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Men are more predisposed to getting Glioblastoma multiforme (GBM) tumor and increased mortality due to genetic predispositions and different molecular pathways.

Abstract:

Glioblastoma multiforme (GBM) tumor is a highly malignant and cancerous type of brain tumor. It is considered one of the most aggressive and lethal forms of brain cancer. This research paper identifies molecular pathways and genetic mutations contributing to the development of GBM and how they affect men more than women. Data from published research studies has consistently demonstrated that GBMs have an incidence rate 1.6 times higher in men than in women. The research studies used in vivo and in vitro models, functional assays, genomic and epigenomic profiling, cell culture, and clinical trials. Genomic data was collected using genome-wide association studies (GWAS). Findings explicitly show that tumor suppressor genes such as retinoblastoma susceptibility gene (RB1) and p53 (which regulates cell-cycle progression) are inactivated, leading to infiltration of tumor cells. Mutations in epidermal growth factor receptor (EGFR) in the male-only group of one study led to the overexpression of the gene and resulted in uncontrolled growth of tumor cells. Glycolytic gene overexpression and critical mutations in the Isocitrate Dehydrogenase 1 and 2 (IDH1/2) genes have been linked to decreased survival in men. Interestingly, women with overexpressed glycolytic genes and IDH1 mutations survived longer than men with the same type of mutation or a wild-type version and overexpression of glycolytic genes. These findings offer valuable progress towards the understanding and potential treatment of GBM. By understanding the genetic and molecular underpinnings of GBM, researchers can improve prognosis and focus on developing more targeted and effective treatment options.