# Dendritic cell vaccine

Dendritic cell-based vaccines are an intensively studied active immunotherapy technology.

Their effectiveness was studied most widely in the treatment of malignant glial tumors, the study went from experimental work to phase III clinical studies, preliminary results of which indicate some positive results of this immunotherapy method in adults. Currently, the emphasis is also being placed on the identification of clinical and immunological correlates of the patient's response to therapy and on the search for new antigens for sensitization of dendritic cells Studies of dendritic cell vaccines also include a number of other neuro-oncological diseases [1].

The finding that dendritic cells (DCs) orchestrate innate and adaptive immune responses has stimulated research on harnessing DCs for developing more effective vaccines for DC therapy. The expression of cytomegalovirus (CMV) antigens in glioblastoma multiforme (GBM) presents a unique opportunity to target these viral proteins for tumor immunotherapy.

A meta-analysis focused on the effectiveness of dendritic cell (DC) therapy and viral therapy (VT) in clinical trials. Fourteen eligible studies have been evaluated and the results suggest the improvement of both OS (HR = 0.65) ($p < 0.0001$) and PFS (HR = 0.59) ($p = 0.01$) for patients receiving DC therapy. The data for VT showed a slight improvement in terms of OS (HR = 0.81), while PFS was similar to the control arms (HR = 1.06) ($p = 0.41$) [2].

Human tumors express a number of protein antigens that can be recognized by T cells, thus providing potential targets for cancer immunotherapy. Dendritic cells (DCs) are rare leukocytes that are uniquely potent in their ability to present antigens to T cells, and this property has prompted their recent application to therapeutic cancer vaccines. Isolated DCs loaded with tumor antigen ex vivo and administered as a cellular vaccine have been found to induce protective and therapeutic anti-tumor immunity in experimental animals. In pilot clinical trials of DC vaccination for patients with non-Hodgkin's lymphoma and melanoma, induction of anti-tumor immune responses and tumor regressions have been observed. Additional trials of DC vaccination for a variety of human cancers are under way, and methods for targeting tumor antigens to DCs in vivo are also being explored. Exploitation of the antigen-presenting properties of DCs thus offers promise for the development of effective cancer immunotherapies [3].

1)
Chekhonin IV, Kobyakov GL, Gurina OI. [Dendritic cell vaccines in neurological oncology]. Zh Vopr Neirokhir Im N N Burdenko. 2020;84(1):76-85. doi: 10.17116/neiro20208401176. Russian. PubMed PMID: 32207746.
2)
Vatu BI, Artene SA, Staicu AG, Turcu-Stiolica A, Folcuti C, Dragoi A, Cioc C, Baloi SC, Tataranu LG, Silosi C, Dricu A. Assessment of efficacy of dendritic cell therapy and viral therapy in high grade glioma clinical trials. A meta-analytic review. J Immunoassay Immunochem. 2018 Nov 30:1-11. doi: 10.1080/15321819.2018.1551804. [Epub ahead of print] PubMed PMID: 30497337.
3)
Timmerman JM, Levy R. Dendritic cell vaccines for cancer immunotherapy. Annu Rev Med. 1999;50:507-29. Review. PubMed PMID: 10073291.