Inhibiting the Proliferation of Patient-Derived Glioblastoma Multiforme (GBM) Cells and U-87 MG Cell Line Using Leaf Extract of Bacopa monnieri

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Glioblastoma multiforme (GBM) is the most common and aggressive type of primary brain tumor. Patients with GBM have a median survival of 15 months. Current treatments for GBM are quite limited and research into developing novel therapeutics is warranted. Bacopa monnieri, a species of herbaceous perennials, has shown to exhibit numerous beneficial effects. Phytochemical analysis of Bacopa has revealed high concentrations of compounds known as terpenoids, which have anti-tumorigenic properties. Considering these properties of terpenoids, it was hypothesized that Bacopa may inhibit the proliferation of GBM cells in vitro. The objective was to prepare leaf extract of Bacopa monnieri and assess its effect on GBM cells. Methanolic extract of Bacopa leaves was applied to patient-derived GBM cells & U-87 MG cell line in-vitro. Tested extract concentrations ranged from 4 to 300 µg/mL. After 72 hrs of exposure, GBM cell proliferation was analyzed through a colorimetric WST-1 tetrazolium reduction assay. The results revealed that cell proliferation was inhibited by the Bacopa extract in patient-derived GBM cells and U-87 MG cell line. The IC50 (50% inhibitory dose) range was between 11 and 33 µg/mL for patient-derived GBM and between 33 and 100 µg/mL for U-87 MG. Data analysis revealed statistically-significant F-values and P-values for both cell lines. In conclusion, this study presents that Bacopa monnieri does indeed inhibit GBM proliferation, a finding which has never been previously reported or published. This study presents a potential novel approach to the treatment of GBM. If the bioactive compound(s) responsible for the observed inhibitive phenomenon can be identified and safely tested, Bacopa monnieri has the potential to be used as an adjuvant therapy for GBM.

Awards Won:

American Statistical Association: Second Award of $1,000