

the students and the staff of the University College of Medical Sciences.

PTC Screening: Prior to the measurement of gustatory taste stimuli, the subjects were asked to taste the PTC solutions (solution 1 or 0.13%) with successive half dilutions ranging from 0.13 to 0.00003%. PTC taste sensitivity was investigated as per the method of Harris and Kalmus (9). Subjects were instructed to indicate the solutions in which they were able to detect a definite taste. The subjects rinsed their mouths at the beginning of the test and each time after taking the PTC solution. The PTC concentration (CONCT) in which the subjects were able to detect bitter taste was noted. Subjects who were able to detect PTC in CONCT of 0.008 to 0.00003% were labelled as "tasters" and those who were unable to detect PTC in any or all of the CONCT from 0.016 to 0.13 were labelled as "non-tasters".

Taste Stimuli: For testing the taste intensity and taste hedonics, 7 serial half dilutions each of 2.0 M glucose, 1.0M sodium chloride (NaCl), 0.05 M citric acid and 0.001M guinine sulphate (QS) CONCT were used (10). The responses were rated using a category scaling. For taste intensity, a 0-6 category scale (0-no taste, 6-extremely strong taste) was used. The pleasantness rating was provided on a 6-point scale (1-extremely disliked, 6-extremely liked). No neutral point was provided to denote indifference, so that the subjects were required to state whether they liked or disliked the stimulus.

Statistical analysis: The mean intensity and hedonic rating for each concentration of test solutions were calculated for PTC tasters and non-tasters, in HPO and HPR subjects. Such statistical comparisons were carried out for all the four basic taste solutions between (a) HPO tasters and non-tasters (b) HPR tasters and non-tasters.

RESULTS AND DISCUSSIONS

The results of PTC taste sensitivity indicate that the percentage of tasters among the hypothyroid are considerably lower than other groups, being 40% in the HPO subjects and 60%

in the control and HPR subjects. The median threshold CONCT of PTC was 0.002 for the control HPR subjects (Fig.1) and 0.016 for HPO subjects. The median threshold CONCT for non-tasters was 0.0325 in all groups. However, among tasters it was 0.0005 for HPR subjects and 0.00025 for the HPO subjects.

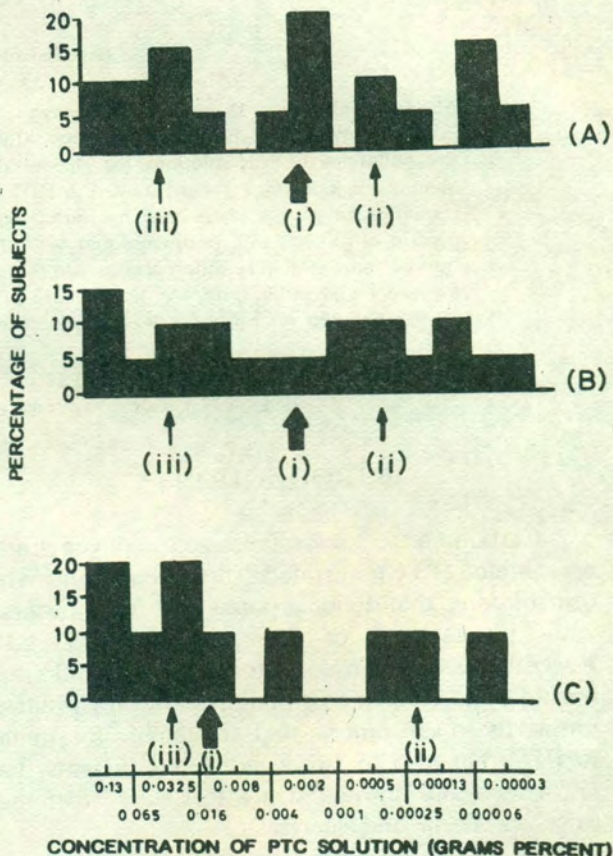


Fig. 1: Frequency distribution (in percentage) of subjects tasting PTC at exponentially decreasing concentration of PTC. The median concentration for the (i) whole group (ii) tasters and (iii) non-tasters shown in (A) Control (B) hyperthyroid and (C) hypothyroid subjects.

Further extension of present study to elucidate anomalies of taste perception in the sub-population of the PTC tasters or the non-tasters revealed that i) the diminished intensity perception of sweetness and bitterness was prevalent largely among the non-tasters HPO (Table I) (Fig. 2 & 4) and (ii)

TABLE I : Showing mean values of glucose intensity ratings in tasters and non-tasters.

Glucose Conct	TASTERS			NON-TASTERS		
	Control	Hyper	Hypo	Control	Hyper	Hypo
2.0	5.16	5.8	5.5	5.25	5.7	4.7
1.0	4.5	5.3	4.8	4.37	5.2	3.6
0.5	3.0	4.3	4.4	3.0	4.1	2.3
0.25	2.33	3.4	3.5	2.37	3.2	2.0
0.125	1.83	2.5	3.0	1.0	2.3	1.8
0.065	1.33	1.3	1.5	1.53	1.8	0.5
0.0325	0.5	0.8	0.9	0.0	1.0	0.4

increased hedonic perception of saltiness was largely among the HPO tasters (Fig.3). The maximum pleasantness peak for NaCl was at 0.25 M CONCT

of NaCl solution in HPR patients, with mean hedonic value at 4.0, after which the hedonic rating decreased sharply. These findings indicate that

- Hyperthyroid Tasters
- Hyperthyroid Non-Tasters
- - - Hypo thyroid Tasters
- Hypo thyroid Non-Tasters

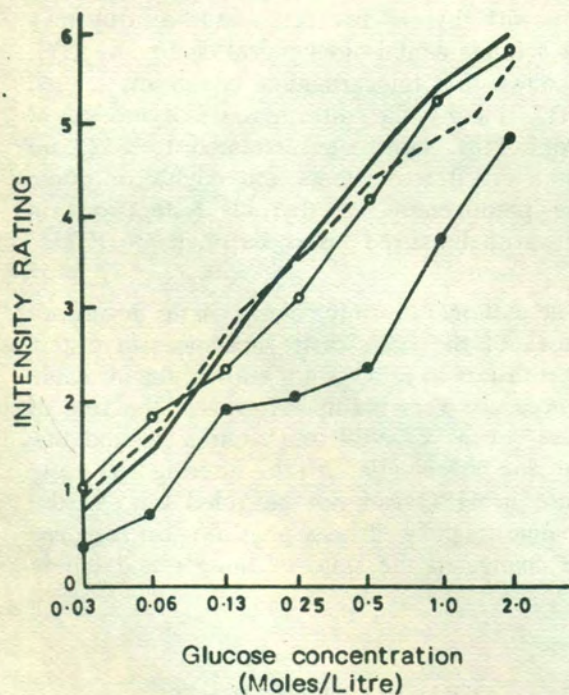


Fig. 2: Intensity responses to glucose, of the PTC tasters and non-tasters among hyperthyroid and hypothyroid subjects.

- Control Tasters
- × Control Non-Tasters
- Hyperthyroid Tasters
- Hyperthyroid Non-Tasters
- - - Hypo thyroid Tasters
- Hypo thyroid Non-Tasters

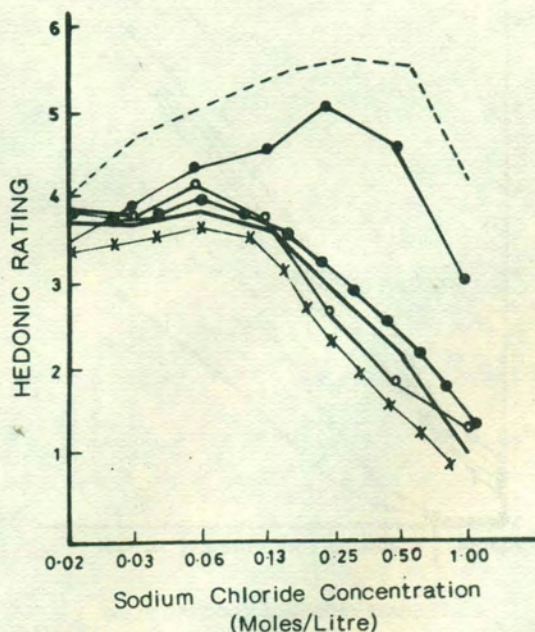


Fig. 3: Differential hedonic responses to sodium chloride, of the PTC tasters and non-tasters among hyperthyroid and hypothyroid subjects.

HPO non-tasters are less sensitive to sweet and bitter substance and for HPO tasters hedonic ratings are higher for salty substances. No such statistically important response difference exists between HPR tasters and non-tasters. Response for citric acid did not also shown any significant difference in the two groups.

The present result is not contradictory to an earlier observation by Fragely (11), that HPO rats show a preference for saline. The results of PTC taste sensitivity obtained in the present study are more or less-concordant with earlier results in the

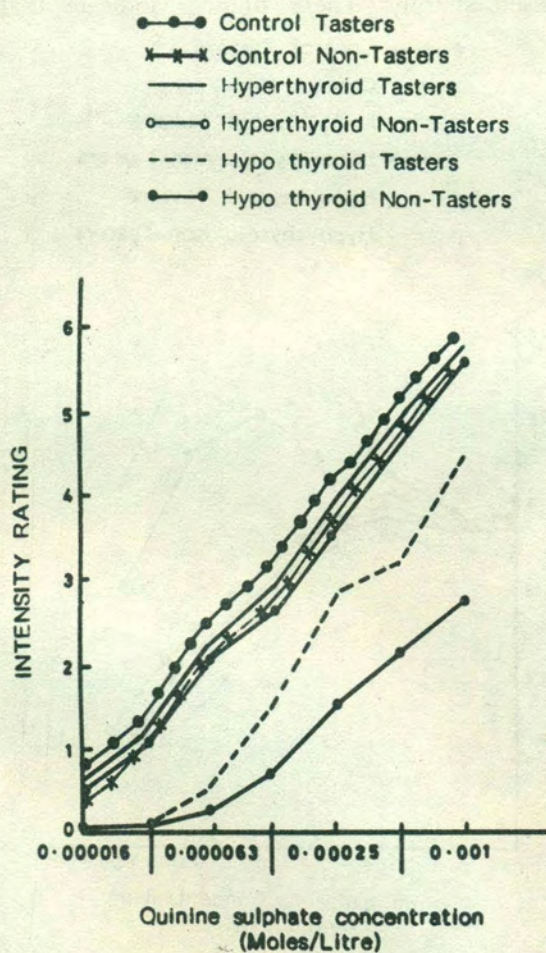


Fig. 4: Intensity responses to quinine sulphate, of the PTC tasters and non-tasters in hyperthyroid and hypothyroid subjects.

same field. Harris et al (12) demonstrated a significantly high incidence of non-tasters among patients with nodular goitre. A more detailed survey (13,14) confirmed that in 246 cases of adenomatous goitre, there was a significantly higher incidence of non-tasters, proportionately greater in men than in women. Also, patents with toxic diffuse goitre showed a highly significant paucity of non-tasters compared to controls. Memaria (15) found no relation between juvenile endemic diffuse goitre and PTC sensitivity in Brazil, while Brand (6) found in Israel a strong associat of endemic nodular goitre with non-tasters status. Azieved (16) in a study in Brazil demonstrated that the non-taster status was sigificantly associated with nodular goitre, while there was no significant association with diffuse goitre. The contradictory results found by different investigators concerning .PTC taste response in toxic diffuse goitre may be explained by differences in age, sex and treatment.

The different taster responses to PTC in patients with thyroid disorders and in controls may reflect a fundamental biochemical divergence (17). It is known that thiocarbamide chemically related to PTC, blocks the intrathyroidal synthesis of thyroxine (18). Goitrogens, related to PTC are found in cruciferous plants and might contribute to the pathogenesis of thyroid dysfunctions in persons with impaired tastes sensitivity to PTC.

The pathogenesis of the defects in the gustatory responses of the basic taste substances in tasters and non-tasters in HPO is not known; the available references are very scanty. However, the role of elevated serum CONCT of Vitamin A and low serum zinc levels (19, 20) in altering the taste response in HPO can not be ruled out. Lastly, the change might well be a physiological response to the change in the state of hunger and satiety in HPO.

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