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Abstract (publication only)

Interaction of different Lactobacillus paracasei probiotic culture fractions with pathogenic Streptococcus pyogenes strains isolated from kindergarten children

L. Marutescu, L. Ditu, M. Mitache, V. Lazar*, M. Ghinescu, M. Chifiriuc (Bucharest, RO)

Lactobacilli are commonly used for probiotic therapy of different intestinal and urogenital infections, but little is known about their health benefits in respiratory and skin infections, like those produced by Streptococcus pyogenes (group A Streptococcus-GAS). Objective: to characterize at phenotypic and molecular level the virulence potential of GAS strains and to determine the influence of soluble or cellular fractions of Lactobacillus paracasei (LP) probiotic culture on GAS strains growth rate and expression of different virulence features. Methods: Twenty GAS strains were isolated from children with streptococcal infections, including scarlet fever. The isolates were identified using conventional tests (sheep blood haemolysis, bacitracin susceptibility, latex agglutination and API Strep). Cell associated (adhesins) and soluble enzymatic virulence factors were assessed by inoculation of GAS strains on HeLa cells and respectively, on specific enriched culture media containing different biochemical substrata. The GAS strains were also investigated by PCR for the streptococcal superantigenic toxin gene profiles (speA, speB, speC, speF, speG, speH, speJ, ssa, smeZ and speI). Further, GAS standardized suspensions were mixed with LP whole culture/sterile supernatants (at different volume ratios) and then plated on Columbia Sheep Blood Agar using calibrated loops. Colony counts were performed and compared using t-tests and ANOVA statistical analyses. All the virulence assays were also repeated after co-cultivation of GAS strains with LP culture fractions. Results. All tested strains exhibited the ability to colonize the HeLa cells with a predominant diffuse-aggregative pattern and to produce soluble virulence factors, represented by beta-haemolysins, proteases and DN-ases. The most frequent superantigen gene alleles were the chromosomally located ones spef, speg and ssa, followed by speb, spec and speh, spei, smez. A statistically significant decrease of the colony counts of GAS strains co-cultivated with LP culture fractions was observed. The profile of soluble virulence factors did not significantly changed in the presence of LP fractions. In exchange, the soluble LP fraction stimulated the GAS adherence and internalization in HeLa cells. Conclusion: understanding the interactions between probiotic bacteria and GAS could lead to an expansion of the use of probiotics as candidates for the prevention and treatment of skin and respiratory tract infections.