PRESS RELEASE

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GENETICS MAY DETERMINE WHO BENEFITS FROM BROCCOLI'S EFFECTS ON KIDNEY HEALTH

Highlights

- Deletion of the gene that codes for an enzyme called GSTM1 increased kidney injury in mice with hypertension and kidney disease, but supplementing the diet with broccoli powder lessened kidney injury in the genetically altered mice.
- In humans, high consumption of broccoli and other cruciferous vegetables was linked with a lower risk of kidney failure, primarily in individuals lacking GSTM1.

Washington, DC (November 14, 2019) — New research indicates that the benefits of a dietary compound on kidney health may depend on an individual's genetics. The findings, which appear in an upcoming issue of *JASN*, may be helpful for tailoring interventions to prevent or treat kidney disease.

Glutathione S-transferase mu-1 (GSTM1) is an enzyme that plays a role in ridding the body of toxins and combatting oxidative stress. Many individuals carry a variant in the *GSTM1* gene that prevents the gene's expression (called a null variant) and therefore they lack production of the enzyme. A team led by Thu H. Le, MD (University of Rochester Medical Center) previously showed that individuals carrying this variant face a higher risk of experiencing kidney function decline.

In their latest study, the investigators found that deletion of the gene increases kidney injury in mice with hypertension and kidney disease. Supplementing the diet with broccoli powder (which is rich in an antioxidant-activating compound) significantly lessened kidney injury in the genetically altered mice, but not in normal mice with kidney disease.

"We speculate that the GSTM1 enzyme may be involved in the breakdown of antioxidant-promoting compounds, and therefore deficiency in the enzyme may increase the bioavailability of protective compounds relevant in kidney disease," said Dr. Le.

When the researchers examined information from a large clinical trial, they found that high consumption of broccoli and other cruciferous vegetables was linked with a lower risk of kidney failure, primarily in participants with the *GSTM1* null variant.

“Our study highlights diet-gene interactions in kidney disease and illustrates that response to the disease-modifying effect of diet is influenced by genetics,” said Dr. Le. “In the context of personalized and precision medicine, increased consumption of cruciferous vegetables may be protective, particularly in those lacking GSTM1 who are genetically most at risk for kidney disease progression. Furthermore, our study suggests that knowing an individual’s genetic information enables tailoring an intervention to prevent or delay kidney disease progression among those who would respond based on their genetic makeup.”

Study co-authors include Joseph C. Gigliotti, PhD, Adrienne Tin, PhD, MS, Shirin Pourafshar, PhD, Sylvia Cechova, PhD, Yves T. Wang, PhD, Sun-sang J. Sung, PhD, Gabor Bodonyi-Kovacs, MD, Janet V. Cross, PhD, Guang Yang, PhD, Nhu Nguyen, BS, Fang Chan, B, Casey Rebholz, PhD, Bing Yu, PhD, Megan L. Grove, MS, Morgan E. Grams, MD, PhD, Anna Köttgen, MD, Robert Scharpf, PhD, Phillip Ruiz, MD, PhD, Eric Boerwinkle, PhD, and Josef Coresh, MD, PhD.

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The article, entitled “GSTM1 Deletion Exaggerates Kidney Injury in Experimental Mouse Models Yet Confers the Protective Effect of Cruciferous Vegetables in Mice and Humans,” will appear online at http://cjasn.asnjournals.org/ on November 14, 2019, doi: 10.1681/ASN.2019050449.

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