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Scientists find that neurological changes can happen due to social status

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Researchers at Georgia State University have discovered that in one species of freshwater crustaceans, social status can affect the configuration of neural circuitry.

They found that dominant and subordinate crayfish differ in their behavioral responses when touched unexpectedly, and that those differences correlate with differences in neural circuits that mediate those responses.

The article was published this week in the Journal of Neuroscience. The research team included Edwards, Fadi A. Issa and Joanne Drummond of Georgia State, and Daniel Cattaert of the Centre de Neurosciences Integratives et Cognitives of the Universities of Bordeaux 1 and 2.

When dominant crayfish are touched unexpectedly, they tend to raise their claws, while subordinate animals drop in place and scoot backwards, said Donald Edwards, Regents' Professor of neuroscience at Georgia State.

In looking at the nervous systems of the animals, the researchers noticed differences in how neurons were excited to produce different reactions to being touched when the animals' behavioral status changed. The changes do not represent a wholesale rewiring of the circuits, Edwards said.

"There is reconfiguration going on, but it is probably a shift in the

excitation of the different neurons," he explained.

Neuroscientists at Georgia State are working on building computational models of the animals' nervous systems to learn more about how the neurons work in crayfish.

"If you can't build it, you don't know truly how it works," Edwards said.

More information: *Journal of Neuroscience*, 32(16):5638-5645. doi:10.1523/JNEUROSCI.5668-11.2012

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