

Possible Integrative Approaches to Treatments of Colon Cancer

Type: Comprehensive Review
Received: August 05, 2024
Published: August 16, 2024

Christina Rahm*

DRC VENTURES LLC, USA

***Corresponding Author:** Christina Rahm, DRC VENTURES LLC, USA.

Citation:

Christina Rahm. "Possible Integrative Approaches to Treatments of Colon Cancer". PriMera Scientific Surgical Research and Practice 4.3 (2024): 82-90.

Copyright:

© 2024 Christina Rahm. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Colon cancer, which is also referred to as colorectal cancer, is an invasive and fatal disease that commences in the cells that line the colon or the rectum. This third most prevalent cancer among men and women has seen an increase in incidences and now constitutes a public health challenge. The American Cancer Society projected about 153,020 new cases in the U.S. alone and 52,550 mortalities in 2023 (American Cancer Society, 2023). Increases in incidence point out the need to develop new effective strategies that will help to improve treatment efficiency, leading to a better quality of patients' lives.

The complex nature of colon cancer demands an approach of individualized treatment strategies. The disease is multifactorial in its etiology, with genetics, environmental, and lifestyle factors interacting for it to occur, calling for specific intervention programs. Some genetic mutations put a person at risk of colon cancer (Frugé et al., 2021). Lifestyle factors, including diet and exercise, are of great importance, too, underscoring the significance of customized treatments that account for these elements. Conventional treatment modalities for colon cancer comprise surgical procedures, chemotherapy, radiation therapy, targeted therapy, and immunotherapy. Although these methods proved efficient for disease management, the complications and the consequences of general health impact on patients' welfare require a more all-inclusive and patient-oriented approach. Integrative medicine is a new approach that mixes traditional medicine with complementary therapy. This approach has become the latest and the most promising method in cancer treatment (National Center for Complementary and Integrative Health [NCCIH], 2022).

Complementary therapies include various interventions such as dietary changes, physical exercises, and mental health approaches. The methods aim to reduce the side effects of conventional treatment, increase the effectiveness of treatment, and generally promote well-being among those with colon cancer. Frugé et al. (2021) emphasizes dietary interventions with Green leafy vegetables. In addition, there is a growing need for lifestyle and complementary interventions to be recognized as an integral part of cancer care.

An integrative approach is essential because it can deal with the diverse problems associated with colon cancer holistically. When healthcare practitioners combine conventional and complementary therapies, they give each patient personalized treatment depending on genetics, lifestyle, and preferences (Markowitz et al., 2002; Labianca et al., 2010). In addition, this method is consistent with patient-centered care, as each person requiring treatment has different necessities and realities.

In the following sections, we shall explore some case studies and integrative protocols to shed more light on how personalized and integrated approaches can enhance the effectiveness of colon cancer treatment. This exposition will emphasize the possibility of integrative medicine to improve the quality of care for persons with this overwhelming disease.

Conventional Treatments for Colon Cancer

Colon cancer, as one of the most significant causes of cancer morbidity and mortality worldwide, requires an insightful and multi-faceted intervention. The primary weapon against this powerful disease is conventional treatment, which contains surgery, chemotherapy, radiotherapy, targeted therapy, and immunotherapy. The section below discusses each modality, explains their rate of success in various cases, and outlines possible consequences and benefits of screening using colonoscopies.

1. ***Surgery***: Colon cancer is still managed through surgery. Studies by Weitz et al. (2005) indicate that surgery is still among the most important treatment options for localized disease, aiming at local disease control, especially in preventing the spread of the tumor. The success rates are remarkable, especially in early-stage cases and a possible cure with long-term survival (Weitz et al., 2005). However, surgery is not free from risks and potential complications. Surgeries may include a high risk of infections and bleeding and may damage the surrounding structures; hence, detailed pre-operative assessments and the involvement of competent surgeons should be done (Weitz et al., 2005).
2. ***Chemotherapy***: One of the systemic treatment modalities is chemotherapy, which aims to treat the cancer cells that may be distributed all over the body. It is commonly used after surgery to eradicate remaining cancer cells to reduce the chance of relapse. The American Cancer Society (ACC) (2023) states that chemotherapy can help to extend the survival period, particularly in advanced cases. Nonetheless, the negative impacts might prove hard for patients. In a presented case study by the American Cancer Society (2023), the person complained of weakness all over his body, diarrhea, nausea, and vomiting, which are some of the common complications associated with chemotherapy. Besides, chemotherapy might also result in hematological changes, as noted in mild anemia (American Cancer Society, 2023).
3. ***Radiation Therapy***: One form of treatment is radiation therapy, which targets high radiation levels in cancer cells. It is sometimes applied with surgery or palliative care for those in advanced stages. Radiation therapy highly depends on properly aiming for it to be effective, as observed in studies by Sauer et al. (2004). Fatigue, skin change, and gastrointestinal disturbance are also some of the side effects of the treatment. Therefore, balancing these complications with benefits is critical for good patient outcomes.
4. ***Targeted Therapy***: Among the prevailing concepts of modern cancer treatment is target therapy. The main advantage of targeted therapies is that they are precise, focusing on specific molecules contributing to cancer growth. Ojo et al. (2022) researched whether target drug therapies for blocking EGFR and VEGF could be efficiently employed for colon cancer treatment. Specifically, though, the target therapies are accompanied by unpleasant side effects. Examples are skin rashes, hypertension, and intestinal perforation, which call for monitoring and proper management during treatment (Ojo et al., 2022).
5. ***Immunotherapy***: In cancer treatment, a new revolution called immunotherapy entails triggering the immune system to spot and destroy cancer cells. Immune checkpoint inhibitors such as pembrolizumab and nivolumab have effectively treated late-stage colorectal cancers. According to a study by Le et al. (2015), specific subsets of colorectal cancer patients can be treated using immunotherapy. However, immunotherapy also faces a series of problems relating to effectiveness. However, such adverse events require close attention, including colonic, hepatic, or pulmonary disorders (Risk-benefit for treatment) (Le et al., 2015).
6. ***Early Detection through Colonoscopy***: Colon cancer needs to be treated early to improve the chances of cure and patient survival. Colonoscopy is highly recommended as a screening tool as it offers a direct view of the colon, allowing the detection and removal of early precancerous polyps before they progress into cancer. Winawer et al. (1993) illustrate the importance of colonoscopy in lowering the impact of colorectal cancer. Screening is also critical, especially in the case of people who have risk factors, such as family members who have colon cancer.

Complementary Approaches in Colon Cancer Treatment

Treatment of colon cancer, which is caused by multiple reasons, necessitates a multi-dimensional procedure that is more far-reaching than the conventional methodologies. Complementary approaches such as diets, exercise programs, psycho-emotional help, and modern nanotechnologies to cure people with colon cancer should be a part of a total complex of measures.

Diet: Dietary approaches provide a crucial backdrop for colon cancer prevention and management. There is a strong relationship between diet and cancer risk, especially concerning some food products that provide positive protection. A study by Frugé et al. (2021) highlights the reduction effect of dietary intervention high in green leafy vegetables on oxidative DNA damage. Plenty of green leafy vegetables contain antioxidants, fiber, and phytochemicals, which make them an essential part of an anti-inflammatory diet that has been shown to help reduce colorectal cancer risk. Additionally, researchers from Sánchez-Fidalgo et al. (2019) discovered that certain plant chemicals, such as polyphenols in fruits, may be used to fight cancer cells. This study points out the significance of diet diversity and its rich contents.

Curcumin: Curcumin, contained in Turmeric, is under consideration because of its potential use against cancer, specifically when treating colorectal cancer. In their review, Ojo et al. (2022) discuss the multi-dimensional impact of curcumin. In addition to its anti-inflammatory and antioxidant effects, curcumin has been observed to regulate several signal transduction pathways critical to tumor formation and malignant evolution. Elaborating on this, He et al., 2020 show how curcumin may counter chemoresistance and can be added to traditional treatments as auxiliary therapy.

Exercise: physical activity and exercise have become valuable allies in fighting Colorectal cancer. Colorectal cancer is often associated with a sedentary lifestyle, and exercising regularly can help in preventing colorectal cancer and improving overall health. Schmid and Leitzmann's (2014) meta-analysis underscore the significance of physical activity as a protective factor against colon cancer, with the incidence rate being lower for active participants than for their inactive counterparts. Other studies focus on the molecular aspects of physical activity and its potential for cancer development. For example, a study by Campbell et al. (2018) elucidates how physical activity impedes cancer progression via actions it takes upon the immune system, insulin resistance, and inflammation.

Probiotics: An increasing number of scholars have begun to acknowledge that the gut microbiome plays an essential role in overall health and cancer development. A study conducted by Shang and colleagues in 2019 on the contribution of probiotics to the inhibition of colon cancer cells. Zuo et al. (2021) also extend this study by delving into the elaborate interplay between microbes and colon cancer. These studies emphasize the prospect of probiotics suppressing cancer cells and modulating the tumor microenvironment and immune responses. This implies that a healthy intestinal microbiome could be considered an ancillary approach to preventing adenocarcinoma.

Enzyme-Triggered Casein-Gated Release: Modern nanotechnology has led to the creation of more accurate cancer treatments. Wijewantha et al. (2021) investigated enzyme-mediated casein-gated release of nanoparticles for targeted delivery to colon cancer cells. The use of nanoparticles to provide tailored dosage in response to specific enzymatic action will significantly contribute to the growth of tailor-made medicine. At the same time, Sun et al. (2021) proposes a new strategy for drug delivery that aims to treat colorectal cancer specifically through personalized approaches.

Mental Well-being: Comprehensive cancer management now includes mental well-being, which has traditionally been neglected. The National Comprehensive Cancer Network (2021) recommends psychosocial support for inclusion in cancer care plans. In their study, Pinquart and Duberstein (2010) reveal that psychological factors, including survival rate and treatment compliance, are essential in determining cancer results. Mental and emotional resilience is attained in colon cancer through strategies like mindfulness-based interventions, counseling, and support groups. Additionally, this enhances the quality of life of those involved.

Integrative Protocols: Combining traditional therapies with personal-specific compatible strategies in treating colon cancer using an integrated approach. Greenlee et al.'s. (2017) research underscores that integration approaches in oncology should be informed by patients' individual preferences, needs, and expectations. Therefore, an integrative approach usually requires changing one's diet, exercising, using different mind-body strategies like yoga, or even complementary treatments like acupuncture and herbs (Greenlee et al., 2017)). However, such protocols are aimed at personalizing care for each person. Consequently, a holistic and patient-oriented approach is adopted.

Case Studies

Treatment for colon cancer is multi-dimensional and, therefore, complex as well. This Case study shows how Colon cancer patients travel their way through their medical history, traditional treatments, and the integrative protocol used to manage this disease.

Case Study: a 72-year-old male with a family background for colon cancer.

By Dr. Norbert Ketskés, M.D., and Dr. Christina Rahm Ph.D.

Patient Demographics and Medical History

A 72-year-old male diagnosed with controlled hypertension on medication came to the facility with a problem. Notably, he had a 30-year history of smoking and a family history of colon cancer. Complaints of abdominal pain, among others, changes in bowel habits (diarrhea and constipation), rectal bleeding, tiredness, and a 10 kg weight loss in four months.

Diagnosis and Conventional Treatment

This patient underwent a colonoscopy that showed a sizeable obstructing mass in the sigmoid colon. Diagnosis via biopsy was adenocarcinoma (Stage II colon carcinoma of the sigmoid colon), not involving surrounding lymph nodes and distant organs. The conventional therapy was chemotherapy, which commenced eight months before the integrative program.

Chemotherapy Side Effects

After chemotherapy, he went through various side effects. Some of these were manifestations such as general weakness, diarrhea, nausea, vomiting, malaise, and mild anemia, evidenced by low hemoglobin and hematocrit levels. The inflammatory parameters were raised, and there was a marked disparity in liver enzyme levels from the normal range.

Integrative Protocol

It included proprietary blends and additional treatments, which Dr. Norbert Ketskés, M.D., and Dr. Christina Rahm, Ph.D designed.

Proprietary Blend I: Dosage: 4 drops in the morning and evening, three consecutive days; after that, increase by two drops every three days up to 2x10.

Proprietary Blend II: Dosage: Take one capsule for seven days, then increase it to 2 tablets (one in the morning and one in the afternoon).

Proprietary Blend III: Dosage: Initially, one sachet in the morning for seven days. Then, one sachet in the morning, one in the evening.

Proprietary Blend IV: Dosage: 1/2 teaspoon in the morning.

Proprietary Blend V: Dosage: One teaspoon in the morning for seven days and then increased to two teaspoons, one in the morning and the other in the evening.

Proprietary Blend VI: Dosage: Take two capsules in the morning and one capsule in the evening for one week before increasing the dosage to 2 capsules twice daily.

Additional Treatments

Dr. Ketskés had vast experience, and the patient was on a specific diet. The diet was used to complement the integrative protocol and the conventional treatments. Moreover, exercise routines to positively affect an individual's mental and emotional states were put in place.

Rationale Behind Integrative Protocol

Every proprietary mixture consisted of natural compounds designed to promote the immune system, minimize inflammation, and support healing. Such an increase in dose was aimed at considering the patient's reaction to therapy, which was individual-specific.

Results After 2 Months

Laboratory parameters demonstrated notable improvements. White blood cell count decreased from 15.2 to 9.6, and inflammatory parameters reduced significantly (CRP: 75 to 28 mg/l). Liver enzyme levels showed a positive trend towards normalization (ASAT: The average laboratory results obtained are as follows: AST range (97 - 55 U/L), ALAT range (96 - 58 U/L), and GGTP range (100 - 62 U/L)). There was an increase in hemoglobin and hematocrit levels from 92g/l to 110g/l and 0.25l/l to 0.30l/l, respectively.

Patient complaints were significantly reduced. Diarrhea stopped; patients felt less tired; their appetites got better and breathing improved. Generally, the patient stated he was well, which signifies that the integrative protocol was optimistic.

Discussion

This is a case study that underscores the value of incorporating alternative methods along with conventional treatments in the management of colon Cancer. The improvement of the laboratory indices and the patient's well-being indicate that the patient had benefited from the integrated approach, which acted as a supplementary approach to the therapy and the control of side effects.

The application of its blends, specially developed for the patient's requirements, demonstrates an individualized approach considering every incident's individuality. This focuses intensely on diet, exercise, and mental health, which is in line with the latest research results that indicate the lifestyle and outcome of cancer. Nevertheless, these results should be interpreted with caution. Although these improvements are promising, it is necessary to consider the efficacy of the integrative protocol with the variable characteristics and the complexity of the cancer's development. More studies, for example, controlled clinical trials, are needed to ascertain the benefits seen in this case.

Case Study: A man, aged 58, with stage 4 colon cancer.

By Steven J. Cohen, MD

Chief Complaint

A 58-year-old male plumber, MK, consults for disseminated colon cancer with the option treatments discussed.

Relevant Medical History: Gout, Hyperlipidemia.

Clinical Presentation/Laboratory Tests

Abdominal pain was diagnosed in 2014. Liver and peritoneal masses were shown by C.T. scan.

A colonoscopy confirmed a descending colon mass, and the biopsy revealed adenocarcinoma.

The mutation was not observed in expanded RAS testing (wild type).

Previous treatments: FOLFIRI/cetuximab (response, then progression) and FOLFOX/bevacizumab (initial response, then progression).

Current symptoms: Abdominal pain and fatigue.

Eastern Cooperative Oncology Group performance status: 1.

Uneventful complete blood count and chemistry panel results.

Treatment Plan: For progressing metastatic colon cancer treated with FOLFIRI/cetuximab and FOLFOX/bevacizumab, M.K.'s oncologists consider further systemic therapy.

Clinical Progression: M.K. is initiated on regorafenib at 160 mg orally once daily on days 1 to 21 of each 4-week cycle. After two months, follow-up imaging indicates stable disease. However, M.K. develops grade 3 hypertension, necessitating antihypertensive therapy.

Discussion

M.K.'s case reveals difficulties in managing colon cancer, especially when it comes to resistance or progression after basic management measures. Abdominal pain led to the initial diagnosis in 2014, which was followed by imaging and biopsy.

Using FOLFIRI/cetuximab and FOLFOX/bevacizumab reveals the typical response followed by progression in metastatic colon cancer. A wild-type mutation is implied by negative expanded RAS testing; hence, the treatment decisions and some selective therapies are ruled out.

Adding regorafenib is a shift in cancer therapy. After the disease progresses on the standard chemotherapy, regorafenib, a potent tyrosine inhibitor, is adopted. The treatment was effective after two months and led to the stabilization of the disease in M.K.'s Case. Although grade 3 hypertension development is vital in the management of side effects, Regorafenib is associated with hypertension as an adverse event. Early antihypertensive therapy emphasizes continuous surveillance and active administration of preventive measures against any treatment-induced side effects.

Treatment of colon cancer using integrative protocols

The management of colon cancer is complex, and it demands an integrated approach that encompasses various aspects simultaneously. Combining conventional with complementary therapies in integrative medicine becomes more like a practical step toward the successful treatment of colon cancer. This section considers the foundations of integrative medicine, assesses the positive aspects of combining traditional and alternative therapies, and proposes a general integrative treatment protocol consisting of dietary modifications, supplementation, exercise, and mental health measures.

Integrative Medicine in Cancer Care

The concept of integrative medicine to treat cancer is a more comprehensive treatment that involves traditional effective treatments as well as alternative therapies. It recognizes that cancer does not only affect the body but goes beyond the mind and soul as well. According to the National Cancer Institute, integrative medicine aims to supplement cancer treatment approaches and improve the general well-being of patients (National Cancer Institute, 2021). The Benefits of Combining Conventional And Complementary Therapies.

Enhanced Symptom Management: Symptom management is best achieved through integrative medicine. Some complementary therapies, such as acupuncture, massage, and some mind-body techniques, have proven beneficial for reducing pain, fatigue, and emotional distress.

Improved Quality of Life: An integrative approach improves the general quality of life among cancer patients, with the patient at the center. Dietary interventions, exercise, and mental health strategies are significant in enhancing physical and emotional well-being so that the patient can see the positive sides during the hard times of cancer treatment (Greenlee et al., 2017).

Optimized Immune Function: Certain alternative treatments, particularly nutritional therapies and dietary products may improve the functioning of an individual's immune system. One example is when a green food-based diet has been observed to limit oxidative DNA damage, which could be important for boosting immunity (Frugé et al., 2021).

A Generic Integrative Protocol for Colon Cancer

1. **Dietary Interventions:** Integrative protocols are established on dietary-based procedures. Incorporating a variety of fruits, vegetables, whole grains, and lean proteins into the plant-based diet plan will be beneficial. The dietary intake consists of many nutrients, including antioxidants that promote good health and may prevent cancer (Schmid & Leitzmann, 2014). Dietary recommendations based on the experience of Dr. Norbert Ketskés are an invaluable reference resource for designing dietary approaches in colon cancer patients.
2. **Supplements:** One of the essential approaches is integrating supplements with known benefits to cancer support. Turmeric has anti-cancerous properties (e.g., curcumin in colorectal cancer (Ojo et al., 2022). Fish oil encompasses omega-3 fatty acids that can have anti-inflammatory properties and, thus, improve general well-being (Sanchez-Fidalgo et al., 2019).
3. **Exercise:** The integrative protocol relies on physical activity as part of it. Exercise tremendously preserves physical function and boosts one's mental health profile (Campbell et al., 2018). The exercise regimens must be tailored to fit the patient's overall health condition, the level of their general energy, and the special restrictions caused by cancer or its treatment.
4. **Mental Health Strategies:** The integrative approach involves mental health strategies. Mindfulness-based practices, meditation, and counseling can be used to assist one in reducing stress, anxiety, and depression effectively (Pinquart & Duberstein, 2010). These strategies are like Dr. Ketskés' focus on a positive mental and emotional state.

This protocol outlined to integrate the colon cancer management program is based on scientific evidence and experts' recommendations for a complete framework. This approach to diet is in coherence with the studies reporting that plant-based diets could positively impact the development of colorectal cancer (Schmid Lietzmann, 2014). Supplements are added to current research into compounds such as curcumin with possible implications on colorectal cancer treatment (Ojo et al., 2022).

Additionally, the role of exercising in cancer care has increased in importance. Exercise is essential for physical needs but also impacts better mental health outcomes with this holistic approach to the patient care process (Campbell et al., 2018). The basis of mental health approaches is this holistic perspective, where cancer patients have both a healthy mind and body.

This integrative protocol derives its strength from being adaptable. In this case, personalized care considers the health records of each patient. The idea of practicality in adaptability stems from Dr. Ketskés' tailor-made dietary recommendations based on accumulated clinical experience.

Conclusion

In summary, the use of complementary techniques as an extra method in the fight against the complexity of colon cancer is essential. It shows that cancer treatment should be all-inclusive, and patient focused. This use of complementary therapies combined with conventional methods can improve the quality of life and enhance outcomes for patients with colorectal cancer disease.

Importance of Integrating Complementary Approaches

Integrating Complementary Approaches considers a patient's overall health from not only the physical point of view but also the mental and emotional components involved in the disease. Controlling symptoms that improve the quality of life involves various complementary therapies, including dietary, mental health, and immune function. The modalities are combined to provide an additive

effect to the conventional methods. This is because cancer patients have numerous needs that traditional therapies cannot meet.

Personalized Treatment Plans

A key takeaway from the study of integrative approaches is that every patient should have a unique treatment plan. Everybody's colon cancer is different and should be approached considering inheritance, nutrition, and any specificities of the disease. The discussion on the integrative protocol discusses a flexible approach that considers the tailoring of intervention for each patient's needs.

Future Research in Integrative Oncology

The recent progress made in understanding the benefits of integrative approaches is impressive, but integration oncology is highly promising in terms of research. Some of these areas are examining how diet can be optimized in a manner personalized to the molecular and genetic profile, testing different customized supplement programs, and researching new mind-body techniques targeted toward the emotional and psychological aspects of fighting cancer. Longitudinal studies are needed to study the long-term effect of integrative protocols on quality of life and survival.

References

1. American Cancer Society. (2023) "Cancer Facts & Figures 2023". <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2023.html>
2. Campbell PT, et al. "Associations of Recreational Physical Activity and Leisure Time Spent Sitting with Colorectal Cancer Survival". *Journal of Clinical Oncology* 31.7 (2018): 876-885.
3. Cohen SJ. (n.d.). Case Study: 58-year-old Man with Stage 4 Colon Cancer. <https://www.cancertherapyadvisor.com/slideshow/clinical-quiz/case-study-58-year-old-man-with-stage-4-colon-cancer/>
4. Frugé AD, et al. "A Dietary Intervention High in Green Leafy Vegetables Reduces Oxidative DNA Damage in Adults at Increased Risk of Colorectal Cancer: Biological Outcomes of the Randomized Controlled Meat and Three Greens (M3G) Feasibility Trial". *Nutrients* 13.4 (2021): 1220.
5. Greenlee H, et al. "Clinical practice guidelines on the use of integrative therapies as supportive care in patients treated for breast cancer". *Journal of the National Cancer Institute. Monographs* 52 (2017): lgx012.
6. He ZY, et al. "A systematic review and meta-analysis of the effect of curcumin on colorectal cancer in experimental and clinical studies". *Clinical and Translational Oncology* 22.8 (2020): 1214-1225.
7. Ketskés N and Rahm C. (n.d). Colon Cancer: A Case Study. *ISNS Case Studies in Oncology*.
8. Labianca R, et al. "Colon cancer". *Critical reviews in oncology/hematology* 74.2 (2010): 106-133.
9. Le DT, et al. "PD-1 Blockade in Tumors with Mismatch-Repair Deficiency". *New England Journal of Medicine* 372.26 (2015): 2509-2520.
10. Markowitz SD, et al. "Focus on colon cancer". *Cancer cell* 1.3 (2002): 233-236.
11. National Cancer Institute. *Integrative, Alternative, and Complementary Therapies* (2021). <https://www.cancer.gov/about-cancer/treatment/cam>
12. National Center for Complementary and Integrative Health (NCCIH). "Complementary, Alternative, or Integrative Health: What's in a Name?" (2022). <https://www.nccih.nih.gov/health/complementary-alternative-or-integrative-health-whats-in-a-name>
13. National Center for Complementary and Integrative Health (NCCIH). "Cancer: In Depth". (2022). <https://www.nccih.nih.gov/health/cancer-in-depth>
14. National Comprehensive Cancer Network. "Distress Management, Version 3.2021". (2021). https://www.nccn.org/professionals/physician_gls/pdf/distress.pdf
15. Ojo OA, et al. "Anticancer Properties of Curcumin Against Colorectal Cancer: A Review". *Frontiers in Oncology* 12 (2022): 881641.
16. Pinquart M and Duberstein PR. "Depression and cancer mortality: A meta-analysis". *Psychological Medicine* 40.11 (2010): 1797-1810.

17. Sánchez-Fidalgo S., et al. "Dietary extra virgin olive oil polyphenols supplementation modulates DSS-induced chronic colitis in mice". *Journal of Nutritional Biochemistry* 66 (2019): 10-20.
18. Sánchez-Fidalgo S., et al. "Polyphenols from Food and Natural Products: Neuroprotection and Safety". *Antioxidants* 8.8 (2019): 361.
19. Sauer R., et al. "Preoperative Versus Postoperative Chemoradiotherapy for Rectal Cancer". *New England Journal of Medicine* 351.17 (2004): 1731-1740.
20. Schmid D and Leitzmann MF. "Television Viewing and Time Spent Sedentary in Relation to Cancer Risk: A Meta-analysis". *Journal of the National Cancer Institute* 106.7 (2014): dju098.
21. Schmid D and Leitzmann MF. "Association between physical activity and mortality among breast cancer and colorectal cancer survivors: a systematic review and meta-analysis". *Annals of Oncology* 25.7 (2014): 1293-1311.
22. Shang F, et al. The inhibitory effects of probiotics on colon cancer cells: in vitro and in vivo studies. *Journal Of Gastrointestinal Oncology* 11.6 (2020): 1224-1232.
23. Sun D., et al. "Recent progress in drug delivery". *Acta Pharmaceutica Sinica B* 11.5 (2021): 1340-1356.
24. Weitz J., et al. "Colorectal Cancer". *The Lancet* 365.9454 (2005): 153-165.
25. Wijewantha N., et al. "Targeting Colon Cancer Cells with Enzyme-Triggered Casein-Gated Release of Cargo from Mesoporous Silica-Based Nanoparticles". *Bioconjugate chemistry* 32.11 (2021): 2353-2365.
26. Winawer SJ., et al. "Randomized Comparison of Surveillance Intervals After Colonoscopic Removal of Newly Diagnosed Adenomatous Polyps". *New England Journal of Medicine* 328.13 (1993): 901-906.
27. Zhang M., et al. "Acupuncture for Symptom Management in Cancer Care: An Update". *Current Oncology Reports* 21.6 (2019): 418.
28. Zuo T., et al. "Gut mucosal virome alterations in ulcerative colitis". *Gut* 68.7 (2019): 1169-1179.