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THE STUDY OF TASTERS AND NON-TASTERS OF PHENYL-THIO-CARBAMIDE (PTC) AND ITS RELATION TO BLOOD GROUPS

R. S. BHATKAR*, S. C. NALLULWAR AND V. A. KATTI

Department of Physiology,
Govt. Medical College, Miraj - 416 410

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Summary : The ability to taste phenyl-thio-Carbamide (PTC) is one of the gene marker systems which provides one of the means to reconstruct relationships of ethnic groups of man. In 433 Maharashtrian subjects the ability to taste PTC was studied by Harris and Kalmus method. At the same time, blood groups of these subjects were determined by slide agglutination method. It was found that 63.74% of local population was taster and 36.26% non-taster. The percentage of non-tasters was higher in males, than in females. No significant relation was found between the ability to taste PTC and the blood groups. The results were compared with those observed by other workers and it was found that the percentage of non-tasters in local population in the present study was similar to that found in Indian elsewhere.

Key words : PTC tasters non-tasters blood groups

INTRODUCTION

The ability to taste phenyl-thio-Carbamide-(PTC) is inherited as a dominant factor. Penetrance of gene T, the tasting gene is variable, as some people detect the bitter taste of PTC at very high dilutions, while others detect it with only crystals of PTC or do not taste it at all (1). The normal threshold for PTC tasting is 0.00002 M, but in non-tasters it is 0.008 M. Different studies have shown that about 3 to 40% of Caucasians are non-tasters. The taste-blindness is highly selective since there is no taste blindness to other bitter substances or to other substances which are sweet, salty or sour.

Prevalence of gene for non-tasting is rare in Blacks, South American Indians and certain Asiatic groups, while in Whites it is 30% (2). The knowledge of this trait is one of the important means to reconstruct the relationships of the major and ethnic groups of man to one another. It provides one of the criteria used in modern physical Anthropology (3).

The association of the ability to taste PTC and different diseases has been reported. High prevalence of non-tasters is found in diseases like nodular goitre, cretinism and diabetes mellitus, while low prevalence of non-tasters is reported in diffuse goitre, carcinoma of thyroid, breast, cervix, uterus and ovary (2)

The purpose of this work is to present the data on tasters and non-tasters of PTC in Maharashtrian population and to study the correlation of tasters and non-tasters to ABO blood group system.

*Corresponding Author

METHODS

The ability to taste PTC and blood groups were studied in 433 Maharashtrian subjects in the age group of 17-40 yrs. In these 433 subjects, 252 were males and 181 were females.

The ABO blood groups were determined by slide agglutination method.

The ability to taste PTC was studied by Harris and Kalmus method (3) solution containing 0.13 g% PTC was prepared in boiled tap water and serial dilutions of PTC were prepared as follows (3).

Soln No.	*PTC in mg/litre*
1	1300.00
2	650.00
3	325.00
4	162.50
5	81.25
6	40.63
7	20.31
8	10.16
9	5.08
10	2.54
11	1.27
12	0.63
13	0.32
14	0.16

Starting with the solution of the highest dilution and working down, two drops of the solution were put on the back of the clean tongue of the subject and it was seen whether he could taste it or not. The dilution of the solution tasted was noted. The subjects who could taste only the solution No. 4 to solution No. 1 were labelled as non-tasters and those who could taste PTC at higher dilutions were labelled as tasters (4).

RESULTS

The results are shown in the following tables.

TABLE I : Frequency distribution of tasters and non-tasters in local population.

Total No. of Subjects	*Tasters*	%	*Non tasters*	%	*Gene frequency 't'*
433	276	63.74	157	36.26	0.6021

TABLE II : Sexwise distribution of tasters and non-tasters.

Sex	*Total No. of Subjects*	*Tasters*	%	*Non-tasters*	%	*Gene frequency 't'*
Males	252	153	60.71	99	39.29	0.6268
Females	181	123	67.96	58	32.04	0.5660

In males percentage of non-tasters is more than that in females. This difference is not significant statistically.

TABLE III : Frequency distribution of tasters and non-tasters in different blood groups.

Blood group	*Total No. of subjects*	*Tasters*	%	*Non-tasters*	%	*Gene frequency 't'*
A	105	67	63.80	38	36.20	0.6012
B	142	91	64.08	51	35.91	0.5992
AB	41	27	65.85	14	34.15	0.5843
0	145	91	62.76	54	37.24	0.6102

This table shows that the percentage of non-tasters is highest in blood group 0 and lowest in blood group AB. The difference is not significant statistically.

DISCUSSION

From the results of the present work it is observed that in local population the frequency of tasters is 63.74% and that of non-tasters in 36.26%. The percentage of non-tasters in Indians reported by some other workers is similar to that in this work. The similar results are reported by Das-33.70% (5), Ghosh-33.57% (6) and Bhatia *et al* 33.43% (4).

The percentage of non tasters in Indians reported by some other workers is a little higher or lower than that found in this work. Higher percentage is reported by Sanghavi *et al* 42.50% (7). The lower percentage is also reported by Lugg and White 24% (3). This shows that prevalence of the gene for non-tasting is not rare in Maharashtrian population exactly as in Indians elsewhere.

In this study it is seen that in males the percentage of non-tasters is higher i.e. 39.29% than that in females-32.04%. But this difference is not significant statistically. Similar results are obtained by other workers. Vijaya Devi found in Mathur Kayastha that non-tasters in males were 60.76% and in females 55.73% (8). Giles reported non-tasters in males 9.8% and in females 7% (9). Agrawal and Chatopadhaya also reported higher frequency of non-tasters in males. On the contrary Chandraih *et al* (10) found high percentage of non-tasters in females.

It is also observed from the present study that, the percentage of non-tasters is high in blood group O, while it is low in blood group AB. This difference is not significant statistically. This shows that though the PTC tasting ability and blood groups are inherited as dominant factors there is no inter-relationship of the two. Bhatia *et al* reported highest percentage of non-tasters in blood group B and lowest in blood group AB. Though the reports on frequency distribution of PTC tasters and non-tasters and blood groups in different population samples are available, a correlation between blood groups and PTC tasting has not been reported by other workers.

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