Taste alteration is a frequent and significant problem for patients with cancer. Taste alterations are defined as changes in the usual patterns of taste perception that are unique to the person experiencing the changes (Bender, 1999). Taste alterations may occur as a result of the cancer itself, treatment of the cancer, or other social and emotional factors.

Alterations in taste are not a life-threatening side effect of cancer treatment and, therefore, may be overlooked by healthcare providers. Taste alteration also has received little attention in the recent literature; however, many patients with cancer commonly experience this symptom. In a study of 59 hospitalized patients with cancer, 66% reported distressing changes in taste (Foltz, Gaines, & Gullatte, 1996). During cancer treatment, patients report that food tastes like cardboard or metal; tastes too salty, sweet, sour, or bitter; or has no taste at all (DeConno, Ripamonti, Sbanotto, & Ventafridda, 1989). This article discusses the role of clinicians in the symptom management of cancer-induced taste alterations.

Pathophysiology

The sense of taste includes four primary sensations: sweet, sour, bitter, and salty. Taste buds, the receptors and conductors of taste sensation, respond to all four taste sensations to varying degrees. A taste bud receptor for bitter also can perceive salty, sweet, and sour sensations, but less acutely (Wickham et al., 1999). Taste buds are located on the tongue, soft palate, glosso-palatine arch, and posterior portions of the pharynx. The sensation of taste involves stimulation of specific chemoreceptors (taste buds), adequate saliva, neural pathways, and smell (Schiffman, 1994). The impulses from the taste cells are transmitted through cranial nerves V, VII, IX, and X to the cerebral cortex (Bender, 1999). Intact olfactory receptors, adjacent to the nasal septum, are important because smell is the other chemosensory component associated with taste (Wickham et al.). The lifespan of a taste cell is about 10 days. These cells rapidly proliferate and, therefore, are predisposed to cellular destruction that occurs as a result of cancer and its treatment (Strohl, 1984).

The exact etiology of aberrations in taste among patients with cancer is unknown. Many theories are recognized, including the effect of tumors, cancer cell mitosis, vitamin deficiencies, and cytokine involvement. Cancer treatment and the presence of malignant cells may reduce the number of taste buds. The higher taste threshold that patients experience is a result of a decrease in the number of taste buds cells (Stubbs, 1989). A large tumor burden (e.g., large primary tumor, regional or metastatic invasion) can increase the degree and duration of taste alterations. When the tumor load decreases, taste sensations commonly return to their usual patterns. Taste alteration may be an early diagnostic sign of cancer, an indication that cancer has returned, or a sign that tumor load is increasing (Goodman, Ladd, & Purl, 1993).

Cancer cells actively divide and secrete an amino acid-like substance. This process enhances the bitter taste sensation and is the basis for aversions to foods that contain high levels of amino acids (Strohl, 1984). Proteins, composed of amino acids and urea, are the substances that give meat its taste. Other foods high in amino acids include chocolate and tomatoes (Bender, 1999). Stubbs (1989) found that many patients experiencing taste alterations find protein-rich foods, tea, and coffee unpalatable.

Another etiology of taste alteration is cancer-induced deficiencies in zinc, copper, nickel, and vitamin A. Heavy metals, such as zinc, copper, and nickel, are involved in the physiology of taste function (Henkin & Bradley, 1970). The specific role of these metals is unknown, but low plasma concentrations of zinc, copper, and nickel have been linked to a distortion of normal taste (dysgeusia) and a reduction in taste sensitivity (hypogeusia) (Davidson, Pattison, & Richardson, 1998). Bernard and Halpern (1968) identified a role for vitamin A in taste alterations. Low levels of vitamin A in plasma have an impact on the physiologic function of cells with a high turnover rate, such as taste receptor cells (Davidson et al.). Low vitamin A levels cause patients to complain of a loss of discrimination or reduction in taste threshold.


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Patients with cancer frequently develop taste alterations, which are manifested by food aversions and decreased caloric intake. Many etiologies are recognized, including the effect of tumors, cancer cell mitosis, vitamin deficiencies, and cytokine involvement. Preventing or improving taste alterations in patients with cancer is challenging. Clinicians play an important role in assessing, educating, and referring (when indicated) patients experiencing potential or actual taste alterations. Directions for further nursing research include the development of assessment tools and preventative strategies.