10-minute urine test can measure specific compounds from food consumed

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Can we say goodbye to unreliable food diaries and diet recall in exchange for a urine test that will better aid researchers in figuring out what foods might help prevent cancer?

Researchers at Georgetown Lombardi Comprehensive Cancer Center in Washington, DC, have developed a method that can quickly evaluate specific food compounds in human urine. They say their method could one day replace unreliable food logs used in population studies examining the effects of diet on cancer and will also help scientists accurately identify the most beneficial anticancer foods.

For their study, the researchers focused on cruciferous vegetables, which showed a protective benefit against lung cancer in a study of more than 63,000 people who participated in the National Institutes of Health's Singapore Chinese Health Study. Cruciferous vegetables, a major food in the Asian diet, include cabbage, Brussels sprouts, broccoli, cauliflower, bok choy and watercress, among others.

"We know these foods are beneficial to health, and the ten-minute method we developed, which can test for the presence of specific compounds linked to these vegetables, will help researchers quantify exactly how much of these molecules are being consumed," says the study's lead author, Marcin Dyba, PhD, from Georgetown Lombardi. He'll present the study's findings Monday, April 18, at the annual meeting of the American Association for Cancer Research in New Orleans.

Dyba says the urine test will also allow scientists to figure out which compounds associated with cruciferous vegetables have the strongest link to cancer prevention. Those findings could then be tested in animal models, and if any of the molecules are found to be significantly protective against cancer, the information could lead to stronger dietary recommendations or to a dietary supplement, he says.

"We are very interested in understanding how and why the compounds work," Dyba says. "You couldn't do this work just using self-reported food logs."

The Georgetown scientists validated the effectiveness of their tool using urine that was collected as part of the Singapore Chinese Health Study.

That study, which began in Singapore in 1993, was designed to look at the effect of diet on cancer and a number of other disorders. Researchers, led by Jian-Min Yuan, MD, PhD, from the University of Pittsburgh Cancer Institute and a co-author on this study, gave more than 63,000 middle- and older-aged residents of Singapore a detailed, 165-item quantitative food frequency questionnaire, and then followed them over several years through telephone calls. In 2005, about half of the study participants donated biospecimens, and studies examining urine donations found compounds from cruciferous vegetables that might be offering anti-cancer benefits.

The new urine test looks for specific members of the isothiocyanates (ITCs) family (among other compounds), found in cruciferous vegetables. Animal and cell studies have shown that different types of ITCs have varying anticancer properties and potency, suggesting they are not equal in protecting against cancer, Dyba says. "We developed our test because there has been no way to find out which specific ITCs works best," he says.

More information: Poster #22: A LC-MS/MS method to quantify specific dietary isothiocyanates in human urine for epidemiological studies, Monday, April 18, 2016, 1:00 pm - 5:00 pm

Provided by Georgetown University Medical Center