

讲义

Neuroscience

神经科学

The wisdom of youth

年轻的智慧

Newborn **neurons** might treat Alzheimer's disease—**assuming** they actually exist

新生神经元或可治疗阿尔茨海默病——假设它们真的存在

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One of the first signs of Alzheimer's disease is confusion. Most people can park their car in a different space every morning and find it again in the evening. Those with Alzheimer's find this type of problem much harder. Memories of things they do often, like eating or taking medication, become **tangled** in their minds.

阿尔茨海默病的初期症状之一是神志不清。大多数人每天早上都能把车停在不同的地方，晚上又能找到。而阿尔茨海默病患者却很难做到这一点。他们经常做的事情，比如吃饭或吃药，会在他们的脑海中纠缠不清。

【词汇】

1. **neuron** /'nɜːrɔ:n/ n. **GMAT** a cell that carries information within the brain and between the brain and other parts of the body; a nerve cell 神经元

2. **assume** /ə'su:m/ v. **四级** **GMAT** **高考** **考研** to think or accept that something is true but without having proof of it 假定；假设；认为

例：Assuming he's still alive, how old would he be now?

假定他还活着，现在有多大年纪了？

3. **tangled** /'tæŋɡld/ adj. complicated, and not easy to understand 复杂的；纠缠不清的

例：He spent the next few days wrestling with very tangled emotions.

他接下来的几天全力解决纠缠不清的情感问题。

【特殊名称】

1. **Alzheimer's disease** /'ɔ:ltʃəzmərz dɪzi:z/ a serious disease, especially affecting older people, that prevents the brain from functioning normally and causes loss of memory, loss of ability to speak clearly, etc. 阿尔茨海默氏病；老年性痴呆病

The ability to distinguish between similar memories depends on a tiny **strip** of brain **tissue** called **the dentate gyrus**. Studies in mice have shown that the dentate gyrus is one of the few bits of the brain to generate new neurons even in adulthood. Those new neurons are thought to help keep similar memories distinct.

区分相似记忆的能力依赖于一小块被称为齿状回的脑组织。对老鼠的研究表明，齿状回是大脑中少数几个即使在成年期也能产生新神经元的部位之一。这些新的神经元被认为有助于保持相似记忆的不同。

【词汇】

1. **strip** /stri:p/ n. 四级 六级 GRE 考研 a long narrow piece of paper, metal, cloth, etc. 条，带

例：The wallpaper can then be torn off in strips.

随后墙纸就可以一条一条地撕下来。

2. **tissue** /'ti:ʃu:/ n. 四级 GMAT 高考 考研 a collection of cells that form the different parts of humans, animals and plants (人、动植物细胞的) 组织

【特殊名称】

1. **the dentate gyrus** : The dentate gyrus (DG) is part of the hippocampal formation in the temporal lobe of the brain, which also includes the hippocampus and the subiculum. The dentate gyrus is part of the hippocampal trisynaptic circuit and is thought to contribute to the formation of new episodic memories, the spontaneous exploration of novel environments and other functions. 齿状回

齿状回 (DG) 是大脑颞叶海马体形成的一部分，颞叶还包括海马体和亚锥体。齿状回是海马三突触回路的一部分，被认为有助于形成新的外显记忆、自发探索新环境及其他功能。

Whether something similar happens in humans is less clear. But a **clutch** of new results described this week at the Society for Neuroscience's conference in Washington, D.C., suggest that it might. And if it does, then

类似的情况是否会在人类身上还不太清楚。但本周在华盛顿举行的神经科学学会会议上描述的一系列新结果表明，这是有可能的。如果确实如此，那

encouraging the process might offer a new treatment for Alzheimer's disease.

么鼓励这个过程可能会为阿尔茨海默病提供一种新的治疗方法。

【词汇】

1. **clutch** /klatʃ/ n. 六级 考研 雅思 a group of people, animals or things 一群；一批；一系列

例：He's won a whole clutch of awards.

他获了一大堆奖。

Until the 1960s scientists thought adult brains did not produce new neurons. Then evidence began to emerge of young neurons in the brains of adult rats and mice,—specifically in the **olfactory bulb**, which processes smell, and the dentate gyrus. These new neurons had developed from neural **progenitor** cells, a type of **undifferentiated** neuron **akin to** a **stem cell**, in a process scientists call **neurogenesis**.

直到 20 世纪 60 年代，科学家们一直认为成年人的大脑不会产生新的神经元。后来有证据表明，成年大鼠和小鼠的大脑中开始出现年轻的神经元，特别是在处理嗅觉的嗅球和齿状回中。这些新神经元是从神经祖细胞(一种类似于干细胞的未分化神经元)发育而来的，科学家们将这一过程称为神经发生。

【词汇】

1. **olfactory** /ɑ:l'fæktəri/, /əʊl'fæktəri/ adj. GRE GMAT connected with the sense of smell 嗅觉的

2. **bulb** /bʌlb/ n. 四级 GRE 考研 an object that is like a bulb in shape, for example the end of a thermometer 鳞茎状物

The olfactory bulb (bulbus olfactorius) is a neural structure of the vertebrate forebrain involved in olfaction, or the sense of smell. 嗅球：脊椎动物前脑中参与嗅觉或嗅觉的神经结构。

3. **progenitor** /prəʊ'dʒenɪtər/ n. GRE a person or thing from the past that a person, animal or plant that is alive now is related to (人或动、植物等的) 祖先，祖代

A progenitor cell is a biological cell that, like a stem cell, has a tendency to differentiate into a specific type of cell, but is already more specific than a stem cell and is pushed to differentiate into its "target" cell. 祖细胞是一种生物细胞，与干细胞一样，有分化成特定类型细胞的趋势，但它比干细胞更具特异性，会被推动分化成其“目标”细胞。

4. **undifferentiated** /ˌʌndɪfə'reɪʃieɪtɪd/ adj. not yet developed or specialized into a specific type or function 未分化的

【词组】

1. **akin to** : similar to something 相似的；类似的

例：Listening to his life story is akin to reading a good adventure novel.

听他的生活故事就像读一部好的探险小说。

【特殊名称】

1. **stem cell** : a basic type of cell which can divide and develop into cells with particular functions. All the different kinds of cells in the human body develop from stem cells 干细胞

2. **neurogenesis** /ˌnɪərə'dʒɛnɪsɪs/ the process by which nervous system cells, the neurons, are produced by neural stem cells (NSCs). In short, it is brain growth in relation to its organization. 神经发生：神经干细胞（NSC）产生神经系统细胞（神经元）的过程。

And there seems to be a link, at least in mice, between these new neurons and Alzheimer's disease. Mice genetically **engineered** to have Alzheimer's-like symptoms also have fewer young neurons in their brains. Two studies published in 2021 and 2022 showed that encouraging neurogenesis could improve memory in such animals.

至少在老鼠身上，这些新神经元和阿尔茨海默病之间似乎存在联系。经过基因改造后出现类似阿尔茨海默病症状的老鼠，大脑中年轻的神经元也更少了。2021年和2022年发表的两项研究表明，鼓励神经发生可以改善这些动物的记忆力。

【词汇】

1. **engineer** /ˌendʒɪ'nɪr/ v. 四级 高考 考研 to change the genetic structure of something 改变…的基因结构

例：Some biotech crops are engineered to ward off pests.

有些生物技术作物经过改造，可以抵御害虫。

So far so promising—if you are a mouse. But studying neurogenesis in humans is tricky. **MRI** scanners cannot watch the growth of individual neurons. Scientists must take samples of brain tissue from **cadavers** and either **stain** them with chemicals that bind only to young neurons, or

到目前为止，前景是光明的——如果你是一只老鼠的话。但是研究人类的神经发生是很棘手的。核磁共振扫描仪不能观察单个神经元的生长。科学家们必须从尸体上采集脑组织样本，用只与年轻

measure the genes that have been expressed within brain cells to look for the hallmarks of youth.

神经元结合的化学物质进行染色，或者测量脑细胞内表达的基因，以寻找年轻的标志。

【词汇】

1. **cadaver** /kə'dævər/ n. [GRE][GMAT] a dead human body 死尸；尸体
2. **stain** /steɪn/ n. [四级][GRE][高考][考研] to change the colour of something using a coloured liquid 给…染色
例：Stain the specimen before looking at it under the microscope.
先把标本染色，再放到显微镜下观察。
3. **hallmark** /'hɔ:lma:rk/ n. [GMAT][专八] a feature or quality that is typical of somebody/something 特征；特点

【特殊名称】

1. **MRI** : a method of using a strong magnetic field to produce an image of the inside of a person's body (the abbreviation for "magnetic resonance imaging") 磁共振成像；磁力共振成像

【长难句】

Scientists must take samples of brain tissue from cadavers and either stain them with chemicals that bind only to young neurons, or measure the genes that have been expressed within brain cells to look for the hallmarks of youth.

句子主干部分为 Scientists must take samples of brain tissue from cadavers and either stain them with chemicals or measure the genes, 意为：科学家们必须从尸体上采集脑组织样本，用化学物质进行染色，或者测量基因 that bind only to young neurons 为定语从句，修饰限定 chemicals, 意为：只与年轻神经元结合的（化学物质） that have been expressed within brain cells 为定语从句，修饰限定 genes, 意为：脑细胞内表达的（基因） to look for the hallmarks of youth 为目的状语，意为：以寻找年轻的标志

Dozens of such papers have been published. But for every one that has found evidence of neurogenesis, another has failed to do so. The pro-neurogenesis camp thinks the null results are down to poor-quality brain tissue or crude preservation techniques. The antis argue that either humans do not grow these neurons in the dentate gyrus, or if they do, there are too few of them

此类论文已发表数十篇。但是，每有一篇找到神经发生证据的论文，都有另一篇没能找到。支持神经发生的阵营认为，这些无效结果是由于脑组织质量差或保存技术粗糙。反对者认为，要么人类在齿状回中没有生长出这些神经元，要么即使生长

to be useful.

出了，数量也太少，无法发挥作用。

【词汇】

1. **null** /nʌl/ adj. GMAT 雅思 托福 lacking any legal or binding force 无效的；无约束力的

例：The contract was declared null and void.

合同被宣布无效。

2. **crude** /kru:d/ adj. 四级 GRE GMAT 考研 simply made, not showing much skill or attention to detail 粗糙的；粗制的

例：Obviously, this is a simple and crude example.

很明显，这是一个简单而粗糙的示例。

【词组】

1. **be down to** : to be caused by a particular person or thing 由…引起（或造成）

例：She claimed her problems were down to the media.

她声称她的问题是媒体造成的。

The research presented in Washington strengthens the case for human neurogenesis. Three of these researchers also studied the brains of healthy older people or people with Alzheimer's disease. Their results suggested that the production of the supposed new neurons slows with age, and falls **precipitously** in Alzheimer's disease. Previous studies by two of the groups also found that Alzheimer's patients with more of these neurons had better memories.

在华盛顿发表的研究加强了人类神经发生的论证。其中三名研究人员还研究了健康老年人及阿尔茨海默病患者的脑。他们的研究表明，随着年龄的增长，所谓的新神经元的产生速度会减慢，而阿尔茨海默症患者的神经元产生速度会急剧下降。其中两组先前的研究还发现，拥有更多此类神经元的阿尔茨海默病患者记忆力更好。

【词汇】

1. **precipitously** /prɪ'sɪptəʊsli/ adv. GMAT suddenly and to a very great extent 突然地；骤然地；急剧地

例：The dollar plunged precipitously.

美元直线下跌。

But while the new research strengthens the case for human neurogenesis, it is not yet definitive. One group of researchers from Yale University questioned whether the staining technique used in one of the studies was accidentally **tagging** other brain cells such as **astrocytes**. They are also concerned that the studies tend to find very few progenitor cells. “Where are all the mothers of these baby neurons?” asked Jon Arellano, one of the **sceptics**.

但是，虽然这项新研究加强了人类神经发生的论证，但它还不是最终结论。耶鲁大学的一组研究人员疑问其中一项研究中使用的染色技术是否意外标记了其他脑细胞，如星形胶质细胞。他们还担心，这些研究往往只发现很少的祖细胞。“这些小神经元的母细胞都去哪了？”怀疑论者之一乔恩·阿雷利亚诺问道。

【词汇】

1. **tag** /tæg/ v. 四级 GMAT 考研 If you tag something, you attach something to it or mark it so that it can be identified later. 标记；做记号；贴标签

例：Professor Orr has developed interesting ways of tagging chemical molecules using existing laboratory lasers.

奥尔教授发明了用现有实验室激光设备给化学分子做记号的种种有趣的办法。

2. **astrocyte** /'æstrə,sait/ n. any of the star-shaped cells in the tissue supporting the brain and spinal cord (neuroglia) (支持脑和骨髓的)星形胶质细胞

3. **sceptic** /'skeptɪk/ n. a person who usually doubts that claims or statements are true, especially those that other people believe in 惯持怀疑态度的人；怀疑论者

But although not all the scientists at the conference were convinced, some drug-makers appear to be. In April, Biomed Industries, a **pharmaceutical** firm based in California, said that results from an early **clinical trial** suggested that a new drug that the firm claims increases neurogenesis in mice improved memory in people with **moderate** Alzheimer's. If subsequent trials prove to be equally encouraging, that could be further evidence that the neurogenesis theory of Alzheimer's may indeed have something to it.

不过，尽管并非所有与会科学家都深信不疑，但一些制药商似乎对此很相信。今年4月，总部位于加州的制药公司 Biomed Industries 表示，一项早期临床试验的结果表明，该公司声称能促进小鼠神经发生的一种新药改善了中度阿尔茨海默氏症患者的记忆力。如果后续的试验结果同样令人鼓舞，那将进一步证明阿尔茨海默氏症的神经发生理论可能确实有所作为。

【词汇】

1. **pharmaceutical** /ˌfɑːrmə'suːtɪkl/ adj. GRE GMAT 考研 专八 雅思 connected with making and selling medical drugs 制药的；配药的；卖药的

2. **moderate** /'mɔːdərət/ adj. 四级 GRE 考研 that is neither very good, large, hot, etc. nor very bad, small, cold, etc. 适度的；中等的

例：None of the people in the vaccine group experienced moderate or severe disease.

接种疫苗的人没有出现中度或重度疾病。

【特殊名称】

1. **clinical trial** : When a new type of drug or medical treatment undergoes clinical trials, it is tested directly on patients to see if it is effective. 临床试验

【长难句】

In April, Biomed Industries, a pharmaceutical firm based in California, said that results from an early clinical trial suggested that a new drug that the firm claims increases neurogenesis in mice improved memory in people with moderate Alzheimer' s.

句子主干部分为 Biomed Industries said that results suggested that a new drug improved memory in people with moderate Alzheimer' s, 意为：Biomed Industries 表示，结果表明一种新药改善了中度阿尔茨海默氏症患者的记忆力

其中，with moderate Alzheimer' s 是**后置定语**，修饰限定 people，意为：中度阿尔茨海默氏症(患者)

In April 为**时间状语**，意为：今年四月

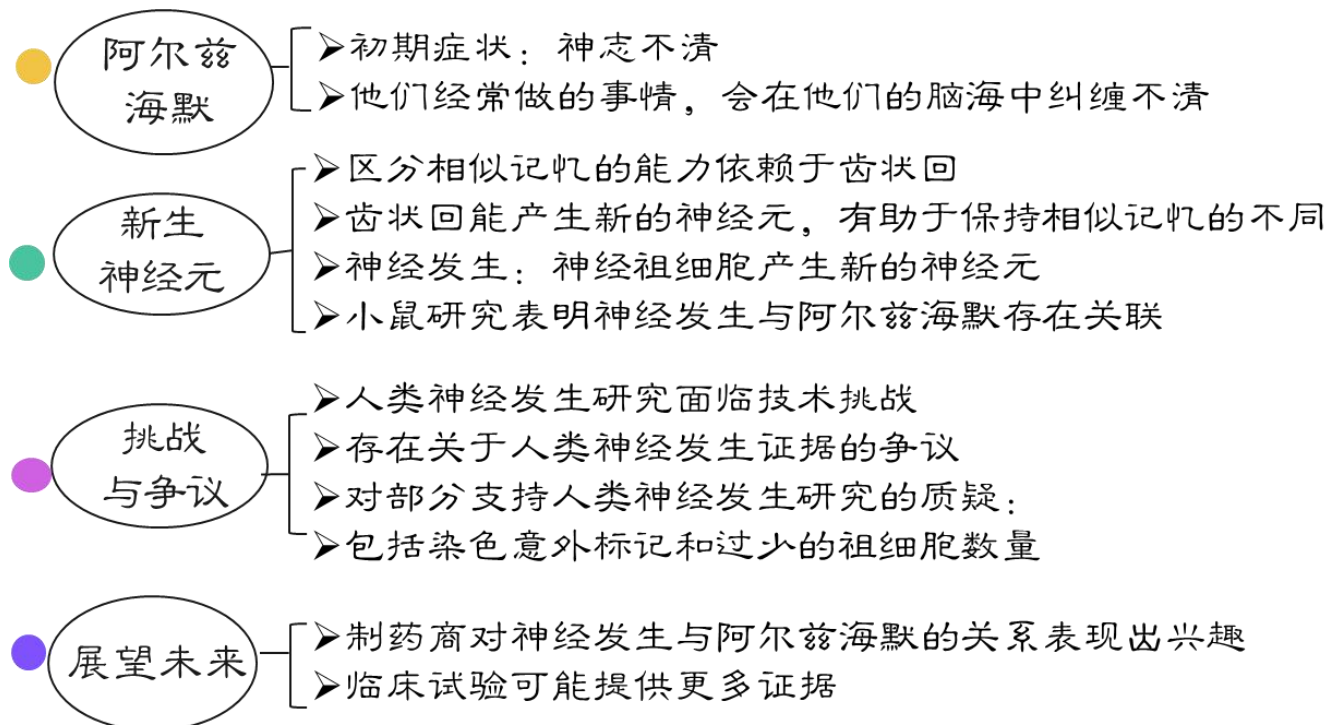
a pharmaceutical firm based in California 为**同位语**，补充说明 Biomed Industries，意为：总部位于加州的制药公司
其中，based in California 为**后置定语**，修饰限定 firm，意为：总部位于加州的

from an early clinical trial 为**后置定语**，修饰限定 results，意为：一项早期临床试验的（结果）

that the firm claims increases neurogenesis in mice 为**定语从句**，修饰限定 a new drug，意为：该公司声称能促进小鼠神经发生的（一种新药）

总结

1) 文章架构



2) 同义替换

✓ 产生

generate

one of the few bits of the brain to generate new neurons even in adulthood.

少数几个即使在成年期也能产生新神经元的部位之一

produce

Until the 1960s scientists thought adult brains did not produce new neurons.

直到 20 世纪 60 年代，科学家们一直认为成年人的大脑不会产生新的神经元。

其他： develop/create/emerge

例：A deep mutual respect and understanding developed between them.

他们之间产生了深切的相互尊重和理解。

✓ 疑问

question

One group of researchers from Yale University questioned whether the staining technique used in one of the studies was accidentally tagging other brain cells such as astrocytes.

耶鲁大学的一组研究人员疑问其中一项研究中使用的染色技术是否意外标记了其他脑细胞，如星形胶质细胞。

ask

“Where are all the mothers of these baby neurons?” asked Jon Arellano

“这些小神经元的母细胞都去哪了？”乔恩·阿雷利亚诺问道。

其他：doubt/query

例：I rang the water company to query my bill.

我给自来水公司打电话对账单上的水费提出疑问。

3) 一词多义

✓ assume

- ✓ 文章原句：Newborn neurons might treat Alzheimer’s disease—assuming they actually exist 新生神经元或可治疗阿尔茨海默病——假设它们真的存在

✓ 释义：

① **to think or accept that something is true but without having proof of it** 假定；假设；认为

Assuming he's still alive, how old would he be now?

假定他还活着，现在有多大年纪了？

② **to take or begin to have power or responsibility** 承担（责任）；就（职）；取得（权力）

The court assumed responsibility for the girl's welfare.

法庭承担了保障这个女孩福利的责任。

③ **to begin to have a particular quality or appearance** 呈现（外观、样子）；显露（特征）

This matter has assumed considerable importance.

这件事看来相当重要。

④ **to pretend to have a particular feeling or quality** 装出；假装

He had assumed a stage Southern accent.

他佯装戏中的南方口音。

✓ **stain**

✓ 文章原句：Scientists must take samples of brain tissue from cadavers and either stain them with chemicals that bind only to young neurons 科学家们必须从尸体上采集脑组织样本，用只与年轻神经元结合的化学物质进行染色

✓ 释义：

① **to change the colour of something using a coloured liquid** 给…染色

Stain the specimen before looking at it under the microscope.

先把标本染色，再放到显微镜下观察。

② **to leave a mark that is difficult to remove on something; to be marked in this way** (被) 留下污渍

Some foods can stain the teeth, as of course can smoking.

某些食物会在牙齿上留下污渍，吸烟当然也会。

③ **to damage the opinion that people have of something** 玷污，败坏 (名声)

The events had stained the city's reputation unfairly.

这些事件使该市背上了不应有的恶名。

4) 仿写训练

✓ 描述正反观点

✓ 文章原句：

But for every one that has found evidence of neurogenesis, another has failed to do so. The pro-neurogenesis camp thinks the null results are down to poor-quality brain tissue or crude preservation techniques. The antis argue that either humans do not grow these neurons in the dentate gyrus, or if they do, there are too few of them to be useful.

✓ 句型：

But for every one..., another has failed to do so. 但是，每一...时，都有另一...没能...

The pro-... camp thinks... 支持...的阵营认为...

The antis argue that... 反对者认为...

✓ 仿写示例：

But for every one educational reform that has successfully enhanced student learning and prepared individuals for the future, another has failed to do so. The pro-education reform camp thinks that adapting teaching methods, integrating technology, and prioritizing individualized learning experiences are essential for meeting the diverse needs of students and fostering critical thinking skills. The antis argue that hastily implemented reforms may neglect the foundational principles of education, risking the dilution of core knowledge and undermining educational standards.

✓ 仿写作业——描述技术的正反观点

但是，每当一项技术创新成功地为各行各业带来变革并改善我们的日常生活时，就会有另一项技术创新没能做到。

支持技术的阵营认为，持续的技术进步对于社会进步、促进经济增长和应对紧迫的全球挑战至关重要。

反对者认为，无节制的技术发展会带来风险，包括工作岗位流失、环境恶化以及对隐私和安全的威胁。

5) 主题词总结

今日主题——神经科学	
1. neuroscience	神经科学
2. newborn neuron	新生神经元
3. Alzheimer's disease	阿尔兹海默病
4. brain tissue	脑组织
5. dentate gyrus	齿状回
6. neural progenitor cell	神经祖细胞
7. stem cell	干细胞
8. neurogenesis	神经发生