Effect of 5'-fluoro-2'-deoxycytidine and sodium butyrate on the genes of the intrinsic apoptotic pathway, p21, p53, cell viability, and apoptosis in human hepatocellular carcinoma cell lines

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Epigenetic regulation such as DNA methylation plays a major role in chromatin organization and gene transcription. Additionally, histone modification is an epigenetic regulator of chromatin structure and influences chromatin organization and gene expression. The relationship between DNA methyltransferase (DNMTs) expression and promoter methylation of the tumor suppressor genes (TSGs) has been reported in various cancers. Previously, the effect of 5-aza-2'-deoxycytidine (5-AZA-CdR), trichostatin A (TSA), and valproic acid (VPA) was shown on various cancers. This study aimed to investigate the effect of 5'-fluoro-2'-deoxycytidine (FdCyd) and sodium butyrate on the genes of the intrinsic apoptotic pathway, p21, p53, cell viability, and apoptosis in human hepatocellular carcinoma SNU449, SNU475, and SNU368 cell lines.

Materials and Methods: In this lab trial study, the SNU449, SNU475, and SNU368 cells were cultured and treated with 5'-fluoro-2'-deoxycytidine and sodium butyrate. To determine cell viability, cell apoptosis, and the relative gene expression level, MTT assay, flow cytometry assay, and qRT-PCR were done respectively.

Results: 5'-fluoro-2'-deoxycytidine and sodium butyrate changed the expression level of the BAX, BAK, APAF1, Bcl-2, Bcl-xL, p21, and p53 gene ($P<0.0001$) by which induced cell apoptosis and inhibit cell growth in all three cell lines, SNU449, SNU475, and SNU368.

Conclusion: Both compounds played their roles through the intrinsic apoptotic pathway to induce cell apoptosis.

Keywords: Carcinoma, Hepatocellular, Methylation, P21, P53