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July 2002, 51:1 &gt; Necrosis and Glioblastoma: A Friend...

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## ARTICLE LINKS:

[Fulltext](#) | [PDF \(2.85 M\)](#)**Necrosis and Glioblastoma: A Friend or a Foe? A Review and a Hypothesis.****Literature Review**

Neurosurgery. 51(1):2-13, July 2002.

Raza, Shaan M. B.S.; Lang, Frederick F. M.D.; Aggarwal, Bharat B. Ph.D.; Fuller, Gregory N. Ph.D., M.D.; Wildrick, David M. Ph.D.; Sawaya, Raymond M.D.

**Abstract:**

**OBJECTIVE :** Two main forms of cell death are encountered in biology: apoptosis (i.e., programmed cell death) and necrosis (i.e., accidental cell death). Because necrosis and apoptosis can lead to cell removal, one might intuit that they are both desirable in cancer treatment. However, in the setting of glioblastoma multiforme, a malignant brain tumor for which the presence of necrosis is an important diagnostic feature, clinical studies indicate that as the degree of necrosis advances, the patient's prognosis worsens. Despite the apparent importance of this form of cell death, the mechanism of development of necrosis in glioblastomas remains unelucidated. The purpose of this article is to try to resolve this dilemma by hypothesizing the mechanism of necrosis formation in these tumors.

**METHODS :** On the basis of an extensive review of the literature, we present a hypothesis for the mechanism of necrosis formation in glioblastoma multiforme.

**RESULTS :** One of the many possible pathways leading to necrosis formation may involve increased tumor cell secretion of tumor necrosis factor. Procoagulation and antiapoptotic mechanisms resulting from certain pathways could prevent the completion of tumor necrosis factor-induced apoptosis and could promote necrosis as the final mode of cell death. Such a hypothesis would explain the inverse correlation that exists between tumor necrosis and the survival of patients with glioblastomas, because the hypoxia that results from procoagulation selects for tumor cells that are more aggressive and more resistant to apoptosis-inducing therapies.

**CONCLUSION :** A complete understanding of the series of events surrounding necrosis development in glioblastomas that is evidence-based is likely to provide targets for future therapies. On the basis of the potential mechanisms of development of necrosis described in this article, we postulate that effective therapies may have to be directed against the pathways that result in the formation of necrosis.

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