Adding refined fiber to processed food could have negative health effects

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Adding highly refined fiber to processed foods could have negative effects on human health, such as promoting liver cancer, according to a new study by researchers at Georgia State University and the University of Toledo.

Accumulating evidence demonstrates consumption of whole foods

naturally rich in fiber confers an array of health benefits. This, combined with an appreciation by many health-conscious consumers that their diets are lacking in such fibers, has led to the food industry enriching foods with highly refined soluble fibers, such as inulin. Recently, changes in U.S. Food and Drug Administration rules allow foods containing supplemented fibers to be marketed as health-promoting. This study raises serious concerns about the safety of adding refined fiber to processed foods.

The researchers set out to test the idea that a diet enriched with refined inulin might help combat obesity-associated complications in mice. While such an inulin-containing diet did stave off obesity, some of the mice started to develop jaundice. After six months, many of these mice developed liver cancer.

"Such a finding was really surprising," said Dr. Matam Vijay-Kumar of the University of Toledo and senior author of the study, "but at the same time we recognized their potential importance and accepted the challenge of exploring how processed dietary soluble fiber was inducing liver cancer."

Although this study was performed in mice, it has potential implications for human health, particularly cautioning against enriching processed foods with highly refined, fermentable fiber.

"These findings indicate that enriching foods with purified fibers may not recapitulate the benefits of eating fruits and vegetables naturally rich in soluble fiber," said Dr. Andrew Gewirtz, professor in the Institute for Biomedical Sciences at Georgia State and one of the study's authors. "Moreover, it may result in serious, life-threatening liver cancer in some individuals. Hence, we think the recent FDA rule change that has effectively encouraged marketing of fiber-fortified food as health-promoting is ill-conceived and should be reconsidered."

These findings were published in the Oct. 18 issue of *Cell*, one of the world's leading biological journals.

"The inulin used in this study is coming from chicory root, not a food we would normally eat. In addition, during the extraction and processing of the fiber, it goes through a chemical process," said Vishal Singh, a postdoctoral fellow from The University of Toledo and one of the lead researchers in the study.

Mice that developed liver cancer in this study had preexisting dysbiosis, meaning an altered intestinal microbiota composition, which was found to play a central role in the promotion of liver cancer.

These findings highlight the need for more studies looking at the effects of purified diet consumption in humans, and especially on liver health.

"We importantly demonstrated that soluble fiber, while it generally beneficially impacts health, can also become detrimental, leading to diseases as severe as liver cancer," said Dr. Benoit Chassaing, assistant professor in the Neuroscience Institute at Georgia State. "However, we do not want to promote that fiber is bad. Rather, our research highlights that fortifying processed foods with fiber may not be safe to certain individuals with gut bacterial dysbiosis, in whom consumption of purified fiber may lead to liver cancer."

More information: Vishal Singh et al. Dysregulated Microbial Fermentation of Soluble Fiber Induces Cholestatic Liver Cancer, *Cell* (2018). DOI: 10.1016/j.cell.2018.09.004

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