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Commentary

SHELL RESPONSIBILITY IN MAINTAIN NEUTRAL MOBILITY IN CEPHALOPOD MOLLUSCS

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INTRODUCTION

Any animal belonging to the molluscan order cephalopoda, such as an octopus, cuttlefish, or nautilus, is a cephalopod. A large head, bilateral body symmetry, and a set of arms or tentacles that have been adapted from the original molluscan foot are the distinguishing features of these only oceanic creatures. Due to their widespread capacity to spray ink, fishermen occasionally refer to cephalopods as inkfish. During the Ordovician era, cephalopods represented by early nautiloids became prominent. The coleoidea subclass, which comprises octopuses, squid, and cuttlefish, and the nautiloidea subclass are the only two surviving, distantly related subclasses of the class. The only living cephalopods with a genuine exterior shell are nautiluses. However, the ectoderm is what creates the shell of every molluscan. Cephalopods most frequently move through the air using jet propulsion. A cephalopod, such as an octopus or squid, will quickly eject water out of its muscular mantle chamber, which is utilised to deliver oxygenated water to its gills, in order to travel by jet propulsion.

The nervous systems of cephalopods are the most complex of any invertebrate species, and their brain-to-body mass ratio is intermediate between that of endothermic and ectothermic vertebrates [1]. Cephalopods are regarded as the most intelligent invertebrate species. They also have highly developed senses and large brains. The ability of captive cephalopods to crawl out of their aquariums, move across the lab floor, enter another aquarium to feed on the crabs, and then return to their own aquarium has also been documented. Some cephalopods have the ability to fly. Although cephalopods are not especially aerodynamic, they are able to travel these astounding distances thanks to jet-propulsion, in which water is still ejected from the funnel as the organism flies. The animals actively controlled lift force with body posture as they extended their fins and tentacles to form wings [2]. The majority of cephalopods have a combination of skin elements that respond to light. The nautilus has a unique method for propulsion and buoyancy that capitalises on the compressibility of gas. A nautilus has gas chambers inside its shell that it uses as floatation.

The majority of cephalopods use eyesight to identify potential threats and prey as well as to communicate with one another. As a result, cephalopod vision is keen; training trials have revealed that the common octopus can recognise differences in object brightness, size, shape, and orientation. Cephalopod eyes work similarly to shark eyes because to their morphological structure, but they are built differently since they lack a cornea and have an everted retina [3]. Eyes of cephalopods are likewise sensitive to the polarisation direction of light. The eyes of nautiluses, unlike those of many other cephalopods, lack a solid lens despite having a highly developed eye structure. As their chromatophores expand or contract, cephalopods can quickly alter their colours and patterns for active camouflage or signalling purposes. There is evidence that skin cells, specifically chromatophores, may detect light and adjust to light conditions independently of the eyes, even though colour changes appear to rely mostly on vision input. During periods of peaceful and active sleep, the octopus alters the colour and texture of its skin [4].

Even while most cephalopods have jet propulsion, it is a much more energy-intensive form of propulsion than fish use on their tails. A waterjet powered by propellers is more effective than a rocket. As an animal becomes larger, the relative effectiveness of jet propulsion declines even further; larvae are significantly more effective than juveniles and adults [5]. Fins and tentacles are now utilized to maintain a constant velocity instead of jet propulsion, which has been less prevalent since the Paleozoic era when competition with fish created an environment where efficient mobility was essential to life. The stop-start motion supplied by the jets continues to be beneficial for producing bursts of high speed, not least when grabbing prey or avoiding predators, even though jet propulsion is never the exclusive means of propulsion. Cephalopods are the quickest marine invertebrates as a result, and they can outrun the majority of fish. In the squid, the fins flap every time a jet is emitted, enhancing the thrust, and they are then stretched between jets to support the jet motion. When the muscles in the mantle cavity contract, spent water is evacuated through the hyponome, which is a fold in the mantle. Oxygenated water is absorbed into the mantle cavity to the gills. The organ's posterior and anterior ends differ in size, which affects how quickly the organism can make a jet. For an animal with a given mass and form, the velocity of the organism can be predicted with accuracy.

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