71. In vitro interactions during bacterial vaginosis development demonstrate that multi-species biofilms have enhanced antimicrobial tolerance

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Background. Bacterial vaginosis (BV) is the worldwide leading vaginal bacterial infection commonly identified between menarche and menopause in women of all ethnicities. It is associated with serious health problems relating to both fertility and pregnancy. The hallmark of BV is the presence of a polymicrobial biofilm on the vaginal epithelium, formed mainly by *Gardnerella* spp., followed by *Fannyhessea vaginae*, and in a minor part by many other anaerobic species. It is considered that this multi-species biofilm allows BV-associated bacteria to show increased tolerance to antibiotics, thus leading to treatment failure and high BV recurrence rates. However, functional studies addressing this problem are lacking.

Objectives. In the present study, we selected *G. vaginalis*, *F. vaginae*, and another prominent species in BV, *Peptostreptococcus anaerobius*, and aimed to understand the role that interactions between these species in triple-species biofilms could play on BV treatment.

Methods. Metronidazole and clindamycin, two antibiotics recommended for the treatment of BV, were used against single and multi-species biofilms. Their effect on biomass, total cells and culturable cells as well as bacterial populations of triple-species BV biofilms was evaluated under *in vitro* conditions. Bacterial composition was assessed by genomic DNA quantification by qPCR.

Results. Neither metronidazole nor clindamycin were able to eradicate the biomass of the triple-species biofilms, although being effective in selective single-species biofilms. Similar results were registered for the total and culturable cells. Interestingly, despite individual strains susceptibilities to antibiotics, the triple-species biofilms were mainly composed by *G. vaginalis.*

Conclusions & Significance: Taken together, these results strengthen the idea that when co-incubated, bacteria interact and therefore respond differently to the antimicrobial therapy, mostly promoting an overall increased to tolerance, which clearly explains the observed clinically high recurrence rates associated with BV.

References & funding information

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