Letter to the Editor

# Comment on "Multiple logistic regression analysis predicts cancer risk among tobacco usage with glutathione *S*-transferase p1 genotyping in patients with head and neck cancer"

The recent article by Anuradha *et al*. beautifully shows that the association between head and neck cancer and *GSTP1* gene is meaningful only when considered in a multifactorial format.[1] Tobacco use, in particular, was found to strongly influence the genetic association. This is an important finding because cancer is a complex disease and the traditional genetic association studies focus only on common confounding factors like age, gender, and family history, but pay little attention to habits. The Ile105Val variant of *GSTP1* gene has failed to show an association not only in this study but also at the level of meta-analysis. In fact, this had prompted us to consider the other functional variants in the *GSTP1* gene *viz.,* Ala114Val and Arg187Trp.[2,3] Similar to Anuradha *et al*., our studies also found evidence for interaction between *GSTP1* gene and tobacco use. However, the interaction was with the Arg187Trp and not Ile105Val variant.

In addition to genetic factors and tobacco use, human papillomavirus has been proposed as a risk factor for head and neck cancer. We have shown that, at least in some populations, tobacco use is the main risk factor - not human papillomavirus.[4] The impact of tobacco use on carcinogenesis is well established in the case of lung cancer but not with head and neck cancers. While tobacco use in smoke-form is linked to lung cancer, chewable-form appears to be the culprit in the case of head and neck cancers. Tobacco smoke is more carcinogenic than chewable tobacco since combustion results in the formation of highly carcinogenic substances like tar. However, the lower carcinogenicity of chewable tobacco is augmented by the habit of prolonged retention of the chew in the oral cavity.

Overall, emerging studies show that gene–environment interaction plays an important role in the epidemiology of head and neck cancer. Current studies focus on head and neck cancers and their link to genetic factors and tobacco use. As a result, the profile of tobacco use is heterogeneous both within and between the study groups. Future studies should reverse the approach by focusing on tobacco use, its impact on head and neck carcinogenesis, and the risk-modifying effect of the genetic factors. Also, an objective method for quantifying tobacco use is required. This information is currently obtained through patient declaration, a method that is plagued by inaccuracies and cultural prejudices. To conclude, we need to adopt "there is more to genetic predisposition than just genes" approach.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

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## References

1. Anuradha A, Kalpana VL, Kirmani N. Multiple logistic regression analysis predicts cancer risk can tobacco usage with glutathione S-transferase p1 genotyping in patients with head and neck cancer. Indian J Cancer 2019;56:24-8.
2. Rajesh D, Balakrishna S, Mohiyuddin AS, Suryanarayana R, Kutty AV. Novel association of oral squamous cell carcinoma with *GSTP1* Arg187Trp gene polymorphism. J Cell Biochem 2019;120:5906-12.

3. Rajesh D, Azeem Mohiyuddin SM, Suresh TN, Balakrishna S, Moideen Kutty AV. GSTP1 c.341C>T gene polymorphism increases the risk of oral squamous cell carcinoma. Mutat Res 2018;831:45-9.
4. Rajesh D, Mohiyuddin AS, Kutty AV, Balakrishna S. Prevalence of human papillomavirus in oral squamous cell carcinoma: A rural teaching hospital based cross-sectional study. Indian J Cancer 2017;54:498-501.



**Access this article online**

**Website:** www.indianjcancer.com

**Quick Response Code:**

**DOI:** 10.4103/ijc.IJC_322_19

**How to cite this article:** Balakrishna S. Comment on "Multiple logistic regression analysis predicts cancer risk among tobacco usage with glutathione *S*-transferase p1 genotyping in patients with head and neck cancer". Indian J Cancer 2020;57:354-5.

**Received:** 16-Apr-2019 **Revised:** 28-Apr-2019
**Accepted:** 07-May-2019 **Published:** 22-Jun-2020