

## Importance of probiotics in the prevention and treatment of colorectal cancer

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**Abstract:** Colorectal cancer stands out as a concern in the world. Deaths related in Brazil to cancer is the second leading cause in women, and the third leading cause in men after lung and prostate. Several strategies to promote and prevent the treatment of this pathology have been studied. The aim of this article is to bring the importance of probiotics in the prevention and treatment of colorectal cancer. The methodology used in this research was a systematic review, in order to obtain information on the subject between the years 2012 and 2019, involving the bases of studies: Science Direct, PubMed. Seven articles were used that can observe that probiotics brought benefits for both healthy people and patients with colorectal cancer in the postoperative period. It was concluded that the use of probiotics showed positive effects to treatment and prevention in colorectal cancer. The need for

future studies stands out.

**Keywords:** Micro Gastrointestinal Biome. Colorectal Neoplasms. Probiotics. Kefiran

## 1. Introduction

The most common diseases nowadays are different from the diseases that affected the population in the past decades, when infectious diseases were the most frequent. Currently, there is a gradual number of allergic, autoimmune, inflammatory and chronic non-communicable diseases (NCDs), a fact caused by the changes of habitus of Western society (MAIA; FIORIO; SILVA, 2018). Among the main diseases caused by these lifestyle changes is cancer, a disease caused by the misaligned development of cells involving tissues and organs, managing to advance to different areas of the body (MAIA; FIORIO; SILVA, 2018).

Malignant neoplasms are the second leading cause of mortality in the Brazilian population, representing almost 17% of deaths of known cause. According to data from the National Cancer Institute (INCA), it was stipulated that in 2018, 36,360 new cases of patients diagnosed with colorectal cancer (CCR), 17,380 men and 18,980 women (INCA, 2018).

RCC is a malignant tumor that develops in the thick intestine to the final part, the rectum. It has multiple origins, having as main risk factors for heredity, inflammatory diseases, age diet obesity and sedentary lifestyle (CORRÊA, 2016). Among the environmental risk factors, diet contributes to about 35% of new cases. The high consumption of calories, fats and red meats, associated with low consumption of fruits and vegetables, may lead to a mayor incidence of the disease (OLIVEIRA, 2012). Despite advances in screening and early diagnosis, RCC remains the second leading cause of cancer-related deaths. Therefore, more attention is needed to research for prevention, treatment and prognosis of RCC (DING, 2020).

Probiotics are living organisms that when ingested in a certain number can bring benefits to the host, improving the characteristics of the intestinal microbiota. They inhibit the growth of pathogens by reducing intraluminal PH and stimulating the secretion of antimicrobial peptides, improve mucosal barrier function and modulate innate and adaptive immunological response (CORREIA, 2012). Recent evidence has shown that probiotics can be used for the treatment of RCC (FLETCHER, 2018). Several studies judge the use of probiotics in the regulation of intestinal disorders, such as diarrhea (MANTEGAZZA, 2018)

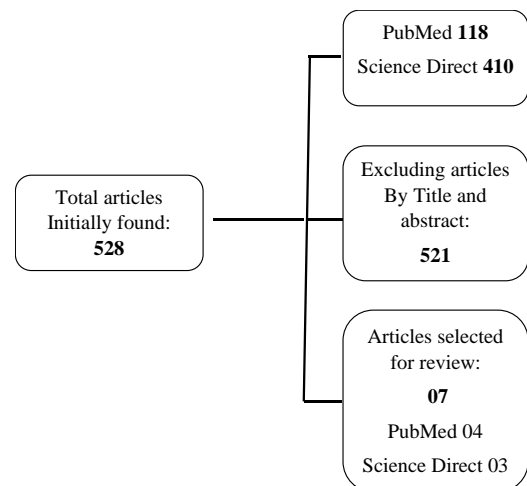
Surgeries such as colostomy are one of the main treatments of RCC, associated with radiotherapy and/or chemotherapy, which brings side effects, implying the nutritional condition and quality of life of the patient. In this context, the use of probiotic microorganisms has been recommended in the prevention and treatment of infections and dysfunctions of the gastrointestinal tract, presenting as a primary benefit the promising effect on the development of the monthly microbiota of the intestine, since it guarantees the effective proportion between the deleterious agents and the

bacteria that are indispensable for the proper activities of the organism (SILVEIRA, 2017).

## 2. Methodology

A systematic review was carried out based on study and hypotheses of main deductive research through the development and discovery of knowledge from textual and quantitative bases, using objectives in an exploratory way, with bibliographic procedures. In order to answer the right question: Why do probiotics help prevent colorectal cancer?

The review was carried out through the following steps: 1- Analysis of the literature focusing on the following areas: probiotics and colorectal cancer; 2- Exploratory research on the use of probiotics in colorectal cancer patients in articles by SCIENCE DIRECT and PUBMED. 3- Implications for the use of probiotics. In order to obtain information on the subject, with scientific productions between the years 2012 and 2019. In addition, we opted for the terms of the Descriptors in Health Sciences (DeCs): "Probiotics", "Colorectal Neoplasms", "Intestinal Microbiota". The descriptors were applied in combination; "probiotics in colorectal cancer"; in English and Portuguese. (Figure 1).



**Figure 1.** Systematic review. Source: Prepared by the author, 2021

## 3. Results and Discussion

Of the 528 publications found, the studies that met the inclusion criteria were then selected. Studies whose outcome was not directly about the theme of this study were excluded. After consulting the databases and applications of search strategies. Seven studies were chosen as a table to coming the sample of this review, showing the use of probiotics in the prevention and treatment of RCC.

In the study presented by DALLAL. *et al.* (2015) direct effects of probiotics on tumor cells were identified,

evaluating cell proliferation, necrosis, apoptosis, migration and invasion. Presenting immunomodulatory responses in the *Lactobacillus* family, resulting in a prophylactic option against gastrointestinal malignancies, especially colorectal neoplasms. This is due to the suas antimutagenic, anti-carcinogenic properties of host immunological activation, and may help in prevention.

According to ZHANG *et al.* 2015, the use of probiotics caused bifid bacteria counts to increase significantly, while *Escherichia* counts decreased significantly in the postoperative days. Bifid bacteria are bacteria that make up the intestinal biota; these reside in the colon and promote health benefits of their hosts. *Escherichia*, on the other, are gram-negative bacteria that, when acquired from contaminated food or water, cause infections. The results found by this author showed that the use of probiotics minimizes the occurrence of postoperative infectious complications.

Kefiran is one of the most elucidated substances in studies that indicate antitumor, antifungal, antibacterial, anti-inflammatory and antioxidant properties, is a hetero polysaccharide that presents glucose and galactose monomers (SOTTORIVA *et al.*, 2018).

For Sekkal (2016), other studies have shown a role in the regularization of gastrointestinal disorders, an antitumor effect thanks to the presence of kefir that inhibits the growth of tumors and stimulates humoral immunity in intestinal tissues. In addition, kefir has a protective effect against apoptotic destruction of intestinal cells induced by X-ray irradiation. Kefir can be consumed in cases of diabetes, obesity or heart and heart disease.

By examining LIU *et al.* (2016), observed that the use of probiotics also improves trans epithelial resistance, decreasing bacterial translocation, reducing enteropathogenic bacteria in the blood and increasing fecal bacterial variety. Postoperative recovery from peristalsis, incidence of diarrhea and infection-related complications have also been improved

Kotzampassi *et al.* (2015), demonstrated in his study that the use of probiotic combinations was not beneficial only in relation to the reduction of postoperative complications, but the results also reflected in relation to the length of stay of these patients in the hospital.

Some studies result in the objective of reducing the quality of life of these colorectal cancer patients. LEE *et al.* (2019), observed the effect of probiotic supplementation for 12 weeks in these patients analyzing that the administration of probiotics, which had the decreased proportion of patients suffering intestinal symptoms and feeling of fatigue. It was resulting between the case and control group groups can see improvement in well-being.

To Yang *et al.* (2016), several external and intern's factors may be related to the causes of postoperative infections, including bacterial translocation governed by intestinal dysbiosis, and inadequate use of medications and chemotherapy.

Meanwhile, Mego *et al.* (2015), brings that the

probiotics evaluated, assist in the prevention of diarrhea in patients with metastatic colorectal cancer treated with irinotecan in chemotherapy. Suggesting that the administration of probiotics is safe in adjustment and may lead to a decrease in the incidence and severity of diarrhea, which is also one of the symptoms caused by anterior resection syndrome. In addition to prevention, probiotics with emphasis on the importance in the treatment of colorectal cancer contribute to the reduction of inflammations and intestinal symptoms in postoperative patients.

## 4. Conclusions

It is found that the use of probiotics showed positive effects to treatment and prevention in patients with RCC, thus bringing benefits: improvements in local immunity and intestinal symptoms, the decrease in enterobacteria and enterococci and recuperation of intestinal function. Despite the positive results obtained in studies with the use of probiotics, we highlight the need for future long-term studies to better highlight this relationship.

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