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Associations between 6-n-propylthiouracil (PROP) bitterness, macronutrient intake and variations in bitter-taste receptor gene *TAS2R38*

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PROP is a bitter-tasting compound to which sensitivity varies and, depending on their response, individuals may be classified into three groups: super tasters (ST), medium tasters (MT) and non-tasters (NT)⁽¹⁾. Differences in bitter-taste perception have previously been associated with two polymorphisms of *TAS2R38*⁽²⁾, designated PAV (taster) and AVI (NT). PROP tasters may be more sensitive to the bitter compounds inherent in fruit and vegetables (f&v)⁽³⁾. PROP sensitivity has also been linked to increased sensitivity to other tastes, including sweet⁽⁴⁾ and fat⁽⁵⁾. Previous studies have shown that this sensitivity may affect taste perception and subsequently macronutrient selection⁽⁶⁾.

In the present study data were collected from a group of children (*n* 199) and adults (*n* 52) who were recruited from schools in the Dublin area. PROP bitterness was assessed through the rating on the general labelled magnitude scale (gLMS) of a PROP-impregnated paper disc. Individuals were then divided into three taster groups according to their response. Dietary intake was assessed using a 3 d diet history, which was analysed using WISP[®] (Tinuviel Software, Llanfechell, Anglesey, UK). Buccal cells samples were obtained and DNA was extracted using the QiAMP DNA mini kit (Qiagen UK, Crawley, West Sussex, UK). Extracted samples were sent for single-nucleotide polymorphism analysis to Kbiosciences (Hoddesdon, Herts., UK) for variants in *TAS2R38*⁽²⁾. Statistical analysis was carried out using SPSS version15 (SPSS Inc., Chicago, IL, USA).

PROP bitterness was significantly associated with *TAS2R38* genotype (*P*<0.001). PAV homozygotes gave the PROP disc the rating (43.3 (SD 23.5), followed by heterozygotes (39.2 (SD 22.8) while AVI homozygotes gave the lowest bitterness ratings (24.4 (SD 21.0). There were no significant differences in macronutrient intakes across the three taster groups in either adults or children.

	Adults							Children							<i>P</i>
	NT		MT		ST		NT		MT		ST				
	<i>n</i> 15		<i>n</i> 26		<i>n</i> 11		<i>n</i> 52		<i>n</i> 103		<i>n</i> 44				
	m 5, f 10		m 7, f 19		m 3, f 8		m 25, f 27		m 47, f 56		m 23, f 21				
Mean daily intakes	Mean	SD	Mean	SD	Mean	SD	<i>P</i>	Mean	SD	Mean	SD	Mean	SD	<i>P</i>	
Energy (kJ)	8693	1906	8457	1722	8461	2458	0.86	8793	1890	8709	1880	9029	2018	0.33	
Total carbohydrate (g)	221.4	44.5	225.3	56.1	228.2	91.1	0.91	274.0	54.6	275.2	63.7	285.9	64.1	0.25	
Sugars (g)	84.2	36.5	86.35	36.6	83.6	49.3	0.94	116.6	35.1	118.6	47.7	124.6	41.9	0.34	
Total fat (g)	88.3	26.1	82.0	21.6	79.4	24.3	0.27	82.5	24.3	82.45	23.7	86.04	28.9	0.43	
Protein (g)	83.8	25.2	78.7	21.2	80.7	18.3	0.58	75.6	22.0	72.5	17.0	73.6	19.5	0.32	
Fibre (g)	14.1	3.9	14.0	4.8	12.9	4.4	0.39	12.0	3.4	11.8	3.6	11.9	3.0	0.32	

m, Males; f, females.

It has been suggested that NT may have a higher intake of fats and sugars because of their lowered sensitivity for these tastes. It has also been suggested that ST may add sugar to their food to mask bitter tastes. While the results of our analysis were not significant, the data suggest that in children the latter may be true. Additionally, fibre intake was slightly lower in ST groups in both adults and children, which may be an indicator of decreased f&v consumption in this group. Further analysis of the foods underlying the reported macronutrient intakes may yield more conclusive results. The results presented here are part of a larger on-going study aiming to examine the eating habits and reasons for food choice in Irish children and their parents.

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