AN INVESTIGATION OF HOW A MENINGOCOCCAL VACCINE MAY HAVE GENERATED CROSS-PROTECTION IMPACTING THE INCIDENCE OF GONORRHOEA

Seib KL[1], Semchenko EA[1], Tan A[1],Borrow R[2],

[1] Institute for Glycomics, Griffith University, Gold Coast, QLD, 4222, Australia

[2] Vaccine Evaluation Unit, Public Health England, Manchester Royal Infirmary, Manchester M13 9WZ, United Kingdom

Introduction:
Neisseria gonorrhoeae and *Neisseria meningitidis* are closely related bacteria that cause a significant global burden of disease. Control of gonorrhoea is becoming increasingly difficult due to widespread antibiotic resistance. While vaccines are routinely used for *N. meningitidis*, no vaccine is available for *N. gonorrhoeae*. Recently, the outer membrane vesicle (OMV) meningococcal B vaccine, MeNZB, was reported to be associated with reduced rates of gonorrhoea following a mass vaccination campaign in New Zealand. To probe the basis for this protection we assessed cross reactivity to *N. gonorrhoeae* of serum raised to the meningococcal vaccine Bexsero, which contains the MeNZB OMV component plus three recombinant antigens (NadA, fHBP-GNA2091, and NHBA-GNA1030).
Methods:
Bioinformatic analysis was performed to assess the similarity of MeNZB OMV and Bexsero antigens to gonococcal proteins. Rabbits were immunised with the OMV component or the three recombinant antigens of Bexsero, and Western blot, ELISA, serum bactericidal activity (SBA) assays and neutrophil opsonophagocytosis assays were used to assess antibodies recognising *N. gonorrhoeae.* Serum from humans immunised with Bexsero was also investigated assess the nature of the anti-gonococcal response.
Results:
There is a high level of sequence identity between the MeNZB OMV and Bexsero OMV antigens, and gonococcal proteins. NHBA is the only Bexsero recombinant antigen that is conserved and surfaced exposed in *N. gonorrhoeae*. Rabbit antibodies to the OMV component or to the three recombinant antigens of Bexsero recognise gonococcal proteins and mediate SBA and opsonophagocytic killing of *N. gonorrhoeae* strains. Furthermore, Bexsero induces antibodies in humans that recognise gonococcal proteins. The functional activity of Bexsero-induced human antibodies against *N. gonorrhoeae* is ongoing.
Conclusion:
The anti-gonococcal antibodies induced by MeNZB-like OMV proteins could explain the previously seen decrease in gonococcal cases following MeNZB vaccination. The high level of anti-gonococcal-NHBA antibodies generated by Bexsero vaccination in humans may result in additional cross-protection against gonorrhoea.

Disclosure of Interest Statement: RB performs contract research on behalf of Public Health England for GlaxoSmithKline (GSK), Pfizer, and Sanofi Pasteur. KLS worked for Novartis Vaccines (now GSK Vaccines) on the development of Bexsero from 2006 to 2012.