Why does this animal never age? - Raymond Adkins — 中英對照學習本

TED-Ed（講解：Raymond Adkins）· 5 分 50 秒

中英對照學習本 · 每段約 100 字 · 段落開頭時間碼可點擊跳轉影片

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In 1740, while Swiss naturalist Abraham Trembley was tutoring the sons of a nobleman, he had scooped up some pond water for them to study when he found something shocking inside. He couldn't identify the odd little thing or even tell if it was a plant or an animal. Its way of moving and consuming things seemed animal-like. But when he cut parts off, or even split it in two, it regenerated, which was decidedly plant-like, in keeping with its green hue. Trembley noted the organism's similarity to the Hydra, the monster from Greek mythology, and the name stuck. Today, we know hydras are animals capable of some incredible feats, apparently including immortality.

> 1740 年，瑞士自然學家 Abraham Trembley 正在教一位貴族子弟讀書，就順手撈起一些池塘水給他們研究，卻在裡面發現了令人吃驚的東西。他認不出這怪怪的小東西是什麼，甚至搞不清它究竟是植物還是動物。它移動和進食的方式，看起來比較像動物。但當他切下它的一部分，甚至把它切成兩半，它卻又長回來，這就很明顯地像植物了，跟它翠綠的顏色也很相配。Trembley 留意到這種生物跟 Hydra 很像，Hydra 就是希臘神話裡的怪物，從此這個名字便沿用至今。今日我們知道，水螅是動物，而且本事大得驚人，看來甚至可以長生不老。

(v.) **tutoring**
授課；教導

(n.) **nobleman**
貴族；貴胄

(v.) **scooped**
撈起；舀起

(v.) **regenerated**
再生；重新長出

(phr.) **in keeping with**
與…相配；符合

(n.) **hue**
色澤；色調

(n.) **feats**
本事；壯舉

(n.) **immortality**
不死；長生不老

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They comprise a genus of tiny aquatic animals in the broader phylum Cnidaria. Some cnidarians, like jellyfish, have a stationary polyp phase, then a free-swimming Medusa stage. But hydras and some of their relatives stay polyps their whole lives. Hydras have relatively simple cylindrical body plans, one end forming the foot, the other the mouth, framed by fanning tentacles. They'll eat just about any critter they can snag. And although they can scoot around if needed, most of the time, they remain stuck to things using a gluey substance secreted from their foot. They can reproduce sexually, but they more often do so asexually, budding new growths off their bodies.

(n.) **genus**
屬（生物分類單位）

(adj.) **aquatic**
水生的；水裡的

(n.) **phylum**
門（生物分類單位）

(adj.) **stationary**
固定不動的

(adj.) **cylindrical**
圓柱形的

(adj.) **gluey**
黏稠的；黏的

牠們是微小水生動物的一個屬，隸屬於更大的刺胞動物門（Cnidaria）。有些刺胞動物，例如水母，會先經歷一個固定不動的螅體階段，然後才進入自由游泳的水母型（Medusa）階段。但水螅跟牠們某些親戚，一輩子都維持螅體形態。水螅的身體構造相對簡單，是圓柱形，一端形成腳，另一端是口，口邊圍著會像扇子般擺動的觸手。凡是被牠們抓得到的小生物，牠們幾乎都照單全收。雖然必要的話，牠們也能快速移動，但大部分時間裡，牠們還是會靠腳底分泌的黏稠物質，緊緊貼在別的東西上。牠們可以進行有性生殖，不過更多時候是用無性生殖，從身體上長出新的芽體。

(v.) **secreted**
分泌；分泌出

(adv.) **asexually**
以無性方式

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Where exactly they hunker down in the freshwater ponds and slow-moving streams they populate varies by species, which likewise differ in shape, size, and hue. Green hydras, for one, bask in sunny spots to feed the photosynthetic algae they host, which lend them their color and provide sugars in return for other nutrients. This explains some of Trembley's "animal-or-plant" confusion. Meanwhile, other species, like brown hydras, stick to the shade and hunt more actively. Hydra tentacles are covered with stinging cells containing little capsules of pressurized, harpoon-like structures. When triggered, they fly out at explosive speeds, immobilizing small prey. This adaptation doesn't protect hydras from larger predators, but what they lack in defenses, they make up for in their unparalleled regenerative abilities.

牠們具體棲身在哪裡，在淡水池塘和緩慢溪流的不同位置，會因物種而異，這些物種的形狀、大小和顏色也各不相同。以綠水螅為例，牠們會曬太陽，在陽光充足的地方讓體內寄生的行光合作用藻類進食，這些藻類回報給牠們色素和糖分，作為其他養分的交換。這就解釋了 Trembley 當初為何會搞不清牠是「動物」還是「植物」。與此同時，其他物種，例如褐色水螅，會躲在陰影處，較積極地獵食。水螅的觸手上布滿了刺細胞，裡面含有裝著帶壓力的魚叉狀構造小囊。一旦受到觸發，就會以爆炸般的速度射出，令細小的獵物動彈不得。但這個適應並不能保護水螅免受較大的捕食者襲擊——不過牠們在防禦上的不足，正好由無與倫比的再生能力補回來。

(v.) **hunker**
棲身；蹲下

(v.) **populate**
棲息於；遍佈於

(adv.) **likewise**
同樣地；一樣地

(v.) **bask**
曬太陽；浸沐於

(adj.) **photosynthetic**
行光合作用的

(n.) **algae**
藻類

(n.) **nutrients**
養分；營養物

(adj.) **regenerative**
有再生能力的；再生的

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Not only can hydras regrow lost appendages, they can also reassemble themselves after going through a blending process of sorts, where they're completely broken down into individual cells. To do this, these cells first aggregate into a sphere, then they begin to sort themselves, gradually hollowing out and elongating as they group into external and internal layers. Soon, one end sprouts a few buds, which become the tentacles,

(n.) **appendages**
肢體；附肢

(v.) **reassemble**
重新組裝；重新拼合

(v.) **aggregate**
聚集；聚合

(v.) **elongating**
拉長；伸長

while the other end develops into the foot. In a matter of days, the hydra is back in one piece, bopping around and catching worms like nothing happened. In labs, this process has helped shed light on embryonic development, because some of the stages and proteins are common among all animals, though the ability to perform it willy-nilly, as hydras do, is decidedly not.

> 水螅不但能長回失去的肢體，還能重新組裝自己，過程是先經過某種混合，被完全拆解成一個個獨立的細胞。要做到這一步，這些細胞首先會聚集成一個球體，然後開始自行分揀，慢慢由內部掏空、拉長，同時分組成外層與內層。不久，其中一端長出幾個芽，之後就變成觸手，另一端則發育成為腳。幾天之內，水螅就完好無缺地回來了，照樣蹦蹦跳跳地四處活動、捕捉小蟲，彷彿甚麼事都沒發生過。在實驗室裡，這個過程幫助我們看清了胚胎發育的機制，因為其中某些階段和蛋白質，是所有動物都有的——但要像水螅那樣隨隨便便就做到，卻絕對不是辦得到。

(adj.) **embryonic**
胚胎的

(v.) **bopping**
蹦蹦跳跳地走動

(phr.) **shed light on**
闡明；使人了解

(adv.) **willy-nilly**
隨隨便便地；不管三七二十一

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Interestingly, if multiple hydras go through this shearing process, the resulting cells will form a single hydra. This is probably because their immune systems don't distinguish between self and others. And this even holds true for interspecies mixtures. However, hydras made from multiple species will fall apart because their cell types can't adhere properly. But when they're all in one place, they're kind of unstoppable. All animals have stem cells, which can divide and differentiate into specialized cell types. But for humans, they decline after embryonic development and become limited to specific parts of the body. Meanwhile, hydra stem cell levels remain constant and can help replace any part of their body and seemingly divide forever.

> 有趣的是，如果有幾隻水螅同時經歷這種撕碎的過程，得來的細胞會合成一隻水螅。這大概是因為牠們的免疫系統，分不出自己人和外人。即使是不同物種混在一起，也一樣如此。不過，由多個物種混合而成的水螅卻會散架，因為牠們的細胞類型無法好好黏合在一起。但只要牠們聚在一起，就幾乎勢不可擋。所有動物都有幹細胞，可以分裂並分化成專門的細胞類型。但對人類來說，幹細胞在胚胎發育之後就會減少，並被限制在身體的特定部位。相反，水螅的幹細胞數量一直維持穩定，可以補充身體任何部位的細胞，看來能無限分裂下去。

(n.) **shearing**
剪碎；撕碎

(adj.) **immune**
免疫的

(v.) **distinguish**
分辨；區別

(adj.) **interspecies**
跨物種的

(v.) **adhere**
黏附；黏合

(adj.) **unstoppable**
勢不可擋的

(n.) **stem cells**
幹細胞

(v.) **differentiate**
分化；分化成

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In a roughly 20-day span, a hydra has all new cells. This perpetual turnover prevents the buildup of age-related cellular damage, while

(adj.) **perpetual**
永不停歇的；持續不斷的

(n.) **turnover**
更替；汰換

enabling apparently boundless regeneration and reproduction. They aren't indestructible. But so long as nothing kills them, they can theoretically live forever, without aging. And many have indeed been persisting in labs for years on end, teaching us about development, regeneration, mortality, and tiny, tentacled freshwater life. All of this from some supposed pond scum.

> 大約 20 天的時間，水螅全身的細胞就全部換成新的。這種永不停歇的汰換，阻止了與年齡相關的細胞損傷累積，同時帶來看似無上限的再生與繁殖。牠們並不是打不死的。不過只要沒有東西殺死牠們，理論上牠們可以永遠活下去，永不老化。事實上，許多水螅在實驗室裡已經存活了好幾年，教會我們關於發育、再生與死亡的種種事，以及這些長著觸手的微小淡水生命。這一切，竟然都來自所謂的池塘浮渣。

(n.) **buildup**
累積；積聚

(adj.) **cellular**
細胞的

(adj.) **boundless**
無限的；無邊界的

(adj.) **indestructible**
不可摧毀的；打不死的

(adv.) **theoretically**
理論上

(n.) **mortality**
死亡；生命終結