Antibiotic-associated dysbiosis affects intestinal inflammation via the gut microbiota

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Video Byte

Keywords: FMT, fecal transplant, IBD, irritable bowel, antibiotics, gut microbiota, microbes, bacteria, metronidazole, streptomycin, vancomycin, iNKT, immune system, inflammation, intestine, gut, mouse, human, dysbiosis, Microbiome

DOI: https://doi.org/10.21203/rs.3.rs-276219/v1

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Abstract

Human gut microbes are critical for maintaining the integrity of the GI tract, immune system homeostasis, and host energy metabolism. Alterations in this network can have health consequences, including inflammatory bowel disease (IBD). Antibiotic treatment compromises the composition of the gut microbiome, affecting microbial function and resulting in long-lasting detrimental effects on the host. A recent study examined how different antibiotics affect the ability of gut microbes to control intestinal inflammation. Researchers treated mice with antibiotics prior to fecal microbiota transplantation. They found that antibiotic pre-treatment significantly altered the ability of the microbiota to control intestinal inflammation. Streptomycin- and vancomycin-treated microbes failed to control inflammation, and pathobionts associated with IBD thrived. In contrast, microbes treated with metronidazole were able to control inflammation, and beneficial microbial species were enriched. When inflammation was controlled, immune responses involving iNKT cells were boosted. Cells isolated from patients with IBD were skewed towards the Th1/Th17 lineage, while metronidazole-conditioned microbiota induced iNKT-mediated IL-10 production. These results suggest that different antibiotic regimens have different effects on the ability of gut microbes to control inflammation. Future studies will focus on the mechanisms of this effect and expand these findings to the clinical realm.