

## **Compound in Apples Inhibits E. coli** 0157:H7

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A compound that is abundant in apples and strawberries inhibits the highly pathogenic E. coli O157:H7 biofilms while sparing a beneficial strain of E. coli that also forms biofilms in the human gut, according to a paper in the December 2011 issue of the journal Infection and Immunology.

Transcriptome analysis revealed that the compound, called phloretin, suppresses toxin and other genes involved in O157:H7 pathology and biofilm formation. And in a <u>rat model</u> of colitis, phloretin, reduced colon <u>inflammation</u> and body weight loss. "Phloretin has a triple biological activity as an antioxidant compound, a biofilm inhibitor, and an anti-inflammatory agent," says corresponding author Jintae Lee of Yeungnam University, Gyeongsan, Korea.

E. coli O157:H7 causes hemorrhages in the intestine. To date, no effective therapy for O157:H7 biofilms has been found. Biofilms generally are notoriously resistant to antimicrobial therapy. So in the study, Lee screened a dozen flavonoids, including phloretin, for their ability to inhibit these biofilms. "We found that phloretin markedly reduced E. coli O157:H7 biofilm formation on abiotic surface and human colon epithelial cells, while phloretin did not harm commensal E. coli K-12 biofilms," says Lee. Commensal E. coli can actually fortify the human immune system, he says.

In addition to its anti- E. coli O157:H7 biofilm activity, phloretin "accounts in part for the antioxidant capacity of apples, and it also shows



anti-inflammatory activity," says Lee. "This study suggests that phloretin in apples could reduce the risk of E. coli O157:H7 infection and intestinal inflammation."

"This study demonstrated for the first time that phloretin, a natural flavonoid, is a nontoxic inhibitor of enterohemorrhagic E. coli O157:H7 biofilms, but does not harm commensal E. coli K-12 biofilms," Lee writes. "Also, importantly, our results confirmed that phloretin shows anti-inflammatory properties in both the in vitro and in vivo inflammatory colitis models. The effect of phloretin was noticeably more pronounced than that of the conventional [inflammatory bowel disease] drug 5-aminosalicylic acid."

**More information:** J.-H. Lee, et al., 2011. Apple flavonoid phloretin inhibits Escherichia coli O157:H7 biofilm formation and ameliorates colon inflammation in rats. *Infect. Immun.* 79:4819-4827.

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