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The Role of Notch3 and Wnt Signaling Pathways in Ovarian Cancer Chemoresistance and Their Potential as Therapeutic Targets

Abstract:

Ovarian cancer (OC) ranks among the most lethal cancers impacting women, presenting significant health challenges. Cancer cells can generally be divided into two categories based on how they react to chemotherapy: chemosensitive and chemoresistant. The Notch3 signaling pathway plays a crucial role in the proper development and maintenance of body tissues. Research involving ovarian cancer cell lines has shown a significant uptick in enzyme activity within the Notch3 pathway. This increased activity underscores Notch3's critical role in ovarian cancer progression, creating substantial hurdles for effective treatment. Similarly, the Wnt signaling pathway is vital for animal development and the stability of adult tissues, having a profound effect on cellular behavior and the overall form and function of an organism. Additionally, numerous studies indicate that the Wnt pathway plays a significant role in the development of chemotherapy resistance in tumor cells. It is encouraging to note that tumor cells can regain sensitivity to treatment by specifically targeting and inhibiting these pathways. This potential of targeting and inhibiting the Wnt and Notch3 pathways to improve treatment outcomes is inspiring. While the exact roles of Wnt and Notch3 in cellular function and development concerning ovarian cancer are still not fully understood, this review will explore how the Wnt and Notch signaling pathways contribute to chemoresistance in ovarian cancer. It aims to examine their mechanisms, implications for treatment, and potential therapeutic targets.