

## FEATURE ARTICLE

# Cytokine-Release Syndrome: Overview and Nursing Implications

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Cytokine-release syndrome is a symptom complex associated with the use of many monoclonal antibodies. Commonly referred to as an infusion reaction, it results from the release of cytokines from cells targeted by the antibody as well as immune effector cells recruited to the area. When cytokines are released into the circulation, systemic symptoms such as fever, nausea, chills, hypotension, tachycardia, asthenia, headache, rash, scratchy throat, and dyspnea can result. In most patients, the symptoms are mild to moderate in severity and are managed easily. However, some patients may experience severe, life-threatening reactions that result from massive release of cytokines. Severe reactions occur more commonly during the first infusion in patients with hematologic malignancies who have not received prior chemotherapy; severe reactions are marked by their rapid onset and the acuity of associated symptoms. Massive cytokine release is an oncologic emergency, and special precautions must be taken to prevent life-threatening complications. This article will present an overview of the etiology and management of cytokine-release syndrome in patients receiving monoclonal antibodies to better prepare oncology nurses to safely care for such patients.

**M**onoclonal antibodies (MOABs) have become an integral part of treatment plans for patients with a variety of malignant and nonmalignant disorders. With the widespread use of MOABs, a potentially serious and even fatal cluster of symptoms known as cytokine-release syndrome has been observed. This article will describe cytokine-release syndrome in patients receiving MOABs and provide oncology nurses with the information necessary to identify and protect patients at risk for life-threatening reactions.

## Cytokines

Cytokines are a group of polypeptide proteins that are produced and secreted by most cells in the human body. Examples include interleukin (IL), interferons (IFNs), tumor necrosis factor (TNF), and hematopoietic growth factors, also known as colony-stimulating factors (CSFs). Cytokines that are secreted by lymphocytes are referred to as lymphokines; those that are secreted by monocytes or macrophages are termed monokines. Cytokines that bind to target cells causing other immune effector cells to be attracted to the area are called chemokines (National Cancer Institute, 2005).

Cytokines act as chemical messengers, facilitating communication among cells. In humans, cytokines coordinate responses among the innate and acquired immune systems and organs. Cytokines serve many functions, including promotion or inhibition of cell growth, activation of lymphocytes and other immune effector cells, mediation for the destruction of cells targeted by MOABs, and mediation of the inflammatory response

### At a Glance

- ◆ Infusion reactions associated with administration of monoclonal antibodies for hematologic malignancies are caused by cytokine-release syndrome.
- ◆ Newly diagnosed, untreated patients with hematologic malignancies are at highest risk for life-threatening reactions.
- ◆ Nurses must be able to identify and monitor patients at risk for severe reactions to safely care for them.

(see Figure 1). Cancer cells also produce and secrete cytokines (Ekmeckioglu, Grimm, & Kurzrock, 2006; Oldham, 2003).

IL, IFN, and TNF are families of cytokines that are integrally involved in mediating the inflammatory response. Systemic effects of cytokine activation can include fever, fatigue, hypotension, increased insulin production, and shock (Oldham, 2003). Because of their immunostimulatory effects, cytokines such as

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