COULD THE GENETICS OF TASTE AFFECT YOUR HEALTH?
Lessons learned from the Guelph Family Health Study

Introduction and Research Goals
We assessed the relationship between genetic variants in taste receptors and markers of health. In particular, we sought to understand how variants in genes for tasting sweet, fat, and bitter affected blood sugar and lipid levels. While there is a body of research highlighting the impact of social and cultural factors on dietary intake and health, we know less about the genetics of taste and how this might affect health.

We investigated:
• The influence of genetic variants in fat, sweet, and bitter taste receptors on metabolic outcomes in children aged 1.5 – 6 years who are enrolled in the Guelph Family Health Study.

Background
Taste is an important factor for parents when creating dietary habits for themselves and their children. Chronic diseases such as obesity and type 2 diabetes have been partially attributed to adverse eating behaviours in individuals compelled by taste. Knowledge of genetic predisposition to selecting specific foods will advance our fundamental understanding of factors influencing food intake and the development of chronic diseases.

Taste receptors on the tongue can be characterized in terms of genetic variants in order to determine how genetics contribute to specific eating behaviours and potential chronic diseases. Fat, sweet, and bitter taste genes contain common genetic variants which may alter taste perception, food preference, and subsequent metabolic and health outcomes.

Variants in receptors for sweet, fat, and bitter taste form much of the basis for the known inter-individual differences in taste perception.

Methods
A sample of 44 families was obtained during the pilot phase of the Guelph Family Health Study. Children must have been 1.5 – 6 years of age at the time of recruitment. All 44 families completed the health assessment visit where saliva was collected, with 7 families opting out of the blood sampling. A total of 16 children provided both blood and saliva samples. Saliva was collected for genetic analysis using saliva collection kits. Participants were fasted for a minimum of 12 hours before the blood sample was provided. Children provided blood with consent of their parents. Measurements of blood chemistry were conducted by Lifelabs and included fasting glucose, insulin, and HbA1c levels.

All study procedures were administered at the University of Guelph after the parents of the participants provided written, informed consent. Incentives were provided for study participation. The study was approved by the University of Guelph Research Ethics Board.

Limitations
This is an exploratory study shedding new light on the influence of our taste buds on health outcomes. Further research based on these preliminary findings is warranted.

Research Findings
• The present pilot study is the first to demonstrate a relationship between variants in taste genes and blood sugar and lipids in children.
• The fat taste variant, associated with a preference for fatty foods, trended towards having higher triglyceride levels. These children also had higher fasting insulin levels.
• The sweet taste variant, associated with higher sugar consumption, had higher blood glucose and insulin.
• Carriers of both bitter taste variants (supertasters) did not tolerate green leafy vegetables and were more likely to consume sweet foods in compensation. These children had higher insulin levels and body mass index.
• The findings of this pilot study may have important implications for understanding the genetic basis of chronic disease development and warrant further analysis.

Conclusions:
• Genetic taste profiles may be predictors of metabolic and health outcomes in children.
• The relationship between genetic taste profiles and metabolic/health outcomes may be strengthened by including data pertaining to eating behaviour, such as food records or food frequency questionnaires.

References

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