高 等 学 校 教 材

生物与制药工程专业英语

张永勤　刘福胜　主编

化学工业出版社

·北 京·

本书以化学、生物、药学、工程学等学科领域来设定专业词汇的语域构架，并按照学生所学课程顺序编排教材内容，如无机化学、有机化学、生物化学、分析化学、微生物学、分子生物学、生物信息学、药理学、药剂学、天然药物化学、发酵工程、分离工程及其设备、制剂生产等，并附有相关构词法、实验室常用仪器名称、相关专业术语以及相关专业文献如美国药典、药品说明书、文献检索、英文科技论文及化学文摘导读、英文摘要写作等知识的介绍。书后附有词根、前缀及后缀总表，分子生物学术语表及词汇总表以便读者查阅。

本书适用于化学、药学、药物制剂、制药工程、生物制药、生物工程、发酵工程、生物技术、生化工程等相关专业本科生教材，也可用于科研院所、企事业单位的科技及其他从业人员参考。

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前　　言

本书以学生所学的相关基础、专业课程为基础，根据所涉猎的化学、生物、药学、工程学等学科领域来设定专业词汇的语域构架，并按照学生所学课程顺序编排教材内容，如无机化学、有机化学、生物化学、分析化学、微生物学、分子生物学、生物信息学、药理学、生药学、药剂学、发酵工程、分离工程及其设备、制剂生产等，以加强英语的专业性、实用性和新颖性，使学生在回顾所学课程的同时掌握专业词汇的构词规律。在选材方面，针对学生在公共英语学习阶段重理解轻翻译的现状，选择能够体现当今科技文献水平的具有一定难度的材料作为教材如英文原版教材、美国药典、药品说明书、化学文摘等，使学生掌握英文翻译技巧。此外，每单元的后半部分均附有相关构词法、实验室常用仪器名称、相关专业术语以及相关专业文献如美国药典、药品说明书、文献检索、英文科技论文及化学文摘导读、英文摘要写作等知识的介绍。书后附有词根、前缀及后缀总表，分子生物学术语表及词汇总表以便学生查阅。

本书分为 16 个单元，可安排 36～70 学时。每个单元由多篇课文及阅读材料构成，其中每篇课文后都附有带音标的生词表，每单元之后均附有相关知识介绍和练习题。单元中的课文是依据相关专业内容由浅入深来设置的，可根据专业需要来选用。对于短学时课程，可利用课后的总结性相关知识介绍（additional information），力求“一点盖面”，使学生全面掌握相关专业英语知识。

本书的教学重点主要在于专业词汇和翻译技巧。专业词汇是学生学习专业英语的基础，也是初学专业英语学生的薄弱环节。首先应重点掌握专业词汇的构词方法，以便于大量熟记专业词汇；其次，可根据课文所涉猎的专业知识，引导学生掌握更多的专业词汇。注意重点掌握常用专业词汇，对于使用频率低的词汇，可不必要求学生死记硬背。进入专业英语学习的学生一般都已通过国家四级或六级英语考试，具备了一定的阅读理解能力，但往往缺乏翻译技巧的训练，无法胜任未来的翻译工作。因此，在课文讲解过程中，除要求学生掌握一定专业词汇之外，还应重点掌握翻译技巧。本书词汇部分所附音标取自“金山词霸 2006”中的“现代英汉综合大辞典”。

本书适用于制药工程、药物制剂、生物工程、发酵工程、生物技术、生物制药、生化工程等相关专业的专业英语教学。

本书的编写工作起始于 2000 年，在近七年的教学实践中得以不断更新，不断完善。当然，“没有最好，只有更好”。本书在编写过程中得到了青岛科技大学和化学工业出版社的大力支持，对此一并表示衷心的感谢。

本书编写分工，第一单元、第三单元、第四单元、第五单元、第七单元、第八单元、第九单元、第十单元、第十二单元、第十三单元、第十六单元及附录一和总词汇表由张永勤编写，第二单元、第十四单元由刘福胜编写，第六单元、第十五单元及附录二由石琰璟和张永勤编写，第十一单元由赵文英编写。

本书从结构设计到课程内容安排都是一种尝试。由于编者水平有限，不妥之处希望使用本书的师生、读者多提宝贵意见。

编　者

2007 年 **1** 月于青岛科技大学

目　　录

Unit 1 Translation Skills

Text A

The Heritage of Pharmacy

Drugs, in the form of vegetation and minerals, have existed longer than man himself. Human disease and man's instinct to survive have, through the ages, led to their discovery. The use of drugs, crude though they may have been, undoubtedly dates back long prior to recorded history, for the instinct of primitive man to relieve the pain of a wound by bathing it in cool water or by soothing it with a fresh leaf or protecting it with mud is within the realm of belief. From experience primitive man would learn that certain therapy was more effective than others, and from these beginnings the practice of drug therapy began.

Among many early races, disease was believed to be caused by the entrance of demons or evil spirits into the body. The treatment quite naturally involved ridding the body of the supernatural intruders. From the earliest records of history it is evident that the primary methods of doing so were through the use of spiritual incantations, the application of noisome materials, and the administration of specific herbs or plants.

The First Apothecary

Before the days of the priestcraft, the wise man or woman of the tribe, whose knowledge of the healing qualities of plants had been gathered through experience or handed down by word of mouth, was called upon to attend to the sick or wounded and prepare the remedy. It was in the preparation of the medicinal materials that the art of the apothecary originated.

The art of the apothecary has always been associated with the mysterious, and its practitioners were behaved to have connection with the world of spirits and thus performed as intermediaries between the seen and the unseen. The belief that a drug had magical associations meant that its action, for good or for evil, did not depend upon its natural qualities alone. The compassion of a god, the observance of ceremonies, the absence of evil spirits, and the healing intent of the dispenser were individually and collectively needed to make the drug therapeutically effective. Because of this, the tribal apothecary was one to be feared, respected, trusted, sometimes mistrusted, worshipped, and revered, for it was through his potions that spiritual contact was made and upon which the cures or failures depended. Through history the knowledge of drugs and their application to disease has always meant power. In the Homericepics, the term pharmakon (Gr.) from which our word pharmacy was derived connotes a charm or a drug that can be used for good or for evil purposes. *Many of the tribal apothecary's failures were doubtless due to impotent medicines, inappropriate medicines,* *underdosage*, *overdosage*, *and even poisoning*. His successes may be attributed to an appropriate drug based on his experience, coincidence of proper therapy, inconsequential effect of the therapy for an individual with a nonfatal illness, or placebo effects, that is, successful treatment due to psychologic rather than therapeutic effects. Even today, placebo therapy with nonpotent or inconsequential chemicals is successfully employed in the treatment of individual patients and is a routine practice in the clinical evaluation of new drugs where subjects' responses to the effects of the actual drug and the placebo are compared and evaluated[1].

As time passed, the art of the apothecary became combined with priestly functions, and among the early civilizations the priest-magician or priest-physician became the healer of the body as well as of the soul. Pharmacy and medicine are indistinguishable in their early history, since their practice was generally the function of the tribal religious leaders.

Early Drugs

Due to the patience and intellect of the archeologist, the types and the specific drugs employed in the early history of drug therapy are not as indefinable as one might suspect. Numerous ancient tablets, scrolls, and other relics dating as far back as 3000 B. C. have been uncovered and deciphered by archeologic scholars to the delight of historians of both medicine and pharmacy, for contained in these ancient documents are specific associations with our common heritage.

Perhaps the most famous of these surviving memorials is the Papyrus Ebers, a continuous scroll some 60 feet long and a foot wide dating back to the 16^{th} century before Christ. This document, which is now preserved at the University of Leipzig, is named for the noted German Egyptologist, George Ebers, who discovered it in the tomb of a mummy and partly translated it during the last half of the nineteenth century. Since that time, many scholars have participated in the translation of the document's challenging hieroglyphics, and although they are not unanimous in their interpretations there is little doubt that by 1550B. C. the Egyptians were using some drug formulas, with more than 800 formulas or prescriptions being described and over 700 different drugs being mentioned[2]. The drugs referred to are chiefly botanic, although mineral and animal drugs are also noted. Such currently used botanic drugs as acacia, castor bean (from which we express castor oil), and fennel are mentioned along with apparent references to such minerals as iron oxide, sodium carbonate, sodium chloride, and sulfur. Animal excrements were also employed in drug therapy.

The formulative vehicles of the day were beer, wine, milk, and honey. Many of the pharmaceutical formulas employed two dozen or more different medicinal agents, a type of preparation later referred to as a "*polypharmacal*". *Mortars, hand mills, sieves, and balances were commonly used by the Egyptians in their compounding of suppositories, gargles, pills, inhalations, troches, lotions, bintments, plasters, and enemas.*

Related Words and Expressions

acacia	[ə'keiʃə]	阿拉伯树胶	archeologist	[ˌɑːki'ɔlədʒist]	考古学家
apothecary	[ə'pɔθikəri]	药剂师，药材商	ointment	['ɔintmənt]	油膏，膏剂

botanic	[bə'tænik]	植物的
carbonate	['kɑːbəneit]	碳酸盐
castor	['kɑːstə]	蓖麻，调味瓶
decipher	[di'saifə]	解释，解读，破解
demon	['diːmən]	恶魔，精灵
enema	['enimə]	灌肠剂
excrement	['ekskrimənt]	粪便
fennel	['fenəl]	茴香
formula	['fɔːmjulə]	配方，药方
gargle	['gɑːgl]	漱口药
heal	[hiːl]	治愈，愈合
heritage	['heritidʒ]	遗产，传统
hieroglyphic	[ˌhaiərə'glifik]	象形文字
Homericepics	[ˌhɔməri'sepiks]	古希腊时代
incantation	[ˌinkæn'teiʃən]	咒文，魔法
indefinable	[ˌindi'fainəbl]	不确定的
inhalation	[ˌinhə'leiʃən]	吸入剂
instinct	[in'stiŋkt]	本能，知觉
intermediary	[ˌintə(ː)'miːdjəri]	中间物，调解者
lotion	['ləuʃən]	洗剂，洗液
mill	[mil]	磨粉机
mortar	['mɔːtə]	研钵
noisome	['nɔisəm]	有害的，有毒的
observance	[əb'zəːvəns]	祭奠
papyrus	[pə'paiərəs]	纸莎草（纸）
placebo	[plə'siːbəu]	安慰剂
plaster	['plɑːstə]	橡皮膏药
polypharmacal		复配药，复方药剂
potion	['pəuʃən]	饮剂
practitioner	[præk'tiʃənə]	从业者
preparation	[ˌprepə'reiʃən]	制剂
priestcraft	['priːstkrɑːft]	神职，祭师
psychologic	[saikə'lɔdʒik]	心理学的
realm	[relm]	领域，范围
remedy	['remidi]	治疗法，药物
scroll	[skrəul]	卷轴
sieve	[siv]	筛子
sodium	['səudiəm]	钠
soothe	[suːð]	缓解伤痛
troche	[trəuʃ]	片剂，锭剂
unanimous	[juː'næniməs]	无异议的
vegetation	[vedʒi'teiʃən]	植物（总称）

Notes

[1] placebo therapy：安慰剂。subject：受试者。routine practice：常规实验。甚至在今天，用无效或无关紧要的化学药物进行的安慰剂疗法仍成功地用于个别病人的治疗，并成为临床评价新药的常规实验，在该实验中，可比较和评价真药和安慰剂对受试者的反应。注意：英语常采用被动语态，如句中 where…引导的从句，为适应中文的表达习惯，常将“被动”变“主动”来翻译。

[2] although they are…mentioned. 句中 with…being described and…being mentioned 为一独立主格结构表示根据或原因。本段可翻译为：尽管他们在翻译过程中仍有异议，但是根据其上所描述的 800 多个配方或处方以及所提及的 700 多个不同种药物可以几乎无异议的是埃及人早在公元前 1550 年正使用某些药物配方。

Text B

Introduction of the Scientific Viewpoint

Throughout history many individuals have contributed to the advancement of the health sciences. Notable among those whose genius and creativeness had a revolutionary influence on the development of pharmacy and medicine were Hippocrates (ca. 460～377 B. C.), Dioscorides (1st century A. D.), Galen, and Paracelsus (1493～1541 A. D.).

Hippocrates was a Greek physician who is credited with the introduction of scientific pharmacy and medicine. *He rationalized medicine, systematized medical knowledge, and put the practice of medicine on a high ethical plane.* His thinking on the ethics and science of medicine dominated the medical writings of his and successive generations, and his concepts and precepts are embodied into the now renowned Hippocratic oath of ethical behavior for the healing professions. His works included the descriptions of hundreds of drugs, and it was during this period that the term pharmakon came to mean a purifying remedy for good only, transcending the previous connotation of a charm or drug for good or for evil purposes. Because of his pioneering work in medical science and his inspirational teachings and advanced philosophies that have become a part of modern medicine, Hippocrates is honored by being called the "father of Medicine."

Dioscorides, a Greek physician and botanist, was the first to deal with botany as an applied science of pharmacy. His work, De Materia Medica, is a milestone in the development of pharmaceutical botany and in the study of naturally occurring medicinal materials. This area of study is today known as pharmacognosy, a term formed from two Greek words, pharmakon, drug, and gnosis, knowledge. Some of the drugs described by Dioscorides, as opium, ergot, and hyoscyamus, continue to have use in medicine today. His descriptions of the art of identifying and collecting natural drug products, the methods of their proper storage, and the means of detecting adulterants or contaminants were the standards of the period and established the need for additional work and the guidelines for future investigators.

Claudius Galen, a Greek pharmacist-physician who attained Roman citizenship, aimed to create a perfect system of physiology, pathology, and treatment and formulated doctrines that were followed for 1500 years. He was one of the most prolific authors of his or any other era, having been credited with 500 treatises on medicine and some 50 others on subjects of philosophy, law, and grammar. *His medical writings include descriptions of numerous drugs of natural origin with a profusion of drug formulas and methods of compounding*. He originated so many preparations of vegetable drugs by mixing or melting the individual ingredients that the area of pharmaceutical preparations has been commonly referred to as "Galenic pharmacy." Perhaps the most famous of his formulas is one for a cold cream, called Galen's Cerate, which is remarkably similar in formulation to some in use today.

Pharmacy remained a function of medicine until the increasing variety of drugs and the growing complexity of compounding demanded specialists who could devote full attention to the art. Pharmacy was officially separated from medicine for the first time in 140A. D. When a decree of the German Emperor Frederick Ⅱ regulated the practice of pharmacy within that part of his kingdom called the Two Sicilies. His edict separating the two professions acknowledged that pharmacy required special knowledge, skill, initiative, and responsibility if adequate care to the medical needs of the people was to be guaranteed. Pharmacists were obligated by oath to prepare reliable drugs of uniform quality according to their art. Any exploitation of the patient through business relations between the pharmacist and the physician was strictly forbidden. Between that time and the evolution of chemistry as an exact science, pharmacy and chemistry became united somewhat as pharmacy and medicine had been.

Perhaps no man in history exercised such a revolutionary influence on pharmacy and medicine as did Aureolus Philippus Theophrastus Bombastus von Hohenheim, a Swiss physician and chemist who called himself Paracelsus. He influenced tremendously the transformation of pharmacy from a profession based on chemical science. Some of his chemical observations were astounding for his time and for their anticipation of later discoveries. He believed that it was possible to prepare a specific medicinal agent for use in combating each specific disease and introduced a host of chemical substances to internal therapy. Some of the formulas he devised, the names he coined, and the theories he advanced have remained a part of our daily practice of pharmacy.

Early Research

As the knowledge of the basic sciences increased so did their application to pharmacy. The opportunity was presented for the investigation of medicinal materials in a firm scientific basis, and the challenge was accepted by numerous pharmacists who conducted the research in the backrooms and basements of their pharmacies. Noteworthy among them was Karl Wilhelm Scheele (1742～1786), a Swedish pharmacist who is perhaps the most famous of all pharmacists because of his scientific genius and dramatic discoveries. Among his discoveries were the chemicals lactic acid, citric acid, oxalic acid, tartaric acid, and arsenic acid. He identified glycerin, invented new methods of preparing calomel and benzoic acid, and discovered oxygen a year prior to Priestley.

The isolation of morphine from opium by the German pharmacist Friedrich Serurner (1783～1841) in 1805 prompted a series of isolations of other active materials from medicinal plants by a score of French pharmacists. Joseph Caventou (1795～1877) and Joseph Pelletier (1788～184) combined their talents and isolated quinine and cinchonine from cinchona, and strychnine and brucine from nux vomica. Pelletier together with Pierre Robiquet (1780～1840) isolated caffeine and Robiquet independently separated codeine from opium. Melodically one chemical after another was isolated from plant drugs and identified as an agent responsible for the plants'medicinal activity. Today we are still engaged in this fascinating activity as we probe nature for more useful and more specific therapeutic agents.

Throughout Europe during the late 18th century and the beginning of the 19th century, pharmacists like Pelletier and Serturner were held in great esteem by their communities because of their intellect and technical abilities. They applied the art and the science of pharmacy to the preparation of drug products that were of the highest standards of purity, uniformity, and efficacy possible at that time. The extraction and isolation of various active constituents from crude or unprocessed drugs were major breakthroughs in the development of concentrated dosage forms of uniform strength containing singly effective therapeutic agents of natural origin. Many pharmacists of the period began to manufacture quality pharmaceutical products on a small but steadily increasing scale to meet the growing drug needs of their communities. Some of today's gigantic pharmaceutical manufacturing companies developed from these progressive prescription laboratories of over a century and a half ago.

Although many of the drugs indigenous to America and first used by the American Indian were adopted by the settlers, the vast majority of drugs needed in this country before the 19th century were imported from Europe, either as the raw materials or as finished pharmaceutical products。With the Revolutionary War however, it became more difficult to import drugs, and American pharmacist was stimulated to acquire the scientific and technologic expertise of his European contemporary. From this period until the Civil War, pharmaceutical manufacture as we know it today was in its infancy in this country, but some of the pharmaceutical firms established during that period are still preparing drugs. Three firms are known to have been established before 1826, with 22 additional ones having their origin in the subsequent half century. In 1821 Philadelphia College of Pharmacy was established as the nation's first school of pharmacy.

Related Words and Expressions

A. D. (*Anno Domini*)	[ˈænəuˈdɔminai]	[拉] 公元
acid	[ˈæsid]	酸
adulterant	[əˈdʌltərənt]	掺杂物，粗劣品
arsenic acid	[ɑːrˈsenikæsid]	砷酸
benzoic acid	[benˈzəuikˈæsid]	苯甲酸
botany	[ˈbɔtəni]	植物学
brucine	[ˈbruːsi(ː)n]	二甲马钱子碱
ca. (*circa*)	[ˈsəːkə]	[拉] 大约，大概
cinchona	[siŋˈkəunə]	金鸡纳树
cinchonine	[ˈsiŋkəniːn]	金鸡宁，辛可宁
citric acid	[ˈsitrikˈæsid]	柠檬酸
codeine	[ˈkoudiːn]	可待因
connotation	[ˌkɔnəuˈteiʃən]	内涵
decree	[diˈkriː]	法令，判决
doctrine	[ˈdɔktrin]	教条，学说
edict	[ˈiːdikt]	官方命令，布告
efficacy	[ˈefikəsi]	效力，功效
ergot	[ˈəːgət]	麦角，麦角碱
ethic	[ˈeθik]	道德标准
expertise	[ˌekspəˈtiːz]	专门技术
gigantic	[dʒaiˈgæntik]	巨人似的，巨大的
glycerin	[ˈglisərin]	甘油
Hippocrates of Cos	[hiˈpaːkrətiːz]	希波克拉底（古希腊医师）
hyoscyamus	[ˌhaiəˈsaiəməs]	黑莨菪的干叶
indigenous	[inˈdidʒinəs]	本地的
infancy	[ˈinfənsi]	初期，幼年期
isolation	[ˌaisəˈleiʃəu]	离析
lactic acid	[ˈlæktikˈæsid]	乳酸
morphine	[ˈmɔːfin]	吗啡
noisome	[ˈnɔisəm]	有毒的，有害的
nux vomica	[ˈnʌksˈvɔmikə]	马钱子
opium	[ˈəupjəm]	鸦片
oxalic acid	[ɔkˈsælikˈæsid]	草酸
pharmacognosy	[ˌfɑːməˈkɔgnəsi]	生药学
plane	[plein]	水平，水准
precept	[ˈpriːsept]	规则，戒律
prolific	[prəˈlifik]	多产的，丰富的
quality	[ˈkwɔliti]	优质的
quinine	[kwiˈniːn]	奎宁
renown	[riˈnaun]	vt. 使有声望
strychnine	[ˈstriknain]	马钱子碱，士的宁，番木鳖碱
tartaric acid	[tɑːrˈtærikˈæsid]	酒石酸
transcend	[trænˈsend]	超越，优于
treatise	[ˈtriːtiz]	论文，专著

Additional Information

科技英语翻译基本法

一、基本知识

英汉两种语言属于两种完全不同的语系，无论在词汇，还是在语法结构上都存在着巨大差异，因此，英汉两种语言的句子在措词、语序、结构等方面各有特点，如：英语多后置定语，而汉语多前置定语；英语多长句（句子中心在句首），而汉语多短句（句子中心在句

尾)；英语多非人称做主语，而汉语多以人称做主语；英语中状语多放于谓语动词之后，而汉语则习惯放动词之前；英语状语顺序为方式状语＋地点状语＋时间状语，而汉语则是时间状语＋地点状语＋方式状语；英语多被动语态，汉语多主动语态；英语多倒装句，汉语多正装句。因此，对英文文献的翻译并非是简单对应的词汇罗列。对于科技英语而言，译者应更注重逻辑思维，讲究语言规范，表达妥帖，译文流畅，措辞严谨，不拖泥带水。另外，必须掌握相当的专业知识，恰当地运用专业词汇及专业术语。翻译方法大体有直译和意译两种，在翻译时，要根据具体对象适当地选择，力求准确明白，通顺严密，简练全面。由于英文科技文献具有思维严密、措辞严谨、句子结构复杂等特点，因此，掌握一定的翻译技巧是非常必要的。

二、翻译一般技巧

1. 词类的转换

(1) 英语名词的转换

Among many early races，disease was believed to be caused by the ***entrance*** of demons or evil spirits into the body. 在许多早期的人类历程之中，人们相信疾病是由魔鬼和罪恶的神灵***进入***人体造成的（英语名词→汉语动词）。

Today's surgical procedures would be virtually impossible without the ***benefit*** of general anesthetics，analgesics…今天的外科手术如果不***利用***一般的麻醉药、止痛剂……实际上是不可能的（英语名词→汉语动词）。

This may provide greater ***assurance*** that a batch meets a particular monograph requirement. 这将更有力地***确保***每批产品满足专论特别规定的条件（英语名词→汉语动词）。

Each of the dosage units is designed to contain a specified quantity of medication for ***ease and accuracy*** of dosage administration. 每一种剂量单位都要设计成含有指定量的药物以***简便而准确地***给药（英语名词→汉语副词）。

(2) 形容词的转换

A good designer must have a full knowledge of physical science，which makes the products designed by him ***lower*** cost. 一个好的设计人员必须具有丰富的自然科学知识，这才能使他所设计的产品价格***低廉***（英语形容词动词化，另外还有英语形容词转换为汉语动词、汉语副词）。

The compassion of a god，the observance of ceremonies，the absence of evil spirits，and the healing intent of the dispenser were individually and collectively needed to make the drug therapeutically ***effective***. 上帝的怜悯、仪式的举行、恶魔的驱散以及药剂师的治病意图都分别和共同地需要药物具有治疗***功效***（英语形容词→汉语名词）。

(3) 英语动词的转换

Mantle cell lymphoma ***is characterized by*** inactivation of the ATM gene. 套细胞淋巴瘤的***特点***是钝化 ATM 基因（英语动词→汉语名词）。

Since the 1940s many other fermentation have been ***commercialized***. 自从 20 世纪 40 年代以来许多其他发酵产品都已实现***商业化生产***（英语动词→汉语副词）。

Protein synthesis in eukaryotic cells ***differs from*** that…真核生物细胞中的蛋白质的合成的***区别***在于……（英语动词→汉语名词）

(4) 英语副词的转化

① This approach has the advantages that it is ***generally relatively*** rapid. 这种方法的优点是***比较***迅速（英语副词→汉语形容词）。

② Oxygen is one of the important elements in the physical world, it is very active ***chemically***. 氧是物质世界的重要元素之一，它的***化学性能***很活泼。

（5）英语介词的转化：有些具有动作意味的介词，如 for、by、in、past、with、over、into、around、across、toward、through、throughout 等，汉译时，可转化为汉语的动词。

Since most drugs are absorbed by passive diffusion ***through*** the lipoid barrier, the lipid/water partition coefficient and the pK_2 of the drugs are of prime importance to…由于大部分药物是通过被动扩散***穿过***类脂屏障的，药物的油脂分配系数与 pK_2 值对……是非常重要的。

2. 长句的翻译方法

科技英语中的难句主要表现在句子长、结构复杂。其实，不管句子有多么长，多么复杂，都有一定的规律可循。英语句子长，动词少，语序灵活，讲究平衡；而汉语句子短，动词多，语序比较固定，讲究对称，因此在翻译时，必须弄清关系，区别主次，重新按照汉语的习惯加以组合。具体方法为：要首先理清句子结构，确定主谓（宾）关系，运用“化整为零”的方法抓住句子的主要构架，找出句子的中心内容；再通过语法分析弄清定语、状语的修饰关系，找出各层意思；然后再根据上下文分析几层意思之间的相互逻辑关系（因果、时间顺序等），再按汉语特点和表达方式准确翻译原文。由于英语的表达习惯与汉语略有不同，因此在翻译过程中常做如下语法方面的调整，灵活运用翻译技巧。

（1）语序的转换　英语的语序与汉语的语序有所不同，而且英语的句子成分的位置变化较多，且从句套从句的现象较多见，这特别体现在科技英语的文体中。因此在翻译时必须对原文的语序进行适当的调整，使译文更加符合汉语的表达习惯。最常使用的语序转换方法为“颠倒法”，以改变英语句子中头大身小的不平衡状态。这种转换往往发生在被动语态的句子中，需要变“被动”为“主动”来翻译。具体请见下面的实例。

Care should be taken in patients with decreased renal function especially elderly patients. 对于肾功能衰竭的病人特别是老年病人应多加小心。

A patient should be warned of any expected minor side effects, and of foods, beverages, and other drugs which may interfere with the effectiveness of the medication. 应警告病人可预期的所有微小的副作用以及可能干扰药物疗效的食物、饮料和其他药物（本句以主动语态来翻译）。

（2）使用“分译法”　英语长句子比较多，汉语句子相对而言比较短。在翻译时可以改变原文结构，采用“分译法”，把原文的某个成分从原来的结构中分离出来，译成一个独立成分、从句或并列分句。具体请见下面的实例。

The extensive tissue penetration of ciprofloxacin combined with its enhanced antibacterial activity, enables ciprofloxacin to be used alone or in combination with an aminoglycoside or with beta-lactam antibiotics. 环丙沙星具有广泛的组织渗透性和较强的抗菌活性，这使其可单独使用或与某种氨基糖苷类抗生素或 β-内酰胺类抗生素联用（首先将主语部分句子化，增译“这”将后面句子连接起来）。

Another extraction system having potential in the downstream processing of proteins is ***that*** of reverse micelles which are thermodynamically stable aggregates of surfactant molecules and water in organic solvents. 可用于蛋白质下游工艺的另一种萃取系统为反胶束，该

系统形成热力学稳定的聚集体，而聚集体是由表面活性剂分子与油中水组成的（省译代词“that”，用“该系统”、“而聚集体”分译句子）。

（3）使用“增译法” 英语中的一些简略表达方式在中文中有时没有相应词汇对应，需根据相关专业知识补充说明所翻译的词汇。如下句中的 simplicity，在中文中很少使用“简便性”，因此应根据译者所掌握的专业知识应在“简便”前用“操作”加以修饰，考虑到汉语表达的对称性，将“可靠性”改写为“工艺可靠”。另外，根据相关句中的 apply“应用”指的是“生产方面的应用”，可增译“生产”以保持语句的平衡。

Because of its reliability and simplicity evaporation is often applied on a large scale，normally using steam as the heat source. 由于蒸发（工艺）可靠，（操作）简便，因此常应用于大规模（生产）并以蒸汽作为热源（括号内为增译内容）。

（4）使用“省译法” 由于英汉两种语言在语法结构、表达方式以及修辞手段上的不同，有些词语或句子成分在英语中是必不可少的，但若搬到译文中去，就会影响译文的简洁和通顺。因此在英译汉的过程中，为了使译文更加简练，更符合汉语的表达习惯，需要省略一些可有可无或翻译后反嫌累赘的词语。

The interfacial tension between the two phases is significantly lower than that in water-organic solvent systems. 两相间的界面张力明显低于水-油溶剂系统（省略代词 that）。

Exercises

一、**Answer the following questions**

（1）How were drugs discovered in the early history?

（2）What is “placebo”?

（3）Who have contributed to the advancement of the health sciences throughout history?

二、**Translate the italic sentences above into Chinese**

三、**Translate the following into English**

生药学　植物学　物理学　药学　生物化学　酸　碱　酒石酸　甘油　草酸　柠檬酸　苯甲酸　配方　洗液　麦角碱　鸦片　吗啡　安慰剂

四、**Fill in the blanks with the following words or phrases**

compound　by the action of　vitamin　rich in　supply

Vitamin D can be formed right in your skin ________ sunlight. This ________ helps build calcium and other minerals into the bones and teeth. If the bones do not take up minerals properly，they become soft；and a disease called rickets（佝偻病）may be the result. Ordinary foods do not have much of this ________；so it is important for you to get as much sunshine as you can. The livers of fish are ________ vitamin A and D. Doctors often give young children fish liver oils to ________ plenty of these vitamins.

Unit 2 Inorganic Chemistry

Text

Important Biomolecules (1)

Biologists and chemists divide compounds into two principal classes, inorganic and organic. Inorganic compounds are defined as molecules, usually small, that typically lack carbon and in which ionic bonds may play an important role. Inorganic compounds include water, oxygen, carbon dioxide, and many salts, acids, and bases..

Water

All living organisms require a wide variety of inorganic compounds for growth, repair, maintenance, and reproduction. Water is one of the most important, as well as one of the most abundant, of these compounds, and it is particularly vital to microorganisms. Outside the cell, nutrients are dissolved in water, which facilitates their passage through cell membranes. And inside the cell, water is the medium for most chemical reactions. In fact, water is by far the most abundant component of almost all living cells. Water makes up 5% to 95% or more of each cell, the average being between 65% and 75%. Simply stated, no organism can survive without water.

Water has structural and chemical properties that make it particularly suitable for its role in living cells. As we discussed, the total charge on the water molecule is neutral, but the oxygen region of the molecule has a slightly negative charge and the hydrogen region has a slightly positive charge. Any molecule having such an unequal distribution of charges is called a polar molecule. The polar nature of water gives it four characteristics that make it a useful medium for living cells.

First, every water molecule is capable of forming four hydrogen bonds with nearby water molecules. This property results in a strong attraction between water molecules. Because of this strong attraction, a great deal of heat is required to separate water molecules from each other to form water vapor; thus, water has a relatively high boiling point (100℃). Since water has such a high boiling point, it exists in the liquid state on most of the earth's surface. Furthermore, the hydrogen bonding between water molecules affects the density of water, depending on whether it occurs as ice or a liquid. For example, the hydrogen bonds in the crystalline structure of water (ice) make it more spacious. As a result, ice has fewer molecules than an equal volume of liquid water. This makes its crystalline structure less dense than liquid water. It is for this reason that ice floats and can serve as an insulating layer on the surfaces of lakes and streams that harbor living organisms.

Second, the polarity of water makes it an excellent dissolving medium or solvent. Many polar substances dissociate (separate) into individual molecules in water—that is, dissolve—because the negative part of the water molecule is attracted to the positive part of the molecules in the solute (dissolving substance), and the positive part of the water molecules is attracted to the negative part of solute molecules. Substances (such as salts) that are composed of atoms (or groups of atoms) held together by ionic bonds tend to dissociate into separate cations and anions in water. Thus, the polarity of water allows molecules of many different substances to separate and become surrounded by water molecules.

Third, polarity accounts for water's characteristic role as a reactant or product in many chemical reactions. Its polarity facilitates the splitting and rejoining of hydrogen (H^+) and hydroxide (OH^-) ions. Water is a key reactant in the digestive processes of organisms, whereby larger molecules are broken down into smaller ones. Water molecules are also involved in synthetic reactions——water is an important source of the hydrogen and oxygen that are incorporated into numerous organic compounds in living cells.

Finally, the relatively strong hydrogen bonding between water molecules makes water an excellent temperature buffer. A given quantity of water requires a great gain of heat to increase its temperature and a great loss of heat to decrease its temperature, as compared with many other substances. Normally, heat absorption by molecules increases their kinetic energy and thus increases their rate of motion and their reactivity. In water, however, heat absorption first breaks hydrogen bonds rather than increasing the rate of motion. Therefore, much more heat must be applied to raise the temperature of water than to raise the temperature of a nonhydrogen-bonded liquid. The reverse is true as water cools. Thus, water more easily maintains a constant temperature than other solvents and tends to protect a cell from fluctuations in environmental temperatures.

Acids, Bases, and Salts

when inorganic salts such as sodium chloride ($NaCl$) are dissolved in water, they undergo dissociation, or ionization. That is, they break apart into ions. Substances called acids and bases show similar behavior.

An acid can be defined as a substance that dissociates into one or more hydrogen ions (H^+) and one or more negative ions (anions). Thus, an acid can also be defined as a proton (H^+) donor. A base dissociates into one or more positive ions (cations) plus one or more negatively charged hydroxide ions (OH^-) that can accept, or combine with, protons. Thus, sodium hydroxide ($NaOH$) is a base because it dissociates to release hydroxide ions, which have a strong attraction for protons and are among the most important proton acceptors. A salt is a substance that dissociates in water into cations and anions, neither of which is H^+ or OH^-.

Acid-Base Balance

An organism must maintain a fairly constant balance of acids and bases to remain healthy. In the aqueous environment within organisms, acids dissociate into hydrogen ions (H^+) and anions. Bases, on the other hand, dissociate into hydroxide ions (OH^-) and cations. The more hydrogen ions that are free in a solution, the more acid the solution is. Conversely,