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# Patient-Specific Vaccine Therapy for Non-Hodgkin Lymphoma

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**N**on-Hodgkin lymphoma (NHL) is a hematologic cancer in which cells of the lymphatic system called lymphocytes (also known as B cells and T cells) become malignant. NHL is the sixth most common cancer among men and women. Approximately 54,000 new cases of NHL were expected to be diagnosed in the United States in 2004 (Jemal et al., 2004).

NHL has many different subtypes. Follicular NHL, the second most common subtype after diffuse large B cell (see Figure 1), has been the main focus of vaccine clinical trials (The Non-Hodgkin's Lymphoma Classification Project, 1997). Follicular NHL arises from B cells and usually presents with painless enlargement of lymph nodes. These lymphomas are considered low-grade or indolent in nature as compared to other more aggressive histologies. Because the disease is slow growing, many patients live with follicular NHL for several months to years before initial treatment. Occasionally, spontaneous regression followed by regrowth of tumors is seen. Therefore, a watch-and-wait approach often is recommended until the disease becomes more aggressive or causes symptoms that require treatment. Although follicular NHL usually responds to initial therapy, no cure exists, and treatment is considered palliative. The disease is characterized by multiple relapses and remissions, with a median overall survival of 10 years. Several

Follicular non-Hodgkin lymphoma (NHL) is an indolent, or slow-growing, malignant disease of the lymphoid tissue, which usually responds to initial therapy. However, the disease is characterized by multiple relapses and remissions, eventually causing death. Several effective therapies are available, but improvement of overall survival in patients with follicular NHL has not been demonstrated. Stimulation of the immune system to recognize malignant lymphoma cells as foreign has been demonstrated as a viable treatment option for patients with follicular NHL. Patient-specific vaccine therapy is a new form of active immunotherapy being studied for NHL. Clinical trials have shown a benefit for patients receiving this type of therapy. This article will provide a foundation for nurses caring for patients receiving patient-specific vaccine therapy.

effective therapies for follicular NHL exist (e.g., chemotherapy, antibody therapy, radiation therapy); however, no improvement in overall survival has been demonstrated with these therapies alone or in combination (Horning, 1993; Rohatiner & Lister, 1998).

## Non-Hodgkin Lymphoma and the Immune System

NHL arises from normal B cells and T cells. The B cells and T cells are lymphocytes, which are the primary cells necessary to elicit strong immune system responses (Kunkel, 2004). Eliciting an immune response against NHL has been attempted with the intent to stimulate the immune sys-

tem to recognize antigens on the malignant cells as foreign.

The immune system is a complex one, designed to protect individuals from foreign substances such as pathogens and tumors. Blood lymphocytes (B cells and T cells) and dendritic cells play important roles in immunity. Two types of immunity exist: humoral and cellular. When B cells are stimulated by a foreign antigen, a humoral response occurs. B cells mature into plasma cells and memory B cells. Plasma cells are active with the initial immune response. Memory B cells become active with subsequent responses that occur with future exposures to the same foreign antigen (Bauer, 2000). The B cells then produce antibodies, which bind with the antigen, inactivating the foreign

substance. When T cells are stimulated, a cellular response occurs. Cellular responses occur against the body's own cells that have become infected or malignant. The T cells bind to antigens on the cells, causing cell death.

*Submitted March 2004. Accepted for publication September 13, 2004. Susan E. King, RN, MS, OCN®, is an employee of Genitope Corporation, which is mentioned in this article. (Mention of specific products and opinions related to those products do not indicate or imply endorsement by the Clinical Journal of Oncology Nursing or the Oncology Nursing Society.)*

Digital Object Identifier: 10.1188/05.CJON.85-90