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To Investigate the Role of *XRCC6/Ku70* in Taiwanese Hepatocellular Carcinoma at DNA, RNA, and Protein Levels

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Backgrounds: Hepatocellular carcinoma (HCC) is a neoplasm for which the prevalence and mortality rates are very high in Taiwan. The DNA repair gene *XRCC6/Ku70* plays an important role in the repair of DNA double–strand breaks (DSBs) induced by both exogenous and endogenous DNA–damaging agents. Defects in DSB repair capacity can lead to genomic instability and carcinogenesis. **Materials and Methods:** In this study, we investigated the contribution of *XRCC6* to the risk of HCC from the levels of DNA, RNA and protein. In this hospital-based study, 298 patients with HCC and 298 cancer-free controls frequency matched by age and gender were recruited. Firstly, the associations of *XRCC6* promoter T-991C (rs5751129), promoter G-57C (rs2267437), promoter A-31G (rs132770), and intron 3 (rs132774) polymorphisms with HCC risk were evaluated. Secondly, 30 HCC tissue samples with variant genotypes were tested to estimate the *XRCC6* mRNA expression by real-time PCR. Finally, the HCC tissue samples of variant genotypes were examined by immunohistochemistry and Western blotting to estimate their XRCC6 protein expression levels. **Results:** Compared with the TT genotype, the TC and CC genotypes conferred a significantly increased risk of HCC. The mRNA and protein expression levels in HCC tissues revealed statistically significantly lower *XRCC6* mRNA and protein expressions in the HCC samples with TC/CC genotypes compared with those with TT genotype. **Conclusion:** Our multi-approach findings at the DNA, RNA and protein levels suggested that *XRCC6* may play an important role in HCC carcinogenesis.