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Cancer Immunotherapy by Autologous T Cells

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Objective: Cancer immunotherapy is a strategy by which components of immune system are recruited to combat malignant cells. In recent years, a great deal of investigation has focused on this approach and promising outcomes have obtained.

Material and Methods: To review current knowledge regarding cancer immunotherapy, published papers including key words immunotherapy, cancer and adaptive cell therapy, were extracted from PubMed, Scopus, Web of Science, and Google Scholar.

Results: Adoptive cell therapy (ACT) is a method by which lymphocytes are isolated from patients' peripheral blood or tumor-draining lymph nodes, genetically manipulated and expanded in vitro, and then reinfuse to the same patient. The aim of this approach is to generate acceptable number of tumor-specific T cells and improve their functionality. The use of tumor-infiltrating lymphocytes (TILs) is another option for ACT through which mixtures of T cells, grown from resected metastatic tumor deposits, are expanded ex vivo. This process also involves lymphodepleting regimen prior to TIL infusion, since it eliminates immunosuppressive cells in the tumor microenvironment and increases levels of homeostatic cytokines such as interleukins. To provide antigen-specificity for T cells, genetic engineering was first used to express T cell receptor (TCR) α and β chains, but since highly avid TCRs were able to destroy healthy tissues expressing the same target antigen as well, chimeric antigen receptors (CARs), which consist of an Ig variable domain attached to a TCR constant domain, seem to be more applicable.

Conclusion: In a series of recent clinical trials, it has been shown that autologous T cells therapy is a promising option for cancer treatment, specifically for patients with melanoma. Nevertheless, more investigation is required to improve clinical outcomes of cancer immunotherapy and reduce its adverse effects.

***Keywords*:** Immunotherapy, Cancer, Adaptive cell therapy

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