P61 - **Preliminary data on the physiological responses of Enterococci to human derived bioactive compounds**

Scardaci R., Lazzarini F., Cirrincione S., Musso T., Mazzoli R., Pessione E.
Department of Life Sciences and Systems Biology, Department of Public Health, University of Turin.
rossella.scardaci@unito.it, enrica.pessione@unito.it

Enterococci are controversial organisms involved in food fermentations as starters, biocontrol agents and probiotics, but also in pathogenic events occurring in hospitalized patients[1].
In the present research, we would like to evaluate the phenotypic responses of enterococci (*E. faecalis* DISAV 1022, *E. faecium* NCIBM 10415) to aminoacids derivatives (GABA, serotonin, norepinephrine), human bioactive molecules abundant at gut level[2–4]. The aim was to establish if contact with these compounds was able to modify the growth curves and the probiotic attitude of the strains in study (phenotypic tests), their protein profiles (comparative proteomic approach) and their ability to affect behaviour of dendritic cells (DC).
Analyses of growth curves, biofilm formation, resistance to gastric and intestinal digestion and to bile salts, as well as adhesion to o-xylene were evaluated in different ranges of bioactive compounds, according to the molecules. Mono-dimensional and bi-dimensional sub-proteomes were also evaluated. Responses of DC to serotonin and norepinephrine-stimulated in toto bacterial cells were then examined.
E. faecium NCIBM 10415 was the best responder to human bioactive compounds and some modification of growth pattern and phenotypic features were observed. Norepinephrine and serotonin were chosen for further studies concerning comparative proteomic approach and the responses of DC to treated and untreated bacteria and their supernatants.
As previously demonstrated for pathogenic bacteria[5,6], also enterococci are able to respond to human bioactive molecules by modifying both the growth curves and some phenotypic traits useful to establish their probiotic attitude. Work is in progress to evaluate bacterial metabolic pathway modification exerted by these compounds (proteomics) and possible feed-back effects induced on the dendritic immune cells by treated bacteria and cell supernatants.

References

1. Franz, C. M., Holzapfel, W. H. & Stiles, M. E. *Enterococci at the crossroads of food safety?* Int. J. Food Microbiol. 47, 1–24 (1999).
2. Taubin, H. L., Djahanguiri, B. & Landsberg, L. *Noradrenaline concentration and turnover in different regions of the gastrointestinal tract of the rat: an approach to the evaluation of sympathetic activity in the gut*. Gut 13, 790–795 (1972).
3. Krantis, A. *GABA in the Mammalian Enteric Nervous System*. Physiology 15, 281–284 (2000).
4. Grosnstad, K. O. et al. The Effects of Vagal Nerve Stimulation on Endoluminal Release of Serotonin and Substance P into the Feline Small Intestine. Scand. J. Gastroenterol. 20, 163–169 (1985).
5. Biaggini, K. et al. *The pathogenic potential of Pseudomonas fluorescens MFN1032 on enterocytes can be modulated by serotonin, substance P and epinephrine*. Arch. Microbiol. 197, 983–990 (2015).
6. Doherty, N. C., Tobias, A., Watson, S. & Atherton, J. C. *The Effect of the Human Gut-Signalling Hormone, Norepinephrine, on the Growth of the Gastric Pathogen Helicobacter pylori*. Helicobacter 14, 223–230 (2009).