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Mass Spectrometry Advances in Analysis of Glioblastoma

Sofian Al Shboul ¹, Ashita Singh ², Renata Kobetic ³, David R Goodlett ⁴, Paul M Brennan ⁵, Ted Hupp ², Irena Dapic ³

Affiliations

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Abstract

Some cancers such as glioblastoma (GBM), show minimal response to medical interventions, often only capable of mitigating tumor growth or alleviating symptoms. High metabolic activity in the tumor microenvironment marked by immune responses and hypoxia, is a crucial factor driving tumor progression. The many developments in mass spectrometry (MS) over the last decades have provided a pivotal tool for studying proteins, along with their posttranslational modifications. It is known that the proteomic landscape of GBM comprises a wide range of proteins involved in cell proliferation, survival, migration, and immune evasion. Combination of MS imaging and microscopy has potential to reveal the spatial and molecular characteristics of pathological tissue sections. Moreover, integration of MS in the surgical process in form of techniques such as DESI-MS or rapid evaporative ionization MS has been shown as an effective tool for rapid measurement of metabolite profiles, providing detailed information within seconds. In immunotherapy-related research, MS plays an indispensable role in detection and targeting of cancer antigens which serve as a base for antigen-specific therapies. In this review, we aim to provide detailed information on molecular profile in GBM and to discuss recent MS advances and their clinical benefits for targeting this aggressive disease.

Keywords: glioblastoma; glycans; lipids; mass spectrometry; proteomics; tissues.

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