

Fish may actually feel pain and react to it much like humans

April 29 2009, by Brian Wallheimer

(PhysOrg.com) -- Fish don't make noises or contort their faces to show that it hurts when hooks are pulled from their mouths, but a Purdue University researcher believes they feel that pain all the same.

Joseph Garner, an assistant professor of animal sciences, helped develop a test that found goldfish do feel [pain](#), and their reactions to it are much like that of humans. A paper detailing the finding was published in the early online version of the journal *Applied [Animal Behaviour Science](#)*.

"There has been an effort by some to argue that a fish's response to a noxious stimuli is merely a reflexive action, but that it didn't really feel pain," Garner said. "We wanted to see if fish responded to potentially painful stimuli in a reflexive way or a more clever way."

Garner and Janicke Nordgreen, a doctoral student in the Norwegian School of Veterinary Science, attached small foil heaters to the goldfish and slowly increased the temperature. The heaters were designed with sensors and safeguards that shut off the heaters to prevent any physical damage to a fish's tissue.

Half of the fish were injected with [morphine](#), and the others received saline. The researchers believed that those with the morphine would be able to withstand higher temperatures before reacting if they actually felt the pain. However, both groups of fish showed a response at about the same temperature.

Because both groups of fish wriggled at about the same temperature, the researchers thought the responses might be more like a reflex than a cognitive reaction to experiencing pain. The reflexive response is similar to a person involuntarily moving a hand off a hot stove with which they had come into contact. The reaction happens before a person actually experiences pain or understands that they have been hurt.

Upon later observation in their home tanks, however, the researchers noticed that the fish from each group were exhibiting different behaviors.

"The fish given the morphine acted like they always had: swimming and being fish," Garner said. "The fish that had gotten saline - even though they responded the same in the test - later acted different, though. They acted with defensive behaviors, indicating wariness, or fear and anxiety."

Nordgreen said those behavioral differences showed that fish can feel both reflexive and cognitive pain.

"The experiment shows that fish do not only respond to painful stimuli with reflexes, but change their behavior also after the event," Nordgreen said. "Together with what we know from experiments carried out by other groups, this indicates that the fish consciously perceive the test situation as painful and switch to behaviors indicative of having been through an aversive experience."

Garner believes that the morphine blocked the experience of pain, but not behavioral responses to the heat stimulus itself - either because the responses were reflexive or because the morphine blocked the experience of pain, but not the experience of an unusual stimulus.

"If you think back to when you have had a headache and taken a painkiller, the pain may go away, but you can still feel the presence or

discomfort of the headache," Garner said.

Those with saline both experienced pain in the test, as well as responding to it, and were able to cognitively process that pain, thus causing the later fear and anxiety.

"The goldfish that did not get morphine experienced this painful, stressful event. Then two hours later, they turned that pain into fear like we do," Garner said. "To me, it sounds an awful lot like how we experience pain."

The findings could raise questions about slaughter methods and how fish are handled in research. Garner said standards of care could be revisited to ensure [fish](#) are being treated humanely.

Provided by Purdue University ([news](#) : [web](#))

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