

# Milk protein that alleviates chemotherapy side effects could enhance patients' recovery

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Patients undergoing cancer treatment confront a number of well-documented side effects.

Chemotherapy and other [cancer](#) therapies can wreak havoc on the [taste buds](#) and olfactory senses, depriving recipients of the intricate interplay between taste and smell that is critical to grasping flavors and enjoying foods. Over time, taste and smell abnormalities (TSA) can lead to a loss of appetite and anorexic behaviors, compromising patients' ability to recuperate from the disease.

In a new paper published in the journal *Food & Function*, Virginia Tech College of Agriculture and Life Sciences researchers Susan Duncan and Aili Wang investigated the feasibility of [lactoferrin](#), a highly bioactive protein found in saliva and milk, as a treatment for TSA. Their findings could bring relief to millions of patients undergoing [cancer treatment](#).

"The underlying molecular mechanisms of TSA are not well-understood," said Duncan, associate director of the Virginia Agricultural Experiment Station and a professor in the Department of Food Science and Technology. "The prevailing symptom described by patients undergoing chemotherapy is a persistent metallic flavor or aftertaste, with or without food intake. This can last for hours, weeks, or even months after the completion of treatments."

As a consequence, cancer patients suffer poor appetite, weight loss, depression, and diminished nutrition, all of which are detrimental to recovery. Although TSA is widespread and a frequent complaint of cancer patients, until now, there have been no established therapies that reliably prevent or treat this problem.

"Our research shows that daily lactoferrin supplementation elicits changes in the salivary protein profiles in cancer patients – changes that may be influential in helping to protect taste buds and odor perception," said Duncan. "By suggesting lactoferrin as a dietary supplement, we can reduce TSA for many patients, restoring their ability to enjoy foods during a time in which nutrition can play a key role in their recovery."

This research could help us develop TSA-targeted biomarkers and strategies for improving quality of life during chemotherapy. Cancer patients and their supporting family and friends may again find comfort in enjoying a meal together. "

The transdisciplinary team, including William Ray, Department of Biochemistry; Andrea Dietrich, of the Charles E. Via Jr. Department of Civil and Environmental Engineering in the College of Engineering; and Glenn Lesser, from Wake Forest Baptist Medical Center, previously identified the role of lactoferrin, a specific milk protein, in diminishing the metallic flavor stimulated by chemotherapy medications. The substance is well-known as a first-line defense, aiding the body's immune response, but little is known about its ability to impact salivary proteins. Their most recent study builds on the previous body of work through the application of lactoferrin supplements in treating taste and smell abnormalities.

The team's findings will make it possible for [cancer patients](#) to taste foods properly and to enjoy a healthier appetite, enabling more optimal nutrition during a critical period of recovery. Lactoferrin supplementation also enhances the expression of salivary immune proteins, which may help reduce oxidative stress and resulting side effects. Oral infections, such as thrush, also may be diminished.

**More information:** Aili Wang et al. Effect of lactoferrin on taste and smell abnormalities induced by chemotherapy: a proteome analysis, *Food & Function* (2018). [DOI: 10.1039/C8FO00813B](https://doi.org/10.1039/C8FO00813B)

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