Fred Hutch Cancer Center

Supplement Use: Decoding the Confusion by a Registered Dietitian's Perspective

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Disclosures

None

- I am an employee of Fred Hutch Cancer Center.
- I receive no compensation, financial or otherwise, from any supplement manufacturers.
- This talk is not a substitute for Medical Nutrition Therapy or Medical Advice.
- Consult with your medical team for individualized recommendations.

Outline

- Definitions
- Supplements and Cancer Risk
- Decoding the Evidence
  - RD Recommendations
- Putting Science on Your Plate
- Q +A

Supplement Industry

- Global market size valued at $712 billion in 2023.
- Expected to grow to > $1.25 trillion in 2030.
- Marketing is rampant:
  - Make sure your healthcare team knows all supplements, natural products and/or anything over the counter you are taking.
- The healthcare team: :
  - Should ask at every visit if you are taking anything new.
  - Provide safe, evidence-based recommendations regarding dietary supplements and natural products.
  - Refer to experts if they do not know the answer.
    - RD
    - Pharm D
    - Integrative Medicine providers w/expertise in oncology.

Definition: **Supplement** vs Nutraceutical

- Dietary supplements primarily aim to supplement the diet + address nutritional deficiencies.
- For example, vitamin D deficiency.
- Common supplements include:
  - Vitamins (multivitamins or individual vitamins)
  - Minerals (calcium, magnesium, etc.)
  - Amino acids (tryptophan, glutamine, etc.)
  - Live microbials (commonly referred to as “probiotics”)

- Dietary supplements must comply with the Dietary Supplement Health and Education Act (DSHEA).
- Can only make claims about the role of a nutrient in affecting the structure or function of the body **without** suggesting they can treat or prevent diseases.

Definition : Supplement vs **Nutraceutical**

Nutraceuticals lack a standardized regulatory definition, leading to varying classifications and regulations across different countries. Depending on the jurisdiction, they can be regulated as foods, drugs, or dietary supplements.

1

Nutraceuticals are marketed to provide medicinal or health benefits, including the prevention and treatment of diseases.

2

They are often purported to improve overall health, delay aging, and support specific bodily functions.

3

There are no internationally agreed definitions of ‘nutraceuticals’ and ‘functional foods’, or of similar terms.

4

Nutraceuticals can make broader claims about their ability to prevent or treat specific health conditions based on their combination of ingredients.

Important to know:

Label

- Manufacturers suggest the serving size, but your healthcare provider might decide a **different amount** is right for you.

Effectiveness:

- Some supplements can improve health and manage certain conditions (calcium and vitamin D to reduce bone loss)
- Many supplements **need more study** to determine if they have value.

Safety + Risk

- Can **interact** with some medicines in ways that might cause problems.
- Vitamin K + warfarin
- Antioxidants + chemotherapy and/or radiation

Quality

- **Seek products with independent third-party testing**. This does not guarantee safety or effectiveness, but indicates proper manufacturing, accuracy of ingredients listed on label, and absence of harmful levels of contaminants.

Keep in Mind:

The term natural doesn’t always mean safe.

Before taking any supplements, ask yourself and your doctor:

- What are the potential benefits?
- Does it have safety risks?
- What is the proper dose?
- How, when, and for how long should I take it?

Supplements and Cancer Risk

From the American Institute for Cancer Research:

- Do not use supplements for cancer prevention.
- Aim to meet your nutritional needs through diet alone.
- We advise against the use of supplements as protection against specific cancers.

https://www.aicr.org/cancer-prevention/recommendations/do-not-use-supplements-for-cancer-prevention/

Categories that may require Supplements

- Bariatric Surgery
- Oncologic GI Surgery (ie: Whipple)
- Malabsorption
- Medication-Induced Wasting
- Anemias
- Medication requirements
- Restrictive Diets (Vegan, Keto)

Omega-3 Fatty Acids (Fish Oil)

Claim

- Some studies indicate that omega-3s may prevent cancer and heart disease.

Evidence

- Fish oil contains omega-3 fatty acids, which helps the body absorb nutrients and fend off inflammation.
- Unclear if fish oil acts alone or with other food chemicals to provide cancer protection.
- Most people can tolerate up to 3,000 milligrams per day of fish oil.
- Higher doses may impair the immune system, increase bleeding and stroke risk.
- People with very low platelets should avoid products with anticoagulant/thrombocytopenic effects to decrease the risk of major bleeding.

RD Recommendation

- Instead of using fish oil, include oily fish, such as salmon and tuna, in your diet.
- Meat sources of omega-3 include fatty fish: sardines, anchovies, mackerel, albacore tuna, krill, and swordfish.
- Plant-based sources include walnuts, flaxseed oil, canola oil, chia seeds, and soybeans.
- 3 oz salmon = ~1200 mg; 3 oz sardines = ~2000 mg, ¼ cup walnuts = 2500 mg, 1 Tbs flaxseed oil = ~3500 mg

- Focus on omega-3 to omega-6 ratio
- Goal = include more omega-3 vs omega-6
- Focus on plant-based eating pattern=
- 2/3 plate plant-based, 1/3 plate animal-based

Turmeric

Claim

- Turmeric, a curry spice, has anti-inflammatory properties.
- Contains an antioxidant called curcumin.
- Antioxidants protect your cells from damage.
- Curcumin can also reduce swelling and pain.

Evidence

- Evidence is currently inadequate to recommend curcumin-containing products to be used as adjuncts for the cancer treatment/prevention.
- More research is needed to confirm its efficacy and safety for cancer therapy.
- High in oxalates; patients with oxalate kidney stones should avoid.
- Overall, the development of turmeric for clinical use needs further investigation due to its inherent poor absorption, rapid metabolism, complex mechanistic profile, and largely preclinical data.

RD Recommendation

- Use as a spice in cooking or in tea.
- 1 tsp dried turmeric = 200 mg curcumin.
- Piperine in black pepper significantly increases the absorption of curcumin.

- Golden Milk Popsicle Recipe from AICR:
- https://www.aicr.org/cancer-prevention/recipes/golden-milk-popsicle/
- If a patient is experiencing unexplained liver or kidney toxicity, inquire about the use of dietary supplements and herbal products.

Vitamin D (Chole- or Ergocalciferol)

Claim

- Vitamin D supplementation reduces cancer risk.
- Vitamin D helps control cell growth and holds promise for cancer prevention.

Evidence

- Research hasn't determined what dose of Vitamin D is effective or safe for cancer prevention.
- Eat vitamin D rich foods such as oily fish, milk + fortified cereals.
- Continue to wear sunscreen; even though our bodies manufacture vitamin D as a result of sun exposure, it isn't worth the skin cancer risk.

RD Recommendation

Eat vitamin D rich foods.

Foods that are high in vitamin D

This chart shows foods that are high in vitamin D. The amount of vitamin D is listed below. Please note that the actual amount of vitamin D depends on the brand.

Food	Serving size	Vitamin D
Seafood		
Herring	3 ounces	32 mcg
Halibut	3 ounces	13 mcg
Canned salmon	3 ounces	13 mcg
Mackerel	3 ounces	8 mcg
Canned tuna	3 ounces	5 mcg
Shrimp	3 ounces	4 mcg
Sardines	2 each	1.5 mcg
Milk and soy products		
Milk (nonfat, 1%, 2%, whole, buttermilk)	1 cup	2.5 mcg
Soy milk, calcium/vitamin D fortified	1 cup	2.5 mcg
Tofu	1/3 cup	3 mcg
Other		
Juice, calcium/vitamin D fortified	1 cup	2.5 mcg

Daily calcium and vitamin D requirements

This chart shows the daily amount of calcium and vitamin D you should have based on your age and sex assigned at birth.

Age and sex	Calcium	Vitamin D
Female 19 –70 years Male 19 – 70 years Male or female over 70 years	1200 mg 1000 mg 1200 mg	15 mcg 15 mcg 20 mcg
Receiving steroid therapy: Over 18 years	1500 mg	25 mcg
Adults with osteopenia or osteoporosis	1500 mg	25 mcg

https://patient-education.fredhutch.org/documents/Calcium%20and%20Vitamin%20D.pdf

Green Tea (epigallocatechin-3-gallate (EGCG))

Claim

- Green tea reduces cancer risk.

Evidence

- Contains plant chemicals called polyphenols that act as antioxidants and anti-inflammatories.
- The AICR Third Expert Report identifies limited evidence that tea may reduce risk of bladder cancer.
- The Expert Panel for the AICR Third Expert Report categorized evidence for other cancers — including mouth, pharynx and larynx; nasopharynx; lung; stomach; pancreas; gallbladder; liver; colorectum; breast; ovary; endometrium; prostate; and kidney — as too limited to draw a conclusion.

RD Recommendation

- Enjoy!
- Consider different varieties such as:
  - Green Tea (1 cup = ~180 mg EGCG)
  - Matcha (1 tsp = 60-200 mg EGCG)
- Levels may vary widely depending on the product and preparation.
- Green tea extracts or pills are not recommended due to risk of liver toxicity.
- EGCG can interfere with folate metabolism; a B vitamin essential for fetal growth and development. **You should not take EGCG supplements if you are pregnant.**

Lycopene

Claim

- Lycopene reduces cancer risk.

Evidence

- No conclusive data.

- **RD Recommendation:** Eat foods rich in lycopene. Do not use supplements.

Why are supplements not the same as food? Example 1.

ATBC trial

- Researchers noted that diets rich in beta-carotene seemed to reduce lung cancer risk in smokers.
- Beta-carotene supplements were tested by smokers as a preventive strategy, BUT cancer risk increased.
- Why is there a difference?
  - High dietary intake of fruit and vegetables has been associated with reduced risk of cancer and heart disease.
  - Although beta-carotene supplements do not appear to prevent or effectively treat cancer, beta-carotene obtained from the diet may be beneficial.
  - This is because it may interact with other phytochemicals in fruits and vegetables and have a greater effect on the body than do supplements.

Why are supplements not the same as food? Example 2.

SELECT trial

- Clinical trial to see if selenium and/or Vitamin E could help prevent prostate cancer when taken as dietary supplements.
- Men who took vitamin E alone =17% relative ↑ in numbers of prostate cancers compared to placebo (statistically significant).
- Men taking selenium alone, or vitamin E + selenium=more likely to develop prostate cancer compared to placebo (not statistically significant).
- The observation that the risk of prostate cancer has continued to increase suggests that vitamin E may have long-term effects on prostate cancer risk.
- Men who had high levels of selenium at the start of the trial had ~2x chance of developing a high-grade prostate cancer if they took the selenium supplement compared to men with low levels of selenium at the start of the trial.

Sulforaphane (Broccoli Sprouts)

Claim

- Prevents cancer.

Evidence

- No evidence to support this claim.
- Larger studies are needed to determine the chemopreventive potential of broccoli sprouts.
- Using high-dose broccoli sprout supplements while on chemotherapy can increase nausea/vomiting.

- **RD recommendation:** It's safe to include broccoli and broccoli sprouts in your diet. Talk with your healthcare providers before taking them as supplements.

Fiber supplements

Four clinically meaningful designations:

1. Insoluble, poorly fermented
    - Wheat bran; can exert laxative effect

2. Soluble, nonviscous, readily fermented
    - Inulin, wheat dextran, oligosaccharides, resistant starches; prebiotic, no laxative effect

3. Soluble viscous/gel forming, readily fermented
    - Beta-glucans, raw guar gum; improves glycemic control, lowers elevated cholesterol, no significant laxative effect

4. Soluble viscous/gel forming, nonfermented
    - Psyllium; improves glycemic control, lowers elevated cholesterol, softens hard stool in constipation, firms liquid stool in diarrhea, normalizes stool form in IBS

Whole Food Fiber Sources

Plants!

- All foods of plant origin have some amount of fiber.
- The closer the food looks like something you can find in nature, the more fiber it has.
- With a balanced diet and 3 meals per day you will likely be eating enough fiber.

Fiber and Phytochemicals

Goal	Sources	Serving
• 30 grams/day • ~10% Americans meet this goal	• Fruit • Vegetables • Whole grains • Nuts/seeds • Beans	• ½ cup cooked whole grain • 1 cup whole grain cereal • 1 cup raw fruit/vegetable • ½ cup cooked fruit/vegetable • ~1.5 oz whole nuts • 2 Tb nut butter

Modes of Gut Microbiome Modulation: Diet

The American Gut Project

The number of plant types you eat plays a role in the diversity of their gut microbiome.

Participants who ate >30 different plant types/week had gut microbiomes that were more diverse than those who ate 10 or fewer plant types/week.

This is likely why fiber supplements do not have the same metabolic/microbiome effect.

To learn more or participate, visit AmericanGut.org.

It's not all about Probiotics

Prebiotics

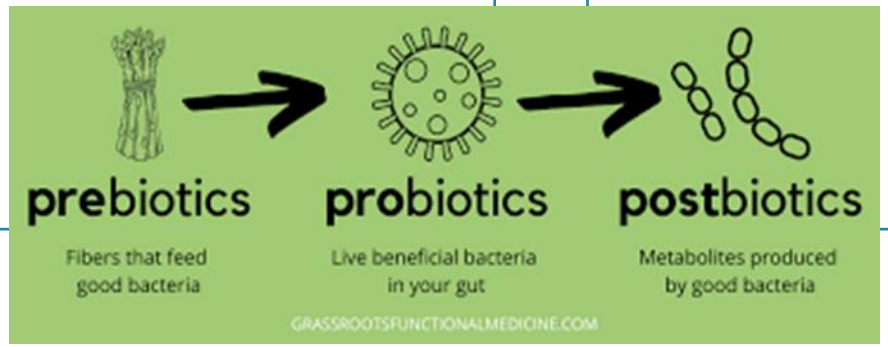
- Consist of nondigestible food ingredients (undigested fibers that support the growth of beneficial bacteria)
- **Examples**: whole grains, bananas, onions, garlic, artichokes

Probiotics

- Contain a defined amount of viable microorganism that upon administration, confer a benefit to the host
- **Examples:** pasteurized food sources (yogurt, kefir, acidophilus milk)

Postbiotics

- "End game" of probiotics and prebiotics – released from gut bacteria that are fed nondigestible food ingredients (undigested fibers) that support the growth of beneficial bacteria
- **Examples:** Short-chain fatty acids, vitamins, amino acids, lipopolysaccharides



Staffas, 2016

Probiotic supplementation

Interest in probiotics is growing, especially considering current research into probiotics increasing efficacy of immunotherapy

- While promising, we do not encourage self replication of clinical trials
- To aid the diversity of your gut microbiome we recommend a balanced diet including a wide variety of plant foods

Micronutrient supplementation

- Recommended if the diet is deficient in any specific micronutrient or there is a blood deficiency of any specific micronutrient.

- **There is no value to supplementing micronutrients more than the DV, and potential negative consequences.**

Multivitamins/minerals (MVM)

- MVM can help protect against vitamin or mineral deficiencies if we are eating lower amounts of food due to cancer treatment.
- Valuable if we have poor diet quality.
- When selecting MVM search for products that are as close to 100% of the DV for each micronutrient.

Supplement Facts

Serving Size 1 Gelcap
Servings Per Container 100

	Amount Per Serving	% Daily Value
Vitamin A (as retinyl acetate and 50% as beta-carotene)	900 mcg	100%
Vitamin C (as ascorbic acid)	90 mg	100%
Vitamin D (as cholecalciferol)	20 mcg (800 IU)	100%
Vitamin E (as dl-alpha tocopheryl acetate)	15 mg	100%
Thiamin (as thiamin mononitrate)	1.2 mg	100%
Riboflavin	1.3 mg	100%
Niacin (as niacinamide)	16 mg	100%
Vitamin B_6 (as pyridoxine hydrochloride)	1.7 mg	100%
Folate	400 mcg DFE (240 mcg folic acid)	100%
Vitamin B_{12} (as cyanocobalamin)	2.4 mcg	100%
Biotin	3 mcg	10%
Pantothenic Acid (as calcium pantothenate)	5 mg	100%

Other ingredients: Gelatin, lactose, magnesium stearate, microcrystalline cellulose, FD&C Yellow No. 6, propylene glycol, preservatives (propylparaben and sodium benzoate).

Putting Science on Your Plate

AICR RECOMMENDATIONS FOR CANCER PREVENTION

A Blueprint to Beat Cancer

To prevent cancer, people should aim to follow as many of the 10 Cancer Prevention Recommendations as possible. However, any change you make that works toward meeting the goals set out in the Recommendations will go some way to reducing your cancer risk.

BE A HEALTHY WEIGHT

Keep your weight within the healthy range and avoid weight gain in adult life

BE PHYSICALLY ACTIVE

Be physically active as part of everyday life – walk more and sit less

EAT A DIET RICH IN WHOLE GRAINS, VEGETABLES, FRUITS AND BEANS

Make whole grains, vegetables, fruits and pulses (legumes) such as beans and lentils a major part of your usual daily diet

LIMIT CONSUMPTION OF RED AND PROCESSED MEAT

Eat no more than moderate amounts of red meat, such as beef, pork and lamb. Eat little, if any, processed meat

LIMIT CONSUMPTION OF SUGAR-SWEETENED DRINKS

Drink mostly water and unsweetened drinks

LIMIT CONSUMPTION OF "FAST FOODS" AND OTHER PROCESSED FOODS HIGH IN FAT, STARCHES OR SUGARS

Limiting these foods helps control calorie intake and maintain a healthy weight

LIMIT ALCOHOL CONSUMPTION

For cancer prevention, it's best not to drink alcohol

FOR MOTHERS: BREASTFEED YOUR BABY, IF YOU CAN

Breastfeeding is good for both mother and baby

AFTER A CANCER DIAGNOSIS: FOLLOW OUR RECOMMENDATIONS, IF YOU CAN

Check with your health professional about what is right for you

DO NOT USE SUPPLEMENTS FOR CANCER PREVENTION

Aim to meet nutritional needs through diet alone

American Institute for Cancer Research®
www.aicr.org

Not smoking and avoiding other exposure to tobacco and excess sun are also important in reducing cancer risk.

Following these Recommendations is likely to reduce intakes of salt, saturated and trans fats, which together will help prevent other non-communicable diseases.

AICR's Foods that Fight Cancer™

No single food can protect you against cancer by itself.

But research shows that a diet filled with a variety of vegetables, fruits, whole grains, beans and other plant foods helps lower risk for many cancers. In laboratory studies, many individual minerals, vitamins and phytochemicals demonstrate anti-cancer effects. By including more foods that fight cancer into your diet, you will help reduce your risk of developing cancer.

APPLES

ASPARAGUS

BLUEBERRIES

BROCCOLI AND CRUCIFEROUS VEGETABLES

BRUSSELS SPROUTS

CARROTS

CAULIFLOWER

CHERRIES

COFFEE

CRANBERRIES

FLAXSEED

GARLIC

GRAPEFRUIT

GRAPES

KALE

ORANGES

PULSES: DRY BEANS, PEAS, AND LENTILS (LEGUMES)

RASPBERRIES

SOY

SPINACH

SQUASH (WINTER)

STRAWBERRIES

TEA

TOMATOES

WALNUTS

WHOLE GRAINS

Additional Resources:

- **AICR Healthy 10 Challenge**: https://healthy10challenge.org/

- **AICR Cancer Prevention Guidelines:** https://www.aicr.org/resources/media-library/10-cancer-prevention-recommendations/

- **Cook for Your Life:** https://www.cookforyourlife.org/

- **Memorial Sloan Kettering About Herbs:** https://www.mskcc.org/cancer-care/diagnosis-treatment/symptom-management/integrative-medicine/herbs

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Questions?

Thank you