Scientists discover how starfish get 'legless'

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Photograph of a specimen of the common European starfish Asterias rubens with a regenerating arm. Starfish shed arms (autotomy) when attacked by predators and then regenerate a new arm to replace the lost arm. Research by scientists at Queen Mary University of London have uncovered the mechanisms of autotomy by identifying a neurohormone that promotes arm loss in starfish. Credit: Professor Maurice Elphick / Queen Mary University of London

Researchers at Queen Mary University of London have made a discovery about how starfish manage to survive predatory attacks by shedding their own limbs. The team has identified a neurohormone responsible for triggering this remarkable feat of self-preservation. The study is published in the journal *Current Biology*.

Autotomy, the ability of an animal to detach a body part to evade predators, is a well-known survival strategy in the animal kingdom. While lizards shedding their tails are a familiar example, the mechanisms behind this process remain largely mysterious.

Now, scientists have unveiled a key piece of the puzzle. By studying the common European starfish, Asterias rubens, they identified a neurohormone akin to the human satiety hormone, cholecystokinin (CCK), as a regulator of arm detachment.

Furthermore, the scientists propose that when this neurohormone is released in response to stress, such as a predator attack, it stimulates the contraction of a specialized muscle at the base of the starfish's arm, effectively causing it to break off.

Remarkably, starfish possess incredible regenerative abilities, allowing them to grow back lost limbs over time. Understanding the precise mechanisms behind this process could hold significant implications for regenerative medicine and the development of new treatments for limb injuries.

Dr. Ana Tinoco, a member of the London-based research group who is now working at the University of Cadiz in Spain, explained, "Our findings shed light on the complex interplay of neurohormones and tissues involved in starfish autotomy. While we've identified a key player, it's likely that other factors contribute to this extraordinary ability."

Professor Maurice Elphick, Professor of Animal Physiology and Neuroscience at Queen Mary University of London, who led the study, emphasized its broader significance. "This research not only unveils a fascinating aspect of starfish biology but also opens doors for exploring the regenerative potential of other animals, including humans. By deciphering the secrets of starfish self-amputation, we hope to advance our understanding of tissue regeneration and develop innovative therapies for limb injuries."

More information: Discovery of a neuropeptide that acts as an autotomy-promoting factor, *Current Biology* (2024). DOI: 10.1016/j.cub.2024.08.003. www.cell.com/current-biology/f … 0960-9822(24)01079-0

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