PROBIOTIC BACTERIA SELECTIVELY STIMULATES THE IMMUNE RESPONSE OF CAENORHABDITIS ELEGANS TO THE INFECTION OF FOODBORNE PATHOGENS

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Although the immune response of *Caenorhabditis elegans* to microbial infections is well-established, very little is known about the effects of health promoting-probiotic bacteria on evolutionarily conserved *C. elegans* host responses. We found that the probiotic Gram-positive bacterium *Lactobacillus acidophilus* is not harmful to *C. elegans* and that *L. acidophilus* is unable to colonize the *C. elegans* intestine. Conditioning with *L. acidophilus* significantly decreased the burden of a subsequent *Enterococcus faecalis* infection in the nematode intestine and prolonged the survival of nematodes exposed to pathogenic strains of *E. faecalis* and *Staphylococcus aureus*, including multi-drug resistant (MDR) isolates. Pre-exposure of nematodes to *Bacillus subtilis* did not provide any beneficial effects. Importantly, *L. acidophilus* activates key immune signaling pathways involved in *C. elegans* defenses against Gram-positive bacteria, including the p38 mitogen-activated protein kinase pathway (via TIR-1 and PMK-1) and the β-catenin signaling pathway (via BAR-1). Interestingly, conditioning with *L. acidophilus* had a minimal effect on Gram-negative infection with *Pseudomonas aeruginosa* or *Salmonella enterica* serovar Typhimurium and had no or negative effect on defense genes associated with Gram-negative or general stress. In conclusion, we describe a new system for the study of probiotic immune agents and our findings demonstrate that probiotic conditioning with *L. acidophilus* modulates specific *C. elegans* immunity traits. (Acknowledgement: This work supported by the Health Care Projects to Gwangju Metropolitan City, Korea)