Medscape Medical News

Artificial Sweeteners Alter the Duodenal Microbiome

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TOPLINE:

Consuming nonsugar sweeteners (NSS) leads to significant changes in both stool and duodenal microbial diversity and composition and levels of circulating inflammatory markers.

METHODOLOGY:

- Researchers analyzed samples from the REIMAGINE (Revealing the Entire Intestinal Microbiota and its Associations with the Genetic, Immunologic, and Neuroendocrine Ecosystem) study to assess the potential effects of NSS consumption on the duodenal luminal microbiome.
- They analyzed subjects consuming non-aspartame nonsugar sweeteners (NANS; n = 35) and aspartame only (ASP; n = 9), who were compared with 55 control participants matched for age, sex, and body mass index.
- A subset of 40 participants provided stool samples for additional analysis.

TAKEAWAY:

- Duodenal alpha diversity was lower in NANS consumers vs controls.
- Duodenal relative abundance (RA) of *Escherichia*, *Klebsiella*, and *Salmonella* was lower in both NANS and ASP vs controls, whereas stool RA of these phylum Proteobacteria was increased in both NANS and ASP.

- Compared with controls, NANS and ASP differed in how they altered predicted duodenal microbial metabolic pathways, with NANS impacting polysaccharides biosynthesis and D-galactose degradation and ASP significantly enriching biosynthesis of cylindrospermopsin, a potential cancer-causing agent known to adversely impact the liver and nervous system.
- Circulating levels of interleukin (IL)-1b, a pro-inflammatory cytokine that plays a key role in the immune response, were significantly decreased in NANS vs controls, whereas IL-6 and IL-10, two cytokines with protective properties, were decreased in the ASP group vs controls.

IN PRACTICE:

"Given the crucial role played by small intestinal microbes in digestion, nutrient absorption, immune regulation, and endocrine functions, coupled with the substantial prevalence of NSS consumption among US adults (estimated at 41.4%), our findings have potential implications for metabolic and gastrointestinal health in a considerable proportion of the American adult population."

SOURCE:

The study, conducted by Ava Hosseini, MPH, and colleagues at Cedars-Sinai, Los Angeles, was published online on November 22, 2023, in *iScience*.

LIMITATIONS:

The study population may not be representative of healthy individuals as they underwent upper endoscopy for various reasons (eg, evaluation of intestinal complaints). After exclusions, the duodenal sample size for the aspartame group was small. Samples were collected at a single timepoint, limiting the ability to establish causal relationships.

DISCLOSURES:

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