

Perivisceral coelomic fluid as a mediator of spawning induction in tropical holothurians

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Summary

Holothurians are among the most commercially valuable echinoderms for which successful spawning induction under laboratory conditions is still difficult to obtain on a reliable basis. The present study demonstrates that the transfer of perivisceral coelomic fluid (PCF) can be used as a reliable tool to induce spawning in mature individuals. PCF collected from holothurians that had been in the typical spawning posture, without shedding gametes, for ca. 20 min triggered spawning in 71 to 100% of conspecifics. The individuals responded to the injection of a 2–3 ml aliquot by displaying the spawning posture within 30–62 min and by massive gamete broadcast 57–83 min later. The results varied according to the time of PCF collection with respect to the spawning activity of the donor and the amount of PCF injected. The inductive substance was found not to be sex-specific since positive responses were observed in individuals of the same or opposite sex as the donor. The PCF of a spawning donor was also active when added to the surrounding seawater, as it induced the typical posturing in 47–65% of mature individuals and subsequent gamete release in 20–31% of them less than 85 min later. PCF collected from immature or non-spawning individuals did not induce spawning. Although most experiments were performed with *Bohadschia argus*, similar results were obtained with *B. marmorata*, *Holothuria leucospilota* and *H. atra*. Inter-specific trials were also successful, inferring that the chemical involved is not species-specific. Nonetheless, PCF from spawning asteroids and echinoids did not induce spawning behaviour or gamete release in holothurians. The results showed that holothurian PCF acts as a carrier of inductive substances during spawning. Its efficacy even when diluted in seawater could partly explain the epidemic and synchronous spawning observed in some holothurian populations.

Key words: *Bohadschia argus*, *Bohadschia marmorata*, echinoderm, *Holothuria atra*, *Holothuria leucospilota*, holothurian, holothuroidea, perivisceral coelomic fluid, sea cucumber, spawning induction

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