

## ROLE OF MICRORNA MODULATED WNT PATHWAY IN BREAST CANCER AND ITS THERAPEUTIC USE

S. BANERJEE, A.K.A. MANDAL \*

Department of Biotechnology, School of Bio Sciences and Technology, Vellore Institute of Technology University, Vellore, Tamil Nadu, 632014, India

E-mail: akamandal@rediffmail.com, shrila.banerjee93@gmail.com

Corresponding author AKA Mandal: akamandal@rediffmail.com

*The Wnt pathway plays a key role in cell growth, survival, and self-renewal which is frequently hyperactive in various cancers. It is categorized into canonical and non-canonical Wnt pathways depending upon the influence of the  $\beta$ -catenin protein. Gene expressions are often altered by small non-coding RNAs, known as microRNAs (miRNAs) leading to regulation involving cell-proliferating pathways like Wnt in various cancers, including breast. miRNAs frequently act as an oncogene or a tumor-suppressor depending upon their regulatory roles. In this review article, the significance of the Wnt pathway in cancer progression, most importantly breast cancer is widely explained. The role of miRNAs in modulating varied pathways especially the Wnt pathway in breast cancer is also reviewed here. Breast cancer suppression using new-age miRNA therapeutics is showing promising results and the use of different nanocarriers for therapeutic delivery is increasing its efficacy. Targeting the Wnt pathway and its related genes can show a new path for the treatment of cancer stem cells (CSCs) of breast and other cancers as the Wnt pathway plays a pivotal role in maintaining the stemness of CSCs. Moreover, controlling the Wnt pathway through miRNA nanocarrier can give another dimension to breast cancer therapy by inhibiting aggressive and tricky breast cancer stem cells.*

**Key words:** Wnt pathway, Breast cancer, MicroRNA, nanocarrier, therapeutics.

### РОЛЬ МІКРОРНК-МОДУЛЬОВАНОГО ШЛЯХУ WNT ПРИ РАКУ МОЛОЧНОЇ ЗАЛОЗИ І ЙОГО ТЕРАПЕВТИЧНЕ ЗАСТОСУВАННЯ

Шлях Wnt відіграє ключову роль у рості, виживанні й самовідновленні клітин і часто є гіперактивним при різних видах раку. Залежно від впливу білка  $\beta$ -катеніну його поділяють на канонічний і неканонічний шляхи Wnt. Часто експресію генів змінюють невеликі некодуючі РНК, відомі як мікроРНК (міРНК), що призводить до регуляції із залученням таких клітинно-проліферативних шляхів, як Wnt,

при різних видах раку, зокрема, раку молочної залози. Залежно від своєї регуляторної ролі міРНК часто виступають онкогенами або пухлиносупресорами. Ця оглядова стаття пояснює значимість шляху Wnt у розвитку раку, здебільшого раку молочної залози. Також у ній розглядається роль міРНК у модуляції різних шляхів, особливо шляху Wnt при раку молочної залози. Супресія раку молочної залози за використання терапевтичних міРНК засобів нового покоління демонструє перспективні результати, а застосування різних наноносіїв для доставки терапевтичних агентів підвищує свою ефективність. Цілеспрямований вплив на шлях Wnt і пов'язані з ним гени може започаткувати новий спосіб лікування ракових стовбурових клітин (РСК) при раку молочної залози та інших видах раку, оскільки шлях Wnt відіграє важливу роль у підтриманні стовбуровості РСК. Крім того, контроль шляху Wnt через наноносія міРНК може надати нового виміру терапії раку молочної залози за рахунок інгібування агресивних і підступних ракових стовбурових клітин.

**Ключові слова:** шлях Wnt, рак молочної залози, мікроРНК, наноносій, терапевтичні засоби.

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