

Link found between bitter-taste sensitivity and cancer risk

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High bitter-taste sensitivity is associated with a significantly increased risk of cancer in older British women, according to researchers who conducted a unique study of 5,500 women whose diet, lifestyle and health has been tracked for about 20 years.

The research examined the relationship between the ability to taste the bitter-tasting chemical phenylthiocarbamide, known as PTC, or the presence of specific genetic differences in the bitter taste receptor, TAS2R38, which binds to PTC, and risk of cancer in a subset of the UK Women's Cohort Study.

The UK Women's Cohort Study was established in 1995 by nutritional epidemiologists at Leeds University to explore links between diet and chronic disease, cancer in particular. The study had an initial middle-aged female population of 35,000. The researchers obtained cancer incidence data from Great Britain's National Health Service Central Register.

Researchers analyzed the food intake of women in

the study, using a 217-item food-frequency questionnaire administered when the women joined the cohort in the late 1990s. Researchers hypothesized that women with higher bitter-taste [sensitivity](#) would consume fewer vegetables and have higher incidence of cancer.

Although there was no correlation between bitter-taste sensitivity and [vegetable](#) intake, researchers did find that, among older women, bitter-taste sensitivity was associated with greater cancer risk, according to lead researcher Joshua Lambert, associate professor of food science in the College of Agricultural Sciences, Penn State.

Lambert, who collaborated with scientists in Leeds University's nutritional epidemiology group while he was on sabbatical in England conducting the research, noted that depending on the level of sensitivity to bitter tastes, study participants were classified as super-tasters, tasters and non-tasters. The findings were published online this month in the *European Journal of Nutrition*.

"The difference in cancer incidence between the women with the highest bitter-taste sensitivity and those with the lowest was striking," he said. "Super-tasters had about a 58 percent higher risk of cancer incidence, and the tasters had about a 40 percent higher risk of developing cancer, compared to women who were classified as non-tasters."

However, in this analysis, high bitter-taste sensitivity didn't yield the expected link to dietary choices that could explain the higher [cancer incidence](#), Lambert pointed out.

"Our hypothesis was that women who had higher bitter-taste sensitivity—either they were PTC tasters or super-tasters, or they had the TAS2R38 diplotype to suggest that they were tasters or super-tasters—would be at higher risk of developing cancer than women who were non-tasters. We thought that would happen because over their

lifetime they would have consumed fewer bitter-tasting vegetables, which have been reported to have cancer preventive activities," he said.

"When we looked at the data, we saw that for women over 60, our hypothesis was partially correct. Cancer risk was higher among women classified as tasters or super-tasters, but we didn't see any differences in bitter-tasting [vegetable consumption](#)."

Super-tasters and tasters didn't eat fewer vegetables than the non-tasters, Lambert noted. They reported consuming as many Brussels sprouts and as much broccoli, for instance, as the non-tasters.

So where does that leave researchers? Anxious to do more studies to unravel the factors that drive the relationship between bitter-taste sensitivity and cancer, Lambert said. He and colleagues in Penn State's Department of Food Science and Department of Public Health Sciences submitted a grant application in May to the American Institute for Cancer Research to fund a study on the relationship between bitter-taste sensitivity and colon [cancer risk](#) in American men and women.

But it also has them thinking that the relationship between bitter-taste sensitivity and cancer likely relates more to overall diet quality than just vegetable consumption, according to Lambert. He said that more and more, cancer experts suspect that dietary connections to the disease will only be revealed if researchers study the bigger picture.

"Our hypothesis that women with greater bitter-taste sensitivity would eat fewer vegetables, putting them at heightened risk for cancer, was perhaps too narrow a concept," he said. "If you have an aversion to bitter taste, you are also less likely to drink alcohol, and alcohol is a risk factor for cancer. So, do the risks of eating too few vegetables outweigh the benefits of not drinking alcohol in terms of your overall [cancer](#) risk, or vice versa? We just don't know, yet."

Although researchers didn't see the relationship between bitter-taste sensitivity and vegetable consumption that they expected, that doesn't mean

it doesn't exist in the wider context of the total diet, Lambert suggested.

"Maybe, if we pull back and look at the whole-diet level, we will see that women who are super-tasters have a poorer quality overall diet compared to [women](#) who are non-tasters," he said.

Provided by Pennsylvania State University

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