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Studies may underestimate exposure to bisphenol A

Bisphenol A (BPA) is a chemical found in polycarbonate plastic and other food containers (including baby bottles and reusable water bottles). More than 8 billion pounds of BPA are produced each year, and the chemical can be detected in almost every water body. Human exposure to BPA, largely through diet, is practically unavoidable, and measurable quantities of the chemical exist in more than 90% of people in the US.

The amount of BPA to which people are exposed on a daily basis is not precisely known, nor are the potential adverse effects of this exposure. But because BPA is an endocrine disruptor that can bind to steroid receptors, affecting estrogen, testosterone and thyroid functions, multiple studies have evaluated the effects of BPA in animal models. In these studies, BPA is usually administered as a single dose. New work now suggests that these single-dose tests may underestimate BPA exposure in mice.

The new study, led by Cheryl S. Rosenfeld (University of Missouri, Columbia), showed that BPA bioavailability was greater after continuous dietary exposure than after single-dose administration in mice (*Environ. Health Perspect.* doi:10.1289/ehp.1003385; published online 6 June 2011). Dietary administration seems to be a more relevant experimental model for human exposure to BPA.

The adaptable cuttlefish

In addition to changing their skin patterns and coloration, animals can change their posture to help camouflage themselves. For instance, field observations suggest that the cuttlefish can tailor its arm posture to match nearby objects. A recent study provides the first experimental evidence that the common European cuttlefish (*Sepia officinalis*) uses visual cues from different backgrounds to control such arm postures (*Proc. R. Soc. B.* doi:10.1098/rspb.2011.0196; published online 11 May 2011).

Roger Hanlon of the Marine Resources Center in Woods Hole, MA and colleagues presented 10 cuttlefish with three separate backgrounds. These backgrounds consisted of stripes that were horizontal, vertical or diagonal (relative to the animal's main body axis). For each cuttlefish on each substrate, the researchers measured the angle of the cuttlefish's arm that was closest to the background, relative to the horizontal axis. The cuttlefish moved their arms to match the angle of the stripes but did not move their arms when in front of a blank gray wall.

These results show that arm posture, like many other types of camouflage behavior in cuttlefish, is determined by visual information. The authors suggest that further studies could examine the role of the visual background in overall body orientation of cuttlefish and other cephalopods.

An alternative pain reliever

For the first time, chemists have successfully synthesized conolidine, a natural product with analgesic potential. Experiments in mice suggest that conolidine might effectively reduce a certain type of pain without causing some of the side effects associated with opioids, drugs that are commonly used to treat chronic pain (*Nat. Chem.* **3**, 449–453; 2011).

Conolidine was first isolated from the bark of the tropical plant *Tabernaemontana divaricata* several years ago (*Chem. Biodivers.* **1**, 646–656; 2004). This plant, known as the pinwheel flower, is used in traditional Chinese, Ayurvedic and Thai medicines. Its applications have included the treatment of fever, pain, scabies and dysentery. Though compounds similar to conolidine have been shown to have analgesic properties, researchers had been unable to test conolidine's properties because it is present at such low levels in *T. divaricata*.

Glenn Micalizio and his team of chemists at the Scripps Research Institute in Jupiter, FL used a type of reaction they had recently developed to synthesize conolidine. They then approached Laura Bohn, a pharmacologist at Scripps, about testing the biological activity of conolidine. Conolidine reduced inflammatory pain in mice through a mechanism that differs from that used by opioids. Future studies will investigate precisely how conolidine reduces pain.