

# Eat your greens: they can prevent the ill-effects of toxins in foods

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Photo-illustration depicts the relationship between aflatoxin B1, and healthy greens.

(PhysOrg.com) -- LLNL researchers have found that a small dose of chlorophyll or chlorophyllin, found in green leafy vegetables, could reverse the effects of aflatoxin poisoning, a potent, naturally occurring carcinogenic. Food and food crops most prone to aflatoxin contamination include corn and corn products, cottonseed, peanuts and peanut products, tree nuts and milk. Aflatoxins can invade the food supply at anytime during production, processing, transport and storage.

The age old reminder to always eat your greens isn't just for kids anymore.

Not only are the vitamins and minerals good for you, but eating greens could also save your life, according to a recent study involving scientists from Lawrence Livermore National Laboratory (LLNL).

LLNL researchers Graham Bench and Ken Turteltaub found that giving someone a small dose of chlorophyll (Chla) or chlorophyllin (CHL) — found in green leafy vegetables such as spinach, broccoli and kale — could reverse the effects of aflatoxin poisoning.

Aflatoxin is a potent, naturally occurring carcinogenic mycotoxin that is associated with the growth of two types of mold: *Aspergillus flavus* and *Aspergillus parasiticus*. Food and [food crops](#) most prone to aflatoxin contamination include corn and corn products, cottonseed, peanuts and [peanut products](#), tree nuts and milk.

Bench and Turteltaub, working with colleagues from Oregon State University and an industry partner, Cephalon Inc., found that greens have chemopreventive potential.

Aflatoxins can invade the food supply at anytime during production, processing, transport and storage. Evidence of acute aflatoxicosis in humans has been reported primarily in developing countries lacking the resources to effectively screen aflatoxin contamination from the [food supply](#). Because aflatoxins, particularly aflatoxin B1 (AFB1), are potent carcinogens in some animals, there is interest in the effects of long-term exposure to low levels of these important mycotoxins on humans.

The study used AMS to provide aflatoxin pharmacokinetic parameters previously unavailable for humans, and suggest that chlorophyll and chlorophyllin co-consumption may limit the bioavailability of ingested aflatoxin in humans, as they do in animal models, according to Bench.

Exposure to environmental carcinogens has been estimated to contribute

to a majority of human cancers, especially through lifestyle factors related to tobacco use and diet. Notable examples are the tobacco-related carcinogens; heterocyclic amines produced from sustained, high-temperature cooking of meats; and the fungal food contaminants aflatoxins.

The team initially gave each of three volunteers a small dose of carbon 14 labeled aflatoxin (less than the amount that would be found in a peanut butter sandwich.) In subsequent experiments the patients were given a small amount of Chla or CHL concomitantly with the same dose of carbon 14 labeled aflatoxin.

By using LLNL's Center for Accelerator Mass Spectrometry, the team was able to measure the amount of aflatoxin in each volunteer after each dosing regimen and determine whether the Chla or CHL reduced the amount of aflatoxin absorbed into the volunteers.

"The Chla and CHL treatment each significantly reduced aflatoxin absorption and bioavailability," Bench said.

"What makes this study unique among prevention trials is, that we were able to administer a microdose of radio-labeled aflatoxin to assess the actions of the carcinogen directly in people. There was no extrapolation from animal models which often are wrong," Turteltaub said.

The research, which is co-funded by the National Institutes of Health's National Resource for Biomedical Accelerator Mass Spectrometry, appeared in the December issue of the journal, *Cancer Prevention Research*.

Provided by Lawrence Livermore National Laboratory

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