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IN BRIEF

MICROBIOME

More fibre a day keeps the pathogens away

Although the health benefits of the consumption of dietary fibre have long been implied, the direct effect of fibre polysaccharides on the composition and physiology of the microbiota has remained elusive. Previous studies suggested a link between diet and the status of the colonic mucus layer, which is a complex barrier that is composed of the glycoprotein mucin 2 and provides protection against both commensal and pathogenic microorganisms. Desai *et al.* assembled a synthetic gut microbiota from human gut bacteria in gnotobiotic mice and showed that a fibre-free diet promotes the enrichment of mucin-degrading bacteria. The fibre-deprived gut microbiota expressed carbohydrate-active enzymes and degraded the colonic mucus barrier, which increased susceptibility to the enteric pathogen *Citrobacter rodentium* and colitis. Thus, the link between diet, the gut microbiota and intestinal barrier dysfunction could be exploited for dietary therapeutics.

ORIGINAL ARTICLE Desai, M. S. *et al.* A dietary fiber-deprived gut microbiota degrades the colonic mucus barrier and enhances pathogen susceptibility. *Cell* **167**, 1339–1353 (2016)

MARINE MICROBIOLOGY

When a relationship turns ugly

The highly abundant microalga *Emiliania huxleyi* forms blooms, and although *E. huxleyi* blooms harbour a rich community of bacteria, these bacteria are not considered to be a factor that influences algal physiology and bloom dynamics. Segev *et al.* showed that *E. huxleyi* associates with the bacterium *Phaeobacter inhibens* when co-cultured. During the initial 10 days of culturing, the number of algae co-cultured with *P. inhibens* increased compared with algal cultures alone, which suggests that *P. inhibens* promotes algal growth. However, after 17 days, most algal cells in the co-culture were dead. These findings suggest that following the mutualistic phase in the algal–bacterial interaction, *P. inhibens* causes the bleaching and death of its algal partner. Interestingly, the bacterial compound indole-3-acetic acid promotes algal growth at low concentrations, but becomes harmful at higher concentrations and causes algal death.

ORIGINAL ARTICLE Segev, E. *et al.* Dynamic metabolic exchange governs a marine algal–bacterial interaction. *eLife* **5**, e17473 (2016)

MICROBIOME

Weight loss without the yo-yo effect

Despite effective weight-reduction strategies, individuals fail to maintain the reduced weight. The mechanisms that underlie the weight-cycling-induced phenomena and the influence of the gut microbiota are not well understood. Thaiss *et al.* used mouse models of weight loss and recurrent obesity and found that obesity-induced alterations to the microbiome persist over long periods of time and enhance the rate of weight gain during secondary metabolic challenge. In addition, low flavonoid levels in post-dieting mice were shown to contribute to the increased weight regain, whereas their therapeutic replenishment ameliorated this susceptibility. The authors propose a model whereby a high-fat diet promotes the growth of flavonoid-metabolizing bacteria, which, in turn, decrease the amount of bioavailable flavonoids, thereby negatively regulating energy expenditure and promoting exaggerated recurrent weight gain.

ORIGINAL ARTICLE Thaiss, C. A. *et al.* Persistent microbiome alterations modulate the rate of post-dieting weight regain. *Nature* http://dx.doi.org/10.1038/nature20796 (2016)