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## Study finds strong link between bacteria of the human penis and viral STIs among South African men

Male circumcision is known to reduce the risk of sexually transmitted infections (STIs) and impact the penile microbiota, also known as bacterial communities. [One study](#) suggested that the presence of specific bacteria is a risk factor for HIV acquisition in men. Despite this and the high burden of HIV in South Africa, there is currently no data about the link between HIV and penile microbiota in a South African cohort. In addition, potential association between penile microbiome and HPV has not been reported anywhere in the world.

However, a paper recently published in BMC Microbiology provides insight into the connection between microbiome and two STIs – human papillomavirus (HPV) and HIV infections – among South African men. The paper is authored by Dr Harris Onywera, a postdoctoral research fellow at the University of Cape Town's (UCT) Department of Pathology, in collaboration with the Centre for Genomic Regulation (CRG), Barcelona, Spain.

Dr Tracy Meiring's team at UCT's Division of Medical Virology, where Onywera is also based, set about to address this knowledge gap. "For the first time, such a large-scale study was conducted that involved HPV- and HIV-infected sexually active circumcised men," says Onywera. "We identified, in these men, separate groups that differ dramatically by bacterial compositions. This is the major finding of our research. It is important, because now by taking a swab from the penis we can estimate the risk of penile cancer and other diseases, including those associated with STIs and reproductive function."

Through the programme, Onywera spent six months at CRG to obtain training in bioinformatics and to use the CRG Genomic, Computing and Bioinformatics facilities. "This study used penile swabs collected from 282 South African men aged between 20-67 years," he explains. "We extracted from these samples bacterial DNA and shipped DNA to Spain for sequencing on the MiSeq Illumina machine at the CRG Genomic facility. While in Barcelona, I was hosted by the Bioinformatics facility, led by Dr Julia Ponomarenko, where I learned new methods of analysing microbiome sequencing data. This paper is the result of this successful collaboration."

Almost half of the men had penile microbiota dominated by microbiota of the genus *Corynebacterium*. Onywera explains: "We observed that these men were less likely to have cancer-causing HPV compared to men with other types of microbiota. It seems, therefore, that there might be a link between *Corynebacterium* and protection against HPV."

The study also found that men with HIV had greater relative abundance of *Staphylococcus* compared to men without. Moreover, the study observed that men with cancer-causing HPV had greater relative abundance of bacteria associated with vaginal disorder in females, such as *Prevotella*, *Peptinophilus*, and *Dialister*, compared to men without the cancer-causing HPV. Hence, the presence of *Staphylococcus*, along with bacteria associated with vaginal disorder, might increase the risk of acquiring HIV and HPV, respectively, and facilitate conditions in which these infections persist, although further study would be needed to examine causation.

In summary, the findings indicate that there is a strong link between bacteria of the human penis and viral STIs, specifically HIV and HPV. The observation that bacteria associated with vaginal disorder and *Lactobacillus*, which is a common vaginal bacterium, were abundant in men is an indication that these bacteria could be sexually exchanged. The team is currently investigating the connection between microbiomes of female and male couples and viral and bacterial infections.

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