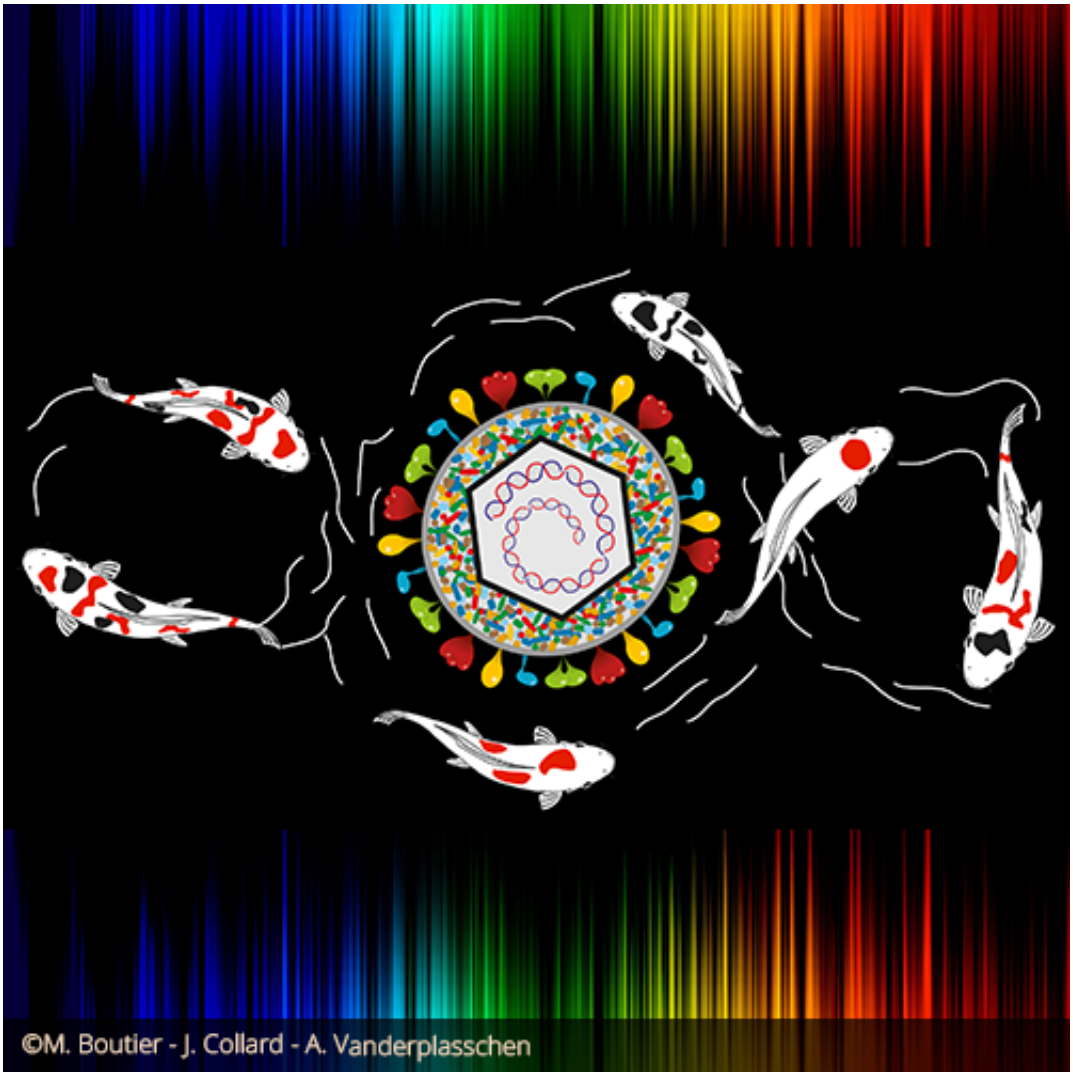
Fish express a form of fever related to that of humans

February 10 2017



Fish express a form of fever in response to infection. This can save their live. A study, lead by Professor Alain Vanderplasschen of the Laboratory of Immunology-Vaccinology of the Univeristy of Liège (FARAH), reveals that it is induced by the same molecule that triggers fever in humans.

The Laboratory of Immunology and Vaccinology of the University of Liège led by Professor Alain Vanderplasschen (FARAH) has been studying for a few years a virus, cyprinid herpesvirus 3 or CyHV-3, causing ravages on a global scale in common carp farms. Among fish species produced in aquaculture at a global scale, common carp is the third most important species with an annual production of 4 to 5 million tonnes. It is an essential component in the diet of millions of humans.

When studying carp infection by CyHV-3, as part of the development of a vaccine, the researchers observed an unexpected behavior of the fish: fishes grouped themselves near the heating system of their aquarium as if they were trying to warm up themself. This behavior is known in cold-blooded animals as behavioral fever. When infected, the animal tries to raise its temperature by moving, within its environment, to places warmer than those where it habitually resides.

To test the hypothesis that carp infected with CyHV-3 may express behavioral fever, the laboratory builded aquariums with several compartments within which a temperature gradient was established. Using this system, researchers found that non-infected carp choose to reside at 24°C, while infected carp moved voluntarily to the highest temperature of 32°C, resulting in a very rapid healing of the fish. In contrast, infected fish kept at 24°C all died from the infection. More surprisingly, researchers have identified a mechanism by which the virus delays the expression of this behavioral fever and has discovered that it is induced by the same molecule that triggers fever in humans.

The results of this research are published in the prestigious scientific journal *Cell Host & Microbe*. These results demonstrate that the behavioral fever of cold-blooded animals and the fever of warm-blooded animals (like humans) rely on common molecules acquired more than 400 million years ago. They also illustrate the benefits of fever and reveal that changes in the environment (global warming, changes in ecosystems, etc.) could have a real impact on animal species.

More information: Krzysztof Rakus et al. Conserved Fever Pathways across Vertebrates: A Herpesvirus Expressed Decoy TNF-α Receptor Delays Behavioral Fever in Fish, *Cell Host & Microbe* (2017). DOI: 10.1016/j.chom.2017.01.010

Provided by University de Liege