

The Immunomodulatory and antimicrobial anti-Candida effects of *Lactobacillus rhamnosus*, *in vitro* and *in vivo*

Mariello Leao, A. L. Jorjao, T. A. A. Tavares, V. C. Castro, F. C. Ribeiro, P.P. Barros, S.S.F. Santos, C.R.G.Silva, J.C. Junqueira, L.D. Oliveira, A. O. C. Jorge

Universidade de Taubate, Brazil

Based on previous studies, which demonstrated the reduction on prevalence and amounts of *Candida* in the oral cavity of young and elderly individuals after consumption of probiotics, we have been studied the immunomodulatory and antimicrobial anti-*Candida* effects of *Lactobacillus rhamnosus*, *in vitro* and *in vivo*. For this, suspensions of *Candida albicans* were inoculated in the oral cavity of experimentally immunosuppressed mice for induction of candidosis. The animals were divided into four groups: a) with induction of candidosis without consuming probiotic; b) with induction of candidosis with probiotic consumption just during the inoculation of *Candida*; c e d) without inducing candidosis on those two different manners regarding the consumption of probiotics. Oral cavity samples were collected and the yeasts were counted. After animal sacrifice, the tongues were macroscopically analyzed and immersed in formalin for histopathological investigation. In addition, serum samples were collected for analysis of TNF- α , β IL-1, IL-4, IL-6, IL-10, IL-12, by ELISA technique. The ability of *L. rhamnosus* to induce the release of TNF- α , β IL-1, IL-4, IL-6, IL-10, IL-12 and nitric oxide by macrophages (RAW 264.7) was also investigated *in vitro*. *In vitro* anti-*Candida* antimicrobial action of *L. rhamnosus* was investigated using agar diffusion and planktonic growth inhibition tests. The preliminary results of the *in vitro* experiments showed that *L. rhamnosus* was not able to interfere in *Candida* growth. Regarding cytokines, *L. rhamnosus* could induce the release of TNF- α , IL-6, nitric oxide and IL-10, sometimes like endotoxin. The *in vivo* studies revealed a reduction in amounts (cfu/mL) of *Candida* in the oral cavity of animals from group b (with probiotic consumption), however this difference was not statistically significant. Regarding cytokine analyzes, all groups showed low levels of TNF- α , IL-4, IL-10 and IL-12, and there was no statistical difference between them. The IL-6 production was better verified and although the groups with consumption of probiotics (b and d) had presented lower levels of these cytokine, the difference was not significative. So, the results have shown that *L. rhamnosus* seems to reduce *Candida* amounts in oral cavity of animals with candidosis, probably by interfering with its adhesion not with its growth, and inducing or modulating the secretion of cytokines.

Biography

Graduated in Medical Biology by Federal University of São Paulo(1996). Master and doctoral degrees in Oral Bio-pathology in São Paulo State University, (1999-2002). She is currently an Assistant Professor of Microbiology and Immunology at the University of Taubaté (Taubaté) and postdoctoral researcher at School of Dentistry of São José dos Campos, São Paulo State University, where she contributes to the project "Study of Immunomodulatory and antimicrobial anti-*Candida* action of *Lactobacillus rhamnosus*".

mariella.leao@unitau.com.br