Maternal Characteristics and Secretor Genotype in Human Milk Composition

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Introduction: Human milk oligosaccharides (HMOs) protect against infectious disease in breastfed infants by inhibiting pathogen binding to mucosal receptors. Most HMOs are "secretor" oligosaccharides, which contain a fucose with an α1,2-linkage synthesized by enzymes of the secretor gene (FUT2). The secretor HMOs protect against noroviruses, campylobacter and other enteric pathogens. Variation in secretor and total HMO composition is associated with variation in human milk protection against infant diarrheal diseases, but factors associated with this variation have not been examined in representative populations.
Aim: To determine the association between maternal factors, secretor genotype and HMO composition.
Hypotheses: Maternal sociodemographic factors are not associated with HMO composition, but the secretor genotype (AA – homozygous recessive, do not produce secetor HMOs; AG – heterozygous secretors; and GG – homozygous secretors) of the mothers affects the quantity of α1,2-linked fucosylated HMO and total fucosylated HMO.
Methods: 121 mother-infant pairs were enrolled. Milk was collected at postpartum weeks 2, 4, 13, and 26 and analyzed by LC/MS. Secretor genotype was determined from maternal blood sample.
Results: HMO composition changed over the course of lactation in all genotype groups. Total and α1,2-fucosylated HMO were significantly lower in women with non-secretor genotype (AA) compared to the secretor genotypes. Women with AG and GG genotypes had similar HMO composition. No association was found between maternal demographic factors and HMO composition.
Conclusion: Maternal secretor genotype is a major determinant of HMO composition and may influence the anti-infectious impact of human milk in some circumstances.