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The Role of TP53 and Inflammatory indices in Colorectal Cancer: Molecular Insights and Prognostic Implications

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Colorectal cancer (CRC) remains the leading cause of cancer-related mortality worldwide. The aim of our study was to investigate the relationship between TP53, a major tumor suppressor, and systemic inflammatory markers - monocyte-lymphocyte ratio (MLR), platelet-lymphocyte ratio (PLR), and neutrophil-lymphocyte ratio (NLR) - and their role in CRC progression and prognosis. According to the results, a significant increase in TP53 protein and PLR is observed in CRC patients, especially in late-stage tumors. At the same time, the level of inflammatory markers (PLR) is inversely associated with TP53 and APC protein levels and is an indicator of poor prognosis, especially in patients with aggressive KRAS mutations (e.g., G12V). These data suggest that the combined assessment of TP53 levels and inflammatory indices may allow us to more accurately predict prognosis and tailor treatment strategies. Further studies are needed to assess the therapeutic potential of targeting TP53-related pathways and the use of inflammatory biomarkers for long-term disease management.

Biography

Ia Pantsulaia is a Doctor of Biological Sciences with expertise in immunology and molecular medicine. She currently works as an Associate Professor at Tbilisi State Medical University and as Director/Chief Scientist at the Vladimir Bakhutashvili Institute of Medical Biotechnology. With extensive experience in the pathogenesis of complex diseases, immunomodulation, and biomarker discovery, Dr. Pantsulaia has led multiple national and international research projects, including those funded by the Shota Rustaveli National Science Foundation, the European Commission (TEMPUS), and the Swiss National Foundation (SCOPE). She is actively involved in global scientific collaborations, including the Virtual Research Institute of Poland ("WIB"), where she contributes as an expert in oncological biotechnology. Her research focuses on immune regulation in diseases such as cancer, diabetes, and osteoarthritis. With an h-index of 17 and publications in high-impact journals, Dr. Pantsulaia is recognized as a leading figure in immunotherapy and biotechnological innovation.

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