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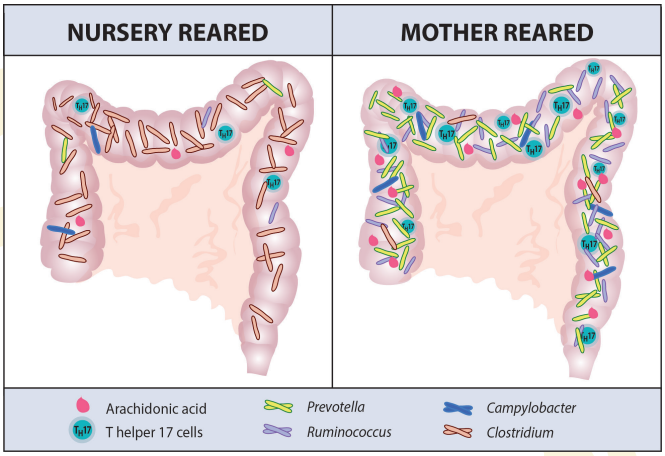
Infant and pediatric immune responses to vaccines and agents of chronic infection

The goal of my research is to understand variability in human immune responses to vaccines and agents of chronic infection. Every person's immune system is unique—shaped by a combination of genetics and environmental encounters with various microbes. An individual's immunologic ecosystem evolves over time, and the immune response to a particular organism may vary depending on the current status of the system. For example, some HIV-infected individuals display a rapid decline in immune health in the absence of treatment, whereas others resist disease progression. Discovering which factors contribute to these divergent responses may help to identify new ways to control, and perhaps eradicate, this disease.

My research will provide the detailed understanding needed to improve current vaccines and therapies for infectious disease.



Our research found that breast-fed infant monkeys had a higher gut microbiota diversity and richness than their formula-fed counterparts. Both Prevotella and Campylobacter were significantly more abundant in breast-fed than formula-fed animals at 12 months, and Clostridium was more abundant in the bottle-fed infants. We also found a network of significant correlations between stool levels of beneficial arachidonic acid, TH17 cells and bacterial genera such as Prevotella and Campylobacter.

Breast- and bottle-fed infant rhesus macaques develop distinct gut microbiotas and immune systems

Ardeshir A, Narayan N, Mendez-Lagares G, Lu D, Rauch M, Huang Y, Van Rompay KKA, Lynch SV, Hartigan-O'Connor D
2014 Sci Transl Med 6, 252ra120

Subsequently we showed that CCR5+ cells resident in infant gut are vulnerable to targeted depletion. The HIV reservoir forming at the earliest stages of infection is likely composed of CCR5+ cells, because these cells are the targets of transmissible virus. Restriction of the CCR5+ reservoir, particularly in gut, may be needed for subsequent cure attempts. A bispecific antibody for CCR5 and CD3 depleted all CCR5+ cells from blood and the vast majority of such cells from the colonic mucosa (up to 96% of CD4+CCR5+).

Depletion of gut-resident CCR5+ cells for HIV cure strategies

Merriam DP, Chen C, Mendez-Lagares G, Rogers K, Michaels A, Yan J, Casaz P, Reimann K, Villenger F, Hartigan-O'Connor DJ
2017 AIDS Res Hum Retroviruses Sep 17

To contact Dr. Dennis Hartigan-O'Connor and for more information on his research, see: http://www.cnprc.ucdavis.edu/dennis-hartigan-oconnor/

The mission of the CNPRC is to improve human health and quality of life through support of exceptional nonhuman primate research programs.