

MNT APPROACH TO ONCOLOGY



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Overview

- Cancer Overview
- Nutrition Assessment
 - Pathophysiology/Etiology
 - Treatments
 - Nutrition Implications
- Nutrition Diagnoses
- Nutrition Intervention
 - Medication management and nutrition support included
- Nutrition Monitoring/Evaluation

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Meet D.W.

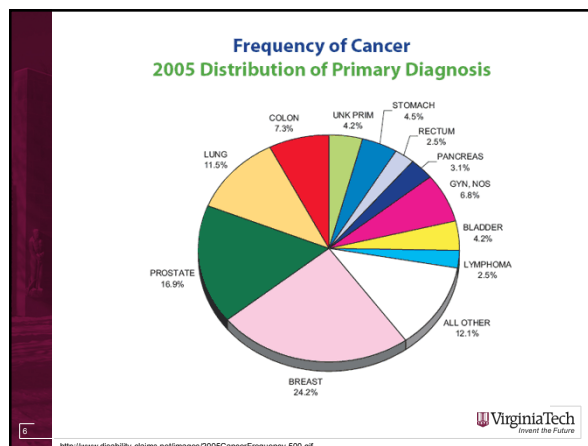
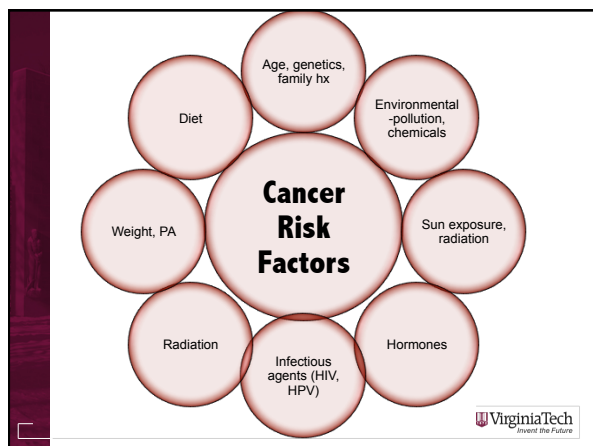
- 63 yo white female
- Admitted for SOB, hypoxia
- Dx: DVT, PE
- Hx: COPD on home O₂, peripheral neuropathy, smoking hx 1-2 ppd...Non-small cell lung carcinoma diagnosed 3 months ago; finished chemo/radiation 1 week PTA

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Cancer Statistics

- Cancer is the 2nd leading cause of death in the US
 - Men: 1 in 2 chance
 - Women: 1 in 3 chance
- Leading cancer cases
 - Men: Prostate, lung, colorectal, urinary bladder
 - Women: Breast, lung, colorectal, uterine
- 1/3 of cancer deaths are related to nutrition, inactivity, overweight/obesity
- More than 100,000 cancers each year are related to excess body fat

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- Major Tissue/Organ Sites**
- Prostate Cancer
 - Age- 2/3 of cases are in males >65y
 - Race- African Americans
 - High fat (HF) diet
 - Breast Cancer
 - Age- 50+
 - Early menarche, late menopause
 - No children, or 1st child after 30 years
 - HF diet
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- Major Tissue/Organ Sites**
- Colon Cancer
 - Family hx
 - Area of Residence (urban/industrial)
 - HF, low fiber diet
 - IBD or other inflammatory intestinal conditions
 - Sedentary
 - Lung Cancer
 - Smoking
 - Environmental tobacco/smoke
 - Asbestos, radon, radiation
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Staging of Cancer

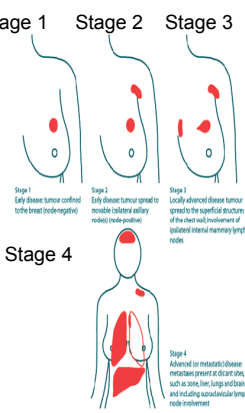
TNM Staging System
T=Tumor, N= Node, M= Metastases

STAGE 1	Tumor ~2mm
STAGE 2	Tumor ~2-5mm OR Lymph nodes in armpit affected
STAGE 3	Tumor >5mm AND armpit lymph nodes affected
STAGE 4	Tumor any size >5mm Lymph nodes affected Cancer has metastasized


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
http://www.breastcancer.summit.com/breastcancer/summit/10010_11002.asp?mid=6

Staging of Breast Cancer



Stage 1 **Stage 2** **Stage 3**


Stage 4



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Dietary Factors & Cancer

It has been estimated that 35% of cancer cases/deaths may be related to dietary factors (Doll and Peto, 1981).

<p>Decrease Risk</p> <ul style="list-style-type: none"> • Physical activity • High fiber diet • Fruits, vegetables and whole grains • Carotenoids • Vitamin A • Vitamin C • Vitamin E • Selenium • Calcium 	<p>Increase Risk</p> <ul style="list-style-type: none"> • Overweight/Obesity • HF diet • High intake red meat • Excess alcohol consumption
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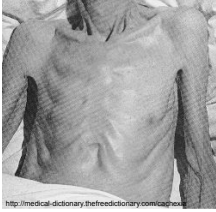
http://rex.nci.nih.gov/NCI_Pub_Interface/raterisk/risk673.html
 http://www.newscenter.com/wp-content/uploads/2010/08/haydiet_rumb.jpg

Pathophysiology: Carcinogens

- Carcinogens: physical, chemical, or viral agent that induces cancer
- Carcinogens in the diet
 - Dietary carcinogen enhancers
 - Heterocyclic amines; benzopyrene (red fat meat)
 - Aflotoxins
 - Dietary carcinogen inhibitors
 - antioxidants, phytochemicals
- Cause a deviation in normal function
 - Proliferation of abnormal cells, increased cell mass, interference with normal tissue function, or metastases


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NUTRITIONAL IMPLICATIONS OF CANCER



<http://medical-dictionary.thefreedictionary.com/cachexia>

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Nutritional Implications

- Tumor-related depletion of nutrient stores
 - Altered energy metabolism
- Changes in dietary patterns
 - Overall decreased intake
- Antineoplastic Therapy
- Hormonal/electrolyte imbalances

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Nutritional Implications

- Cancer/treatment related N/V
- Location of tumor may have specific nutritional implications on organs, GI tract
 - i.e. GIT dismotility
- Cancer cachexia

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Metabolic Alterations

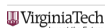
- Carbohydrate
 - Insulin resistance & glucose intolerance
 - ↑ gluconeogenesis, & glycose synthesis
- Protein
 - ↑ Whole body protein turnover
 - ↓ Muscle protein synthesis & ↑ catabolism lead to protein deficiency
- Lipids
 - ↑ Lipolysis-uncontrolled by elevated [blood glucose].
 - ↑ TG's, ↓ HDL's
 - ↑ Hormone sensitive lipase
 - Tumors cause ↑ production LMF
 - increases lipolysis furthermore

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Malnutrition & Cancer

- R/t decreased nutrient intake:
 - Anorexia
 - Food aversions
 - N/V/D
 - Constipation
 - Mouth sores
 - Difficulty swallowing
 - Pain, depression, anxiety
 - Premature satiety
 - Changes in appetite, taste, smell and ability to eat or absorb food



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GIT Effects

- Difficulty chewing, swallowing
- Mechanical obstruction of GIT
- Maldigestion, malabsorption
- Enteropathy → protein losses
- GIT dysmotility
 - Dysphagia
 - Early satiety
 - Diarrhea
 - Constipation



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Cancer Cachexia

"KAKOS"-BAD; "HEXIS"-CONDITION

- Protein-energy malnutrition
 - Secondary condition in cancer patients
- Cytokines play pertinent role
- More common in lung, GI and pancreatic cancers



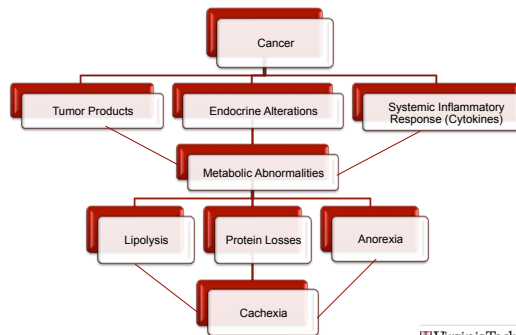
http://www.oncolyn.com/gf/archive2008/vol7_no37_discourse_3.jpg

Nutritional S/S:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Progressive weight loss • Anorexia • General wasting & weakness • Altered taste • Early satiety • Malnutrition | <ul style="list-style-type: none"> • Anemia • Edema • Immunosuppression • Altered BMR • Abnormal energy/fluid metabolism |
|---|---|

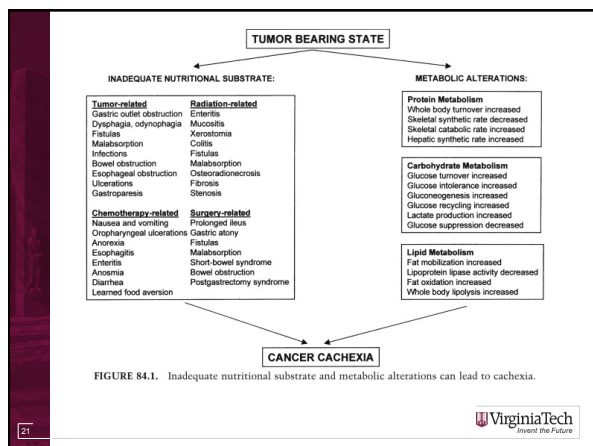
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Factors Contributing to Cancer Cachexia



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Argiles JM, Busquets S, Lopez-Soriano F.J. Cytokines in the Pathogenesis of Cancer Cachexia. *Curr Opin Clin Nutr Metab Care*. 2003; 6: 401-406



Nutrition-Focused Physical Examination

- Adipose tissue- distribution
- Muscle tissue-face + limbs
- Edema/Ascites
- Hair/nail quality
- Skin
- Buccal Mucosa
- Neurological s/s
- % Wt loss, % IBW

D.W. Physical Examination

- D.W. appears frail, older than stated age, noticeable muscle and fat wasting, temporal wasting, sunken eyes, + clubbing.
- Height: 60"
- Weight: 82#
- UBW: 103# 4 months ago

TREATING CANCER

Chemotherapy
Radiation
Surgery
Hematopoietic Stem Cell Transplantation
Immunotherapy

D.W.'s Cancer Treatment Plan

- Finished chemo & radiation 1 week PTA
- Needed a wider area of radiation than originally anticipated secondary to large area of lung involved and slow tumor response.



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<http://www.treatment-for-lung-cancer.info/images/Treatment-for-lung-cancer-radiotherapy-lung-cancer.jpg>

SURGERY

Excision of malignant tumor(s) and surrounding tissues



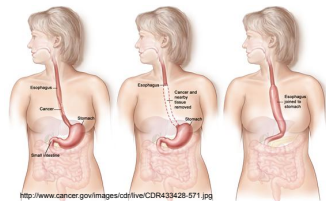
http://www.ncsurgical.net/images/6_proc/surgery.jpg

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Surgery as a treatment option

- Used alone or in combination with radiation or chemotherapy
- Removal of an organ/tissue can be partial, subtotal or total
- Most commonly used for head and neck cancer, stomach cancers, breast cancer



<http://www.cancer.gov/images/cdr/ive/CDR433428-571.jpg>

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Nutritional Implications: Surgery

- Increased energy & protein needs for wound healing
- Possible temporary or permanent reliance on tube feedings
- Specific organs affected depending on site of surgery
- Normal physiology & nutrient intake may be affected
- Examples:
 - Dumping syndrome
 - Post-op ileus
 - Pancreatic resection/insufficiency
 - Intestinal resection
 - Short bowel syndrome

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RADIATION

The use of high-energy X-rays to kill cancer cells and keep them from growing and multiplying



External:Skin; or Internal (brachytherapy): Injection, Implantation of a radioactive pellet



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Cells Affected by Radiation

- Cells of the nervous system
 - Extent of affects depend upon total radiation dose, size of the fractions, duration of therapy, and volume of healthy brain nervous tissue treated.
- Cells of G.I. System
 - Radiation therapy to the abdomen may cause acute gastritis or enteritis
- Long-term radiation exposure can lead to the scarring and death of normal tissue.



Nutritional Implications: Radiation

Side Effects

<ul style="list-style-type: none"> •Painful/difficulty swallowing •Lack of energy, fatigue •Loss of appetite •Altered taste, smell •Low blood counts •Esophagitis, enteritis, stenosis 	<ul style="list-style-type: none"> •N/V/D •Malabsorption •Hair, tooth loss •Stomatitis •Decreased salvia production
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- Usually peak 2-3 wks after treatment and resolve 2-4 wks later
- Reducing side effects- Frequency of treatment
 - Healthy cell damage is minimized by smaller, frequent doses and taking brief rests



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CHEMOTHERAPY

The use of chemical agents to stop cancer cells from growing



Destroys any cell in the body that divides rapidly



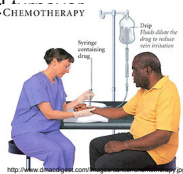
http://www.cosmoomagazine.com/files/imagecache/news/files/2007/06/13_chemo.jpg

Chemotherapy

- A systemic therapy that affects the whole body
→ Affects normal & malignant cells

- Especially harsh for cells with rapid turnover

- Hair, skin, mouth
- Lining of the GI tract
- Blood and bone marrow
 - Low WBC count
 - Neutropenia
 - Low RBC count
 - Low platelet count



- Delivery: injection, intra-arterial, intraperitoneal, intravenous, topically, orally



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Nutritional Implications: Chemotherapy

Side Effects

<ul style="list-style-type: none"> • Altered taste and smell • Mucositis/stomatitis • Suppression of bone marrow production (myelosuppression) • Anemia/Fatigue • N/V/D • ↓ Appetite/anorexia/wt loss • GI upset • Sodium & fluid retention • Glucose intolerance 	<ul style="list-style-type: none"> • Xerostomia (dryness of mouth) • Altered GI function (adynamic ileus) • Xs losses urinary protein, K⁺, Ca²⁺ • Osteoporosis • Hypercalcemia • ↑ appetite/Weight gain
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**Specific side effects depend on specific use of medications and agents; more severe side effects expected with treatment of the head and neck.



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MNT: Chemotherapy

- TLC=suppressed → not an accurate measure of nutritional status
- Manage DNI's through dietary supplements/alterations
- Management of N/V/D
- Altered taste/smell
 - Oral intake preferred
 - Liquid supplementation prn
 - Timing of food presentation
- Artificial saliva or saliva stimulants



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Radiation + Chemotherapy Combined

- Produces a radiation-enhancing effect
- Multimodality = very individualized depending upon the patient's needs
- Doctors have the ability to be conservative with what they remove
- Patients have the ability to preserve limbs
 - ↓ Need for surgery



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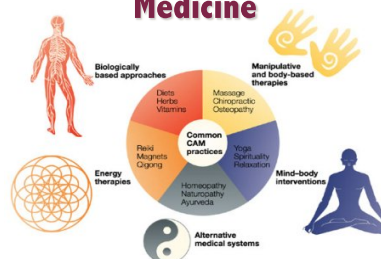
Other Treatment Modalities

- Hematopoietic Stem Cell Transplantation (HSCT)
 - Used for leukemia, lymphoma, malignant solid tumors and autoimmune disorders
 - Graft vs. host disease
- Immunotherapy
 - Involvement of cytokines and antibodies
- Photodynamic Therapy
 - Combines drug therapy and use of a light to kill cancer cells
- Target Cancer Therapies
 - Shuts down specific pathways to prevent cancer growth



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Complementary & Alternative Medicine



- 90% cancer patients report using at least 1 form of CAM
- Only 50% report discussing CAM options with their physicians



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<http://www.mydochub.com/images/complementary-alternative-medicine.jpg>

Your role as the RD...

- Ask patients about previously and currently-used CAM practices.
- Educate!!
 - Provide evidenced-based information to allow patients to make educated choices.
 - Encourage the patient to play an active role in their health.
 - Promote diet modifications, lifestyle changes over supplement use.



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Summary: Nutritional Implications of Tx

- Severity of side effects depend upon:
 - Specific treatment agents
 - Intensity of dosage
 - Treatment cycles/Length of treatment
 - Concurrent drugs
 - Previous and current health status
 - Individual response
- Nutritional Intervention can play an effective role in managing side effects.
- Be alert towards potential DNI's



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Implications for D.W.

- c/o severe difficulty taking PO.
- Spicy foods “burn” her esophagus.
- Difficulty swallowing r/t thrush

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NUTRITION DIAGNOSES

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Common Nutrition Diagnoses for Cancers

- Hypermetabolism (NI-1.1)
- Inadequate oral food/beverage intake (NI-2.1)
- Increased nutrient needs (NI-5.1)
- Evident protein-energy malnutrition (NI-5.2)
- Inadequate protein intake (NI-52.1)
- Inadequate vitamin intake (NI-54.1)
- Inadequate mineral intake (NI-55.1)
- Swallowing difficulty (NC-1.1)
- Chewing (masticatory) difficulty (NC-1.3)
- Altered GI function (NC-1.4)
- Food-medication interaction (NC-2.3)
- Underweight (NC-3.1)
- Involuntary wt. loss (NC-3.2)
- Food- and nutrition-related knowledge deficit (NB-1.1)

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D.W. Diagnoses

- Unintentional weight loss r/t lung cancer treatment AEB 20% weight loss in 3 months, 80% IBW, physical s/s of cachexia.
- Difficulty swallowing r/t thrush AEB low PO intake, patient complaints of spicy foods burning esophagus

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Nutrition Diagnoses

- Remember to prioritize!
 - Address most pertinent nutritional issues first.
 - Addressing top 2-3 problems will oftentimes resolve the rest!
- Communication with other practitioners is a must!
 - There are multiple issues surrounding cancer & cancer treatment
 - Know what you can treat, what you cannot. Clear communication with other care givers will result in the best outcomes for the patient.



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NUTRITION INTERVENTION



Overall MNT Treatment Goals

- Symptom management
- Supply adequate calories, protein
- Treat vitamin/mineral deficiencies
- Address DNI's
- Improve QOL, lengthen survival
- Overcome psychological, economic & time barriers to meeting nutrition needs
- Remember: Pt has right to refuse tx at any time
- Benefits may be minimal w/ terminal cancer



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<http://media.photobucket.com/image/chemotherapy/aprilmapri19551144/0063631.jpg>

Interventions for Cancers

- Initiate enteral or parenteral nutrition (ND-2)
- Commercial beverage/food supplement (ND-3.1)
- Vitamin or mineral supplements (ND-3.2)
- Feeding Assistance (ND-4)
- Initiate nutrition education (NE-1)
- Modify distribution/food type (ND-2)
 - According to the Pt preferences/aversions



Delivery Recommendations: PO Intake

- Must meet at least 75% of needs
- Modify type, amount, volume, texture of foods
- Use appetite stimulants and supplements as necessary

Specific Scenarios:

Xerostomia

- Provide frequent sips of H₂O.

Mucositis

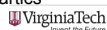
- Ice chips to soothe
- Sucralfate suspension

N/V

- 5-OH tryptamine receptor antagonist

Diarrhea/Constipation

- Loperamide (D)
- Osmotic Cathartics
- Fiber



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What is a neutropenic diet?

- Low-microbial diet to protect patient's with lowered immune function
- Common for cancer patients with an ANC count <500 cells/mm³
- Avoid: fresh fruits & vegetables, raw/rare meats, & other raw foods
- Allow: pasteurized dairy products, "well-done" meat and poultry, cooked starches & vegetables, canned fruit, fresh fruit with thick rinds (i.e. orange).
- Other neutropenic precautions
 - Fresh flowers
 - Sick relatives



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Enteral vs. Parenteral

Enteral Nutrition

(preferred)

- To supplement PO intake if meets <75% of needs
- PEG-most common for LT care
- Calorically dense formulas
 - Jevity 1.2
 - Isosource 1.5
- Elemental formulas when GI tract is compromised (radiation) or partially removed

Parenteral Nutrition

- Reserve for pt's w/ non-functioning GIT
 - Or when enteral/PO intake is insufficient
- For interventions >10-14 days
- CA subsets:
 - GYN
 - Bone marrow transplants



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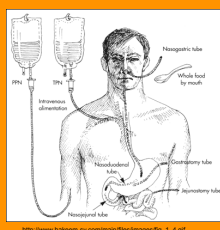
Energy and Nutrient Needs

- Every cancer patient is different!
- Tx increases nutrient needs
- Cancer may cause an alteration in metabolism needs
- Meet calorie, protein, fluid goals
 - HBE x 1.1-1.6
 - 28-30 kcal/kg
 - Use clinical judgment!
 - Increased protein needs for tissue repair
 - Hydration needs



D.W. Intervention

- Previous hx of home enteral nutrition (stopped 1 month PTA)
- What do you recommend?



Pharmacologic Support

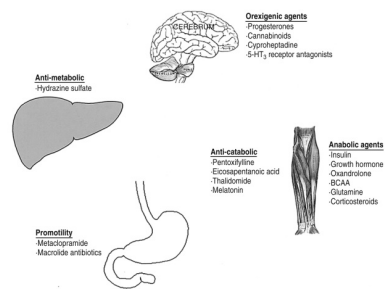


FIGURE 84.2. Pharmacologic agents have been developed to improve weight gain and nutritional status in cancer patients.

ADA Position: Ethical and Legal Issues in Nutrition, Hydration & Feeding

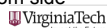
"It is the position of the ADA that individuals have the right to request or refuse nutrition and hydration as medical treatment. RD's should work collaboratively to make recommendations on providing, withdrawing or withholding nutrition and hydration in individual cases..."

NUTRITION MONITORING & EVALUATION

Ensuring intervention goals are met

Nutrition Monitoring & Evaluation

- Cancer & treatment side effects, nutritional implications
- Weight, fluid status, physical S/S
 - If intake falls below 75% of needs, supplement with nutrition support; or administer appetite stimulants
- Labs
 - TG's, N-balance
- Patient Education
 - Changes in nutritional needs due to cancer/tx
 - Address CAM, educate patient through evidence-based literature
 - Communicate the relevance and importance of nutrition on cancer outcome and relief from side effects



American Cancer Society Cancer Prevention General Recommendations

1. Choose most of your foods from plant sources
2. Limit HF food intake, especially from animal sources
3. Be active to achieve and maintain a healthy weight
4. Limit consumption of alcohol



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