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**Gene Expression Analysis of the Concomitant Existence of Lymphovascular and Perineural Invasion in Colorectal Cancer**

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**ABSTRACT**

The invasion of cancer cells into the peritumoral, lymph node and perineural system could be detrimental on cancer patients. In colorectal cancer (CRC) patients, the presence of lymphovascular (LVI) and/or perineural (PNI) invasion could significantly influence the survival rates, treatment options and recurrence tendencies. To date, no study has analysed the concomitant existence of LVI and PNI in CRC, particularly in relation to the molecular profiles. Here, we reanalysed the datasets of CRC from The Cancer Genome Atlas (TCGA) and focused on cases where the information regarding LVI and PNI are available (n=176). We performed differential gene expression, methylation and microRNA analysis by comparing between the groups having both or either LVI and PNI with the control group (LVI negative and PNI negative). Although there were no significant difference in the methylation and miRNA profiles, we identified a number of differentially expressed genes (DEGs). The comparison between the LVI+PNI+ and LVI-PNI- groups revealed key DEGs including SFTA2, PHACTR3, CRABP2, ODZ3, GRP, HAP1 and HDAC9. Meanwhile, in the LVI-PNI+ vs LVI-PNI- group, some of the DEGs found were PTPRR, EFNA2, FGF20, IGFL4 and IGFBPL1. We believe that our findings could be beneficial and add value to further understand the complex molecular profiles of CRC.