Bacterial vaginosis (BV) is the most common vaginal disorder of women of reproductive age. It is commonly accepted that the microbial switch from normal to BV state is characterized by a decrease in vaginal colonization by Lactobacillus species together with an increase in the number of Gardnerella vaginalis and others anaerobes. G. vaginalis can be found associated with normal vaginal epithelium but recent findings suggest that it is the biofilm produced by G. vaginalis that leads to establishment of BV, by allowing other anaerobes to grow. Further research into the properties of G. vaginalis and its interactions with other BV-associated anaerobes may be essential for better understanding the BV etiology. Therefore, our goal was to study competitive initial adhesion between Lactobacillus crispatus (an important vaginal species with probiotic activity) and several anaerobes. Also, this study aimed to evaluate differences in biofilm formation between a healthy G. vaginalis strain (5-1) and the other anaerobes as compared with a BV G. vaginalis strain (101). In addition to G. vaginalis strains (5-1 and 101), Prevotella bivia, Fusobacteria nucleatum, Mobiluncus mulieris and Atopobium vaginae were used in this social interaction research. First, initial adhesion assays at 100rpm for 30 min were conducted in glass 8-well slides using an equal mixture of L. crispatus 39G strain and a second anaerobe at same concentration (10^3
CFU/ml) in each well. Next, we used qPCR to study the biofilm social evolution (synergic, antagonist and commensal relationship) between a pre-established (24h) biofilm formed by one of the two G. vaginalis strains and a second anaerobe. Our results showed that G. vaginalis 5-1 and 101 strains had definitively the greatest initial adherence capability when in presence of the same number of L. crispatus 39G cells, followed by P. bivia, M. mulieris and A. vaginae. In addition, qPCR analysis of the two species biofilms revealed that both G. vaginalis strains established commensal relationships with all others anaerobes except with P. bivia, for which a synergic relation was found. In fact, this synergic relation between these two species had previously been noted. Importantly, G. vaginalis 101 (pathogenic strain) showed nearly a 2-fold increase in biofilm formation when compared with G. vaginalis 5-1 (healthy strain) in the presence of any other anaerobes studied. This work was supported by European Union funds (FEDER/COMPETE) and by national funds (FCT) under the project with reference FCOMP-01-0124-FEDER-008991 (PTDC/BIA-MIC/098228/2008).

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