Oral Presentation

Targeted Treatments Against Cancer Stem Cells: Innovative Extracellular Vesicles as Therapeutic Targets for Cancer

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ABSTRACT: Cancer stem cells (CSCs) are a subset of cancer cells that exhibit characteristics similar to those of normal stem cells, including the ability to self-renew and differentiate into various cell types. They are thought to play a crucial role in cancer progression, metastasis, and recurrence because they can evade conventional therapies, leading to treatment failure. Recent trends in cancer drug therapy have explored the use of various nanovesicles, particularly exosomes and other forms of extracellular vesicles, as innovative delivery systems for cancer treatment. These vesicles are capable of encapsulating therapeutic agents, including small molecules, miRNA, and long non-coding RNAs, allowing for more precise targeting of cancer cells compared to traditional drug delivery methods. Additionally, extracellular vesicles are naturally occurring structures that may be better tolerated by the body than synthetic carriers, potentially reducing the risk of side effects. Herein, we explore the role of a novel engineered nanovesicle designed to specifically target subpopulations of cancer stem cells (CSCs), thereby enhancing drug delivery efficiency and reducing off-target effects. By integrating new biomarkers of long non-coding RNA with various anticancer drugs directly within these vesicles aimed at CSCs, we effectively circumvent the resistance mechanisms these cells display against conventional therapies. Our ongoing research is investigating the efficacy and safety of using engineered nanovesicle-based drug delivery systems in clinical settings, with a focus on various types of cancer. Furthermore, the use of vesicles facilitates the combination of multiple therapeutic agents, which can be particularly potent against CSCs that may depend on diverse pathways for survival and proliferation. Overall, the integration of cancer stem cell research with advanced drug delivery systems, such as vesicles, holds promise for improving outcomes in cancer therapy and addressing some of the challenges currently faced in treating malignant tumors.

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