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Breast Cancer Cellular Immunotherapies

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Abstract : The goals of treating patients with breast cancer are to cure the disease, prolong survival, and improve quality of life. Immune cells in the tumor microenvironment have an important role in regulating tumor progression. The term of cellular immunotherapy refers to the administration of living cells to a patient; this type of immunotherapy can be active, such as a dendritic cell (DC) vaccine, in that the cells can stimulate an anti-tumour response in the patient, or the therapy can be passive, whereby the cells have intrinsic anti-tumour activity; this is known as adoptive cell transfer (ACT) and includes the use of autologous or allogeneic lymphocytes that may, or may not, be modified. The most important breast cancer cellular immunotherapies involving the use of T cells and natural killer (NK) cells in adoptive cell transfer, as well as dendritic cells vaccines. T cell-based therapies including tumour-infiltrating lymphocytes (TILs), engineered TCR-T cells, chimeric antigen receptor (CAR T cell), Gamma-delta (γδ) T cells, natural killer T (NKT) cells. NK cell-based therapies including lymphokine-activated killers (LAK), cytokine-induced killer (CIK) cells, CAR-NK cells. Adoptive cell therapy has some advantages and disadvantages some. TILs cell strictly directed against tumor-specific antigens but are inactive against tumor changes due to immunoediting. CIK cell have MHC-independent cytotoxic effect and also need concurrent high dose IL-2 administration. CAR T cell are MHC-independent; overcome tumor MHC molecule downregulation; potent in recognizing any cell surface antigen (protein, carbohydrate or glycolipid); applicable to a broad range of patients and T cell populations; production of large numbers of tumor-specific cells in a moderately short period of time. Meanwhile CAR T cells capable of targeting only cell surface antigens; lethal toxicity due to cytokine storm reported. Here we present the most popular cancer cellular immunotherapy approaches and discuss their clinical relevance referring to data acquired from clinical trials .To date, clinical experience and efficacy suggest that combining more than one immunotherapy interventions, in conjunction with other treatment options like chemotherapy, radiotherapy and targeted or epigenetic therapy, should guide the way to cancer cure.

Keywords : breast cancer , cell therapy , CAR T cell , CIK cells
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