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*Idbaih, Ahmed a,b,c; Omuro, Antonio a,b,c; Ducray, Francois a,b,c; Hoang-Xuan, Khe a,b,c***Abstract:**

Purpose of review: This review summarizes recent studies on applications of molecular markers such as chromosome 1p/19q codeletion and MGMT status in the treatment of glioma.

Recent findings: Prospective trials confirmed that 1p/19q codeletion represents a strong and independent favourable prognostic factor in anaplastic oligodendroglial tumours. Other retrospective studies have suggested that 1p/19q loss is also predictive of chemosensitivity to alkylating agents (nitrosoureas and temozolomide) in low-grade gliomas. Recent reports have provided evidence that 1p and 19q deletions are mediated by unbalanced translocation. The targeted genes remain to be identified, however. Promoter methylation of MGMT gene silencing has been shown to predict benefit from chemotherapy in glioblastoma. MGMT promoter methylation and low expression of MGMT-encoded protein are frequently observed in low-grade gliomas and anaplastic oligodendroglial tumours. In such tumours, however, preliminary studies have yielded contradictory results on the predictive value of MGMT status regarding objective response to chemotherapy and correlation with 1p/19q deletion.

Summary: There is mounting evidence that 1p/19q deletion and MGMT inactivation are relevant prognostic markers and predictors of chemosensitivity in gliomas. Although such markers remain to be formally validated by ongoing and planned prospective trials, it is likely that they will soon become essential for optimizing treatment decisions.

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