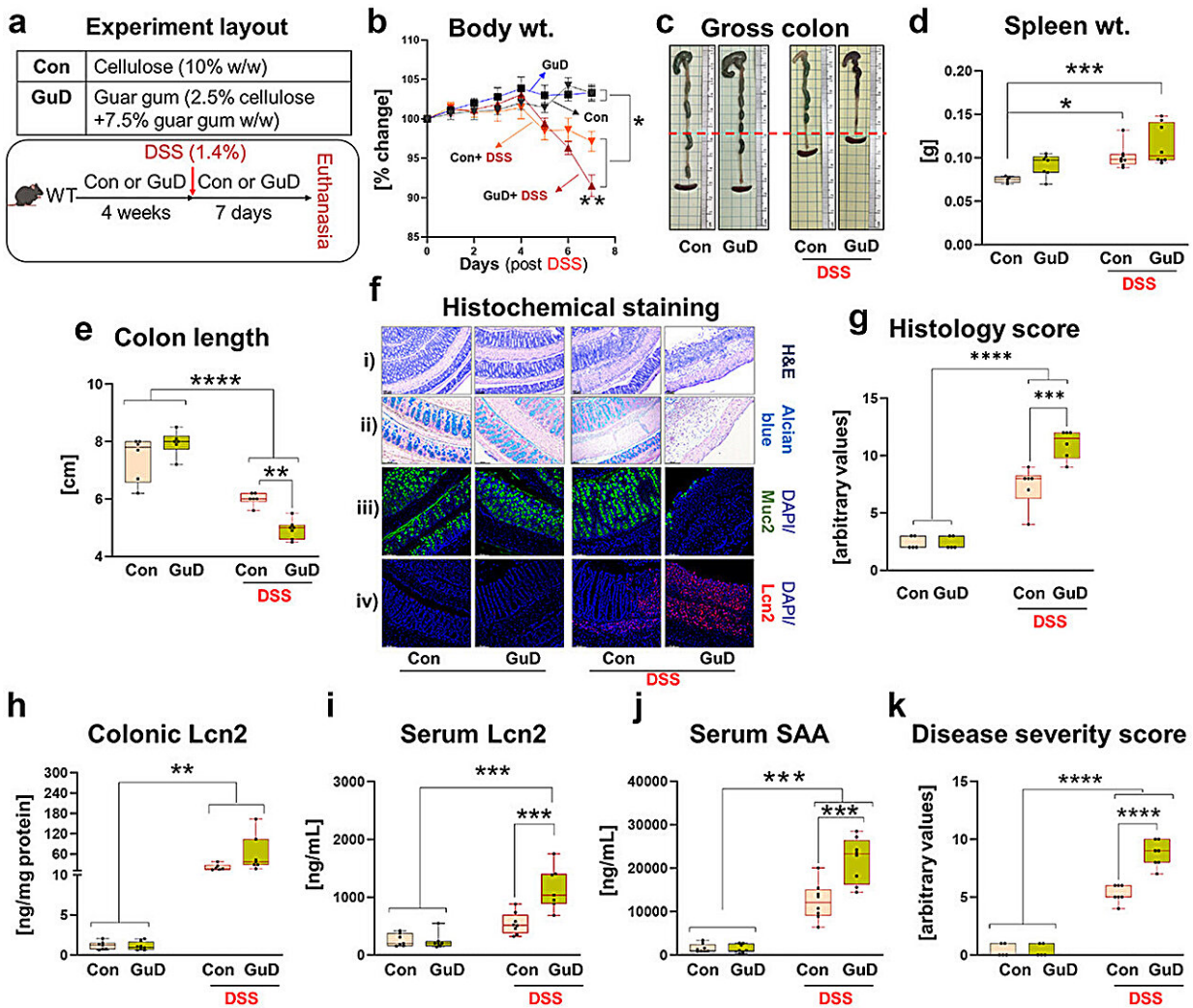


Refined dietary fiber may increase risk for inflammatory bowel disease

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Guar gum exacerbated DSS-induced acute colitis. Credit: *Gut Microbes* (2024). DOI: 10.1080/19490976.2024.2341457

For many people, an enjoyable summer staple food is a scoop of their favorite ice cream. What they may not know is that this creamy treat often contains refined dietary fibers, such as guar gum, that could have negative effects on intestinal health, according to researchers at Penn State.

Guar gum is a naturally occurring dietary fiber found in cluster beans. Its processed form is a common food additive used for its thickening and stabilizing characteristics in ice cream, processed cheeses, bakery products, salad dressings, beverages and more.

However, a recent study by a team in the Penn State Department of Nutritional Sciences discovered that ultra-processed diets containing guar gum showed an increased likelihood of developing [inflammatory bowel disease](#) (IBD) in an [animal model](#). The researchers published their [findings](#) in *Gut Microbes*.

Vishal Singh, assistant professor of nutritional physiology and microbiome, led the study on the mechanism underlying the effects of guar gum on the [gut microbiome](#) and how it increases the susceptibility of developing IBD.

"There is an understanding and agreement that naturally occurring dietary fibers are considered beneficial for our health and that we should increase how much we include in our diets," Singh said.

"But what we don't know is how processed versions of these fibers, like guar gum powder, impact our gut microbiome and colon health long term and if we actually see benefits like you would from natural sources of fiber."

To determine the effects of guar gum consumption, researchers conducted a controlled study with mice, providing one group with an

ultra-processed [diet](#) containing 7.5% guar gum and 2.5% cellulose, the fiber that provides structure in cell walls in plants. The control group ate a diet with 10% cellulose.

After following these diets for four weeks, the mice were then given water containing dextran sulfate sodium, which is used in research to induce inflammation and model digestive diseases such as colitis, for one week.

The mice group that received the guar gum diet developed severe IBD and exhibited extensive inflammation of the colon as compared to the control group.

"We found that the mice who were fed a guar gum diet had a significantly altered gut microbiome composition, specifically an increased level of bacteria belonging to the Actinobacteriota species," Singh said.

"Following antibiotic treatment, these mice recovered when guar gum was reintroduced to their diet, suggesting that the development of IBD from processed guar gum relies on the gut microbiome's interaction with this refined fiber."

The findings of the study suggest that consuming processed foods containing guar gum may significantly increase the risk of developing IBD, said Devendra Paudel, lead author who graduated with his doctorate in nutritional sciences in summer 2024.

This study is in line with other findings from previous studies, including one [published](#) in *Cancer Reports* last year, by the team, in which they investigated the effects of another refined dietary fiber, inulin, on intestinal health.

Researchers noted that limitations of this study included the administration of a higher dose of guar gum than typically consumed daily by humans and the use of mouse models to investigate the relationship between IBD, diet, and microbiota, which may not accurately portray the interactions that occur in humans.

"Understanding the narrative that people should eat more fiber, companies are increasingly developing their own isolated dietary fibers, like partially hydrolyzed guar gum, and marketing them as daily supplements," Singh said.

"As fiber supplements increase in popularity as a means for people to meet their recommended fiber intake, more research will be needed to assess their impact on gastrointestinal health."

The researchers said they are looking to continue this line of nutrition research by investigating the outcomes of other types of refined fibers on digestive health outcomes.

More information: Devendra Paudel et al, Dietary fiber guar gum-induced shift in gut microbiota metabolism and intestinal immune activity enhances susceptibility to colonic inflammation, *Gut Microbes* (2024). [DOI: 10.1080/19490976.2024.2341457](https://doi.org/10.1080/19490976.2024.2341457)

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