Pathogen Genomics in Maternal and Neonatal Health: understanding the vaccine targets and mother-to-baby transmission of Group B streptococcus

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Résumé

Streptococcus agalactiae, also known as Group B Streptococcus or GBS, is one of the leading causes of invasive infant infections globally. Approximately 20-30% of healthy adults are carrying GBS asymptomatically in their rectal and vaginal tract. Most commonly, GBS is passed on to the baby during birth and can lead to early onset infections (0-6 days of life) or late-onset infection (7-90days of life). Currently there are no licensed Group B streptococcus (GBS) vaccines, but a hexavalent-polysaccharide (Ia, Ib, II, III, IV, V), and a multivalent-adjuvanted-protein vaccines are in the pipeline. We have investigated the diversity of the GBS population found in mother-baby pairs in the Gambia and have looked at the genetic diversity of vaccine targets in carriage population in the Gambia and disease isolates in the UK.

We have used whole genome sequencing to analyse GBS isolates from carriage samples from mother-baby pairs in the Gambia to determine potential GBS genetic features that can be associated with transmission. As part of the work, we have confirmed that in 65% (15/23) mother-baby pairs had more than one GBS serotype identified, which has potential implications for introduction of GBS vaccines. The genes encoding capsule serotypes in the six-valent GBS vaccine were found in 98-99% of investigated invasive isolates from the UK and the carriage isolates in the Gambia. Proteins, targeted by the protein vaccine were also found in 97-98% of the GBS isolates.

Though the presence of vaccine targeted proteins/serotypes slightly differed between carriage and disease isolates from the Gambia and the UK; nearly all analysed GBS would be covered by the six-valent-polysaccharide GBS vaccine and protein-based GBS vaccine. This data provides evidence for the GBS vaccines phase IV trials as the steps are finalised for the potential inclusion of GBS vaccines into vaccination programme.

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