Vimentin and E-cadherin Expression Delineates Epithelial to Mesenchymal Transition in Early Onset Colorectal Cancer

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Colorectal cancer (CRC) is the third most common cancer globally, with over 1.9 million new cases and nearly 1 million deaths annually. The incidence of early-onset CRC, defined as cancer occurring in individuals under 50 years of age, has been steadily increasing, with a rise of approximately 2% per year in recent decades. This highlights the urgent need for improved biomarkers to aid in early diagnosis and targeted treatment strategies. Vimentin, an intermediate filament protein, is involved in the epithelial-mesenchymal transition (EMT), which contributes to increased cell motility and metastasis in various cancers. This study examines the correlation between Vimentin expression and CRC progression, hypothesizing that, as CRC advances, Vimentin expression will increase, while E-cadherin expression will decrease, reflecting the loss of cell-cell adhesion and a more invasive tumor phenotype. Fluorescent assays were used to measure Vimentin and E-cadherin expression levels in noncancerous, precancerous, and cancerous tissues across five trials. Results showed a non-linear fluctuation in Vimentin expression: it increased from noncancerous to precancerous stages, then decreased in cancerous tissues. These findings suggest that Vimentin expression may not follow a simple progression pattern and may be regulated by additional factors. While E-cadherin levels consistently decreased with advancing stages, the complex behavior of Vimentin underscores the need for further research into its regulatory mechanisms, which could aid the development of novel diagnostic and therapeutic approaches for CRC, particularly in early-onset cases.

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