

Letter to Editor

Gene Therapy for Breast Cancer

Seyed Mohammad Amin Kormi^{1,2}, Gholamreza Motaleb^{2*}

Author Information

1. Cancer Genetics Research Unit, Reza Radiation Oncology Center, Mashhad, Iran
2. Department of Biology, Faculty of Sciences, University of Zabol, Zabol, Iran

Dear editor,

Definitely, gene therapy is considered as a great and fundamental change and evolution in the treatment of many genetic diseases (1). In cancer gene therapy, especially in breast cancer, have had a tremendous and increasing growth and development and has seriously shifted from the theoretical range of works to the practical and clinical field (2). Some of the methods that are currently used to treat breast cancer, including chemotherapy (3), radiation therapy (4), surgery, hormone therapy (5), and laser therapy; however, these methods have some side effects for the patients. But there are some modern molecular methods, which are used in gene therapy (6). These methods are including oncolytic viruses, suicide gene, anti-angiogenesis (7), tumor suppressor genes, immunotherapy (8), and antisense targeting that are considered to be utilized for the treatment of breast cancer, which is the most common cancer type observed among women (9,10).

Utilizing suitable viral and non-viral carriers, by selection and design of suitable carriers, the target gene can be selectively introduced into the cells or a specific gene can be made off of the cells; the work which has a very effective role in the treatment process. Results gene therapy is very useful not only in the field of complete treatment for cancer, but also in the exact and early diagnosis, and moreover in the prognosis of cancer diseases.

Gene therapy has made a great evolution to the future of treatment process, and especially of cancer treatment and is an important step towards personalized medicine. However, many questions have been remained unanswered in this context (10).

References

1. Bender E. Gene therapy: Industrial strength. *Nature*. 2016 Sep;537(7619):S57–9.
2. McCrudden CM, McBride JW, McCaffrey J, Ali AA, Dunne NJ, Kett VL, et al. Systemic RALA/iNOS Nanoparticles: A Potent Gene Therapy for Metastatic Breast Cancer Coupled as a Biomarker of Treatment. *Mol Ther - Nucleic Acids*. 2017 Mar;6:249–58.
3. Diego EJ, McAuliffe PF, Soran A, McGuire KP, Johnson RR, Bonaventura M, et al. Axillary Staging After Neoadjuvant Chemotherapy for Breast Cancer: A Pilot Study Combining Sentinel Lymph Node Biopsy with Radioactive Seed Localization of Pre-treatment Positive Axillary Lymph Nodes. *Ann Surg Oncol*. 2016 May;23(5):1549–53.
4. Rahimi A, Timmerman R. New Techniques for Irradiating Early Stage Breast Cancer: Stereotactic- Partial Breast Irradiation (S-PBI). *Semin Radiat Oncol*. 2017 Feb.
5. Miller KD, Siegel RL, Lin CC, Mariotto AB, Kramer JL, Rowland JH, et al. Cancer treatment and survivorship statistics, 2016. *CA Cancer J Clin*. 2016 Jul;66(4):271–89.
6. Censabella S, Claes S, Robijns J, Bulens P, Mebis J. Photobiomodulation for the management of radiation dermatitis: the DERMIS trial, a pilot study of MLS® laser therapy in breast cancer patients. *Support Care Cancer*. 2016 Sep;24(9):3925–33.
7. Mirzaei H, Sahebkar A, Avan A, R. Jaafari M, Salehi R, Salehi H, et al. Application of Mesenchymal Stem Cells in Melanoma: A Potential Therapeutic Strategy for Delivery of Targeted Agents.
8. Spires H. The Rodent Parvovirus H-1 and its Potential in Combination with Tien Hsien Liquid as a Treatment for Breast Cancer. *Sel Honor Theses*. 2016;
9. Annan AC, Fisher PB, Dent P, Siegal GP, Curiel DT. Gene Therapy in the Treatment of Human Cancer. In: *The Molecular Basis of Human Cancer*. New York, NY: Springer New York; 2017. p. 811–41.
10. Mo L, Bachelder RE, Kennedy M, Chen P-H, Chi J-T, Berchuck A, et al. Syngeneic Murine Ovarian Cancer Model Reveals That Ascites Enriches for Ovarian Cancer Stem-Like Cells Expressing Membrane GRP78. *Mol Cancer Ther*. 2015 Mar;14(3):747–56.