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Exploring the associations between sweet taste
perception and habitual dietary intake in New
Zealand European women

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Abstract

Background: Obesity is a global epidemic, leading to the development of chronic diseases. Sweet taste perception has been identified as a driver of habitual dietary intake, thus may contribute to excessive weight gain. Investigating these associations in New Zealand (NZ) European women may provide insight into the factors leading to obesity.

Aim: To investigate sweet taste perception and habitual dietary intake in a group of NZ women of two distinct body mass index (BMI) groups, obese (BMI ≥ 30 kg/m²) and normal (BMI ≥ 18.5 - 24.9 kg/m²), aged between 18-45 years, and to identify potential associations between these factors.

Methods: One hundred and forty eight NZ European women, aged 18-45 years, were recruited. Participants were presented with four different aqueous glucose concentrations to assess sweet taste perception. Sweet hedonic liking and perceived intensity of each concentration were rated on a general Labelled Magnitude Scale. Participants completed a 220-item validated food frequency questionnaire to assess dietary intake. Height and weight were measured to calculate BMI (kg/m²).

Results: Negative correlations between sweet hedonic liking and perceived sweet taste intensity were observed at the two highest glucose concentrations for the obese group, and at all four concentrations for the normal BMI group. Carbohydrate and sugar intake was significantly correlated with liking for the obese BMI group ($r = 0.337$, $p = 0.004$, and $r = 0.313$, $p = 0.008$, respectively). Significant associations between intensity ratings were found for the normal BMI group and with intake of fats, with polyunsaturated fat displaying the strongest correlation ($r = 0.300$, $p = 0.008$). Positive correlations between intake of desserts and liking ratings ($r = 0.257$, $p = 0.032$), and intake of starchy vegetables and intensity ratings ($r = 0.298$, $p = 0.012$) were observed for the obese BMI group at the highest glucose concentration.

Conclusion: The present study highlights a clear BMI-specific association between hedonic liking and perceived intensity of sweet taste, with intake of macronutrients and sugars, and with intake of sweet food groups, contributing to our understanding of the underlying aetiology leading to the development of obesity and chronic disease.

Key words: *sweet taste perception, sweet hedonic liking, perceived sweet taste intensity, habitual dietary intake, obesity*

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Abbreviation List

AMDR	Acceptable Macronutrient Distribution Range
ATP	Adenosine Triphosphate
BF%	body fat percentage
BIA	bioelectrical impedance analysis
BMI	Body Mass Index
DFE	Daily Frequency Equivalent
DLW	doubly labelled water
EAR	Estimated Average Requirement
EER	Estimated Energy Requirement
FFQ	food frequency questionnaire
GLAST	glutamate aspartate transporter
gLMS	general Labelled Magnitude Scale
GLP-1	Glucagon-like peptide-1
GPCR	G-protein-coupled receptors
NRV	Nutrient Reference Values
NTPDase2	nucleoside triphosphate diphosphohydrolase-2
NZ	New Zealand
PROMISE	PRedictors linking Obesity and gut MIcrobiomE
PROP	6-n-propylthiouracil
ROMK	renal outer medullary potassium channel
SD	standard deviation
SNP	single nucleotide polymorphisms
TAS1R2	taste receptor type 1 member 2
TAS1R3	taste receptor type 1 member 3
TE	total energy
WHR	waist:hip ratio