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Advancements of gene therapy in cancer treatment: A comprehensive review

(2024) *Pathology Research and Practice*, 261, art. no. 155509, .

DOI: 10.1016/j.prp.2024.155509

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Abstract

Cancer is the main contributor for mortality in the world. Conventional therapy that available as the treatment options are chemotherapy, radiotherapy and surgery. However, these treatments are hardly cell-specific most of the time. Nowadays, extensive research and investigations are made to develop cell-specific approaches prior to cancer treatment. Some of them are photodynamic therapy, hyperthermia, immunotherapy, stem cell transplantation and targeted therapy. This review article will be focusing on the development of gene therapy in cancer. The objective of gene therapy is to correct specific mutant genes causing the excessive proliferation of the cell that leads to cancer. There are lots of explorations in the approach to modify the gene. The delivery of this therapy plays a big role in its success. If the inserted gene does not find its way to the target, the therapy is considered a failure. Hence, vectors are needed and the common vectors used are viral, non viral or synthetic, polymer based and lipid based vectors. The advancement of gene therapy in cancer treatment will be focussing on the top three cancer cases in the world which are breast, lung and colon cancer. In breast cancer, the discussed therapy are CRISPR/Cas9, siRNA and gene silencing whereas in colon cancer miRNA and suicide gene therapy and in lung cancer, replacement of tumor suppressor gene, CRISPR/Cas9 and miRNA. © 2024 Elsevier GmbH

Author Keywords

Breast cancer; Cancer treatment; Colon cancer; Gene delivery; Gene therapy; Gene vectors; Lung cancer

Index Keywords

microRNA, polymer, small interfering RNA; breast cancer, cancer therapy, clustered regularly interspaced short palindromic repeat, colon cancer, drug therapy, gene, gene silencing, gene targeting, gene therapy, gene vector, human, lung cancer, malignant neoplasm, photodynamic therapy, review, stem cell transplantation, therapy, tumor suppressor gene

Funding details

AXA Research FundAXA
Universitas AirlanggaUNAIR

This study was supported by Airlangga Research Fund 2024.

This study was supported by Research Scheme IRCON ARF Universitas Airlangga 2014.

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Publisher: Elsevier GmbH

ISSN: 03440338
CODEN: PARPD
Language of Original Document: English
Abbreviated Source Title: Pathol. Res. Pract.
2-s2.0-85200723827
Document Type: Review
Publication Stage: Final
Source: Scopus