Maria Vittoria Barone et al., J Prob Health 2014, 2:2
http://dx.doi.org/10.4172/2329-8901.S1.015

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Probiotics, Functional & Baby Foods
September 23-25, 2014 Hotel Royal Continental, Naples, Italy

Lactobacillus paracasei CBA L74 prevents entrance of undigested gliadin peptides and rotavirus in Caco-2 cells

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Objectives and Study: Recent reports describe a role of probiotics as therapeutic approach for Celiac Disease (CD). Besides, rotavirus (RV) infections are described as a potential risk factor for CD development. Undigested A-gliadin peptides P31-43 and P57-68 are central to CD pathogenesis, entering in enterocytes in vesicular compartments by endocytosis and inducing an innate and an adaptive immune response respectively. Aim of the study was to test the effect of probiotic Heinz proprietary strain *Lactobacillus paracasei* CBA L74 (International Depository Accession Number LMG P-24778) and its supernatant on P31-43, P57-68 and RV entrance in Caco-2 cells to verify its protective effect. The effect of supernatant on ROS production in RV infected Caco-2 was also tested.

Methods: LP CBA L74, obtaining 108 CFU/ml was cultivated and its supernatant was obtained by centrifugation and filtration. Caco-2 cells were treated with LP CBA L74 or with its filtered supernatant at 37°, CO2 5%, for 30 minutes, and then labeled P31-43/P57-68 or RV were added to cells cultures. We studied entrance of labeled peptides by fluorescence assay. RV entrance was assessed by direct immunofluorescence and the reactive oxygen species (ROS) production by dichlorofluorescein fluorimetric assay in Caco-2 cells infected with RV with or without bacterial supernatant.

Results: LP CBA L74 inhibited both P31-43 (FI reduction: 67.28%, P<0.001) and P57-68 (FI reduction: 37.05%, P<0.001) entrance respect to control. LP CBA L74 supernatant was also able to induce decrease of both gliadin peptides entrance in Caco-2 cells (FI reduction: 49.38% and 29.67% respectively, P<0.001), indicating that this biological effect was due to some product included in LP CBA L74 supernatant. Supernatant significantly prevented RV entrance and ROS production (reduction of 56%, P<0.001) in RV infected Caco-2 cells, showing a potential protective effect in RV infections.

Conclusion: LP CBA L74 and its supernatant reduce P31-43, P57-68 and RV entrance in Caco-2 cells probably acting on the endocytic trafficking. Moreover supernatant can protect Caco2 cells from RV mediated increase of ROS.

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