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EST Reading

科技英语系列教材

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主编　韩孟奇

上海交通大学出版社

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主　编　韩孟奇
副主编　刘全勇　冯晓红
　　李秋芹　王迎朝

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内 容 提 要

本书共15个单元，每个单元包括两篇课文，即课文A和课文B，内容涉及生命科学、计算机科学、工程学、生物学、医学、环境科学、新能源、太空科学等15个科技领域。本书兼具新颖性、趣味性和知识性，使用对象为具备大学英语四级水平的理工科大学生和英语专业二、三年级学生及广大英语和科技爱好者。

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韩孟奇 **主编**

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前　言

随着我国对外科技交流的发展，科技英语已成为我国科技工作者查询科技资料、撰写学术论文、进行对外学术交流的工具。因此，对大学生尤其对理工科和英语专业的大学生而言，掌握科技英语使用技能的必要性和重要性正与日俱增。阅读技能是所有技能的基础，要想进一步提高科技英语水平，首先应突破阅读关。

本书的使用对象是已具备大学英语四级水平，希望继续提高英语水平的理工科大学生和英语专业二、三年级学生及广大英语和科技爱好者。本书特点如下：

1. 新颖性。所有文章均选自近期出版的英语科技报刊、科普读物或国际上著名的科技网站，反映了目前先进的科研成果。

2. 趣味性。充分考虑使用者心理规律，以兴趣为先导，以培养能力为目标，力戒以往教材因过于强调知识而挫伤读者积极性的做法。

3. 知识性。选材重视文章的知识含量，避免过分浅显，力求帮助读者提高科学素养。

本书的选材以科普文章为主，取材广泛，内容涉及生命科学、计算机科学、工程学、生物学、医学、环境科学、新能源、太空科学等 15 个科技领域，反映了当代科技的前沿成果，并贴近现实，富有时代气息。

本书语言富有科技英语特色，含有较丰富的通用和专业科技英语词汇和语法结构。在内容编排上，根据课文 A 的难度系数，由易到难，循序渐进。本书结合文章内容，设计了形式多样的练习，以帮助读者充分理解、掌握和运用所学知识。本书还配有同步辅导书《科技英语阅读导读》，《导读》主要包括背景简介、难点解析、练习答案、参考译文等内容，以满足教师和学习者的需求。

本书使用建议：

1. 课堂讲解以课文 A 为主，课文 B 作为学生自学材料。每周 3～4 个学时学习一个单元，学完全书需要 45～60 个学时。

2. 课文涉及多个专业，教师可根据本校情况选择与学生专业相关的内容。

参加本书编写的人员如下：韩孟奇（第 1、2、10 单元），刘全勇（第 4、9、11 单元），冯晓红（第 3、6、7 单元），李秋芹（第 13、14、15 单元），王迎朝（第 5、8、12 单元）。全书由韩孟奇统校。

本书由昆士兰大学 Richard B. Baldauf 教授审订，在此表示衷心的感谢。

鉴于编者的水平有限，不当之处敬请相关专家和读者批评指正。

编　者

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Unit 1 Life Science

Text A

Human Cloning

by Kevin Bonsor

Scientists in South Korea claimed to have created human embryos via cloning. This could radically change the medical landscape—therapeutic cloning could be used to combat diseases like Parkinson's and Alzheimer's.

1 Nothing really prepared the world for the 1997 announcement that a group of Scottish scientists had created a cloned sheep named Dolly. Many folks believe that within the next decade, we will hear a more shocking announcement of the first cloned human. Scientists in South Korea have already created human embryonic stem cells through cloning.

2 Until now, the idea of human cloning has only been possible through movie magic, but the natural progression of science is making human cloning a true possibility. We've cloned sheep, mice and cows, so why not humans? Some countries have set up laws banning cloning, but it is still legal in many countries.

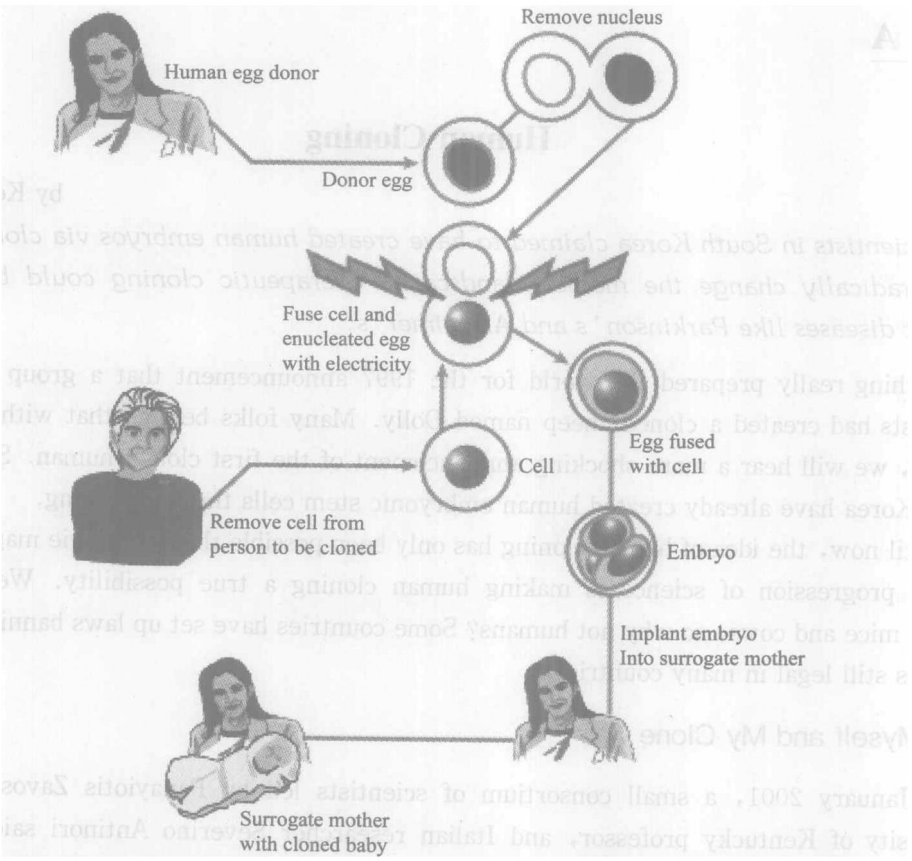
Me, Myself and My Clone

3 In January 2001, a small consortium of scientists led by Panayiotis Zavos, a former University of Kentucky professor, and Italian researcher Severino Antinori said that they planned to clone a human in the next two years. At about the same time, the *New York Post*① reported a story about an American couple who planned to pay $500,000 to Las Vegas-based Clonaid for a clone of their deceased infant daughter.

4 These scientists may be chasing glory in the name of science. Whatever their motivation, it's likely that we will see the first cloned human baby appear on the evening news in the next decade. Scientists have shown that current cloning techniques work on animals, but only rarely do they succeed in creating a cloned embryo that makes it through birth.

5 If human cloning proceeds, one method scientists can use is **somatic** cell nuclear transfer, which is the same procedure that was used to create Dolly, the sheep. Somatic cell nuclear transfer begins when doctors take the egg from a donor and remove the nucleus of the egg, creating an **enucleated** egg. A cell, which contains DNA②, is then taken from the person who

is being cloned. The enucleated egg is then **fused** together with the cloning subject's cell using electricity. This creates an embryo, which is implanted into a **surrogate** mother through ***in vitro* fertilization**. If the procedure is successful, then the surrogate mother will give birth to a baby that is a clone of the cloning subject at the end of a normal **gestation period**. Of course, the success rate is only about one or two out of 100 embryos. It took 277 attempts to create Dolly. Take a look at the graphic below to see how the somatic cell nuclear transfer cloning process works.



6 Some scientists seem to think that human cloning is inevitable, but why would we want to clone people? There are many reasons that would make people turn to cloning. Let's explore a few of these reasons.

Who Will Clone?

7 Not all cloning would involve creating an entirely new human being. Cloning is seen as a possible way to aid some people who have severe medical problems. One potential use of cloning technology would involve creating a human **repair kit**. In other words, scientists could clone our cells and fix **mutated** genes that cause diseases. In January 2001, the British government passed rules to allow cloning of human embryos to combat diseases such as Parkinson's and Alzheimer's.

8 While it may take time for cloning to be fully accepted, **therapeutic** cloning will likely be the first step in that direction. Therapeutic cloning is the process by which a person's DNA is used to grow an embryonic clone. However, instead of inserting this embryo into a surrogate mother, its cells are used to grow stem cells. These stem cells can be used as a human repair kit. They can grow replacement organs, such as hearts, livers and skin. They can also be used to grow neurons to cure those who suffer from Alzheimer's, Parkinson's or Rett **Syndrome**.

9 Here's how therapeutic cloning works:

- DNA is extracted from a sick person.
- The DNA is then inserted into an enucleated donor egg.
- The egg then divides like a typical **fertilized egg** and forms an embryo.
- Stem cells are removed from the embryo.
- Any kind of tissue or organ can be grown from these stem cells to treat the sick.

10 Others see cloning as a way to aid couples with **infertility** problems, but who want a child with at least one of the parent's biological attributes. Zavos and Antinori say that helping these couples is the goal of their research. Zavos said that there are hundreds of couples already lined to pay approximately $50,000 for the service. The group said that the procedure would involve injecting cells from an infertile male into an egg, which would be inserted into the female's **uterus**. Their child would look the same as the father.

11 Another use for human cloning could be to bring deceased relatives back to life. Imagine using a piece of your great-grandmother's DNA to create a clone of her. In a sense, you could be the parent of your great-grandmother. This opens the door to many ethical problems, but it's a door that could soon be opened. One American couple is paying $500,000 to Clonaid to clone their deceased daughter using preserved skin cells.

To Clone or Not to Clone

12 Critics of cloning repeat the question often associated with controversial science: "Just because we can, does it mean we should?" The closer we come to being able to clone a human, the hotter the debate over it grows. For all the good things cloning may accomplish, opponents say that it will do just as much harm. Another question is how to regulate cloning procedures.

13 There is no federal law banning cloning in the United States, but several states have passed their own laws to ban the practice. The U.S. Food and Drug Administration (FDA)③ has also said that anyone in the United States attempting human cloning must first get its permission. In Japan, human cloning is a crime that is punishable by up to 10 years in prison. England has allowed cloning human embryos but is working to pass legislation to stop total human cloning.

14 While laws are one **deterrent** to pursuing human cloning at this time, some scientists believe the technology is not ready to be tested on humans. Ian, one of co-creators of Dolly, has even said that human cloning projects would be criminally irresponsible. Cloning technology is still in its early stages, and nearly 98 percent of cloning efforts end in failure.

The embryos are either not suitable for implanting into the uterus or they die sometime during gestation or shortly after birth.

15 Those clones that do survive suffer from genetic **abnormalities**. Some clones have been born with defective hearts, lung problems, **diabetes**, blood vessel problems and **malfunctioning immune systems**. One of the more famous cases was a cloned sheep that was born but suffered from **chronic hyperventilation** caused by **malformed arteries** leading to the lungs.

16 Opponents of cloning point out that while we can **euthanize** the defective clones of other animals, it's much more morally problematic if this happens during the human cloning process. Advocates of cloning respond that it is now easier to pick out defective embryos before they are implanted into the mother. The debate over human cloning is just beginning, but as science advances, it could be the biggest ethical dilemma of the 21st century.

(1,253 words)

New Words

somatic /sə'mætik/	*adj.*	肉体的,身体的
enucleate /i'nju:klieit/	*v.*	[生]从……摘除细胞核
fuse /fju:z/	*v.*	使融合,合并,结合一起
surrogate /'sʌrəgeit/	*adj.*	代理的,代用的
gestation /dʒes'teiʃən/	*n.*	怀孕,妊娠
mutate /mju:'teit/	*v.*	变异,突变
therapeutic /ˌθerə'pju:tik/	*adj.*	治病的;治疗术的;治疗学的
syndrome /'sindrəum/	*n.*	综合征
infertility /ˌinfə'tiliti/	*n.*	不肥沃,不孕症
uterus /'ju:tərəs/	*n.*	子宫
deterrent /di'terənt/	*adj.* & *n.*	阻碍的,制止的;制止物,威慑物
abnormality /ˌæbnɔ:'mæləti/	*n.*	畸形,异常性,功能失常
diabetes /ˌdaiə'bi:ti:z/	*n.*	糖尿病
malfunction /ˌmæl'fʌŋkʃən/	*n.*	故障;障碍
chronic /'krɔnik/	*adj.*	慢性的,延续很长的
hyperventilation /ˌhaipə(:)venti'leiʃən/	*n.*	[医]换气过度,强力呼吸
malformed /mæl'fɔ:md/	*adj.*	畸形的;残缺的
artery /'ɑ:təri/	*n.*	动脉
euthanize /'ju:θənaiz/	*v.*	使安乐死,对……施无痛致死术

Phrases and Expressions

in vitro fertilization	人工受精
gestation period	妊娠期
repair kit	(全套)维修工具

fertilized egg	受精卵
immune system	免疫系统

Notes

① *New York Post*:《纽约邮报》,创刊于 1801 年,是美国连续出版时间最久的报纸。

② DNA:deoxyribonucleic acid 的缩写,又称"脱氧核糖核酸",是染色体的主要化学成分,同时也是组成基因的材料。有时被称为"遗传微粒",因为在繁殖过程中,父代把自己 DNA 的一部分复制传递到子代中,从而完成性状的传播。

③ U.S. Food and Drug Administration (FDA):美国食品药品管理局,隶属于美国卫生教育福利部,负责全国药品、食品、生物制品、化妆品、兽药、医疗器械以及诊断用品等的管理。FDA 下设药品局、食品局、兽药局、放射卫生局、生物制品局、医疗器械及诊断用品局和国家毒理研究中心、区域工作管理机构,即 6 个局(也称 6 个中心)、1 个中心和 1 个区域管理机构。

Exercises

Ⅰ. Building up Your Word Power

Directions: *Each of the following phrases paraphrases a word you have learned in the text of this lesson. Read each of them and then write the word it represents on the line provided.*

1. of, relating to, or affecting the body, especially as distinguished from a body part, the mind, or the environment _____
2. acting as a substitute _____
3. to undergo a change; to become different in essence; to lose one's or its original nature _____
4. having or exhibiting healing powers _____
5. a group of symptoms that collectively indicate or characterize a disease, psychological disorder, or other abnormal condition _____
6. the persistent inability to conceive a child _____
7. a hollow muscular organ located in the pelvic cavity of female mammals in which the fertilized egg implants and develops _____
8. the condition of not being normal _____
9. faulty or abnormal functioning _____
10. lasting for a long period of time or marked by frequent recurrence, as certain diseases _____

Ⅱ. Terms Matching

Directions: *Match the Chinese terms with their English equivalents.*

1. 使融合 A. gestation

2. 代理的	B. malfunction
3. 变异，突变	C. uterus
4. 治疗学的	D. abnormality
5. 综合征	E. euthanize
6. 不孕症	F. therapeutic
7. 子宫	G. diabetes
8. 妊娠	H. mutate
9. 畸形	I. syndrome
10. 糖尿病	J. infertility
11. 故障，功能失常	K. chronic
12. 慢性的	L. malformed
13. 畸形的	M. artery
14. 动脉	N. *in vitro* fertilization
15. 使安乐死	O. fertilized egg
16. 人工受精	P. surrogate
17. 受精卵	Q. fuse

Ⅲ. Questions for Discussion

Directions: *Work in groups and discuss the following questions.*

1. What shocked the world in 1997 and in later years?
2. Brief the procedure of somatic cell nuclear transfer, which was used to create Dolly the sheep.
3. Why do some people think human cloning is inevitable?
4. List some potential risks of human cloning.
5. Do you think human cloning can be achieved? What is your opinion about it?

Ⅳ. Multiple Choices

Directions: *Choose the best answer for each item.*

1. Scientists in South Korea have already created _____ through cloning.
   A. human　　B. mice
   C. cow　　D. embryonic stem cells
2. One method scientists can use for human cloning is _____.
   A. to create stem cell　　B. to implant somatic cell
   C. to transfer cell nuclear　　D. to implant fertilized egg
3. In therapeutic cloning, a patient's DNA is used to grow _____.
   A. organs　　B. tissues
   C. an embryonic clone　　D. hearts
4. _____ can be used as a human repair kit in therapeutic cloning.

A. Neurons
B. Tissues
C. An embryonic stem cells
D. Organs

5. Stem cells have the potential to grow _____.
A. liver
B. skin
C. any organ or tissue
D. heart

6. The couples with infertility problems can have a child with _____ of the parent's biological attributes.
A. only one
B. two
C. none
D. all

7. What prevents human cloning from being produced at present?
A. Laws.
B. Technology.
C. Moral problem.
D. All of them.

8. Supporters of cloning insist that cloning problems can be solved by avoiding defective _____ before being implanted.
A. embryos
B. stem cells
C. fetuses
D. enucleated eggs

9. Opponents of cloning point out that while we can euthanize the defective clones of other animals, it's much more morally problematic if this happens during the human cloning process. The underlined word has the same meaning with _____.
A. eulogize
B. euthyrox
C. to subject to a pleasant death
D. euthyroid

10. With the development of science, _____ could be the biggest ethical issue of the 21st century.
A. stem cell cloning
B. growing stem cells from embryo
C. implanting embryo
D. human cloning

Ⅴ. Sentence Translation

Directions: *Translate the following Chinese sentences into English.*

1. 如果克隆技术能够得以继续下去,科学家们可能采用的方法就是体细胞核移植,即培育多利羊所采用的方法。
2. 若这一过程成功,代孕母亲足月后就可分娩出婴儿,即被试者的克隆体。
3. 克隆技术为人们完全接受尚需时日,但用于治疗目的的克隆技术有可能为人们首先接受。
4. 有人把克隆技术看做不育夫妇的补救措施,利用该技术生出的孩子至少含有不育夫妇的一种生物学特性。
5. 目前对于克隆人类来说,法律是一道屏障,一些科学家相信不会用人类做实验来检验这项技术。

Ⅵ. Passage Translation

Directions: *Translate the following passage into Chinese.*

If human cloning proceeds, one method scientists can use is somatic cell nuclear transfer, which is the same procedure that was used to create Dolly, the sheep. Somatic cell nuclear

transfer begins when doctors take the egg from a donor and remove the nucleus of the egg, creating an enucleated egg. A cell, which contains DNA, is then taken from the person who is being cloned. The enucleated egg is then fused together with the cloning subject's cell using electricity. This creates an embryo, which is implanted into a surrogate mother through *in vitro* fertilization. If the procedure is successful, then the surrogate mother will give birth to a baby that is a clone of the cloning subject at the end of a normal gestation period. Of course, the success rate is only about one or two out of 100 embryos. It took 277 attempts to create Dolly. Take a look at the graphic below to see how the somatic cell nuclear transfer cloning process works.

Text B

Are We 10 Years Away from Artificial Life?

by Jacob Silverman

1 In late August 2007, an Associated Press① article put forth the claim that scientists were no more than 10 years away from creating artificial life—and possibly as few as three. Could such a thing be possible? Scientists have made tremendous strides in **decoding** human and animal **genomes**, **synthesizing** DNA and cloning. Creating artificial, functioning biological **organisms** seems to present a tremendous leap beyond any of these abilities. But some of the companies and researchers involved in the quest for artificial life believe that the 10-year time frame is possible. Not only that—they say that the development of wet artificial life② (as it's often called) will radically affect our views of biological life and our place in the universe.

2 The claims about the **impending** invention of artificial life may be a tad bold. Among the **skeptics** is Francis Collins, head of the Human Genome Project, says the 10-year time frame is too ambitious. Even so, the prospect of artificial life holds a lot of appeal, and we'll take a look at it in this article.

3 Wet artificial life is not a **modified** or genetically engineered organism. It's life created entirely from basic parts. But as we saw in our article about weird life, scientists don't have a **rigorous**, standardized definition of what life is. Even so, biologists have some basic ideas about which qualities artificial life needs to possess in order to be considered alive.

4 First, artificial life needs to have DNA or genetic code. It also needs to be able to reproduce and to pass on its **genetic code**. The life form then needs somewhere to place its genetic code, a protective **casing** or **membrane**, similar to a **cell wall**, which keeps the DNA and other parts together. The cell wall should also allow for normal biological processes to be carried out. In other words, it should be **permeable** enough to allow for the absorption of nutrients and relatively impermeable against **pathogens**. Once its basic parts are together, the organism should be **self-sustaining**: It should eat and **metabolize** food. Finally, the life form needs the ability to repair itself and to adapt and evolve.

5 Developing some of these characteristics presents many challenges to researchers. But one Harvard scientist predicted (in that same AP article) that by early 2007, great advances would be made in creating cell membranes. Keeping an artificial organism alive for more than a few minutes or a few hours is also a challenge, though scientists can focus on strengthening the organisms after some of the initial hurdles are overcome.

6 To create DNA, some scientists advocate placing **nucleotides** (the building blocks of DNA) inside the cell casing. The nucleotides could somehow be combined to form DNA. That in itself might pose a challenge, as **enzymes** may be required to assemble the nucleotides, which might violate the "basic parts" rule for creating artificial life.

7 Next, we'll take a look at more challenges that stand between scientists and artificial life. We'll also consider this question: Will artificial life forms get out of control?

Artificial Life Concerns and Challenges

8 Science fiction books and movies are filled with examples of out-of-control machines, viruses, artificial organisms and artificial intelligences. These fictions represent the worst possible outcome, some people say, in *Playing God*③. Some scientists offer the reassurance that by the time artificial organisms are actually created, more **mechanisms** would be in place to control them.

9 It's also important to remember that the wide range of diverse and complex organisms on Earth represents the product of almost four billion years of evolution. Even if the 10-year time frame is correct, scientists in 2017 won't be working with artificially created **toxic** plants, **predatory** animals or unstoppable viruses. Early synthetic life forms will be rather simple organisms of a few cells or less. In fact, more danger likely lies in the abuse of genetic engineering techniques to modify existing viruses to make them highly **contagious** or **virulent**.

10 To those who say that scientists don't have the right to "play God", advocates often say that creating artificial life is a natural extension of humanity's desire for progress and discovery. Research into artificial life may yield insights into some of biology's fundamental processes, though again, science fiction depictions of artificial creations **run amok** have likely not helped the case for artificial life.

11 Since there is some dispute about what defines both life and artificial life, we may see several **premature** claims of success from biologists. What would qualify as a success? Does it have to be a functional, complex, self-replicating organism, or would a simple bit of artificially created, self-replicating genetic code **suffice**? How basic must the ingredients be that are combined to create the organism? Francis Collins says that scientists would be "cheating" by using enzymes, which are themselves derived from life forms.

12 In what may represent an important first step, some scientists have already produced artificial viruses, but they did so by synthetically reproducing DNA of known viruses. They then injected this DNA into cells that weren't synthetically formed.

13 Once an artificial organism is created, how (and for how long) will it live? Collins

believes that artificial life should be able to survive in a basic environment, perhaps in a simple sugar **solution**, without humans providing complicated chemicals. Others might say that, at least at first, making some sort of **microbe** or organism that can survive briefly qualifies as a success—even if it requires a lot of outside control or monitoring.

14 At the very least, some of the initial claims regarding artificial life will face significant scrutiny. In the coming years, expect an ongoing debate about what defines life, both "real" and artificial.

(971 words)

New Words

decode /di:'kəud/	*v.*	解码,译解
genome /'dʒi:nəum/	*n.*	[生]基因组,染色体组
synthesize /'sinθisaiz/	*v.*	综合,合成
organism /'ɔ:gənizəm/	*n.*	生物体,有机体
impending /im'pendiŋ/	*adj.*	即将发生的,逼近的
skeptic /'skeptik/	*n.*	怀疑者,怀疑论者
modified /'mɔdifaid/	*adj.*	改良的,改进的,修正的,修饰的
rigorous /'rigərəs/	*adj.*	严格的,严密的,精确的
casing /'keisiŋ/	*n.*	包装,保护性的外套
membrane /'membrein/	*n.*	膜,隔膜
permeable /'pə:miəbl/	*adj.*	可渗透的,有渗透性的
pathogen /'pæθədʒ(ə)n/	*n.*	[微生物]病菌,病原体
metabolize /mə'tæbəlaiz/	*v.*	产生代谢变化
nucleotide /'nju:kliətaid/	*n.*	[生化]核苷酸
enzyme /'enzaim/	*n.*	[生化]酶
mechanism /'mekənizəm/	*n.*	机械装置,机构,机制
toxic /'tɔksik/	*adj.*	有毒的,中毒的
predatory /'predətəri/	*adj.*	掠夺的,食肉的
contagious /kən'teidʒəs/	*adj.*	传染性的,会感染的
virulent /'virulənt/	*adj.*	病毒的,易传染的;恶性的
premature /ˌpremə'tjuə/	*adj.*	太早的,早熟的
suffice /sə'fais/	*v.*	满足……的需要;使满足
solution /sə'lu:ʃən/	*n.*	溶液
microbe /'maikrəub/	*n.*	微生物,细菌

Phrases and Expressions

genetic code	遗传密码
cell wall	细胞壁

self-sustaining	自立的，自谋生活的
run amok	乱砍乱杀，胡作非为，横冲直撞

Notes

① Associated Press：美联社，1892 年成立于芝加哥，1900 年总社迁至纽约。国内分社 134 个，国外分社 83 个，驻外记者 500 人。每天用 6 种文字播发新闻和经济信息约 300 万字。不仅为美国 1 500 多家报纸、6 000 家电台和电视台服务，还为世界 115 个国家和地区的 1 万多家新闻媒体供稿。

② wet artificial life：湿人工生命。世界各地有些顶尖科学家正投身于鲜为人知的“湿人工生命”研究领域，试图创造出人造生命，并有可能在 3 年至 10 年内获得重大成果，届时将改写达尔文的进化论。

③ *Playing God*：本电影中文名称为《洛城疑云》，1997 年由安迪·威尔森导演，主要演员有大卫·杜楚尼、蒂莫西·赫顿和安吉丽娜·朱莉。大卫·杜楚尼在电影《X 档案》中曾担任主角，《洛城疑云》是他在《X 档案》成功后首次担当主角。

Exercises

Ⅰ. Terms Matching

Directions: *Match the English terms with their Chinese equivalents.*

1. decode	A. 太早的
2. synthesize	B. 生物体，有机体
3. organism	C. 严格的
4. skeptic	D. 解码
5. modified	E. 怀疑者
6. rigorous	F. 机制
7. permeable	G. 有毒的
8. mechanism	H. 修饰的
9. toxic	I. 可渗透的
10. predatory	J. 病毒的
11. contagious	K. 合成
12. virulent	L. 遗传密码
13. premature	M. 食肉的
14. suffice	N. 自立的
15. solution	O. 细胞壁
16. microbe	P. 溶液
17. genetic code	Q. 传染的
18. cell wall	R. 微生物
19. self-sustaining	S. 使满足