

Triclosan promotes liver tumor growth in mice, say SRP researchers

By Sara Mishimandani

A collaborative study performed by NIEHS-funded scientists from the University of California (UC) San Diego and UC Davis showed that long-term exposure to triclosan promotes the growth of liver tumors in laboratory mice, raising concerns about its safety for humans. Triclosan is a common antibacterial chemical used in a wide variety of consumer products such as cosmetics, soaps, detergents, and toothpaste.

“Triclosan’s increasing detection in environmental samples and its increasingly broad use in consumer products may overcome its moderate benefit and present a very real risk of liver toxicity for people,” said study leader Robert Tukey, Ph.D., director of the Superfund Research Program (SRP) Center at UC San Diego. Tukey led the study with Bruce Hammock, Ph.D., director of the UC Davis SRP Center.

Investigating health effects of triclosan

The authors investigated long-term exposure to triclosan in mice by treating them with triclosan for 6 months, which is roughly equivalent to 18 human years. They then compared the livers of exposed mice with those of mice not exposed to triclosan. Researchers found that chronic exposure to triclosan in mice caused liver damage and liver cell death. They also discovered that triclosan exposure in mice increased susceptibility to tumor formation through enhanced cell growth, liver fibrosis (excessive accumulation of proteins in the liver), and proinflammatory responses, which are circumstances within which human cancer forms.

The scientists found that triclosan interferes with a nuclear receptor, known as the constitutive androstane receptor, that plays a role in detoxifying the blood. To compensate for this interference, the liver overproduces cells, which can lead to fibrosis and cancer.

Addressing a human health concern

Although the animal studies used higher concentrations than generally predicted for human exposure, the study indicates that triclosan can promote tumors in the liver and that the way triclosan acts on the mouse may be relevant to human physiology. The study authors concluded that because of this new evidence, the potential of triclosan to cause liver cancer in humans should be evaluated.

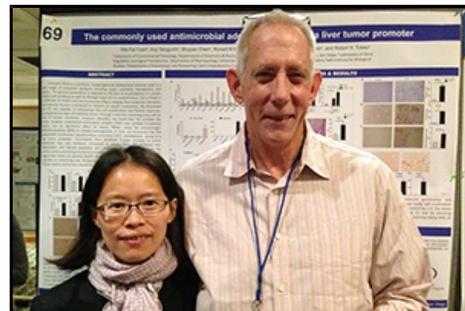
“We could reduce most human and environmental exposures by eliminating uses of triclosan that are high volume, but of low benefit, such as inclusion in liquid hand soaps,” said Hammock. “Yet we could also, for now, retain uses shown to have health value — as in toothpaste, where the amount used is small.”

Citation: Yueh M-F, Taniguchi K, Chen S, Evans RM, Hammock BD, Karin M, and Tukey RH.

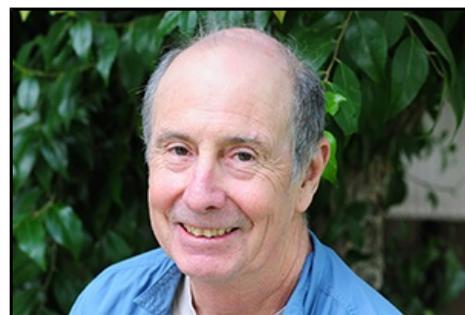
(<http://www.ncbi.nlm.nih.gov/pubmed/25404284>)

2014. The commonly used antimicrobial additive triclosan is a liver tumor promoter. *Proc Natl Acad Sci U S A* 111(48): 17200-17205. [Summary](#)

(Sara Mishamandani is a research and communication specialist for MDB Inc., a contractor for the NIEHS Superfund Research Program and Division of Extramural Research and Training.)



Tukey, right, is a joint professor in the Department of Pharmacology and the Department of Chemistry and Biochemistry. Mei-Fei Yueh, Ph.D., project scientist at UC San Diego, is the lead author on the paper. (Photo courtesy of Robert Tukey)



Hammock holds a joint appointment with the UC Davis Department of Entomology and Nematology, and the Comprehensive Cancer Center. (Photo courtesy of Kathy Garvey)

Hammock elected to National Academy of Inventors

Hammock was elected to the National Academy of Inventors Dec. 16, in recognition of his innovations in multiple fields of research and practical applications, such as therapeutic drugs and biosensor development.

According to the academy, election is accorded to academic inventors who have demonstrated a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society.

For Hammock, this is yet another addition to his long list of awards (see related [story](#)). Hammock and his fellow nominees will be inducted March 20, 2015, during the academy's fourth annual conference, at the California Institute of Technology in Pasadena.

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