【4.1】

**4.1每日一篇 | 外刊精读**

Gene editing：Fully **woolly**  
   
Mice have had their **genomes** **tweaked** to resemble mammoths  
   
【1】Forget the elephant **shrew**—meet the **mammoth** mouse. On March 4th Colossal Biosciences, a company trying to revive long-gone species, announced that they had **genetically** **engineered** a Mus **musculus** to have **qualities** of the **extinct** Mammuthus **primigenius**. Instead of Earth-**shaking** **stature** or **enormous** **tusks**, the **creature** **possessed** an **abundance** of **dense**, golden fur. It was, in other words, **adorable**. “That was the main **unintended** **consequence**,” says Ben Lamm, Colossal’s boss and co-founder.Panda Foreign Magazine Intensive Reading:Respect for Originality, Piracy Must Be Punished  
   
【2】Colossal’s long-term goal is on a larger scale. The company wants to create real mammoths, by growing gene-edited **embryos** of Asian elephants to term. To understand which edits are needed, the firm’s scientists must work out which tweaks give rise to **mammoth** **traits**. That is hard to test in elephants, partly because these animals **gestate** for 22 months—which is a long time to wait for data—and partly because they are endangered, highly intelligent **creatures** which cannot be **experimented** upon willy-nilly. To **circumvent** these difficulties, the company’s scientists set out to test which edits might lead to **mammoth**-like features in mice instead.  
   
【3】Led by Beth Shapiro, an expert in ancient DNA, Colossal’s team first **searched** for mouse **mutations** already known to cause **woolly** fur. At the same time, they also compared ancient **mammoth** **genomes** that had been **naturally** **preserved** with **genomes** from present-day Asian elephants. By doing so, the team was able to **pinpoint** genes that might **contribute** to a **specifically** mammothy **appearance**, rather than a **purely** **elephantine** one. The **literature** could then be **scoured** to see if **mutated** **versions** of those genes existed in mice.  
   
【4】The team **settled** on ten **mutations** in ten genes: nine related to hair and fur and one linked to fat **storage**, which may have kept mammoths **insulated** on the **tundra**. Thus **armed**, the team at Colossal began to engineer those **mutations** into **laboratory** mice using tools based on the gene-editing technology called CRISPR, which can be thought of as a pair of **molecular** **scissors** that makes cuts in **specific** genes.Panda Foreign Magazine Intensive Reading:Respect for Originality, Piracy Must Be Punished  
   
【5】In experiments **conducted** on several groups of mice in 2024, **combinations** of these ten genes were **tweaked**. The **resulting** mice were not **hybrids**—they contained no DNA taken from actual mammoths—but did wind up sporting **dense**, woollen fur. The mutation put into the fat-**storage** gene, however, did not immediately lead to **heavier** mice. Whether this changes with diet and temperature remains to be seen. Indeed, the next step will be to test whether the new physical **traits** give the **woolly** mice any advantage in **handling** the cold. This will be done during the coming year, says Dr Shapiro.  
   
【6】The results are intriguing, but a **resurrected** **mammoth** remains far away. Making a mouse **woolly** is one thing—tweaking an elephant to be **woolly**, small-eared and cold-**resistant** is a truly **mammoth** task. “It’s the first step on a long journey,” says Eske Willerslev, a **specialist** in ancient DNA at the University of Cambridge, who was not **involved** with the work.  
   
【7】There are many more unknowns along the way. For one thing, says Patricia Chrzanova Pecnerova, an elephant researcher at the University of Copenhagen, it is unclear if an Asian elephant whose genome had been similarly edited would be a true **mammoth** or just a long-**haired** elephant. Different scientists will have different **opinions** about when de-**extinction** has been **achieved**.  
   
【8】Whether it should be **attempted** at all remains **hotly** **debated**. Critics point out that **resurrected** mammoths might not bond with their elephant mothers, and could have health problems. They also **contend** that money **invested** in such **endeavours** would be better spent **protecting** existing species. Mr Lamm and Dr Shapiro, for their part, say they raise money for **conservation**, and point out that all the technology their company **develops** has been made freely available to **conservationists**. With many species struggling to adapt to climate change, they argue, the gene-editing tools used to **reverse** **extinction** might also help **prevent** it.

**①短语**

1. 原文：Instead of Earth - shaking stature or enormous tusks, the creature possessed an abundance of dense, golden fur.

词典：instead of 代替；而不是

例句：Instead of going to the park, we decided to stay at home and watch TV.

我们决定待在家里看电视，而不是去公园。

1. 原文：Colossal’s long - term goal is on a larger scale.

词典：on a larger scale 大规模地；更大范围地

例句：The company plans to expand its business on a larger scale next year.

这家公司计划明年大规模拓展业务。

1. 原文：To understand which edits are needed, the firm’s scientists must work out which tweaks give rise to mammoth traits.

词典：work out 解决；算出；弄清楚；制定出

例句：We need to work out a plan to solve this problem.

我们得制定出一个计划来解决这个问题。

原文：To understand which edits are needed, the firm’s scientists must work out which tweaks give rise to mammoth traits.

词典：give rise to 引起；导致；使发生

例句：The new policy may give rise to some unexpected problems.

新政策可能会引发一些意想不到的问题。

1. 原文：... because they are endangered, highly intelligent creatures which cannot be experimented upon willy - nilly.

词典：upon willy - nilly 随意地；随心所欲地

例句：You can't make decisions upon willy - nilly in such an important matter.

在如此重要的事情上，你不能随意做决定。

1. 原文：To circumvent these difficulties, the company’s scientists set out to test which edits might lead to mammoth - like features in mice instead.

词典：set out 出发；开始；着手做

例句：They set out to explore the unknown forest.

他们出发去探索那片未知的森林。

1. 原文：At the same time, they also compared ancient mammoth genomes that had been naturally preserved with genomes from present - day Asian elephants.

词典：be...preserved with 用…… 保存；与…… 一起保存（此处指基因组的保存状态对比）

例句：These historical documents are preserved with special techniques to prevent damage.

这些历史文献用特殊技术保存以防损坏。

1. 原文：“The literature could then be scoured to see if mutated versions of those genes existed in mice.”

词典：be scoured to 被仔细查阅以……；被搜索以……

例句：The library records were scoured to find any information about the rare book.

图书馆记录被仔细查阅，以寻找关于那本珍本书籍的任何信息。

**②长难句**

原文：That is hard to test in elephants, partly because these animals gestate for 22 months—which is a long time to wait for data—and partly because they are endangered, highly intelligent creatures which cannot be experimented upon willy-nilly.

分析：这是一个复合句。“That is hard to test in elephants,”是主句，其中“that”是主语，“is”是系动词，“hard to test in elephants”是表语，“in elephants”为状语，说明在大象身上进行测试这件事很难。“partly because......and partly because they are......” 是两个并列的原因状语从句，由“and”连接，说明难以在大象身上进行测试的两个原因。在第一个原因状语从句中，“these animals gestate for 22 months”是核心内容，“which is a long time to wait for data”是一个非限制性定语从句，修饰“22 months”，进一步说明等待数据的时间很长。在第二个原因状语从句中，“they are endangered, highly intelligent creatures”是核心部分，“which cannot be experimented upon willy - nilly”是一个限制性定语从句，修饰“creatures”，表明这些生物不能被随意用于实验。

译文：在大象身上进行这类测试困难重重：一方面，大象的妊娠期长达22个月，等待实验数据的周期太过漫长；另一方面，它们属于濒危物种且具有高智商，不能随意用于实验。

原文：For one thing, says Patricia Chrzanova Pecnerova, an elephant researcher at the University of Copenhagen, it is unclear if an Asian elephant whose genome had been similarly edited would be a true mammoth or just a long-haired elephant.

分析：句子的主体部分是 “it is unclear if...”，“it”是形式主语，真正的主语是后面的“if”引导的主语从句。在这个主语从句中，“an Asian elephant”是主语，“whose genome had been similarly edited”是定语从句，修饰先行词“an Asian elephant”，用于说明该亚洲象的基因组经过了类似编辑这一特征；“would be”是谓语部分，“would be”表示一种推测的语气，“or”连接了“a true mammoth”和“just a long - haired elephant”，表示两种可能的情况，即这头经过基因编辑的亚洲象要么是真正的猛犸象，要么只是一头长毛象。

译文：哥本哈根大学大象研究员帕特里夏・赫扎诺娃・佩克诺娃（Patricia Chrzanova Pecnerova）指出，首先，目前尚不清楚一只基因组经过类似编辑的亚洲象究竟算是真正的猛犸象，还是仅仅是一只长毛大象。

**③写作技巧**

原文： That is hard to test in elephants, partly because these animals gestate for 22 months—which is a long time to wait for data—and partly because they are endangered, highly intelligent creatures which cannot be experimented upon willy-nilly.

在大象身上进行这类测试困难重重：一方面，大象的妊娠期长达22个月，等待实验数据的周期太过漫长；另一方面，它们属于濒危物种且具有高智商，不能随意用于实验。

“upon willy - nilly”意为“随意地；随心所欲地”，该短语以一种形象且较为口语化的方式，强调行为的任意性和缺乏约束性。在写作中运用它，能使表达更加生动活泼，精准传达出某行为不应毫无顾忌、肆意而为的意思，相较于普通表达，更能引起读者对行为不当性的关注。与之类似的表达有：at random、randomly、without restraint等。

例句：

The files were arranged at random, making it hard to find the needed one.

档案被随意摆放，很难找到所需的那份。

He spent his money randomly and soon ran out of it.

他随意花钱，很快就把钱花光了。

Don't act without restraint in public places.

在公共场所不要肆意妄为。

**④背景知识**

CRISPR基因编辑技术（Clustered Regularly Interspaced Short Palindromic Repeats）：是一种新兴的、精确的基因编辑工具，被形象地称为“分子剪刀”。它源于细菌的获得性免疫系统，能够识别并切割特定的DNA序列，从而实现对生物体基因组的精确修改。在文中，巨物公司的科学家利用CRISPR技术对实验室小鼠的基因进行编辑，以测试哪些基因调整能产生类似猛犸象的特征。这一技术在基因治疗、农业育种、生物制药等领域具有巨大的应用潜力，也为复活灭绝物种等前沿研究提供了可能。

复活灭绝物种（De-extinction）：指通过科学技术手段，使已经灭绝的物种重新出现的过程。目前常见的方法包括克隆、基因编辑和选择性育种等。像本文中 巨物生物科技（Colossal Biosciences）公司就致力于通过基因编辑亚洲象胚胎来复活猛犸象。复活灭绝物种不仅具有科学研究价值，可帮助人们了解生物进化和生态系统的历史，还引发了诸多伦理、生态和社会问题的讨论，比如复活后的物种能否适应现代环境，以及是否会对现有生态系统造成影响等。

**⑤段落大意**

【1】成果宣布：巨物公司造出有猛犸象特征的“猛犸鼠”

【2】目标难题：公司欲造猛犸象，大象实验困难转而用小鼠

【3】研究方法：团队找小鼠突变基因并对比象与猛犸象基因

【4】基因选定：选定十个基因突变，用CRISPR技术编辑小鼠

【5】实验结果：小鼠长绒毛，脂肪基因效果待察，将测耐寒性

【6】现状评价：小鼠实验成果有趣但复活猛犸象仍任重道远

【7】未知因素：基因编辑亚洲象难定是否算猛犸象，标准存争议

【8】争议讨论：复活猛犸象存争议，支持者称技术可助保护物种