Correlation between gene polymorphisms of *CYP1A1*, *GSTP1*, *ERCC2*, *XRCC1*, and *XRCC3* and susceptibility to lung cancer

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ABSTRACT. Lung cancer is a common malignant tumor that is characterized by high morbidity and poor prognosis. Studies suggest that an individual's genetic background affects the risk of developing lung cancer. Therefore, we investigated the relationship between gene polymorphisms and susceptibility to lung cancer. We recruited 308 primary lung cancer patients as subjects and 253 healthy adults as controls. After extraction of DNA from blood samples, gene polymorphisms in *CYP1A1*, *GSTP1*, *ERCC2*, *XRCC1*, and *XRCC3* were investigated by polymerase chain reaction and restriction fragment length polymorphism. The frequencies of the genotypes in both groups were investigated to obtain odds ratios and 95% confidence intervals, and correlation analysis was carried out. The analysis results showed that the following polymorphisms were correlated with susceptibility to lung cancer: rs4646903 in *CYP1A1* (P <

0.001), rs1048943 in *CYP1A1* ($P < 0.001$), rs1695 in *GSTP1* ($P < 0.05$), rs13181 in *ERCC2* ($P < 0.001$), and rs25487 in *XRCC1* ($P < 0.05$); no such correlation existed in rs861539 in *XRCC3* ($P > 0.05$). The study revealed that the more high-risk gene polymorphisms a patient carries, the greater the risk of developing lung cancer. Carriers of rs4646903 in *CYP1A1*, rs1048943 in *CYP1A1*, rs1695 in *GSTP1*, rs13181 in *ERCC2*, and rs25487 in *XRCC1* are more likely to develop lung cancer.

Key words: Lung cancer; *CYP1A1*, *GSTP1*, *ERCC2*, *XRCC1*, *XRCC3*; Gene polymorphism; Correlation analysis