Study suggests fish can experience 'emotional fever'

November 25 2015, by Bob Yirka

(Phys.org)—A small team of researchers from the U.K. and Spain has found via lab study that at least one type of fish is capable of experiencing 'emotional fever,' which suggests it may qualify as a sentient being. In their paper published in the journal *Proceedings of the Royal Society B*, the team describes their experiments with stressing zebra fish, how the fish reacted, and why they believe it should now be added to the list of organisms labeled as sentient beings.

Prior research has shown that mammals and birds and one species of lizard respond to stress by experiencing an increase in body temperature

on the order of 1 or 2 C°—a reaction that some have suggested indicates that the creature is a sentient being—one that is able to perceive or feels things, whether emotional or physically. The term sentient has also been used a lot in science fiction to describe extraterrestrial life that is intelligent enough to offer some form of interaction with humans, as is the case with most mammals and birds here on Earth. Unfortunately, to date, no such increase in body temperature related to stress has ever been reported in fish, which has left many labeling them as non-sentient and unable to feel either stress or pain, such as from being hooked on the end of a line. In this new effort, the researchers sought to find out if this is true.

The experiments by the researchers consisted of placing 72 zebra fish in a net in water that was 1 C° colder than was normal for them. They also had a control group that was left alone with no changes to their environment. All of the fish were then transferred to a tank that had sections heated to different levels, which the fish could access freely if they wished. The team watched to see which section the fish would swim to, and noted that those fish that had been stressed spent more time in the sections that were slightly warmer than normal, than did the control fish. Doing so caused the body temperature of the fish to rise from 2 to 4 C°, which the team claims showed the fish experienced elevated body temperatures in response to stress, demonstrating emotional fever, and therefore they should qualify as sentient beings.

More information: Sonia Rey et al. Fish can show emotional fever: stress-induced hyperthermia in zebrafish, *Proceedings of the Royal Society B: Biological Sciences* (2015). DOI: 10.1098/rspb.2015.2266

Abstract
Whether fishes are sentient beings remains an unresolved and controversial question. Among characteristics thought to reflect a low level of sentience in fishes is an inability to show stress-induced

hyperthermia (SIH), a transient rise in body temperature shown in response to a variety of stressors. This is a real fever response, so is often referred to as 'emotional fever'. It has been suggested that the capacity for emotional fever evolved only in amniotes (mammals, birds and reptiles), in association with the evolution of consciousness in these groups. According to this view, lack of emotional fever in fishes reflects a lack of consciousness. We report here on a study in which six zebrafish groups with access to a temperature gradient were either left as undisturbed controls or subjected to a short period of confinement. The results were striking: compared to controls, stressed zebrafish spent significantly more time at higher temperatures, achieving an estimated rise in body temperature of about 2–4°C. Thus, zebrafish clearly have the capacity to show emotional fever. While the link between emotion and consciousness is still debated, this finding removes a key argument for lack of consciousness in fishes.