Nutrition Guidelines for Cancer Survivorship

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#caringforthegoodlife

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Disclosures

- No financial disclosures to report.

Objectives

1. Differentiate macronutrients from micronutrients.

2. Understand nutrition guidelines for cancer survivors.

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Introduction

Target Population: Cancer Survivors

National Cancer Institute Definition of a Cancer Survivor:

"An individual is considered a cancer survivor from the time of diagnosis through the balance of life. There are many types of survivors, including those living with cancer and those free of cancer. This term is meant to capture a population of those with a history of cancer rather than to provide a label that may or may not resonate with individuals."

Cancer Survivorship Care

Registered Dietitians: Nutrition Experts

- Minimum bachelors degree in dietetics or related field
  - As of 2024 they must now possess a Masters Degree
- 1250 hours of supervised practice in a variety of chronic and acute disease states
- No financial gain from the recommendations we make
- Understand personalized nutrition strategies for optimal outcomes
- Provide evidenced –based recommendations

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Nutrition Basics

What is Nutrition?

- Nutrition is the process of providing or obtaining food necessary for health and growth
- Food is essential, meaning we must have it to survive
- Food is comprised of:
  - Macronutrients which offer calories, they also perform specific roles in health maintenance
  - Micronutrients (vitamins and minerals) and phytochemicals
    - Micronutrients do not provide calories but are essential for a variety of critical functions which help the body operate optimally
- Nutrition is nuanced, recommendations should never be one size fits all.

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Macronutrients

Explaining Macronutrients

- Macro = Large
- Body needs larger amounts of these nutrients to function
- Provide the body with energy in the form of calories or kcals

Explaining Macronutrients

- There are three main macronutrient groups

    1. Protein
    2. Carbohydrate
    3. Fat

Protein

- Main function is for growth, repair and building
- Made up of amino acids, “building blocks” – 2 types
  1. Essential Amino Acids – Required to be obtained through diet
  2. Non-Essential Amino Acids – Our bodies make on their own

Protein

- Sources include both animal and plant foods
- 4 calories/gram
- Typically makes up 10-35% of our caloric intake
- Examples: Whole eggs, chicken, beef, pork.

Carbohydrates

- Broken down into glucose, which is our body's main source of energy. Also, a source of fiber.
- Two types of carbohydrates
  1. Simple
  2. Complex
- 4 calories per gram
- Make up 45-65% of our daily caloric intake
- Examples: Fruits, starchy vegetables (corn, peas), grains.

Fat

- Important for making hormones, provides cushion for organs, energy storage, vitamin absorption, cell membrane integrity

- 9 calories per 1 gram
  - The highest calorie/gram macronutrient

- Fat should comprise 20-35% of our total caloric intake

Fat

- There are three types of fat:
  - Trans: stick margarine, fried foods, shortening.
  - Unsaturated: olive oil, avocado oil, nuts, seeds.
  - Saturated: butter, sausage, bacon, cheese, coconut oil, palm oil.

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Micronutrients

Explaining Micronutrients

1. Water-soluble vitamins
2. Fat-soluble vitamins
3. Macrominerals
4. Trace minerals

Water-soluble vitamins

- Dissolve in water upon entering the body, excess are excreted out in urine
- Need consistent replenishment from our diet because our body does not store them
- Roles:
  - Prevent cell damage
  - Produce energy
  - Create red blood cells

Nutrient	Function	Sources
Thiamine (B1)	Needed for energy metabolism; essential to nerve function	Pork, whole-grain enriched breads and cereals, legumes, nuts, seeds
Riboflavin (B2)	Needed for energy metabolism; important for normal vision and skin health	Dairy products, leafy green vegetables, whole-grains, enriched breads and cereals
Niacin (B3)	Needed for energy metabolism; Important for nervous system function, digestive and skin health	Meat, poultry, fish, whole-grain or enriched breads and cereals, vegetables, peanut butter
Pyridoxine (B6)	Part of enzyme needed for protein metabolism; helps make red blood cells	Meat, fish, poultry, vegetables, fruits
Cobalamin (B12)	Part of an enzyme needed for making DNA and new cells, specifically red blood cells. Keeps nerves and brain healthy.	Chicken, beef, fish, dairy foods, eggs, fortified foods (cereal, non-dairy milks, soy products)

Nutrient	Function	Sources
Ascorbic Acid (Vitamin C)	Antioxidant; needed for protein metabolism; wound healing production of collagen; increases iron absorption	Bell peppers, citrus fruits and juices, dark-green leafy vegetables, liver, potatoes
Folic Acid	Part of an enzyme needed for making DNA and new cells, especially red blood cells	Dark-green leafy vegetables, legumes, seeds, no added to most refined grains
Biotin	Needed for metabolism of carbs, protein and fats.	Widespread in foods; also produced in intestinal bacteria
Pantothenic Acid	Needed for energy metabolism	Widespread in foods

Fat-soluble vitamins

- Dissolve in fat, not water
- Stored in the body (liver and fatty tissue)
- Vitamins A, D, E, K
- Roles:
  - Vision
  - Strengthen immune system
  - Support blood clotting
  - Provide antioxidants

Nutrient	Function	Sources
Vitamin A	Vision, healthy skin, mucous membranes, bone and tooth growth, immune system health	Fruits, fish (cod and halibut fish oil), dark-green leafy vegetables, milk, liver, squash
Vitamin D	Healthy bone structure; aids in absorption and metabolism of calcium	Vitamin-D fortified milk, fatty fish, egg yolk, liver
Vitamin E	Antioxidant; protects cell walls	Egg yolks, fatty fish, fortified milk. When exposed to sunlight the skin can make Vitamin D.
Vitamin K	Needed for proper blood clotting	Leafy green vegetables, green vegetables (Brussel sprouts, broccoli, asparagus), also produced by intestinal tract bacteria

Macrominerals

- Necessary for many bodily functions such as:
  - Maintaining muscle and bone strength
  - Control of blood pressure
  - Fluid balance
  - Nerve transmission
  - Healthy bones and teeth

Mineral	Function	Sources
Sodium	Fluid balance; nerve transmission; muscle contraction	Table salt, processed foods. Small amount in milk, bread, vegetables and unprocessed meats
Potassium	Fluid balance; nerve transmission; muscle contraction	Meats, milk, fresh fruits and vegetables, whole grains, legumes
Calcium	Important for healthy bones and teeth; helps muscles contract and relax; blood clotting; blood pressure regulation, immune system health	Dairy products, canned fish with bones, fortified grains, fortified tofu, fortified milks, greens (mustard greens, broccoli).
Phosphorus	Important for healthy bones and teeth; cellular health; helps maintain acid-base balance	Meats, dairy, grains, and vegetables. Often added to foods and drinks as a preservative.
Magnesium	Found in bones, needed for making protein, muscle contraction, nerve transmission, immune system health	Legumes, nuts, whole grains, some vegetables.
Sulfur	Found in protein molecules	Found in foods as part of a protein: Meats, poultry, eggs, fish, milk, legumes, nuts.

Trace Minerals (Microminerals)

- Needed in smaller amounts than macrominerals
- Necessary for many bodily functions such as:
  - Supporting the immune system
  - Defending cells against damage from stress
  - Nervous system support

Mineral	Function	Sources
Iron	Found within hemoglobin in red blood cells which carry oxygen in the body; needed for energy metabolism	Organ meats; red meats; fish; poultry; shellfish; egg yolks; legumes; fortified cereals; leafy greens; iron-enriched breads
Zinc	Needed to make protein and genetic material; helps with taste perception; wound healing; sperm production; immune system health	Meats, fish, poultry, vegetables
Iodine	Found in thyroid hormone, which helps regulate growth, development and metabolism	Seafood, foods grown in iodine-rich soil, iodized salt, bread, dairy products
Selenium	Plays a role in reproduction, thyroid hormone metabolism, DNA synthesis, considered an antioxidant	Meats, seafood, grains
Copper	Part of many enzymes, works with iron to form red blood cells	Legumes, nuts and seeds, whole grains, organ meats, drinking water

Mineral	Function	Sources
Manganese	Helps form connective tissue and bones, sex hormones, blood clotting factors; Plays a role in CHO and fat metabolism	Widespread in foods, especially plant foods
Fluoride	Involved in formation of bones and teeth; helps prevent tooth decay	Drinking water, fish, and most teas
Chromium	Works closely with insulin to regulate blood sugar (glucose) levels	Unrefined foods, especially liver, brewer's yeast, whole grains, nuts and cheeses
Molybdenum	Part of some enzymes	Legumes, breads and grains, leafy greens, milk, liver

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Nutrition in Cancer Care

American Institute for Cancer Research

"AICR is committed to putting what we know about cancer prevention into action. Our panel of world-renowned independent experts from across the globe have reviewed decades of evidence and from their conclusions have developed the most reliable cancer prevention lifestyle advice currently available. This is summarized in our 10 Cancer Prevention Recommendations."

Interpreting the Evidence

- “After a systematic review of the global scientific literature, AICR/WCRF analyzed how foods and their nutrients affect the risk of developing cancer.”
- Evidence categorized as “convincing” or “probable” means there is strong research showing a causal relationship to cancer—either decreasing or increasing the risk.
  - The research must include quality human studies that meet specific criteria and biological explanations for the findings.
  - A convincing or probable judgment is strong enough to justify recommendations.
- Evidence categorized as “limited suggestive” means results are generally consistent in overall conclusions
  - Rarely strong enough to justify recommendations to reduce the risk of cancer.

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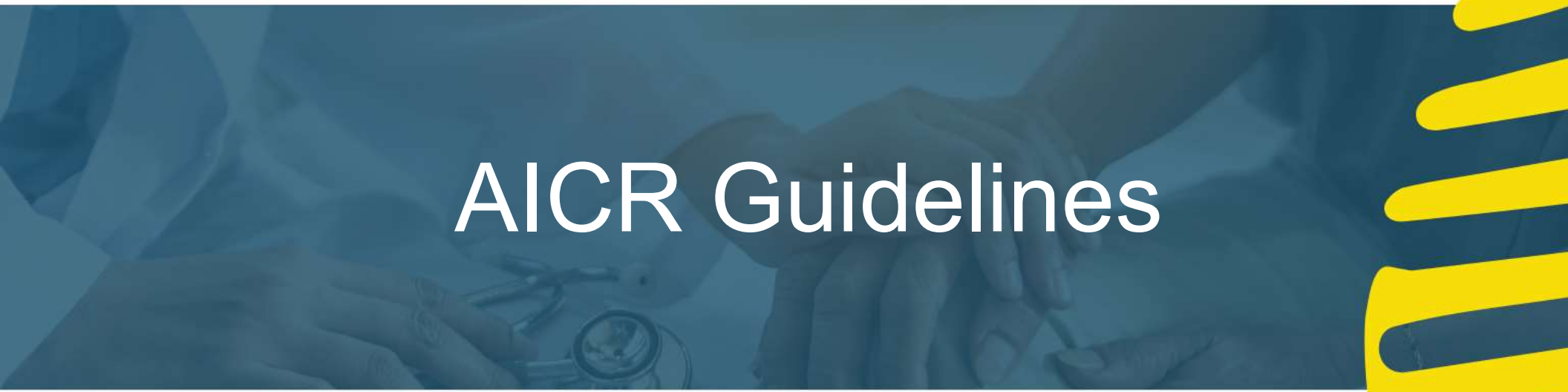

AICR Guidelines

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1. Be a Healthy Weight

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- Aim to keep your weight within a healthy range. BMI is one tool:
  - Under 18.5 – This is described as underweight.
  - between 18.5 and 24.9 – This is described as the 'healthy range'.
  - between 25 and 29.9 – This is described as overweight.
  - between 30 and 39.9 – This is described as obesity.
  - 40 or over – This is described as severe obesity.

- Aim to avoid weight gain in adult life
- Evidence linking body fat to cancer is overwhelming and increasing in strength
- More body weight = increased risk for heart disease, high blood pressure, and diabetes

What the Science Says:

- Too much body fat can produce cytokines → increased inflammation
  - State of constant cellular growth + chronic inflammation creates opportunities for cancer to occur
- More fat tissue → increased production of estrogen
  - Increased risk for breast and endometrial cancer
- Fat cells produce variety of proteins → increased insulin levels and other hormones
  - Can spur cancer cell growth
- Never too late to make lifestyle changes and decrease your risk!
  - Eat a nutrient dense diet
  - Avoid sugary drinks
  - Mind your portions
  - Be physically active

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2. Be Physically Active

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- Physical activity lowers cancer risk, helps you achieve a healthy weight, and lessens risk for other chronic diseases

- Start with 30 minutes, 5 days per week to reduce your risk

- 150-300 minutes of moderate-intensity per week is the gold standard

What the Science Says:

- Research shows that physical activity can help protect you from three types of cancer:
  - Breast, colorectal, endometrial

- Studies show regular physical activity:
  - Supports healthy immune system
  - Reduces chronic inflammation
  - Helps maintain healthy levels of hormones like estrogen and insulin

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3. Eat a Diet Rich in Whole Grains, Vegetables, Fruits and Beans

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- High in fiber, nutrients and phytochemicals (natural substances) which may help to prevent cancer
- Plant-foods help manage weight while giving you energy
- Follow the New American Plate 2/3-1/3 model
  - 2/3 of plate should be plant foods
  - Remaining 1/3 from animal protein, dairy

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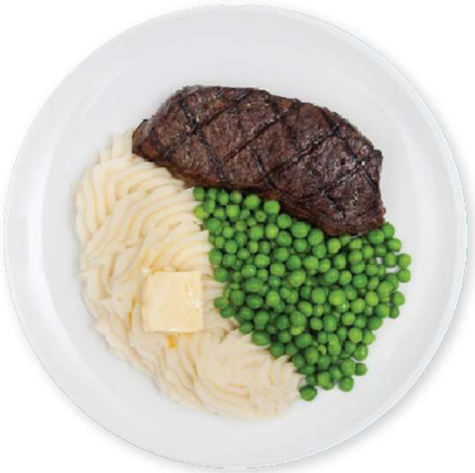
What the Science Says:

- Consume at least 30g of fiber from food sources
  - AICR cites strong evidence eating plenty of plant foods reduces risk of colorectal cancer
    - 3 ounces or servings of whole grains per day lowers colorectal cancer risk
    - 1 oz. equates to…
      - ½ cup cooked brown rice,
      - ½ cup cooked oatmeal,
      - 1 regular slice whole grain bread

- Aim to eat a minimum of 3.5-5 cups of vegetables and fruit per day
  - Supplies the body with vitamins, minerals and fiber
  - Best to eat fruit whole for fiber and less calories
  - Include a variety of vegetables
    - Can be fresh, frozen or canned (try to avoid added salt and fat varieties)

New American Plate

Old American Plate



Transitional Plate

New American Plate

New American Plate

- 2/3 of plate covered in plant-foods
  - Whole grains, beans, nuts, vegetables, fruits
- Remaining 1/3 of plate may be filled with animal-based protein rich foods such as seafood, poultry and dairy foods
  - Occasionally lean red meat

New American Plate

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Mediterranean diet and functional foods

Mediterranean Diet

Emphasizes:

- Healthy fats:
  - Olives, avocados, nuts, seeds
- Limiting unhealthy fats:
  - Red meats, dairy products and processed foods
- Primary proteins:
  - Nuts, seafood, legumes
- Whole-grains should make up 50% of your day's grain servings
  - Whole wheat, barley, oats, bulgur, brown rice
- Dairy, when included, should be low-fat or fat-free
- Inclusion of a wide variety of fruits and vegetables
  - Deep color = Big Nutrients

Functional Foods Defined

The Academy of Nutrition and Dietetics Defines functional foods as “whole foods along with fortified, enriched, or enhanced foods that have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis at effective levels based on significant standards of evidence.”

Functional Foods History

- Food and health agencies have recognized a need to enrich, fortify, and/or enhance foods to improve public health for nearly one hundred years

- Since the early 20th century, we have fortified foods to replace what has been removed during processing or to achieve a public health goal

Regulations

- Health claims must meet requirements of the Nutrition Labeling and Education Act of 1990
  - Characterize relationships between bioactive substances and disease risk reduction based on a “standard of significant scientific agreement.”
  - Claims are allowed between food and six disease categories, including cancer

Health Benefits of Functional Foods

- Food developed for a specific disease or condition is a medical food
  - Examples include special infant formulas and oral rehydration solutions
- Food providing general health benefits is a functional food
  - Examples include medical nutrition beverages, yogurt with added fibers, juices with added calcium
- Functional foods fall into three categories

Categories of Functional Foods

Category	Examples
Conventional Foods	Vegetables, fruits, grains, dairy and fish provide a variety of non-nutritive bioactive compounds (ex antioxidant vitamins, isoflavones and prebiotics) that influence health
Modified Foods	Ready-to-eat cereals fortified and enriched with vitamins, minerals, phytonutrients, including lycopene and lutein Margarines and spreads fortified or enhanced with bioactive substances such as n-3 fatty acids
Food Ingredients	Indigestible carbohydrates such as resistant starch that provide prebiotic benefits

Functional Foods Role in Cancer

- Oxidative stress (associated with chronic inflammation)
  - Early in carcinogenesis, oxidative stress creates an environment conducive to DNA mutations within a cell
  - Bioactive food compounds decrease inflammation which reduces risk or incidence of oxidative stress --> reducing risk of DNA mutation.
  - Variety in the diet is important!

Compound	Potential Anti-Cancer Function	Conventional Food Sources	Functional Food Sources
Beta-Carotene	Antioxidant activity	Carrots and other bright orange, red, yellow foods	Beta-carotene rich juice
Beta-glucans	Natural polysaccharide and soluble fiber which may boost immune system	Barley, oats, fruits, vegetables, seaweed	Beta-glucan-enriched breakfast cereals, breads, snack bars, bran products and milk beverages
Genistein	May block estrogen receptors; early exposure to genistein may decrease risk of breast cancer	Soyfood, including edamame, tofu and soymilk	Genistein added to a variety of foods including snack bars
Inulin and Fructo-oligosaccharides (FOS)	Exhibits prebiotic activity, which can enhance intestinal health	Onions, shallots, Jerusalem artichokes	Inulin can be incorporated into food as a fat replacement FOS and inulin added to beverages and jellies
Lignans	Phytoestrogen; associated with reduced risk of breast cancer	Flaxseed is richest source; grind flaxseed to improve digestion; sesame seeds, chickpeas, oats and barley	Flaxseed added to snack bars

Compound	Potential Anti-Cancer Function	Conventional Food Sources	Functional Food Sources
Lutein	Efficient in cell cycle progression and inhibits growth of a number of cancer cell types	Dark green leafy vegetables, broccoli, squash, green peas, lettuce, onions, corn, pumpkin, egg yolk	Lutein added to some ready-to-eat cereals
Lycopene	Antioxidant; blocks activity of free radicals	Tomatoes and tomato products, red/yellow/orange fruits and vegetables	Added to some ready-to-eat cereals; tomato lycopene complexes developed for functional foods
Omega- 3 fats	Anti-inflammatory activity	Fatty fish	Eggs fortified with omega-3s
Soluble fibers (guar gum, pectin, acacia gum, psyllium)	Promote intestinal health	Oats, lentils, apples, oranges, bananas, strawberries, nuts, flaxseeds, beans, dried peas, blueberries	Soluble fiber available in banana flakes; added to some ready-to-eat cereals

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Fad Diets

Juicing and Detox Diets

- Unsupported Claims: Cleanse organs, lose weight quickly
- Necessary nutrients are often left out
- Limitations: Expensive and often sugar-filled
- Our body has a natural detoxification system, and it is FREE

Ketogenic and Paleo Diets Defined

- **Ketogenic Diet**
  - Low Carbohydrate, High Fat Diet
- **Paleo**
  - High in protein, moderate –high in fat, low in carbohydrate, low in refined sugars

Ketogenic Diet

- What is Ketosis?
- Harvard School of Public Health Study Findings
- Type of fat matters!
- Limited research on the long-term health implications of a ketogenic diet

Paleo Diet

- “Caveman Diet”
- Limited processed foods and refined sugar is always a good idea
- Portion Control is Key
- Elimination of food groups is always suspect

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4. Limit Consumption of “Fast Foods” and Other Processed Foods

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- Limiting these foods helps control calorie intake
- Strong evidence diets containing greater amounts of fast foods are a cause of weight gain and obesity
- Higher body fat percentage is a known cause of 12 cancers

What the Science Says:

- Fuel up on “fast” foods which feature minimally processed ingredients
  - It is not the speed of preparation which matters, it is the nutrient quality
  - Aim to avoid chips, cookies, candy bars, processed baked goods, sugary cereals and fried foods
  - Opt for small bag of nuts, hummus and vegetables or fruit
- Read the nutrition facts label whenever possible
  - Consider serving size, calories per serving, sugar, fat and sodium content

Good Foods vs Bad Foods

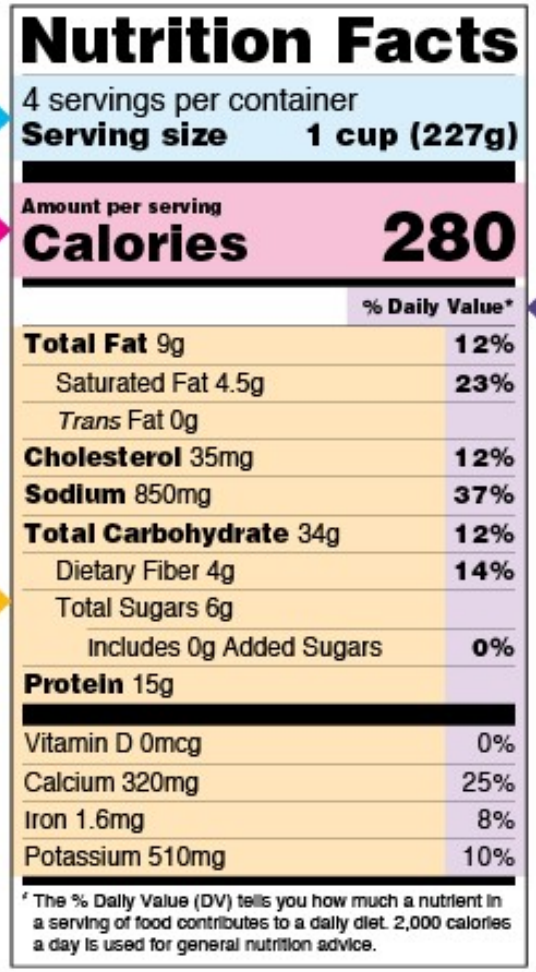
- Do not put food in a category, nutrition recommendations are nuanced
- “Dose makes the toxin.”
- No morality in food!
- Negative ideas around foods create unhealthy relationships with food. All foods fit!

1. Serving Information

2. Calories

3. Nutrients

4. Quick Guide to percent Daily Value (%DV)
   - 5% or less is **low**
   - 20% or more is **high**



Nutrition Facts

4 servings per container

Serving size **1 cup (227g)**

Amount per serving

Calories **280**

	% Daily Value*
Total Fat 9g	**12%**
Saturated Fat 4.5g	**23%**
Trans Fat 0g	
Cholesterol 35mg	**12%**
Sodium 850mg	**37%**
Total Carbohydrate 34g	**12%**
Dietary Fiber 4g	**14%**
Total Sugars 6g	
Includes 0g Added Sugars	**0%**
Protein 15g	
Vitamin D 0mcg	0%
Calcium 320mg	25%
Iron 1.6mg	8%
Potassium 510mg	10%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

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Perceived “Good” Foods

Organic Foods

- Are they better?
- Organic Farming
- Criteria set by the USDA
- Environmental benefit

Non GMO Foods

- Definition of a GMO
- There are currently only 10 GMO plants produced in the US
- National Academy for Science Statement on GMOs
- Be a smart consumer

Perceived “Bad” Foods

Gluten

- Claims: Our digestive system is not able to process gluten therefore leading to weight gain, digestive issues, and poor immune function. Is this accurate?

- Gluten is a protein found in wheat containing products

- Gluten free does not mean lower calorie

Soy Foods

- Attention in the oncology setting
- What does the new research tell us?
- Benefits of consuming soy foods
- Soy foods to be including in your diet

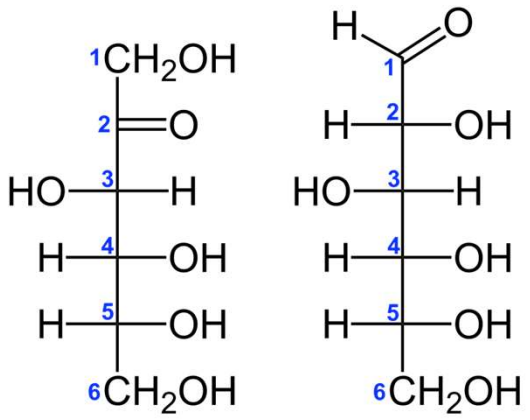
Carbohydrates

- Claims against carbohydrates
- Body's main source of energy
- What foods are considered a carbohydrate?
- Monitor your intake

Perceived “Bad” Ingredients

High Fructose Corn Syrup

- Health implications
- Excess calorie intake → obesity
- Sugar has 4 calories per 1 gram
- Amount of sugar in common foods and beverages
    - Example 20 ounce Mountain Dew has 77grams of sugar



Flavorings: Natural vs Artificial

- FDA definitions:
  - Natural flavorings: chemical flavor compounds extracted directly from plant and animal products found in nature.

  - Artificial flavorings: Not extracted from nature but re-produced in the lab.
  - *Many artificial flavorings have the EXACT same chemical structure as naturally occurring flavors.*

- Same nutrient value so if cost is a concern, take the discount!

Artificial Flavorings

- Safety closely monitored by FDA
- Natural flavorings require more processing to obtain.
- Artificial can reduce environmental concerns and costs and are easier to control
- Always a good idea to eat more whole foods!

Artificial Colorings

- “Any dye, pigment, or substance that when added to food, drug or cosmetic is capable of imparting color.” – FDA
- Safety and regulations
- Often found in highly processed foods which we know have limited nutrient value
- What to look for on the label:
  - FD & C #
  - “color added”
  - Common name, for ex “annatto extract”

Processed Foods

- All foods undergo some level of processing before consumption
  - Ex. washing a chickpea then cooking it = processing
- There are different levels of processing, we use the NOVA classification system in United States
- Issues with this classification system, need to look big picture!

NOVA Food Classification System

Group	Examples
Group 1 Unprocessed or Minimally Processed Foods: Naturally occurring foods with no added salt, sugar, oils, or fats.	Milk, meat, eggs, fish, poultry, plain unsweetened yogurt, beans, fresh, frozen, or dried fruits and vegetables, oats, grits, pasta, rice.
Group 2 Processed Culinary Ingredients: Food products from Group 1 that have been processed by pressing, refining, grinding and/or milling; they are used in home and restaurant kitchens to prepare, season and cook Group 1 foods.	Vegetable oils, butter, vinegar. Salt, sugar and molasses from cane or beet, honey extracted from combs and syrup from maple trees.
Group 3 Processed Foods: Food products made by adding sugar, oil and/or salt to create simple products from Group 1 foods with increased shelf life or enhanced taste.	Canned vegetables, fruits, and beans; some salted or sugared nuts and seeds; salted, cured, or smoked meats; canned fish; fruits in syrup; cheese and freshly made bread.
Group 4 Ultra-Processed Foods: Industrially created food products created with the addition of multiple ingredients that may include some Group 2 ingredients as well as additives to enhance the taste and/or convenience of the product, such as hydrolyzed proteins, soy protein isolate, maltodextrin, high fructose corn syrup, stabilizers, flavor enhancers, non-sugar sweeteners, and processing aids such as stabilizers and bulking and anti-bulking agents.	Commercially produced breads, rolls, cakes, cookies, donuts, breakfast cereals, soy burgers, flavored yogurts, ready-to-heat meals, such as frozen pizzas, soft drinks, and candy.

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5. Limit Consumption of Red and Processed Meats

5. Limit Consumption of Red and Processed Meat

- Consumption of > 18 oz/week can increase cancer risk
- Aim to limit consumption to 3 portions per week or 12-18 oz cooked
  - 1 moderate portion is roughly the size of a deck of cards
  - Rule of thumb: 4 oz uncooked = 3 oz cooked

- Moderate amounts of lean red meat can provide protein, vitamin B12, iron and zinc
  - Think of meat as a side dish

What the Science Says:

- Studies show putting an excess of red meat on the plate often crowds out plant foods.

- Processed meat contains high amounts of saturated fat, salt, and chemical additives.
  - Can increase risk for colorectal cancer

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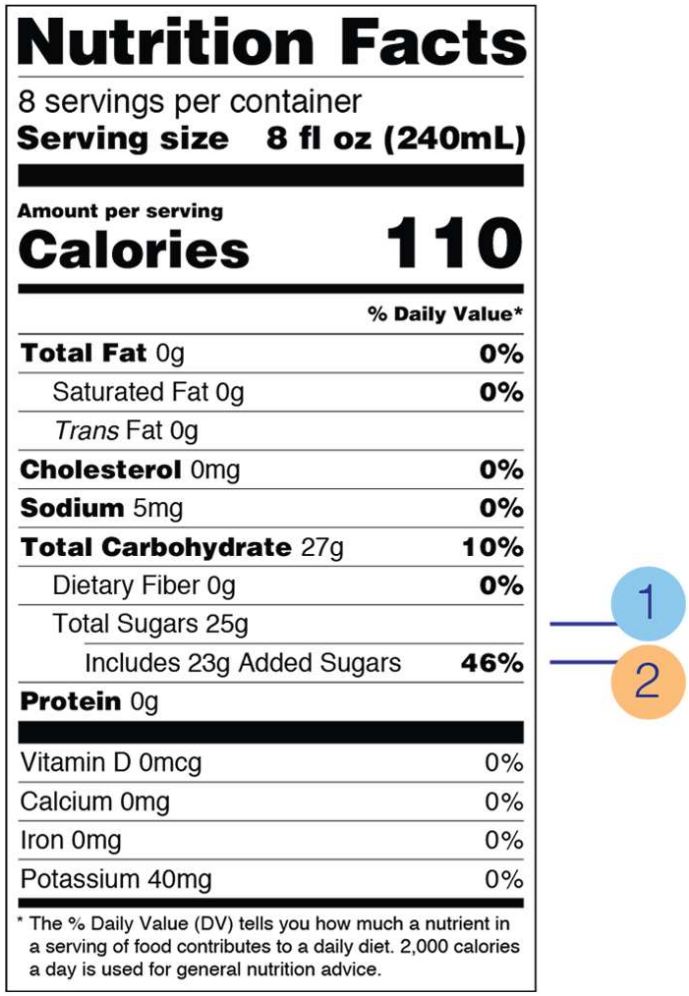
6. Limit Consumption of Sugar-Sweetened Drinks

6. Limit Consumption of Sugar-Sweetened Drinks

- Drink mostly water with incorporation of some unsweetened drinks
- Still or sparkling water is a healthy choice
- The FDA and USDA require added sugars be labeled on our nutrition facts label
  - 5% of a nutrient is considered to be a low source
  - 20% is considered to be a high source



Nutrition Facts

8 servings per container

Serving size **8 fl oz (240mL)**

Amount per serving

Calories **110**

	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 5mg	**0%**
Total Carbohydrate 27g	**10%**
Dietary Fiber 0g	**0%**
Total Sugars 25g	
Includes 23g Added Sugars	**46%**
Protein 0g	
Vitamin D 0mcg	0%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 40mg	0%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

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What the Science Says:

- One 12-ounce can of many popular sodas contains at least 9 tsp. of sugar
  - This equates to150 calories, no other nutrients
  - 4 grams of sugar = 1 tsp

- The American Heart Association Recommendations for added sugar are as follows:
  - Men = 9tsp or 38g per day
  - Women = 6 tsp or 25g per day

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Identifying Added Sugars

Agave nectar	Evaporated cane juice	Malt syrup
Brown sugar	Fructose	Maple syrup
Cane crystals	Fruit juice concentrates	Molasses
Cane sugar	Glucose	Raw sugar
Corn sweetener	High-fructose corn syrup	Sucrose
Corn syrup	Honey	Syrup
Crystalline fructose	Invert sugar	
Dextrose	Maltose	

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7. Limit Consumption of Alcohol

7. Limit Consumption of Alcohol

- Any reduction in alcohol consumption will lower cancer risk
- Serving recommendations:
  - Two drinks per day for men
  - One drink per day for women
  - 1 serving = 12 ounce beer, 5 oz. of wine, 1.5 oz. of distilled spirits
- Be conscious of habits
  - Restaurants often serve larger than standard size drinks
  - Avoid asking for a double
  - Sip slowly
  - Alternate between alcoholic and non-alcoholic drinks
  - Designate alcohol-free days during the week

What the Science Says:

- Strong evidence points to link between alcohol and cancer risk
- Considered a carcinogen
- Directly related to seven different cancers:
  - Breast; colorectal, esophageal, liver, mouth, pharynx, larynx, breast
- Alcohol → acetaldehyde (ethanol)
  - Damages DNA, as well as prevents repair of DNA
  - Damage to DNA → dysfunction of cellular growth → cancer develops
- Alcohol drinks are also high in calories which can contribute to weight gain
- The less you drink, the lower your risk!

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8. Do Not Use Supplements for Cancer Prevention

8. Do Not Use Supplements for Cancer Prevention

- Research shows supplements don't offer the same benefits as eating whole foods
- Dietary supplements are regulated by FDA as food, not as drugs.
  - Dietary supplements may contain biological effects which can conflict with medications
- Balance your diet
  - Follow The New American Plate Guidelines
    - 2/3 plate filled with plant foods
    - 1/3 may be filled with animal-based protein foods (seafood, poultry, dairy foods and occasionally red meat)

What the Science Says:

- Eating whole foods allows your body to absorb a wide range of vitamins, minerals, amino acids. These nutrients work together for health protection

- When compounds are isolated they are often not absorbed as well

- Always consult with your doctor, pharmacist or Registered Dietitian about possible interactions before starting a supplement

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Safety of Dietary Supplements

- Regulated in the U.S. by multiple agencies with overlapping jurisdiction. FDA and the FTC; enforced by the State AGO and DOJ; monitored (not regulated) by the CDC
  - FDA regulates supplements as a food subcategory
  - FDA them identifies products causing harm after they have been on shelves; No premarket evaluation.
- U.S. Congress, when passing the Dietary Supplement Health and Education Act (DSHEA), established and defined regulatory framework for dietary supplements.

Dietary Supplements: Emerging Evidence

- May fill gaps in nutrient intake and may be essential for replenishing deficient states
- Thirty plant-derived compounds are currently being investigated for use in cancer therapy
- Emerging research suggests some bioactive compounds in supplement form may help manage side effects of cancer treatments or increase efficacy.
- Effective and safe doses are still unknown.

Supplement Quality

- Certain conditions may require supplementation
  - Ex bariatric surgery
- Factors to consider:
  - Ingredient source → quality
  - Ingredient absorption → natural vs synthetic

- Look for supplements with the USP or NF on the label
  - Indicates third party testing for quality has been done
- Many online resources available for determining supplement quality and safety

Multivitamin and Multimineral

- Research examining the role of vitamin and mineral supplementation in cancer prevention has failed to consistently demonstrate a benefit.
- However, if a cancer patient is having difficulty eating because of symptoms they are at greater risk for deficiency or malnutrition and a MVI or multimineral supplement may be beneficial.
- Multivitamin/mineral supplements containing 100% of the Daily Value for each nutrient can be considered safe for healthy individuals but it is important to evaluate each person's needs.
- **A diet containing many fortified, enriched and functional foods may already be meeting recommended nutrient needs.**

Drug and Nutrient Interactions

- Need to consider possible drug and nutrient interactions
  - How are they interacting with other pharmaceuticals as well as food nutrients
- Often need to be careful with timing of medications
- Can also cause depletion of other nutrients
- **Main Takeaway: Consult with your physician, pharmacist and/or Registered Dietitian to determine appropriate use of supplements.**

Drug-Nutrient Interactions

Pharmaceutical	Class of drug	Nutrient	Interaction	Class
Acetaminophen/ Hydrocodone Vicodin, Norco	**Pain** Narcotic, Anti-Inflammatory	Caffeine	Increases analgesic effects	A
			Increases absorption	B
			Increases elimination of drug	C
		Alcohol	Increases risk of hepatotoxicity	B
			Induces CYP2E1	C
Albuterol Ventolin, Proventil	**Breathing** Bronchodilator	None	No significant interactions confirmed	N/A
Amlopidine Norvasc	**Blood Pressure** Calcium Channel Blocker	Grapefruit Juice	Inhibits CYP3A4; slightly increases plasma concentration of drug	C
Atorvastatin Lipitor	**Cholesterol** Statin	Grapefruit Juice	Increases serum atorvastatin;	B
			Induces CYP3A4; increases plasma concentration of atorvastatin acid and atorvastatin lactone	C
		St. John's Wort	Increases LDL and total cholesterol	C
Gabapentin Neurontin, Neuraptine	**Neuropathy, Pain**	Alcohol	Gabapentin is safe to use in treatment of alcohol dependency; reduces symptoms of alcohol withdrawal	A
		Cannabis	Gabapentin reduces symptoms of cannabis withdrawal	B
Insulin Glargine Injection Lantus Solostar	**Diabetes** Insulin analogue	None	Potentially significant theoretical interaction	F
			See the **white paper** for further details	

Drug-Nutrient Interactions (cont'd)

Pharmaceutical	Class of drug	Nutrient	Interaction	Class
Levothyroxine Levothroid, Synthroid	**Thyroid** Synthetic Thyroxine	Calcium	Decreases absorption of drug; increases TSH	B
		Vitamin C	Increases absorption of drug; decreases TSH	B
		Coffee	Decreases absorption of drug	C
		Grapefruit Juice	Inhibits OATP1A2; slightly decreases absorption of drug	C
Lisinopril Prinivil, Zestril	**Blood Pressure** ACE Inhibitor	None	No significant interactions confirmed	N/A
Metformin Glucophage XL, Gluformin	**Diabetes (biguanide)** Hepatic Glucose Reducer	Berberine (300 mg)	Improves insulin sensitivity; decreases HOMA-IR, total cholesterol, LDL	B
		Alcohol (>7 drinks/week)	Increases effect of drug; increases lactic acidosis and lactate production	C
Metoprolol Lopressor, Toprol-XL	**Blood Pressure** Beta-blocker	None	No significant interactions confirmed	N/A
Omeprazole Prilosec, Zegerid	**Acid-Reflux** Proton Pump Inhibitor	St. John's Wort	Induces CYP2C19 and CYP3A4; decreases effectiveness of drug	C
		Grapefruit Juice	Inhibits CYP3A4; inhibits metabolism of drug	C
Rosuvastatin Crestor	**Cholesterol** Statin	Grapefruit Juice	Inhibits OATP2B1; reduces bioavailability of drug	C
		EGCG	Significantly reduces systemic exposure of drug	C

Drug–Nutrient Depletions

Pharmaceutical	Class of drug	Nutrients depleted	Recommended dosage	Class
Acetaminophen/ Hydrocodone Vicodin, Norco	**Pain** Narcotic, Anti-Inflammatory	Glutathione	NAC – FDA approved protocol **Loading phase:** 0.14 to 0.16 g/kg up to 17 doses. **Maintenance:** 0.069 to 0.083 g/kg	B
Albuterol Ventolin, Proventil	**Breathing** Bronchodilator	No significant depletions confirmed. See **white paper** for details.	N/A	N/A
Amlopidine Norvasc	**Blood Pressure** Calcium Channel Blocker	No significant depletions confirmed	N/A	N/A
Atorvastatin Lipitor	**Cholesterol** Statin	Coenzyme Q10	50–200 mg/day	B
Gabapentin Neurontin, Neuraptine	**Neuropathy, Pain**	Folic Acid	400 mcg/day	B
Insulin Glargine Injection Lantus Solostar	**Diabetes** Insulin analogue	Magnesium	336 mg/day for 3 months	B
Levothyroxine Levothroid, Synthroid	**Thyroid** Synthetic Thyroxine	No significant depletions confirmed	N/A	N/A
Lisinopril Prinivil, Zestril	**Blood Pressure** ACE Inhibitor	Zinc	11 mg/day for men and 8 mg/day for women	A
Metformin Glucophage XL, Gluformin	**Diabetes (biguanide)** Hepatic Glucose Reducer	Vitamin B12	1000 mcg/day sublingual	B
		Folic Acid	5 mg/day	B
Metoprolol Lopressor, Toprol-XL	**Blood Pressure** Beta-blocker	No significant depletions confirmed. See **white paper** for details.	N/A	N/A
Omeprazole Prilosec, Zegerid	**Acid–Reflux** Proton Pump Inhibitor	Magnesium	250–300 mg/day	A
		Vitamin B12	1000–2000 mcg/day	C
		Calcium	500–1000 mg elemental calcium (carbonate, citrate) 3x/day	C
		Iron	105–210 mg/day elemental iron	C
Rosuvastatin Crestor	**Cholesterol** Statin	Coenzyme Q10	50–200 mg/day	A

Supplement Resources

Herbs, botanicals, and other products Memorial Sloan-Kettering Cancer Center http://www.mskcc.org/mskcc/html//11570.cfm
Dietary supplement fact sheets Office of Dietary Supplements, National Institutes of Health http://ods.od.nih.gov/healh_information/information_about_individual_dietary_supplements.aspx
Dietary supplements during cancer care Caring 4 Cancer http://www.caring4cancer.com/go/cancer/nutrition/dietary-supplements
Nutrient Supplementation (position paper) Academy of Nutrition and Dietetics http://www.eatright.org/
Evidence-based database with product monographs including safety, efficacy, and interaction information Natural Medicines Comprehensive Database http://naturaldatabase.com
Micronutrient Information Center Linus Pauling Institute, Oregon State University http://Lpi.orst.edu/infocenter
Food and Drug Administration Dietary supplement alerts and safety information and adverse event reporting www.fda.gov/Food/DietarySupplements/default.htm
Position paper on dietary supplements **American Society of Health-System Pharmacists (ASHP)** **http://www.ashp.org/DocLibrary/BestPractices/SpecificStDietSuppl.aspx**
Livertox: Clinical and Research Information on Drug-Induced Liver Injury United States National Library of Medicine. http://livertox.nlm.nih.gov/index.html

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9. For Mothers: Breastfeed Your Baby if You Can

9. For Mothers: Breastfeed Your Baby If You Can

- Breastfeeding offers numerous health benefits for the baby and mother
- Evidence strongly suggests breastfeeding can lower breast cancer risk for the mother
- Studies suggest breastfed babies have a lower risk of developing obesity in adulthood
- WHO and UNICEF recommend exclusive breastfeeding for 6 months of life, if possible

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What the Science Says:

- BF drops levels of some cancer-related hormones in a mother's body
- Breastfeeding helps protect babies from infection and disease
  - Protects development of immature immune system
- Mother's have a lower risk of type 2 diabetes
- Reduces risk for adulthood obesity
  - Lower body fat = decreased cancer risk

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10. After Diagnosis Follow AICR Recommendations, If Able.

10. After a Cancer Diagnosis: Follow AICR Recommendations, If Able

- Consult with a health professional about what is right for you
- AICR recommendations are applicable during cancer prevention, treatment and recurrence
- Numerous tools available at www.aicr.org

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Sources

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- www.aicr.org
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- https://brainmd.com/blog/benefits-of-intermittent-fasting/
- http://sitn.hms.harvard.edu/flash/2015/the-flavor-rundown-natural-vs-artificial-flavors/
- https://www.eatrightpro.org/news-center/practice-trends/examining-the-nova-food-classification-system-and-healthfulness-of-ultra-processed-foods
- https://www.fda.gov/food/information-consumers-using-dietary-supplements/questions-and-answers-dietary-supplements
- https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=501.22
- www.nutritioncaremanual.org

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