Role of *Lactobacillus crispatus* in vaginal infections: insights from metagenomics and metabolomics studies

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Objective: *Lactobacillus* spp. constitute the most prevalent bacterial microorganism in the vaginal milleu. Several probiotic mechanisms have been associated with *Lactobacillus*, but the most relevant one is lactate production – resulting in a low pH value, typical of the healthy vagina. We aim to elucidate the role of a native vaginal microorganism, *Lactobacillus crispatus*, in vaginal infections.

Methods: Twenty-four vaginal washes have been collected from women (mean 38±14 years of age) attending a gynecology consultation of a private clinic. The samples were categorized according with clinical diagnosis at the time of sampling. The distribution of bacterial species, and their prevalence was assessed by next-generation sequencing of the 16S V4 region. In addition, lactate was quantified in all washes by a commercial kit.

Results: *L. crispatus* was dominant (>70%) in 11 out of 24 samples – diagnosed for vaginal atrophy (VA, 3), cytolytic vaginosis (CV, 2), lactobacillosis (LB, 2) and vulvovaginal candidosis (VVC, 1). For three samples, diagnostic was inconclusive. Lactate was increased in CV, LB and VA cases only. One sample, diagnosed with VVC had 23% dominance of *L. crispatus*; and lower lactate metabolite. *L. crispatus* was not detected in the remaining 12 cases (6 VVC, 4 VA, 1 healthy and 1 inconclusive). Of these, only 5 samples had moderate lactate metabolite.

Conclusions: *L. crispatus* dominance, associated with increased lactate production, was observed in CV, LB and VA cases. These results indicate that this microorganism might have a role in dysbiosis of the vagina associated with these specific pathologies.