

P37 - Characterization of probiotic strains for their role as antimicrobial agents and their possible effects on epithelial intestinal cell lines

A. De Giani, F. Bovio, P. Di Gennaro

Department of Biotechnology and Biosciences, University of Milano-Bicocca

a.degiani@campus.unimib.it

Background: The human gut microbiota is a complex ecosystem and disorders such as IBD and IBS have been associated with a compromised imbalance in the microbial community. Therefore, the search for new probiotics is driven by the increased levels of health consciousness leading to the concept of preventive health care. Among probiotics, *Lactobacillus* and *Bifidobacterium* genera are considered desirable members of the intestinal microbiota, due to their beneficial strain-specific properties, for instance the antimicrobial activity. Thus probiotics and their antimicrobial metabolites could be used as new antimicrobial strategies for treatment and prevention of infection, improving human health.

Objective: The aim of the present work is the characterization of the antimicrobial activity of several probiotic strains, belonging to *Lactobacillus* and *Bifidobacterium* genera, against antagonistic bacteria. Then the evaluation of mechanisms underlying this activity and possible effects of the strains on human intestinal cells were investigated.

Results: The strains were characterized for their probiotic properties, in particular for their antimicrobial activity. Supernatants from *Lactobacillus plantarum* LP, *Lactobacillus rhamnosus* LRh and *Bifidobacterium lactis* BL could inhibit the growth of all tested antagonist microorganisms, except for *C. albicans*. Otherwise, its growth could be inhibited by the direct contact between probiotics and pathogen. We selected *L. plantarum* LP for further investigations. Among its secondary metabolites, bacteriocin-like compounds were extracted and defined as antimicrobial molecules, because they could inhibit *E. coli* and *S. aureus* growth. Moreover, LP bacteriocin-like molecules had beneficial effects on host epithelial intestinal cells: viability increased in healthy mucosa cell line and slightly decreased in tumoral colon cell line. A strong modulation of EGFR pathway was observed.

Additional studies will evaluate the impact of probiotics on human gut through microbiome analysis.

References

-Shokryazdan P, Sieo C, Kalavathy R, Liang JB, Alitheen NB, Jahromi MF, Ho YW, *Probiotic Potential of Lactobacillus Strains with Antimicrobial Activity against Some Human Pathogenic Strains*, BioMed Research International (2014), 2014: Article ID 927268

-Chikindas ML, Weeks R, Drider D, Chistyakov VA, Dicks LMT, *Functions and emerging applications of bacteriocins*, Current opinion in Biotechnology (2018), 49: 23-28