

4.1蛋学长外刊精读|基因编辑：解锁“毛茸模式”



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Gene editing: Fully **woolly**

基因编辑：解锁“毛茸模式”

Mice have had their **genomes tweaked** to resemble mammoths

小鼠基因组经调整后呈现出猛犸象的特征

【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

先别管象鼩了，来认识一下“猛犸鼠”。3月4日，致力于复活灭绝物种的巨物生物科技（Colossal Biosciences）公司宣布，他们通过基因技术让一只小老鼠具备了已灭绝的猛犸象特

中文导读

小鼠基因组经调整后呈现出猛犸象的特征

woolly /'wʊli/ adj.有毛覆盖的,毛状物覆盖的,毛制的,毛的,似毛的,糊涂的,混乱的,模糊的n.毛料衣服,(尤指针织的)毛线衣,羊 This cloth has a warm **woolly** feel.这块布摸上去毛茸茸的。

genomes /'dʒi:nəʊm/ n.基因组,染色体组genome的复数 That **genal genome** may lead to better treatment and control of disease.那些基因组能带来比较好的治疗和疾病的控制。

tweaked /twi:kt/ v.扭,拧,扯,稍稍调整(机器、系统等)tweak的过去式

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shrew /ʃru:/ n.泼妇,悍妇,鼯鼠(形似鼠,吻长)

mammoth /'mæməθ/ n.猛犸象,毛象,猛犸(象)adj.庞大的,极其巨大的 The problem is beginning to assume **mammoth proportions**.这个问题开始显得十分重大。

genetically /dʒə'netɪkli/ adv.遗传上地 How many of these traits are **genetically inherited**?这些特征有多少是遗传的?

engineered /'endʒɪ'niəd/ v.密谋策划,设计制造,改变...的基因(或遗传)结构engineer的过去分词和过去式

musculus /mʌsk'jʊləs/ n.肌;肌肉 Method **Musculus flexor hallucis longus** with **musculus peroneus longus** were anastomosed to strengthen fibular muscle producing posterointernal lysis for clubfoot.方法在行足后内侧软组织松解术时,足母长屈肌与腓骨长肌吻合,加强腓侧肌力。

qualities /'kwɒlətɪz/ n.质量,品质,上乘,优质,高标准,(尤指好的)人品,素质,品德quality的复数 Her **best qualities** come out in a crisis.她的优秀品质在危机时显示了出来。

extinct /ɪk'stɪŋkt/ adj.灭绝的;绝种的;绝迹的;消亡了的;死的;废除了的;不再存在的;不再活跃的 Is there anything could rekindle his **extinct** passion?有什么事情可重燃他逝去的热情呢?

shaking /'jeɪkɪŋ/ n.摇动,抖动,颤动v.摇动,动摇,撼动,抖动,(使)颤动,摇(出),抖(掉),摇头shake的现在分词 We sealed our agreement by **shaking hands**.我们最后以握手表示达成了协议。

stature /'stætʃə(r)/ n.身材;身高;个子;声望;名望 Pablo's amour propre must have been tested by his short **stature**.巴勃罗自尊心很可能因身材矮小受到考验。

enormous /ɪ'nɔ:məs/ adj.巨大的,庞大的,极大的 The sight of such an **enormous** crowd astonished us.看到如此庞大的人群我惊讶万分。

tusks /tʌsk/ n.(象和某些其他动物的)长牙 v.用长牙掘(tusk的第三人称单数)tusk的复数 Musty during rut, the tusk named Dhanapalaka is uncontrollable. Held in captivity, the tusk does not touch a morsel, but only longingly calls to mind the elephant forest.那名为护财的

征。这只小家伙虽然没有猛犸象那样震撼的体型和巨大的獠牙，却长着一身浓密的金色毛发。说白了，就是可爱极了。“这多半是个意外成果。”Colossal公司老板兼联合创始人本·拉姆（Ben Lamm）说道。

【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.

该公司的长期目标更为远大，希望通过将亚洲象的基因编辑胚胎孕育足月，创造出真正的猛犸象。为了明确需要哪些基因编辑，公司的科学研究者必须研究出哪些基因调整能催生出猛犸象的特征。

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。为克服这些难题，公司科学家转而尝试在小鼠身上测试哪些基因编辑可能诱发类似猛犸象的特征。

【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

象发怒时是难以制伏的，被捕后它绝食，只想著要回去象林（照顾母亲）。

creature /'kri:tʃə/ n.生物,动物,(具有某种特征的)人 **This creature's natural habitat is the jungle.**这种动物的栖息地是丛林。

possessed /pə'zest/ adj.着了魔v.有,拥有,具有(特质),攫住,支配,控制possess的过去分词和过去式 **she was possessed by the Devil.**她被魔鬼给缠住了。

abundance /ə'bʌnd(ə)ns/ n.大量,丰盛,充裕 **The tree yields an abundance of fruit.**这树结果甚多。

dense /dens/ adj.稠密的,密集的,浓密的,浓重的,愚笨的,迟钝的,笨拙的,(信息量大得)难理解的,难懂的,密度大的 **The general ambushed his troops in the dense woods.**将军把部队埋伏在浓密的树林里。

adorable /ə'dɔ:rəb(ə)l/ adj.可爱的,讨人喜爱的 **He is adorable for his devotion to science.**他献身科学的精神令人敬佩。

unintended /ʌnɪn'tendɪd/ adj.非计划的,无意的,无心的 **an unintended slight.**非故意的怠慢

consequence /'kɒnsɪkw(ə)ns/ n.结果,后果,重要性 **Is it of any consequence to you?**对你重要吗?

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embryos /'embri,o/ n.胚胎,胚,(尤指受孕后八周内的)人类胚胎embryo的复数 **Toxoplasmosis ophthalmopathy is mainly characterized by congenital malformation from optic pit and optic vesicle s lesion at earlier embryo period, and retinoblastoma from inflammation.**弓形虫眼病主要表现为胚胎弓形虫侵犯使视窝及视泡的形成发生障碍引起的先天畸形以及炎症损害引起的视网膜脉络膜炎。

traits /tret/ n.(人的个性的)特征,特性,特点trait的复数 **His generosity is one of his good traits.**慷慨大方是他的好品质之一。

gestate /dʒes'teɪt/ vt.妊娠;怀孕;孕育

creatures /'kri:tʃəz/ n.生物,动物,(具有某种特征的)人creature的复数 **The animal kingdom is full of fine and glorious creatures.**动物界有很多精巧而美妙的生物。

experimented /ɪk'sperɪməntɪd/ v.做试验,进行实验,尝试,试用experiment的过去分词和过去式

circumvent /,sɜ:kəm'vent/ vt.规避,绕过,绕行,设法回避,绕道旅行 **Ships were registered abroad to circumvent employment and safety regulation.**船只在外国注册逃避有关雇佣和安全的規定。

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searched /sɜ:tʃt/ v.搜索,搜寻,搜查,查找,搜身,思索,细想(问题答案等)search的过去分词和过去式

mutations /mju(:)'teɪʃənz/ n.(生物物种的)变异,突变,(形式或结构的)转变,改变mutation的复数

naturally /'nætʃ(ə)rəli/ adv.自然地;自然而然地;合理地;天然地;理所当然地;顺理成章地;天生地;当然地 **The country is abundant in natural resources.**这个国家天然资源丰富。

preserved /pri'zə:vd/ v.保护,维护,保留,维持...的原状,保存,保养,贮存,保鲜preserve的过去分词和过去式 **Fishing in this pond is strictly preserved.**本池塘严禁捕鱼。

was able to **pinpoint** genes that might **contribute** to a **specifically** mammoth **appearance**, rather than a **purely elephantine** one. The **literature** could then be **scoured** to see if **mutated versions** of those genes existed in mice.

在古DNA专家贝丝·夏皮罗（Beth Shapiro）的带领下，巨物团队首先着手寻找已知会让小鼠长出浓密毛发的基因突变。与此同时，他们还将天然保存的远古猛犸象基因组与现代亚洲象的基因组进行了对比。通过这一方法，研究团队能够精准定位出那些可能塑造猛犸象独特外貌（而非普通大象外貌）的基因。接下来，他们便查阅相关文献，核查这些基因的突变版本是否存在于小鼠体内。

【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

研究团队最终选定了十个基因中的十个突变：九个与毛发相关，一个与脂肪储存相关，后者可能帮助猛犸象在苔原地带保持体温。有了这些发现，巨物团队开始利用基于基因剪刀（CRISPR）基因编辑技术的工具，将这些突变植入实验室小鼠体内。CRISPR技术就像一把分子剪刀，能够对特定基因进行精准剪切。

【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

pinpoint /'pɪnpɔɪnt/ vt. 准确指出, 明确指出, 确定(位置或时间), 准确解释(或说明) adj. 精确的, 准确的 n. 极小的范围, 光点 These missiles can be fired with **pinpoint** accuracy. 这些导弹可精确地命中目标。

contribute /kən'trɪbjʊ:t/ v. 贡献, 捐献, 捐赠(尤指款或物), 捐助, 是...的原因之一, 增加, 增进, 添加(到某物), 撰稿 The senators **contributed** an offertory (aurum oblativum). 元老们献上贡金。

specifically /spə'sɪfɪkli/ adv. 明确地, 特意, 具体地, 专门地, 具体来说, 确切地说 The book was written **specifically** for children. 这本书是特地为儿童编写的。

appearance /ə'pɪərə(ə)ns/ n. 外貌, 外观, 外表, (尤指突然的) 抵达, 到来, 起源, 出现, 首次使用, 公开露面, 出版 Do not judge according to the **appearance**. 不要从事物的外表来判断。

purely /'pjʊəli/ adv. 仅仅, 完全 The items he makes are **purely decorative**. 他做的那些物品纯粹用于装饰。

elephantine /,elɪ'fæntaɪn/ adj. 象 笨拙, 重

literature /'lɪtərɪʃə/ n. 文学, 文学作品, (某学科的) 文献, 著作, 资料 The book hardly belongs to **literature** proper. 这本书不好说是纯文学书。

scoured /'skaʊəd/ v. (彻底地) 搜寻, 搜查, 翻找, (用粗糙的物体) 擦净, 擦亮, 冲刷成, 冲刷出 scour 的过去分词和过去式 We **scoured** the area for somewhere to pitch our tent. 我们四处查看, 想找一个搭帐篷的地方。

mutated /mju:'teɪtɪd/ v. (使) 变异, 突变, 转变, 转换 mutate 的过去分词和过去式

versions /'vɜːʒənz/ n. 变体, 变种, 型式, (从不同角度的) 说法, 描述, (电影、剧本、乐曲等的) 版本, 改编形式, 改写本 version 的复数 I have heard two **versions** of the accident. 我已经听到关于这个事故的两种说法了。

settled /'setld/ adj. 稳定的, 不大可能变动的, 舒适自在的, (对住所、工作、生活方式等) 习惯的 v. 结束(争论、争端等), 解决(分歧、纠纷等), (最终) 决定, 确定, 安排好, 定居 settle 的过去分词和过去式 Darkness **settled** over the fields. Dust **settled** in the road. 黑暗笼罩田野。灰尘飘落在路上

storage /'stɔːrɪdʒ/ n. 存储(方式), 贮存, 贮藏(空间), 付费托管 Besides, **pitthos storage** was better than stainless jar **storage**. 陶缸陈酿效果优于不锈钢大罐陈酿。

insulated /'ɪnsə'leɪtɪd/ adj. 有隔热(或隔音、绝缘)保护的 v. 使隔热, 使隔音, 使绝缘, 使免除(不愉快的经历), 使免受(不良影响), 隔离 insulate 的过去分词和过去式 The royal family is **insulated** from many of the difficulties faced by ordinary people. 王室成员都毋须应付平民所面临的许多困难。

tundra /'tʌndrə/ n. 冻土带, 冻原, 苔原(树木不生, 底土常年冰冻的北极地区) The arctic **tundra** is at the top of the world around the North Pole. 北极冻原是指北极点周边的地区, 是世界最高的地方。

armed /ɑːmd/ adj. 使用武器的, 用武力的, 携带武器的, 持枪的, 荷枪实弹的, 备有所需的 v. 武装, 装备, 备战, 给...装上引信, 打开...的保险, 准备发射, 使(炸弹等)随时爆炸 arm 的过去分词和过去式 They are **armed** with swords and guns. 他们装备着刀和枪。

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.

2024年，研究团队在多组小鼠身上开展了实验，对这十个基因的不同组合进行了调整。结果显示，这些小鼠并非杂交体。它们的DNA并非来自真正的猛犸象，但最终确实长出了浓密的绒毛。然而，植入脂肪储存基因的突变并未立即让小鼠体重增加。这一现象是否会随饮食和温度变化而改变仍有待观察。因此，下一步研究将聚焦于测试这些新的生理特征是否能让毛茸茸的小鼠在抵御寒冷方面具备优势。夏皮罗博士（Dr Shapiro）透露，这项测试将在明年进行。

【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.

这些结果颇具吸引力，但复活猛犸象仍前路漫漫。让小鼠长出浓密毛发尚属易事，可要让大象长出绒毛、耳朵变小并具备耐寒能力，却是不折不扣的庞大工程。“这只是万里长征的第一步。”未参与该研究的剑桥大学古DNA专家埃斯克·威勒斯列夫（Eske Willerslev）说。

【7】There are many more unknowns along the way. For one thing, says Patricia Chrzanova Pecnerova, an

laboratory /lə'borətəri/ n.实验室,实验大楼 Did you perceive anyone entering the **laboratory**?你看见有人进入实验室吗?

molecular /mə'lekjələ/ adj.分子的 The research will provide direct insight into **molecular** mechanisms.这项研究将使人能够直接地了解分子的机理。

scissors /'sɪzəz/ n.剪刀v.剪断,删除scissor的第三人称单数 It's a penknife, **scissors**, corkscrew all rolled into one.这集小折刀、剪刀和螺丝起子于一身。

specific /spə'sɪfɪk/ adj.具体的,特定的,特有的,明确的,独特的n.特效药,特性,细节,显著的性质 He speaks in concepts rather than **specifics**.他讲话时尽用抽象概念,而不谈具体。

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conducted /kən'dʌktɪd/ v.组织,安排,实施,执行,指挥(歌唱或音乐演奏),带领,引导,为(某人)导游conduct的过去分词和过去式

combinations /,kəm'biːneɪʃən/ n.结合体,联合体,混合体,结合,联合,混合,(用于开密码锁的)数码组合, 字码组合 combination的复数 These players made a very good combination.这些运动员配合得很好。

resulting /rɪ'zʌlt/ v.(因...)发生,(随...)产生result的现在分词 The results of this experiment don't correlate with the results of earlier ones.这次试验的结果与以往试验的结果毫不相干。

hybrids /'haɪbrɪdz/ n.杂种动物,杂交植物,杂种,(不同事物的)混合物, 合成物hybrid的复数

heavier /'heviə-ðən'et/ adj.更重的,重的,沉的,(在数量、程度等方面)超出一般的,比一般严重的,大而结实的,不精致的adv.大量地,笨重地heavy的比较级 He burdened himself with a heavy overcoat.他给自己加一件厚大衣。

handling /'hændlɪŋ/ n.(形势、人、动物等的)处理,对付,对待,组织,控制,管理,(手的)触摸,触摸感觉,握,拿,费用,手续费,(车辆的)驾驶,操纵v.处理,应付(局势、人、工作或感情),(用手)触,拿,搬动,控制,操纵(车辆、动物、工具等)handle的现在分词 How does cerebral hemorrhage arouse gatism **handling**?脑出血引起大小便失禁怎么办?

6

resurrected /,rezə'rektɪd/ v.重新应用,恢复使用,使复兴,起死回生,使复活resurrect的过去分词和过去式

resistant /rɪ'zɪstənt/ adj.抵抗的,有抵抗力的,抵制的,阻止的,抗...的,耐...的n.抵抗者,有抵抗力的东西,防染剂 Many pests are **resistant** to the insecticide.许多害虫对这种杀虫剂有抵抗力。

specialist /'speʃ(ə)list/ n.专家,专科医生 She's a **specialist** in canine psychology and behaviour.她是狗心理和行为专家。

involved /ɪn'vɒlvd/ adj.卷入的,参与,作为一部分,有关联,耗费很多时间,关注,关系密切,复杂难解的v.牵涉,包含,需要,使成为必然部分(或结果),牵连,影响,(使)参加,加入 involve的过去分词和过去式 It all sounds terribly **involved** and complicated.这事听起来非常错综复杂。

7

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**.

沿途还存在许多未知的挑战。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。

对于何时才算真正实现了灭绝物种的复活，不同的科学家会有不同的评判标准。

【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.

是否应该进行这样的尝试仍争议激烈。批评者指出，复活的猛犸象可能无法与大象母亲建立情感纽带，还可能面临健康问题。他们还强调，投入此类研究的资金若用于保护现存物种会更有价值。而拉姆先生和夏皮罗博士则表示，他们致力于保护项目筹款，并透露公司研发的所有技术均已向环保主义者免费开放。他们认为，在众多物种正竭力适应气候变化的当下，

haired /hed/ 有毛发的，（常用以构成复合词）长着...头发的 The Basenji is a small, short **haired** hunting dog from Africa. 贝生吉犬是原产于非洲的小型、短毛猎犬。

opinions /ə'pinjən/ n. 意见,想法,看法,(群体的)观点,信仰,专家意见 **opinion**的复数 Public opinion polarised into completely opposite **opinions** on the issue of mercy killing. 公众舆论在安乐死这一问题上分化成了完全不同的对立观点。

extinction /ik'stɪŋ(k)ʃ(ə)n/ n. 灭绝,(植物、动物、生活方式等的)绝种,消亡 The plant is now in danger of **extinction**. 这种植物现在有绝种的危险。

achieved /ə'tʃi:vɪd/ v. (凭长期努力)达到(某目标、地位、标准),完成,成功 **achieve**的过去分词和过去式

8

attempted /ə'temptɪd/ adj. 未遂的 v. 努力,尝试,试图 **attempt**的过去分词和过去式 He had **attempted** to rescue the drowning man. 他曾试图去救那个溺水的男人。

hotly /'hɒtli/ adv. 强烈地; 愤怒地; 坚决地; 激动地; 起劲地 He was **hotly** pursued after by his dog. 他的狗紧紧在他的后面。

debated /di'beɪtɪd/ v. (尤指正式)讨论, 辩论, 仔细考虑, 思考, 盘算 **debate**的过去分词和过去式 Economic crises usually polarise the political debate. 经济危机通常会使政治辩论两极化。

contend /kən'tend/ v. 竞争, 争夺, (尤指在争论中)声称, 主张, 认为 He has too much to **contend** with. 他要应付的事太多。

invested /ɪn'vestɪd/ v. 投资, 投入(时间、精力等) **invest**的过去分词和过去式 The money has been **invested** for a fixed period. 这笔款项已作定期投资。

endeavours /ɪn'devəʊz/ n. (尤指新的或艰苦的)努力, 尝试 v. 努力, 尽力, 竭力 **endeavour**的第三人称单数和复数

protecting /prə'tektɪŋ/ v. 防护, (通过征关税)保护(国内企业), 实行贸易保护 **protect**的现在分词 He was given the task of **protecting** her for the duration of the trial. 他被委以在审判期间保护她的任务。

conservation /kən'sə'veɪʃ(ə)n/ n. (官方对历史或艺术建筑的)保护, 文物保护, 防止流失(或浪费、损害、毁坏), 保持 "However, **conservation** alone is not the answer." 然而, 仅仅靠节约还不是解决问题的办法。"

develops /dɪ'veləps/ v. (使)成长, 发展, 壮大, 开发, 研制, 患(病), 出现(问题), (疾病)开始侵袭, (问题)开始影响 **develop**的第三人称单数

conservationists /kən'sə(:)'veɪʃənɪsts/ n. 自然环境保护主义者 **conservationist**的复数

reverse /rɪ'vɜ:s/ v. 颠倒, 彻底转变, 使完全相反, 撤销, 废除(决定、法律等), 使反转, 使次序颠倒, 交换(位置或功能), 承认错误, (使)倒退行驶, 打对方付费的电话 n. 相反的情况(或事物), 后面, 背面, 反面, 倒挡, 损失 adj. 相反的, 反面的, 反向的, 背面的, 后面的 The driver bumped the kerb while **reversing**. 司机倒车时撞到了路边石。

prevent /prɪ'vent/ vt. 防止, 阻止, 阻碍, 阻挠 Dentists advise their patients to brush and floss regularly to

用于复活灭绝物种的基因编辑工具，或许也能为濒危物种的保护提供助力。

今日词汇

capacity[kə'pæsəti]

n. 容量、容积；能力；产量

考研出现次数：10+

考频：★★

考点回顾

阅读考点真题例句：

[例] We still have the imaginative capacity to rise above temptation and reverse the high-speed trend. (2013年英语二35题)

[译] 我们仍然具备创造性的能力去战胜诱惑并扭转快速决策的趋势。

完形考点真题例句：

[例] As time went by, computers became smaller and more powerful, and they became "personal" too, as well as institutional, with display becoming sharper and storage capacity increasing. (2002英语一完形)

[译] 随着时间的推移，计算机变得越来越小，功能却更加强。它们不仅被单位，也被个人使用。计算机的图像显示变得更加清晰，储存容量也在增加。

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

prevent their teeth from decaying. 牙医建议他们的病人定期刷牙并用洁牙线剔牙，以防止蛀牙。

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。

2. 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。

3. 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。

4. 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。

5. 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。

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

“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。

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。

7. 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。

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