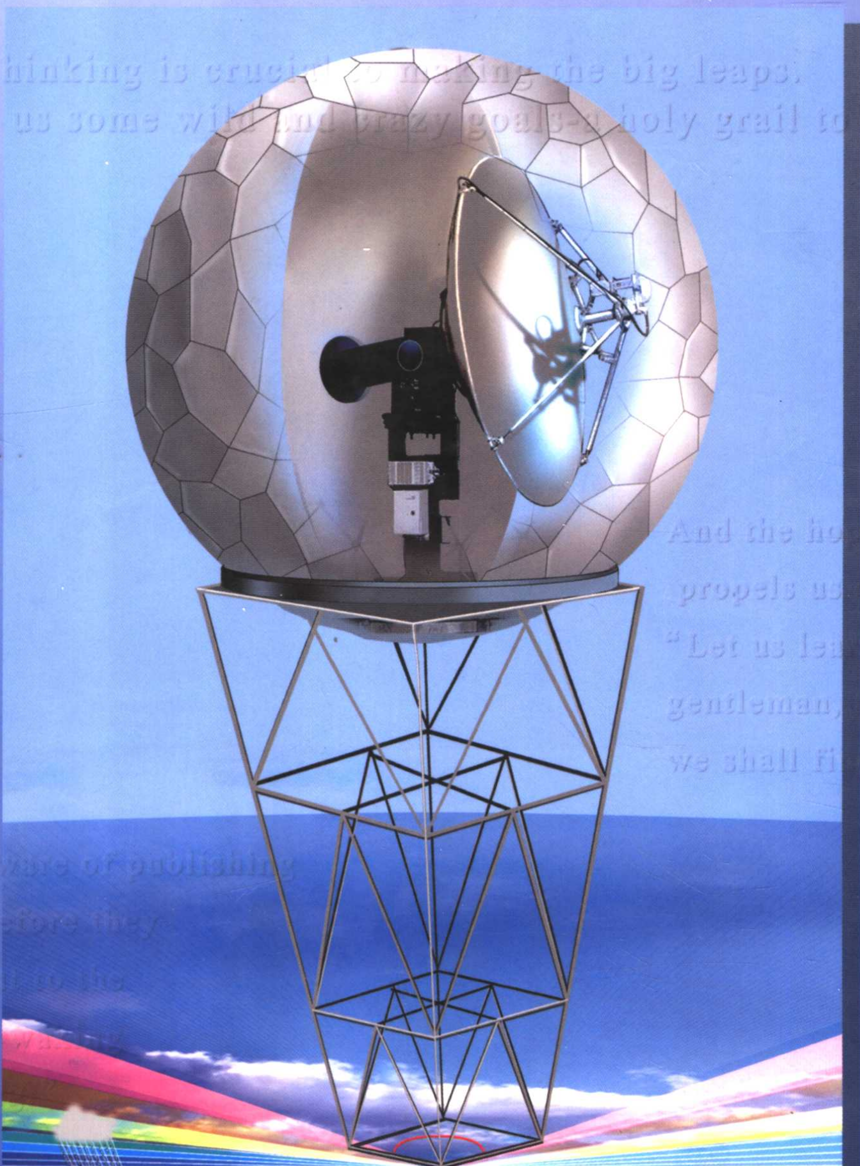
大学科普英语

COLLEGE ENGLISH IN POPULAR SCIENCE

主审：丁树德　主编：龚丽英



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大学科普英语

COLLEGE ENGLISH IN POPULAR SCIENCE

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前　言

当今世界科学技术飞速发展，科技成果层出不穷。随着克隆、基因组、磁悬浮列车、载人飞船等突破性技术的报道在诸多媒体频频出现，以网络、计算机为先导的最新科技成果在日常工作中的广泛应用，越来越多的人们将目光投向自然科学领域，关注科技发展的最新动态。同时教育界人士也将提高学生的科学素养作为素质教育的一个重要环节。

《大学科普英语》节选近年来在电视、广播、报刊等媒体和因特网上出现频率最高的有关科技报道，内容包括生物工程、天体宇宙学、航天技术、纳米技术、计算机网络、化学工程、生态环境、环保型汽车和科学方法论等九大领域的 24 篇文章，反映了各学科最前沿的科技成果，力求为读者提供信息量密集的丰富信息，并且兼顾知识体系的基础性，为将来进一步深入了解各学科的发展扫清语言障碍，打下基础。

本教材最显著的特点是针对大学英语学习者将要通过或已通过四级 CET-4 的读者群编著。目前全国大学英语的主流教材所选课文几乎全部属于社会科学范畴，而近三年的四、六级及研究生入学英语考试的阅读理解部分，自然科普类文章却常常占绝大比例，学生迫切要求加强科技英语阅读能力的培养。促使编者动笔构思这样一个极具挑战的工作的另一个重要因素是，目前大学英语课程设置往往在二年级考过四级后便全线结课，学生必须通过自学或上培训班准备六级 CET-6。他们经常要求英语教师推荐合适的自学教材，指导有效的学习方法。

本教材编者根据多年的教学经验，深入研究六级英语试题、研究生英语试题及一些出国考试如 GRE，TOEFL，IELTS 的阅读篇目，精心挑选，编纂了 24 篇具有代表性的文章。本书规模虽小，但基本涵盖了专业性较强，仍属于普通用途英语的词汇。学生在四级通过后一学期之内若选用此书为教材，辅之以六级词汇手册，考

前模拟题集训，试想六级难关应能一举突破。对有志于报考研究生和GRE，TOEFL，IELTS考试，准备出国留学的学生尤其适用，本书可起到直通车的作用。本书亦适合科技英语专业中等阅读水平的读者。

特别指出：读者在使用过程中应严格按照各部分的提示及练习题要求进行。尤其在每单元第II——阅读理解部分，题型设计兼顾各类考试特点，既包括辨认事实题，又包括推理、判断题，这就要求读者既能准确地理解把握全文，又能保持一定的阅读速度，在相当程度上应具备略读（skim）和寻读（scan）的能力。所谓略读，简单地说即抓住文章主旨；所谓寻读，即提取具体细节性信息，其它信息可以过滤掉不计。读者在阅读第一遍时，须在规定时间之内完成阅读理解题。教材每单元课文都标有字数，由于个别篇目难度较大，规定时间不完全遵照六级大纲，而是根据教材手稿试用期间学生反馈而定。读者在使用过程中可根据自身不同目的略做调整，但编者所建议时间乃是上限。当然，仅限于做对题目是远远不够的，要想掌握词汇，揣摩科技文体特点，还需对课文细读一二，完成词汇练习。词汇的收录和整理参考大学英语六级和GRE范围。由于超出此范围词汇数量极少，每课词汇表不再另行特别标注。

本书词汇表及词汇练习由段维彤、李朝红老师编辑整理。

在本教材出版之际，承天津大学科技英语系丁树德教授审订。

由于编者水平有限，教材中的错误在所难免，殷切希望广大师生提出宝贵意见，以便修订再版。

编　者

2003年2月

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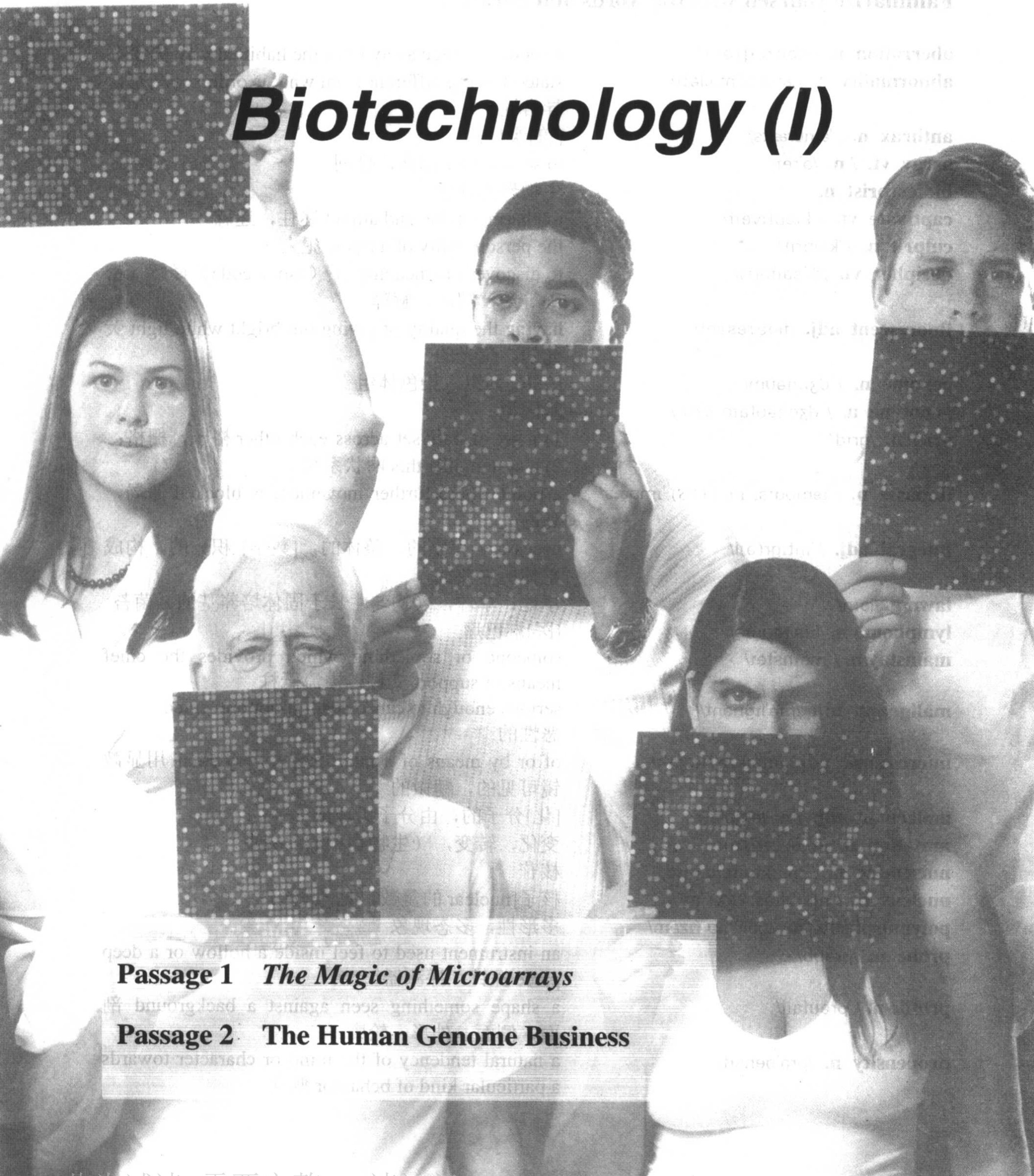
Unit 1

Biotechnology (I)



Passage 1 ***The Magic of Microarrays***

Passage 2 The Human Genome Business

Passage 1 The Magic of Microarrays

I. Word List

Familiarize yourself with the words and phrases.

aberration n. /æbə'reɪʃ(ə)n/	a sudden change away from the habitual way 失常
abnormality n. /ˌæbnɔː'mælətɪ/	state of being different from what is ordinary 畸形，异常性
anthrax n. /'ænθræks/	[兽]炭疽热
array vt. / n. /ə'reɪ/	to set in order 部署，排列
bioterrorist n.	生物恐怖分子
captivate vt. /'kæptɪveɪt/	to charm, excite, and attract 迷住，迷惑
culprit n. /'kʌlprɪt/	the person guilty of a crime 犯人
decipher vt. /dɪ'saɪfə(r)/	to discover the meaning of （esp. a code）译解（密码等），解码，解释
fluorescent adj. /fluə'resənt/	having the quality of giving out bright white light 荧光的，莹光的
genome n. /'dʒiːnəʊm/	[生]基因组，染色体组
genotype n. /'dʒenəʊtaɪp,'dʒiː-/	基因型
grid n. /grɪd/	1) a set of bars set across each other 格子，栅格；2) a system like this 网状系统
impasse n. /'æmpɑːs, 'ɪm-; (*US*) 'ɪmpæs/	a point where further movement is blocked 僵局，死路
integral adj. /'ɪntɪgr(ə)l/	necessary 完整的，整体的，[数学] 积分的，构成整体所需要的
lawn n. /lɔːn/	草地，草坪，（均匀生长于固体培养基的）菌苔
lymphoma n. /lɪm'fəʊmə/	[医]淋巴瘤
mainstay n. /'meɪnsteɪ/	someone or something which provides the chief means of support 支柱，中流砥柱
malignant adj. /mə'lɪgnənt/	serious enough to cause death if not prevented 恶性的
microscopic adj. /maɪkrə'skɔpɪk/	of or by means of a microscope; very small 用显微镜可见的，精微的
molecular adj. /mə'lekjʊlə(r)/	[化]分子的，由分子组成的
mutation n. /mjuː'teɪʃ(ə)n/	变化，转变，（生物物种的）突变
nucleotide n. /'njuːklɪətaɪd, -tɪd/	核苷
nucleus n. /'njuːklɪəs; (*US*) 'nuː-/	核子[nuclear 的复数，见 nuclear]
polymorphism n. /ˌpɔlɪ'mɔːfɪzəm/	多形性，多态现象
probe n. /prəʊb/	an instrument used to feel inside a hollow or a deep place 探针，探测器
profile n. /'prəʊfaɪl/	a shape something seen against a background 剖面，侧面，外形，轮廓
propensity n. /prə'pensɪtɪ/	a natural tendency of the mind or character towards a particular kind of behavior 倾向

scanner n. /ˈskænə(r)/ 扫描器；扫描仪
sensor n. /ˈsensə(r)/ 传感器
simulation n. /sɪmjuˈleɪʃ(ə)n/ representation, pretending, imitation 仿真，假装，模拟
snapshot n. /ˈsnæpʃɔt/ an informal picture taken with a hand-held camera 快照，急射，简单印象
snip n. /snɪp/ a small piece 小片
strand vt. /strænd/ to cause to run onto the shore 使搁浅
subscriber n. /səbˈskraɪbə(r)/ a person who gives 捐献者
succumb vi. /səˈkʌm/ to die 死
tag n. /tæg/ a small narrow length of paper fixed to something show what it is 标签，名称，标记符
template n.(=templet) /ˈtempleɪt,-/ɪt/ a thin board or plate of metal cut into a special shape used as guide for cutting metal 模板
tether v. /ˈteðə(r)/ to fasten with a rope 用绳子拴起来
transcribe v. /trænˈskraɪb, trɑ:-/ to make a full copy of 转录
trouper n. /ˈtru:pə(r)/ a member of a company 演员，戏团演员，老练演员
virtual adj. /ˈvɜ:tjuəl/ almost what is stated 实质的，[物]有效的
virulent adj. /ˈvɪrulənt/ very powerful, quick-acting, and dangerous to life or health[医]有病毒的，恶性的
wafer n. /ˈweɪfə(r)/ [无]晶片，圆片

II. Read the article to get the reading comprehension exercise done within 30 minutes

1 Most people stricken with a cancer called diffuse large B cell lymphoma initially respond well to standard therapy. Yet in more than half of cases, the cancer soon roars back lethally. Physicians have long assumed that the reason some individuals succumb quickly while others do well is that the disease actually comes in different forms caused by distinct molecular abnormalities. But until two years ago, investigators had no way to spot the patients who had the most virulent version and thus needed to consider the riskiest, most intensive treatment.

2 Then a remarkable tool known as a DNA microarray, or DNA chip, broke the impasse. It enabled a team of researchers from the National Institutes of Health, Stanford University and elsewhere to distinguish between known long- and short-term survivors based on differences in the overall pattern of activity exhibited by hundreds of genes in their malignant cells at the time of diagnosis. That achievement should lead to a diagnostic test able to identify the patients in greatest danger.

3 DNA microarrays, first introduced commercially in 1996, are now mainstays of drug discovery research, and more than 20 companies sell them or the instruments or software needed to interpret the information they provide. The devices are also beginning to revolutionize how scientists

explore the operation of normal cells in the body and molecular aberrations that underlie medical disorders. The tools promise as well to pave the way for faster, more accurate diagnoses of many conditions and to help doctors personalized medical care—that is, tailor therapies to the exact form of disease in each person and select the drugs likely to work best, with the mildest side effects, in those individuals.

Tiny Troupers

4 The arrays come in several varieties, but all assess the composition of genetic material in a tissue sample, and all consist of a lawn of single-stranded DNA molecules (probes) that are tethered to a wafer often no bigger than a thumbprint. These chips also capitalize on a very handy property of DNA: complementary base pairing. DNA is the material that forms the more than 30,000 genes in human cells—the sequences of code that constitute the blueprints for protein. It is built from four building blocks, usually referred to by the first letter of their distinguishing chemical bases: A, C, G and T. The base A in one strand of DNA will pair only with T (A's complement) on another strand, and C will pair only with G.

5 Hence, if a DNA molecule from a tissue sample binds to a probe having the sequence ATCGGC, an observer will be able to infer that the molecule from the sample has the complementary sequence: TAGCCG. RNA, which is DNA's chemical cousin, also follows a strict base-pairing rule when binding to DNA, so the sequence of any RNA strand that pairs up with DNA on a microarray can be inferred as well.

6 Complementary base-pairing reactions have been integral to many biological tests for years. But amazingly, DNA microarrays can track tens of thousands of those reactions in parallel on a single chip. Such tracking is possible because each kind of probe – be it a gene or a shorter sequence of code – sits at an assigned spot within a checkerboardlike grid on the chip and because the DNA or RNA molecules that get poured over the array carry a fluorescent tag or other label that can be detected by a scanner. Once a chip has been scanned, a computer converts the raw data into a color-coded readout.

7 Scientists rely on DNA microarrays for two very different purposes. So-called genotype applications compare the DNA on a chip with DNA in a tissue sample to determine which genes are in the sample or to decipher the order of code letters in as yet unsequenced strings of DNA. Frequently, however, investigators these days use the devices to assess not merely the presence or sequence of genes in a sample but the expression, or activity level, of those genes. A gene is said to be expressed when it is transcribed into messenger RNA (mRNA) and translated into protein. Messenger RNA molecules are the mobile transcripts of genes and serve as the templates for protein synthesis.

Gene Hunters

8 Researchers have employed the genotype approach to compare the genes in different organisms (to find clues to the evolutionary history of the organisms, for example) and to compare the genes in tumors with those in normal tissues (to uncover subtle differences in gene composition or number). One day gene comparisons performed on DNA chips could prove valuable in medical practice as well.

9 Carefully designed arrays could, for instance, announce the precise cause of infection in a patient whose flulike symptoms (such as aches, high fever and breathing difficulty) do not point to one clear culprit. A surface could be arrayed with DNA representing genes that occur only in selected disease-causing agents. And a medical laboratory could extract and label DNA from a sample of infected tissue (perhaps drawn from the person's nasal passages). Binding of the patient's DNA to some gene sequence on the chip would indicate which of the agents was at fault. Similarly, chips now being developed could signal that bioterrorists have released specific types of anthrax or other exotic germs into community.

10 For better or worse, gene-detecting microarrays could also identify an individual's genetic propensity to a host of disorders. Most genetic differences in people probably take the form of single nucleotide polymorphism, or SNPs, in which a single DNA letter substitutes for another. A chip bearing illness-linked gene variants could be constructed to reveal an individual's SNPs and thus predict the person's likelihood of acquiring Alzheimer's disease, diabetes, specific cancers and so on. Those people at greatest risk could then receive close monitoring, intensive preventive care and early intervention. Whether these kinds of tests would appeal to the public is an open question, though: the downside of such knowledge can be increased anxiety and the potential for discrimination by employers and insurers.

11 Other valuable information provided by SNP chips would pose no threat to people's mental state, employability or insurability. The gene variants we possess influence how our bodies process the medicines we take, which in turn influences the effectiveness of the drugs and the intensity of their side effects. Chips that highlighted our unique genetic sensitivities would help physicians choose the drugs that work best and pose the fewest dangers in each of us. SNP chips displaying genetic mutations that increase the aggressiveness of tumors might also help pathologists determine whether benign-looking tumors are actually fiercer than they seem based on microscopic analyses. Both types of arrays are already being investigated for use in medical care.

12 As the operations of cells and the entire body become better understood, physicians will be able to make more precise diagnoses, to offer patients more sophisticated therapies (possibly including gene therapies), and to tailor these interventions to an individual's genetic background and

current state of physiological functioning. By the year 2020, health maintenance organizations could conceivably keep virtual simulations of the personal molecular states of their subscribers. Those who go along with the program will probably delay the effects of aging more successfully and lead healthier lives. (1,211 words)

Reading Comprehension Exercise

Decide on the best choice to answer questions or complete statements. What you know formerly can help you, but all the information you need is inside the article.

1) The different therapeutic effect on B cell lymphoma patients inspired medical workers initially to ___.

A) introduce DNA microarrays commercially

B) experiment with alternative therapies

C) attribute the difference to distinct molecular aberration

D) break the impasse to identify the survivors

2) DNA microarrays enabled researchers to spot the patient with the most virulent version by distinguishing ___.

A) between known long- and short-term survivors

B) between genes activity in malignant cells and in normal cells

C) different forms caused by disease

D) who respond well to the standard medical treatment

3) Which statement is true of the achievement by researchers in Stanford University and elsewhere?

A) Instruments or software are needed to interpret the DNA chips.

B) It is a further improvement of the established method to explore the operation of cells.

C) It promises good profitability for drug industry.

D) Not many people are aware of its significance.

4) DNA microarrays can be perceived as___.

A) a new discovery on physiological functions of human body

B) a theory to explain how human body's tissues become infected with certain disease

C) a new therapy for large B cell lymphoma

D) a diagnostic device to help doctor to choose appropriate therapy

5) DNA has all the following properties except that ___.

A) it is tethered to a wafer smaller than a thumbprint

B) it constitutes genes in human cells

C) it has a chemical counterpart, RNA, which binds it

D) it is built from four types of building blocks

6) According to complementary base pairing, if a DNA molecule has the sequence of TCGATA, it can be inferred that there must be a complementary sequence, ____.

A) CTTCGC B) CTAGCG

C) AGCTAT D) ACGCAT

7) Enabling factors for tracking complementary base pairing reactions include:

a) probe being assigned to certain spot on the chip

b) scanner detecting the label carried by RNA and DNA

c) template synthesizing protein

d) computer converting raw material into color-coded readout

A) a and b B) b, c and d

C) b and d D) a, b and d

8) The purposes, for which scientists rely on DNA microarrays are _____.

A) to investigate the presence or sequence of genes in a simple & to express the activity level of genes

B) to compare the DNA on a chip with RNA in a tissue sample to determine which genes are in the sample

C) to determine which genes are in the sample & to decipher the order of code teller in unsequenced strings of DNA

D) to classify genes into different types & to transcribe genes into messenger RNA

9) Which of the following applications of DNA chip have researchers employed?

A) pinpointing the agent at fault which causes disease

B) performing comparisons between different organism, genes and tissues

C) identifying what kind of chemical weapon terrorists use

D) predicting one's likelihood of infecting diabetes, cancers, etc.

10) The least likely role played by a person's SNP is that ____.

A) genetic difference in person takes the form of SNP

B) chip revealing one's SNP predicts his genetic propensity to certain disease

C) SNP chips suggest pathologists to determine whether a tumor benign or malignant

D) knowledge extracted from SNP has reassuring psychological effect on one's well-being