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What happens to *Gardnerella vaginalis* when growing as a biofilm: a comparative transcriptomic analyses by RNA-seq

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Bacteria assume distinct lifestyles during the planktonic and biofilm modes of growth. In biofilms, they are more tolerant to antibiotics and can evade the immune system response more effectively. However, little is known regarding the molecular determinants involved in biofilm formation by *Gardnerella vaginalis*, the predominant species found in the polymicrobial condition bacterial vaginosis (BV), the most common vaginal disorder of women in reproductive age.Hence, to gain insight into the pathogenesis of *G. vaginalis,* we carried out a comparative transcriptomic analysis between planktonic and biofilm phenotypes, using RNA-sequencing. Significant differences were found in the expression of 815 genes. A detailed analysis of the results obtained was performed based on direct and functional gene interactions. In biofilm bacteria, the cell envelope appeared to be very active since genes encoding binding proteins and proteins involved in the synthesis of murein were significantly up-regulated. In addition, our data showed that *G. vaginalis* reflects the typical adaptation to stress and starvation conditions. Interestingly, genes associated with glucose and carbon metabolism, as well as oxidoreductase activity were found down-regulated in biofilms.Furthermore, gene-regulated processes in *G. vaginalis* biofilms resulted in a protected form of bacterial growth, characterized by low metabolic activity, which is appropriate to guarantee long-term survival during BV recurrence. Therefore, our data suggested that *G. vaginalis* adjust its lifestyle during colonization and infection by means of an extensive change of gene expression.