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## REVIEW

# Natural killer cells enhance the immune surveillance of cancer



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**Abstract** Immune system (IS) is comprised of molecules, cells, tissues and organs involved in host defense mechanism from infectious agents or tumor cells. On crossing the cell barriers by these infectious agents, the defense mechanism is alerted by the immune system to respond against these invading microbes. Innate immune response (IIR) and acquired immune response (AIR) are working in parallel to control these invading microbes. IIR is composed of various types of phagocytes and lymphocytes, while AIR is comprised of T and B lymphocytes. All the cells of the immune system cooperatively work against infectious agents and cancerous cells but Natural killer (NK) cells are playing an important role to respond to tumor by enhancing the expression of complementary domain (CD86) on dendritic cells (DCs) and production of IL-12. NK cells demolished tumor through perforin and granzyme, which are important for immune surveillance and death of tumor cells induced by cytokines such as tumor necrosis factor (TNF), Fas ligand (CD178), interferon- $\gamma$  (IFN- $\gamma$ ) and IL-10. These cytokines have inhibited proliferation of tumor by inducing anti-angiogenic factors and maintaining cross talk with other immune cells. Natural products like transfer factor plus, immune modulator mix, ascorbic acid, *Ganoderma lucidum*, *Agaricus blazei* teas, nitrogenated soy extract, *Andrographis paniculata* and several phytochemicals enhanced the efficiency of NK cells in controlling cancers. Further studies will unravel the impact of NK cells in cancer control and how NK efficiency can be further enhanced.

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## 1. Introduction

Immune system (IS) is a network of a population of molecules, cells, tissues and organs to protect the body from microbes like viruses, bacteria and other toxins. When microbes cross the natural cell barriers, the IS alerts the defense mechanism of the body and activates different types of cells to respond to these invading microbes to protect the health of the organism. The IS naturally has the ability to protect and heal the body and to prevent various diseases. A healthy IS increases the ability of the body to defend against various pathogens, microbes, decreases infection rate, allows efficient healing

and improves quality of health [1]. The immune system is dependent on two types of immunities; innate immune response (IIR) and acquired immune response (AIR). The IIR is a second line of defense because it acts against invaders, who cross the physical barriers such as skin and mucosa. IIR is comprised of various phagocytes such as Natural killer cells, dendritic cells, macrophages, neutrophils, basophils and eosinophils (Fig. 1). Natural killer cells are involved in the destruction of tumor and virus-infected cells, while the dendritic cells, macrophages, basophils, eosinophils and neutrophils mediate the inflammatory response which is immediate but of short term. These cells also act as physical or chemical barriers to

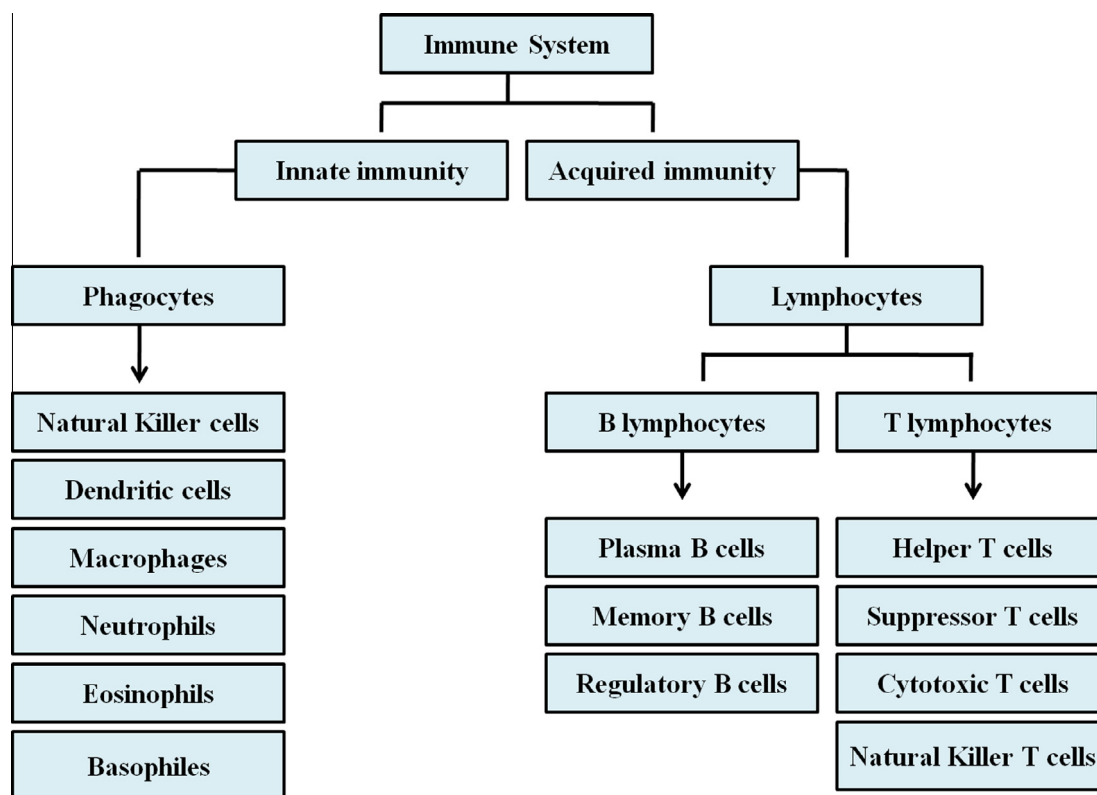


Figure 1 Type of immune system and various immune cells involved in defense system.

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