

Are bacteria making you hungry?

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Over the last half decade, it has become increasingly clear that the normal gastrointestinal (GI) bacteria play a variety of very important roles in the biology of human and animals. Now Vic Norris of the University of Rouen, France, and coauthors propose yet another role for GI bacteria: that they exert some control over their hosts' appetites. Their review was published online ahead of print in the *Journal of Bacteriology*.

This hypothesis is based in large part on observations of the number of roles bacteria are already known to play in host biology, as well as their relationship to the host system. "Bacteria both recognize and synthesize neuroendocrine hormones," Norris et al. write. "This has led to the hypothesis that microbes within the gut comprise a community that forms a microbial organ interfacing with the mammalian nervous system that innervates the [gastrointestinal tract](#)." (That nervous system innervating the GI tract is called the "enteric nervous system." It contains roughly half a billion neurons, compared with 85 billion neurons in the [central nervous system](#).)

"The gut microbiota respond both to both the nutrients consumed by their hosts and to the state of their hosts as signaled by various hormones," write Norris et al. That communication presumably goes both ways: they also generate compounds that are used for signaling within the human system, "including neurotransmitters such as GABA, amino acids such as tyrosine and tryptophan—which can be converted into the mood-determining molecules, dopamine and serotonin"—and much else, says Norris.

Furthermore, it is becoming increasingly clear that [gut bacteria](#) may play a role in diseases such as cancer, metabolic syndrome, and [thyroid disease](#), through their influence on host signaling pathways. They may even influence mood disorders, according to recent, pioneering studies, via actions on dopamine and peptides involved in appetite. The gut bacterium, *Campilobacter jejuni*, has been implicated in the induction of anxiety in mice, says Norris.

But do the gut flora in fact use their abilities to influence choice of food? The investigators propose a variety of experiments that could help answer this question, including epidemiological studies, and "experiments correlating the presence of particular bacterial metabolites with images of the activity of regions of the brain associated with appetite and pleasure."

More information: V. Norris, F. Molina, and A.T. Gewirtz, 2012. Hypothesis: bacteria control host appetites. *J. Bacteriol.* Online ahead of print 9 November 2012.

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