

The O(6)-methylguanine-DNA methyltransferase (MGMT) gene is located at chromosome 10q26 and encodes a DNA repair enzyme that can abrogate the effects of alkylating chemotherapy such as temozolamide. In this situation, the alkylating chemotherapy damages DNA and kills tumor cells. However, if the MGMT gene is active, the damage is rapidly repaired.

Malignant gliomas may have the MGMT gene inactivated due to methylation of its promoter region. Methylation of DNA is a well known mechanism for controlling gene expression. The prediction, borne out by current research, is that by methylating the MGMT gene, a BETTER response to chemotherapy can occur (as the tumor has no means to repair the DNA damage induced by the alkylating agent). In gliomas, MGMT promoter methylation is a favorable prognostic marker in the setting of either radiation or chemotherapy.