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Perspective

CD151 - A Typical Therapeutic and Diagnostic Marker of Breast Cancers

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Triple negative breast cancer (TNBC) is highly aggressive subtype, commonly diagnosed in younger women (< 50 years), with limited treatment options. TNBC patients have poor survival and increased risk of visceral and central nervous system metastases. Diagnosis of TNBC at early stage can increase the survival rate, avoid metastasis and requires less expensive treatment. However, early detection is one of the major challenges in the struggle against this disease. These facts underscore the pressing need of novel biomarkers, strategies, and technologies.

CD151 also known as GP-27/MER-2/PETA-3/19 RAPH/SFA-1/TSPAN-24 belongs to tetraspanin super family. It is a plasma membrane protein which forms a "tetraspanin web". It regulates various cellular and signaling pathways. It regulates multiple stages of carcinogenesis and metastasis. It acts as scaffolds for integrins, growth factor receptors and MMPs. CD151 involves in diverse regulatory mechanisms of cancer progression and the metastasis. CD151 is implicated in pathological processes associated with cancer progression, neoangiogenesis and epithelial mesenchymal transition. CD151 has been underappreciated, despite of its presence on nearly all cells and tissue types. This article critically analyzed the recent insights of CD151 with considerable emphasis on possibility as a novel marker for predicting the prognosis of breast cancer patients.

Exosomes, important intercellular communicators, deliver proteins, mRNA, and miRNA to selected targets during pre-metastatic niche. The enrichment of CD151 web proteins within secreted exosomes, hints the role of tetraspanin in the regulation of exosome uptake. CD151 preferentially targets exosomes to lung, lymph node, and stroma cells. CD151 is post transcriptionally regulated by miR-152, miR-22 miR-124, and miR-199a-3p in different types of cancers. The discovery of novel miRs regulating CD151 pathway could be an effective option for early detection of triple negative breast cancer.

Studying the role of CD151 in molecular mechanisms associated with self-renewal, differentiation, DNA damage response, epigenetic mechanisms, and anchorage-dependent and anchorage-independent tumor cell survival using gene silencing methods may provide an ample scope for future cancer research.

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