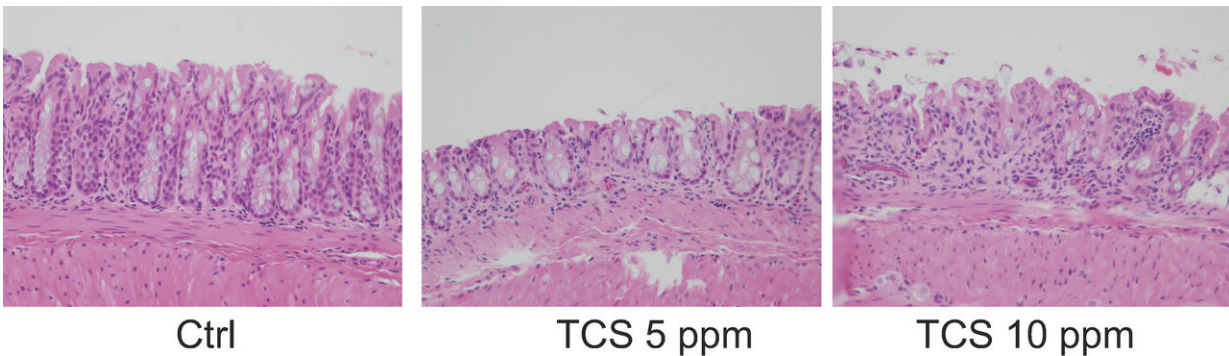


Mouse study links triclosan, a common antimicrobial, to colonic inflammation

May 30 2018



Exposure to triclosan (TCS) exacerbated the severity of colitis and inflammation in mice. Credit: H. Yang et al., *Science Translational Medicine* (2018)

A large research team led by senior author Guodong Zhang at the University of Massachusetts Amherst reports that the antimicrobial ingredient triclosan, found in hand soaps and toothpastes among other products, could have adverse effects on colonic inflammation and colon cancer by altering gut microbiota, the microbes found in our intestines.

The study reported in *Science Translational Medicine* suggests that short-time treatment with low-dose triclosan caused low-grade colonic inflammation, and exaggerated disease development of colitis and colitis-associated [colon cancer](#) in mice, Zhang says. "These results, for the first time, suggest that triclosan could have [adverse effects](#) on gut health," he

notes.

Co-first authors Haixia Yang and Weicang Wang, both from the Zhang laboratory in the food science department at UMass Amherst, point out that triclosan is among the most widely used antimicrobial ingredients and is found in more than 2,000 consumer products. They note that a National Health and Nutrition Examination Survey showed that triclosan was detected in about 75 percent of the urine samples of individuals tested in the United States and it is among the top ten pollutants found in U.S. rivers.

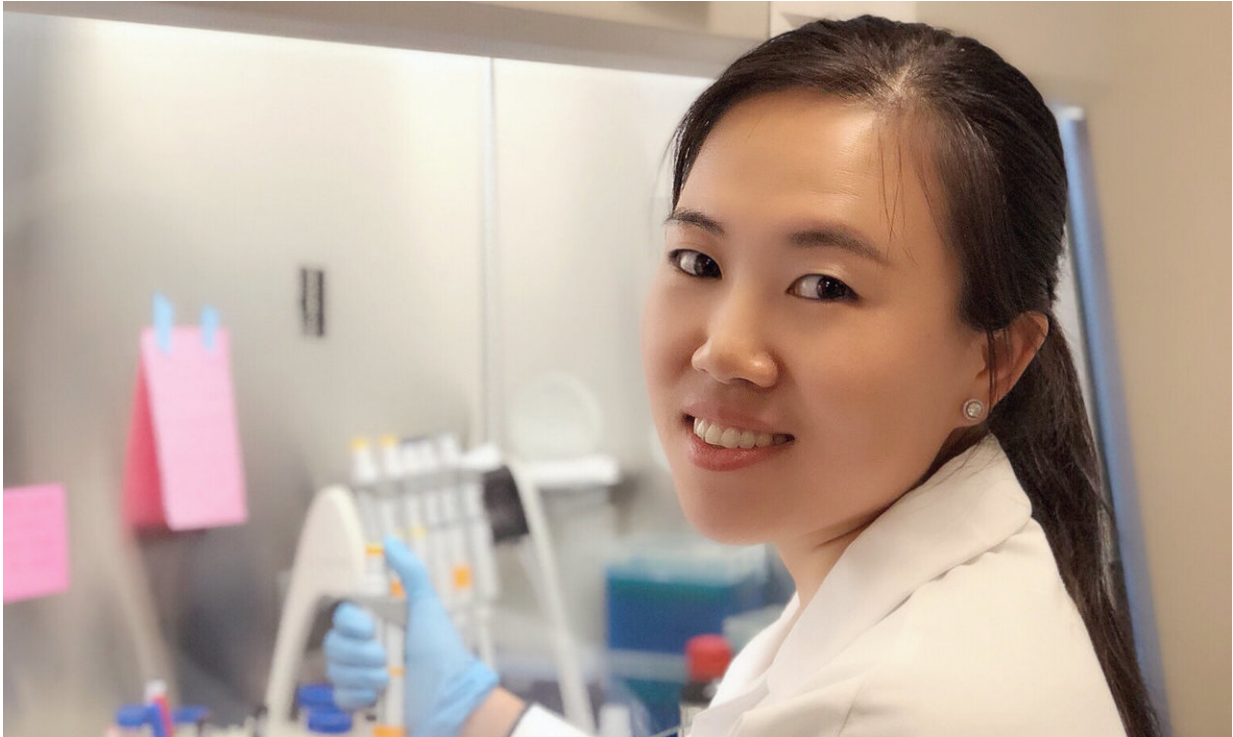
"Because this compound is so widely used, our study suggests that there is an urgent need to further evaluate the impact of triclosan exposure on gut health in preparation for the potential establishment of further regulatory policies," says Yang, a postdoctoral fellow in Zhang laboratory.

In this study, the 21-member team that included 12 UMass Amherst researchers, investigated the effects of triclosan on colonic inflammation and colon cancer using several [mouse](#) models. In all mouse models tested, triclosan promoted colonic inflammation and colon tumorigenesis, Zhang reports.

His co-author, food scientist Hang Xiao, adds, "In particular, we used a [genetically engineered mouse](#) model which develops spontaneous inflammatory bowel disease or IBD. Also, treatment with triclosan significantly increased disease development of IBD in the mice, suggesting that IBD patients may need to reduce exposure to this compound."

In a series of experiments designed to explore mechanisms, the research team found that [gut microbiota](#) is critical for the observed adverse effects of triclosan. Feeding triclosan to mice reduced the diversity and

changed the composition of the [gut microbiome](#), a result similar to what was observed in a human study conducted by others, Zhang says.



Co-first author Haixia Yang and colleagues at UMass Amherst report results in mice suggesting that the antimicrobial ingredient triclosan, found in hand soaps and toothpastes among other products, could have adverse effects on colonic inflammation. Credit: UMass Amherst

Also, triclosan had no effect in a germ-free [mouse model](#) where there is no gut microbiome present, nor in a genetically engineered mouse model where there is no Toll-like receptor 4 (TLR4) - an important mediator for host-microbiota communications. "This is strong evidence that gut microbiota is required for the biological effects of triclosan" Zhang points out.

In an editorial note accompanying the article, the journal says, "Triclosan exposure is practically unavoidable in the United States, but little is known how ingestion may affect our health." This study observed that triclosan altered mouse gut microbiota, increased inflammation, increased the severity of colitis symptoms and spurred colitis-associated colon cancer cell growth. Though limited to mouse models, "this work suggests that the effects of [triclosan](#) on human health should be examined more closely," editors noted.

More information: H. Yang et al., "A common antimicrobial additive increases colonic inflammation and colitis-associated colon tumorigenesis in mice," *Science Translational Medicine* (2018).
stm.sciencemag.org/lookup/doi/10.1126/scitranslmed.aan4116

Provided by University of Massachusetts Amherst

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