MICROBIOLOGY

A focus on fungi in the mouse gut

Mims, T.S. et al. *Commun. Biol.* **4**, 281 (2021)

When it comes to the microbiome – the microorganisms found within and upon a larger organism – much attention has been paid to the bacterial players and how they influence the health of their host. There are however other microbes to consider, including viruses, archaea, and fungi. This last category, the mycobiome, was the recent focus of work from researchers at the University of Tennessee Health Science Center.

“Compared to the microbiome, the mycobiome is a bit more mysterious,” says author Joseph Pierre. Technical limitations have skewed prior microbiome studies towards bacteria – these are cheaper to detect with 16S sequencing technologies and there are much richer databases of genetic data to compare against as you are assembling what is in your sample, says author Kent Willis. Fungal classification – long based on morphology rather than genetics – is still catching up, and it takes a little more effort to design the right primers to find fungi. But with

those in hand, it was off to look for some overlooked microbes.

Just as you won't find just one bacterial make up when you look at different animals, Pierre and Willis hypothesized that there wouldn't be one unique mycobiome either, so they obtained mice from four different vendors and systematically assessed the fungi found in each. Indeed, mice from each provider came with distinct fungal baselines, though these changed a little after the animals arrived in Memphis, suggesting some transient rather than resident inhabitants.

They then wanted to explore potential environmental influences – in this study, they chose diet. Over time, both the fungal and bacterial communities in the guts of mice fed a highly processed, low-fat diet diverged from those in animals fed standard chow; these changes were associated with increased body fat. Two fungal genera seemed most involved with weight gain and other metabolic changes: *Thermomyces* and *Saccharomyces*.

The links are causal, though Pierre plans to start digging into the basic mechanisms by which fungi influence their hosts. Willis, who has since joined the University of Alabama, has translation in mind – he hopes to develop mouse models to explore the role of the microbiome – fungi included – on neonatal lung development. Overall, the results agree with prior, bacteria-focused studies that indicate that the environment can profoundly influence an animal by way of its microbiome. They are also a reminder not to forget about fungi. “You can't control for something you don't look for,” says Willis. “There is a strong possibility that fungi have played a role in other metabolic studies.” When it comes to health, Willis and Pierre stress the need to consider the holobiont – the animal and *all* of its microorganisms.

Ellen Neff

Published online: 26 April 2021
<https://doi.org/10.1038/s41684-021-00764-5>

scientific reports

Scientific Reports is an open access journal publishing original research from across all areas of the natural and clinical sciences.

As a leading multi-disciplinary open access journal with over 1.5 million readers a month, *Scientific Reports* is the perfect place to publish your research.

- **Expert** Editorial Board to manage your paper
- Follows Nature Research's **high peer review standards**
- Indexed in **Web of Science, PubMed** and other major repositories
- Research accessed from over **180 countries worldwide**

nature.com/scientificreports

807307

nature portfolio