Austin Journal of Cancer and Clinical Research

Open Access

Austin Publishing Group

Editorial

Identification of the Nk Cells for Clinical Benefit

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Received: July 13, 2015; **Accepted:** August 12, 2015; **Published:** August 15, 2015

Keywords

Natural Killer; Lymphocytes; Clinical

Editorial

Natural Killer (NK) cells are a class of lymphocytes, responsible of the defense against invading infectious pathogens and malignant transformation [1,2]. They belong to innate immune system since clonally distributed receptors don't show on their cytoplasmic membrane, as well as instead it happens for the lymphocytes B and T [3]. Rather NK cells express a broad spectrum of activating and inhibitory receptors, which define the measurement of the immune response, and activate NK cells to lyse target cells. These include killer cell immunoglobulin-like receptors (KIRs), C-type lectins, and natural cytotoxicity receptors (NCRs) [4]. Human NK cells comprise 10% of all blood lymphocytes and are identified by the expression of the CD56 surface antigen and the lack of CD3; they are identified in two subsets of human NK cells according to cell surface density of CD56 expression [5].

Clinical Application

Nk cells activated release the restrained protein in cytoplasmic granules which cause apoptotic death of the target cell. Each NK cell express its own repertoire of activating and inhibitory receptors, and cytotoxicity is ultimately regulated by a balance of signals from these activating and inhibitory receptors that interact with MHC class I and molecules on target cells [3].

NK cells have cytotoxic activity against some virus-infected, leukemic, and other tumor cells; they also mediate antibody-dependent cellular cytotoxicity (ADCC). The increasing knowledge of how NK cells recognize target cells and about to activating and inhibitory receptors, points to the potential clinical utility for the treatment of leukemia and other various clinical situations [6]. In fact, Nk cell infusion may be a perfect tool to practice graft-versus-leukemia / tumor (GvL/T) effects, since induction of graft-versus-host disease (GvHD) has not been observed so far. It's been observed that additional activation or expansion of NK cells with use of the cytokines, actuate GvL/T efficacy. The cure of leukemia and other hematologic malignancies following allogeneic stem cell transplantation is linked to the ability of donor immune cells in the graft to recognize and eliminate neoplastic cells survived to the high-dose chemotherapy [7].

In haploidentical peripheral blood stem cell transplantations (PBSCT), the NK cells drive immune reconstruction, stabilize an decreasing donor chimerism and prevent relapse of hematological malignant diseases, such as acute myeloid leukemia (AML) and chronic myeloid leukemia (CML). Strategies aimed at either using the mismatch of receptors and ligands that is present in certain allogeneic settings, or blocking the interaction between inhibitory NK cell receptors and MHC class I molecules, may be more successful. Clinical data suggest that for patients with AML, a KIR mismatch between the donor and the host during allogeneic bone marrow transplantation may be used to reduce the risk of relapse, graft – versus- hot diseases and graft rejection [8].

New scientific studies and the increase of our knowledge about NK cell biology and receptors will lead to advancements in cancer immunotherapy. Actually, clinical research is also directed to the use of NK cells against solid tumors but also for the future treatments of viral / fungal infections.

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Citation: Daniele N, Tomassetti F and Zinno F. Identification of the Nk Cells for Clinical Benefit. Austin J Cancer Clin Res 2015;2(7): 1056.