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## Genetics play vital role in knee pain sensitivity

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Genetics play a key role in knee pain sensitivity, according to a team of researchers studying knee osteoarthritis patients.

"This work was part of a larger study focused on the daily lives of couples in which one person has arthritis," said Lynn Martire, professor of human development and family studies, Penn State.

The researchers looked at how arthritis affects mood and interactions with each other.

"The biggest problem in arthritis is that a person becomes physically inactive because they are in pain, but if they don't move, then it makes them hurt more," she said. "As a supplement to the larger study, we collected genetic data from those who were willing to participate to determine if there were any associations with daily knee pain sensitivity."

Previous research focused on two specific genes, COMT and OPRM1, and how having one or more copies of a certain allele -- a specific version of the gene -- for either of these genes affects pain sensitivity. These studies looked at average pain severity between people with different genetic backgrounds but not in osteoarthritis patients specifically. In the present research, published in the *Scandinavian Journal of Pain*, the researchers focused on differences in the variability of knee pain and the level of pain following daily physical activity within individual osteoarthritis patients. According to Martire, within-person variability looks at whether patients who have more pain are less active, whereas between-person variability looks at whether patients are less active on those days when they have more pain.

As part of the study, 120 knee osteoarthritis patients went through a 22-day assessment protocol in which they wore an accelerometer to measure daily physical activity and reported on their pain three times a day using a questionnaire. According to Martire, reporting more pain variability throughout the day reflects increased sensitivity to pain after physical activity.

"Our results showed that the genotypes that had increased pain sensitivity were the opposite of what we predicted, but the context and the design of our experiment are different from previous work," said Martire.

The researchers predicted that patients with one or more copies of a certain allele in either COMT or OPRM1 would report having greater pain variability and more pain after daily physical activity. However, they found that patients with two copies of a different allele showed more pain variability and more pain at the end of the day as a result of physical activity.

"With such a novel study, part of the challenge was trying to make predictions because there's not a lot of other data out there," said Stephanie Wilson, graduate student in human development and family studies, Penn State.

"Previous studies looking at clinical populations compared different people within the arthritis group to each other and to healthy populations to try to associate their genotype with greater severity of pain. However, we were looking at day-to-day pain changes for a single person and its association with their genetics."

According to Martire, the biggest issue in arthritis is trying to get the patient to be more physically active. If these preliminary findings can be confirmed in a larger study, then tailored behavioral programs could be used that are sensitive to a person's genotype.

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Source:  
Penn State

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