



# PUGET SOUND QUARTERLY

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## THE DENDRITIC CELL

# An Old Player With New Applications

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The use of dendritic cells (DCs) in cancer therapy is the subject of a growing interest in research trials and clinical applications. Once thought of as a curiosity or an inconsequential component of the hematopoietic system, these cells are gaining recognition as having a potential role in cancer immunotherapy as an antitumor agent, and in allogeneic hematopoietic stem cell transplantation (HCT) (Waller & Ernstoff, 2003). Other emerging uses in which the dendritic cell can assist the macrophage are with wound healing and in other diseases of the immune system (Payne et al., 2001). Some interest also lays in the DCs ability to confer a protective effect on recovering stem cells in patients undergoing myelosuppressive therapy (Armitage, 1998). The purpose of this article is to give an overview of the characteristics and uses of the dendritic cell in cancer therapy and beyond.

### Dendritic Cells

Dendritic Cells are rare cells of the immune system that are derived from the myeloid and lymphocyte line (Figure 1). Dendritic cells, like all hematopoietic cells originate in the bone marrow and circulate through the bloodstream to most tissues of the body then take up residence until they are activated by various immunomodulatory mechanisms to travel to tissues and

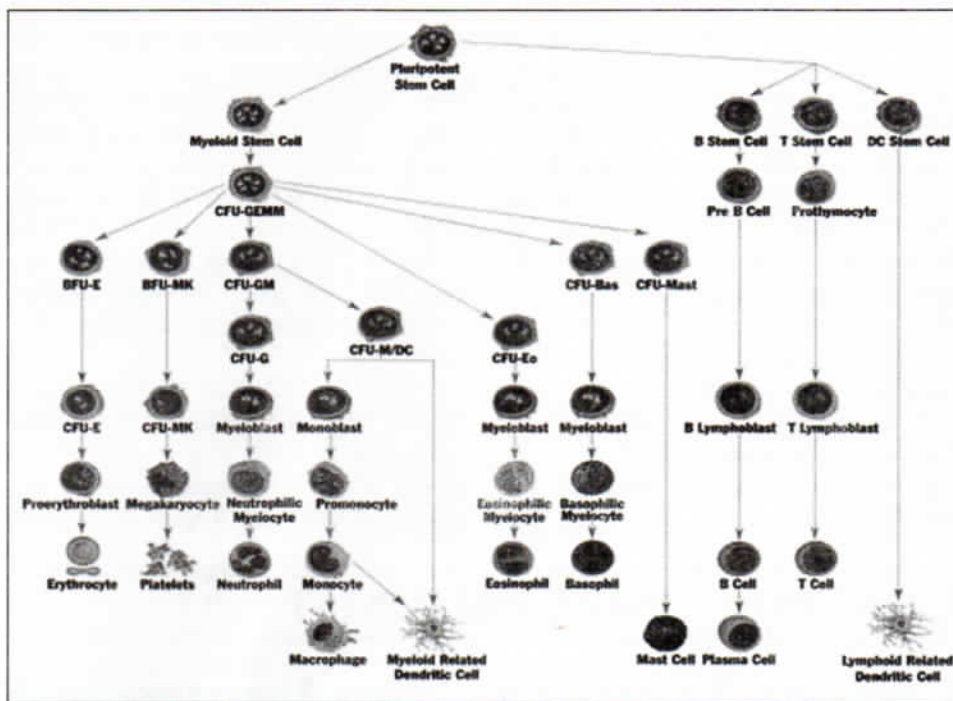


Figure 1.

organs under attack from a myriad of toxic antigens (Figure 2). The first DCs discovered are called Langerhans. They reside in the non-lymphoid tissue. It is now known that the DC is found in very small amounts in lymphoid organs such as the thymus, lymph nodes, spleen, as well as bone marrow and peripheral blood.

Two types of DCs have been identified (a) the myeloid related dendritic cell (DC1) and (b) the lymphoid related dendritic cell (DC2). DC1 arise directly from early precursor cells called colony-forming unit-macrophage/DCs or from monocytes. This type of cell is key in

initiating immune responses against non-self, such as cancer cells (DeMeyers & Barr, 2002). The lymphoid-like type 2 dendritic cells (DC2) originate from type 2 dendritic cell precursors that have been stimulated by T helper lymphocytes (Th2) which then help B-cells produce antibodies (Banchereau & Steinman, 1998). Much is known about the DC1 cell, but it is only recently that the DC2 is being characterized and under preliminary research.

Dendritic cells continuously scan their environment for antigens in the form of microbes, allergens, toxins, viral-

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