ISSN 0972-3757
INTERNATIONAL JOURNALOF HUMAN GENETICS

Int J Hum Genet, 3(2): 99-108 (2003)
PRINT: ISSN 0972-3757 ONLINE: 2456-6360
DOI: 10.31901/24566330.2003/03.02.04

Polymorphisms in Drug-metabolizing Genes and Risk of Head and Neck Squamous Cell Carcinoma

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KEY WORDS Metabolic genes; polymorphisms; populations; tobacco use; HNSCC

ABSTRACT One kind of defense mechanism against development of cancer involves activities of a series of enzymes that metabolize and excrete potentially toxic compounds and repair subtle mistakes in DNA. Head and neck squamous cell carcinoma (HNSCC) is causally associated with tobacco use alone and also in combination with alcohol consumption. Most of the carcinogens present in tobacco and tobacco smoke are converted into DNA-reactive metabolites by cytochrome P450 enzymes and detoxification of these metabolites are performed by glutathione S-transferases and N-acetyltransferases in humans. Several of these genes display polymorphisms that could modulate enzymatic activities like activation and detoxification of carcino-gens. Molecular epidemiological studies, to assess the risk associated with metabolic polymorphisms and HNSCC, have shown that overall effect of common polymorphisms is moderate in terms of penetrance and relative risk. However, it may have a great population impact to assess the risk of cancer caused by tobacco habit. In this review, we have discussed the reported prevalences of these common polymorphisms and risk of HNSCC causally related to tobacco habit in different populations. Although a large number of studies with small sample sizes have been conducted, the results have been inconsistent and therefore inconclusive. So, future studies should be conducted with sufficiently large sample sizes to detect the moderate or even small risks in a population.

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