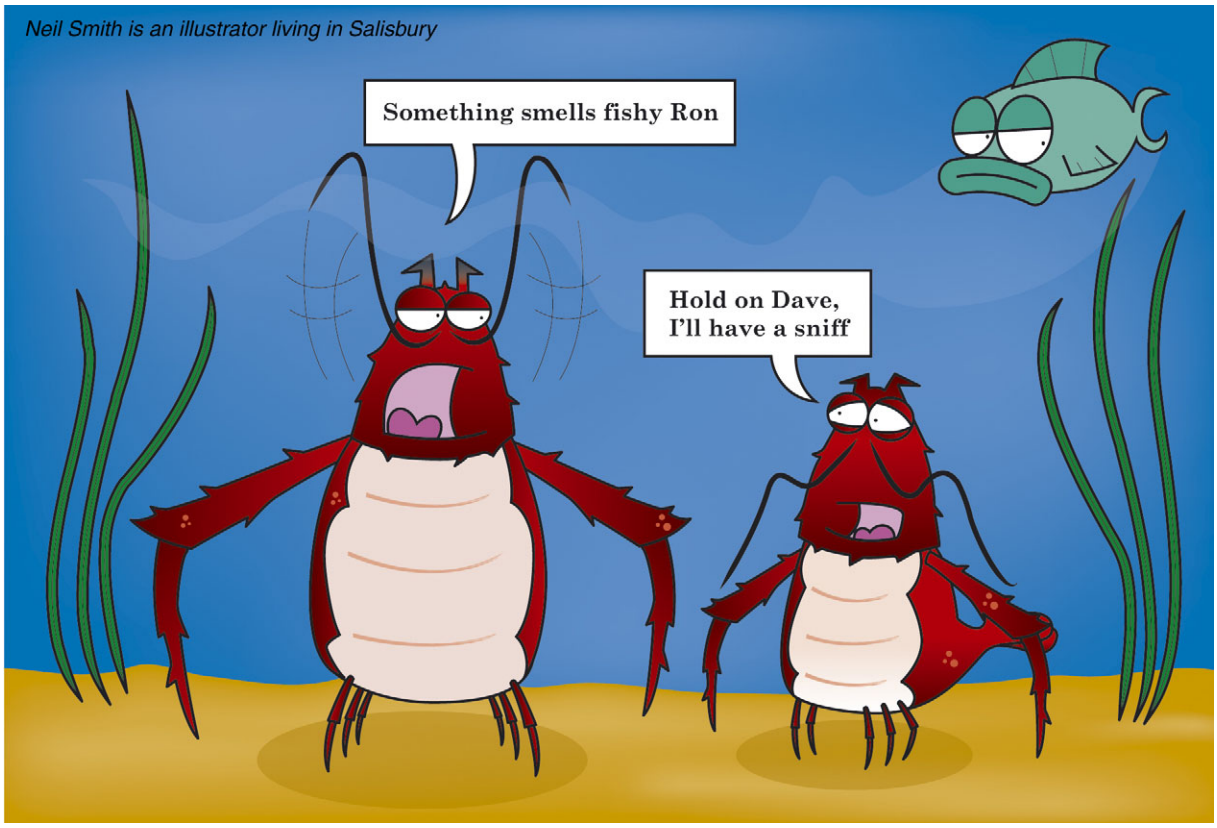
SPINY LOBSTERS SNIFF BY FLICKING



When spiny lobsters sniff out the lay of the land, they wave their scent-sensitive antennules through odour plumes that waft their way. According to Mimi Koehl from the University of California, Berkeley, spiny lobsters 'sniff' by rapidly flicking their antennules downwards before slowly lifting the antennule up. But how do the flicking movements affect the way that odour molecules get picked up by scent receptors on the antennules' aesthetascs? Koehl, Matthew Reidenbach and Nicole George built a large scale model of an antennule from clay, complete with aesthetascs and guard hairs made from Pyrex©. Next the team reproduced the antennule's flicking movements in slow motion in a tank filled with mineral oil, while visualising the fluid flows around the Pyrex© aesthetascs with a plane of laser light (p. 2849).

According to Koehl, the fluid flowed rapidly through the hair and aesthetasc network as the antennule swept downward, completely replacing the fluid in contact with the scent-sensitive aesthetascs. Then the fluid remained trapped by the guard hairs and aesthetascs as the model antennule slowly returned to its starting point. Knowing that a return 'flick' could take as long as 0.5 s, Koehl and her team calculated that this would be long enough for 25% of the odour molecules trapped in the fluid to diffuse through to the aesthetascs' scent receptors, allowing the lobsters to take a good sniff at any scent that drifted by.

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Reidenbach, M. A., George, N. and Koehl, M. A. R. (2008). Antennule morphology and flicking kinematics facilitate odor sampling by the spiny lobster, *Panulirus argus*. *J. Exp. Biol.* **211**, 2849-2858.

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