

A Scientific Evaluation of Probiotics and Probiotic-like Treatments against Chemotherapy-induced Gastrointestinal Mucositis

Gabriel Nathan*

Department of Pharmacy and Medicines, Hospital de Clínicas de Porto Alegre, Porto Alegre, Brazil

Description

Cancer is a pervasive and life-threatening disease that affects millions of people worldwide. The conventional treatment for many cancer types, including chemotherapy, often leads to a range of adverse effects. One common and highly uncomfortable side effect of chemotherapy is gastrointestinal mucositis, which involves inflammation and damage to the gastrointestinal mucosa. Gastrointestinal mucositis can significantly impact a patient's quality of life, compromise their nutritional status, and even necessitate chemotherapy dose reduction or delay. In recent years, there has been growing interest in the potential role of probiotics and probiotic-like treatments in managing chemotherapy-induced gastrointestinal mucositis. This scientific evaluation explores the current state of knowledge in this field, examining the mechanisms, research findings, and practical implications of using probiotics to mitigate gastrointestinal mucositis [1].

Chemotherapy is a cornerstone in the treatment of various cancers, but its cytotoxic effects extend beyond cancer cells. One of the most troublesome side effects of chemotherapy is the damage it inflicts on the rapidly dividing cells in the gastrointestinal tract, leading to gastrointestinal mucositis. Mucositis is characterized by inflammation and ulceration of the mucosal lining of the gastrointestinal tract, which includes the mouth, oesophagus, stomach, small intestine, and colon. The development of gastrointestinal mucositis significantly impacts patients' quality of life and nutritional status. It manifests with symptoms like pain, nausea, vomiting, diarrhoea, and in severe cases, it can lead to malnutrition and increased susceptibility to infections. Consequently, patients may experience chemotherapy dose reduction, delays, or discontinuation, which can compromise the effectiveness of cancer treatment. This has led researchers to explore novel strategies to prevent or alleviate chemotherapy-induced mucositis.

Probiotics are live microorganisms, primarily bacteria, that when administered in adequate amounts, confer health benefits to the host [2]. They are commonly associated with promoting gut health by influencing the composition and activity of the gut microbiota, which is intricately linked to overall well-being. Probiotics have been investigated in various health conditions, including gastrointestinal disorders, inflammatory diseases, and immunity modulation. Their potential to mitigate gastrointestinal mucositis during chemotherapy has attracted considerable attention. The exact mechanisms by which probiotics exert their influence on gastrointestinal health are multifaceted and not yet fully elucidated. However, several proposed mechanisms are worth mentioning.

Probiotics can restore the balance of the gut microbiota, which is often disrupted by chemotherapy. This rebalancing can reduce the growth of harmful

bacteria and promote the proliferation of beneficial strains, contributing to mucosal integrity. Probiotics can influence the immune response in the gut. By modulating immune activity, they may help reduce inflammation and promote tissue repair, thereby preventing or ameliorating mucositis. Some probiotic strains are known to produce short-chain fatty acids like butyrate. Butyrate has anti-inflammatory properties and is a key energy source for colonic epithelial cells, potentially aiding in mucosal healing. Probiotics can enhance the gut's barrier function by reinforcing tight junctions between intestinal cells. This helps prevent the leakage of harmful substances into the bloodstream [3].

Various probiotic strains have been explored for their potential in preventing or ameliorating chemotherapy-induced gastrointestinal mucositis. Notable strains and combinations include. These are among the most common probiotic genera investigated for mucositis management. They are believed to help maintain gut homeostasis and reduce inflammation. This yeast-based probiotic has shown promise in reducing the incidence and severity of chemotherapy-induced diarrhoea. LGG has been evaluated in clinical trials and is thought to reduce the risk of severe mucositis in patients undergoing hematopoietic stem cell transplantation. Some studies have explored combining multiple probiotic strains to maximize the potential benefits. For instance, a combination of *Lactobacillus acidophilus*, *Lactobacillus casei*, and *Bifidobacterium bifidum* has been studied for its efficacy in preventing mucositis.

The use of probiotics and probiotic-like treatments in managing chemotherapy-induced gastrointestinal mucositis has been a subject of ongoing research. While the results are promising, the evidence is not yet robust enough to establish clear clinical guidelines. Here are some key findings from recent studies. Some studies suggest that probiotics can reduce the severity of chemotherapy-induced mucositis. For example, a meta-analysis of Randomized Controlled Trials (RCTs) found that probiotic supplementation was associated with a lower incidence of severe mucositis in cancer patients. Probiotics, particularly *Saccharomyces boulardii*, have demonstrated efficacy in reducing the incidence and severity of chemotherapy-induced diarrhoea, a common and distressing symptom of mucositis [4]. Probiotics may help patients maintain better nutritional status during chemotherapy, as they can improve nutrient absorption and reduce symptoms that lead to decreased food intake. While most research focuses on prevention, some studies have explored the use of probiotics in treating established Mucositis. Probiotics have shown potential in providing symptomatic relief to patients with mucositis. They may help alleviate pain, reduce diarrhoea, and improve overall quality of life. Limited evidence suggests that probiotics might promote faster healing of mucosal lesions, although more research is needed in this area. Overall, probiotics have been found to be safe and well-tolerated in cancer patients. However, caution is advised, as immunosuppressed individuals are more susceptible to infections. Therefore, the choice of probiotic strains and dosages should be made carefully, taking into account the patient's specific condition.

Practical Implications for healthcare providers and patients, the potential use of probiotics in managing chemotherapy-induced gastrointestinal mucositis presents several practical considerations: Patients should always consult with their oncologists or healthcare providers before starting any probiotic treatment. Individualized recommendations should be based on the patient's specific cancer type, treatment plan, and overall health. The choice of probiotic strains should be made carefully, taking into account the available evidence and individual patient characteristics. It is crucial to choose strains with proven efficacy in mucositis management. Optimal dosages and timing of probiotic administration require further investigation. These factors should be determined in consultation with healthcare providers [5].

*Address for Correspondence: Gabriel Nathan, Department of Pharmacy and Medicines, Hospital de Clínicas de Porto Alegre, Porto Alegre, Brazil, E-mail: Gabriel@nathan.yale.br

Copyright: © 2023 Nathan G. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 01 September, 2023, Manuscript No. jbps-23-116716; Editor Assigned: 04 September, 2023, PreQC No. P-116716; Reviewed: 15 September, 2023, QC No. Q-116716; Revised: 20 September, 2023, Manuscript No. R-116716; Published: 27 September, 2023, DOI: 10.37421/2952-8100.2023.6.444

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

References

1. Shah, Dhavan and David Bentrem. "Environmental and genetic risk factors for gastric cancer." *J Surg Oncol* 125 (2020): 1096–1103.
2. Huang, Junhua, Alan Yaw Min Hwang, Yuting Jia and Brian Kim, et al. "Experimental chemotherapy-induced mucositis: A scoping review guiding the design of suitable preclinical models." *Int J Mol Sci* 23 (2022): 15434.
3. Torricelli, Piera, Francesco Antonelli, Pasquale Ferorelli and Iaria Borromeo, et al. "Oral nutritional supplement prevents weight loss and reduces side effects in patients in advanced lung cancer chemotherapy." *Amino Acids* 52 (2020): 445–451.
4. Maiuolo, Jessica, Micaela Gliozzi, Cristina Carresi and Vincenzo Musolino, et al. "Nutraceuticals and cancer: Potential for natural polyphenols." *Nutrients* 13 (2021): 3834.
5. Touchefeu, Y., E. Montassier, K. Nieman and T. Gastinne, et al. "Systematic review: The role of the gut microbiota in chemotherapy- or radiation-induced gastrointestinal mucositis—Current evidence and potential clinical applications." *Aliment Pharmacol Ther* 40 (2014): 409–421.

How to cite this article: Nathan, Gabriel. "A Scientific Evaluation of Probiotics and Probiotic-like Treatments against Chemotherapy-induced Gastrointestinal Mucositis." *J Biomed Pharma Sci* 6 (2023): 444.