

Title: Role of probiotics in the protection against pulmonary allergic diseases: a search for a mechanism

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Recent studies have revealed that an estimated 20% of the population worldwide suffers from some form of allergic disorder. Although the exact etiology remains unknown, it has been proposed that the reduction in the intensity and diversity of the microbial stimulation, early in life, may be a major trigger factor. Probiotics are microorganisms that have beneficial influence on the host health. We have previously shown that the probiotic *Lactobacillus delbrueckii* UFV-H2b20 is able to stimulate immune responses and protect mice against bacterial and fungal infections. Here we evaluated the protective effects of *L. delbrueckii* UFV-H2b20 on a murine model of pulmonary allergy, focusing on identifying the possible mechanisms involved. Our results show that oral treatment with viable, but not with heat-killed, *L. delbrueckii* prevents the inflammatory response. Interestingly, we observed an increased number of $Foxp3^+$ regulatory T (Treg) cells in the lungs of treated mice. Our data suggest that the mechanism of action is associated with an increased expression of CD39 and CD73 by Treg cells. CD39 and CD73 are proteins that calibrate the purinergic signals delivered to immune cells through the conversion of ATP to adenosine. This drives a shift from a pro-inflammatory environment to an anti-inflammatory milieu. In addition, mice treated intranasally were also protected from lung inflammation. Finally, we observed that treatment with the culture supernatant of *L. delbrueckii* was also able to protect mice from allergic inflammation. We suggest that metabolites produced by the probiotic might provide the stimulating signal that drives adenosine production and regulation of inflammation.

Biography

Dr. Liliane Martins dos Santos has completed her PhD in 2011 under the mentorship of Dr. Yasmine Belkaid at the NIH in collaboration with Dr. Leda Vieira in Brazil. She has completed postdoctoral studies from NIH-USA and Federal University of Minas Gerais. She is an associate researcher at the Department of Biochemistry and Immunology at the Federal University of Minas Gerais in Brazil. She has extensive experience studying the role of the microbiota and probiotics in the modulation of immune responses during infections and allergic diseases.

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