Review Article

A REVIEW ON GENE THERAPY IN CANCER TREATMENT

Mushtaq Basit*, Mistry Kamalesh , Zahid,Tamheed , Sharma Tanya
Faculty of Pharmaceutical Science, Mewar University, Chittorgarh, Rajasthan, India

Gene therapy has emerged as a promising and innovative approach in the treatment of cancer by targeting the genetic abnormalities responsible for tumor development and progression. Unlike conventional therapies such as chemotherapy and radiotherapy, which often affect both normal and cancerous cells, gene therapy offers a more specific and targeted strategy by modifying or manipulating genetic material within cells. This project provides an overview of the principles, mechanisms, and applications of gene therapy in cancer treatment. Various strategies such as replacement of mutated genes, inactivation of oncogenes, introduction of therapeutic (suicide) genes, and enhancement of the immune response have been discussed . The role of gene delivery systems, including viral vectors like adenoviruses and retroviruses, as well as non-viral methods such as liposomes and nanoparticles, has also been highlighted Furthermore, the project explores different gene therapy approaches including immunotherapy, oncolytic virotherapy, and tumor suppressor gene therapy. Clinical applications in various cancers, along with the advantages such as target specificity and reduced side effects, are discussed . However, limitations such as delivery challenges, immune responses, high cost, and safety concerns remain significant barriers. Recent advancements, including the development of CRISPR-Cas9 gene editing and improved vector systems, have shown great potential in overcoming these challenges. In conclusion, gene therapy represents a rapidly evolving field with the potential to revolutionize cancer treatment by providing more effective, personalized, and targeted therapeutic options.

Keywords: Cancer, etiology, diagnostic advances, therapeutic strategies, oncolytic virotherapy

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