



# Anti-tumoral Effects of Riluzole Compared to Temozolomide on Glioblastoma and Spinal Cord Tumor Stem Cells Derived from Patients

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### Citation:

Amiri-Shahri M, Rasouli F, Najaf Najafi N, Sahab-Negah S. Anti-tumoral Effects of Riluzole Compared to Temozolomide on Glioblastoma and Spinal Cord Tumor Stem Cells Derived from Patients. *Iranian biomedical journal. Supplementary* (12-2024): 266.

## ABSTRACT

**Introduction:** Glioblastoma multiforme (GBM) and spinal cord tumors have a high recurrence rate. Recent studies have suggested that Riluzole has anti-tumoral effects. We evaluated the efficacy of combination therapy with Riluzole and temozolomide (TMZ) on glioblastoma stem-like cells (GSCs) and spinal cord tumor stem cells (SCTSCs) in vitro.

**Methods and Materials:** Cells were extracted from two patients with spinal cord tumors and three patients with GBM. We evaluated the effects of combinatorial and monotherapy with Riluzole and TMZ on cultured stem cells. The MTS, the CytoTox-Fluor™ Cytotoxicity, and the Caspase-Glo® 3/7 assays were used to assess cell viability, the protease activity of the dead cells, and early apoptosis, respectively.

**Results:** The study included two men with spinal cord tumors and a man and two women with GBM. We found no notable differences between the combination therapy and monodrug therapy of GSCs and SCTSCs in the case of cell viability. However, the apoptosis of GSCs and SCTSCs was significantly induced after 24 h treatment with both monotherapy and combination therapies ( $p = 0.05$ ). However, it turned to non-significant in GSCs after 48 h. The cytotoxicity of GSCs was significant after 24 h of combination therapy ( $p = 0.05$ ), while the cytotoxicity of the SCTSCs turned significant after 48 h in both therapies ( $p = 0.05$ ).

**Conclusion and Discussion:** The data from the present study suggest that combination therapy with Riluzole and TMZ may indicate superior anti-tumoral effects on GSCs and SCTSCs compared to monotherapy.

**Keywords:** Glioblastoma, Riluzole, Spinal cord neoplasms, Temozolomide