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Salivary amylase gene copy number and its association with fasting and postprandial glucose response

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Abstract

Introduction: When compared to other primates, humans elicit a large variation in the copy number for the salivary amylase gene, AMY1. This variation can range from 2 to 17 copies. The AMY1 gene is responsible for coding for salivary amylase, an enzyme needed to catalyze the hydrolysis of starch molecules into smaller sugars. AMY1 copy number correlates with the amount and activity of salivary amylase. Few studies have investigated the effect of amylase copy number on fasting and postprandial glucose levels. The aim was first to investigate the association between AMY1 copy numbers and fasting glucose in an observational study, and secondly to investigate the difference in postprandial effect of high-starch meals in individuals with either high or low AMY1 copy numbers.

Materials and methods: For the observational study, we used data from 436 participants from the Malmö Offspring Study (MOS) cohort whom have been genotyped for AMY1. For the meal study (conducted during May 2019), we used genotype-based-recall to recruit 24 participants from the observational study of the MOS cohort: 12 with low AMY1 copy number (from the lowest 20%) and 12 with high AMY1 copy numbers (from the highest 20%). Each subject will be served a breakfast meal of white wheat bread on two separate test days: one containing 40 g and the other containing 80 g of carbohydrates (mainly starch). Blood samples will then be taken at various time points to investigate postprandial glucose and insulin responses.

Results: When using linear regression analyses adjusting for age and sex, no significant association between AMY1 copy number and fasting glucose was observed ($p = 0.23$). However, there was a difference ($p = 0.05$) in fasting glucose levels between the lowest (2–4 copy numbers: 5.31 mmol/L; 95% CI: 5.13–5.50) and highest (10–16 copy numbers: 5.57 mmol/L; 95% CI: 5.39–5.75) copy number groups. The results for the meal study will be obtained in June 2019 and be presented at the conference.

Discussion: Our findings of higher fasting glucose among the group with more than 10 AMY1 copy numbers is the first study to find this and needs to be replicated in other populations.

Conflict of Interest

There is no conflict of interest.