Curcumin and Capsaicin Synergistically Suppress Neuroblastoma Development

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Neuroblastoma is one of the most common malignant pediatric tumors, accounting for 10% of all childhood cancer deaths. However, current treatment methods often involve chemotherapeutic agents that have significant side-effects on non-targeted cells. The destructiveness and prevalence of the tumor highlight the need for developing an effective and non-toxic treatment. Curcumin and capsaicin, two phytochemicals extracted from spices that have exhibited neuroprotective and anti-cancer properties, have the potential to be substitutes to traditional chemotherapeutic treatments. This study investigated the role of curcumin and capsaicin on neuroblastoma and hypothalamic cells to elucidate the therapeutic potential of the two chemicals holistically. Through MTT cell viability, scratch-healing migration, cell colony formation, and ELISA assays, the results showed that curcumin and capsaicin significantly decreased neuroblastoma survival rate, inhibited metastasis by suppressing the expression of matrix metalloproteinase (MMP)-9, and disrupted the colony formation by decreasing both the number and area of the colonies. The effects are most pronounced at the combined treatment of 10 micromolar of curcumin and 40 micromolar of capsaicin, indicating their synergistic potential. Combined with curcumin and capsaicin's lack of toxicity reported in previous studies, the two chemicals show their anti-cancer potential on neuroblastoma cells with significantly reduced side-effects on non-targeted cells compared to traditional chemotherapeutic agents, highlighting their therapeutic potential and bridge to their clinical feasibility.

Awards Won:
Third Award of $1,000