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L I F E S C I E N C E

生命科学

You and Your Genes 你和你的基因

REBECCA L. JOHNSON (美) 著

外语教学与研究出版社

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你和你的基因

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鲜瑜注

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如果你希望读到地道的英语，在享受英语阅读乐趣的同时又能增长知识、开拓视野，这套由外语教学与研究出版社与美国国家地理学会合作出版的“国家地理科学探索丛书”正是你的选择。

“国家地理科学探索丛书”分为9个系列，内容涉及自然科学和社会研究，秉承《国家地理》杂志图文并茂的特色，书中配有大量精彩的图片，文字通俗易懂、深入浅出，将科学性和趣味性完美结合，称得上是一套精致的小百科。

这套丛书以英文注释形式出版，注释由国内重点中学教学经验丰富的英语教师完成。特别值得推荐的是本套丛书在提高青少年读者英语阅读能力的同时，还注重培养他们的科学探索精神、动手能力、逻辑思维能力和沟通能力。

本丛书既适合学生自学，又可用于课堂教学。丛书各个系列均配有一本教师用书，内容包括背景知识介绍、技能训练提示、评估测试、多项选择题及答案等详尽的教学指导，是对课堂教学的极好补充。

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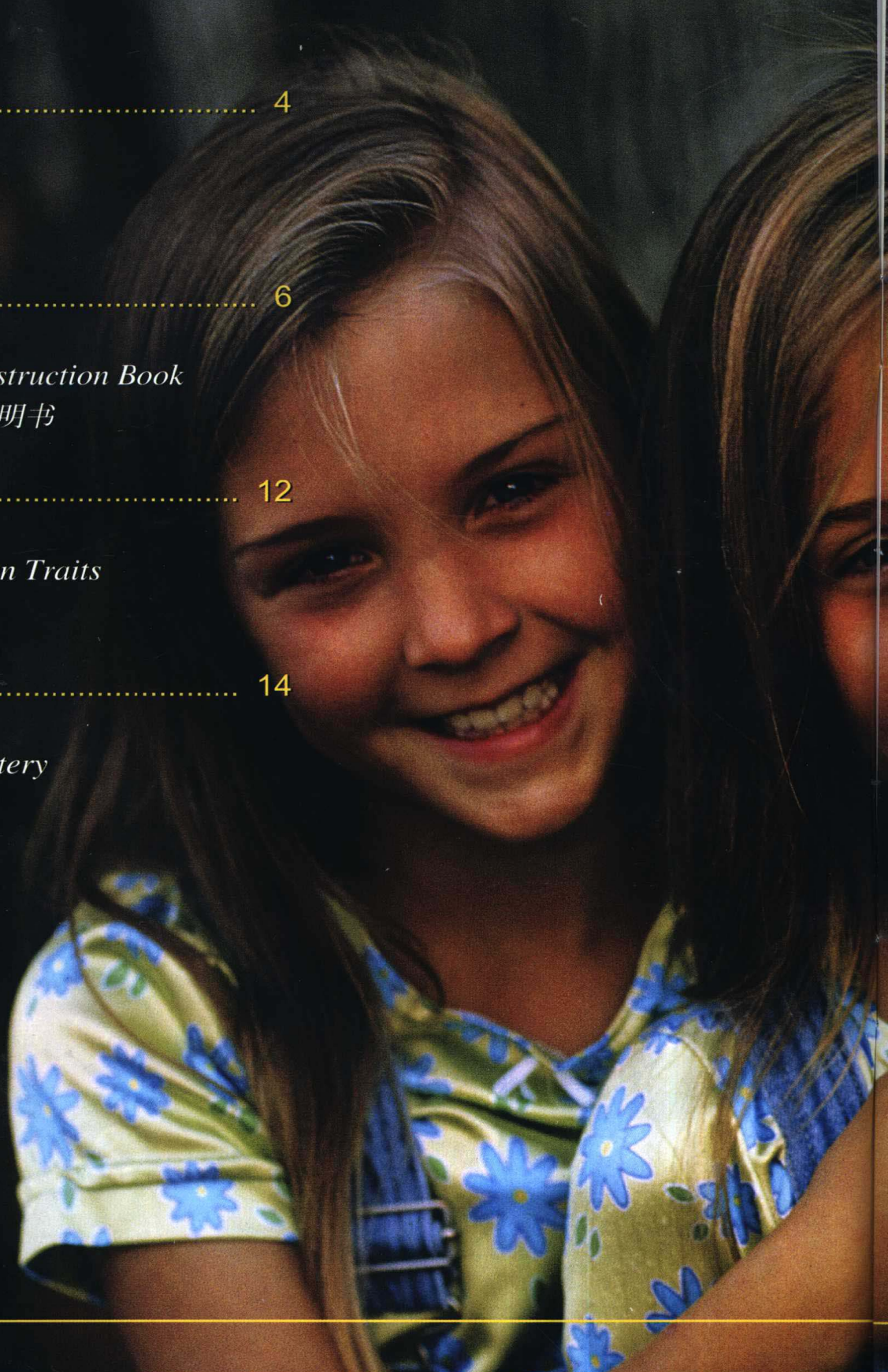
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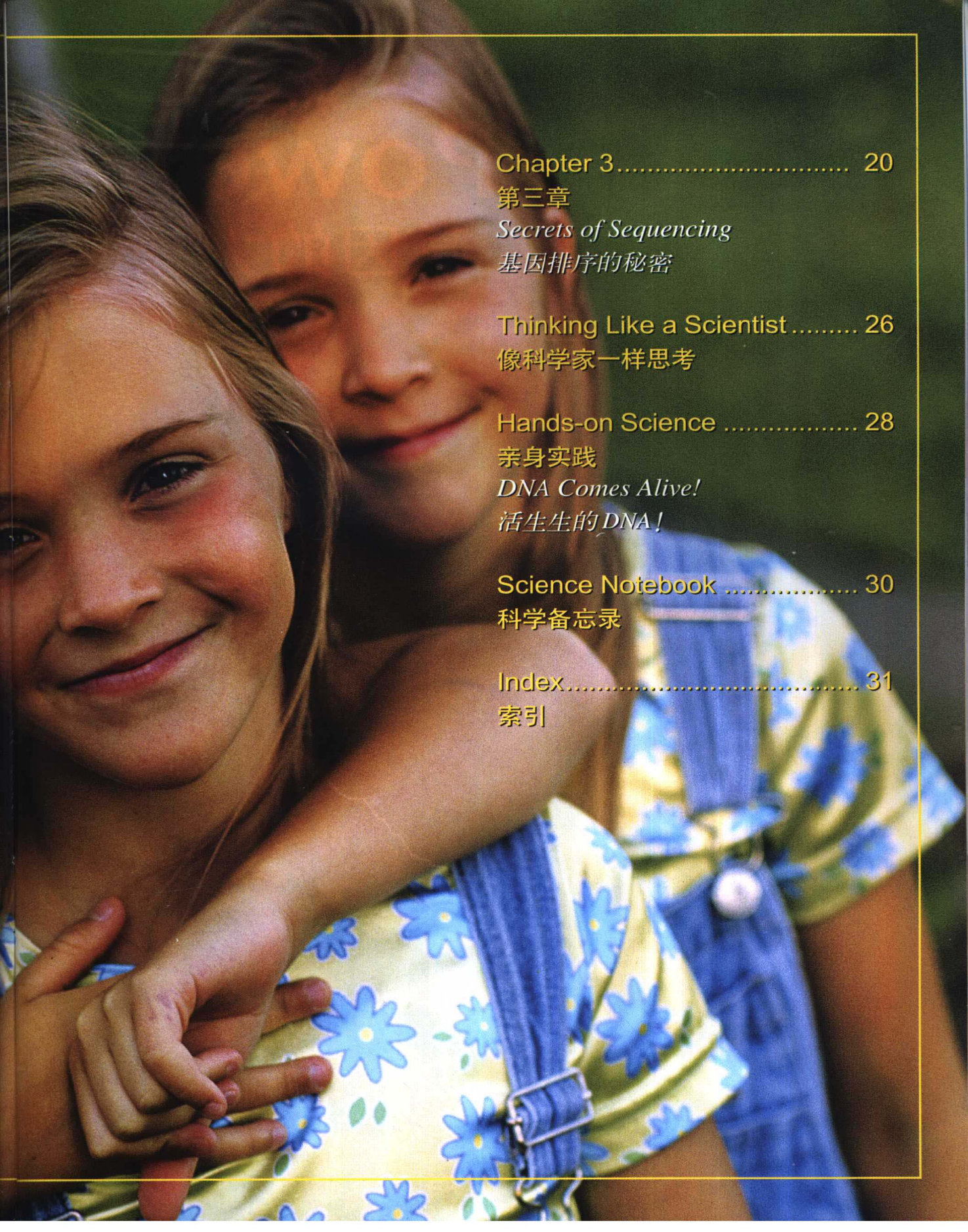
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Gene Power

基因的力量



Animal watching at the zoo is a great way to spend an afternoon. There's a mother tiger and her brand new¹ cubs². Wait a minute—one of the cubs has white instead of orange fur³. How can that be?

In every other way⁴, the white tiger looks like tigers are supposed to look. It has black stripes⁵, big paws⁶ with sharp claws⁷, and a long tail⁸. So what's the secret to its snow-colored fur? Its fur is white, rather than⁹ orange, because of a difference in a single¹⁰ gene¹¹.

Genes are tiny¹² structures¹³ inside cells¹⁴ that control the way cells grow and change. Genes are like a set of instructions for building living organisms¹⁵ and keeping them functioning¹⁶ properly¹⁷. Whether it's a tiger or a toadstool¹⁸, the cells of every living thing contain¹⁹ genes. And that includes²⁰ you. Your genes are mostly responsible²¹ for how you look, from the color of your hair to the fact that you don't have a tail. It's true that your environment²² influences²³ how you look and act. But genes play a big role²⁴.

Genes are tiny. Yet they are powerful²⁵. They must be, if just one gene can make the difference between an orange tiger and a white one. In this book you'll explore²⁶ what we have learned about genes. You'll also learn what scientists are still trying to find out about these mysterious²⁷ little structures in our cells.

1. brand new		新的
2. cub	<i>n.</i>	幼兽
3. fur	<i>n.</i>	软毛
4. in every other way		在所有其他方面
5. stripe	<i>n.</i>	斑纹; 条纹
6. paw	<i>n.</i>	脚爪; 爪子
7. claw	<i>n.</i>	爪; 指甲
8. tail	<i>n.</i>	尾巴
9. rather than		不是……(而是)
10. single	<i>adj.</i>	单一的
11. gene	<i>n.</i>	基因
12. tiny	<i>adj.</i>	微小的
13. structure	<i>n.</i>	结构
14. cell	<i>n.</i>	细胞

15. organism	<i>n.</i>	生物; 有机体
16. function	<i>v.</i>	运行; 行使职责
17. properly	<i>adv.</i>	适当地; 正确地
18. toadstool	<i>n.</i>	伞菌
19. contain	<i>v.</i>	包含; 容纳
20. include	<i>v.</i>	包含
21. responsible	<i>adj.</i>	有责任的; 应负责的
22. environment	<i>n.</i>	环境
23. influence	<i>v.</i>	影响
24. play a big role		起重要作用
25. powerful	<i>adj.</i>	强大的; 有力的
26. explore	<i>v.</i>	探索; 探究
27. mysterious	<i>adj.</i>	神秘的

Life's Little Instruction Book

生命的小小说明书

Tiger Woods's are attached¹. Tara Lipinski's definitely² are not. What are we talking about? Earlobes³—those soft little bits of flesh⁴ at the bottom⁵ of a person's ears.

- | | | |
|-------------------|------|-------|
| 1. attached | adj. | 贴的 |
| 2. definitely | adv. | 无疑地 |
| 3. earlobe | n. | 耳垂 |
| 4. flesh | n. | 肉 |
| 5. bottom | n. | 底部 |
| 6. Olympic | adj. | 奥林匹克的 |
| 7. figure skating | | 花样滑冰 |
| 8. medalist | n. | 奖牌获得者 |



1998 Olympic⁶ figure skating⁷ medalists⁸ Michelle Kwan, Tara Lipinski, and Lu Chen

Notice how Tiger's earlobes are attached to the side of his head. But Tara's are detached¹. Her earlobes hang free. Which type of earlobe do you have—attached or detached? Grab² a mirror and check it out³.

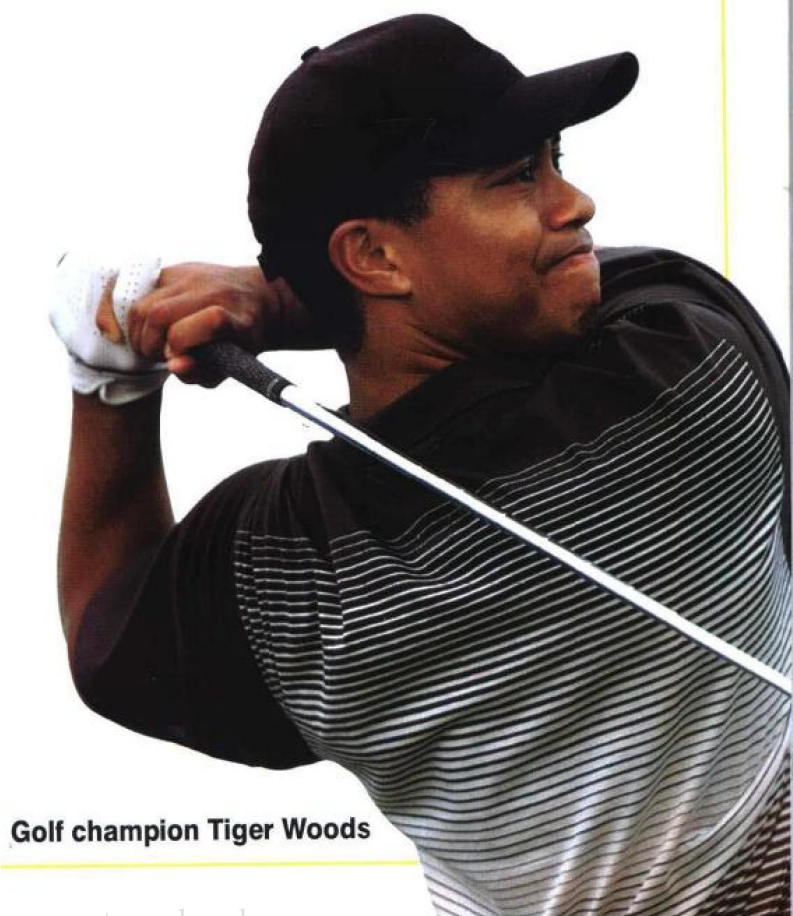
Like the color of a tiger's fur, the shape of your earlobes is caused by a difference in a single gene. Earlobe shape is a human characteristic⁴, or trait⁵. We each have thousands of genes that control thousands of different traits. The instructions for some traits, like earlobe shape, are found in just one gene. Other traits are the result of many genes acting together.

Has anyone ever said to you, "You have your mother's smile" or "your father's nose"? You have many traits that are very similar⁶ to your parents' traits because you inherited⁷ your genes from them. Half of your genes came from your mother, and half came from your father. Those genes all came together in the cell that eventually⁸ developed into you.

The set of genes that you inherited—your own personal⁹ set of instructions for life—are unique¹⁰. Unless you have an identical twin¹¹, there is no one else on Earth exactly¹² like you.

Even though identical twins are the same genetically¹³, why might they look somewhat¹⁴ different from each other?

1. detached	adj.	分开的
2. grab	v.	抓
3. check...out		检查; 验证
4. characteristic	n.	特征
5. trait	n.	特征; 特性
6. similar	adj.	相似的; 类似的
7. inherit	v.	继承; 遗传
8. eventually	adv.	最后
9. personal	adj.	个人的
10. unique	adj.	惟一的; 独特的
11. identical twin		同卵双胞胎
12. exactly	adv.	完全地
13. genetically	adv.	遗传地
14. somewhat	adv.	稍微; 有点



Golf champion Tiger Woods

In Search of¹ Genes

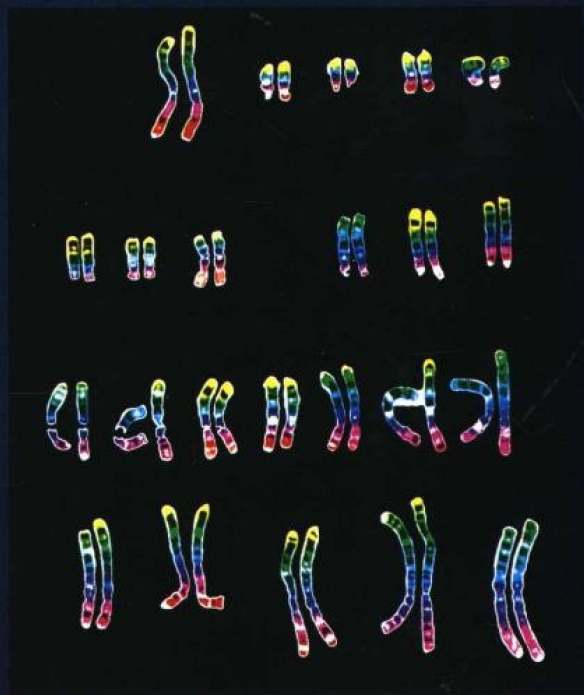
Where are these genes that control so much of what makes you *you*? They're inside almost every cell in your body.

If you looked at one of your cells—say, a skin² cell from the tip³ of your finger—under a microscope⁴, you'd notice a dark blob⁵ near the center. That's the cell's nucleus⁶. Inside the nucleus are long strands⁷ that are coiled⁸ up like tiny springs⁹. These strands are your chromosomes¹⁰.

There are 46 chromosomes, or 23 pairs, in each cell body. One member of each pair came from your mother. The other member of each pair came from your father.

Each of your chromosomes is made up of a substance¹¹ called DNA, which stands for deoxyribonucleic acid¹². Scientists know that DNA looks a bit like a spiral staircase¹³.

Now, at last, we've found the location¹⁴ of the genes. A gene is a particular length of DNA, a specific section¹⁵ of the spiral staircase that coils into chromosomes that lie in the nucleus deep within each cell.



23 pairs of human chromosomes



1. in search of	n.	寻找
2. skin	n.	皮肤
3. tip	n.	顶端; 梢
4. microscope	n.	显微镜
5. blob	n.	一滴; 一点
6. nucleus	n.	(pl. nuclei)核
7. strand	n.	线; 绳
8. coil	v.	卷; 盘绕
9. spring	n.	弹簧
10. chromosome	n.	染色体
11. substance	n.	物质
12. deoxyribonucleic acid (DNA)		脱氧核糖核酸
13. spiral staircase		螺旋梯
14. location	n.	位置
15. section	n.	部分

Chromosomes

Nucleus of cell

Interesting Questions... Q.

Q: Are genes found in every cell of a person's body?

A: No. Genes are in every cell except red blood cells¹. Red blood cells lose their nuclei—and thus their chromosomes—soon after they are formed. That's why red blood cells are shaped a bit like doughnuts²—the squished-in³ part in the center is where the nucleus once was.

Q: Does every human cell with a nucleus contain 23 pairs of chromosomes?

A: No. All cells with a nucleus except the reproductive cells⁴, which are called eggs⁵ and sperm⁶, have 23 pairs of chromosomes. Each egg and sperm cell contains just 23 individual⁷ chromosomes, not 23 pairs. When an egg and a sperm join, the resulting cell—that can eventually develop into a new person—has 23 pairs, or 46 chromosomes.

DNA strand

1. red blood cell		红血球
2. doughnut	<i>n.</i>	炸面圈
3. squished-in	<i>adj.</i>	压进去的
4. reproductive cell		生殖细胞
5. egg	<i>n.</i>	卵子
6. sperm	<i>n.</i>	精子
7. individual	<i>adj.</i>	单独的

Working in Pairs

Remember the examples of tiger fur color and earlobe shape? A single gene controls each of these traits. Actually¹, they're controlled by a single pair of genes. That's because people (and tigers) inherit pairs of chromosomes, and therefore² pairs of genes, from their parents. This means that for each gene on one member of a chromosome pair, there's a similar gene in the same place on the other member of that chromosome pair.

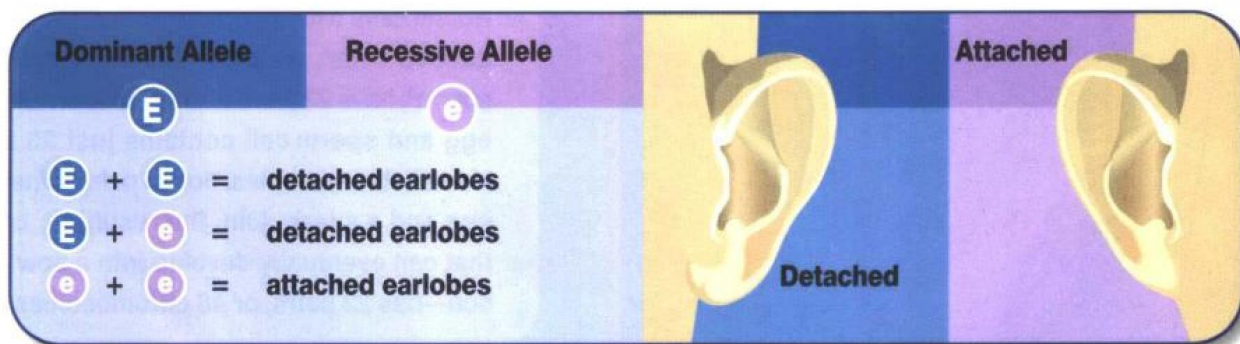
How do these pairs of genes control a trait like earlobe shape? Well, the two genes for this trait that you inherited—one from each of your parents—may be different. Most genes come in slightly³ different forms, called alleles⁴. Different alleles are instructions for slightly different versions⁵ of the same trait.

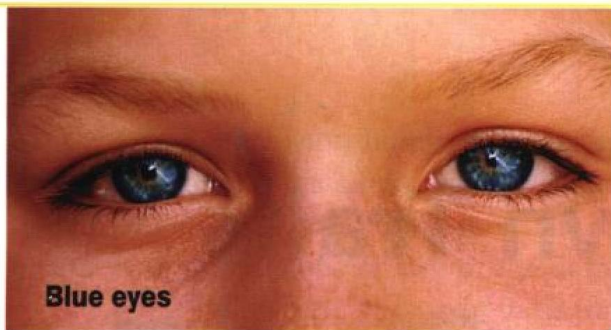
Two alleles are involved in⁶ earlobe shape. One is the dominant⁷ allele, and it calls for detached earlobes. The other is the recessive⁸ allele, which calls for attached earlobes. The dominant allele gets its name from the fact that it can override⁹ or cover up¹⁰ the recessive allele.

How does this work in you and other people? If you inherited two dominant alleles for earlobe shape—one from each of your parents—you have detached earlobes. If you inherited one dominant allele and one recessive allele, you still have detached earlobes because the dominant allele overrode the recessive one. However, if you inherited two copies of the recessive form of the gene for earlobe shape, your lobes¹¹ are attached.

What traits have you inherited from your parents?

1. actually	adv.	实际上
2. therefore	adv.	因此
3. slightly	adv.	轻微地
4. allele	n.	等位基因
5. version	n.	样式; 形式
6. involve in		涉及
7. dominant	adj.	显性的
8. recessive	adj.	隐性的
9. override	v.	使无效; 压倒
10. cover up		掩盖
11. lobe	n.	圆形突出部(尤指耳垂)





Blue eyes



Brown eyes

Complicating¹ Factors

If all traits were controlled by single pairs of genes, then genetics², the study of how traits are inherited, would be easy. However, it turns out to be very complicated.

Many traits are controlled by more than a single pair of genes. The color of your eyes, for example, is the result of many pairs of genes working together in not very clear-cut³ ways. This fact makes it more difficult to figure out⁴ the job of each gene.

It's true that genes play a major⁵ role in determining⁶ how an organism looks and functions. However, genes aren't the only influence. Environmental factors shape living things too.

Take Siamese cats⁷ for instance⁸. Genes contain instructions for the color of their fur. Yet temperature⁹ also can affect¹⁰ their fur color. Where a Siamese cat's body is warmest, its fur is light in color. On slightly cooler parts

of the cat, like its ears, paws, nose, and tail, the fur grows in darker.

Now think about your own body. Your genes are responsible for the fact that you have muscles¹¹ in your arms and legs. However, you can make your muscles bigger and stronger by exercising. Things you do and experiences¹² you have—together with instructions given by your genes—shape you into a unique person.

1. complicate	v.	使复杂
2. genetics	n.	遗传学
3. clear-cut	adj.	明确的
4. figure out		断定; 领会到
5. major	adj.	主要的
6. determine	v.	决定
7. Siamese cat		暹罗猫
8. take...for instance		以……为例
9. temperature	n.	温度
10. affect	v.	影响
11. muscle	n.	肌肉
12. experience	n.	经历





Tracking Down Traits

追踪特性



- | | | |
|-------------------|-------------|---------|
| 1. geneticist | <i>n.</i> | 遗传学者 |
| 2. tongue-rolling | <i>n.</i> | 卷舌 |
| 3. eyelash | <i>n.</i> | 眼睫毛 |
| 4. length | <i>n.</i> | 长度 |
| 5. cosmetic | <i>n.</i> | 化妆品 |
| 6. effect | <i>n.</i> | 效果 |
| 7. temporary | <i>adj.</i> | 暂时的 |
| 8. widow's peak | | 额头的V型发尖 |
| 9. distinctive | <i>adj.</i> | 有特色的 |
| 10. hitchhiker | <i>n.</i> | 免费搭车者 |
| 11. thumb | <i>n.</i> | 大拇指 |
| 12. bend | <i>v.</i> | 弯曲 |
| 13. backward | <i>adj.</i> | 向后的 |
| 14. angle | <i>n.</i> | 角度 |

These two pages show human traits that geneticists¹ know are controlled by a single pair of genes. In each set of photos below, the top photo shows the trait that results if a person inherits one or two of the dominant alleles for that trait. Which form of each of these traits do you have? (注释见第 12 页)



1 Tongue-rolling²

The student above is able to roll her tongue because she inherited one or two copies of the dominant allele for this trait. If you don't have the dominant allele, you can't do the roll.

2 Long Eyelashes³

The length⁴ of your eyelashes is another gene-controlled trait. Cosmetics⁵ can make eyelashes look longer, but their effect⁶ is temporary⁷.

3 Widow's Peak⁸

A widow's peak or point in your hairline is another distinctive⁹ genetic trait. If you have a widow's peak, do other members of your family have one too?

4 Hitchhiker's¹⁰ Thumb¹¹

A single pair of genes controls whether or not you can bend¹² the top joint of your thumb at a backward¹³ angle¹⁴ to the bottom joint.