

## Why human pain can't tell us whether fish feel pain

Commentary on [Key](#) on Fish Pain

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**Abstract:** In his target article, Key (2016) reviews the neuroanatomy of human pain and uses what is known about human pain to argue that fish cannot experience pain. We provide three reasons why the conclusions reached by Key are unsupported. They consider (i) why it is not sufficient to conclude that only human neural structures can process conscious pain, (ii) why an understanding of pain in humans and non-human animals needs to be based within a framework of consciousness, and (iii) evidence already exists that fish treated with noxious stimuli lose the ability to perform normal behaviours: This was a behavioral proxy that Key proposed would provide good evidence for an animal to feel pain.

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The target article by Key (2016) is problematic on multiple grounds. First and foremost is the assumption that human pain processing is the standard for assessing pain processing in non-human animals. Yet many, Key included, agree that the process of convergent evolution allows different structures to perform the same function, so it is puzzling that Key maintains that only human structures can perform the function of conscious pain.

We agree that a central goal in understanding the feeling associated with pain is to determine the unique functional properties of consciousness, but to do so requires a theory of consciousness, which Key has not articulated, much less defended. In particular, arguments for animal consciousness do exist (Droege & Braithwaite, 2014; Edelman & Seth, 2009) and should be considered.

Key does an admirable job of articulating current understanding on the neuroanatomy of human pain, but he does not acknowledge the ongoing debates regarding the neuroanatomy of human consciousness (Block et al., 2014). There are good reasons to believe that global integration and attentional amplification are essential elements in consciousness. So the question is not whether fish have a cortex or an insula, but whether they have the functional capacity for global integration and attentional amplification. Key accuses others of a perfunctory attention to the neuroscience of pain, but he demonstrates a perfunctory attention to the neuroscience of fish.

In his conclusion, Key states that innate defensive behaviors cannot be used as a proxy for fish pain. Instead, he suggests that a good behavioral assay would involve the loss of a normal behavior (such as feeding or locomotion) rather than performance of a reflex behavior (such as an escape response). We agree with this conclusion and in fact, such an example has already been reported for trout, who show impaired avoidance of a novel object when treated with a noxious stimulus but are able to move and stay away from the novel object if given an analgesic (Sneddon et al., 2003).

While Key's conclusion that fish do not feel pain is unsupported, a challenge for animal researchers remains: positive evidence through a variety of behavioral measures for the integration of sensory-motor information is needed for the attribution of conscious pain.

## References

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