Is there an association between Lewis and Secretor phenotypes (*FUT2* and *FUT3* genotypes) and immune response one month after administration of two doses of the Rotarix vaccine in South African infants?

Thabiso Miya[1], Michelle Groome[2], Shabir Madhi[2], Debbie de Assis Rosa[1]
[1]MCB, University of the Witwatersrand, Johannesburg, [2]RMPRU, University of the Witwatersrand, Johannesburg

Introduction

Rotavirus (RV) infection is the leading cause of acute gastroenteritis (AGE) in children below 5 years of age, accounting for 450 000 global deaths in 2008. AGE-induced deaths have declined since the introduction of RV vaccines (Rotarix or Rotateq). However, efficacy of these vaccines is lower in Africa than high-income countries. The reason for this observation is unknown. Recent studies have suggested that Lewis-Secretor status may play a role in RV vaccine efficacy. Lewis-Secretor phenotypes are determined by Fuctosyltransferase (*FUT2/3*) genes. The aim of this study was to investigate the impact of variation in Lewis-Secretor phenotypes and *FUT2/3* genotypes on the IgA response to two doses of Rotarix in South African children.

Methods

A total of 215 saliva and serum samples were collected at vaccination and one month after 2nd Rotarix vaccine in a cohort of South African children. Letters of consent were signed by the parents. This study was approved by Wits University Human Research Ethics Committee. IgA levels in the serum samples were determined by ELISA. Two ELISA assays were performed on the 215 saliva samples to determine the cohort Lewis, Secretor and ABO phenotypes. DNA was extracted from saliva using Norgen and Nucleospin DNA extraction kits. Seven PCR amplicons covering the coding regions of the *FUT2* and *FUT3* genes were amplified in twenty DNA samples and used for Sanger sequencing. Further case-control genotyping is currently in progress.

Results

Among 215 infants, 141 (65.5%) were seroconverters and 74 (34.4%) were non-seroconverters. ABO and Secretor phenotype frequencies were not significantly different between seroconverters and non-seroconverters ($p>0.05$). Pre-vaccine IgA/IgG titers were significantly higher in non-seroconverters as compared to seroconverters ($p<0.001$), suggesting that maternal antibodies may interfere with Rotarix vaccine efficacy in this South African cohort. Lewis B phenotypes and *FUT2/3* genotype data are currently being analysed.