More than Food: Human Milk as Medicine
April 23, 2013

Introduction

Many of us are familiar with milk as a food in our supermarket aisles, whether as a beverage that pairs well with cookies, or as the starting ingredient for cheese and yogurt. But milk is also part of what makes us mammals, a class of animals that produces milk as the first food for our young. Our lecture will begin with a discussion of the “recipe” for milk and investigate why the recipe may vary among species. We will also take a closer look at how different parts of milk support the growing infant. Next, we will dive deeper into how milk supports an infant’s immune system. Finally, we will conclude by discussing current and future applications of milk as medicine.

About me:

I am a third-year PhD student in the Comparative Lactation Lab in the Department of Human Evolutionary Biology. Our lab studies the nutrients, immune molecules, and hormones in milk to determine how milk influences development through infancy and into later life. My own research focuses on the immune molecules in breast milk and investigates if milk composition varies in women living in different areas around the world. Outside of my research, I enjoy volunteering at local science museums and pub trivia.

Glossary of Important Terms

Mammals: A class of animals that have specialized glands, called mammary glands, which produce milk for their young.

Lactose: The most common sugar in milk. It is made of two simple sugars, fructose and glucose, and is digested by the infant for energy.

Milk oligosaccharides: Complex sugars in milk that a human infant’s digestive systems is unable to digest. However, these sugars can be used as food by microbes in the infant’s gut.

Lactoferrin and Lysozyme: Immune proteins in milk that defend against bacterial infections

Antibodies: Immune proteins that bind to germs to prevent them from causing infection or to flag them to be cleared by other parts of the immune system. Antibodies come in different forms. Secretory IgA (SIgA) is the main antibody in milk.

Pathogens: More commonly called “germs,” pathogens are anything that could cause disease, including (but not limited to) bacteria, viruses, and parasites.

Innate immune system: The non-specific branch of the immune system. Molecules and cells that are part of this branch of the immune system recognize pathogens broadly as a virus, bacteria, etc. but do not “remember” specific pathogens.
Adaptive immune system: The specific branch of the immune system. Molecules and cells that are part of this branch of the immune system can recognize specific pathogens and produce defense molecules against them. The adaptive immune system forms memory cells that can “remember” pathogens that they have not seen for many years.

Inflammatory Bowel Disorder (IBD): A group of inflammatory diseases that affect the small intestine and colon.

Necrotizing Enterocolitis (NEC): A disease that is characterized by inflammation and infections in the small intestine and/or colon. It primarily occurs in premature infants.

Human Papillomas: A non-cancerous tumor, frequently found on the skin.

Resources to learn more

SPLASH Milk Science Update, Newsletter from the International Milk Genomics Consortium

Mammals Suck...Milk!, Blog by Dr. Katie Hinde of the Comparative Lactation Lab at Harvard University
http://mammalssuck.blogspot.com/

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May 12, 2014, Science by the Pint at The Burren, Davis Square

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