Clostridia and Erysipelotrichia deplete sugar alcohols in the cecum

Connor R. Tiffany

Jee-Yon Lee

Andrew W.L. Rogers

Erin E. Olsan

Pavel Morales

Franziska Faber

Andreas Baumler

Video Byte

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Abstract

Gut microbe-mediated breakdown of intestinal contents is important for host nutrition and immunity, but the specific nutrients consumed by common gut microbes are unclear. To learn more, a recent study combined microbiota profiling and untargeted metabolomics to examine gut metabolites and microbes in mice. Microbiome disruption with an antibiotic (streptomycin) increased the levels of carbohydrates, particularly sugar acids and sugar alcohols, in the cecum and these increases were associated with depletion of *Clostridia* and *Erysipelotrichia*. Conversely, inoculation of microbe-free mice with a *Clostridia*/*Erysipelotrichia* mixture (CE17) reduced sugar acid and sugar alcohol levels. Transplantation of microbe-free mice with a complex normal-mouse microbiome (C57FMT) produced similar results, supporting the importance of *Clostridia* and *Erysipelotrichia* for digestion of these substances. In vitro, six *Clostridia* isolates and one *Erysipelotrichia* isolate were able to use sugar alcohols for food, especially the common artificial sweetener sorbitol and in vivo, antibiotic-treated mice inoculated with a *Clostridia* strain exhibited reduced cecal sorbitol levels after sorbitol supplementation. Although further studies are needed, the findings identify *Clostridia* and *Erysipelotrichia* as the main consumers of sugar acids/alcohols in the gut and suggest that disruptions in the levels of these bacteria could be related to difficulty digesting artificial sweeteners.