

《科学美国人：人类真的可以青春永驻长生不老吗？》



What if our body could stay in its prime forever?

如果我们的身体能够永葆青春状态那该多好呢？

What if we could be biologically immortal like a hydra—a tiny freshwater creature that can continuously renew its cells?

如果我们可以像水螅(一种可以不断更新细胞的微小淡水生物)一样永生，那会怎么样？

Or what if we could turn back the clock like some jellyfish that never die but revert to an earlier form and go through life all over again?

又或者，如果我们可以让时光倒流，就像某些永生水母一样，永远不会死亡，但会回归到早期的形态，开始新生，那又会怎么样？

But most cells in our body aren't built to last a lifetime: they're damaged all the time by everything from ultraviolet rays to poor nutrition.

但我们身体中的大多数细胞并不是生来就能活一辈子的：从紫外线照射到营养不良，它们总会受到各种因素的破坏。

When this happens, cells make copies of their chromosomes, which contain our DNA, and divide into healthy new cells.

当这种情况发生时，细胞复制包含我们DNA的染色体，并分裂成健康的新细胞。

But at some point, cells lose their ability to replicate.

但在某种程度上，细胞失去了复制能力。

With each cell division the ends of our chromosomes get a bit shorter.

随着每一次细胞分裂，我们染色体的末端都会变短一点。

These end regions don't actually hold active genes; they're protective caps called "telomeres." But once telomeres shrink past a certain point,

这些末端区域实际上并不包含活性基因；它们是被称为“端粒”的保护帽。一旦端粒缩小超过某一临界点，

the cells can't divide anymore and enter a state called "senescence."

这些细胞将不能再分裂，进入一种“衰老”的状态。

There's nothing inherently bad about cells becoming senescent.

细胞衰老本身并没有什么坏处。

Senescent cells just behave differently from cells that can still divide.

只是衰老细胞的行为与仍能分裂的细胞不同。

They also secrete a variety of chemicals that activate the immune system.

它们还会分泌多种化学物质来激活免疫系统。

When we're young and healthy, this can help us recover from injury, for instance.

例如，当我们年轻健康时，这可以帮助我们从伤病中恢复过来。

The issue is when the body doesn't eliminate senescent cells quickly enough, and they

make neighboring cells go senescent as well.

问题是，当身体不能足够快地清除衰老的细胞时，它们会使邻近的细胞也衰老。

That begins a domino effect that can lead to chronic inflammation.

这就开始了多米诺骨牌效应，可能导致慢性炎症。

Over time, this makes our brain work slower and causes our body to start to deteriorate.

随着时间的推移，这会使我们的大脑工作变慢，并导致我们的身体开始退化。

We become more susceptible to disease—and we die.

我们变得更容易感染疾病，最终走向死亡。

But does it really have to happen this way?

但是，事情真的一定是这样吗？

Experts have lots of theories about why we age.

关于我们为什么会变老，专家们有很多理论。

One of the most popular ideas is that human bodies only have a limited amount of lifetime energy,

最流行的观点之一是，人体一生的能量有限，

and we spend lots of this energy prioritizing reproductive functions.

我们花费了大量的精力来优先考虑生殖功能。

Scientists call this the "disposable soma theory." The idea is that our "soma," or body, is disposable, while our germ line lives on.

科学家称其为“一次性体细胞理论”。这个想法是，我们的“躯体”或身体是一次性的，而我们的生殖细胞却在延续。

Not everyone wants to reproduce, though.

然而，并不是每个人都想生育。

For those who would prefer a few extra years to having children, there may be ways to shift your body's energy allocation,

对于那些宁愿多活几年而不愿生孩子的人来说，也许有一些方法可以改变你身体的能量分配。

decreasing your fertility to extend your life span.

通过降低生育能力来延长寿命。

But if everyone could suddenly choose between fertility and long life, it could lead to a host of ethical issues.

但是，如果每个人都有机会突然在生育和长寿之间做出选择，可能会引发一系列伦理问题。

Whose lives are extended, and who can reproduce?

谁的生命得以延长，谁又能繁衍后代？

And if you try to reach a sort of compromise, extending your life span while still having kids,

如果你试图达成某种妥协，延长你的寿命，同时仍生育孩子，

you might just end up increasing your children's or grandchildren's risk of mutations, which could end up causing major issues in your descendants.

这可能最终会增加你的子女或孙辈突变的风险，可能最终会给你的后代带来重大问题。

It's hard to fight aging because it lies at the core of our genetic makeup.

要对抗衰老是很难的，因为衰老是我们基因构成的核心。

Short telomeres would be an obvious target for antiaging interventions.

较短的端粒将是抗衰老干预的明显目标。

But people with very long telomeres—or more telomerase, an enzyme that keeps telomeres long—aren't always better off.

但是，端粒很长的人——或端粒酶(一种保持端粒较长的酶)较多的人，并不一定是更

健康的。

Cancer cells can use telomerase to multiply unchecked.

当癌细胞使用端粒酶进行增殖时，它就不受限制了。

And people with excessively long telomeres may be likelier to get lung cancer and brain tumors.

端粒过长的人可能更容易患肺癌和脑瘤。

Some researchers are trying to prevent cells from reaching senescence or to help the body remove senescent cells more efficiently.

一些研究人员正试图阻止细胞衰老，或帮助人体更有效地清除衰老细胞。

But they face a similar problem: they need to target specific cells that induce aging, and avoid ones that are benefitting the body.

但他们面临着一个类似的问题：他们需要针对的诱导衰老的特定细胞，且避开那些对身体有益的细胞。

Researchers still have some ideas for extending life span, though.

不过，研究人员仍有一些延长寿命的想法。

Among the most popular is moderate caloric restriction.

其中最受欢迎的是适度的热量限制。

In one study, people who ate 15 percent fewer calories for two years ended up with a significantly lower base metabolic rate,

在一项研究中，连续两年摄入15%卡路里的人最终基础代谢率显著降低，

an indicator their body aged less.

这是一个指标，表明他们的身体衰老程度降低。

But this has to be done very carefully because the body needs nutrients to survive and function properly.

但这必须非常谨慎地完成，因为身体需要营养才能生存和正常运作。

And while some caloric restriction may extend life span, scientists are still investigating whether it could lead to unintended side effects.

虽然一些卡路里限制可能会延长寿命，但科学家们仍在调查它是否会导致意想不到的副作用。

For instance, animal studies suggest undereating may decrease gray matter in the brain,

例如，动物研究表明，饮食不足可能会减少大脑中的灰质，

though that doesn't necessarily mean it hurts mental performance.

尽管这并不意味着它会损害精神表现。

Perhaps, though, longer life isn't the right target.

不过，也许长寿并不是正确的目标。

Instead many researchers are turning their attention to giving people more healthy years—something that's remained a challenge despite medical advances.

相反，许多研究人员正将他们的注意力转向让人们更健康地度过岁月——尽管医学取得了进步，这仍然是一个挑战。

Chronic diseases are on the rise globally, posing a major strain on health resources and national economies as people live longer.

随着人们寿命的延长，慢性病在全球范围内呈上升趋势，给卫生资源和国家经济带来了巨大压力。

At this point, there aren't many innovative ways to extend your so-called health span besides obvious factors such as maintaining a balanced diet,

在这一点上，没有太多创新的方法来延长你的所谓健康寿命，比如保持均衡饮食、

exercise and strong social connections.

锻炼身体和强大的社会关系支持等明显因素。

Beyond that, aging is built into our DNA.

除此之外，衰老是我们的DNA所固有的一部分。

And while experts are continuing to explore clever ways to counteract it at a molecular level, through drugs or other therapies,

尽管专家们正在继续探索在分子水平上通过药物或其他疗法来抵消这种疾病的更有效的方法，

our bodies are never going to be permanent.

我们的身体是无法永生的。

重点词汇

go through 经过某过程；经历，经受；翻阅，翻找，整理；通读，彻查；走；重复，例行做；被通过，被批准

all over again 再一次，又一次，重新

a lifetime 一辈子；一生

all the time 总是，一直

divide into 分成

at some point 在某些时候

cell division 细胞分裂