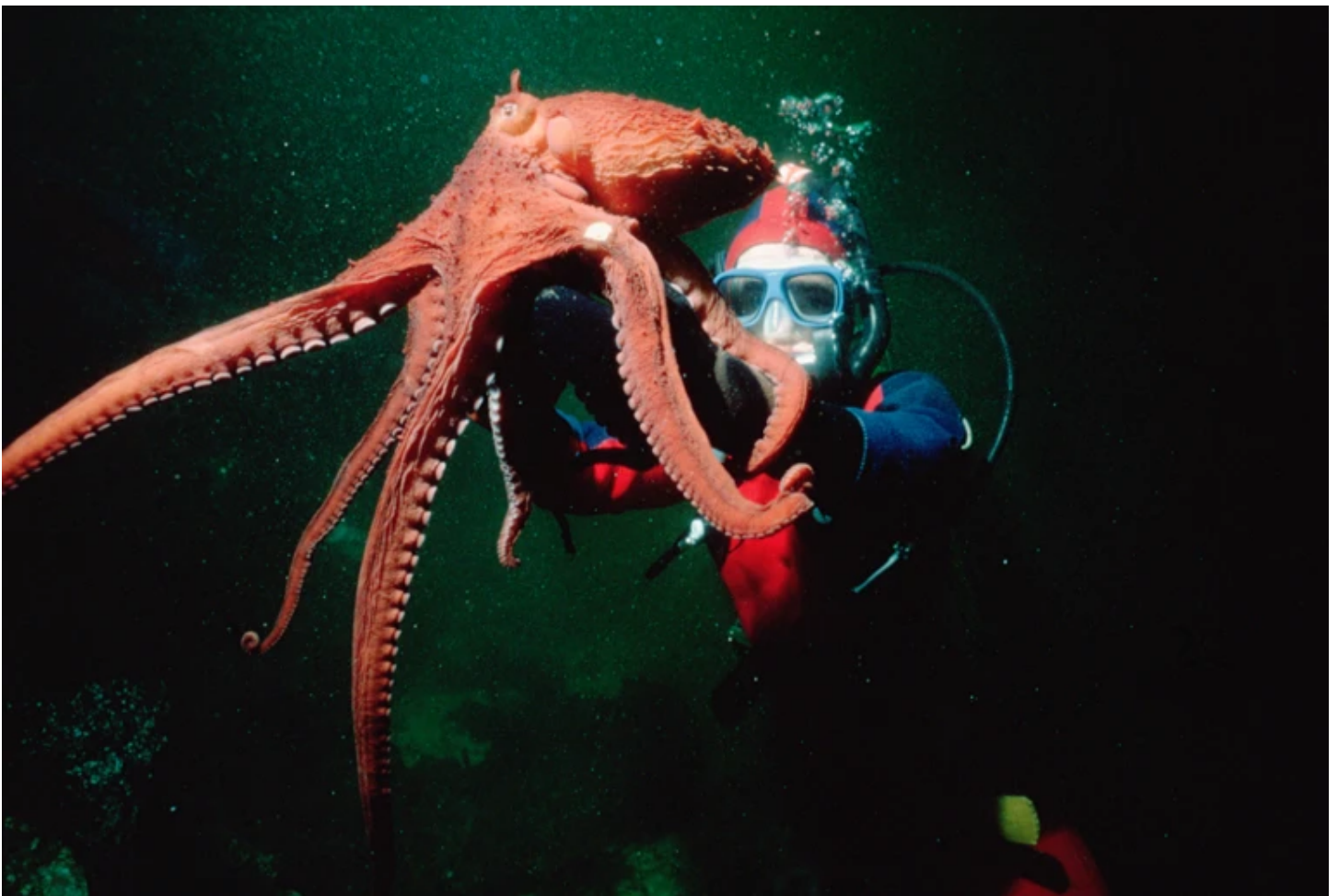


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## Octopuses used in research could receive same protections as monkeys

For the first time in the United States, research with cephalopods might require approval by an ethics committee.

[Sara Reardon](#)



A giant Pacific octopus (*Enteroctopus dofleini*) is weighed and tagged by a biologist. Credit: Fred Bavendam/Minden Pictures/Alamy

Cephalopods such as octopuses and squid could soon receive the same legal protection as mice and monkeys do when they are used in research. On 7 September, the US National Institutes of Health (NIH) asked for feedback on proposed guidelines that, for the first time in the United States, would require research projects involving cephalopods to be approved by an ethics board before receiving federal funding.

“A growing body of evidence demonstrates that cephalopods possess many of the requisite biological mechanisms for the perception of pain,” the NIH [wrote on its website](#). Furthermore, cephalopods have advanced learning and cognitive abilities, and seem to respond

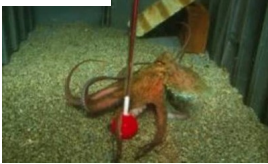
to anaesthesia in a similar way to mammals, it said. But the agency noted that because cephalopod brains are so different from those of mammals, defining what ethical research should look like will require further study.

The US Public Health Service (PHS) sets guidelines for the use of animals in science for both the NIH and the National Science Foundation, defining animals as any vertebrate. Before a research project receives federal funds, scientists must obtain approval from their institutions' ethics boards, which evaluate protocols to ensure compliance with PHS standards.

## A welcome move

But there are no such restrictions around the humane treatment of invertebrates – animals with no backbone that include insects, worms and cephalopods. Late last year, members of the US House of Representatives and US Senate sent letters to the NIH and PHS, asking that research policies redefine 'animal' to include cephalopods. The amendment now proposed by the NIH would require institutions' ethics committees to evaluate cephalopod research.

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"We are really happy to see NIH proposing this guidance," says Catharine Krebs, a medical-research specialist at the animal-rights non-profit organization Physicians Committee for Responsible Medicine in Washington DC. Krebs says that the NIH proposal isn't perfect – in her view, individual ethics committees often apply rules inconsistently and her organization would ultimately like to see cephalopods left out of research entirely. "But we're counting this as a win," she says.

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Cephalopod researchers also welcome the move. Although the number of federally funded scientists studying cephalopods in laboratories is small, it is growing, because researchers who previously used other model animals, such as mice, have become interested in studying the basic biology of the cephalopod nervous system. "It's hard for me to see how this will be a hindrance," says Clifton Ragsdale, an octopus biologist at the University of Chicago in Illinois. "Things that are good for animal welfare are also good for the quality of research."

## Concerns remain

But Robyn Crook, a marine biologist at San Francisco State University in California, says the issue is complicated – because so little is known about cephalopod biology, many scientists don't know how to ensure the animals' welfare. For instance, researchers know that opioid drugs suppress pain in mice, but no one knows whether pain receptors in different cephalopod species respond in the same way. Without understanding that, Crook says, it's hard to tell whether an anaesthetic has dulled an animal's pain or has simply relaxed the animal's muscles so that it can't pull away when poked. Crook's group has been comparing several painkillers in bobtail squid, but Crook says that they haven't had much luck figuring out which drugs are the most effective, despite testing hundreds of animals. "Ninety per cent of what we tried was inconclusive," she says.

Crook hopes that the NIH will provide funding for researchers to study questions such as this specifically to improve cephalopod welfare in the laboratory.

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The NIH acknowledges the gaps in understanding of cephalopod biology. In a statement to *Nature*, the agency said that certain aspects of cephalopod research, such as pain perception and species-specific husbandry, are still being studied. "Applying the PHS policy to cephalopods is challenging at this time," the NIH wrote. However, it added, several of the PHS guidelines on the use of animals in research can already be applied. These include requirements that research be performed only if it advances scientific knowledge and benefits society, that investigators use as few animals as possible and that discomfort is minimized.

## International guidelines

Outside the United States, researchers have already begun to address such issues. In some countries, including the United Kingdom, Switzerland, Norway, Canada, Australia and New Zealand, ethical approval is required for certain types of cephalopod research. Graziano Fiorito, a marine biologist at the Anton Dohrn Zoological Station in Naples, Italy, led an international team of scientists earlier this year to develop recommendations for housing, care and management of cephalopods in research. The advice included specifications for water quality, animal density, anaesthesia and humane euthanasia.

The European Commission is expected to adopt the list of minimum requirements into law around the end of the year and to institute a training certification across the European Union, says Fiorito. Currently, each European country has its own laws for cephalopod research. He hopes that the PHS will end up adopting similar guidelines so as to standardize cephalopod care around the world. "I think that it is very good that the United States will start moving toward standardization."

The NIH is gathering feedback on the proposal until 22 December, but it does not yet have a date at which the guidelines will be instituted.

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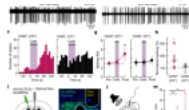
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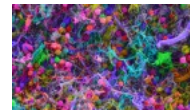
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