

Fighting Cancer with Novel Antibiotics

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Abstract. *Despite current therapies, tumor relapse and therapy resistance present as significant obstacles to successful management of cancer. Cancer stem cells (CSCs) play a crucial role in the development and recurrence of cancer. CSCs are a subpopulation within tumors capable of self-renewal and differentiation into various cell types within tumors. Furthermore, CSCs are thought to drive tumor recurrence after treatment. Even if the majority of tumor cells are eliminated by therapy, CSCs can survive and repopulate the tumor, leading to cancer relapse. However, identifying and effectively targeting CSCs remains a significant challenge. Recent studies have shown that specific antibiotics can effectively inhibit various types of CSCs (breast, ovarian, prostate, lung, pancreatic, melanoma, and glioblastoma cancers). Due to the impact of antibiotics on CSC function, targeting CSCs is a promising strategy for improving outcomes in cancer patients by preventing recurrence and enhancing treatment efficacy. Our preliminary studies have identified several extracts from bacterial antibiotic producers that can inhibit multiple CSC-derived tumorsphere types (breast, lung, and prostate) in cultured human cancer cell lines. Tumorsphere formation is a widely accepted technique used to quantify CSC activity and a reliable method to screen for novel anti-CSC agents. Our objective for this Spring semester is to analyze the gene expression patterns of CSC-associated markers and their impact on tumorsphere quantity and dimensions within cultured A549 human lung cancer cells, compared to healthy lung cells. These studies will provide a baseline for assessing changes in gene expression patterns and tumorsphere morphology following treatment with bacterial extracts.*

Keywords. Tumorspheres, Cancer Stem Cells, Antibiotics, Cancer Recurrence.

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