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狗法则

Dogs Rule!



中国电力出版社
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陈洁译

京权图字 01-2005-3009

图书在版编目 (CIP) 数据

狗法则 / 美国凯勒斯出版公司编著; 陈洁译.

北京: 中国电力出版社, 2005.11

(阅读空间·英汉双语主题阅读)

书名原文: **Dogs Rule!**

ISBN 7-5083-3908-8

I. 狗… II. ①美…②陈… III. 英语—阅读教学—

高中—课外读物 IV. G634.413

中国版本图书馆 CIP 数据核字 (2005) 第 114950 号

Dogs Rule!

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Chinese Translation Copyright © 2005 by China Electric Power Press

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《阅读空间·英汉双语主题阅读》由美国北极星传媒有限公司授权出版,
北京行走出版咨询有限公司策划。

狗法则

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责任编辑: 黄 毅 李宝琳

出版发行: 中国电力出版社

社 址: 北京市西城区三里河路 6 号 (100044)

网 址: <http://www.sjdf.com.cn>

印 刷: 北京世艺印刷有限公司

开 本: 178 × 226

印 张: 3

字 数: 57 千字

版 次: 2006 年 1 月第 1 版, 2006 年 1 月第 1 次印刷

书 号: ISBN 7-5083-3908-8

定 价: 8.90 元

阅读空间 · 英汉双语主题阅读

荣获美国 2003 年非小说类图书 杰出成果奖

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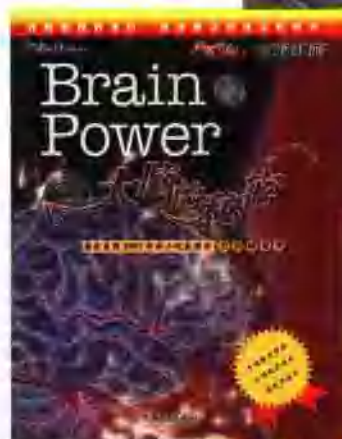
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21世纪教育

此教育部规划项目 英语真实阅读实验用书

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本书探索狗的世界以及我们与狗密切联系的不寻常的15 000年。任何一位狗的主人都知道，大英朋友的存在是为了取悦我们，但有一项新的科学证据表明，狗除了能使我们快乐，还能够使我们更加健康！科学也使我们了解更多关于狗的祖先及其适应性——我们怎样让一个品种既能生出像一头小马驹一样大小的猎狼犬，又能生出一只毛茸茸的吉娃娃狗。然而很多美国人教唆他们的狗去享受美食及温泉浴，另外一些人又因为狗太大、精力太充沛，或者仅仅因为它需要太多的时间与照顾而遗弃了它们。阅读本书，找出你心中最完美的小狗……，说服爸爸妈妈，你真的需要一只小狗。



THE DOG

The prey takes flight across the grass; the predator launches itself in pursuit and brings the prey down with a snap of its jaws. Deer and wolf... or tennis ball and Labrador retriever?

The pack is separated for most of the day. When they reunite, the junior member licks the faces of the older ones. Coyote puppy with parents... or a cocker spaniel with children?

Dogs are closely related to other members of the Canidae family: wolves, coyotes, jackals, and foxes. You can see it in their behavior and their bodies. But dogs are quite different, too. Only dogs are designed to bond with humans.

When and where did this unique species originate? Did dogs descend from wolves, jackals, or a mix of both? How are different breeds related? The latest genetic studies are helping us to understand the canine family tree.

原上猎物飞跑，猎捕者奋力追赶，最后张颚猛咬，将猎物捕获。鹿和狼……或者网球和纽芬兰拾猎（会叼物还主的猎犬）？

狗大多数时间都是分散而居的，当它们聚在一起时，小狗便舔大狗的脸。跟在父母身边的郊狼……或者带着幼犬的西班牙长耳狗？

狗与犬科的其他成员（例如狼、郊狼、豺以及狐狸）关系十分密切。我们可以从它们的行为以及躯体上看出这一点，但是狗又是相当不同的。只有狗与人类关系密切。

这独一无二的品种源于何时何地？它的祖先是狼、豺还是两者的混合体？这些不同的品种是怎样联系到一起的呢？最新的基因研究正帮助我们了解犬类家谱。

CODE

by Pamela S. Turner

狗的 密码



DAWN OF THE DOG

DNA is a long, twisted molecule found inside the cells of an organism. It carries the organism's genetic code (*genome*). The more closely related two species are, the more similar their DNA. From generation to generation, however, small differences accumulate.

狗的起源

DNA是生物体细胞内发现的长长的螺旋分子,它含有生物体的遗传密码。两个品种的关系越近,它们的DNA越相似。然而,一代一代的细小差别积累了起来。这些基因差别可以被用来估算一个品种是在多少

Above and Beyond Any Code

超越任何密码

by Pamela S. Turner

On a spring morning in 1925, a Dr. Ueno walked to Tokyo's Shibuya train station. Hachiko, his young Akita dog, trotted happily by his side. Every day for a year, Hachiko had walked Dr. Ueno to the station, and every evening he had waited for Dr. Ueno to come home on the evening train.

Dr. Ueno had a heart attack on that spring day and died while at work. He never did come home. But Hachiko still went to Shibuya train station every day to wait for Dr. Ueno. In fact, he went faithfully every day, for 10 years, until he died.

Bobby was a Skye terrier that belonged to John Gray, a Scottish policeman. They were inseparable until John Gray died in 1858. Gray was buried in a small, unmarked gravesite in Greyfriars Churchyard. Bobby stood watch over his master's grave, leaving only at noon to beg for food, until his own death 14 years later.

You might explain Hachiko and Bobby by saying that they were genetically designed to bond with humans. But love, faith, and loyalty are more than a chemical code—in dogs as well as in us.

1 925年春天的一个早晨,上野博士来到东京涩谷火车站。他年轻的秋田狗“八公”一路小跑欢快地跟在他的左右。一年以来,“八公”每天都把上野博士送到车站,晚上又等着他坐车回家。

那年春天的一日,上野博士工作时犯了心脏病去世了。他再也没有回家。但“八公”每天仍然去火车站等待他。事实上,十年间,它每天都忠诚地去那儿守候,直至死去。

鲍比是苏格兰警察约翰·格雷的一只猎狗。在1858年约翰·格雷去世之前,他们从未分开过。格雷葬在格瑞弗艾斯教堂墓地的一个不起眼的地方。鲍比总是站在那儿守着主人的墓,只在中午离开去讨食,直到14年后死去。

你也许会说“八公”和鲍比由于基因的关系注定与人类关系密切。但是挚爱、信念和忠诚比化学密码更重要——人如此,狗亦如此。



These genetic differences can be used to estimate how long ago one species separated from another.

In 2002, Swedish scientists uncovered genetic evidence of dogs' origin. By comparing segments of DNA, they found that all modern dogs appear to have descended from a small group of East Asian wolves. The first true dog probably appeared about 15,000 years ago, most likely in China.

Other researchers wondered about ancient dog bones found in Latin America and Alaska. Did people bring dogs from Asia, or were dogs domesticated in America from local wolves? The scientists compared DNA segments from modern dogs, ancient American dogs, Eurasian wolves, and American wolves. All the dogs tested—even ancient American dogs—had Asian ancestry.

If dogs originated in East Asia, then Asia should be home to the oldest dog breeds. Another genetic study found that the Shar-Pei, Pekingese, chow chow, and Japanese Akita are among the oldest breeds; the basenji, saluki, Afghan, and Nordic breeds such as the Siberian husky have also been around a long time. Many dog breeds, however, date from the 1800s, when breed clubs became popular in Europe and America.

The study also discovered that some breeds believed to be very old—such as the Pharaoh hound—are really modern re-creations. The Pharaoh hound may look like the dogs painted on Egyptian tombs, but their genetic code tells a different tale.



年前从另一个品种分离出来的。

2002年，瑞典科学家揭示了狗的血统基因。通过比较DNA片段，他们发现所有的现代狗的祖先似乎都是一小群东亚狼。大体和在中国的一样，第一条真正的狗很可能出现在15 000年前。

其他的研究者对拉丁美洲和阿拉斯加发现的古代狗的骨骼感到好奇。狗是被人从亚洲带来的，还是由美国当地的狼驯化而来的呢？科学家比较了现代狗、远古时期的美洲狗、欧亚狼以及美洲狼的DNA结构。所有被测验的狗——即使是远古的美洲狗——都有亚洲血统。

如果狗来源于东亚，那么亚洲应该是最古老的犬类的家园。另外一项基因研究发现，最古老的犬类包括沙皮狗、小狮子狗、松狮犬和日本秋田狗；猴犬（巴仙冷狗）、萨卢基狗、阿富汗狗和诸如西伯利亚爱斯基摩种狗的北欧品种，都有很长的历史。然而许多狗的品种可以追溯到19世纪，那时饲养俱乐部在欧美很流行。

研究也揭示了许多被认为很古老的犬种——例如法老猎犬——事实是现代繁殖出来的。法老猎犬也许看起来像是古埃及墓里画着的狗，但它们的遗传密码却告诉人们事实并非如此。

HOW TO MAKE A DOG (IN 2.4 BILLION TINY STEPS)

The complete dog genome, like the human genome, contains about 2.4 billion bits of information. Scientists recently *sequenced* (analyzed and mapped) the entire genetic code of a single dog—Tasha, a female boxer. If one letter represents one bit of genetic information, then mapping Tasha's genetic code was like reading and recording *one million* pages of text!

Tasha's contribution was a small blood sample. But sequencing the DNA in Tasha's blood took over a year of intense work by a team of scientists at the Broad Institute in Cambridge, MA.

Why spend all this time and effort to decipher the dog's genetic code? "The dog is an excellent model for human disease," points out Chief Technologist Michael Zody of the Broad Institute.

Dogs suffer from many of the same diseases as humans: cancer, heart disease, allergies, and epilepsy, to name a few. Because purebred dogs are usually descended from a small group of "founder" stock, they have less genetic variation than people. "This makes it easier to find the link between a specific gene, or genes, and a specific disease," explains Zody. Understanding the genetic source of a disease can help pinpoint a cure for both dogs and humans.

It seems fitting for dogs and humans to improve each other's health. After all, we've been helping each other out for 15,000 years.

狗是怎样养成的(24亿个小步骤)

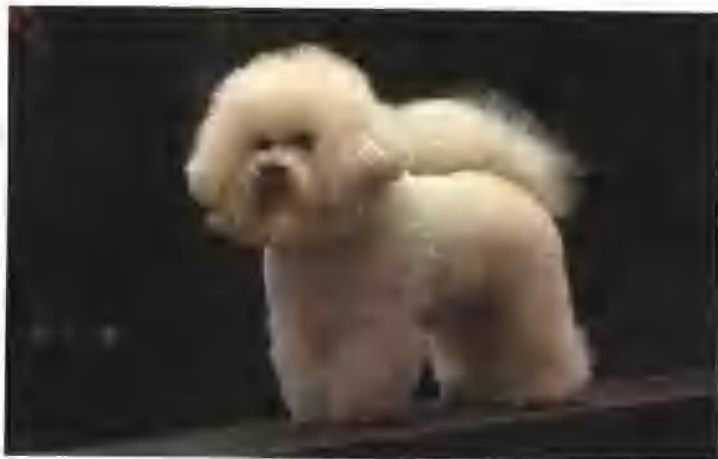
像人类遗传密码一样,完整的狗的遗传密码包含大约24亿比特信息。近来,科学家为一只雌斗拳犬——Tasha编排(分析并测绘)了其完整基因密码。如果一个字母代表一比特基因信息,那么绘制Tasha的基因密码就像是在阅读并记录100万页的文本!

Tasha的贡献是一个小血型样本。但排列其血型的DNA却花费了马萨诸塞州剑桥博大学院一批科学家一年多的紧张工作。

为什么破译狗的遗传密码花费这么长的时间和精力?博大学院的首席科技专家迈克尔·佐迪指出:“对研究人类疾病而言,狗是最佳的模拟。”

狗患有许多和人类一样的疾病,仅列少数例子如下:癌症、心脏病、过敏症、癫痫症。因为纯种狗通常是一群“始祖”家畜的后代,它们的基因变异比人类要少。佐迪解释说:“这就容易找到一个特定基因或几种基因与一种特定疾病之间的联系。”了解一种疾病的基因源既能帮助狗又能帮助人找准治愈方法。

对于狗和人来说,改善彼此的健康状况似乎很合适。毕竟,过去的15000年,我们一直帮助彼此摆脱疾病。





DOGGY DIVERSITY

by Pamela S. Turner

狗的种类多多

Forget ice cream and jellybeans. Dogs come in more “flavors” than any other species on Earth. There are 400 different dog breeds, from caramel-color tidbits like the toy Pomeranian to massive vanilla mountains like the Great Pyrenees.

Scientists have long wondered why dogs show so much *genetic plasticity*—that is, variability in

忘掉冰激凌和胶糖豆吧。狗比世界上任何一个物种都更有“特色”。有400多种狗哩，从波美拉尼亚玩偶狗那样的驼色小身形狗到大比利牛斯狗那样的大身形狗。

一直以来，科学家都好奇于为什么狗表现出这么大的基因可塑性——大小、身形和颜色的不同。因为所有的非野生狗都是同一



size, shape, and color. Because all domestic dogs descended from one species (wolves) in one place (East Asia), the variations could not have come from the parent stock.

Part of dog diversity comes from *hybridization*. When two breeds are crossed, the result is often not an average of the parents, but unexpected new traits like stubby legs or upright ears. Hybrid dogs with desirable traits can then be "spun off" into new breeds. For example, it took Louis Doberman just 35 years to create the Doberman pinscher from hybrids of existing breeds.

Mapping the dog genome may eventually help scientists to understand poochy plasticity at the molecular level.

"Does their diversity come from a small number of genes, or a large number of genes working together?" wonders Michael Zody of the Broad Institute. "Part of the excitement of looking at the dog genome is understanding how the wolf genome ended up creating so many diverse forms."

地方(东亚)同一个物种(狼)的后代,变化本不应该来自于祖先。

狗种类的多样性部分源于杂交。当两个品种杂交时,其后代通常不是二者的平均,而是出乎意料地会出现一些新特征,如短腿或直立的耳朵。有着可取特征的杂交狗就发育成了新品种。例如,路易斯·杜伯曼花了35年通过现存品种的杂交创造出德国短毛猎犬(杜伯曼犬)。

绘制狗的基因图谱最终也许会帮助科学家从分子水平上了解狗的可塑性。

"它们的多样性会不会源于少量基因,或者是大量基因共同作用的结果?"学院委员会的迈克尔·佐迪提出质疑,"观察狗的基因之所以令人新奇,部分是由于我们可以了解狼的遗传基因最终是怎样创造出如此多的种类的。"



DOGS MIRROR PEOPLE

ACGT

by Vijaya Khisty Bodach

Dogs have been helping us for thousands of years, and now even their genetic code is helping us to solve medical puzzles.

Common diseases, such as cancer, heart disease, and Alzheimer's, are caused by many different genes that interact with each other and with the environment. Unraveling this complexity is where dogs come in handy. Dogs mirror people—we share our environment, diseases, and much of our genetic code.

Intense inbreeding (mating father with daughter or brother with sister, for instance) has produced dogs with very distinctive traits, including those for diseases. For example, when dogs are bred for a heightened sense of smell, a cancer-causing mutation can be bred at the same time. Inbreeding concentrates genes, for both positive and negative traits. Certain defects have become breed characteristics: blindness in setters, heart disease in boxers, and deafness in Dalmatians.

几千年来，狗一直在帮助我们，甚至在它们的基因密码也在帮助我们解决医学谜团。

像癌症、心脏病和早老性痴呆病这样常见的疾病是由许多不同基因相互作用或与环境相互作用而引发的。解决这种复杂的问题狗就能很方便地发挥作用了。狗是人类的镜子——我们共享环境，同患疾病，大多数基因密码也相同。

严重的近亲交配（例如使父女或兄弟姐妹交配）使狗拥有了很奇特的特征，也产生了许多疾病。例如，当生育嗅觉更灵敏的狗时，引发癌症的异变也会同时发生。近亲交配集中基因，带来积极和消极的特征。某些缺陷已经成为品

犬类是人类^的镜子

And what's the number one killer in dogs? Cancer, says Dr. Elaine Ostrander, from the Fred Hutchinson Cancer Research Center in Seattle. One in three dogs suffers from it. However, each breed is prone to only a few types of cancer, which means that only a few genes are contributing to it in each breed.

For instance, Saint Bernards get more bone cancer, German shepherds get more kidney cancer, and golden retrievers get more **lymphomas** than the general dog population. The genes causing these specific cancers stand out because other characteristics, such as coat color or leg length, stay the same.

To get a handle on a disease gene, scientists compare bits of DNA between healthy and unhealthy dogs within a breed. These bits of DNA serve as molecular markers on the chromosome. Chances are, if a particular marker crops up in sick dogs but not in healthy ones, there's a gene near the marker that may be the culprit. The search can then be narrowed to pinpoint the troublesome gene.

Ostrander's lab used pedigree records to track markers for a kidney cancer gene in German shepherds. They traced the markers from one sick father and six healthy mothers to the puppies and localized the faulty gene to chromosome #5.

Dog DNA is so similar to human DNA that even though it's arranged differently along the chromosomes, large chunks of it can be matched between the two. Dr. Ostrander's lab fished out the dog kidney cancer gene on human chromosome #17. They found that mutations in that gene cause kidney cancer in people, too!

Dog breeders have given science a useful tool with which to dissect the genetic basis of many diseases that we share with our canine companions. Let's hear it for man's best friend!

种特征:长毛猎狗(犭犬)目盲,斗拳狗患心脏病,而大麦町狗耳聋。

那么狗的第一杀手是什么?是癌症,西雅图弗雷德·哈彻森癌症研究中心的伊莱恩·奥斯忒安德博士说道。然而,每个物种易得的癌症仅有几种,也就是说一个物种只有几种基因能形成癌。

例如,圣伯纳犬比一般的狗更易得骨癌,德国牧羊犬更易得肾癌,金毛猎犬更易得淋巴瘤。基因是引发这些癌症的明显因素,因为诸如毛色或腿长的其他特点都是一样的。

为了控制疾病基因,科学家比较了一个品种的健康狗和病狗的DNA比特数。这些DNA是染色体上的分子标志。如果一个特殊的标志出现在病狗体内而没有出现在健康狗体内,那么很有可能这个标志附近的基因就是罪魁祸首。研究就可以缩小到确认那个惹出麻烦的基因上。

Lymphoma - Cancer arising in the lymph system, specifically the lymphocytes

奥斯忒安德实验室使用家谱去找寻德国牧羊犬的肾癌基因。他们对一条生病的狗父亲和六条健康的狗母亲到小狗们一一进行观察,将有病的基因局限在#5染色体上。

狗的DNA与人类的DNA是如此相似,即使将DNA沿着染色体进行不同排列,大量DNA也能两两互配。奥斯忒安德实验室调查后发现人体的#17染色体含有引发狗肾癌的基因。他们发现人体的这个基因的变异也会引发肾癌。

狗的饲养者已经为科学提供了工具。使用这个工具,我们能分辨出与犬类所共患的许多疾病的基因根源。让我们将它视为人类最好的朋友吧!