



NUTRACEUTICALS IN ONCOLOGY

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Relevant Financial Disclosures

None



Presentation Outline



Today's Topics

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Background



Timeline



8000-5000 BCE

Well-established medicinal uses of plants in India and China

1910-1930

Identification of the "vital amine"
Diseases of deficiency that could be treated with food and synthesized vitamins

1920-1950

Isolation and synthesis of all major vitamins

First isolated vitamin was thiamine in 1926

1989

The term 'nutraceutical' was invented in 1989.
Same timeframe when herb drug interactions were first recognized

2021

The global dietary supplements market size was valued at USD 151.9 billion

Nutraceuticals



Definitions

Products isolated from foods that are generally sold in medicinal forms

A substance, which has physiological benefit or provides protection against chronic diseases

Used to improve health, delay the aging process, prevent chronic diseases, increase life expectancy, or support the structure or function of the body

Mediterranean Diet Pyramid

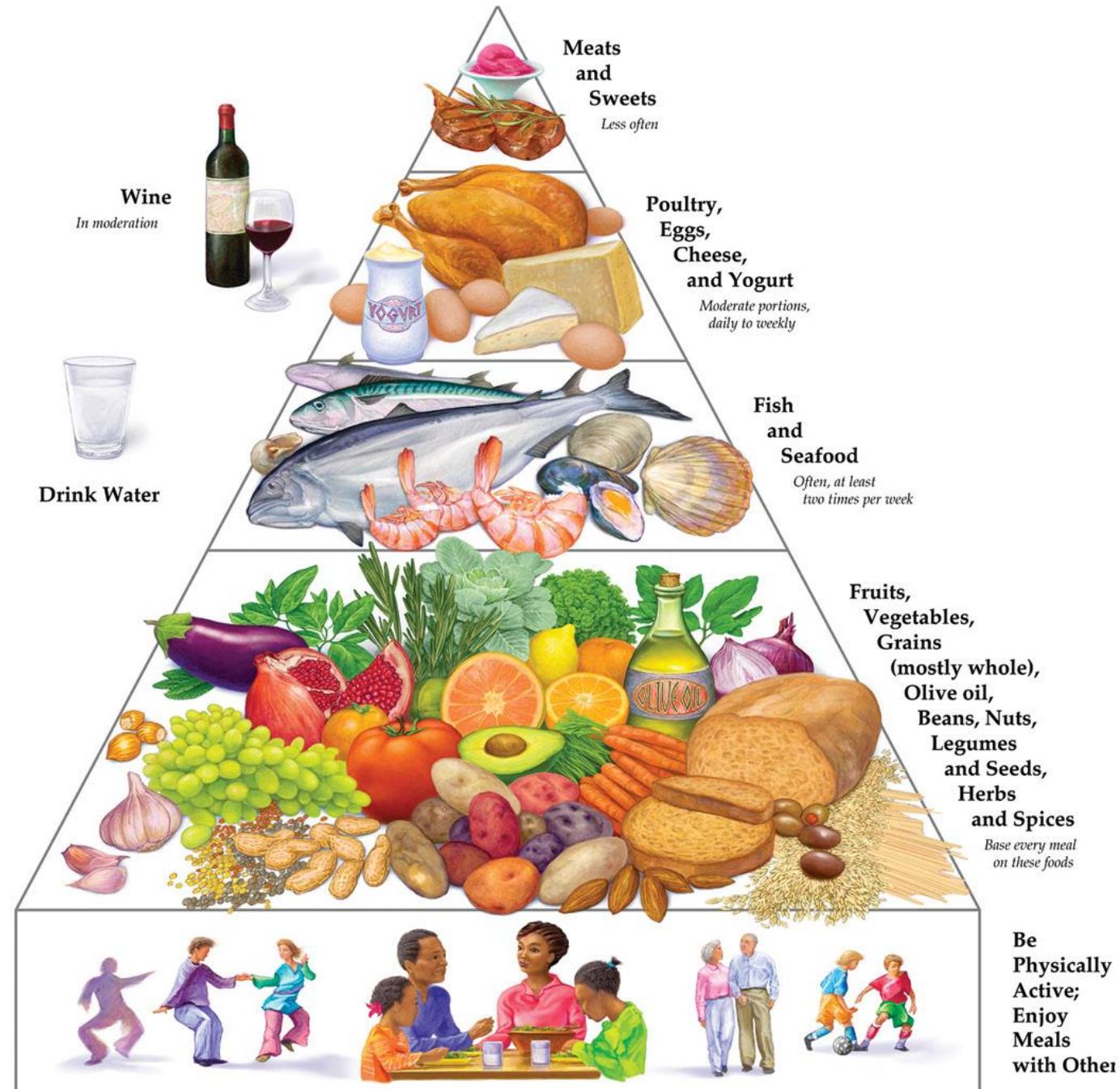


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Food First Approach

Plant-based diets

Change diet patterns and food choices to counteract symptoms of treatment

Support body systems through natural food sources

What if Food Isn't Enough?

Cancer treatment often depletes the body of many nutrients and impairs the ability to eat normally

64% to 81% of cancer survivors report using any vitamin or mineral supplements 26% to 77% reported using any multivitamins

Approximately 50% of US adults use dietary supplements and 33% use multivitamin/multimineral supplements



Nutraceutical use with specific cancer types



Lung Cancer

What They are Taking

- No supplements
 - Antioxidants
 - Herbal blends
-

What Might Help

- Vitamin D
 - Probiotics vs fiber supplements
 - Omega-3
 - Turkey tail
 - Multivitamins
-

What Might Harm

- Many herbs
 - Strong antioxidants
 - Immune stimulants
-

Counseling Tips

● ○ ○ Consider the treatment

Gut microbiome seems to be key for immunotherapy response

Probiotics with chemotherapy, fiber with immunotherapy

● ● ○ Consider the stage

Late-stage cancer with cachexia

May benefit from fish oil, multivitamin, and more liberalized approaches for alleviating symptoms

● ● ● Dosing Matters

Strong antioxidants may interfere with chemotherapy and radiation, and can potentially increase risk of developing lung cancer for smokers

Examples: Vitamins A, C, E, CoQ10, beta carotene

Multivitamins should not be over about 200% of the established daily value for single nutrients



Hepatocellular Carcinoma

What They are Taking

- Milk thistle
 - “Beef Liver”
 - Jujube
 - Broccoli, alfalfa, dandelion, artichoke extracts (usually in blends)
-

What Might Help

- Branched chain amino acids
 - Fish oil
 - Turmeric
 - Many foods with naturally occurring phytonutrients
-

What Might Harm

- Milk thistle
 - High doses of green teas
-

Counseling Tips

● ○ ○ Improving liver function

High protein, high calorie diets with late evening snack

Branched chain amino acids

● ● ○ Important Foods

Early research shows foods like cruciferous vegetables, pomegranate, garlic, tomatoes, apples as well as spices like ginger and turmeric might be beneficial

Continue to reinforce plant-based diets

● ● ● Supplement Considerations

Appropriate use of supplements like ginger, fish oil, and others with anti-inflammatory properties may help

Overuse of supplements like green tea extracts and milk thistle can be toxic to the liver



Pancreatic Cancer

What They are Taking

- Botanical blends (cinnamon bark, fenugreek, garlic, coriander, bilberry, licorice root, cayenne pepper, etc.)
 - OTC enzyme blends
 - Spirulina
 - Many others
-

What Might Help

- Fat soluble vitamins
 - Omega 3
 - Zinc
 - Vitamin D, A, C, E, or K
-

What Might Harm

- Milk thistle
 - High doses of singular vitamins
 - Herbal supplements from non-reputable sources
-

Counseling Tips

● ○ ○ Using whole foods to thrive

Balanced diet, exercise, and control carbohydrate intake

Improve quality of life and potentially improve overall outcomes

● ● ○ Maintaining weight

Small, frequent meals

Lean proteins, plant-based fats, complex carbohydrates
High calorie supplements (plant based, low sugar options preferred)

● ● ● Supplement Considerations

Vitamins ADEK, zinc for malabsorption or deficiency

Vitamin A, D, C, E, K in preclinical studies

Omega 3 for cancer cachexia

Don't forget about pancreatic enzymes! OTC not enough



Other GI Cancers

What They are Taking

- Slippery elm
 - Marshmallow root
 - Licorice root
 - Aloe vera
 - "Lectin defense"
 - Boswellia
-

What Might Help

- Psyllium fibers
 - Probiotics
 - Enteric coated peppermint
 - Glutamine
 - Amino acid blends
 - Ginger
-

What Might Harm

- Garlic
 - Ginkgo
 - Echinacea
 - Ginseng
 - Supplements with caffeine
 - Kava (kava kava)
-

Counseling Tips

● ○ ○ Consider the treatment

Chemotherapy can alter the lining of the gut as well as the gut microbiome

Radiation can irritate the large and small bowel and cause long lasting symptoms

● ● ○ Healing the gut

Several supplements using peppermint, amino acids, and fiber can be safely used during treatment

May reduce symptoms like nausea, diarrhea, mucositis, IBS like symptoms

● ● ● Probiotics

Can be extremely useful in managing GI symptoms but should be used with caution with immunotherapy

If unable to use probiotics, increase fiber intake and natural probiotics

--yogurt, kefir, sauerkraut, tempeh, kimchi, miso, pickles, buttermilk, sourdough bread

Soluble fiber is the most useful for diarrhea

-beans, avocado, oats, sweet potatoes, carrots, apples, pears, chia seeds, flax seeds



Breast Cancers

What They are Taking

- Sea moss
 - Black cohosh
 - Ashwagandha
 - Turkey tail/other mushrooms
 - CoQ10
 - Turmeric
 - Many others
-

What Might Help

- Ginger
 - Turmeric from natural sources
 - Omega 3
 - Fiber
 - Calcium and Vitamin D
 - Soy in natural forms
-

What Might Harm

- Black cohosh
 - Red clover
 - Ginko
 - Ginseng
 - Dong quai
 - Licorice
-

Counseling Tips

● ○ ○ The most common cancer

There is the most information (and incorrect information) available for breast cancer patients

Recommendations may vary based on hormone receptor status

● ● ○ When to use supplements

Best time is after surgery, chemotherapy, and/or radiation

Some supplements can be used along side endocrine therapies to help manage side effects

● ● ● Working together

Diet DOES matter

- Manage calorie intake to maintain or lower body weight
- Anti-inflammatory diets can help with muscle and joint pain

Soy in natural forms should NOT be avoided

- Tofu, tempeh, edamame, soy milk
-



Prostate Cancer

What They are Taking

- Vitamin E
 - Selenium
 - Green tea
 - Mineral blends
 - Saw palmetto
-

What Might Help

- Pomegranate
 - Omega 3
 - Lycopene
 - Cruciferous vegetables
 - Soy in natural forms
 - Modified citrus pectin
-

What Might Harm

- Vitamin E
 - Selenium ??
 - Eggs
 - Calcium
-

Counseling Tips

● ○ ○ Combining tradition with practice

Lycopene from a tomato is not enough

-consider tomato sauce (homemade) combined with olive oil – fat helps with absorption

Cold water fatty fish rather than omega 3 supplements when possible

Green tea rather than EGCG supplements

● ● ○ Thoughts on supplements

Use when conventional therapies should not or cannot be used

-POMI-T, pomegranate, omega 3, green tea with food

Manage treatment side effects

Vitamin E, calcium, multivitamins, and possibly selenium may increase risk

● ● ● Putting it all together

Supplements like POMI-T may be beneficial but should never replace a plant-based diet

Increase lycopene, whole soy, cruciferous vegetables

Reduce saturated fats, processed meats

Caution with milk, eggs



Glioblastoma

What They are Taking

- Niacin (B3)
 - Curcumin
 - GLA
 - Ginko
 - Cannabis
 - Green tea
-

What Might Help

- Vitamin D
 - Melatonin
 - Cannabis
 - Omega 3
-

What Might Harm

- Vitamin E
 - "Traditional" high fat diets
-

Counseling Tips

● ○ ○ Sativex Trial

Phase II 15 hospital study in UK after promising phase I results

Will recruit more than 200 patients

Combines Sativex (oral spray with THC and CBS) to chemotherapy

● ● ○ Diet Quality

Traditional, obesity-inducing high fat diets associated with more aggressive disease in mouse models

Continue to focus on high quality, whole food plant-based diets

● ● ● Therapeutic ketogenic diets

Traditionally 4:1 fat to carbohydrate and protein

May need to be calorie restricted to be more beneficial

Combination plant-based ketogenic?

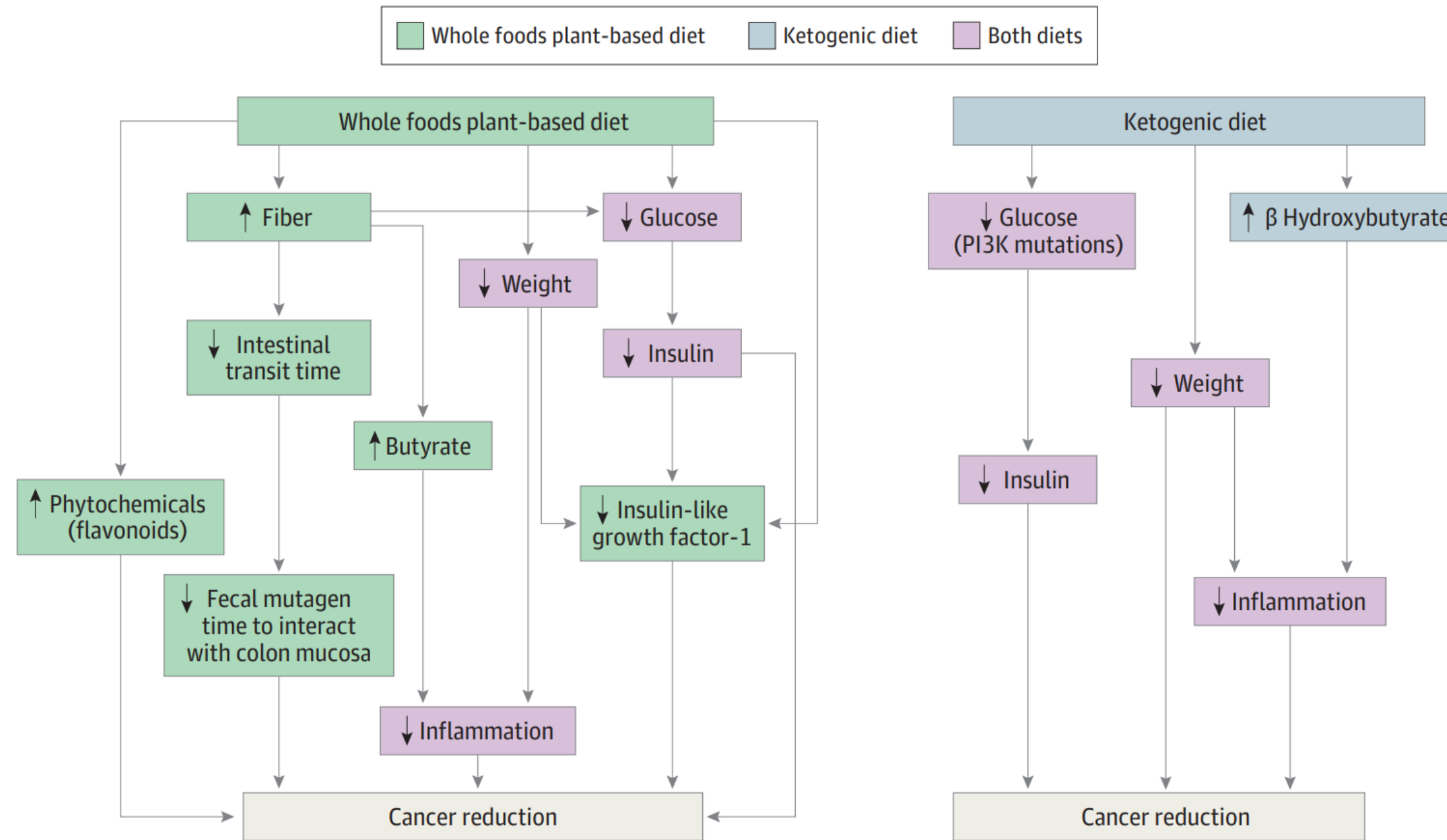
Difficult to follow

New tools available like chronometer and keto-mojo

Should be used in combination with traditional therapy



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



Product Safety



Choosing a Supplement

Making the safest choice

There is an estimated 85,000 + supplements available in the U.S. market

Dietary supplements are regulated as food, not drugs

The FDA is not authorized to review dietary supplement products for safety and effectiveness before they are marketed



Guiding Patients to Safer Choices

01. USE FOOD FIRST

There are no significant risks associated with eating vitamins and herbs as part of a regular diet

Supplemental forms of herbs should be avoided during treatment due to lack of safety information

Vitamins and other nutraceuticals may be used in normal quantities when clinically indicated

02. AVAILABLE CLINICAL RESOURCES

Memorial Sloan Kettering Cancer Center: About Herbs

Natural Medicines Database (requires membership)

Medline Plus (NIH National Library of Medicine)

Guiding Patients to Safer Choices

03.

THIRD PARTY TESTING



United States Pharmacopeia (USP)

tests for label accuracy, contaminants, proper bioavailability; made according to FDA Good manufacturing processes

National Sanitation Foundation: NSF/NSF Certified for Sport

tests for label claims, toxicology, presence of contaminants
provides certifications
reviews manufacturing processes

Lab Door- purity and label accuracy testing
buys supplements off retail shelves
provides grades and rankings but not endorsements

Consumer Lab- purity and quality testing
companies pay to be verified
publish lists of "approved" products

Final Thoughts

SUPPLEMENTS CAN HELP

- Help alleviate side effects
- Correct deficiencies
- Support body systems and functions
- Improve tolerance of treatment

DOSING AND TIMING MATTER

- Time of day
- Phase of treatment
- Avoid over and underdosing



Glioblastoma



When they say “don’t eat anything with ingredients you can’t pronounce” but you took organic chemistry

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