Outline

- General Nutrition Overview
  - Macronutrients – Carbohydrates, Protein, and Fat
  - Vitamins/Minerals
  - Phytochemicals
  - Fluid
- Nutrition and Cancer Risk
- Nutrition During Cancer Treatment
- Nutrition to Manage Treatment Symptoms
  - Nausea
  - Diarrhea/Constipation
  - Decreased Appetite
  - Mucositis
  - Dry Mouth
  - Taste changes
  - Food Safety
  - Dehydration
Carbohydrates

Body’s preferred source of energy. Broken down into glucose which fuels our brain, muscles, and other vital organs.

Simple and Complex Carbohydrates

**Simple Carbohydrates** (aka simple sugars)
- Require little digestion and are quickly absorbed by our bodies
- Provide limited nutrients
- Less than 40 grams (10 teaspoons) per day

**Complex Carbohydrates**
- Slowly digested and absorbed
- Occur naturally in foods (fruit, milk, beans, whole grains, and starchy vegetables)
- Contain fiber and a variety of beneficial vitamins, minerals, and phytonutrients
Fiber

A diet rich in high-fiber foods can reduce your overall calorie intake and help you maintain a healthy weight, which is vital to reducing cancer risk.

**Best sources:** unprocessed plant foods

Vegetables, fruits, whole grains, nuts, seeds, and beans

**Benefits**
- Promotes satiety
- Increases intakes of nutrient dense foods
- Regulates bowel movements
- Lowers cholesterol
- Stabilizes blood sugar levels
- Feeds beneficial gut bacteria

**Goal: 21-38 grams per day**

Increase slowly to prevent discomfort (5 extra grams per day)

Choose foods with at least **2.5 grams** of fiber
Protein

Made from 20+ building blocks called amino acids

Many functions in the body:
• Cell growth, repair and maintenance
  • Muscle
• Fluid and electrolyte balance
• Antibodies
• Energy

Most people are able to meet protein needs with diet alone
• No need to supplement with powders or shakes

Protein needs increase during cancer treatment
• May have trouble meeting needs
• Especially with nausea, taste changes, decreased appetite, etc.
# Protein Sources & Amounts

**Plant-based:**
- 3/4 cup tofu: 19g
- 1/2 cup cooked soybeans: 15g
- 1/2 cup cooked lentils: 9g
- 2 tbsp. peanut butter: 7g
- 1/2 cup cooked beans: 7g
- 1 oz. nuts: 6g
- 1/4 cup hummus: 5g
- 2 tbsp. seeds: 4g
- 1/2 cup cooked quinoa: 4g
- 1 cup almond milk: 1g

**Animal-based:**
- 3 oz. chicken: 23g
- 3 oz. pork: 22g
- 3 oz. beef: 21g
- 3 oz. shrimp: 19g
- 1 cup Greek yogurt: 19g
- 3 oz. salmon: 17g
- 1 cup milk: 8g
- 1 egg: 7g
- 1 oz. cheese: 7g
Fat

Can be part of a healthy diet

Functions:
- Gives our bodies energy
- Provides structure to cells
- Cushions organs to prevent damage
- Help absorb nutrients (Vitamin A, D, E, and K)

Four Major Types

**Saturated fats** (solid)
- Fatty meats, poultry skin, cream, butter, cheese, etc.
- Raise bad LDL cholesterol
- Can increase risk of heart disease and stroke
- Limit to 5-6% of calories (13 grams/day)

**Trans fats** (solid)
- Fried foods, baked goods, stick margarines
- Raise bad LDL and lowers good HDL cholesterol
- Increase risk of heart disease, stroke, and diabetes
- Limit or avoid

**Monounsaturated fats** (liquid)
- Oils - olive, canola, peanut, safflower, sesame
- Lower bad LDL cholesterol
- Replace saturated and trans fats with these

**Polyunsaturated fats** (liquid)
- Fish, walnuts, sunflower seeds, tofu, oils – soybean
- Omega 3 & Omega 6
- Replace saturated and trans fats with these
Vitamins and Minerals

Two main types of micronutrients required for survival and health.

**Vitamins**

Aid in energy production, wound healing, bone formation, immunity, and eye/skin health

**13 essential vitamins**

- Fat Soluble: Vitamins A, D, E, K
- Water Soluble: B vitamins and Vitamin C

Are broken down by heat, air, or acid

- Can be inactivated through cooking, storage, air/light exposure
- Want to eat food in a variety of ways

**Minerals**

Perform a wide variety of functions in our bodies

- Help maintain cardiovascular and bone health

**Major Minerals**: used by our bodies in large amounts

- Calcium, Chloride, Magnesium, Phosphorus, Potassium, Sodium, Sulfur

**Trace Minerals**: required in small amounts

- Chromium, Copper, Fluoride, Iodine, Iron, Manganese, Molybdenum, Selenium, Zinc

A well-balanced diet usually provides our bodies with plenty of vitamins/minerals

Most healthy people do not need to take a vitamins
Supplements

60-80% of people with cancer have taken supplements before, during, or after treatment.

Supplements do not come without risk
- May interact with a person’s cancer treatment
  - Make treatment less effective or more toxic
  - St. John’s Wort - reduces the effectiveness of Imatinib (Gleevec®)
- Are not regulated
  - Cannot guarantee the ingredients are accurate
  - Look for independent testing (NSF or USP)

Prioritize whole food sources
- Naturally contain substances that promote good health

Supplements may be needed with deficiencies
- Will be managed by healthcare team
Phytonutrients

Beneficial compounds naturally found in food
Provide a plant with color, aroma, and flavor

The colors, fragrances, and taste of the plant hint at the phytochemicals it contains.

Natural cancer fighters
Stimulate the immune system
Slow the growth rate of cancer cells
Prevent DNA damage that can lead to cancer
  - Work as antioxidants

Stick to food sources
Phytochemicals in supplement form may not be as easily absorbed as those from food
Water

All cells in our body need water to function

- Important for proper metabolism of food and medications
- Dehydration occurs with inadequate fluids or high losses with diarrhea or vomiting
  - My impact energy levels and electrolytes
- Important to replace lost fluids

Fluid Needs: One-Size does NOT fit all

- Fluid needs vary from person to person
  - Activity level
  - Environment
- **Typically recommend 8, 8 oz glasses per day (~2L)**
- Drink mostly water and unsweetened drinks
  - Fruit and herb infused water
  - Unsweetened tea or coffee
Nutrition And Cancer Risk
How Does Nutrition Impact Cancer?

Science has shown that healthy eating is associated with decreased cancer risk.

Not a “diet” - but an eating pattern.

• Eat a variety of vegetables, fruits, whole grains and beans
• Favor brightly colored or strongly flavored vegetables and fruits
• Focus on moderation of less nutrition options
  • Added sugar
  • Processed meats
  • Alcohol

Plant-Based Eating

- Have plenty of vegetables and fruits
- Eat protein foods
- Make water your drink of choice
- Choose whole grain foods
Plant-Based Eating Pattern

**Eat More**  Vegetables, fruits, whole-grain products, beans, lean meats, eggs, nuts and seeds

**Eat Less**  Red meat (<18 oz/week), processed meats, saturated fat, added sugar (<40 grams)
General Rules of Plant-Based Eating

- Max health benefits from eating a diet high in:
  - Fruits & Vegetables
  - Variety **AND color**
  - Differing cooking methods
  - Fresh or frozen
  - Canned in natural juice or low sodium
  - Whole grains
    - Avoid “enriched”
  - Beans and legumes
    - Low sodium
  - Nuts and seeds
- Be conscious of portion sizes of:
  - Animal proteins
  - Added sugar
Plant-Based Eating

How to follow at breakfast

• More fruits, vegetables, and whole grains
  • Add color
  • Eat whole fruit vs drinking fruit juice
• Less processed meats and sugar sweetened foods
Plant-Based Eating
How to follow at lunch or on-the-go
Plant-Based Eating
How to follow at dinner

PLATE METHOD

Picture a line running down middle of plate
1. Fill the largest section with non-starchy vegetables or fruits

Split the remaining half in two
2. In one small section, put grains and starchy foods
3. In the other small section, put lean protein
Nutrition During Cancer Treatment
# Nutrition During Treatment

Eat as healthy as possible while balancing side effects of treatment and previous diet restrictions

<table>
<thead>
<tr>
<th><strong>Continue Healthy Eating</strong></th>
<th><strong>Nutrition-Related Side Effects</strong></th>
<th><strong>Previous Diet Restrictions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-rounded diet</td>
<td><strong>Severity Varies</strong></td>
<td><strong>Balance is key</strong></td>
</tr>
<tr>
<td>• Calories: to maintain weight</td>
<td>Negative symptoms from cancer treatment</td>
<td>Try to maintain previous nutrition restrictions</td>
</tr>
<tr>
<td>• Protein: to help rebuild or maintain tissue</td>
<td>May reduce the amount of nutrients you are able to take in</td>
<td>• Diabetes</td>
</tr>
<tr>
<td>• Nutrients: vitamins, minerals</td>
<td>Common symptoms:</td>
<td>• Kidney Disease</td>
</tr>
<tr>
<td>• Fluid</td>
<td>• Poor appetite</td>
<td>• Heart Disease</td>
</tr>
<tr>
<td>• Food safety</td>
<td>• Nausea or vomiting</td>
<td>• Medications</td>
</tr>
<tr>
<td></td>
<td>• Constipation or diarrhea</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mucositis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Taste Changes</td>
<td></td>
</tr>
</tbody>
</table>
## Key Nutrients During Cancer Treatment

Cancer treatment can place a lot of nutritional demand on your body. **A main goal is to try to maintain your weight.**

### Calorie Dense Foods

**Carbohydrates and fat** provide our bodies with the bulk of calories to maintain weight

- Good carbohydrates: fruits, starchy vegetables (corn, potatoes, quinoa, oatmeal, etc.), whole grains (rice, quinoa, oatmeal, etc.), pastas, cereals, beans, dairy (yogurt, kefir, and milk)
- Good fats: oils (olive, soybean, etc.), nuts, seeds, avocado, full fat dairy, coconut

### Protein Rich Foods

Helps repair body tissue and maintain a healthy immune system

Individuals with cancer typically need extra protein during treatment

- Good sources: lean meat, fish, poultry, dairy (cheese, Greek yogurt, milk, etc.), eggs, nuts, beans, lentils, soy foods (tofu, soymilk, tempeh, edamame)
- Protein powders or supplemental beverages
Sugar

Does sugar feed cancer?

- All carbohydrate foods are metabolized into “sugar”
  - Glucose

- All cells in our bodies use glucose for fuel
  - Tumor cells can make and use their own glucose

- It is believed that cancer cell growth is more related to high insulin levels vs. sugar intake alone
  - Insulin levels rise quickly following a large intakes of simple carbohydrates or added sugars

Tips to prevent high insulin levels:
1. Choose less simple carbohydrates and more complex carbohydrates
   - Whole grains, fruits (with skins/seeds), non-starchy vegetables
2. Pair carbohydrate foods with fat and protein
3. Go on a short walk after eating
Unintentional Weight Loss

Weight loss – especially extreme or rapid may lead to malnutrition

**Malnutrition**: physical state of unbalanced nutrition

- Increased risk of losing *muscle mass and strength*
- Malnutrition (or even a 5% weight loss) places individuals at risk of:
  - Treatment delays
  - Delayed tissue healing
  - Slow recovery between chemotherapy cycles
  - Increased fatigue
  - Decreased ability to fight infection

Cancer treatment is not the time to lose weight. Focus on maintaining!
Nutrition
To Manage Treatment Symptoms
Nausea

Feeling nauseous can impact your appetite and lead to weight loss. If you vomit, you can become dehydrated.

Best treatment depends on the cause:

• Chemotherapy/Radiation: may require a scheduled anti-nausea medication
• Anxiety/Fatigue: psycho-social counseling or physical/mental relaxation techniques
• Medications/Supplements: may need to take with food instead of an empty stomach

Nutrition tips for managing nausea

• Eat 6-8x/day instead of 3 large meals
• Sip on calorie containing beverages
• Drink clear liquids after vomiting
• Eat bland, dry foods
• Avoid your favorite foods
• Suck on tart hard candies or peppermints
• Sip on herbal teas between meals
• Avoid strong odors:
  • Eat cool or room temperature foods
  • Eat in well-ventilated rooms
  • Sit in a different room while meals are prepared
Gastrointestinal Disturbances
Most common side effect of radiation/chemotherapy treatments

Diarrhea
Adequate hydration (cold or room temperature)
Small/frequent meals
Limit lactose
Avoid greasy, fried, or spicy food
High soluble fiber

Constipation
Adequate hydration (warm or hot temperature)
Small, frequent meals
High soluble & insoluble fiber
Managing Diarrhea and Constipation

Choose the right type of fiber

**Soluble Fiber**
Absorbs water and becomes sticky & gel-like
Slows transit time
Helps form bowel movements

<table>
<thead>
<tr>
<th>Bananas</th>
<th>White Rice</th>
<th>White Toast</th>
<th>Applesauce</th>
<th>Canned fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oatmeal</td>
<td>Mashed Potatoes</td>
<td>Nut Butters</td>
<td>Chia Seeds</td>
<td>Melons</td>
</tr>
<tr>
<td>Farina</td>
<td>Pancakes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supplements: Metamucil, Banatrol, Benefiber, Nana Flakes

**Insoluble Fiber**
Does not absorb water
Increases transit time
Helps promote bowel movements

<table>
<thead>
<tr>
<th>Leafy Greens</th>
<th>Popcorn</th>
<th>Fruit Skins</th>
<th>Whole Nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds</td>
<td>Raw Vegetables</td>
<td>Dried Fruit</td>
<td>Barley</td>
</tr>
<tr>
<td>Beans</td>
<td>Multigrain Bread</td>
<td>Whole Potatoes</td>
<td>Flaxseed</td>
</tr>
</tbody>
</table>

Supplements: Flaxseed, Wheat Bran
Decreased Appetite

Loss of appetite is common during cancer treatment and can lead to weight loss and undernutrition. This can slow the body’s ability to heal and interfere with proper functioning of the body.

Eat 5 or 6 small meals (or snacks) per day.
Large meals may be overwhelming
Aim to eat every 1-2 hours

Eat the largest meal when you are the most hungry.
Typically in the morning

Eat the high protein foods on your plate first.
Poultry, fish, eggs, beans, nuts, dairy, etc.

Stock up on high calorie foods and beverages.
Smoothies, supplemental beverages, avocados, high fat dairy, etc.

Try to be as physically active as possible.
To help stimulate your appetite

Speak up to friends and loved ones.
They can help prepare or purchase food
Convenient Foods

Have nutritious and easy-to-prepare options on hand when you are not in the mood for cooking

1. Keep foods in the front of your fridge/pantry
2. Set non-perishables out on the counter
3. Add calories to your favorite snacks
   - Apples + *peanut butter*
   - Carrots and bell peppers + *hummus*
   - Multigrain toast + *avocado*
   - Peaches + *cottage cheese*
4. Keep extra smoothies or milkshakes in the freezer
Smoothie Formula

½ cup liquid
+
½ cup fruit (frozen or fresh)
+
1 cup vegetables (frozen or fresh)
+
protein source
Mucositis

Sores in the mouth or on the gums or tongue
Can lead to soreness or pain with eating or swallowing

Food choices to manage a sore mouth:

- Choose soft, bland foods
- Choose cold or room temperature foods
  - Hot foods may cause more irritation
- Soothe mouth with cold foods and drinks
  - Frozen fruit (grapes, banana, melon balls)
  - Frozen fruit pops and ice chips
- Moisten foods with broth, soup, sauces, gravy, or butter
- Eat high-protein, high-calorie foods to speed healing
- Use a straw to direct the beverage away from sores

Recommended Foods

<table>
<thead>
<tr>
<th>Cooked Cereal</th>
<th>Smoothie</th>
<th>Yogurt</th>
<th>Pudding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft Meat</td>
<td>Cream Soup</td>
<td>Avocado</td>
<td>Bananas</td>
</tr>
<tr>
<td>Apple Sauce</td>
<td>Mashed Potatoes</td>
<td>Pasta</td>
<td>Scrambled Eggs</td>
</tr>
<tr>
<td>Casserole</td>
<td>Hummus</td>
<td>Ground Meats</td>
<td>Steamed Veggies</td>
</tr>
</tbody>
</table>

Avoid foods that are likely to irritate your mouth

- Acidic foods (citrus fruits, tomatoes)
- Irritating spices or seasonings (pepper, chili powder, salsa, hot sauce, horseradish)
- Rough, dry or coarse foods (granola, hard toast, crunchy snack foods)
Dry Mouth (Xerostomia)

- Drink 8-10 cups of fluid daily
  - Keeps mouth moist and helps thin saliva
- Limit caffeine and alcoholic beverages
- Carry a water bottle with you – sip from it often
- Eat soft, bland foods
- Moisten food with broth, soup, sauces, gravy or butter
- Try tart foods and drinks to increase saliva production
  - Lemonade or cranberry juice
  - Sugar free lemonheads
  - Lemon water
  - Citrus popsicles
- Chew sugar-free gum
# Taste Changes

Cancer treatment can cause changes in your sense of taste and smell

In general, focus on keeping your mouth clean and healthy

<table>
<thead>
<tr>
<th>Metallic</th>
<th>Too sweet</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Choose tart flavors (lemon wedges, lemonade, vinegar, pickled foods)</td>
<td>• Choose tart flavors (lemon wedges, lemonade, vinegar, pickled foods)</td>
</tr>
<tr>
<td>• Add sweeteners or a little sugar to foods (maple syrup, honey, dates)</td>
<td>• Season foods with additional herbs and spices</td>
</tr>
<tr>
<td>• Choose plastic silverware</td>
<td>• Dilute oral nutrition supplements with milk/milk alternatives</td>
</tr>
<tr>
<td>• Limit foods from cans</td>
<td></td>
</tr>
<tr>
<td>• Avoid cooking with cast-iron skillets</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Too salty</th>
<th>Like cardboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Choose tart flavors (lemon wedges, lemonade, vinegar, pickled foods)</td>
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</tr>
<tr>
<td>• Add sweeteners or a little sugar to foods (maple syrup, honey, dates)</td>
<td>• Blend fruits into shakes, ice cream, or yogurt</td>
</tr>
<tr>
<td>• Choose low sodium soups, crackers, etc.</td>
<td>• Season foods with herbs, spices and other seasonings</td>
</tr>
<tr>
<td>• Prepare more meals at home and limit take-out</td>
<td>• Add sweeteners or a little sugar to foods (maple syrup, honey, dates)</td>
</tr>
<tr>
<td></td>
<td>• Add a small amount of salt to foods</td>
</tr>
</tbody>
</table>

**Mouth rinse before eating:** 
\[
\frac{3}{4} \text{ tsp salt} + 1 \text{ tsp baking soda} + 1 \text{ quart water}
\]
Food Safety

Cancer and treatments can weaken your immune system. Leaves you at higher risk of food poisoning.

Tips to reduce risk:

• Wash hands before and after making food
• Wash fresh fruits and vegetables with warm water
• Have separate cutting boards
  • Meat, poultry fish
  • Raw fruits and vegetables
  • Ready to eat foods – bread and cheese
• Avoid raw, rare, and undercooked foods
• Refrigerate leftover food within 2 hrs of cooking
• Check the “use by” or “best by” date on food
• Do not use dented, rusted or leaking cans
• Eating out:
  • Avoid buffets, salad bars, and food trucks
  • Avoid eating condiments, salsa or dips in public bowls
Dehydration

Lose more fluid then you take in

Common during cancer treatment due to:
- Decreased intakes (sore mouth, nausea, poor appetite)
- Vomiting, diarrhea, or excessive sweating
- Increased urination (diabetes or water pills)

Symptoms:

<table>
<thead>
<tr>
<th>Thirst</th>
<th>Dry Mouth</th>
<th>Dry Lips/Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Dark Colored Urine</td>
<td>Constipation</td>
</tr>
<tr>
<td>Rapid Heart Rate</td>
<td>Confusion</td>
<td>Dizziness</td>
</tr>
</tbody>
</table>

Tips to prevent dehydration:
1. Drink frequently (1-2 hours)
2. Aim for 8-12 cups per day
   - More with diarrhea or vomiting
3. Keep a water bottle with you
4. Keep a glass of water next to couch or bed
5. Choose other beverages besides water
   - Diluted fruit juices, flavored waters, decaffeinated coffee/tea, sports drinks, milk, milk alternatives, etc.
6. Eat foods high in fluids
   - Bouillon, soups, gelatin, fruit ices, popsicles, sherbet, milkshakes, smoothies, or supplemental beverages
7. Limit drinks with caffeine (2 per day)
## Infused Water Ideas

### Try These Refreshing Combinations

<table>
<thead>
<tr>
<th>Combination</th>
<th>Helpful tips:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemon → Cucumber → Mint</td>
<td>- Steep loose herbs and flowers in a tea infuser.</td>
</tr>
<tr>
<td>Strawberries → Basil → Cucumber</td>
<td>- Crush herbs or fresh ginger to release flavors.</td>
</tr>
<tr>
<td>Raspberries → Lime → Mint</td>
<td>- Keep it simple! Think of flavor combinations you like in other recipes and build from there.</td>
</tr>
<tr>
<td>Watermelon → Raspberries → Basil</td>
<td></td>
</tr>
<tr>
<td>Blueberries → Lemon → Lavender</td>
<td></td>
</tr>
<tr>
<td>Green Apple → Raspberries → Rosemary</td>
<td></td>
</tr>
<tr>
<td>Pineapple → Cucumber → Mint</td>
<td></td>
</tr>
<tr>
<td>Orange → Cinnamon → Clove</td>
<td></td>
</tr>
<tr>
<td>Mango → Pineapple → Mint</td>
<td></td>
</tr>
</tbody>
</table>

![Image of infused water with ingredients like lemon, cucumber, and mint]
Red Flags of Junk Science

1. Recommendations that promise a quick fix or “cure all”.
2. Claims that sound “too good to be true”.
3. Extreme warnings of danger from a single food or diet pattern.
4. Recommendations made to help sell a certain product.
5. Lists of “good” and “bad” foods.
6. Bold marketing terms such as “breakthrough”, “miracle” or “discovery”.
7. Claims of information “that your doctor doesn’t know”.

Credible Sources:
The American Cancer Society (cancer.org)
-American Institute for Cancer Research (AICR.org)
-The Academy of Nutrition and Dietetics, Oncology Nutrition (oncologynutrition.org)
-Memorial Sloan Kettering Cancer Center (mskcc.org)
Physical Activity And Cancer Risk
Physical Activity and Cancer Risk

In the last 2 decades, it has become clear that exercise plays a key role in cancer prevention. **Physical inactivity** is a well-established risk factor for several types of cancer.

- Positive relationship between physical inactivity and risk for both Hodgkin and non-Hodgkin Lymphoma
- Similar findings in 13 other cancers
Physical Activity
During Cancer Treatment
Benefits of Physical Activity During Cancer Treatment

- Quality of Life
- Treatment Response
- Depression
- Anxiety
- Sleep Quality
- Balance Control
- Fatigue
- Physical Function
- Strength
Physical Activity Recommendations During Cancer Treatment

During cancer treatment, you should be as physically active as your abilities and condition allow.

**Weekly Goal:**
- 150 minutes of moderate intensity activity (30 minutes, 5 days)
- Limit sedentary time
- Start slow and advance as able
- Any activity is better than nothing!
Find activities you enjoy!

- Bike
- Walk
- Dance
- Stretch
- Swim
- Strength Training
- Group Classes
Thank you!

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