


生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	負鼠假死以躲避捕食者 (Opossums Feign Death to Evade Predators)
生物系統 LIVING SYSTEM	負鼠 (Opossums)
功能類別 FUNCTIONS	#保護免受動物傷害 #Protect From Animals
作用機制標題	許多動物使用一種被稱為死亡或強直不動的現象，作為最後的手段裝死，並避免被捕食者殺死。Many animals use a phenomenon known as thanatosis or tonic immobility as a last resort to appear dead and avoid being killed by predators.
生物系統/作用機制示意圖 (確認版權、註明出處；畫質)	 <p>https://asknature.org/wp-content/uploads/2021/08/35415592643_1f4f2a58db_o-1440x598.jpg</p>  <p>https://www.flickr.com/photos/43322816@N08/11713828454</p>
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	

前言

負鼠 (opossum) 表現這種行為非常神奇，人們因此它們的名字 “playing possum” 命名 ‘裝死’ (“玩負鼠”)。當掠食者攻擊負鼠並阻止任何逃跑的機會時，負鼠會側臥，肌肉僵硬，身體彎曲，對觸摸沒有反應——一直到腳趾。他們的呼吸和心跳減慢，變得難以察覺。他們的嘴巴張開著，滿是唾液。他們的舌頭變成藍色並伸出來。它們排出尿液和糞便（以及相關的難聞氣味）。他們的眼睛仍然睜著，但一動也不動。

從表面上看，它們看起來已經死了，而掠食者通常會離開。掠食者天生本能地 (hard-weird) 只攻擊活的獵物，或避免去分解含有毒素的肉。儘管大多數負鼠的身體功能幾乎都關閉了，但它們仍然保持足夠的警覺來監控正在發生的事情。當他們感覺到危險已經過去時，他們會在一分鐘內或有時在幾個小時後 “復活 (come back to life)” 並移到安全的地方。

策略

裝死用更科學地方式稱為假死 (death-feigning or thanatosis)。但這不是演戲。這根本不是自願的。它是一個內置的生理防禦系統。身體的神經系統會引發一系列神經化學物質和激素，這些化學物質和激素會極大地影響大腦許多部位以及全身器官的功能。當捕食者接近時，它與 “凍結” 不同。生物這樣做是為了保持安靜和隱藏，但如果被發現，它們已經做好準備並能夠快速移動。在假死中，身體無法移動，因此許多科學家將這種現象稱為 “緊張性麻痺 (僵直不動)”。(在這種情況下，與肌肉 “張力” 有關，指的是肌肉的長時間收縮。) 不僅負鼠會裝死。冷血爬行動物，如豬鼻蛇 (hognose snake)，腹部向上翻轉並保持僵硬，嘴巴張開，舌頭伸出。他們經常從嘴裡噴出血液，並從肛門腺中散發出難聞的分泌物。鳥會這樣做。蜜蜂這樣做。甚至其他類型的蟲也會這樣做。

侏儒蚱蜢呈現僵硬不動，可以通過多種方式發揮作用。被青蛙逼到牆角的蚱蜢擺出僵硬的姿勢，使它們變得更大，並暴露出它們的脊椎——這使得它們更難被青蛙吞下。雄性螳螂這樣做是為了避免被剛剛交配的雌性吃掉。奇怪的是，雄性蜘蛛為雌性提供了一隻用絲綢包裹的死昆蟲，然後扮演假死以避免自己被吃掉。它們被和禮物一起拖走，當雌性開始進食時，雄性從死亡狀態中醒來，並與分心的雌性交配。

潛力

如此多的不同物種經歷強直不動的事實顯示它可以成為一種有效的防禦機制。直到最近，科學家們才認識到人類也經歷它。

面對危及生命的暴力情況，許多人陳述突然感到無法控制的癱瘓——無法移動或說話。雖然其他動物似乎通常能夠在危險過去後恢復正常功能，但人類通常不能。他們的系統繼續對危險的感覺做出反應。那些經歷過創傷的人通常會因無法控制的反應而感到內疚和/或被污名化 (guilt-ridden and/or stigmatized)。更多的研究來了解觸發強直性不動的生理機制具有開發治療和醫學治療以減輕遭受創傷後壓力的人的症狀的巨大潛力。

Introduction

Opossums perform this behavior so spectacularly, people named it after them: “playing possum.” When predators attack opossums and block any chance at escape, opossums lie on their sides, their muscles rigid, their bodies flexed and unresponsive to touch—right down to their toes. Their breathing and heartbeats slow down and become hardly perceptible. Their mouths, frothy with saliva, hang open. Their tongues turn blue and dangle out. They discharge urine and feces (and the associated unpleasant smells). Their eyes remain open, but unmoving.

By all appearances, they look dead, and predators usually move on. The predators are hard-wired either to attack only live prey or to avoid decomposing flesh that harbors toxins. Although most of the opossums’ body functions all but shut down, they remain alert enough to monitor what’s going on. And when they sense that the danger has passed, they “come back to life”—within a minute or sometimes after a few hours—and move to safety.

The Strategy

(Playing possum is known more scientifically as death-feigning or thanatosis. But it's not acting. It's not voluntary at all. It's a built-in physiological defense system that is automatically triggered as a last-resort response to an otherwise inescapable death. The body's nervous system sets off a cascade of neurochemicals and hormones that dramatically affect the function of the many parts of the brain, as well as organs throughout the body. It's distinct from "freezing" when a predator approaches. Organisms do that to keep quiet and hide, but they are ready and able to move fast if they are detected. In thanatosis, the body cannot move, so many scientists refer to the phenomenon as "tonic immobility." ("Tonic," in this context, relating to muscle "tone" and referring to a prolonged contraction of muscles.) Not only possums play possum. Cold-blooded reptiles such as hognose snakes flip belly-up and remain rigid, with mouth open and tongue hanging out. They often spew blood from their mouth and emit a vile-smelling secretion from anal glands. Birds do it. Bees do it. Even other types of bugs do it. Pygmy grasshoppers show that tonic immobility can work in various ways. Cornered by frogs, the grasshoppers assume a rigid pose that makes them larger and exposes their spines—making them much harder for the frogs to swallow. Male praying mantises do it to avoid being eaten by larger females they have just mated with. In a curious twist on that, male nursery web spiders offer females a dead insect wrapped in silk and then play possum to avoid being eaten themselves. They are dragged along with the gift, and when the females start eating, the males come out of their thanatosis and mate with the distracted females.)

The Potential

The fact that so many different species experience tonic immobility shows that it can be an effective defense mechanism. Only recently, scientists have recognized that humans also experience it.

Confronted by violent life-threatening situations, many people report feeling suddenly and uncontrollably paralyzed—unable to move or speak. While other animals seem generally able to revert to normal functioning when the danger is past, people often cannot. Their systems continue to respond to feelings of danger. Those who experience traumas are often guilt-ridden and/or stigmatized for a reaction that they cannot control. More research to understand the physiological mechanisms that trigger tonic immobility hold great potential to develop therapies and medical treatments to alleviate symptoms of people suffering post-traumatic stress.

文獻引用 (REFERENCES)

“在輕度刺激和裝死期間，監測了四隻自由放養的美洲負鼠 *Didelphis marsupialis* 的心率、呼吸頻率和體溫。…反應的特點是不動、俯臥位和身體僵硬。嘴巴張開，動物對觸摸沒有反應。假死總是伴隨著流涎、排尿、排便和陰莖勃起（男性）。心率降低了 46%……呼吸頻率降低了 30%。……在裝死的過程中，動物是完全清醒的。……”

Behavioral Ecology and Sociobiology | Jan. 15, 2018 | Rosalind K. Humphreys and Graeme D. Ruxton

“致死病——也被稱為假死，我們認為更恰當的是緊張性麻痺 (tonic immobility) ——是一種被報導不足但引人入勝的反捕食者策略，在捕食序列的後期被不同的獵物採用，並且經常在身體接觸捕食者後。裝死被認為可以抑制捕食者的進一步攻擊，並減少捕食者進一步制服獵物的感知需求。這種行為可能存在於比目前描述的更多的分類群中。在人類中的發生是一種更進一步、更近期的研究，它為心理學領域提供了機會，並可能對創傷後治療產生重要影響。”

Behavioral Ecology and Sociobiology | Jan. 15, 2018 | Rosalind K. Humphreys and Graeme D. Ruxton

“Heart rate, respiratory rate and body temperature of four free-ranging American opossums, *Didelphis marsupialis* ... were monitored during mild provocation and during death feigning ('playing possum').

“Thanatosis—also known as death-feigning and, we argue more appropriately, tonic immobility (TI)—is an under-reported but fascinating anti-predator strategy adopted by diverse prey late on in the predation sequence, and frequently following physical contact by the predator. TI is thought to inhibit further attack by predators and reduce the perceived need of the predator to subdue prey further. The behaviour is probably present in more taxa than is currently described. ... [T]he occurrence of TI in humans is a further, more recent avenue of research, with opportunities for the fields of psychology and potentially important implications for post-trauma therapy treatments.”

參考文獻清單與連結 (REFERENCE LIST) **Harvard** 或 **APA** 格式

Harvard Review of Psychiatry | July/August 2015 | Kasia Kozłowska, Peter Walker, Loyola McLean, and Pascal Carrive

延伸閱讀: **Harvard** 或 **APA** 格式 (取自 **AskNature** 原文; 若為翻譯者補充, 請註明)

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AskNature 原文連結

<https://asknature.org/strategy/opossums-feign-death-to-evade-predators/>

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