# 应用体内外实验筛选可降低牛乳β-乳球蛋白过敏的乳杆菌

# Screening of β-lactoglobulin allergy-modulating lactobacilli strains using in vtro-in vivo correlation

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**中文关键词:** 关键词: 牛乳过敏,乳杆菌,细胞因子,Th1/Th2细胞平衡

**英文关键词:** Keywords: milk allergy Lactobacilli strains cytokine Th1 /Th2 cell balance

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**中文摘要:**

摘要:【目的】通过体内外实验评估5 种乳杆菌缓解牛乳β-乳球蛋白(BLG) 过敏的作用，为今后筛选具有抗过敏活性的乳杆菌提供参考。【方法】首先体外分析5 种活的/热致死的乳杆菌促进小鼠原代淋巴细胞分泌细胞因子(CK)IFN-γ和IL-4的水平，随后应用小鼠BLG 过敏模型评估这5 种乳杆菌抑制过敏的能力。将实验动物随机分为空白组、BLG 致敏组和5 种活的/热致死乳杆菌组。采用ELISA 法检测各组小鼠淋巴细胞分泌Th1/Th2 型CK 的水平，并测定小鼠血清中总IgE 和BLG 特异性IgE 的含量。【结果】在体外可促进淋巴细胞分泌IFN-γ、抑制IL-4，使其IFN-γ/IL-4比值(代表Th1/Th2细胞平衡) 显著高于正常对照组(P<0.05)的乳杆菌，在体内实验中也能有效提高致敏小鼠淋巴细胞的IFN-γ/IL-4 分泌率，并显著降低致敏小鼠血清中总IgE和BLG特异性IgE的水平(P<0.05)。相反，在体外的IFN-γ/IL-4 比值较低的乳杆菌，不能缓解特异性IgE抗体介导的食物过敏反应。【结论】基于乳杆菌体外刺激小鼠原代淋巴细胞分泌Th1/Th2型CK的结果，可以预测菌株在体内具有可通过纠正Th2占优势的Th1/Th2细胞失衡，下调抗体分泌量，缓解小鼠BLG 过敏症状的能力。

**英文摘要:**

Abstract: [Objective] We investigated the correlation between the in vitro immune profiling of 5 lactobacilli strains and their in vivo protective effect in a mouse β-lactoglobulin (BLG) allergy model for selecting the candidate strains with potential anti-allergy activity. [Methods] In vitro immunomodulation was assessed by measuring interleukin (IL)-4 and interferon γ (IFN-γ) release by primary lymphocytes stimulated with 5 active/heat-killed lactobacilli. A mice model of β-lactoglobulin allergy was then used to evaluate the alleviating allergy capacity of the same set of strains. The rats were randomly divided into blank group, BLG allergy group and different lactobacilli strains group. The total IgE and BLGspecific IgE contents in the serum of rats were measured with ELISA. Splenic lymphocytes were isolated and cultured in vitro, the levels of Th1/Th2 type cytokine were detected by ELISA. [Results] Protection of BLG-induced allergy was strain-specific. The strains displaying an in vitro capacity to induce higher levels of the Th1 type cytokine (IFN-γ) and lower levels of the Th2 type cytokine (IL-4), significantly decreased the levels of total IgE and BLG-IgE in allergic rat serum (P<0.05). In contrast, strains leading to a low IFN-γ/IL-4 cytokine ratio could not significantly attenuate allergic symptoms. [Conclusion] We could predict the in vivo protective capacity of the studied lactobacilli strains based on the cytokine profile established in vitro. Oral consumption of specific strain may be effective in preventing and alleviating BLG allergic symptoms by the improvement of the Th1 /Th2 cell balance toward Th1 dominance, and the inhibition of IgE production.

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