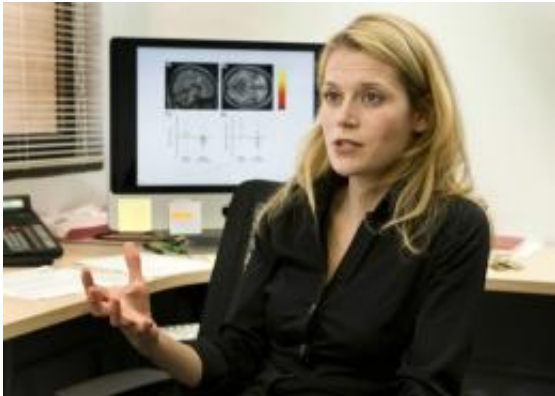


Researchers find genetic link between physical pain and social rejection

August 17 2009



Naomi Eisenberger

(PhysOrg.com) -- UCLA psychologists have determined for the first time that a gene linked with physical pain sensitivity is associated with social pain sensitivity as well.

Their study indicates that variation in the mu-opioid receptor gene (OPRM1), often associated with physical pain, is related to how much social pain a person feels in response to social rejection. People with a rare form of the gene are more sensitive to rejection and experience more brain evidence of distress in response to rejection than those with the more common form.

The research was published Aug. 14 in the early online edition of

[Proceedings of the National Academy of Sciences](#) and will appear in the print version in the coming weeks.

The findings give weight to the common notion that rejection "hurts" by showing that a gene regulating the body's most potent painkillers — mu-opioids — is involved in socially painful experiences too, said study co-author Naomi Eisenberger, UCLA assistant professor of psychology and director of UCLA's Social and Affective Neuroscience Laboratory.

In the study, researchers collected saliva samples from 122 participants to assess which form of the OPRM1 gene they had and then measured sensitivity to rejection in two ways. First, participants completed a survey that measured their self-reported sensitivity to rejection. They were asked, for example, how much they agreed or disagreed with statements like "I am very sensitive to any signs that a person might not want to talk to me."

Next, a subset of this group, 31 participants, was studied using [functional magnetic resonance imaging](#) (fMRI) at UCLA's Ahmanson-Lovelace [Brain Mapping](#) Center during a virtual ball-tossing game in which participants were ultimately socially excluded. Subjects were told that they would be connected over the Internet with two other players who were also in [fMRI](#) scanners and that they would all be playing the interactive ball-tossing game. In reality, however, participants were playing with a preset computer program, not other people.

Initially, participants were included in the activity but were then excluded when the two other "players" stopped throwing the ball to them.

"What we found is that individuals with the rare form of the OPRM1 gene, who were shown in previous work to be more sensitive to physical pain, also reported higher levels of rejection sensitivity and showed

greater activity in social pain-related regions of the brain — the dorsal anterior cingulate cortex and anterior insula — in response to being excluded," Eisenberger said.

The dorsal anterior cingulate cortex and anterior insula are brain regions often associated with the distress of physical pain. Previous research by Eisenberger and her colleagues has shown that these brain regions are also involved in the pain of social rejection.

"Although it has long been suggested that mu-opioids play a role in social pain — and there are convincing animal models that show this — this is the first human study to link this mu-opioid receptor gene with social sensitivity in response to rejection," Eisenberger said.

"These findings suggest that the feeling of being given the cold shoulder by a romantic interest or not being picked for a schoolyard game of basketball may arise from the same circuits that are quieted by morphine," said Baldwin Way, a UCLA postdoctoral scholar and the lead author on the paper.

Eisenberger argues that this overlap in the neurobiology of physical and social pain makes good sense.

"Because social connection is so important, feeling literally hurt by not having social connections may be an adaptive way to make sure we keep them," she said. "Over the course of evolution, the social attachment system, which ensures social connection, may have actually borrowed some of the mechanisms of the pain system to maintain social connections."

Source: University of California - Los Angeles

Citation: Researchers find genetic link between physical pain and social rejection (2009, August 17) retrieved 23 April 2024 from <https://medicalxpress.com/news/2009-08-genetic-link-physical-pain-social.html>

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