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Interactions between alcohol consumption and xenobiotic metabolism SNPs in HNSCC risk: insights from a systematic review

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Abstract

Background: Head and Neck Squamous Cell Carcinoma (HNSCC) is the sixth most predominant cancer worldwide, with a poor prognosis and low survival rate. Alcohol consumption is a well-established environmental risk factor, despite other environmental and genetic risk factors having also been implicated [1,2,3]. Considering the role that xenobiotic metabolizing enzymes play in alcohol metabolism, it is likely that the interplay between these factors contributes significantly to the development of HNSCC. **Objective:** The aim of this work was to identify gene-environment interactions (GxE) involving alcohol consumption and Single Nucleotide Polymorphisms (SNPs) in xenobiotic metabolism genes, previously associated with HNSCC risk, through a systematic review of the scientific literature. **Methods:** The systematic review was registered in the PROSPERO database and conducted according to PRISMA guidelines and PICO criteria. PubMed, Scopus and Web of Science were searched using an expression combining both MeSH and common language terms. Rayyan was used to remove duplicates and select the studies according to the predefined inclusion and exclusion criteria. All relevant data from selected articles were extracted into an Excel datasheet to be further analyzed. **Results:** Most GxE interactions with alcohol consumption involved SNPs in Cytochrome P450 genes SNPs (mainly *CYP1A1*, *CYP1B1* and *CYP2E1*), where replicated results were observed among different studies. SNPs in other phase I enzymes, such as *ADH1B*, *ADH1C* and *ALDH2*, and phase II enzymes, such as *GSTM1*, were also strongly implicated. Isolated significant findings were observed in additional SNPs, but with less conclusive evidence. **Conclusions:** Alcohol consumption interacts with xenobiotic metabolism SNPs, mainly through Phase I enzymes, to increase HNSCC risk. Further studies in larger populations of different origins are needed in order to confirm these findings and expand current knowledge on this important subject.

Keywords: alcohol consumption; xenobiotic metabolism SNPs; HNSCC risk

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