Alternative stable states in the intestinal ecosystem

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Abstract

The gut microbiome interacts intimately with its human host, both in health and in disease. A recent study examined how different states of the gut microbiome might be linked to varying degrees of disease in rats. Researchers exposed rats to different concentrations of dextran sodium sulfate (DSS), a polysaccharide known to induce human-like colitis. The effects on the intestinal microbiome over time were tracked by gene profiling. The results provide some of the first experimental evidence of “alternative states” in the rat intestinal ecosystem. These are distinct microbial profiles related to markers of disease. Importantly, these alternative states were found to be tied to both the host and microbiome, rather than one or the other. That led to a conceptual model of how host inflammatory status and microbiome status interact and how the whole ecosystem may slip into and out of different states of disease. The model provides strong support for combination therapies that target the host and microbiome in chronic immune-mediated diseases including Crohn’s disease and ulcerative colitis.