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Lactobacillus crispatus co-aggregates with Neisseria meningitidis by interacting with Type IV pili.

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Background

Type IV pilus (Tfp), a flexible fiber that can bundle together, be elongated, and retracted, is one of the most important virulence factors of the pathogenic Neisseria. Tfp is involved in adherence to host epithelium, auto-aggregation into multicellular microcolonies, and twitching motility. Lactobacillus spp possess a wide range of antipathogenic abilities, among one is competitive exclusion where the lactobacilli bind and co-aggregate with the pathogens and inhibit adherence to the host. Our preliminary data show that the vaginal isolate, L. crispatus can co-aggregate with different strains of N. meningitidis but less so to N. gonorrhoeae.

Aim/Methods

In this study, we aimed to investigate the binding properties of L. crispatus to different strains of N. meningitidis as well as N. gonorrhoeae in order to characterize the binding molecules involved.

Results

Our ongoing research has shown an ability of L. crispatus to bind to Tfp of N. meningitidis, a binding which in a co-culture leads to co-aggregation. The formation of larger co-aggregative clusters affects the meningococcal microcolony functions. The affinity for Tfp-binding differs between L. crispatus strains and is

inhibited upon Proteinase K treatment, meaning its most likely a protein that bind to meningococcal Tfp. Likewise, the difference in the binding that occurs between meningococcal spp is not related to capsule, pili class, or LPS expression, but rather the ability to form microcolonies. However, this co-aggregation was not as pronounced with N. gonorrhoeae. This binding evasion of N. gonorrhoeae, as well as characterization of the L. crispatus pilus-binding protein, could lead to future therapies and advance the field.

Conclusions

L. crispatus co-aggregates with N. meningitidis, with a possible binding pair being meningococcal Tfp and an unknown surface protein on L. crispatus. The binding is strain-specific and strains forming larger microcolonies seem to be bound by L. crispatus to a higher degree. Isolation and characterization of L. crispatus pilus-binding protein open the possibility to future therapies.