Mapping Genetic Changes That Drive Aggressive Brain Tumors

MAPK and PI3K mutations affect how cancer starts in glial cells in the brain.

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C. Ryan Miller, MD, PhD (Damon Runyon Clinical Investigator ’09-’12) of the UNC Lineberger Comprehensive Cancer Center, Chapel Hill, and colleagues, reported two studies on the genetics underlying brain tumors. The first study showed that mutations in MAPK and PI3K affect how cancer starts in glial cells, brain cells that provide support and insulation for neurons. These mutations triggered tumor initiation and produced increasingly dense low-grade gliomas that quickly progressed to aggressive and often deadly glioblastoma (GBM). The other study, conducted in cell lines and mouse models, tested a combination of targeted drugs as a potential therapy against glioblastoma by inhibiting the MAPK and PI3K cellular pathways. While the treatments overcame resistance in cells grown in the laboratory, they did not reach high enough concentrations to be effective when tumors were in the brain. One of the fundamental challenges in treating brain cancer with drugs is overcoming the blood-brain barrier, a membrane that separates circulating blood from the fluid in the central nervous system. This barrier works to protect the brain from toxins; however, this security system is so effective at protecting the brain that it prevents many life-saving drugs from reaching the cancer. The studies were published in the journal Neuro-Oncology.

Read more about this research here.

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