Study: Sugar binges increase risk of inflammatory bowel disease

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Short-term increases in sugar consumption could increase the risk of inflammatory bowel disease and have a significant impact on our health, a new study out of the University of Alberta suggests.

In a study published in *Scientific Reports*, U of A researchers found that mice had an increased susceptibility to chemically induced colitis and more severe symptoms after only two days of a high-sugar diet compared with those eating a balanced diet.

Karen Madsen, who specializes in diet and its effects on inflammatory bowel disease, said the results echo what many patients with colitis have been saying for a long time: small changes in their diet can make their symptoms flare up.

"It's been previously shown that the type of diet that you are on can change your susceptibility to disease," said Madsen, who led the new study.

"We wanted to know how long it takes before a change in diet translates into an impact on health. In the case of sugar and colitis, it only took two days, which was really surprising to us. We didn't think it would happen so quickly."

Sugar fuels 'bad' bacteria

What could drive such a significant change in such a short time? It turns out it's all about gut bacteria and the impact food has on them.

Fibre-rich foods act as fuel for the "good" bacteria that live in the gut and produce short-chain fatty acids, which are critical for an efficient immune response. Eating high-sugar diets and decreasing intake of fibre feeds "bad" microbes, such as E. coli, that are associated with inflammation and a defective immune response.

Madsen's study showed that the mice on the high-sugar diet had greater intestinal tissue damage and a defective immune response. These problems were alleviated when their diet was supplemented with short-

chain fatty acids normally produced by good bacteria.

"Surprisingly, our study shows that short-term sugar consumption can really have a detrimental impact, and so this idea that it's OK to eat well all week and indulge in junk food on the weekend is flawed," Madsen explained.

Followup studies could pave the way to possibly using short-chain fatty acids as dietary supplements, she noted.

"Changing someone's diet is one of the hardest things to do, even if you tell them that it will fix their health problems," she said.

"People want to eat what they want to eat, so short-chain fatty acids could possibly be used as supplements to help protect people against the detrimental effects of sugar on inflammatory bowel disease."

Possible link to neurodegenerative diseases

Madsen and her colleagues also showed that just two days on the high-sugar diet and the absence of short-chain fatty acids caused an increase in gut permeability, opening interesting avenues of research on how diet may affect the bacteria in our gastrointestinal tract and brain health.

"There is an increasing amount of evidence that suggests there's a link between the bacteria present in our gut and neurodegenerative diseases such as Alzheimer's and Parkinson's," explained Madsen.

"Because our study showed that gut permeability increased quite dramatically in the mice on the high-sugar diet—which means that bacterial products are free to move from the gut, where they normally stay, to the rest of the body—it raises the possibility that this phenomenon might be driving these diseases, but this needs to be looked

into."

More information: Michael Laffin et al. A high-sugar diet rapidly enhances susceptibility to colitis via depletion of luminal short-chain fatty acids in mice, *Scientific Reports* (2019). DOI: 10.1038/s41598-019-48749-2

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