Oncolytic Newcastle Disease Virus

Oncolytic Newcastle disease virus (NDV), an agent with inherent antineoplastic and immune stimulatory properties, is capable of breaking therapy resistance and immunosuppression. A review of Schirrmacher et al. updates the latest information about immunosuppression by the Tumor Microenvironment and discusses mechanisms of how oncolytic viruses, in particular NDV, and cellular immunotherapy can counteract the immunosuppressive effect of the TME. With regard to cellular immunotherapy, the review presents pre-clinical studies of post-operative active-specific immunotherapy and of adoptive T cell-mediated therapy in immunocompetent mice. Memory T cell (MTC) transfer in tumor-challenged T cell-deficient nu/nu mice demonstrates the longevity and functionality of these cells. Graft-versus-leukemia (GvL) studies in mice demonstrate complete remission of late-stage disease including metastases and cachexia. T-cell transfer therapy studies with human cells in human tumor xenotransplanted NOD/SCID mice demonstrate the superiority of bone marrow-derived as compared to blood-derived MTCs. Results from clinical studies presented include vaccination studies using two different types of NDV-modified cancer vaccine and a pilot adoptive T-cell mediated therapy study using re-activated bone marrow-derived cancer-reactive MTCs. As an example of what can be expected from clinical immunotherapy against tumors with an immunosuppressive TME, results from vaccination studies are presented from the aggressive brain tumor glioblastoma multiforme. The last decades of basic research in virology, oncology, and immunology can be considered a success story. Based on discoveries in these research areas, translational research and clinical studies have changed the way of treatment of cancer by introducing and including immunotherapy [1)].

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Schirrmacher V, van Gool S, Stuecker W. Counteracting Immunosuppression in the Tumor Microenvironment by Oncolytic Newcastle Disease Virus and Cellular Immunotherapy. Int J Mol Sci. 2022 Oct 27;23(21):13050. doi: 10.3390/ijms232113050. PMID: 36361831.