PNAS (2013) 11 (27): 11151-1156.
doi: 10.1073/pnas.1303897110

Role of sortase-dependent pili of Bifidobacterium bifidum PRL2010 in modulating bacterium-host interactions

Francesca Turroni[a], Fausta Serafini[b,c], Elena Foroni[b,c], Sabrina Duranti[b,c], Mary O'Connel Motherway[a], Valentina Taverniti[d], Marta Mangifesta[b,c], Christian Milani[b,c], Alice Viappiani[b,c], Tommaso Roversi[d], Borja Sanchez[e], Andra Santoni[c], Laura Gioiosa[f], Alberto Ferrarini[g], Massimo Delledonne[g], Abelardo Margolles[e], Laura Piazza[d], Paola Palanza[f], Angelo Bolchi[c], Simone Guglielmetti[d], Douwe van Sinderen[a], and Marco Ventura[b,c]

a. Department of Microbiology, Alimentary Pharmabiotic Center, Bioscience Institure, National University of Ireland, Cork, Ireland;
b. Laboratory of Probiogenomics,
c. Department of Life Science, and
d. Department of Food, Environmental, and Nutritional Sciences, University of Milan, 20133 Milan, Italy;
e. Departamento de Microbiologia y Bioquimica de Productos Lacteos, Instituto de Productos Lacteos de Asturias, Consejo Superior de Investigaciones Cientificas, Villaviciosa, 3300 Asturias, Spain, and
f. Department of Biotechnology, Functional Genomic Center, University of Verona, 37134 Verona, Italy

Abstract

Bifidobacteria represent one of the dominant groups of microorganisms colonizing the human infant intestine. Commensal bacteria that interact with a eukaryotic host are believed to express adhesive molecules on their cell surface that bind to specific host cell receptors or soluble macromolecules. Whole-genome transcription profiling of *Bifidobacterium bifidum* PRL2010, a strain isolated from infant stool, revealed a small number of commonly expressed extracellular proteins, among which were genes that specify sortase-dependent pili. Expression of the coding sequences of these *B. bifidum* PRL2010 appendages in nonpiliated *Lactococcus lactis* enhanced adherence to human enterocytes through extracellular matrix protein and bacterial aggregation. Furthermore, such piliated *L. lactis* cells evoked a higher TNF-α response during murine colonization compared with their nonpiliated parent, suggesting that bifidobacterial sortase-dependent pili not only contribute to adherence but also display immunomodulatory activity.

Full text:

http://www.pnas.org/content/110/27/11151.full