Ablation Studies of KRAS in Colon Cancer: Predictive Power and Diagnostic Accuracy

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Abstract:

Colorectal cancer (CRC) ranks as one of the most prevalent malignancies globally, with nearly 1.9 million new cases diagnosed annually. Colorectal cancer is due to multiple genetic and environmental factors. Of all genetic mutations, the KRAS and non-KRAS mutated genes have been proven to be two of the most common in the prediction and treatment of CRC. This research analyzes the ability to predict and the diagnostic accuracy of not only the KRAS gene mutation, but particularly the exon 2 mutation in CRC, using convolutional neural network models. Our analysis of 1,120 radiological images from the Cancer Genome Atlas, as well as the Cancer Imaging Archive, into increasing the diagnostic prowess and treatment planning for the patients with CRC, evidenced that CNN models predicted a presence of KRAS in CC 0.82 and the absence of KRAS in CC 0.78. Further, the presence of the KRAS mutation increased the accuracy of the model to 0.81 for the detection of colon cancer. This study emphasizes the potential of KRAS as a biomarker for personalized medicine and the connections between KRAS and non-KRAS gene mutations that have important implications for CRC prognosis and treatment resistance.

Keywords: