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The Relationship between Sweet Taste Perception and Dietary Intake

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Abstract

Background: Since the late 20th century, a high sugar intake has been related to the increased prevalence of obesity and non-communicable diseases like Type-2 diabetes, and some forms of cancer. Therefore, there is an urgent call to reduce sugar intake worldwide. Many studies have suggested that sweet taste perception plays an important role in the dietary intake of sugar. However, limited studies investigate this and conflicting results are found.

Aim: To better understand the link between sweet taste perception and dietary intake in healthy women

Methods: The current study included 44 healthy New Zealand European women aged 20 to 40 years. Their sweet taste intensity and hedonic liking were assessed via general Labelled Magnitude Scales (gLMS) at glucose solutions of 125mM, 250mM, 500mM, and 1000mM concentrations (20 °C). Their current dietary intake was assessed via a four-non-consecutive-day weighed food record.

Results: Results showed that the sweet taste intensity and hedonic liking are positively correlated at 125mM ($r = 0.540$; $p < 0.001$) and negatively correlated at 500mM ($r = -0.748$; $p < 0.001$) and 1000mM ($r = -0.764$; $p < 0.001$) concentration of glucose solutions. Moreover, sweet taste intensity perceived at 1000mM glucose concentration was negatively correlated with dietary intake of total energy ($r = -0.403$; $p = 0.009$), carbohydrates ($r = -0.449$; $p = 0.003$), total sugars ($r = -0.421$; $p = 0.006$), glucose ($r = -0.411$; $p = 0.008$), fructose ($r = -0.408$; $p = 0.008$), and maltose ($r = -0.325$; $p = 0.038$). Also, the sweet hedonic liking at 1000mM glucose concentration was positively correlated with dietary intake of total energy ($r = 0.324$; $p = 0.039$), carbohydrates ($r = 0.360$; $p = 0.021$), total sugars ($r = 0.437$; $p = 0.004$), glucose ($r = 0.418$; $p = 0.007$), fructose ($r = 0.391$; $p = 0.012$), and maltose ($r = 0.463$; $p = 0.002$).

Conclusion: These results suggest an important link between sweet taste perception and dietary intake and support the theory that people who are more sensitive to sweet taste require a lower level of sweetness to achieve equal satisfaction, thus consume less sweet foods and beverages than those who are less sensitive to sweet taste.

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Abbreviations

AMDRs	Acceptable Macronutrient Distribution Ranges
AMPM	Automated Multiple-Pass Method
BIA	Bioelectrical Impedance Assessment
BMI	Body Mass Index
CHO	Carbohydrates
CI	Confidence Interval
CRD	Chronic Respiratory Diseases
CVD	Cardiovascular Disease
DP	Degree of Polymerization
FFQ	Food Frequency Questionnaire
gLMS	General Labelled Magnitude Scale
GPCR	G-Protein Coupled Receptors HDL High-Density Lipoprotein
IP3	Inositol-Trisphosphate
IP3R3	Isoform 3 of the IP3 Receptor
LDL	Small Dense Low-Density Lipoprotein
LMS	Labelled Magnitude Scale
MoH	Ministry of Health
NCDs	Non-Communicable Diseases
TRPM5	Transient Receptor Potential M5
PLC- β 2	Phospholipase C-B2
RCTs	Random Controlled Trials
SEM	Standard Error of the Mean
SSBs	Sugar-Sweetened Beverages
T2D	Type 2 Diabetes
TRCs	Taste Receptor Cells
USDA	United States Department of Agriculture
VAS	Visual Analogue Scale
WHO	World Health Organization
%E	Percent of Total Energy Intake

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