An Integrative Review of the Role of the Oral and Gut Microbiome in Oral Health Symptomatology During Cancer Therapy

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Researchers expect there to be 29.5 million cancer cases per year globally by 2040 (International Agency for Research on Cancer, 2020). Incidence of cancer cases continues to increase because of the aging population, screening and treatment advancements, and increasing health inequities (Miller et al., 2019). Accompanied with advanced treatment protocols, concerns have been raised related to the side effects of systemic chemotherapy and radiation therapy (RT) directed near the oral cavity, particularly detrimental changes to oral health.

Background
Systemic or cytotoxic chemotherapy damages rapidly dividing cells (e.g., normal cells lining the alimentary canal), causing inflammation and an inability to grow new cells in the oral cavity (National Cancer Institute, 2016). In turn, this creates oral health alterations in the form of cluster symptoms, including oral mucositis (OM), xerostomia, pain, and oral sensory alterations. Similarly, RT leads to direct cell damage and breakdown, so RT directed to the mouth or neck can cause injury to the cells in these areas, including salivary glands and sensory receptors (National Cancer Institute, 2016). Therefore, OM, xerostomia, and disturbances in oral sensations (e.g., true taste, retronasal olfaction, altered touch, temperature, pain sensations) are commonly related to cancer treatment (Murtaza et al., 2017). Although research is limited, the literature supports that OM occurs in about 40% of patients receiving chemotherapy (Elting et al., 2003). In addition, about 70% of patients receiving chemotherapy report oral sensory alterations (Zabernigg et al., 2010). Nearly all patients undergoing RT to the head and neck area develop OM (Villa & Sonis, 2015). Overlapping injuries from both chemotherapy and RT lead to increased severity of oral health symptoms.