

OC19 - Development and characterization of a new probiotic formulation, EndolaCoa[®], in allergic patients

Patrizia Malfa¹, Giuliana Zisa², Davide Raineri³, Maria Sole Lilleri², Elena Riboldi⁴, Monica Locatelli⁴, Luca Gigliotti³, Jean Daniel Coisson⁴, Mario Pirisi², Marco Arlorio⁴, Lucia Corrado³, Mara Giordano³, Antonio Sica⁴, Annalisa Chiocchetti³

¹Progefarm, Novara.

²Allergic unit (UPO), Novara.

³Department of Health Science and IRCAD and CAAD, University of Piemonte Orientale (UPO), Novara.

⁴Department of Drugs Science, University of Piemonte Orientale (UPO), Novara

⁵Department of Science and Technology Innovation, University of Piemonte Orientale (UPO), Novara.

annalisa.chiocchetti@med.uniupo.it

Background: Immune responses are regulated by T helper (Th) cells and allergy is associated to a Th2 response. Shifting the immune response toward a Th1 profile, or boosting a Treg response, may represent a clinical approach. 1-2 Food supplementation with probiotics, able to tune the immune response, may be beneficial for individuals with allergic rhinitis (AR), a disease affecting 109 of Italians. 2-4 Here we show the results of a pilot study based on a multidisciplinary and integrated approach moving from basic research, to industrial setting, and clinical trial (RCT).

Objective: The aim of this work, was to develop and test a new probiotic formulation to ameliorate AR symptoms.

Results: All the tested probiotic strains (n=6) showed immunomodulatory activity, but among them, *L. plantarum* P17630 and *L. paracasei* 1688 induced a high and sustained Th1-promoting activity and low Th2 activity. Moreover, given the recognised anti-inflammatory properties of cocoa polyphenols, the association of cocoa powders with probiotics can improve the anti-allergic property of the food supplement. 5-6 Five different commercially available cocoa have been tested for total polyphenols, flavonoids, proanthocyanidine and their antioxidant activity. Acticoa[®] has been selected as the most suitable.

Given these results, Proge Farm Srl prepared the formulation commercially called Endolacoa[®] (*L. plantarum* P17630 and *L. paracasei* 1688 -2 billions CFU/dose, Acticoa[®], and vitamins D3 and B6), that is now on the market. To pilot test its effect on AR, we performed a double-blind cross-over RCT with a daily dose of EndolaCoa[®] vs placebo. We enrolled 8 patients, with diagnosed dust mite allergy. These have been randomly allocated to an arm of the study (EndolaCoa[®] or placebo) once daily for 4 weeks with a wash-out period of 4-8 weeks before cross-over. Immunologically, oral administration resulted in a significant increase of regulatory T cells (CD4+/FoxP3+/CD25+/IL-10+) that inversely correlated with Th2-IL-4+ cells, in EndolaCoa-treated patients vs placebo (p<0.05). Moreover, we found a significant and positive correlation between Tregs, increasing of lactobacilli in faecal samples and Rhinitis Control Assessment (RCAT) post-treatment (p= 0.0072 e r= 0.8810). At the end, DNA methylation analysis identified 3 gene pathways which were dysregulated upon probiotic administration.

Conclusions / Implications for practice

In this pilot study, we obtained preliminary but promising results, suggesting that our new dietary supplemental could shift the immune system toward a less inflammatory response potentially beneficial to AR patients.

References

1. Rutkowski K, Sowa P, Rutkowska-Talipska J, Sulkowski S, Rutkowski R. *Allergic diseases: the price of civilisational progress*. *Postepy Dermatol Alergol*. 2014 May;31(2):77-83. doi: 10.5114/pdia.2014.40936.
2. Rondón C, Campo P, Togias A, et al. Local allergic rhinitis: concept, pathophysiology, and management. *Journal of Allergy and Clinical Immunology*. 2012;129(6):1460–1467.
3. Castellazzi AM, Valsecchi C, Caimmi S, Licari A, Marseglia A, Leoni MC, et al. *Probiotics and food allergy*. *Ital J Pediatr* 2013;39:47.
4. Kim HJ, Kim HY, Lee SY, Seo JH, Lee E, Hong SJ. *Clinical efficacy and mechanism of probiotics in allergic diseases*. *Korean J Pediatr* 2013; 56:369-376
5. Bellik Y., Boukraâ L., Alzahrani H. A., Bakhotmah B. A., Abdellah F., Hammoudi S. M., Iguer-Ouada M. (2013). *Molecular mechanism underlying anti-inflammatory and anti-allergic activities of phytochemicals: an update*. *Molecules*, 18, 322-353
6. Ramiro-Puig E., Castell M. (2009). *Cocoa: antioxidant and immunomodulator*. *British Journal of Nutrition*, 101, 931–940