

Maternal allergy and the presence of nonhuman proteinaceous material in human milk

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Human milk has previously been shown to contain proteins or protein fragments that originate from nonhuman organisms. This proteinaceous material could be a factor that is involved in the development of the immune system of the infant in the first stage of life, leading to e.g., sensitization or the induction of allergen-specific tolerance. A relation between maternal allergy and breast milk composition could be involved in the development of allergic diseases. This has not yet been investigated with regard to nonhuman proteins or protein fragments. The aim of this study was to investigate the relation between maternal allergy and the levels of nonhuman proteins or protein fragments. For this, we reanalysed data-dependent LC-MS/MS data from human milk serum protein samples of 10 mothers with atopic house dust mite allergy and 10 non-atopic mothers. A search was carried out for peptide sequences originating from bovine or allergens, and label free quantification was used to test for differences between the two groups.

Out of the 80 nonhuman peptide sequences that were identified in this study, the majority (n=64) matched with *Bos taurus* proteins. The other 16 sequences matched with proteins from non-bovine allergens, but the majority of these identifications could not be confirmed with analysis of synthesized peptides. In the milk from allergic mothers, 10 peptide sequences were found in significant higher levels than in milk from non-allergic mothers. Nine of these sequences were annotated to bovine β -lactoglobulin.

The significant difference in nonhuman proteinaceous material between milk from allergic and non-allergic mothers shows that maternal allergy has an effect on the transfer of this material into the milk. This difference might have an effect on the development of the immune system of the suckling infant. Future studies need to be carried out to investigate the human milk protein composition and the relation with allergy development in the infant.