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Characterisation of 4CMenB vaccine-induced antibodies to Neisseria gonorrhoeae

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Background
There is currently no available vaccine to prevent Neisseria gonorrhoeae (Ng) infection and gonococcal vaccine development has been challenging. However, observational and epidemiological studies have shown that people vaccinated with the Neisseria meningitidis serogroup B vaccine 4CMenB have a reduced rate of Ng infection compared to unvaccinated controls. 4CMenB is composed of three recombinant antigens (neisseria heparin binding antigen (NHBA), factor H binding protein (fHBP), and neisseria adhesin A (NadA)), as well as outer-membrane vesicles (OMVs) containing Porin A subtype P1.4 from the strain NZ98/254.

Aim/Methods
We are conducting a randomised control trial with 4CMenB in gay and bisexual men (MenGo; ACTRN12619001478101) to determine if two doses of 4CMenB given 3 months apart provides protection against Ng. We are also characterising vaccine-induced immune responses via Western blot and ELISA with Ng whole cells, OMVs and NHBA, and serum bactericidal activity (SBA) against Ng.

Results
Prior to 4CMenB immunisation, there are antibodies present in the majority of MenGo samples that recognise Ng whole cells and OMVs, possibly due to previous Ng infection. Three months following the second dose of 4CMenB there is a substantial increase in IgG1, IgG3, and IgG4 antibodies against Ng NHBA in the vaccinated group compared to the unvaccinated group. There is also a significant increase in SBA titres against Ng.

Conclusions
Vaccination with 4CMenB induces antibodies that can recognise and kill N. gonorrhoeae in vitro, which supports the potential of this vaccine to cross protect against N. gonorrhoeae infection.