

***Bacillus clausii* effects in children with allergic rhinitis**

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Key words: allergic rhinitis; antihistamines; *Bacillus clausii*; children; eosinophils; probiotics.

Allergic rhinitis is characterized by T-helper (Th)2 polarization as elevated levels of Th2-derived cytokines, including interleukin (IL)-4, IL-5 and IL-13, have been evidenced at nasal level in allergic rhinitis

***Bacillus clausii* modulates nasal allergic inflammation cooperating with antiallergic drugs.**

(1). Th2 cytokines play a pathogenic role as they induce IgE synthesis and eosinophil infiltration. Th2 polarization in allergic subjects may occur as consequence of reduced pressure of microbial agents in the gut: the so-called Hygiene Hypothesis (2). Probiotics may stimulate immune system at all mucosal surfaces and exert a primary prevention of atopic diseases and reduce allergic symptoms and inflammatory parameters (3). We previously found out that *Bacillus clausii* was capable of modulating cytokine pattern at nasal level in allergic children with recurrent respiratory infections (4). Particularly, *B. clausii* restored physiological Th1 polarization and induced T-regulatory cell response, as documented by increased levels of IL-10 and tumor growth factor (TGF) β after treatment (4).

Therefore, we conducted a pilot study to investigate the potential effects exerted

by *B. clausii* on nasal symptoms, eosinophils, and symptomatic use of antihistamines in children with allergic rhinitis.

Twenty allergic children, 13 males and seven females, with an average age of 13.4 years (range 12–15) were consecutively evaluated. A detailed clinical history and a complete physical examination, including allergy evaluation, were carried out for each patient. The diagnosis of allergic rhinitis due to pollen sensitization was made according to validated criteria (5). The study was blinded both to the investigator who performed the nasal eosinophil assessment and the investigator who carried out statistical analysis.

Symptomatic use of levocetirizine (5 mg tablets) was prescribed for all children. Ten of them were randomly treated with oral *B. clausii* (Enteroger-

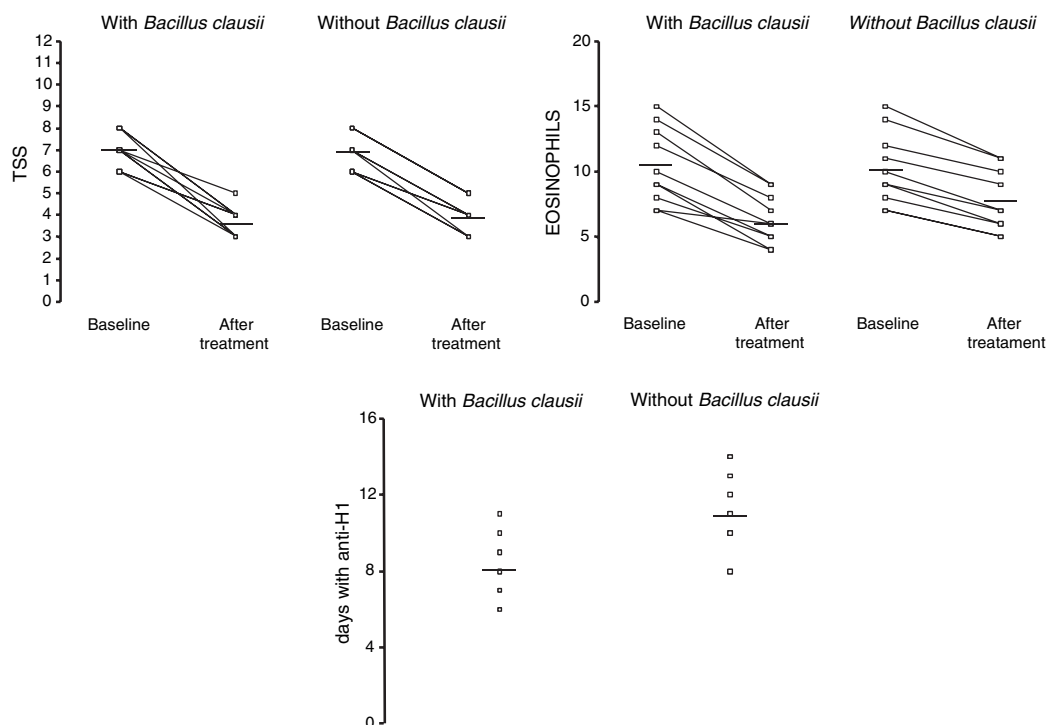


Figure 1. TSS in children before and after treatment with or without *Bacillus clausii* (left upper panel). Eosinophil number in children before and after treatment with or without *B. clausii* (right upper panel). Number of days with antihistamine assumption (lower panel).

mina, Sanofi-Synthelabo OTC, Milan, Italy) spores (2 billion spores/vial) at the dosage schedule of three vials a day for 3 weeks.

The study was performed during the pollen season, when patients were symptomatic, and was approved by the Institutional Review Board. Informed consent was obtained from the parents of the children. Nasal total symptoms score (TSS), nasal eosinophils, and number of days associated with antihistamine assumption were evaluated. Symptoms and eosinophils were assessed in all subjects at baseline and after 3 weeks according to validated criteria (6).

The data collected were subjected to statistical analysis by MANOVA and *post hoc* comparison by Duncan's test. All results with *P*-values < 0.05 obtained were considered statistically significant.

Children treated with *B. clausii* spores, showed significant reduction (*P* = 0.049) of TSS without any side-effect: 7 ± 0.8 at baseline, and 3.7 ± 0.7 after treatment. Nasal eosinophils significantly (*P* = 0.048) diminished: 10.4 ± 2.9 at baseline, and 6.3 ± 1.9 after treatment.

Children treated only with levocetirizine on demand did not show significant (*P* = 0.051) reduction of TSS: 6.9 ± 0.9 at baseline, and 4 ± 0.8 after 3 weeks. Moreover, nasal eosinophils were not significantly (*P* = 0.69) diminished: 10.2 ± 2.8 at baseline, and 7.7 ± 2.3 after 3 weeks.

The intergroup analysis showed that symptom relief was not significantly different in two groups (*P* = 0.061), whereas eosinophils were significantly less in children treated with probiotic (*P* = 0.042). Finally, children treated with *B. clausii* spores significantly (*P* = 0.034) assumed less levocetirizine tablets than other subjects: 8.1 ± 1.7 vs 11.1 ± 2.2 days (Fig. 1).

In conclusion, this pilot study provides evidence that *B. clausii* may exert a modulatory effect on allergic response as documented by reduced eosinophil infiltration. Moreover, this probiotic may

synergize with antihistamine in relieving nasal symptoms. In addition, the symptomatic use of antihistamine does not allow adequate control of both symptoms and inflammation. The possible mechanism of action of *B. clausii* may be attributed to the previous documented activity on immune response at the nasal level (4).

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References

- Christodoulopoulos P, Cameron L, Durham S, Hamid Q. Molecular pathology of allergic disease. II: Upper airway disease. *J Allergy Clin Immunol* 2000;**105**:211–223.
- Bjorksten B. The intrauterine and postnatal environments. *J Allergy Clin Immunol* 1999;**104**:1119–27.
- Matricardi P, Bjorksten B, Bonini S, Bousquet J, Djukanovic R, Dreborg S et al. Microbial products in allergy prevention and therapy. *Allergy* 2003;**58**:461–471.
- Ciprandi G, Tosca MA, Ricca V, Passalacqua G, Riccio AM, Bagnasco M et al. *Bacillus clausii* exerts immuno-modulatory activity in allergic children with recurrent respiratory infections: a pilot study. *Ped Allergy Immunol* 2004;**15**:148–451.
- Bousquet J, Van Cauwenberge P, Khaltaev N. Allergic rhinitis and its impact on asthma (ARIA). *Allergy* 2002;**57**:841–855.
- Ciprandi G, Tosca MA, Milanese M, Caligo G, Ricca V. *Bacillus clausii* exerts immuno-modulatory activity in allergic children with recurrent respiratory infections: a pilot study. *Ped Allergy Immunol* 2004;**15**:148–151.

Flow-assisted diagnosis of anaphylaxis to patent blue

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Key words: anaphylaxis; CD63; flow cytometry; methylene blue; patent blue.

A 20-year-old man was referred because of an anaphylactic reaction with angioedema, bronchospasm with cyanosis and profound hypotension (systolic pressure 120 mmHg to immeasurable) during anaesthesia for combined

We report a case of patent blue-induced anaphylaxis during fistulography in which flow cytometry confirmed diagnosis.

excision of a dermal cyst in the neck and a multifistulated sacral cyst. History revealed no previous allergies. Revision of his anaesthetic report disclosed that the reaction had started 30 min after induction with propofol, sufentanyl and cisatracurium, but within minutes after fistulography with patent blue (Blue patente V[®], Guerbet, Aulnay, France).

Laboratory analysis showed a normal blood count, complement profile and protease inhibitor concentrations. Total immunoglobulin E (IgE) was 11 kU/l and IgE for latex, suxamethonium and ethylene oxide were negative (< 0.35 kUa/l; Immuno-CAP FEIA method; Pharmacia Diagnostics, Brussels, Belgium). Skin tests included latex (Stallergenes, Genval, Belgium), chlorhexidine-digluconate, serial dilutions of five muscle relaxants: suxamethonium (Myoplegine[®]), pancuronium (Pavulon[®]), rocuronium (Esmeron[®]), atracurium (Tracrium[®]) and cisatracurium (Nimbex[®]), the analgesic sufentanyl (Sufenta[®]), the anaesthetic propofol (Diprivan[®]), and the dyes patent and methylene blue. Except for patent blue (Table 1) skin tests were negative.