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Research shows typical American diet can worsen chronic pain

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"We need to be concerned about the consequences our diet has on our bodies, and not just immediately with problems like weight gain, but also with long-term complications. That's what we set out to investigate in this study."

Sufferers of chronic pain are more susceptible to prolonged and pronounced health issues when practicing poor diet habits, according to new research published by University of Alabama at Birmingham

researcher Robert Sorge, Ph.D., and team in the *Journal of Pain*.

Sorge's study highlights the negative effects of poor diet quality with respect to recovery from hypersensitivity and susceptibility to chronic pain. The implications of the research could be significant.

"It is currently unknown whether increased pain is due to greater weight or poor diet quality, or both," said Sorge, an assistant professor in the Department of Psychology in UAB's College of Arts and Sciences. "This study shows us the direct link between poor diet quality and increased pain."

Sorge's team instigated the research looking to further explore the link between obesity and chronic pain. The two medical conditions are often comorbid, and their rates are rising.

In looking into the issue, the team focused on the effects of the Total Western Diet, in particular. TWD foods typically have fewer calories from protein and increased calories from carbohydrates and saturated and monounsaturated fats.

"They call it the Total Western Diet because it's a common pattern in societies in our part of the world—it's a problem particularly here in the U.S.," said Stacie Totsch, the paper's first author and a graduate student in Sorge's lab. "We need to be concerned about the consequences our diet has on our bodies, and not just immediately with problems like weight gain, but also with long-term complications. That's what we set out to investigate in this study."

Mice were fed the TWD so that researchers could investigate the functional and physiological consequences of a nutritionally poor diet in mice. After 13 weeks on the diet, the mice on the TWD showed a significant increase in fat mass and a decrease in lean mass.

Tests run on the mice also revealed increases in pro-inflammatory cytokines, signals that promote systemic inflammation, as well as increases in serum leptin, a hormone secreted by adipose tissue that acts to regulate long-term appetite and energy expenditure.

"Most obese people have increased levels of serum leptin and pro-inflammatory cytokines, so we saw the immediate health effects that the diet had on the mice," Sorge said. "Our next step was to look at how the unhealthy effects of the TWD corresponded to chronic pain. Did it make it any worse, and how?"

After utilizing the TWD, researchers introduced chronic pain to the study in order to better understand their link.

This part of the study showed that hypersensitivity to heat and touch was more pronounced and was significantly prolonged in the TWD-fed mice.

"Poor diet seems to have exacerbated the normal recovery period from this mild inflammatory insult," said Sorge. "Because poor diet heightens hypersensitivity, patients with chronic pain who regularly practice bad diet habits are likely to experience exaggerated pain responses and recovery from injury or surgery."

Specifically, prolonged exposure to poor diet quality resulted in an altered perception of pain through acute nociceptive sensitivity, systemic inflammation and persistent pain following chronic pain induction.

The paper detailing the research, "Total Western Diet alters mechanical and thermal sensitivity and prolongs hypersensitivity following Complete Freund's Adjuvant in mice," was published in the *Journal of Pain* online in October.

"A complete understanding of the impact of diet can aid in treatment

and recovery dynamics in human clinical patients," said Sorge. "Now that we know more about the link between diet and inflammation, we can begin thinking about applications to solve the problem."

More information: Stacie K. Totsch et al. Total Western Diet (TWD) alters mechanical and thermal sensitivity and prolongs hypersensitivity following Complete Freund's Adjuvant in mice, *The Journal of Pain* (2015). DOI: 10.1016/j.jpain.2015.10.006

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