经验的基础上，我们对医学生的英语知识实际需求进行了详细调研，针对目前图书的不足，本书侧重于内容的综合性、前沿性、关联性和实用性四个方面。就综合性而言，本书的12个单元体系完整，涵盖了基础医学的核心课程，并涉及了基础医学的发展方向。就前沿性而言，本书的课文内容尽量做到覆盖学科研究前沿，对在课文中有所涉及又因篇幅所限没能展开的最新内容则通过阅读材料的方式加以补充。就关联性而言，本书在编写中注意与学科的课程设置相配合，编写顺序基本与基础阶段的专业课开设同

步，便于学生在学习过程中与专业学习相互印照，理解提高。就实用性而言，本书体例同时兼顾了各种实用能力的培养，精读课文和阅读材料重在阅读和对医学英语语言的掌握，思考题重在英语语言逻辑和写作能力的提高，对话练习重在听说能力的训练。

编辑此类教材，编者既要具有扎实的英语语言功底，又要具有比较深厚的医学专业知识和教育理论素养。为此，我们要求编者必须具有硕士以上学历，具有较丰富的医学、英语教学和临床医疗经验，并发表过专业论文。参与本书编辑的8位博士、9位硕士不仅符合上述要求，而且均具有强烈的事业心和责任感。在编写过程中，他（她）们精心筛选知识内容，科学安排内容结构，不厌其烦，数易其稿，直至最终定稿。“十年磨一剑”。本书从策划到最后出版用了3年多时间，足见编者的慎重与专注。

在本书编纂过程中，白求恩军医学院刘爱国院长、张宇辉副院长、训练部支国成部长给予了大力支持，并提出了许多指导性意见；主编崔澈博士为本书的最终出版作出了决定性的贡献。当然，我们也深知，一本教材的质量如何，能否达到预期的目标，还有待于实践的检验。我们真诚欢迎来自各方的意见、批评和建议，并表示由衷的谢意，书中失误及不足之处敬请专家评鉴斧正。

编　者

2006年11月

PREFACE

Everything happened has its causes. The cause of compiling this book was the long – term professional medical English teaching.

The teaching of professional English was less concerned because of its status of elective in higher education of non – English major. The new published *The Syllabus of College English* regulates that the students of non – English major in higher schools should choose the professional English as required course, and the time should not less than 100 period. After that, in the courses arrangement of higher schools, English has been the required courses for the students of non – English major, including the students of medical profession. After have taking the teaching task, we decided to choose our text – books from the published professional medical English books. However, during the course of selection, we found that although the published medical books are more than one hundred kinds, they are out of date, simple compiling structures, focusing on some single courses, or emphasizing the training of single capacity, which are not in accordance with the teaching goal of training qualified and all – round graduates. Then the idea of compiling this book occurred to us.

Based on the teaching practice for years, we made a detailed about the practical English need of medical students. Aiming at the shortage of present published books, this book emphasizes particularly on the synthesis, cutting edge of academy, relevancy, and practicability. Considering the synthesis, the 12 units of this book cover almost all the core courses and make a proper introduction on

the frontier of the basic medicine. Considering the cutting edge of academy, this book contains the advanced research result of courses. The latest information which is mentioned in the text and not explained in details can be found in the supplementary reading. Considering the relevancy, cooperating with the setting of the courses, the order of the units is in accordance with the opening of the elementary medical courses. By this way, it is helpful for the students to grasp and understand their professional knowledge. Considering the practicability, the structure of this book takes the training of various practical abilities into consideration. The emphasis of the intensive reading is the reading ability and the grasp of medical English. The dialogue exercise focuses on the training of listening and speaking. The questions' emphasis is the improvement of English language logic. And the summary of the text is mainly about the training of writing.

Compiling a textbook like this, the compilers should not only grasp English well but have the profound medical professional knowledge and educational theory. For this reason, the compilers should be at least master degree, have certain experiences in medicine, English teaching or clinical practice and have published several theses. The compliers of the book, (8 doctors and 9 masters), are not only qualified with the above - mentioned requirements but have strong responsibility. During the compiling period, they circumspectly select the contents, scientifically organize the text structure and patiently modify their script till the final publication. "No pains, no gains". It takes 3 years to plan, compile and publish this book, which entirely shows the compilers' prudence and concentration.

During this period, Liu Aiguo, president of Bethune Military Medical College, Zhang Yuhui, vice - president of the college, and

Zhi Guocheng, director of the training department of the college supported greatly and put forward many instructions. Doctor Cui Cheng, editor in chief, made decisive contribution for the final publication of this book. Of course, we know that only the practice can test the quality of the book and tell us whether the compilers' purposes have been achieved. Different opinions, critiques and advice are welcome and appreciated.

Editors

November 2006

名誉顾问：刘爱国　张宇辉　支国成
主　　编：崔　澂　战庆臣
副 主 编：杨彦忠　李保红　胡建军
编　　委：（以姓氏笔画为序）
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金玉祥　战庆臣　耿进霞
崔　澂　樊宇兵

CONTENTS

Unit One

Text

Cell Biology

Modern biology is rooted in an understanding of the molecules within cells and of the interactions between cells that allow construction of multicellular organisms. The more we learn about the structure, function, and development of different organisms, the more we recognize that all life processes exhibit remarkable similarities.

Living systems, including the human body, consist of such closely interrelated elements that no single element can be fully appreciated in isolation from the others. Organisms contain organs; organs are composed of tissues; tissues consist of cells; and cells are formed from molecules. The unity of living systems is coordinated by many levels of interrelationship: molecules carry messages from organ to organ and cell to cell; tissues are delineated and integrated with other tissues by noncellular membranes secreted by cells; and cells gain identity from contacting with other cells. Generally all the levels into which we fragment biological systems interconnect. To learn about biological systems, however, we must take a segment at a time. The biology of cells is a logical starting point because an organism can be viewed as consisting of interacting cells, which are the closest thing to an autonomous biological unit that exists. The integration of cellular activity into tissues, the development of organisms by growth and specialization of cells, and the metabolic events fueling the dynamism

of living systems are all topics on which we will touch, but they are all topics that fall within the province of other subdisciplines of biological science.

The processes of cells were described by cell biologists. That is to say, cell biology investigates how cells develop, operate, communicate, and control their activities. And cell biology also concentrates on the macromolecules and reactions studied by biochemists, the gene control pathways identified by molecular biologists and geneticists. In this millennium, two gathering forces will reshape cell biology: genomics, study of the complete DNA sequence of many organisms, and proteomics, a knowledge of all the possible shapes and functions that proteins employ. Therefore, in order to study the properties of the molecules of life and the innumerable variations on basic themes that are found in different organisms, modern researchers of cell biology employ concepts and experimental techniques drawn from biochemistry, molecular biology and genetics.

Genetics and genetic engineering provide powerful tools for the study of gene function in both cells and organisms. In the classical genetic approach, random mutagenesis is coupled with screening to identify mutants that are deficient in a particular biological process. These mutants are then used to locate and study the genes responsible for that process. Gene function can also be ascertained by reverse genetic techniques. DNA engineering methods can be used to mutate any gene and to re - insert it into a cell's chromosomes so that it becomes a permanent part of the genome. If the cell used for this gene transfer is a fertilized egg (for an animal) or a totipotent plant cell in culture, transgenic organisms can be produced that express the mutant gene and pass it on to their progeny. Many of these methods are being expanded to investigate gene function on a genome - wide

scale. Technologies such as DNA microarrays can be used to monitor the expression of thousands of genes simultaneously, providing detailed, comprehensive snapshots of the dynamic patterns of gene expression that underlie complex cellular processes.

New Words

delineate [di'linieit] v. 描绘
autonomous [ɔ:'tɔnəməs] adj. 自治的
subdiscipline ['sʌb'disiplin] n. （学科的）分支，分科
macromolecule [ˌmækrəu'məlikju:l] n. 巨大分子，高分子
biochemist ['baiəu'kemist] n. 生物化学家，生化学家
geneticist [dʒi'netisist] n. 遗传学家
millennium [mi'leniəm] n. 太平盛世，一千年
genomics [ˌdʒi:nə'miks] n. 基因组学
proteomics ['prəutiəˌmiks] n. 蛋白组学
mutagenesis [ˌmjutə'dʒenisis] n. 突变形成，变异发生
chromosome ['krəuməsəum] n. 染色体
genome ['dʒi:nəum] n. 基因组，染色体组
progeny ['prɔdʒini] n. 后裔
simultaneously [siməl'teiniəsly] adv. 同时地
snapshot ['snæpʃɔt] n. 快照，急射，简单印象

Phrases and Expressions

multicellular organism 多细胞机体
starting point 起点
be viewed as 被认为，被看作是
concentrate on 集中于，专注于
molecular biologist 分子生物学家

genetic engineering 遗传工程
transgenic organism 转基因生物
DNA microarray DNA 微阵列分析

Questions

1. What does cell biology study?
2. How to understand "The unity of living systems is coordinated by many levels of interrelationship"?
3. Why must modern researchers of cell biology employ concepts and experimental techniques drawn from biochemistry, molecular biology and genetics?
4. Make a speech or write a summary about the text.

Dialogue

How to Count the Cells?

Teacher: Good morning, everyone. Today, let's learn about how to count the cells. Well, Tom, could you tell me what we should prepare for it?

Tom: We need a clean count slide or hemacytometer, a clean cover slide, pipet, the culture medium, and a phase - contrast microscope microscope.

Teacher: Good. What should we do first?

Tom: At first, take a count slide or hemacytometer and cover it with a clean cover slide.

Teacher: The count slide and the cover slide should keep clean, otherwise we can't get the exact result. Ok, next step.

Tom: I think we should need pipet and culture medium now. But I

don't know exactly how to do.

Teacher: Take it easy. Dip a 0.1or 1ml pipet into the culture medium, allow a small drop of liquid to form on the end of the pipet, and touch it lightly to the surface of the slide at the periphery of the cover slide. What happen now? Can you see?

Tom: The liquid quickly spread under the cover slide. Then we should need phase – contrast microscope in the next step, am I right?

Teacher: Yeah! Now you should put the slide on the stage of a phase – contrast microscope set to 400. Remember that is 400! And focus on the cells. Are you clear now?

Tom: Fantastic! I got it!

Teacher: Ok! Do it by yourself now.

Reading Material

1. Receptors

Cell surface receptors are able to recognize and bind with high affinity specific subsets of extracellular macromolecules; furthermore, the binding step usually elicits a cellular response. In the case of those receptors, involved in receptor – mediated endocytosis (RME), a major response is the internalization of the ligand. This may be preceded by the generation of a signal that alters cellular metabolism (eg. Polypeptide hormone receptors), or the internalized ligand may be utilized by the cell for specific metabolic needs. In either case, ligand binding is a physiologically important event.

Ligand – receptor interaction is specific and involves only one

family of homologous extracellular molecules and one set of plasma membrane proteins. These receptors usually have been found to be a single protein or protein – protein complex. Moreover, the binding of the specific ligand depends on characteristic ionic and pH conditions. Ligand – receptor interactions have often been further defined by assessing how the specific modification of either the receptor or the ligand inactivates the binding step.

These receptors can therefore be defined by their molecular proteins, the conditions for ligand binding, and their ability to mediate a specific physiologic event. It is this last property that has usually been responsible for their initial detection. For example, LDL receptors were discovered because of their ability to regulate intracellular cholesterol metabolism. Similarily, the asialoglycoprotein receptor and the lysosomal enzyme receptor, to mention two, were first detected as a result of their physiological activity, not their binding properties.

Even though the physiological response is the single most important criterion for establishing the identity of a specific ligand – receptor interaction, often receptor activity must be studied under conditions where the physiologic response cannot be measured. This is particularly true when trying to detect receptors in fractionated cells or in cells that have been treated with fixatives like formaldehyde or gluteraldehyde. In these situations, the identification of receptor activity has to be based on the properties of ligand binding. These properties must be the same as those established for the intact, responsive cell. Thus, it is not sufficient to measure just ligand – specific displaceable binding (the competition between radiolabeled ligand and excess unlabeled ligand for the receptor). Criteria such as time dependence, ionic and chemical requirements, and cell specificity must also be established.

2. Fibroblast – ECM Interaction

In electron micrographs published during the 1960s, people called attention to the very close association of extracellular fibrils, with the cell surface of a number of fibroblast type cells. In oblique sections across the plasmalemma, the extracellular fibrils appeared to be continuous with cytoplasmic cortical materialof the same density, leading to conclude that the cortical material was a precursor of the fibrillar extracellular material, presumed to be collageous. This tendency of extracellular fibrils to coalign with intracellular fibrous components has been rediscovered in recent years by Hynes and Destree, who demonstrated, by double – labeling immunofluorescence, that fibronectin fibrils on the surface of fibroblasts in vitro codistribute with the actin – rich intracellular stress fibers of cells.

Later, Singer confirmed and extended the work of Hynes and others, providing further evidence for a structural connection between extracellular fibronectin fibrils and intracellular bundles of actin filaments in fibroblasts in vitro. Fibronectin fibrils are identified by ferritin – conjugated antibodies. Sections cut oblique to the plasmalemma show that actin filaments subjacent to the fibrils exhibit a collinear arrangement even when the specimen is tilted through 40°. Sections cut perpendicular to the cell surface also show that the fibrous components are collinear. Therefore, we conclude that the extracellular and intercellular components are coaxial and connect with each other in the cell membrane. It seems more likely that a binding protein or receptor in the plasmalemma and/or adjacent cytoplasm actually interconnects the two components.