Mild fever helps clear infections faster, new study suggests

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It may be better to let a mild fever run its course instead of automatically reaching for medication, new University of Alberta research suggests.

Researchers found that untreated moderate fever helped fish clear their bodies of infection rapidly, controlled inflammation and repaired damaged tissue.

"We let nature do what nature does, and in this case it was very much a positive thing," says immunologist Daniel Barreda, lead author on the study and a joint professor in the Faculty of Agricultural, Life & Environmental Sciences and the Faculty of Science.

Moderate fever is self-resolving, meaning that the body can both induce it and shut it down naturally without medication, Barreda explains.

The health advantages of natural fever to humans still have to be confirmed through research, "but because the mechanisms driving and sustaining fever are shared among animals, it is reasonable to expect similar benefits are going to happen in humans," he adds.

That suggests we should resist reaching for over-the-counter fever medications, also known as non-steroidal anti-inflammatory drugs or NSAIDs for short, at the first signs of a mild temperature, he says.

"NSAIDS take away the discomfort felt with fever, but you're also likely giving away some of the benefits of this natural response."

The study helps shed light on the mechanisms that contribute to the benefits of moderate fever, which "has been evolutionarily conserved across the animal kingdom for 550 million years," Barreda notes. "Every animal examined has this biological response to infection."

Some species, such as fish, reptiles and insects, will even risk predation and decrease their reproductive success to move to temperatures in their environments that bring on natural fever.

"So the big question is, if animals will go to these great lengths, why do we take medication at the first signs of a fever?"

For the study, fish were given a bacterial infection and their behavior was then tracked and evaluated using machine learning. Outward symptoms were similar to those seen in humans with fever, including immobility, fatigue and malaise. These were then matched to important immune mechanisms inside the animals.

The research showed that natural fever offers "an integrative response that not only activates defenses against infection, but also helps control it," Barreda says.

The researchers found that fever helped to clear the fish of infection in about seven days—half the time it took for those animals not allowed to exert fever.

Fever also helped to shut down inflammation and repair tissues that had been injured.

"This works much like turning off a car, rather than leaving it running, after you are finished driving. It saves energy and prevents additional damage," Barreda notes.

The findings could also help veterinarians and livestock producers manage illness in the animals they work with, Barreda suggests.

"We can take advantage of this natural fever response and the tools we have generated to identify animals that are sick or that may need a vaccination booster. Focusing on a subset of the population saves time and is less costly."

Ultimately, Barreda hopes the findings will help strike a healthy balance

between treating fever and benefiting from it.

"In the long term, our goal is to determine how to best take advantage of our medical advances while continuing to harness the benefits from natural mechanisms of immunity."

The study is published in the journal *eLife*.

More information: Farah Haddad et al, Fever integrates antimicrobial defences, inflammation control, and tissue repair in a cold-blooded vertebrate, *eLife* (2023). DOI: 10.7554/eLife.83644

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