Gut microbiome and immunotherapy response

A new study by Vancheswaran Gopalakrishnan (MD Anderson Cancer Center, Houston, TX, USA) and colleagues has found that the composition of the gut microbiome affects the way patients with advanced melanoma respond to anti-PD-1 immunotherapy.

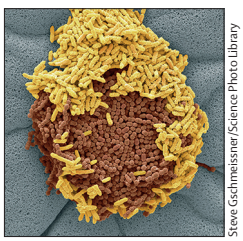
The investigators examined oral and gut microbiome samples from 112 patients with metastatic melanoma before and after treatment with PD-1 inhibitors. Taxonomic profiling of available faecal microbiome samples (n=43) showed significant differences between patients who responded to therapy (n=30) and those who did not (n=13; p<0·01), although the oral microbiome between these patient groups did not differ (p=0·11). Progression-free survival was significantly longer for patients with a high diversity in their gut microbiome than those with an intermediate diversity (hazard ratio 3·60, 95% CI 1·02–12·74;) or low diversity (3·57, 95% CI 1·02–12·52). Responders had a higher abundance of the Ruminococcaceae family and *Faecalibacterium* than did non-responders.

Co-author Jennifer Wargo (MD Anderson Cancer Center) theorised that the gastrointestinal bacteria are interacting with the immune cells that line the gut and might influence immunity through metabolites. "The results raise all kinds of questions", she said. "Can we change the microbiome to enhance responses to immunotherapy? Should we be limiting or at least tightly monitoring antibiotic use in patients who are preparing for immunotherapy? Should we be looking at probiotic use?"

Pippa Corrie (Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK) welcomed the findings. "We are starting to learn how we might be able manipulate the natural environment so we can maximise the benefits of these potentially life-saving drugs", she said. Corrie raised the possibility of turning non-responding patients into responders by transplanting particular bacteria into their gut. "But we need to gather more data—there remains inconsistency over which exactly are the good and bad bacteria", Corrie told *The Lancet Oncology*.

Julia Newton-Bishop (Leeds University, Leeds, UK) noted that larger studies will probably be necessary to capture the way the microbiome differs between individuals, between individuals in different parts of the same country, and between individuals in different countries. "It is a very complicated system, and this is just the beginning of what appears to be a very encouraging development", she said.

Talha Khan Burki



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For the **study by Gopalakrishnan and colleagues** see *Science* 2017; published online Nov 2. DOI:10.1126/science.aan4236