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Current immunotherapy techniques in meningioma

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Abstract

Introduction: Although meningiomas are the most common primary brain tumor, there are limited treatment options for recurrent or aggressive lesions. Compared to other brain tumors, meningiomas may be uniquely amenable to immunotherapy by virtue of their location outside the blood-brain barrier.

Areas covered: This review describes our current understanding of the immunology of the meninges, as well as immune cell infiltration and immune signaling in meningioma. Current literature on meningioma immunology and immunotherapy was comprehensively reviewed and summarized by a comprehensive search of MEDLINE (1/1/1990-6/1/2024). Further, we describe the current state of immunotherapeutic approaches, as well as potential future targets. Potential immunotherapeutic approaches include immune checkpoint inhibition, CAR-T approaches, tumor vaccine therapy, and immunogenic molecular markers.

Expert opinion: Meningioma immunotherapy is in early stages, as no immunotherapies are currently included in treatment guidelines. There is substantial heterogeneity in immune cell infiltration, immunogenicity, and immune escape across tumors, even within tumor grade. Furthering our understanding of meningioma immunology and tumor classification will allow for careful selection of tumors and patient populations that may benefit from primary or adjunctive immunotherapy for meningioma.

Keywords: Meninges; brain tumor; checkpoint inhibitor; dura; immunology; immunotherapy; neuroimmunology; targeted therapy.

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