LITHUANIAN UNIVERSITY OF HEALTH SCIENCES

International
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Practice

Conquering Cancer: Targeting Cancer Stem Cell

Cancer stem cells (CSCs) are a subpopulation of tumor cells characterized by self-renewal, tumor initiation, and resistance to conventional therapies, and are considered a major contributor to tumor recurrence and treatment failure. This study aims to investigate the signaling mechanisms underlying cancer stemness and identify therapeutic strategies capable of reducing CSC properties. To establish a clinically relevant experimental model, cancer cells enriched in stem-like characteristics will be stereotaxically implanted into the brain of experimental animals, thereby reproducing the intracranial tumor microenvironment.

Following tumor establishment, animals will receive treatment conditions designed to mimic those used in patients, allowing evaluation of treatment-induced changes in tumor biology and intracellular signaling pathways. Particular attention will be given to the regulation of CSC-associated markers, including Nestin, CD44, and CD133, which are widely associated with tumor stemness and tumor-propagating potential. Changes in these markers will be analyzed at the molecular and cellular levels to determine whether the treatment can suppress the stem-like phenotype of tumor cells. Furthermore, histopathological and immunohistochemical analyses of tumor tissues will be performed to assess tumor morphology, cellular characteristics, and spatial changes in CSC marker expression. By integrating an in vivo intracranial tumor model with treatment-response analysis, signaling investigation, and pathological assessment, this study seeks to elucidate the mechanisms governing cancer stemness and identify potential approaches for targeting CSCs.

Ultimately, this research may provide insights into strategies for reducing tumor aggressiveness and therapeutic resistance by targeting cancer stemness at its root.