Utilizing Caulobacter crescentus To Target the Bcl-2 Gene and NF-kB to Cause Apoptosis in Nasal Squamous Cell Carcinoma

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The most common type of paranasal sinus and nasal cavity cancer is squamous cell carcinoma. If left untreated, this cancer has a survival rate of 43%. The status quo treatment options for this cancer include surgery, radiation therapy, or chemotherapy, which are expensive, damaging, and invasive. This study investigates the anti-cancer properties of Caulobacter crescentus, and its possible role on the activation of the NF-kB-Bcl-2 apoptotic pathway in squamous cells. In this study, cancer and non-cancerous cells were exposed to Caulobacter crescentus at varying concentrations. Using cytotoxicity and ELISA assays, data was collected on cell viability, cell cytotoxicity, and the levels of Bcl-2 and NF-kB in vitro. The researcher hypothesized that the cancer cells with the most-concentrated treatment (2x10^5 bacteria cells) would have increased levels of NF-kB and decreased levels of Bcl-2, while the non-cancerous cells would remain unaffected. Cancer cells exposed to the most-concentrated bacteria treatment had increased levels of NF-kB and decreased levels of Bcl-2 compared to untreated cancer cells. Treated non-cancerous cells showed decreased NF-kB levels and stable levels of Bcl-2. Furthermore, while treated non-cancerous cells maintained their viability, treated cancer cells showed a decline in their overall viability when compared to non-treated cancer cells. These results show that apoptosis may be involved in the investigated cell death process. These results help provide insight on how Caulobacter crescentus causes apoptosis in cancer cells, and how they can be used to create a safe, non-invasive, and targeted alternative to current cancer treatment therapies.

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