0113. Your Organs Might Be Aging at Different Rates

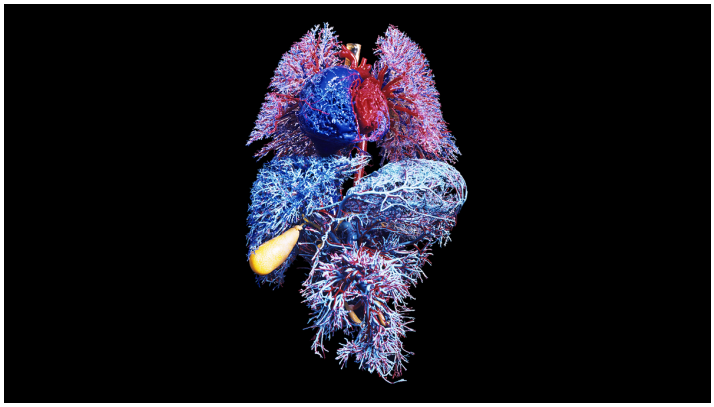
Table of Contents

1. Your Organs Might Be Aging (v.) at Different Rates 您的器官可能以不同的速度老化
2. Your Organs Might Be Aging at Different Rates 您的器官可能以不同的速度老化

1. Your Organs Might Be Aging (v.) at Different Rates 您的器官可能以不同的速度老化

It turns out that your **chronological 按发生时间顺序排列的 age** really is just a number. What's more important for **knowing disease risk** is **the biological age** of each of your organs

事实证明，你的实际年龄实际上只是一个数字。对于了解疾病风险, 更重要的是每个器官的生物学年龄



Major organs of the human body. **Resin 树脂 cast** 铸件；铸造品 of the blood vessels of the lungs (top), heart (top, center), liver (light blue), gallbladder 胆囊 and **biliary 胆汁的；胆管的 tract** 胆道 (yellow) and **digestive tract** 消化道 (bottom). Arteries 动脉 are colored red and veins blue.

人体的主要器官。肺（顶部）、心脏（顶部、中心）、肝脏（浅蓝色）、胆囊和胆道（黄色）以及消化道（底部）血管的树脂铸件。动脉呈红色，静脉呈蓝色。

The number of birthdays you've had — better known as your chronological age — now appears to be less important **in assessing your health** than ever before.

A new study shows that bodily organs **get "older"** 变老 at extraordinarily 极其，极端地；不寻常地 different rates, and each one's biological age can **be at odds (n.) with** （与…）有差异，相矛盾 a person's age on paper.

Example 1. 案例

BE AT 'ODDS (WITH STH)

to be different from sth, when the two things should be the same （与…）有差异，相矛盾 SYN conflict

• These findings **are at odds with** what is going on in the rest of the country. 这些研究结果与国内其他地区的实际情况并不相符。

BE AT 'ODDS (WITH SB) (OVER/ON STH)

to disagree with sb about sth （就某事）（与某人）有分歧

• He's always **at odds (n.) with** his father over politics. 他在政治上总是与他父亲的意见相左。

现在，您的生日次数（即您的实际年龄）对于评估您的健康状况, 似乎比以往任何时候都不再那么重要。一项新的研究表明，身体器官"衰老"的速度截然不同，每个人的生物学年龄, 可能与一个人的纸上年龄不一致。

The new research, published on Wednesday in Nature, **identified** about 宾 **one in five** healthy adults **older than** 50 years old 宾补 **as** an "extreme ager" — a person with **at least** one organ **aging (v.) at a highly accelerated rate**, **compared with** a cohort （有共同特点或举止类同的）一群人，一批人 of their peers.

主 **One in 60** adults 谓 had two or more organs **that were aging rapidly**.

The study team measured (v.) proteins 蛋白质 **related to** organs, including the brain, heart, immune tissue and kidneys.

这项周三发表在《自然》杂志上的新研究发现，50 岁以上的健康成年人中，约有五分之一为“极端老年人”，即与同龄人相比，至少一个器官的衰老速度加快。六十分之一的成年人, 有两个或更多器官正在迅速老化。研究小组测量了与器官相关的蛋白质，包括大脑、心脏、免疫组织和肾脏。

the team **measured** the concentrations 浓度；含量 of thousands of proteins in a drop of blood **and found that** almost 900 of them — about 18 percent of the proteins measured — tended to be **specific (a.)特定的;特有的；独特的 to** a single organ.

When those proteins varied (v.) from **the expected 预料的；预期的 concentration** for a particular chronological age, that indicated **accelerated 使加速; 加速 aging** (v.) in the corresponding organ.

研究小组测量了一滴血液中数千种蛋白质的浓度，发现其中近 900 种蛋白质（约占测量蛋白质的 18%）往往是单个器官特有的。当这些蛋白质与特定年龄的预期浓度不同时，表明相应器官的衰老加速。

“We could say **with reasonable 合理的；有理由的 certainty** that [a particular protein] likely **comes from the brain** and somehow **ends up in the blood**,” explains Tony Wyss-Coray, a professor of neurology at Stanford University and co-author of the new study.

If that **protein concentration** changes (v.) in the blood, “it must also likely change (v.) in the brain — and [that] tells us something about how the brain ages,” Wyss-Coray says.

斯坦福大学神经学教授、这项新研究的合著者托尼·怀斯-科雷 (Tony Wyss-Coray) 解释说：“我们可以合理肯定地说，[一种特定的蛋白质]可能来自大脑，并以某种方式最终进入血液。”如果血液中的蛋白质浓度发生变化，“大脑中的蛋白质浓度也可能会发生变化，这会告诉我们有关大脑如何老化的信息，”怀斯-科雷说。

By **comparing study**(v.) 比较研究,对照研究 participants’ organ-specific proteins, the researchers were able to estimate（对数量、成本等的）估计；估价 an age gap — the difference **between** an organ’s biological age **and** its chronological age.

Depending on the organ involved, 主 participants 后定 found to have **at least** one with accelerated aging 谓 had **an increased 增长的 disease** and **mortality 死亡 risk** over the next 15 years.

For example, 主 those whose heart was "older" than usual 谓 had **more than twice** the risk of heart failure **than** people with a typically aging heart.

主 Aging in the heart 系 was also **a strong predictor** of heart attack.

Similarly, 主 those with a quickly aging brain 系 were more likely to experience **cognitive 认知的；感知的；认识的 decline**.

主 **Accelerated aging** in the brain and vascular 血管的；脉管的；维管的 system 谓 predicted (v.) the progression of Alzheimer's disease **just as strongly as** plasma 血浆;等离子体；等离子气体 pTau-181 — the current clinical **blood biomarker** 生物标志物 for the condition 健康状况;（因不可能治愈而长期患有的）疾病.

Extreme aging in the kidneys was a strong predictor of hypertension and diabetes.

通过比较研究 "参与者的器官特异性蛋白质"，研究人员能够估计年龄差距，即器官的生物学年龄, 与其实际年龄之间的差异。根据所涉及的器官，研究发现，至少有一个器官加速衰老的参与者, 在未来 15 年内, 患病和死亡的风险会增加。例如，那些心脏比平时"老化"的人，其心力衰竭的风险, 是心脏典型老化的人的两倍多。心脏老化, 也是心脏病发作的一个强有力的预测因素。同样，那些大脑快速老化的人, 更有可能出现认知能力下降。大脑和血管系统的加速衰老, 与血浆 pTau-181（目前该疾病的临床血液生物标志物）一样, 有力地预测了阿尔茨海默病的进展。肾脏的极度衰老, 是高血压和糖尿病的有力预测因素。

Paul Shiels, a professor of cellular gerontology 老年学 at the University of Glasgow, who was not **involved in** the new research, says the study **was well powered** with sizable 相当大的，颇大的 cohorts.

But 主 **the age range** of the people included 系 was "a little narrow," he says. "It only **looked at** older individuals, and it wasn't **representative (a.)典型的；有代表性的;可作为典型（或示例）的 of** a whole life course."

格拉斯哥大学细胞老年学教授保罗·希尔斯（Paul Shiels）并未参与这项新研究，但他表示，这项研究的样本量相当大，效果良好。但他说，所包括的人的年龄范围“有点窄”。“它只关注老年人，并不能代表整个生命历程。”

The measurement of **biological aging** is an evolving（使）逐渐发展；进化 science.

“Epigenetic 后生的；外成的；渐成说的；表观遗传的 clocks,” 主 **a leading approach** 后定 pioneered (v.)当开拓者；做先锋；倡导 by Steve Horvath of the biotechnology research start-up Altos Labs, 谓 **look at** DNA changes to determine tissue age **more accurately than** other existing biological age estimators.

When people age (v.), the body **begins to accumulate 积累；积聚 DNA signatures** that can indicate **how old a cell or organ is**; this allows **estimates (n.)（对数量、成本等的）估计；估价 of age**.

But **epigenetic clocks** estimate (v.) the age of the whole organism **instead of** an organ-specific age, Wyss-Coray says.

Example 2. 案例

epigenetic

ADJ of or relating to epigenesis 后成的, 表观遗传的
-→ epi- + genetic

表观遗传学是研究"你的行为和环境, 如何引起影响你的基因工作方式的变化"。与遗传变化不同，表观遗传变化是可逆的，不会改变您的 DNA 序列，但它们可以改变您的身体读取 DNA 序列的方式。

Epigenetics is the study of how your behaviors and environment can cause (v.) changes (n.) **that affect (v.) the way** your genes work. Unlike **genetic changes**, **epigenetic changes** are reversible 可逆的；可恢复原状的 and do not change your DNA sequence, but they can change (v.) how your body reads a DNA sequence.

更具体的介绍见 :
https://www.cdc.gov/genomics/disease/epigenetics.htm

生物衰老的测量是一门不断发展的科学。“表观遗传时钟”是生物技术研究初创公司 Altos Labs 的 Steve Horvath 首创的一种领先方法，它通过观察 DNA 变化, 来比其他现有的生物年龄估计器, 更准确地确定组织年龄。当人们衰老时，身体开始积累 DNA 特征，这些特征可以表明细胞或器官的年龄；这可以估计年龄。但 Wyss-Coray 表示，表观遗传时钟估算的是整个生物体的年龄，而不是特定器官的年龄。

This research is part of **the growing field** of **personalized 个性化 diagnostics** 诊断；诊断法, which is based on the idea that **several biological indicators** of **organ health** can help clinicians **target (v.) treatment**.

Blood measurements **have traditionally been used** to identify illness in the body, with clinicians **making a diagnosis** only after a person **crosses (v.) the threshold 门槛；门口; 阈；界；起始点 of** a certain **set (a.)安排好的；确定的；固定的 indicator**.

But as **protein markers** become more sensitive, “you can actually detect **something abnormal** before you have clinical manifestations 显示；表明；表示; （幽灵的）显现，显灵.”

Example 3. 案例

threshold

manifestation

(n.) [CU] ~ (of sth) : an event, action or thing that is a sign that sth exists or is happening; the act of appearing as a sign that sth exists or is happening 显示；表明；表示

• The riots are **a clear manifestation** of the people’s discontent. 骚乱清楚地表明了人们的不满情绪。

这项研究是不断发展的”个性化诊断”领域的一部分，该领域的基础是, 器官健康的多种生物指标, 可以帮助临床医生确定治疗目标。传统上，血液测量被用来识别体内的疾病，临床医生只有在”当一个人超过某个设定指标的阈值后”才会做出诊断。但随着”蛋白质标记物”变得更加敏感，“您实际上可以在出现临床表现之前, 检测到异常情况，”

The momentum 推进力；动力；势头 of commercial **epigenetic testing** is a “gold rush,” Shiels says. “**There is a degree of oversell 吹嘘；过分颂扬 on** what [the tests] can do.”

商业表观遗传测试的势头是“淘金热”。 “对于[测试]的作用存在一定程度的夸大。”

According to Wyss-Coray, each organ is fundamental 十分重大的；根本的; 基础的；基本的 to overall health. He **likens** 把…比作… the human body **to** a car: “If one part **doesn’t work well**, the other parts **start to suffer**,” he says. “If you maintain 维修；保养 certain parts, you can prolong (v.)延长 **the life span** of the car.”

Wyss-Coray 认为，每个器官对于整体健康至关重要。他将人体比作一辆汽车：“如果一个部件不能正常工作，其他部件就会开始受到影响，”他说。 “如果保养某些零件，就可以延长汽车的使用寿命。”

---

2. Your Organs Might Be Aging at Different Rates 您的器官可能以不同的速度老化

It turns out that your chronological age really is just a number. What’s more important for knowing disease risk is the biological age of each of your organs

Major organs of the human body. Resin cast of the blood vessels of the lungs (top), heart (top, center), liver (light blue), gallbladder and biliary tract (yellow) and digestive tract (bottom). Arteries are colored red and veins blue. Credit: Ralph T. Hutchings/Science Source

The number of birthdays you’ve had—better known as your chronological age—now appears to be less important in assessing your health than ever before. A new study shows that bodily organs get “older” at extraordinarily different rates, and each one’s biological age can be at odds with a person’s age on paper.

The new research, published on Wednesday in Nature, identified about one in five healthy adults older than 50 years old as an “extreme ager”—a person with at least one organ aging at a highly accelerated rate, compared with a cohort of their peers. One in 60 adults had two or more organs that were aging rapidly. The study team measured proteins related to organs, including the brain, heart, immune tissue and kidneys.

the team measured the concentrations of thousands of proteins in a drop of blood and found that almost 900 of them—about 18 percent of the proteins measured—tended to be specific to a single organ. When those proteins varied from the expected concentration for a particular chronological age, that indicated accelerated aging in the corresponding organ.

“We could say with reasonable certainty that [a particular protein] likely comes from the brain and somehow ends up in the blood,” explains Tony Wyss-Coray, a professor of neurology at Stanford University and co-author of the new study. If that protein concentration changes in the blood, “it must also likely change in the brain—and [that] tells us something about how the brain ages,” Wyss-Coray says.

By comparing study participants’ organ-specific proteins, the researchers were able to estimate an age gap—the difference between an organ’s biological age and its chronological age. Depending on the organ involved, participants found to have at least one with accelerated aging had an increased disease and mortality risk over the next 15 years. For example, those whose heart was “older” than usual had more than twice the risk of heart failure than people with a typically aging heart. Aging in the heart was also a strong predictor of heart attack. Similarly, those with a quickly aging brain were more likely to experience cognitive decline. Accelerated aging in the brain and vascular system predicted the progression of Alzheimer’s disease just as strongly as plasma pTau-181—the current clinical blood biomarker for the condition. Extreme aging in the kidneys was a strong predictor of hypertension and diabetes.

Paul Shiels, a professor of cellular gerontology at the University of Glasgow, who was not involved in the new research, says the study was well powered with sizable cohorts. But the age range of the people included was “a little narrow,” he says. “It

only looked at older individuals, and it wasn't representative of a whole life course."

The measurement of biological aging is an evolving science. "Epigenetic clocks," a leading approach pioneered by Steve Horvath of the biotechnology research start-up Altos Labs, look at DNA changes to determine tissue age more accurately than other existing biological age estimators. When people age, the body begins to accumulate DNA signatures that can indicate how old a cell or organ is; this allows estimates of age. But epigenetic clocks estimate the age of the whole organism instead of an organ-specific age, Wyss-Coray says.

This research is part of the growing field of personalized diagnostics, which is based on the idea that several biological indicators of organ health can help clinicians target treatment. Blood measurements have traditionally been used to identify illness in the body, with clinicians making a diagnosis only after a person crosses the threshold of a certain set indicator. But as protein markers become more sensitive, "you can actually detect something abnormal before you have clinical manifestations,"

The momentum of commercial epigenetic testing is a "gold rush," Shiels says. "There is a degree of oversell on what [the tests] can do."

According to Wyss-Coray, each organ is fundamental to overall health. He likens the human body to a car: "If one part doesn't work well, the other parts start to suffer," he says. "If you maintain certain parts, you can prolong the life span of the car."