

Special Issue

Pathophysiology and Molecular Therapy of Brain Tumor

Message from the Guest Editors

Brain tumors are abnormal proliferations of cells within the brain or its surrounding structures. They can originate from neural or glial cells (primary tumors) or metastasize from other parts of the body. The pathophysiology of brain tumors involves complex molecular and cellular alterations, including the dysregulation of cell cycle pathways, the evasion of apoptosis, and the promotion of angiogenesis.

Molecular therapies are transforming the treatment of brain tumors by targeting these aberrant pathways. Monoclonal antibodies, tyrosine kinase inhibitors, and immunotherapy strategies are being developed to inhibit tumor growth while minimizing the damage caused to healthy tissues. Emerging therapies, including CAR-T cells and RNA-based approaches, aim to enhance tumor-specific targeting. Challenges such as the blood–brain barrier and tumor resistance remain, necessitating ongoing research into combination therapies and nanotechnology-based drug delivery systems. In addition, advancements in molecular profiling and personalized medicine could improve the outcomes for patients with brain tumors.

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