proceedings

Abstract

Evaluation of Milk and Lactose Sensitivity in Lactase Non-Persistence Genotypes †

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Background: Lactase non-persistence, a condition affecting 75% of the world's population, is characterized by inactivity of the lactase enzyme, resulting in lactose intolerance. The single nucleotide polymorphisms (SNPs) C/T_{13910} and G/A_{22018} are associated with lactase persistence. However, whether these genotypes relate to symptoms and biomarkers of lactose malabsorption, especially in response to milk, is not well defined. Furthermore, we hypothesized that differences in the β-casein content of milk (conventional milk, containing A1 β-casein, and a2 Milk™, A1 β-casein free) may influence the digestive impact of lactase non-persistence. Thus, this study aimed to explore differences in lactose intolerance of different genotypes in response to lactose, and to milks with differing casein composition.

Methods: 40 healthy young women were challenged with 50 g lactose and then assigned to ingest 750 mL of conventional milk and a2 Milk™ in a randomized order on different occasions one week apart. Breath hydrogen and digestive symptoms (e.g., cramps, bloating, fecal urgency) were recorded before, and at frequent intervals for 3 h after, ingestion of lactose and the two milks. Subjects were genotyped for lactase gene polymorphisms (C/T_{13910} and G/A_{22018}) by restriction fragment length polymorphism.

Results: CC_{13910}/GG_{22018} genotypes showed a greater increase in breath hydrogen (>25 ppm) and experienced greater digestive symptoms after milk and lactose ingestion compared to CT_{13910}/GA_{22018} or TT_{13910}/AA_{22018} genotypes. There was also a difference in the breath hydrogen and digestive symptoms between lactose and milk ingestion in CC_{13910}/GG_{22018} individuals that was absent in the other genotypes. In addition, CC_{13910}/GG_{22018} genotypes reported reduced fecal urgency after a2 Milk™ compared to conventional milk.

Conclusions: Lactase genotype influences both malabsorption and digestive discomfort in response to lactose and milk, with the intensity being higher for lactose compared to milk. Furthermore, digestive responses to milk may depend on lactase genotype and milk β-casein content.

Supplementary Materials: The poster is available online at www.mdpi.com/2504-3900/8/1/21/s1.