Multi-Ethnicity diversity of polymorphism within the TAS2R38 gene and phenotypic correlation with bitter taste perception

Zanera Nawaz,

American society of Microbiology, United Kingdom

Polymorphism is common in nature; it is related to biodiversity, genetic variation, and adaptation. Polymorphism usually functions to retain variety of form in a population living in a varied environment. The most common example is sexual dimorphism, which occurs in many organisms. Polymorphism can be maintained by a balance between variation created by new mutations and natural selection (see mutational load). genetic variation may be caused by frequency-dependent selection. multiple niche polymorphism exists when different genotypes should have different fitnesses in different niches.

Bitterness is natural taste component which protects us from consumption of plant toxins. G- protein-coupled receptors (GPCRs) bind with bitter substance like Phenylthiocarbamide (PTC) and transmit signals to the brain where flavour perceived. Three SNPs of TAS2R38 gene are responsible for individual's ability to taste bitter compound.

The study design was a questionnaire and Laboratory based study

Study participants of Coventry University filled Food consumption questionnaire about age, gender, Ethnicity, favourite fruits and vegetables and preferences for bitter fruits and vegetables. Saliva sample was collected from all participants followed by PTC strip and Dye testing including photography of dyed tongue tip. Then restriction fragment length polymorphism (RFLP-PCR) with gel-electrophoresis was done on extracted and amplified amplicon of DNA including digestion with enzymes (HaeIII, RsaI, Eco47III, and Fnu4h). DNA- Sequencing was also done to confirm RFLP-PCR results. Statistical analysis was done by using SPSS, One-way ANOVA, Principal component analysis and Descriptive statistics.

Total study participants were 32 (Female/male ratio was 2:1) with the age group 18- above 40 years. Bitter fruits and vegetables consumption trend of liking and disliking was more in age group 18-30 and then decreases with the increase of age which was confirmed with Principal component analysis of bitter vegetables p=0.01 and bitter fruits p=0.00. It was also confirmed by Bartlett's test p=0.002. PTC tasters were mostly white females followed by Asian Pakistani females. PTC has no significant correlation with age, gender and Ethnic backgrounds (p=.375). However, DNA concentration in the saliva sample was highest in Asians. An average number of taste buds were 21.75/cm2 in supertasters, 19.8/cm2 in mild tasters and 18.1/cm2 in nonstarters.

There is a significant correlation between bitter fruits and vegetable consumption with age which decreases with the increase in age. However, due to lack of genotypic results, multi- ethnicity diversity of polymorphism within the TAS2R38 gene was not analysed. However, the phenotypic correlation was seen with bitter taste perception by counting fungiform papillae. Which were highest in number in supertasters, followed by less in mild tasters and very less in non-tasters.

KEYWORDS

RFLP-PCR, Gel-electrophoresis, and genotype.