



In the Loop with Poop: Intestinal Microbes in Health and Immunity



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Introduction

Did you know that the average human gut is home to over 100 trillion microorganisms? These numbers are not from a diseased state, but rather are representative of a normal, healthy human gut. Clearly, this suggests that the vast majority of microorganisms living within us are not pathogenic. Animal studies of germ-free or selective gut colonization by microbes provide growing evidence of healthful, symbiotic microorganisms that inhabit the gastrointestinal tract. However, harmful perturbation of the gut microbial ecosystem, collectively termed “dysbiosis”, is associated with many disease states. Further studies of gut microbial communities in both healthy and diseased conditions will inform how modulation of the intestinal flora can be used therapeutically. This talk will discuss basic principles of host-bacterial mutualism, and why these microbes are necessary for health. Additionally, an analysis of tools used to dissect this field will be presented, and connections to various diseases will be made.

About me:



I am a 2nd year student in the Harvard Immunology program. My research focuses on interactions between the immune system and cancer. My undergraduate background is in microbiology, and my postgraduate training focused on immunology. My current research is motivated by the ability of the immune system to control cancer, and the observation that intestinal microbes can effect immune function - even outside of the intestines. Combining these two principles could provide new angles to look at host-cancer interactions, and potentially could be used to determine patient responses to therapy. Outside of science, I like to craft the worst jokes and puns imaginable and spend time outdoors.

Glossary of Important Terms

Microbe: A small organism.

Intestines: A long, tubular organ system responsible for absorption of nutrients and water from consumed food.

Dietary Fiber: Indigestible materials from food, mostly plant material, that can provide nutrients for intestinal microbes.

Fermentation: Process that converts carbohydrates (in this case, fiber) into acids or alcohols, and gasses.

Germ-Free Mouse: A mouse born in, and continuously residing in, a sterile isolator. These mice have no microbes anywhere on their bodies.

Immune System: A system that protects the host from disease.

DNA Sequencing: A procedure of decoding the information stored within genetic material, which is the information storage molecular of life.

Ribosome: A biological structure that assembles proteins. It is common throughout all life.

16S Ribosomal DNA: The genetic information that codes for ribosomal components. This can be sequenced to determine bacteria classification.

Phylogenetics: The study of evolutionary relationships between organisms by means of DNA sequencing.

Metagenomics: Study of genetic material derived from environmental samples.

Microbiota: The collection of microbial organisms living on a host.

Dysbiosis: A perturbed state of the microbiota, often associated with disease.

Autoimmune Disease: A disease involving immune attack against self.

Resources to learn more

Human Microbes BBC Radio

<http://www.bbc.co.uk/programmes/b011jv8r>

A New Genetic Map That Could Make Your Skin Crawl

http://www.pbs.org/newshour/bb/science-jan-june12-microbes_06-14/

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