**Literature Review**

**RQ: How does the expression of WNT family impact the**

**progression and prognosis of BRCA?**

The expression of the WNT family significantly impacts the progression and prognosis of breast cancer (BRCA). Studies have shown that overexpression of various WNT pathway components, such as β-catenin, FZD4, LRP5, LRP6, and TCF1, is associated with poor disease-free survival in BRCA patients [1]. Additionally, the coordination of WNT pathway components is disrupted in breast cancer, leading to different subgroups with distinct WNT signaling signatures, which can be crucial for patient stratification in personalized therapeutic approaches [2]. These findings highlight the importance of WNT signaling in BRCA progression and suggest potential biomarkers like TCF1 for managing BRCA patients effectively [3].

The WNT family, particularly WNT7B, WNT5B, and WNT5A, has been found to play a significant role in breast cancer prognosis. High expression of WNT7B is associated with poor prognosis, while lower expression of WNT5B is linked to larger tumor size. Additionally, lower levels of WNT5A are associated with more aggressive behavior and worse clinical outcomes, particularly in ER-negative disease. These findings suggest that the WNT family may serve as a potential prognostic biomarker in breast cancer (Chen 2018; Hong-ta 2015; Leris 2005; Speirs 2002).

**Wnt Family in Breast Cancer:**

* **Wnt family:** This is a large group of genes that encode proteins called Wnts. Wnts play a crucial role in various cellular processes like development, tissue maintenance, and even tumor development.
* **Expression patterns:** Studies have shown that some Wnt family members are overexpressed in breast cancer, particularly in aggressive subtypes like triple-negative breast cancer (TNBC) . Interestingly, some Wnts, like Wnt5a, might be lost in breast cancer [1]. Wnt9b shows promise as a potential marker for breast cancer due to its high sensitivity and specificity [2].

**Prognostic Significance:**

* **Wnt signaling pathways:** Wnts activate different signaling pathways within the cell. The most studied pathway is the canonical Wnt pathway, which relies on a protein called beta-catenin. Aberrant activation of this pathway is linked to breast cancer cell proliferation and stemness, properties that fuel tumor growth [2].
* **Clinical significance:** Activation of Wnt signaling, even without mutations in the genes themselves, is associated with poorer prognosis in breast cancer patients, including reduced overall survival . This suggests Wnt signaling as a potential target for therapeutic intervention.

**Related Papers**

1.Differential regulation of WNT2 and WNT2B expression in human cancer

<https://doi.org/10.3892/ijmm.8.6.657>

2.The opposing roles of Wnt-5a in cancer

S L McDonald & A Silver

<https://doi.org/10.1038/sj.bjc.6605174>

3.Wnt Family Member 9b (Wnt9b) Is a Sensitive and Specific Marker for Triple-negative Breast Carcinoma Including Metaplastic Carcinoma

<https://doi.org/10.1097/PAS.0000000000002001>

4.Zhan, T., Rindtorff, N. & Boutros, M. Wnt signaling in cancer. *Oncogene* **36**, 1461–1473 (2017). <https://doi.org/10.1038/onc.2016.304>

5.Expression and significance of Wnt signaling components and their target genes in breast carcinoma.

<https://doi.org/10.3892/mmr.2013.1774>

6.Leris AC, Roberts TR, Jiang WG, Newbold RF, Mokbel K. WNT5A expression in human breast cancer. Anticancer Res. 2005 Mar-Apr;25(2A):731-4. PMID: 15868903.

7.Multiple Roles of WNT5A in Breast Cancer

<https://doi.org/10.12659/MSM.902022>

8.Expression of Wnt genes and frizzled 1 and 2 receptors in normal breast epithelium and infiltrating breast carcinoma.T. Milovanović, K. Planutis, Anthony V. Nguyen, J. Marsh, F. Lin, C. Hope, R. Holcombe

<https://doi.org/10.3892/IJO.25.5.1337>