GUT MICROBIOTA

A mother's microbiota: intergenerational transfer

New research shows that a maternally inherited antibiotic-perturbed gut microbiota increased colitis severity in offspring in a mouse model of IBD.

Previous work had highlighted how early life is a crucial period for microbiota, metabolic and immune development. The researchers wanted to explore the effects of transferring a perturbed microbiota (in this case as a result of antibiotics) from mother to offspring. “We isolated the microbiota effect from any effects that the antibiotics themselves have on either mother or pup”, explains author Martin Blaser. “The affected pups never received any antibiotics, their mother never received any antibiotics — just a perturbed microbiota.”

In a series of experiments, pregnant germ-free mice received either a normal gut microbiota or microbiota from mice that had received subtherapeutic levels of penicillin. Crucially, the investigators showed that the antibiotic-perturbed maternal microbiota transferred from dams to pups at birth, and the pups demonstrated dysbiosis (including less diversity in the next generation) in their gut microbiota for at least 21 weeks without any direct exposure to antibiotics.

By comparing *Il10*^{-/-} mice, which are genetically susceptible to colitis, with wild-type mice, they showed that *Il10*^{-/-} offspring that inherited antibiotic-perturbed microbiota from their mothers had worse

disease than the *Il10*^{-/-} pups that inherited a normal microbiota.

“Work in this model points to newly appreciated costs of taking antibiotics, possibly in the next generation,” notes Blaser. The authors are planning future work to test multigenerational models and whether the microbiota can be restored to reduce the disease risk. “Restoration (and thus disease prevention) is the next frontier,” says Blaser.

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ORIGINAL ARTICLE Schulfer, A. F. et al. Intergenerational transfer of antibiotic-perturbed microbiota enhances colitis in susceptible mice. *Nat. Microbiol.* <http://dx.doi.org/10.1038/s41564-017-0075-5> (2017)