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Cross reactive responses against *Neisseria gonorrhoeae* in high-risk individuals immunised by Bexsero

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## Background

Currently, there are no licensed vaccines against *Neisseria gonorrhoeae*, and little evidence of protective immunity following natural infection. Retrospective analysis demonstrates that outer membrane vesicles (OMVs) derived from *Neisseria meningitidis* can confer a degree of protection against gonococcal infection, while individuals recurrently exposed to the gonococcus can develop a degree of immunity against re-infection with closely related strains.

## Aim/Methods

To identify potential cross-reactive antigens, we analysed immune responses in men who have sex with men and female sex-workers in coastal Kenya after receiving two doses of Bexsero, which contains meningococcal OMVs. We enrolled 50 individuals, of whom 46 completed the study. Sera was obtained from individuals pre- and post-immunisation, and responses defined using protein microarrays, and serum bactericidal responses. To fabricate dedicated gonococcal protein microarrays, coding sequences from *N. gonorrhoeae* outer membrane proteins were expressed and purified from *E. coli*, before printing onto nitrocellulose-coated glass slides. Whole genome sequences of *N. gonorrhoeae* were uploaded onto PubMLST, annotated and interrogated for variation in selected antigens.

## Results

Sera from pre- and post-vaccination stages were screened to identify IgG antibodies which cross-reacted with gonococcal antigens using a dedicated protein antigen microarray. Responses to each antigen varied among participants and patterns from each serum sample were compared and used to group individuals with similar response profiles. Clear differences were observed between samples taken before and after vaccination; results have been compared with bactericidal activity in sera from individuals. These experimental observations were combined with an examination of antigen sequence diversity, through the mining of genome sequences derived from diverse *N. gonorrhoeae* on the PubMLST database.

## Conclusions

High-risk, highly-exposed individuals developed cross-reactive responses recognising gonococcal proteins

following immunisation with Bexsero. Antigen microarrays proved to be an effective and powerful technology to dissect the complex antibody responses to vaccines containing OMVs and useful in the identification of cross-protective antigens. These data will be presented in full at the meeting, and should inform the choice of candidate vaccine antigen formulations designed to prevent gonococcal infection.