Fight or flight and the evolution of pain

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Hard wired into the survival mechanisms of all animals is the perception of pain. Different stimuli, such as heat or cold, foul odors, chemicals or a blunt blow can trigger pain receptors in the body that, in the blink of an eye, jolt the body into classic fight or flight responses.

Researcher Shigeru Saito, et. al. have performed the first evolutionary analysis of pain response in chickens by isolating the genes for pain receptors called TRPA1. They were able to examine the function of the receptor using different stimuli and in comparison with other vertebrate species. They found that heat stimulation activated chicken TRPA1, sharing similar thermal properties with other cold blood animals such as frog and reptile TRPA1 rather than mammalian and human TRPA1.

In addition, they identified for the first time in chickens that methyl anthranilate (MA), a repellent chemical for birds, also activates chicken TRPA1. MA-induced activity of TRPA1 varied among diverse vertebrate species and three key amino acid residues involved in the TRPA1 activity by MA were identified. The findings add to the understanding of the functional evolution of TRPA1 and its sensitivity to heat as well as its diversification among vertebrate species.

The study is published in *Molecular Biology and Evolution*.

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