



# Incorporating Evidence Based Integrative Approaches in Oncology

Shannon Fogh, MD, ABOIM  
Associate Professor, Clinical Research Divisions  
Fred Hutch Cancer Center  
Associate Professor, Dept of Medicine and Radiation Oncology, Univ of  
Washington School of Medicine

*October 8th, 2025*

# Definitions in Integrative Medicine

## Traditional therapies

- *Culturally-based health practices*

## Alternative therapies

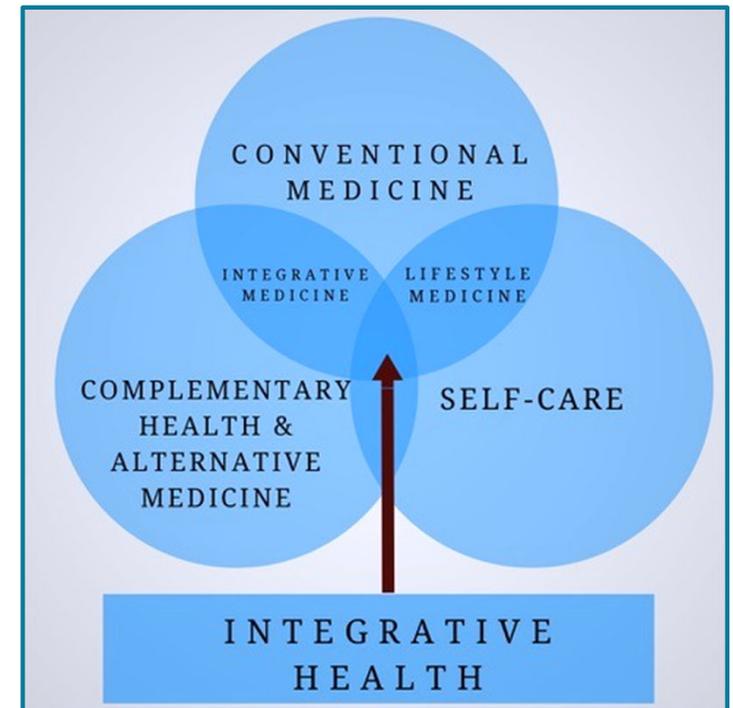
- *Used in place of conventional medicine*

## Complementary therapies

- *Used together with conventional medicine*

## Integrative medicine and health

- *Evidence-based use of complementary approaches in conjunction with conventional therapies*



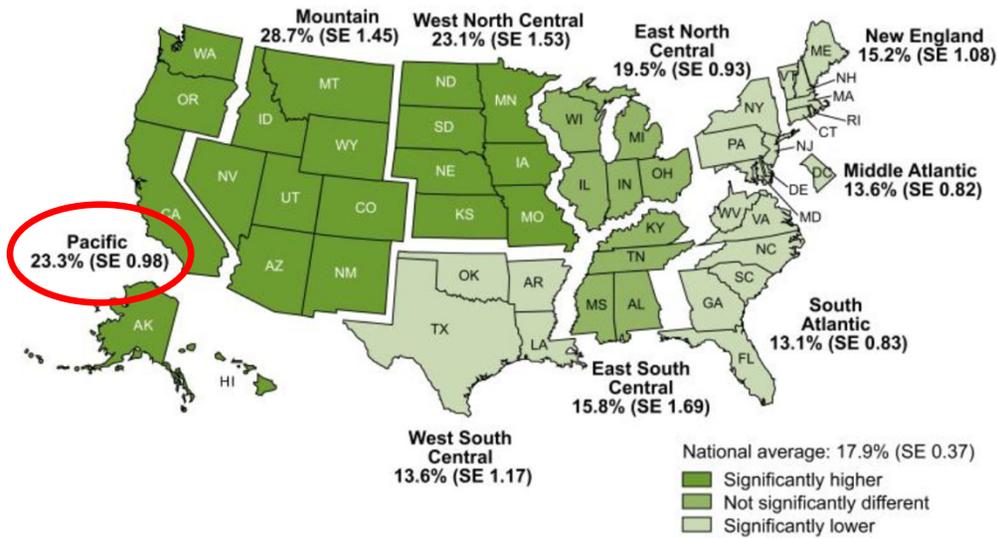
# What is Integrative Oncology?

- Patient-centered, evidence-informed field of cancer care
- Utilizes mind and body practices, natural products, and/or lifestyle modifications
- Delivered alongside conventional cancer treatments.
- Aims to optimize health, quality of life, and clinical outcomes
- Empowers people to prevent cancer and become active participants before, during and beyond cancer treatment.

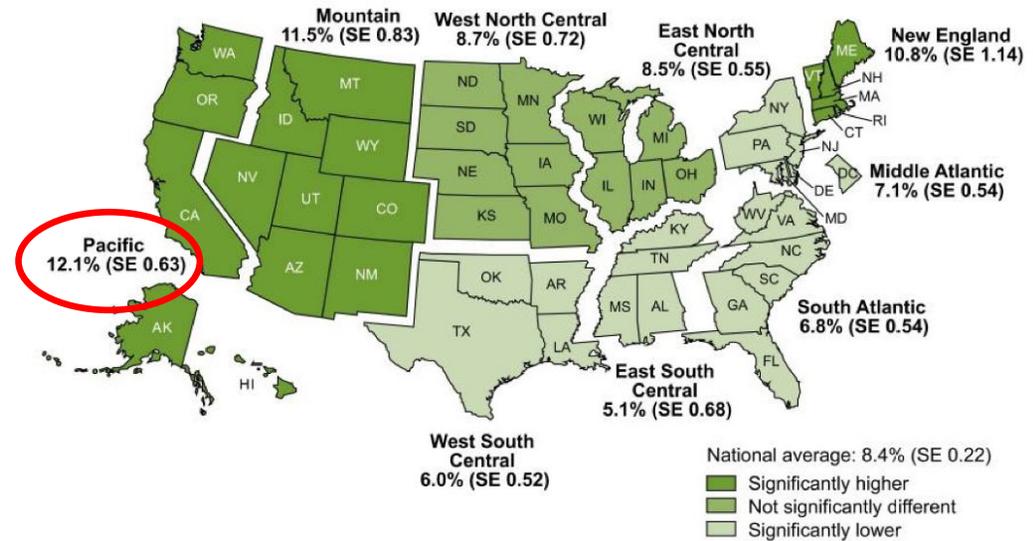


# Use of complementary health approaches in US adults

## Use of non-vitamin, non-mineral dietary supplements



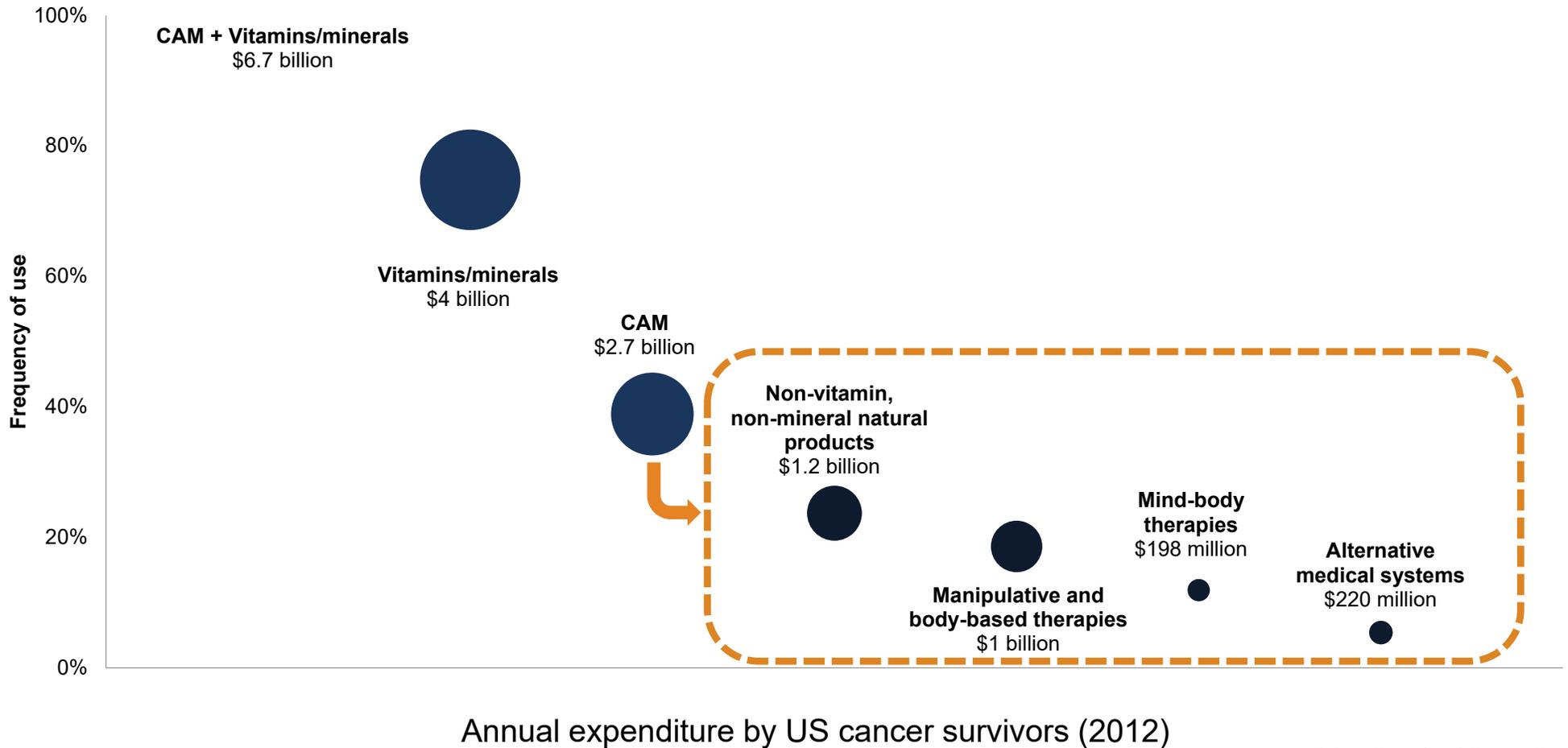
## Use of yoga and meditation



# Complementary & Alternative Medicine Use by US Cancer Survivors

- **US National Health Interview Survey (NHIS)**
  - Annual survey by CDC
  - Questions on CAM use since 2002
- **NHIS 2012**
  - 2,977 adult cancer survivors and 30,551 non-cancer adults
  - Self-reported CAM use in past 12 months
  - **79%** of cancer survivors used  $\geq 1$  vitamin/mineral and/or CAM modality

# Cost of CAM Use by US Cancer Survivors



# Dietary Supplement Use by People with Cancer

## High use during and after cancer treatment

- 64-81% use vitamins and minerals
- 26-77% use multivitamins
- 24% use herbal & non-vitamin supplements

Weak evidence base for use of most dietary supplements in the oncology setting

Providers need to know how to counsel patients on the appropriate use of dietary supplements



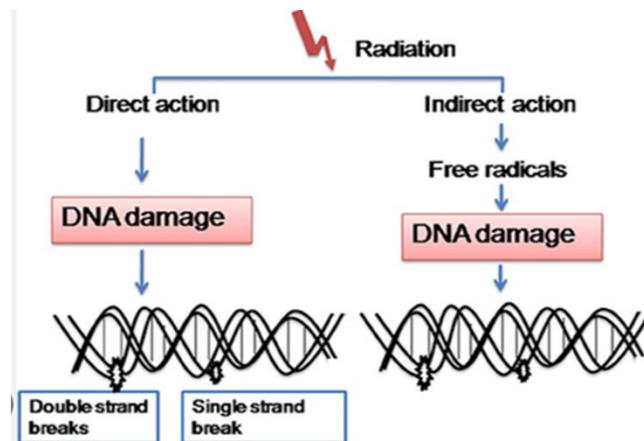
## **WHY is this important?**

There are several things to consider when patients are taking a supplements including:

- Is a potent antioxidant?
- Has anticoagulant properties?
- Is known to stimulate the immune system?
- Has the potential to exacerbate or worsen current symptoms?
- Has potential to worsen cancer outcomes?
- Has side effects that are worsening symptoms or quality of life?

# WHY worry about antioxidants?

- High doses of natural products with antioxidant properties may interfere with radiation or systemic therapy.
- Radiation for example is designed to impact the tumor's DNA by creating free radicals and we want this to make the radiation more effective against the tumor:



## **WHY Worry about Anticoagulants?**

- If patients are taking another medication that can impact the thinning of the blood, supplements that also do this are not usually a good idea.
- If patients are preparing for surgery or a procedure, patients should stop blood thinning medications. This includes supplements that can thin the blood!

### **Some examples include:**

- Vitamin E
- Fish oil
- Turmeric/ Curcumin
- Aloe
- Gingko
- Garlic

## **We also want to make sure we do not make symptoms or side effects worse**

- One example is supplements that might increase the risk of seizures.

### **Examples include:**

- Ginkgo biloba
- Ginseng
- Evening primrose oil
- Borage oil

## **We also want to make sure we do don't take supplements that might worsen cancer outcomes or cancer risk:**

Examples include:

- Beta-carotene, a vitamin A precursor, was associated with an increased risk of lung cancer in smokers
- Vitamin E supplementation has been shown to increase the risk of prostate cancer.
- Selenium may increase risk of high-grade prostate cancer.

# Commonly Used Supplements: Potential Causes for Concern

Human - Clinical trial  
Human - Observational  
In vitro

Supplement	Claimed benefits	Potential Interactions / Contraindications
<b>Multivitamin</b>	Nutrient support	Antioxidant, Absorption issues, Estrogenic (added botanicals)
<b>Fish Oil / Omega-3s</b>	Nutrient support Anti-inflammatory support	Bleeding
<b>Turmeric</b>	Anti-inflammatory support Anti-cancer therapy	Bleeding, CYP interactions, Hepatotoxicity, Antioxidant, Estrogenic
<b>Melatonin</b>	Sleep support Immune support	Antioxidant, Bleeding, CYP1A2 interactions, Estrogenic
<b>Medicinal mushrooms:</b> Reishi, Turkey Tail, Lion's Mane, etc.	Immune support	Hepatotoxicity, Bleeding, Antioxidant, CYP interactions (Reishi)



# Are all supplements created equal?



# What Can Impact Quality?

- The quality of plant material can vary based on where, when and how it is gathered.
- This can lead to variation in the content of a product and a discrepancy between what is on the label and what the supplement actually contains.
- Supplements can also contain unwanted potentially harmful ingredients such as:
  - Mercury
  - Arsenic
  - Lead
  - Cadmium
  - Aluminum
  - Bacteria/microbes/fungi

## Step 3. Check for interactions & contraindications

Name	URL	Cost
<b>Memorial Sloan Kettering Cancer Center's About Herbs</b>	<a href="https://www.mskcc.org/cancer-care/diagnosis-treatment/symptom-management/integrative-medicine/herbs">mskcc.org/cancer-care/diagnosis-treatment/symptom-management/integrative-medicine/herbs</a>	No cost
<b>National Cancer Institute PDQ Cancer Information Summary: Integrative, Alternative, and Complementary Therapies</b>	<a href="https://www.cancer.gov/publications/pdq/information-summaries/cam">cancer.gov/publications/pdq/information-summaries/cam</a>	No cost
<b>NIH Office of Dietary Supplements</b>	<a href="https://ods.od.nih.gov">ods.od.nih.gov</a>	No cost
<b>Natural Medicines</b>	<a href="https://naturalmedicines.therapeuticresearch.com">naturalmedicines.therapeuticresearch.com</a>	Access fee, some institutions have licenses
<b>UpToDate</b>	<a href="https://www.uptodate.com">uptodate.com</a>	Access fee, many institutions have licenses
<b>Consumer Labs</b>	<a href="https://www.consumerlab.com">consumerlab.com</a>	Access fee

# Mind Body Approaches

- Mind Body Medicine is a field of medicine that utilizes the mind to influence the health of the body
- NCAM specifically defines mind body practices as focusing on the interactions among the brain, mind, body and behavior with the intent to use the mind to affect physical functioning and promote health.

# Mind Body Approaches

Improved depression and anxiety symptoms

Reduction of cognitive decline, reduction in perceived stress, and increased quality of life in patients with dementia and cognitive impairment

- Found increases in functional connectivity, percent volume brain change and cerebral blood flow in areas of the cortex

Improved memory and concentration

Improves fatigue

Improved balance and flexibility

# Mindfulness Meditation: Why?

- Lower Cortisol
- Lower inflammation
- Increased “good” brain waves

# Cortisol

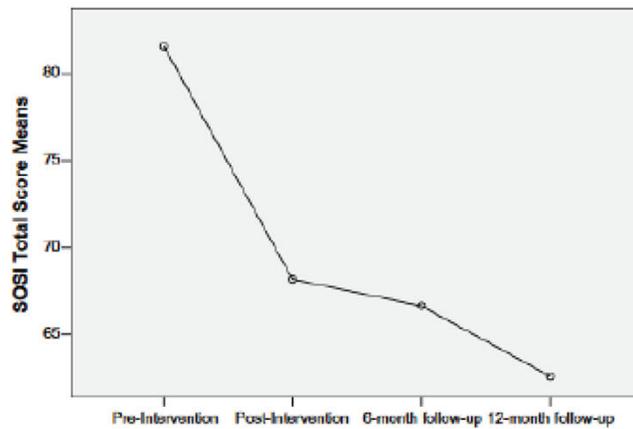


Fig. 2. Symptoms of stress inventory scores.

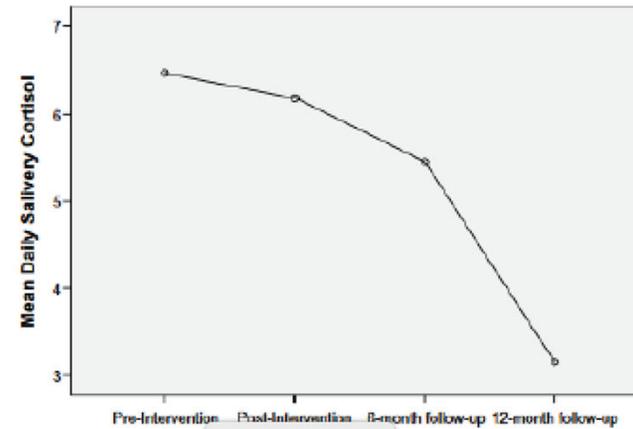
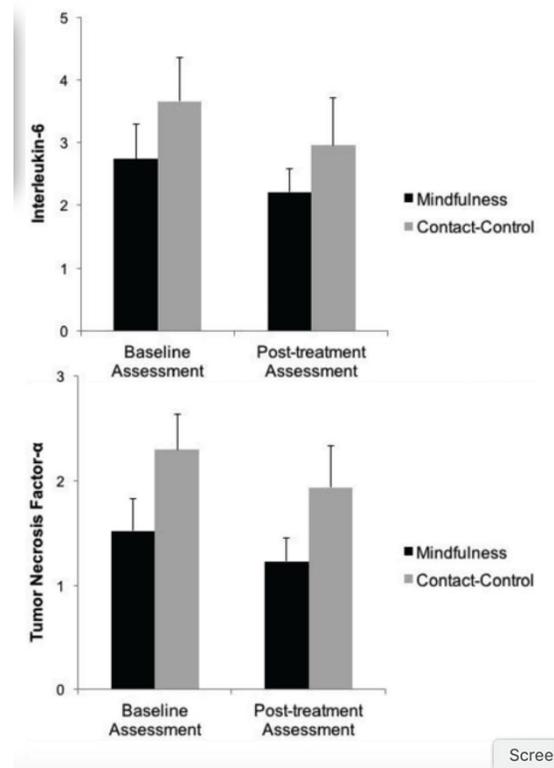
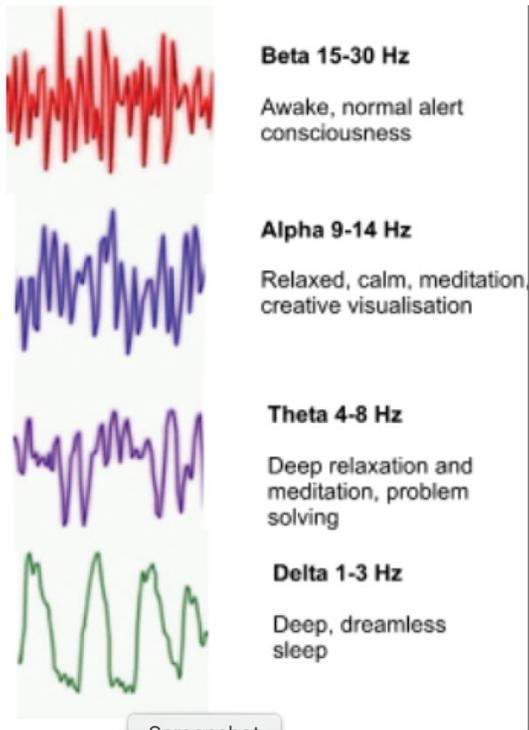


Fig. 3. Mean Screenshot ol values across time.

# Inflammation



# Good Brain Waves



# Meditation Benefits

## Cerebral blood flow differences between long-term meditators and non-meditators

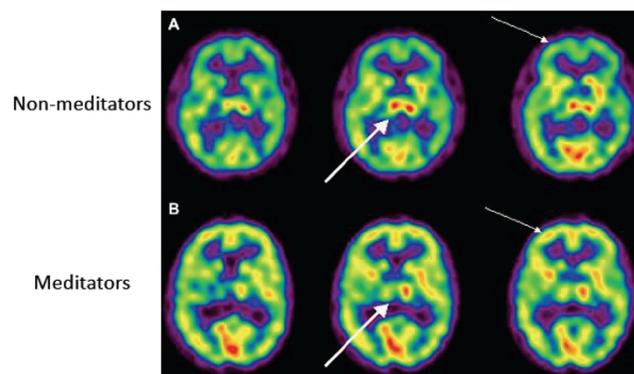
Andrew B. Newberg<sup>a,b,\*</sup>, Nancy Wintering<sup>a,b</sup>, Mark R. Waldman<sup>b</sup>, Daniel Amen<sup>c</sup>,  
Dharma S. Khalsa<sup>b,d</sup>, Abass Alavi<sup>a</sup>

<sup>a</sup> Division of Nuclear Medicine, Department of Radiology, University of Pennsylvania Medical Center, United States

<sup>b</sup> Center for Spirituality and the Mind, University of Pennsylvania, United States

<sup>c</sup> Amen Clinics Inc., Newport Beach, CA, United States

<sup>d</sup> Alzheimer's Research and Prevention Foundation, Tucson, AZ, United States



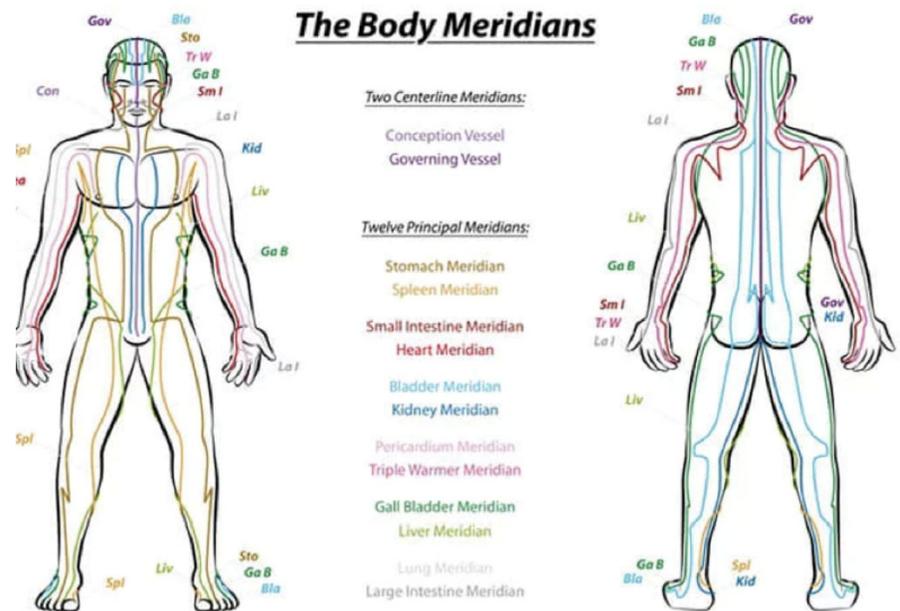
“CBF of long-term meditators was significantly higher ( $p < 0.05$ ) compared to non-meditators in the prefrontal cortex parietal cortex thalamus putamen, caudate and midbrain. The observed changes...appear in structures that underlie the attention network and also those that relate to emotion and autonomic function.”

# Mind Body Approaches

- Meditation
  - Body/breath awareness
  - Mindfulness
  - Loving kindness
  - Compassion-based
- Movement or energy-based therapies
  - Tai Chi
  - Yoga
  - Qi Gong
- Relaxation techniques (i.e., diaphragmatic breathing, progressive muscle relaxation, guided imagery, autogenic training, etc.), and expressive and other practices (i.e., nature, dance, art, writing, and music therapy).

# Acupuncture

- Decreased fatigue
- Improved sleep
- Reduced stress and anxiety
- Improved mood/decreased depression
- Pain
- Nausea



view Article  
 nghurst, J. Defining Meridians: A Modern Basis of Understanding. *J Acupunct Meridian Stud* 2010;3(2):67-74

# Exercise

- Improves functional status
- Quality of Life
- Improved neurocognitive and physiologic outcomes
- Survival
- No adverse effects

# Exercise

## Brain-Derived Neurotrophic Factor (BDNF)

- Noted for its role in **neuroplasticity** and **connectivity**.
- Influences both structure and function of the brain, particularly within the **hippocampus**.
- Modulates several metabolic functions, such as **glucose uptake** and **fat oxidation**, as well as cardiovascular health.
- Individuals who have been diagnosed with **Alzheimer's disease, depression, dementia, and other cognitive impairments** tend to have lower levels of circulating BDNF.

# Exercise

- Aerobic training **improves executive functions** among older adults diagnosed with **mild** subcortical ischemic vascular **cognitive impairment**.
- **Three-weekly 60 minute aerobic training** can improve **executive functions and neural efficiency**.
- Aerobic training is a low-risk and low-cost strategy that can be easily implemented.

# Exercise

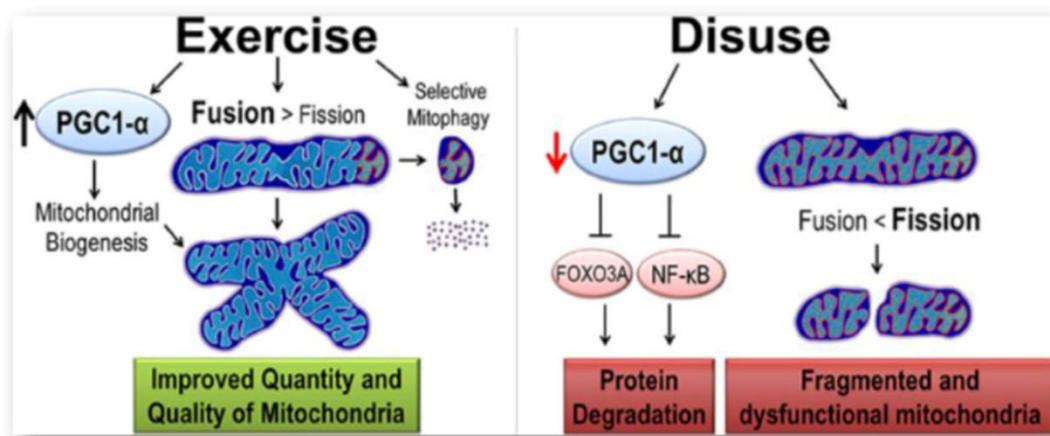
## Neurochemical Changes with Acute Exercise

The Effects of Acute Exercise on Mood, Cognition, Neurophysiology, and Neurochemical Pathways: A Review

- **One bout of exercise led to increased:**
  - BDNF, IGF-1, and VEGF
  - Neurotransmitters, including dopamine, norepinephrine, serotonin, acetylcholine, GABA, and glutamate
  - Neuromodulators, including endogenous opioids and endocannabinoids

# Exercise

## Mitochondrial Biogenesis with Exercise



# Exercise

## Exercise and Depression

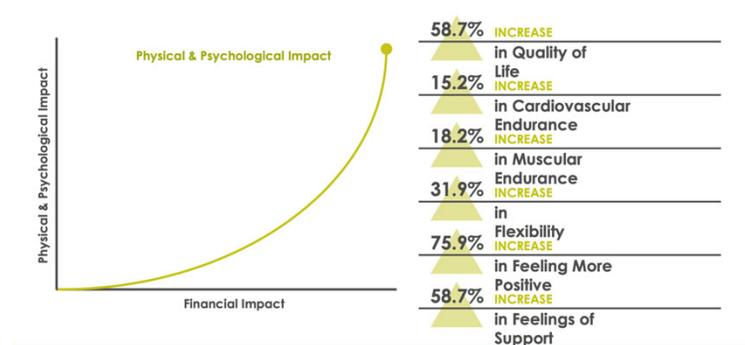
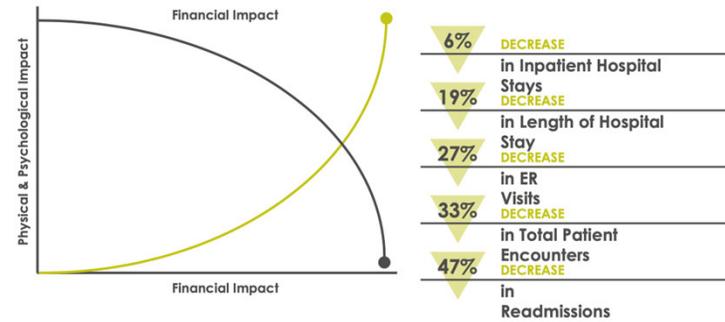
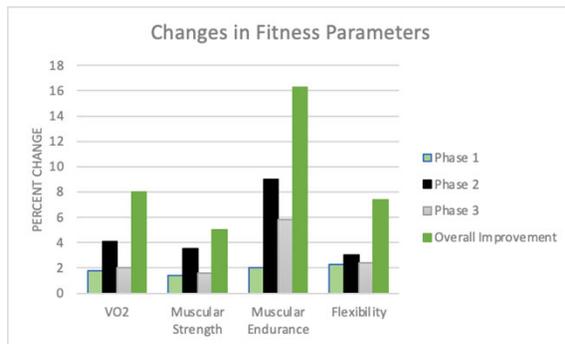
- Exercise combined with treatment as usual (TAU) is **more effective** than TAU alone for depression—**with limited side effects!**
- A total of 2.5 hours of moderate movement per week reduces the risk of depression by **25%**.
- Exercise **improves depressive symptoms, cognition, and overall quality of life** in patients diagnosed with neuroinflammatory disorders.

See References: Exercise and Depression

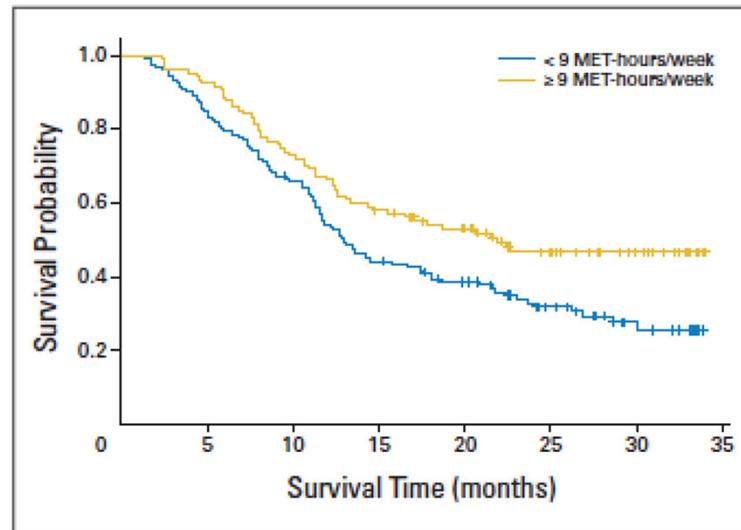


**Exercise is the most potent  
and underutilized antidepressant  
and it's FREE.**

# Exercise



# Exercise

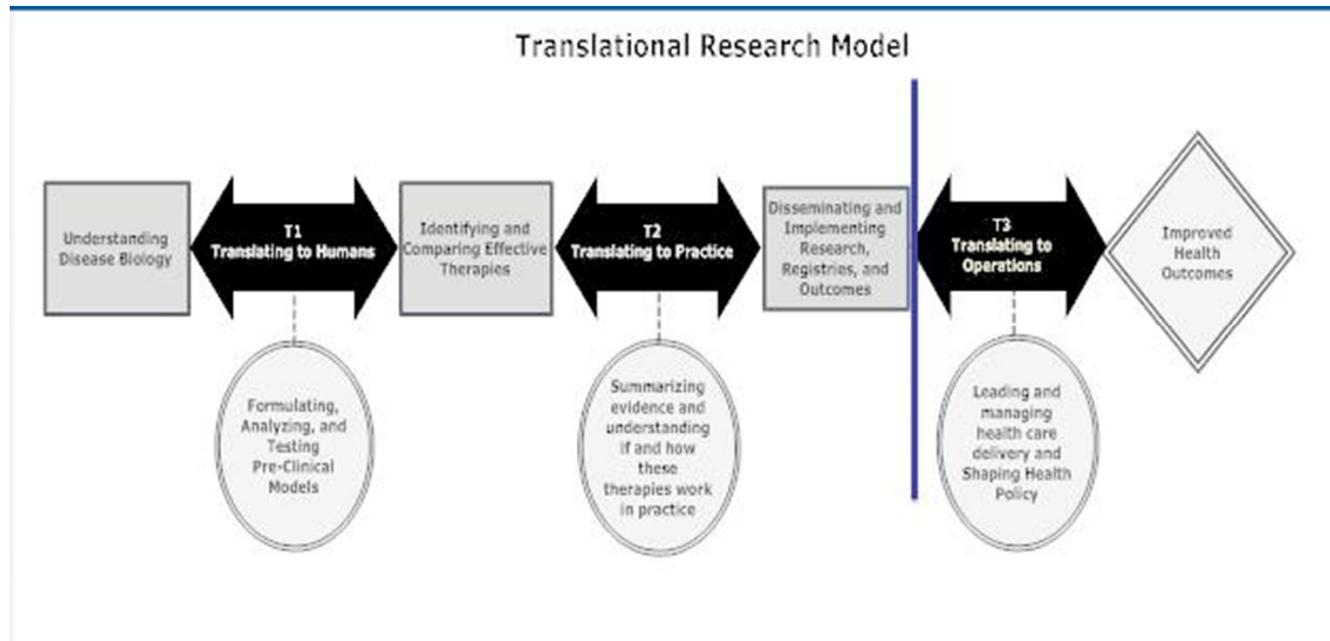


**Fig 2.** Association between exercise behavior (metabolic equivalent [MET]-h/wk) and survival.

# Exercise

- American Institute for Cancer Research
- American Cancer Society
- American Society of Clinical Oncology
- American College of Sports Medicine
- National Accreditation Program of Breast Centers (NAPBC)
- American Society of Breast Surgeons
- Commission on Cancer

# Implementation Science



# Implementation Science

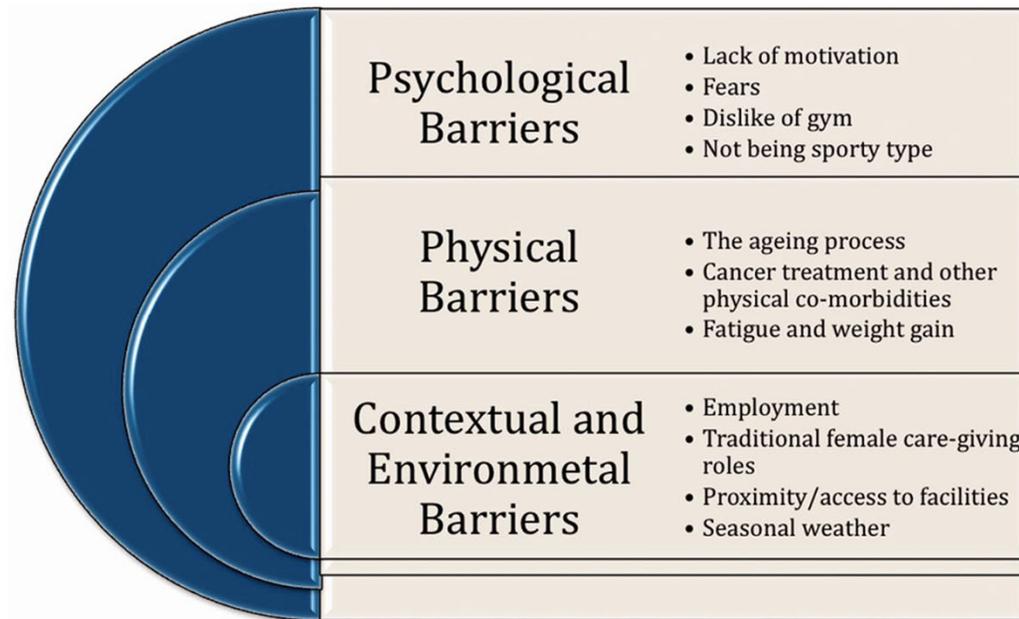


# Exercise Barriers

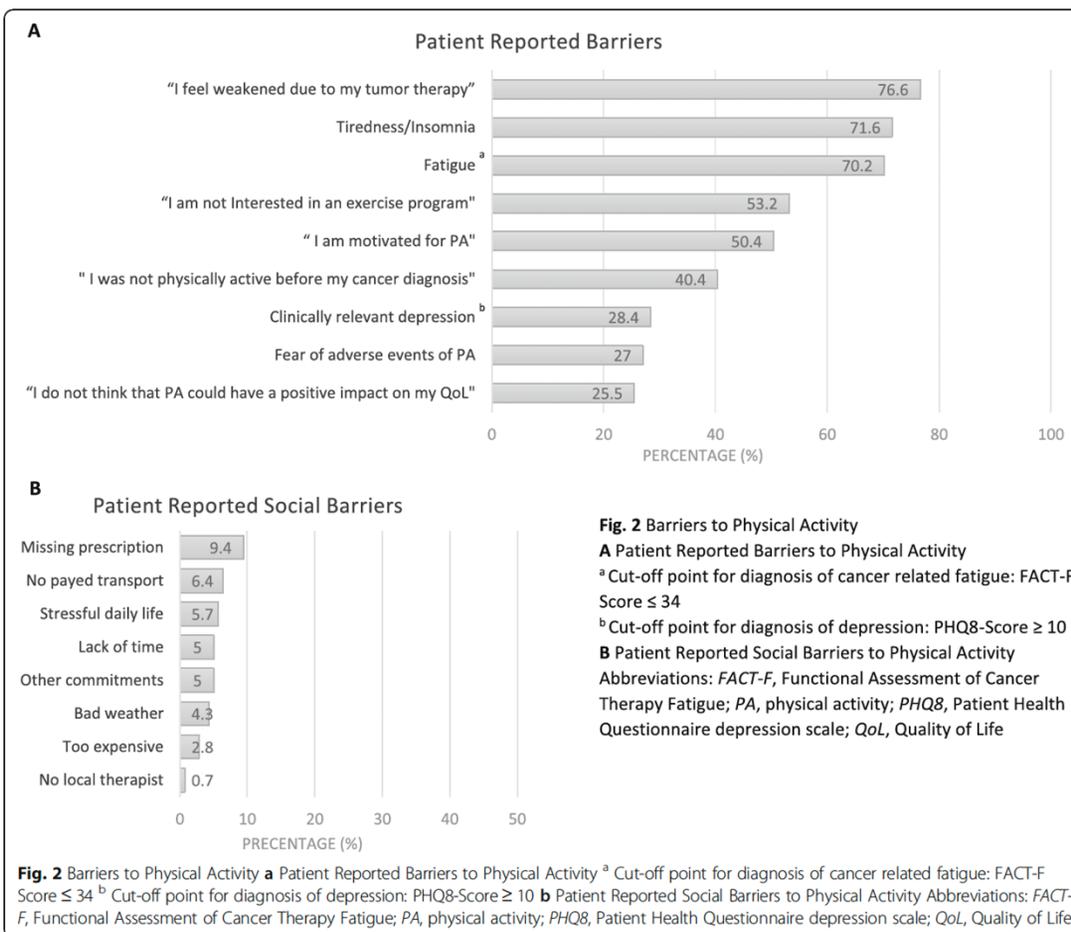
Barriers	Number	Percentage (%)
I do not have the knowledge on how or where to refer a patient to exercise	61	50.8
There is limited time during a patient visit	51	42.5
My training does not qualify me to discuss exercise or refer to an exercise program	39	32.5
I feel that there are situations in patients that I treat where exercise would be unsafe	30	25.0
I do not know how soon after surgery or radiation it is safe to start exercise	27	22.5
This is not part of my regular clinic routine	14	11.7
Patients have been told by other health care providers, friends, or family to rest	13	10.8
I should only refer to an exercise program if a superior (i.e., staff physician or resident) asks this of me	6	5.0
I know that a patient has refused other support services in the past	6	5.0
I am not convinced of the literature with respect to exercise and cancer outcomes	4	3.3
It feels futile to recommend exercise to a patient I know has a poor prognosis	2	1.7
I perceive exercise to lack relevance to my patient's cancer or symptoms	1	0.8
I feel that referring a patient for exercise will make him/her feel guilty for not having done exercise prior to their cancer diagnosis	1	0.8
Other	8	6.7
Strategies	Number	Percentage (%)
Education session about exercise in patients with cancer (indications, guidelines, referral process, and safety information)	58	48.3
For this information to be available as a patient handout	57	47.5
Having a kinesiologist or exercise specialist available as part of the clinical team	34	28.3
Posters for patients to see so they can ask about exercise on their own accord	33	27.5
Electronic / web based form / prescription pad with referral information	23	19.2
Email with written information about exercise in cancer (indications, guidelines, referral process, and safety information)	18	15.0
Paper form / prescription pad with referral information	18	15.0
Automatic paper or electronic referral process	18	15.0
Having the support to refer a patient to an exercise program without my superior's direct request	14	11.7
For this information to be provided to patients at a different time than at physician visits	11	9.2
Other	2	1.7

*Nadler et al*

# Exercise Barriers



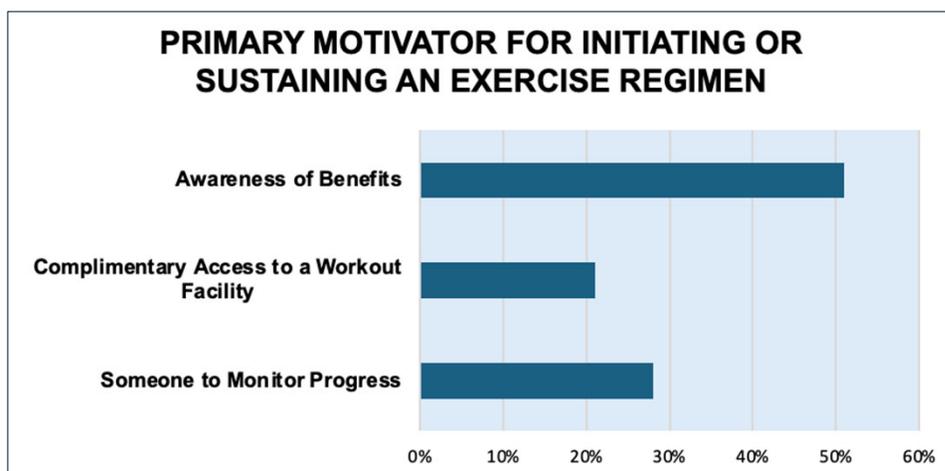
# Exercise



# Exercise

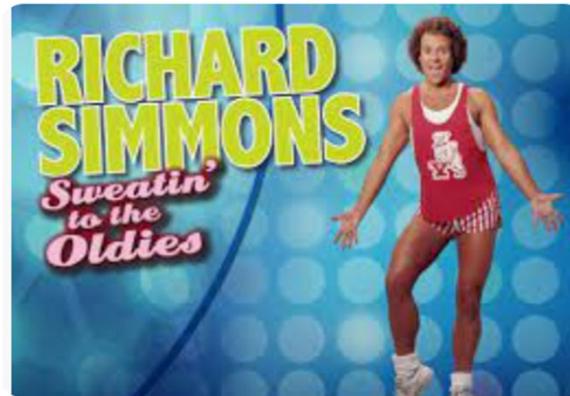
- Most providers (92%) reported that exercise was important for patients' lifestyle
- 80% felt it should be integrated into the treatment of patients with primary brain tumors
- 96% percent felt that exercise improved quality of life, decreased fatigue (100%) and reduced treatment related side effects (92%)
- Yet only 57% of providers initiated a conversation about exercise with patients

# Exercise



**\*\*Sixty-six percent of patients were more likely to participate in an exercise program if mentioned by their healthcare provider or healthcare team during a visit.**

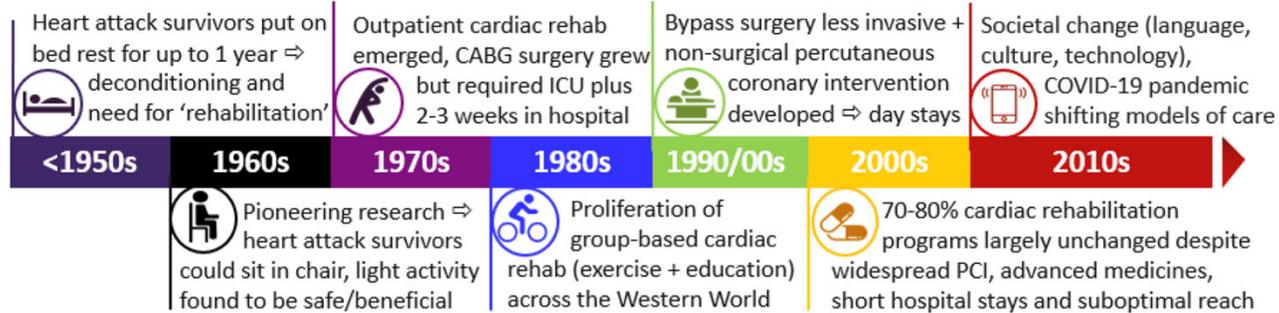
# Exercise



# Exercise

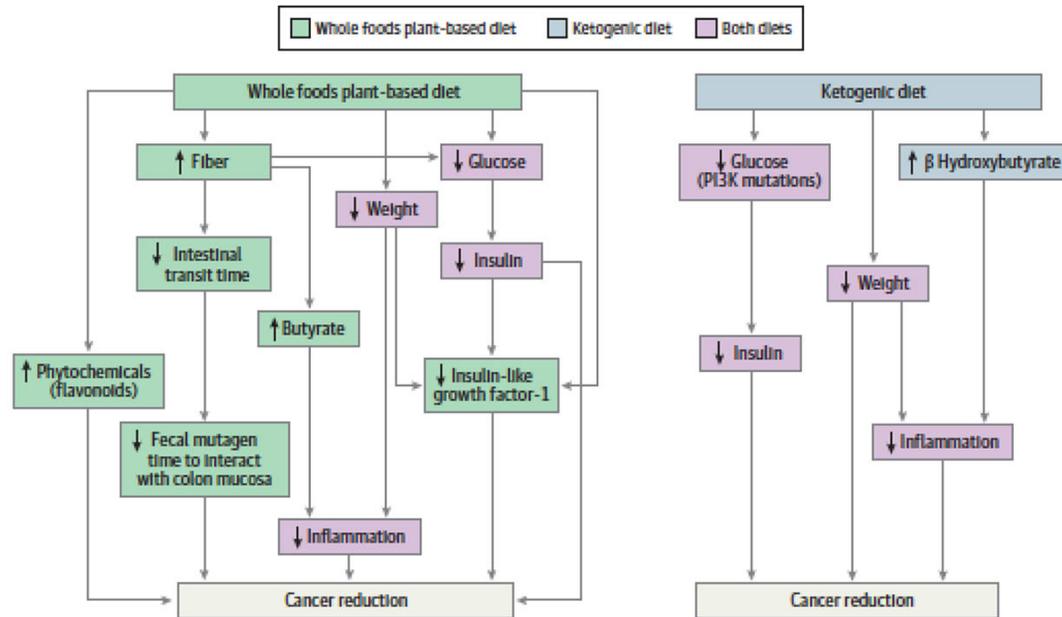
Physical activity	MET <sup>[a]</sup>
<b>Light-intensity activities</b>	<b>&lt; 3</b>
writing, desk work, using computer	1.5 <sup>[10]</sup>
walking slowly	2.0 <sup>[10]</sup>
<b>Moderate-intensity activities</b>	<b>3 to 6</b>
walking, 3.0 mph (4.8 km/h)	3.0 <sup>[10]</sup>
sweeping or mopping floors, vacuuming carpets	3 to 3.5 <sup>[10]</sup>
yoga session with <a href="#">asanas</a> and <a href="#">pranayama</a>	3.3 <sup>[11]</sup>
Tennis doubles	5.0 <sup>[10]</sup>
Weight lifting (moderate intensity)	5.0 <sup>[12]</sup>
sexual activity, aged 22	5.8 <sup>[13]</sup>
<b>Vigorous intensity activities</b>	<b>≥6</b>
aerobic dancing, medium effort	6.0 <sup>[12]</sup>
bicycling, on flat, 10–12 mph (16–19 km/h), light effort	6.0 <sup>[10]</sup>
jumping jacks	>6.0 <sup>[14]</sup>
<a href="#">sun salutation (Surya Namaskar, vigorous with transition jumps)</a>	7.4 <sup>[11]</sup>
basketball game	8.0 <sup>[10]</sup>
swimming moderately to hard	8 to 11 <sup>[10]</sup>
jogging, 5.6 mph (9.0 km/h)	8.8 <sup>[12]</sup>
rope jumping (66/min)	9.8 <sup>[12]</sup>
football	10.3 <sup>[15]</sup>
rope jumping (84/min)	10.5 <sup>[12]</sup>
rope jumping (100/min)	11.0 <sup>[12]</sup>
jogging, 6.8 mph (10.9 km/h)	11.2 <sup>[12]</sup>

# Lessons Learned



# Keto vs. WPBD

Figure. Association of Plant-Based Diets With Multiple Additional Pathways That Suppress Cancer Growth Compared With Ketogenic Diets



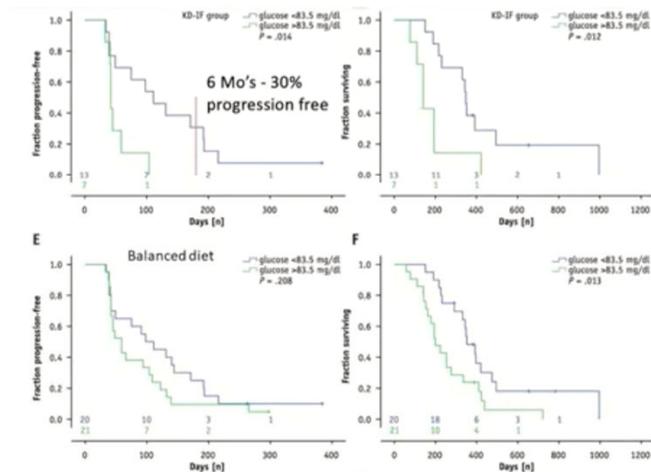
## Keto vs. WPBD

- Complications/ Side Effects of calorie-restricted Ketogenic diet:
  - Uric acid accumulation
    - Monitor levels; hydration; herbal support (celery seed)
    - Rx: allopurinol
- Kidney stones (calcium oxalate)
  - Potassium citrate 2meq/kg (1meq = 39 mg elemental K+
    - Polycitra K used in study on ped's
  - Can use Mg-citrate
- Hypercalciuria
  - Monitor? Ensure adequate Ca intake
- Constipation
  - Add fiber and probiotics
- With ketogenic diets: Work with an experienced nutritionist

# Keto vs. WPBD

## Follow Up Analysis: Low Glucose (day 6) correlated with better outcomes

- Average glucose in the study was 83.5 mg/dL (4.6 mmol/L).
- KD-IF group had lower glucose levels (top graphs)
- OS- better in those with lower glucose (<83.5) regardless of which arm they were in



JAMA Oncology | Review

## The Potential of the Gut Microbiome to Reshape the Cancer Therapy Paradigm

### A Review

Longha Liu, BA; Khalid Shah, MS, PhD

**IMPORTANCE** The gut microbiome, home to the vast kingdom of diverse commensal bacteria and other microorganisms residing within the gut, was once thought to only have roles primarily centered on digestive functions. However, recent advances in sequencing technology have elucidated intricate roles of the gut microbiome in cancer development and efficacy of therapeutic response that need to be comprehensively addressed from a clinically translational angle.

**OBSERVATIONS** This review aims to highlight the current understanding of the association of the gut microbiome with the therapeutic response to immunotherapy, chemotherapy, radiotherapy, cancer surgery, and more, while also contextualizing possible synergistic strategies with the microbiome for tackling some of the most challenging tumors. It also provides insights on contemporary methods that target the microbiota and the current progression of findings being translated from bench to bedside.

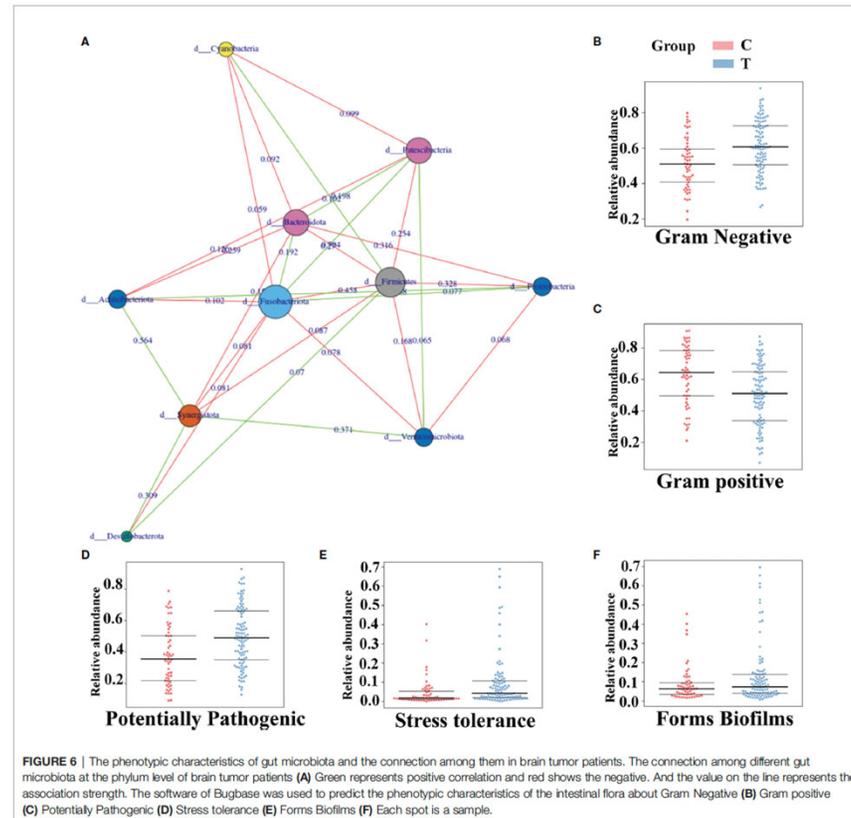
**CONCLUSIONS AND RELEVANCE** Ultimately, the importance of gut bacteria in cancer therapy cannot be overstated in its potential for ushering in a new era of cancer treatments. With the understanding that the microbiome may play critical roles in the tumor microenvironment, holistic approaches that integrate microbiome-modulating treatments with biological, immune, cell-based, and surgical cancer therapies should be explored.

JAMA Oncol. 2022;8(7):1059-1067. doi:10.1001/jamaoncol.2022.0494  
Published online April 28, 2022.

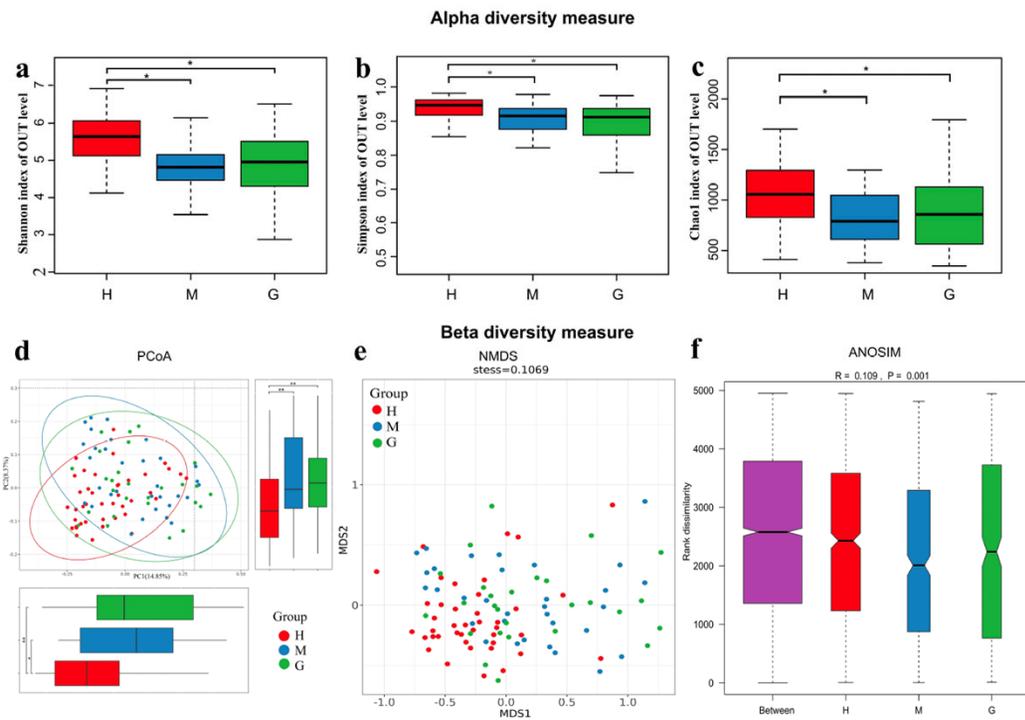
**Author Affiliations:** Center for Stem Cell and Translational Immunotherapy (CSTI), Harvard Medical School, Boston, Massachusetts (Liu, Shah); Department of Neurosurgery, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts (Liu, Shah); Harvard Stem Cell Institute, Harvard University, Cambridge, Massachusetts (Shah).

**Corresponding Author:** Khalid Shah, MS, PhD, Center for Stem Cell and Translational Immunotherapy (CSTI), Harvard Medical School, Boston, MA 02115 (kshah@bwh.harvard.edu).

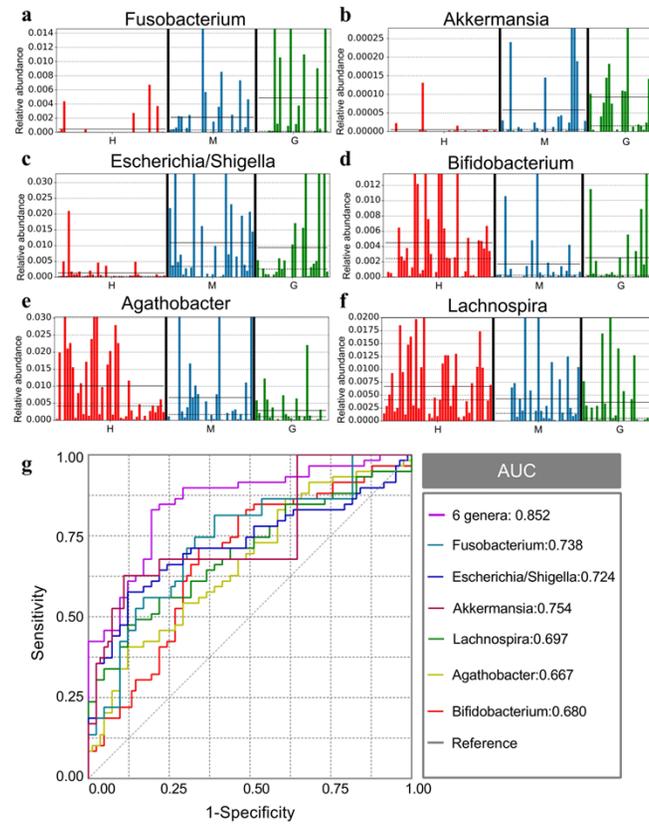
# Microbiome and Neuropathology



# Microbiome and Neuropathology

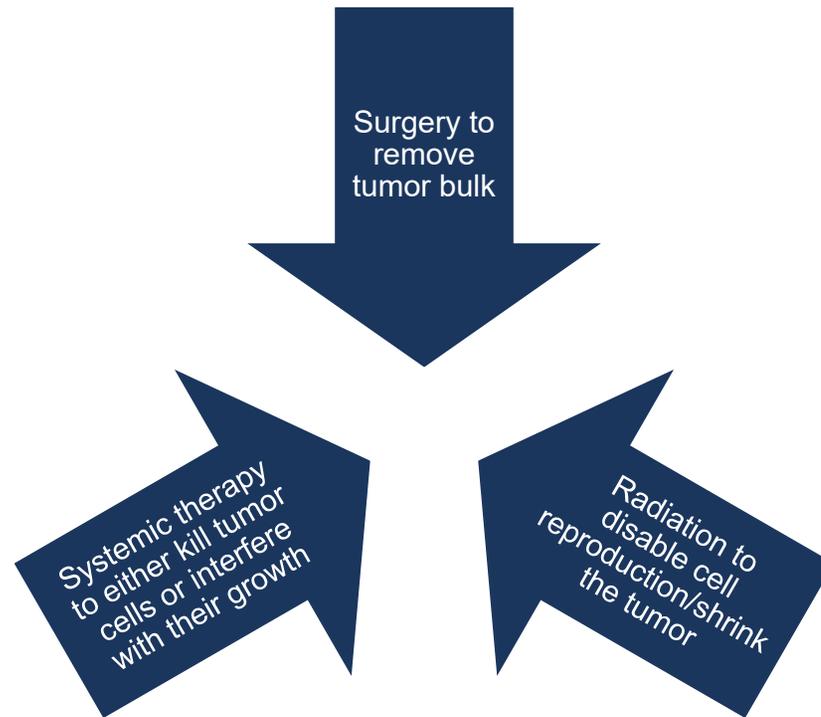


# Microbiome and Neuropathology

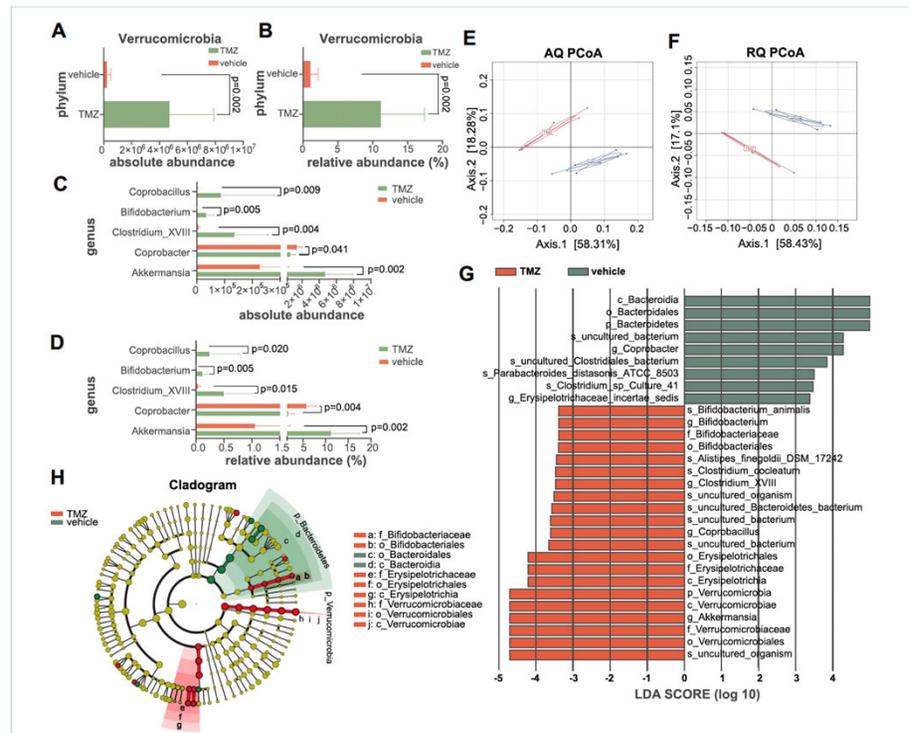


Jiang et al

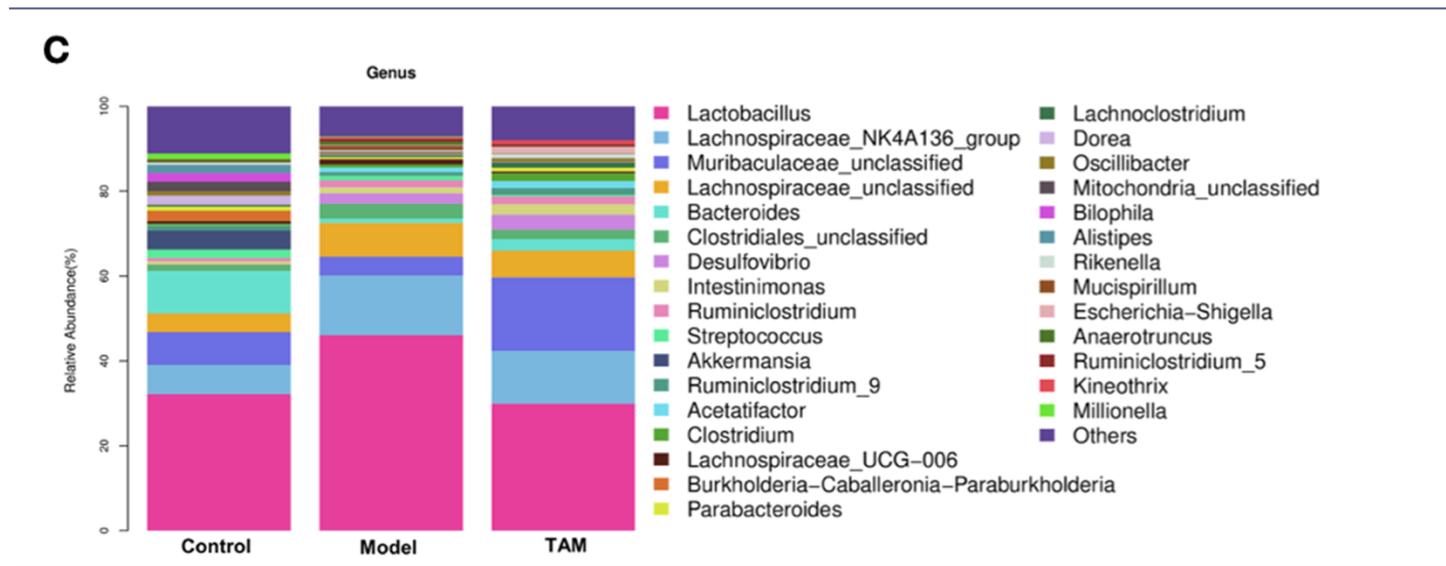
# Impact of Cancer Directed Treatments



# Impact of Cancer-Directed Treatments



# Tamoxifen



*Li et al*

# Caution

## Immunocompromised patients

- Stem or solid organ transplant
- Immunosuppressive agents for autoimmune disease
- Corticosteroids
- Chemotherapy
- Radiation

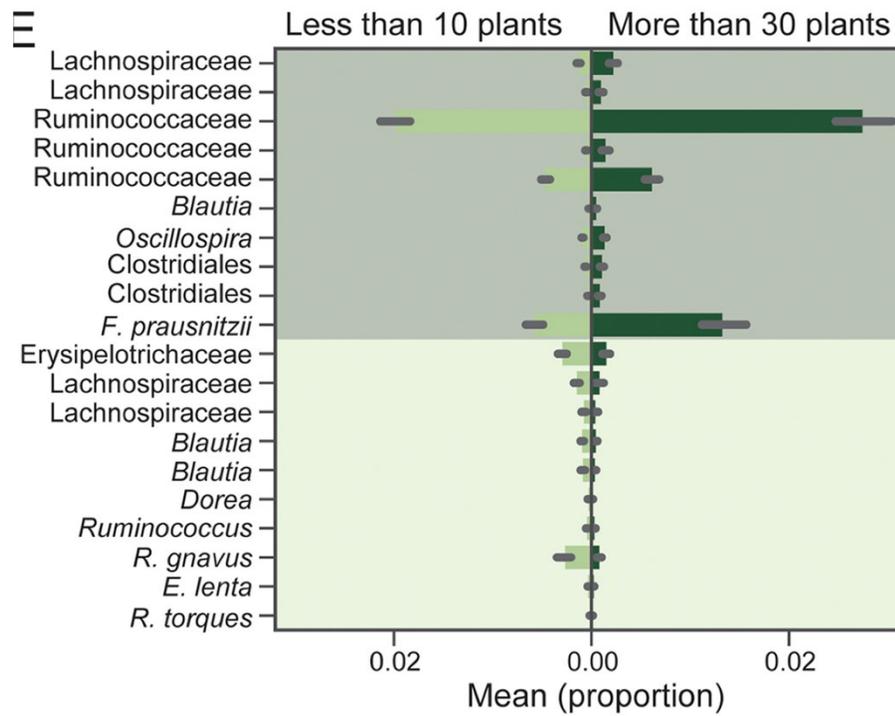
# Caution

- Indwelling medical devices (central venous catheters)
- Severe acute pancreatitis
- Critically ill patients (organ failure)
- Cardiac valve abnormality
- History of endocarditis
- Previous bowel surgery and short gut syndrome
- Diabetes
- Lactose and yeast allergy/hypersensitivity

# What else can we do?

- Nutrition
- Exercise
- Vitamin D
- Mind Body approaches
- Sleep

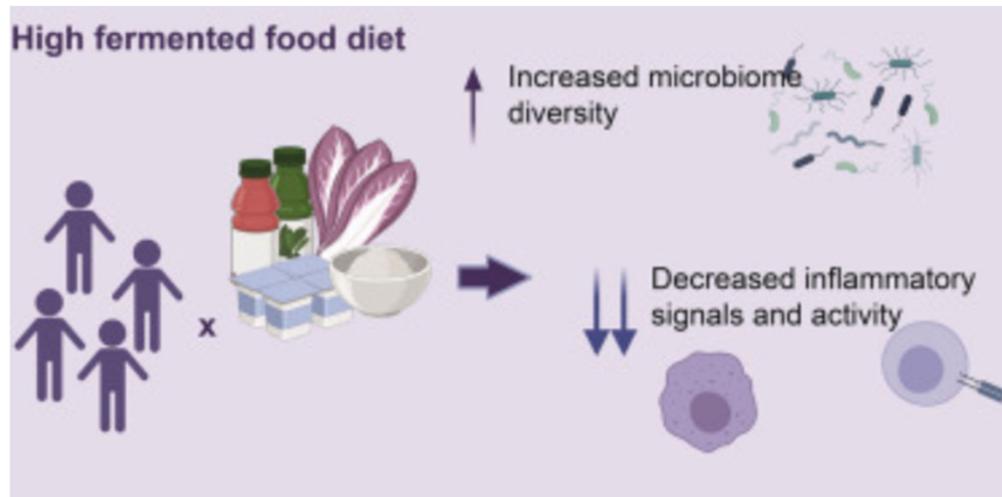
# Nutrition



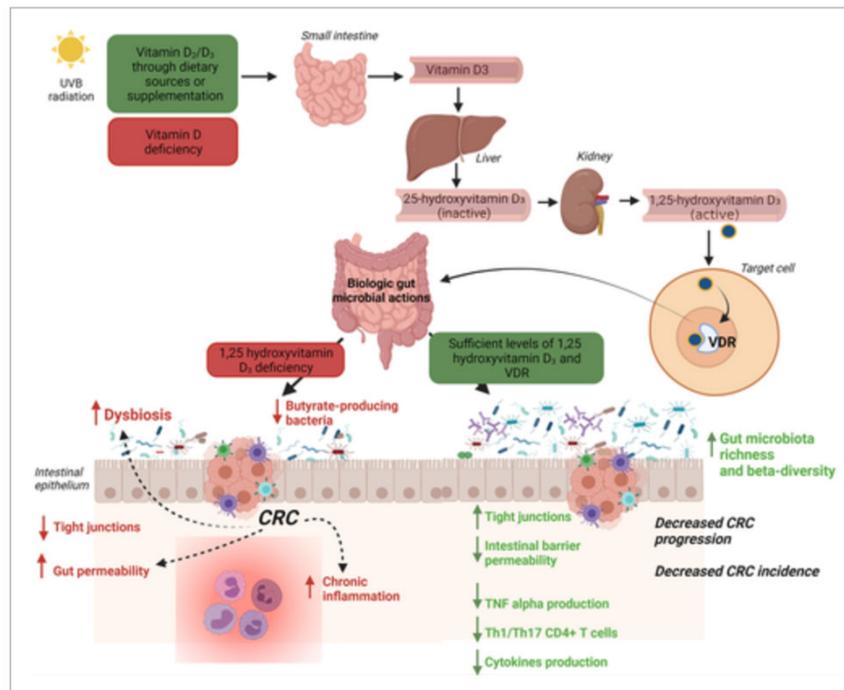
# Nutrition

- Fruit and vegetables
- Legumes
- Grains
- Nuts and seeds
- Herbs and spices

# Nutrition

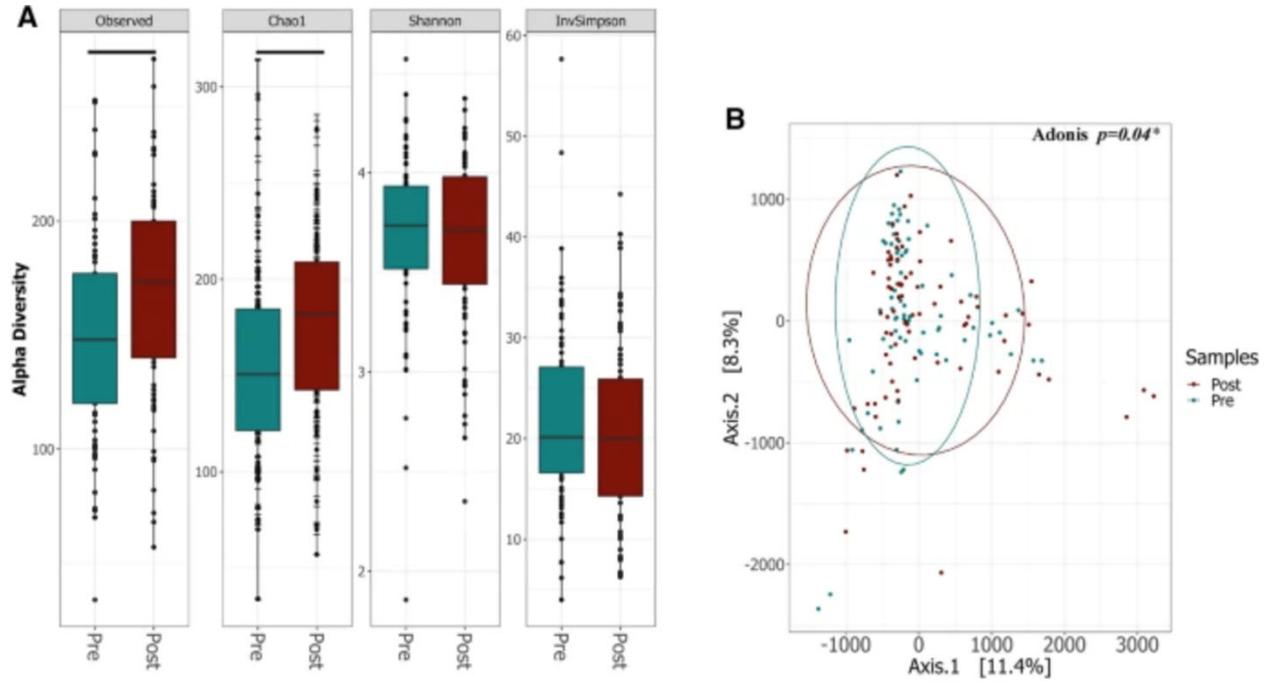


# Vitamin D

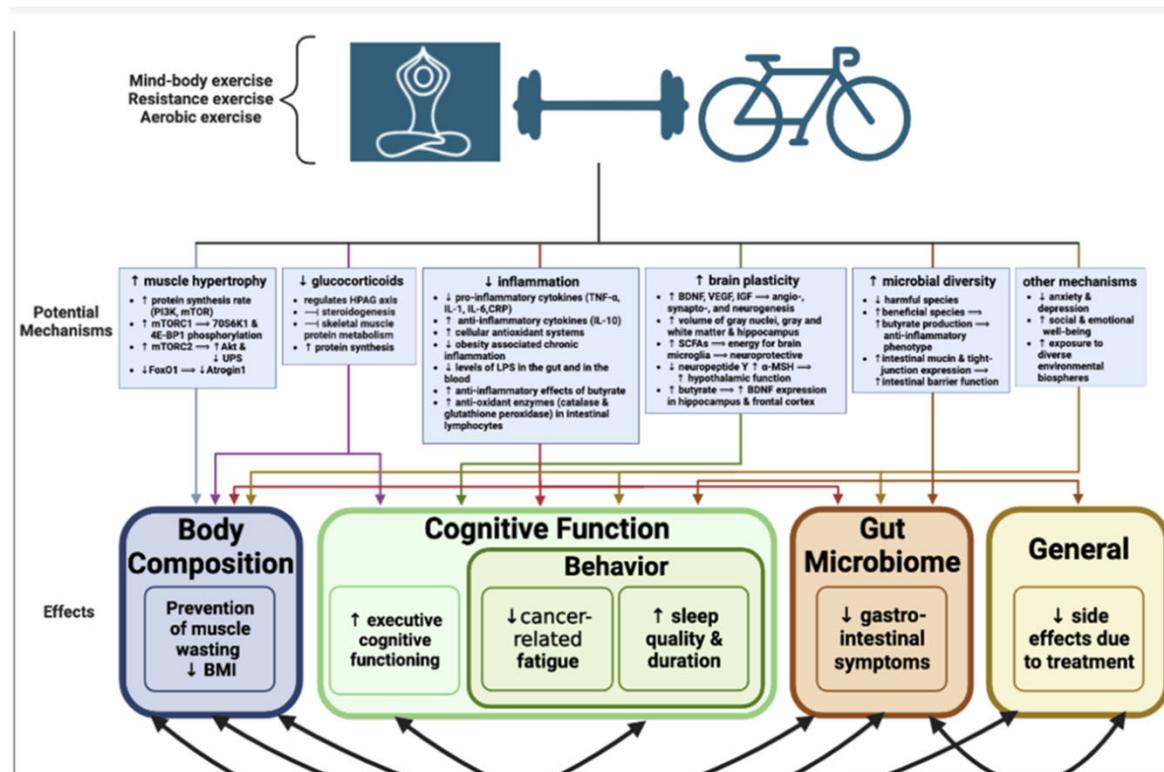


# Vitamin D

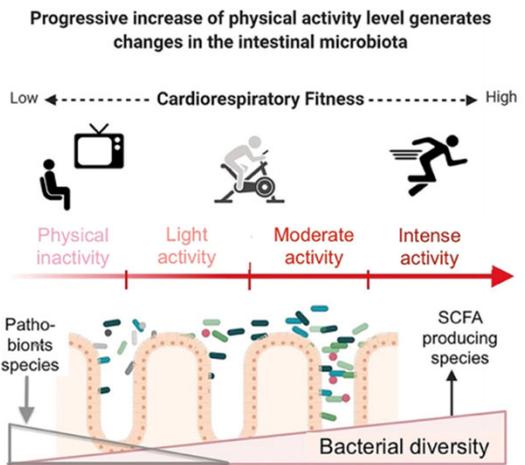
Figure 3



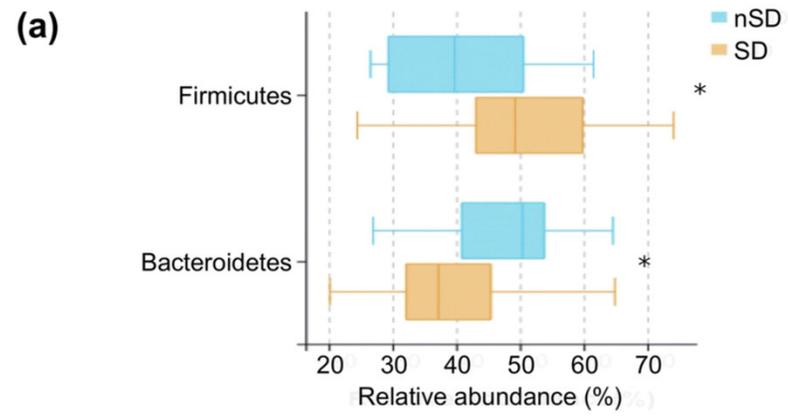
# Exercise



# Exercise



# Sleep



## Conclusion

- High interest in and use of integrative therapies by our patients, at all stages of diagnosis and treatment
- There is a strong need to understand the strategies we have the best evidence for and help patients avoid unsafe or expensive strategies that may not be helpful.
- Need for more research on safety and efficacy of integrative therapies and guidelines for practitioners to help patients navigate these approaches

# SIO Clinical Practice Guidelines

**CHEST** Supplement  
DIAGNOSIS AND MANAGEMENT OF LUNG CANCER, 3RD ED, ACCP GUIDELINES

**Complementary Therapies and Integrative Medicine in Lung Cancer**  
Diagnosis and Management of Lung Cancer, 3rd ed: American College of Chest Physicians

**Clinical Practice Guidelines on the Use of Integrative Therapies as Supportive Care in Patients Treated for Breast Cancer**

Heather Greenlee, Lynda G. Balneaves, Linda E. Carlson, Misha Cohen, Gary Deng, Dawn Hershman, Matthew Mumber, Jane Perlmutter, Dugald Seely, Amanda Sen, Suzanna M. Zick, Debu Tripathy, for the Society for Integrative Oncology Guidelines Working Group

Correspondence to: Heather Greenlee, ND, PhD, MPH, Department of Epidemiology, Mailman School of Public Health, Columbia University, 722W, 168th Street, 3th Floor, New York, NY 10032 (e-mail: [hg2101@columbia.edu](mailto:hg2101@columbia.edu)).

**Clinical Practice Guidelines on the Evidence-Based Use of Integrative Therapies During and After Breast Cancer Treatment**

Heather Greenlee, ND, PhD, MPH<sup>1,2</sup>, Melissa J. DuPont-Reyes, MPH, MPH<sup>1,2</sup>, Lynda G. Balneaves, RN, PhD<sup>3</sup>, Linda E. Carlson, PhD<sup>3</sup>, Misha R. Cohen, OMD, LAc<sup>4,5</sup>, Gary Deng, MD, PhD<sup>6</sup>, Jillian A. Johnson, PhD<sup>7</sup>, Matthew Mumber, MD<sup>8</sup>, Dugald Seely, ND, MSc<sup>1,12</sup>, Suzanna M. Zick, ND, MPH<sup>13,14</sup>, Lindsay M. Boyce, MLIS<sup>15</sup>, Debu Tripathy, MD<sup>16</sup>

**Abstract:** Patients with breast cancer commonly use complementary and integrative therapies as supportive care during cancer treatment and to manage treatment-related side effects. However, evidence supporting the use of such therapies in the oncology setting is limited. This evidence-based clinical practice guideline from the Society for Integrative Oncology (SIO) provides guidance on the use of integrative therapies during and after breast cancer treatment.

JOURNAL OF CLINICAL ONCOLOGY | ASCO SPECIAL ARTICLE

**Integrative Therapies During and After Breast Cancer Treatment: ASCO Endorsement of the SIO Clinical Practice Guideline**

Gary H. Lyman, Heather Greenlee, Kari Bohlik, Ting Bao, Angela M. DeMichele, Gary E. Deng, Judith M. Fossella-Balch, Brigitte Gill, Dawn L. Hershman, Sami Mansfield, Dawn M. Mussallem, Karen M. Mustian, Erin Price, Susan Raffo, and Lorenzo Cohen

**Purpose**

The Society for Integrative Oncology (SIO) produced an evidence-based guideline on use of integrative therapies during and after breast cancer treatment that was determined to be relevant to the American Society of Clinical Oncology (ASCO) membership. ASCO considered the guideline for endorsement.

**Methods**

The SIO guideline addressed the use of integrative therapies for the management of symptoms and adverse effects, such as anxiety and stress, mood disorders, fatigue, quality of life, chemotherapy-induced nausea and vomiting, lymphedema, chemotherapy-induced peripheral neuropathy, pain, and sleep disturbance. Interventions of interest included mind and body practices, natural products, and lifestyle modifications. SIO systematic reviews focused on randomized controlled trials that were published from 1990 through 2015. The SIO guideline was reviewed by ASCO content experts for clinical accuracy and by ASCO methodologists for developmental rigor. On favorable review, an ASCO Expert Panel was convened to review the guideline contents and recommendations.

**Results**

**Integrative Medicine for Pain Management in Oncology: Society for Integrative Oncology-ASCO Guideline**

**Integrative Medicine for Pain Management in Oncology: Society for Integrative Oncology-ASCO Guideline Summary and Q&A**

Jun J. Mao, MD, MSc<sup>1</sup>, Heather Greenlee, PhD, ND<sup>1</sup>, Ting Bao, MD<sup>1</sup>, Nofisat Ismaila, MD<sup>1</sup>, and Eduardo Bruera, MD<sup>2</sup> on behalf of the SIO-ASCO Expert Panel

People with cancer now live longer, thanks to improved diagnosis and treatments; however, many experience pain related to their disease and ongoing or past oncological treatment. Pain not only negatively affects quality of life and daily functioning<sup>1</sup> but also leads to treatment nonadherence that may compromise overall survival.<sup>2</sup> Therefore, effective pain management is critical throughout the cancer care trajectory. In 2016, the Centers for Disease Control and Prevention began emphasizing the importance of incorporating non-pharmacological approaches to pain management.<sup>3</sup>

This Society for Integrative Oncology (SIO)-ASCO joint guideline<sup>4</sup> builds on the existing ASCO guideline Management of Chronic Pain in Survivors of Adult Cancers<sup>5</sup> and was developed by an international multidisciplinary group of experts to provide evidence-based recommendations on integrative approaches to managing pain in people living with cancer. The evidence base comprises systematic reviews, meta-analyses, and randomized controlled trials published from 1990 through 2021 that involved adults and pediatric patients experiencing pain during any stage of their cancer care. The panel also identified critical gaps in knowledge, evidence, and implementation, including those fueled by health care inequities and barriers to trial participation and offers guidance on advancing the field of precision integrative pain management so that the right patient receives the right treatment to improve pain and related outcomes.

In this summary, we specifically highlight the four strongest recommendations from the guideline that are minimally based on intermediate-level evidence, benefit outweighing risk, and with moderate strength of recommendation (Fig 1). The guideline makes a total of 13 recommendations. Please refer to the guideline for recommendations with lower levels of evidence and their evidence review discussions.<sup>6</sup>

**QUESTION: WHAT SPECIFIC FINDINGS CAN I SHARE WITH PATIENTS FOR ACUPUNCTURE OR MASSAGE THERAPIES TO IMPROVE CANCER PAIN?**

The decision to use acupuncture with other treatments for AI-related or musculoskeletal pain needs to be based on patient preference, an assessment of benefit versus risk, and access to acupuncture. Patients should seek acupuncture from providers who are licensed and have experience working with patients with cancer. Patients should be aware that treatment may require 6-10 weekly sessions to achieve durable effects.<sup>7,8</sup> Acupuncture is covered by Medicare for chronic low back pain,<sup>9</sup> but insurance coverage for other pain conditions is mixed depending on the insurance plan. Many patients will need to pay out of pocket for acupuncture services.

**QUESTION: WHAT ARE THE KEY TAKEAWAYS FOR CLINICIANS ON INTEGRATIVE THERAPIES FOR MANAGING PAIN EXPERIENCED BY PEOPLE WITH CANCER?**

Acupuncture should be offered to breast cancer survivors on aromatase inhibitors (AIs) who have arthralgias.<sup>10</sup> Studies show that joint pain results in AI nonadherence,<sup>7,8</sup> which can lead to increased recurrence and mortality for women living with breast cancer.<sup>7</sup> In a large multicenter randomized controlled trial, true acupuncture was more effective than sham acupuncture and usual care control with a greater proportion of individuals experiencing a clinically meaningful response, defined as a two-point reduction in pain on a 0-10 scale.<sup>11</sup>

Acupuncture may also be offered to patients experiencing general or musculoskeletal pain from cancer. A large effect size after 10 weeks of treatment was demonstrated with minimal toxicities and durable treatment effects at 6 months after random assignment.<sup>12</sup> Massage therapy can also be recommended, particularly for patients experiencing pain during palliative and hospice care.<sup>10</sup> The immediate beneficial effect on pain was clinically significant in patients with advanced cancers who had moderate-to-severe pain, with no side effects observed; however, the long-term effects of massage are unknown.

Mind-body therapies such as yoga are generally safe but have more robust evidence for managing psychological distress and fatigue.<sup>13</sup> There is insufficient or inconclusive evidence to make recommendations for pediatric patients.

The strongest recommendation in the guideline<sup>6</sup> across both anxiety and depression symptoms is that Mindfulness-Based Interventions (MBIs) should be offered to people with cancer both during active treatment and post-treatment. This recommendation is based on several meta-analyses and systematic reviews that included up to 29 individual randomized controlled trials (RCTs). MBIs are typically modeled on Mindfulness-Based Stress Reduction and offered in group format with weekly meetings (either in person or virtually) over a period of 6-9 weeks. Participants learn skills of mindfulness through daily home practice of various forms of meditation, gentle movement, didactic teaching about stress, coping and the mind-body connection, and group support and discussion. It is of note that MBIs are also included in the updated 2023 ASCO anxiety and depression guidelines<sup>14</sup> focused on conventional care, demonstrating that with an increasingly strong evidence-base, MBIs are now becoming mainstream.

The next strongest recommendation is that yoga may be offered to people with cancer for both anxiety and depression symptom reduction across the treatment trajectory. Similarly, this is supported by six systematic reviews of RCTs. Most yoga interventions in these studies involved therapeutic or restorative Hatha yoga classes on a weekly or twice per week schedule, for at least 6 weeks.

During cancer treatments such as surgery, chemotherapy or radiation therapy, music therapy, relaxation therapies, and reflexology may be offered to reduce both anxiety and depression symptoms in people with cancer while hypnosis and lavender essential oil inhalation may be recommended to help specifically with anxiety symptoms during diagnostic and treatment procedures. These therapies are especially well suited for people during treatment as they often require little energy to undertake and allow different levels of engagement for those who may feel fatigued or less motivated.

Finally, tai chi or qigong programs may be considered to help alleviate symptoms of both depression and anxiety post-treatment, and reflexology may be recommended for anxiety. Acupuncture may also be considered for women with breast cancer to reduce anxiety symptoms post-treatment.

**Integrative Oncology Care of Symptoms of Anxiety and Depression in Adults With Cancer: Society for Integrative Oncology-ASCO Guideline**

Linda E. Carlson, RPsych, PhD<sup>1</sup>, Nofisat Ismaila, MD<sup>2</sup>, Elizabeth L. Addington, PhD<sup>3</sup>, Gary N. Asher, MD, MPH<sup>4</sup>, Chloe Atreya, MD, PhD<sup>5</sup>, Lynda G. Balneaves, RN, PhD<sup>6</sup>, Joke Bradt, MT-BC<sup>7</sup>, Nina Fuller-Shavel, MB BC<sup>8</sup>, MA<sup>9</sup>, Joseph Goodman, MD<sup>10</sup>, Caroline J. Hoffman, OAM, BN, BSW, PhD<sup>11,12</sup>, Alicia Iannone, MD<sup>13</sup>, Ashwin Mehta, MD<sup>14</sup>, Channing L. Diller, MD<sup>15</sup>, Kimberly Richardson, MA<sup>16</sup>

**Integrative Oncology Care of Symptoms of Anxiety and Depression in Adults With Cancer: SIO-ASCO Guideline Summary and Q&A**

Linda E. Carlson, RPsych, PhD<sup>1</sup>, Nofisat Ismaila, MD<sup>2</sup>, Elizabeth L. Addington, PhD<sup>3</sup>, Gary N. Asher, MD, MPH<sup>4</sup>, Joke Bradt, PhD, MT-BC<sup>7</sup>, Ashwin Mehta, MD<sup>14</sup>, and Julia H. Rowland, PhD<sup>15</sup>, on behalf of the SIO-ASCO Expert Panel

DOI: <https://doi.org/10.1200/JCO.2023.09.038>

**INTRODUCTION**

Cancer takes a substantial psychological toll on affected individuals. Research shows that people living with cancer have a significantly elevated risk of developing a mental health disorder at any time after diagnosis compared with the general population.<sup>1-3</sup> Furthermore, anxiety and depression symptoms have long been associated with lower quality of life and higher mortality in people with cancer.<sup>4-6</sup> Despite this, their psychological symptoms are often underrecognized and undertreated.<sup>7-9</sup> As the number of people living with cancer continues to grow,<sup>10</sup> so does the challenge to health care providers of meeting their mental health needs. Increasing awareness and timely use of integrative as well as conventional evidence-based interventions to address these needs is critical if we are to reduce the burden of cancer internationally.

**QUESTION: WHAT ARE THE MAIN TAKEAWAYS?**

The strongest recommendation in the guideline<sup>6</sup> across both anxiety and depression symptoms is that Mindfulness-Based Interventions (MBIs) should be offered to people with cancer both during active treatment and post-treatment. This recommendation is based on several meta-analyses and systematic reviews that included up to 29 individual randomized controlled trials (RCTs). MBIs are typically modeled on Mindfulness-Based Stress Reduction and offered in group format with weekly meetings (either in person or virtually) over a period of 6-9 weeks. Participants learn skills of mindfulness through daily home practice of various forms of meditation, gentle movement, didactic teaching about stress, coping and the mind-body connection, and group support and discussion. It is of note that MBIs are also included in the updated 2023 ASCO anxiety and depression guidelines<sup>14</sup> focused on conventional care, demonstrating that with an increasingly strong evidence-base, MBIs are now becoming mainstream.

The next strongest recommendation is that yoga may be offered to people with cancer for both anxiety and depression symptom reduction across the treatment trajectory. Similarly, this is supported by six systematic reviews of RCTs. Most yoga interventions in these studies involved therapeutic or restorative Hatha yoga classes on a weekly or twice per week schedule, for at least 6 weeks.

During cancer treatments such as surgery, chemotherapy or radiation therapy, music therapy, relaxation therapies, and reflexology may be offered to reduce both anxiety and depression symptoms in people with cancer while hypnosis and lavender essential oil inhalation may be recommended to help specifically with anxiety symptoms during diagnostic and treatment procedures. These therapies are especially well suited for people during treatment as they often require little energy to undertake and allow different levels of engagement for those who may feel fatigued or less motivated.

Finally, tai chi or qigong programs may be considered to help alleviate symptoms of both depression and anxiety post-treatment, and reflexology may be recommended for anxiety. Acupuncture may also be considered for women with breast cancer to reduce anxiety symptoms post-treatment.

Accepted June 18, 2023  
Published August 15, 2023

JCO Oncol Pract 00:1-6  
© 2023 by American Society of Clinical Oncology



View Online Article