

# 科学家新疗法让中年老鼠“重返青春”

Ageing reversal: scientists rejuvenate tissues in middle-aged mice

自古以来，长生不老就是人类的终极梦想，而生物科技的不断突破让我们距离这个梦想越来越近。美国科学家最近用新疗法成功让中年老鼠变年轻，其中皮肤和肾脏的回春迹象最为明显。



[Photo/Pexels]

Researchers in the US treated healthy mice with a form of gene therapy that refreshed older cells, making the animals more youthful according to biological markers that are used to measure the effects of ageing.

美国研究人员对健康老鼠实施了一种更新老化细胞的基因疗法并获得成功，通过生物标记法他们测出这些老鼠变年轻了。

Repeating the trick in humans is far from straightforward, but the findings will fuel interest in radical new therapies that aim to

slow or reverse the ageing process as a means of tackling age-related diseases such as cancer, brittle bones and Alzheimer's.

尽管不能用同样的方法让人类返老还童，但是这一发现会点燃人们对以延缓或逆转衰老为目标的激进新疗法的兴趣，这种疗法可以用来治疗癌症、骨质疏松和老年痴呆症等老年常见疾病。

"A host of age-related diseases might benefit from this approach," said Heinrich Jasper, a principal fellow and director at the US biotech firm Genentech.

美国生物科技公司基因泰克的首席研究员及主任海因里希·贾斯珀说：

“众多老年病都可能受益于这种疗法。”

The scientists drew on previous work by the Japanese Nobel laureate Prof Shinya Yamanaka, who showed that a mixture of four molecules – known as Yamanaka factors – can rewind adult cells into youthful stem cells that are capable of forming almost any tissue in the body.

美国科学家的这一疗法借鉴了日本诺贝尔奖得主山中伸弥教授先前的研究成果。山中伸弥向世人展示，被称为“山中因子”的四种分子组合在一起可以让成人细胞逆生长为年轻的干细胞，而干细胞可以分化成人体的任何组织。

Writing in the journal *Nature Aging*, the US team led by Jasper and Prof Juan Carlos Izpisua Belmonte at the Salk Institute in

California and the San Diego Altos Institute, found that mice who received Yamanaka factors for several months resembled younger animals in many ways, with their skin and kidneys in particular showing signs of rejuvenation.

来自加州索尔克研究所和圣地亚哥阿尔托斯研究所的贾斯珀和胡安·卡洛斯·依思皮舒·贝尔蒙特教授带领的美国团队发现，连续数月注射山中因子的老鼠在很多方面都变得像年轻老鼠，皮肤和肾脏的回春迹象尤为明显。该研究发表在《自然-衰老》期刊上。

The experiments showed that rejuvenation was more effective when the therapy was given for a long time – seven to 10 months – starting when the animals were 12 to 15 months old, equivalent to age 35 to 50 in humans. When older animals, equivalent to 80 years old in human terms, were treated for one month, the scientists saw little impact.

实验表明，在老鼠 12 到 15 个月大（相当于人类 35 岁到 50 岁）的时候开始采取这一疗法并持续较长时间（7 到 10 个月），回春效果更好。科学家给年长的老鼠（相当于 80 岁老人）用同样的方法治疗一个月，效果微乎其微。

Researchers are cautious about using Yamanaka factors in humans because previous work has shown that fully reprogrammed cells can turn into clumps of cancerous tissue called teratomas.

山中伸弥先前的研究显示，经过完全基因重组的细胞会转变为癌组织畸胎瘤，因此科学家还不敢轻易给人类注射山中因子。

The latest study shows that partial reprogramming may be able to rejuvenate tissues without such risks, but further hurdles remain. Rather than using Yamanaka factors to rejuvenate aged humans, many scientists suspect that new drugs will be needed to partially reprogram cells safely and effectively.

尽管这项新研究表明，部分重组的细胞或许可以在避免这一风险的情况下更新细胞组织，但是实施起来还是障碍重重。许多科学家认为，需要研发新药物才能安全有效地对细胞进行部分重组，而不能直接用山中因子来让人类返老还童。

"In theory, biological age reversal or reduction could be possible. However, we are at very early stages where we need to understand the basic science behind it much better," said Dr Tamir Chandra, an expert in the biology of ageing at the University of Edinburgh, who was not involved in the study.

没有参与该研究的爱丁堡大学衰老生物学专家塔米尔·钱德拉博士说：

“理论上，逆龄生长或延缓衰老是可能实现的。但是，我们现在还处于这一研究领域的初级阶段，我们需要更好地了解这背后的基础科学。”