Visualizing hidden interactions between microbes in the body

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Abstract

Microbes, like those in the gut, interact with each other to form microbial communities and have direct impacts on disease and fitness. However, those multidimensional complex interactions are often undetected by common pattern identification methods based on correlation and mutual information making it difficult to tailor medicine and treatments to different microbiomes. Now, a new method could reveal unseen patterns that occur in three-, four-, and higher-dimensional spaces. For different sets of microorganisms, the approach estimates a strength score for patterns like co-presence or co-absence. Importantly, patterns can describe the interaction between more than two microorganisms. The method was able to tease out distinct patterns between microbes in different parts of the mouth, including the upper surface of the tongue, teeth, and gums. As currently conceived, the approach could be a good way to start exploring possible connections between microbes paving the way toward highly personalized medical treatment.