PHARMACOLOGY:

Breast, Lung, and Colon Cancers

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Objectives

- Define common cancer therapy agent for Breast, Lung, Colon Cancers
- Describe the differences among cancer therapies
- Achieve a basic understanding of the mechanisms of actions of chemotherapy, hormone therapy, targeted therapies, and immunotherapy respective to Breast, Lung, and Colon Cancers
- Have a basic understanding of common toxicities for cancer agents and regimens
- Have an understanding of available resources for information regarding cancer therapies


Cancer treatment

Cancer Therapy Agents

- Chemotherapy
- Hormonal Therapy
- Immunotherapy
- Targeted Therapy

Common Cancer Therapy Side Effects

- Fatigue
- Myelosuppression
- Nausea/Vomiting
- Diarrhea/Constipation
- Mucositis
- Peripheral Neuropathy
- Alopecia
- Immune-mediated pneumonitis, hepatitis, colitis, endocrinopathies and rash
- Oncology Emergencies

Cancer Therapy Limitations

- Toxicity of agents
- Lifetime dose
- Hypersensitivity reactions
- Drug resistance
- Secondary malignancies
- Adherence
- Insurance Authorization
- Patient cost


Simple 'n Easy
Pharmacology

Chemotherapy

- Treatment of cancer cells with chemicals
- Cytotoxic-poisonous to cells

Chemotherapy

Phase cycle specific agents

Only the cells in a specific cycle are affected dividing throughout cycle

Cell cycle specific agents

Effects are mostly on the cells actively

Cell cycle non-specific agents

Effects are on cells at any phase

Chemotherapy Classifications

- Alkylating Agents
- Antimetabolites
- Antimicrotuble Agents
- Topoisomerase I Inhibitors
- Topoisomerase II Inhibitors

Alkylating Agents

- Mechanisms of action: Interfere with DNA replication through cross linking of DNA strands, DNA strand breaking, and abnormal base pairing of proteins
- Most agents are **cell cycle non-specific**
- Activated by cytochrome p450
- **Toxicities**: Nausea/Vomiting, Hematopoietic, Reproductive

Antimetabolites

- Mechanism of action: Inhibit DNA synthesis by substituting metabolites or structural analogues during DNA synthesis
- Most agents are **phase cycle specific**
- **Toxicities:** Hematopoietic and GI
- Folate Analogs, Purine Analogs, Pyrimidine Analogs, Other

Antimicrotubule Agents

- Mechanism of action: Block cell division by preventing microtubule function
- Plant derived
- **Toxicities:** Peripheral Neuropathy

Topoisomerase I Inhibitors

- Mechanism of action: Interferes with the activity of topoisomerase in the process of DNA replication
- **Toxicities:** Nausea, vomiting, diarrhea, abdominal cramping.

Topoisomerase II Inhibitors

- Mechanism of action: Interferes with the activity of topoisomerase in the process of DNA replication
- Anthracyclines, Epipodophyllotoxins
- **Toxicities:** Nausea, vomiting, diarrhea, bone marrow suppression

Hormonal Therapy

Used in managing hormonally sensitive cancers (Breast, Prostate, Ovarian, and Endometrial cancer)

Mechanism of action: The hormone changes the hormonal environment that alters growth factors thus the stimulus for tumor growth is suppressed or removed

Hormone Therapy

Women

- Fatigue
- Hot flashes
- Mood swings
- Nausea
- Osteoporosis
- Weight gain

Men

- Decreased sexual desire
- Enlarged breasts
- Hot flashes
- Impotence
- Incontinence
- Osteoporosis

Examples of Hormonal Therapy

- Aromatase Inhibitors
- Estrogen receptor antagonist
- Selective estrogen receptor modulator (SERM)

Aromatase Inhibitors

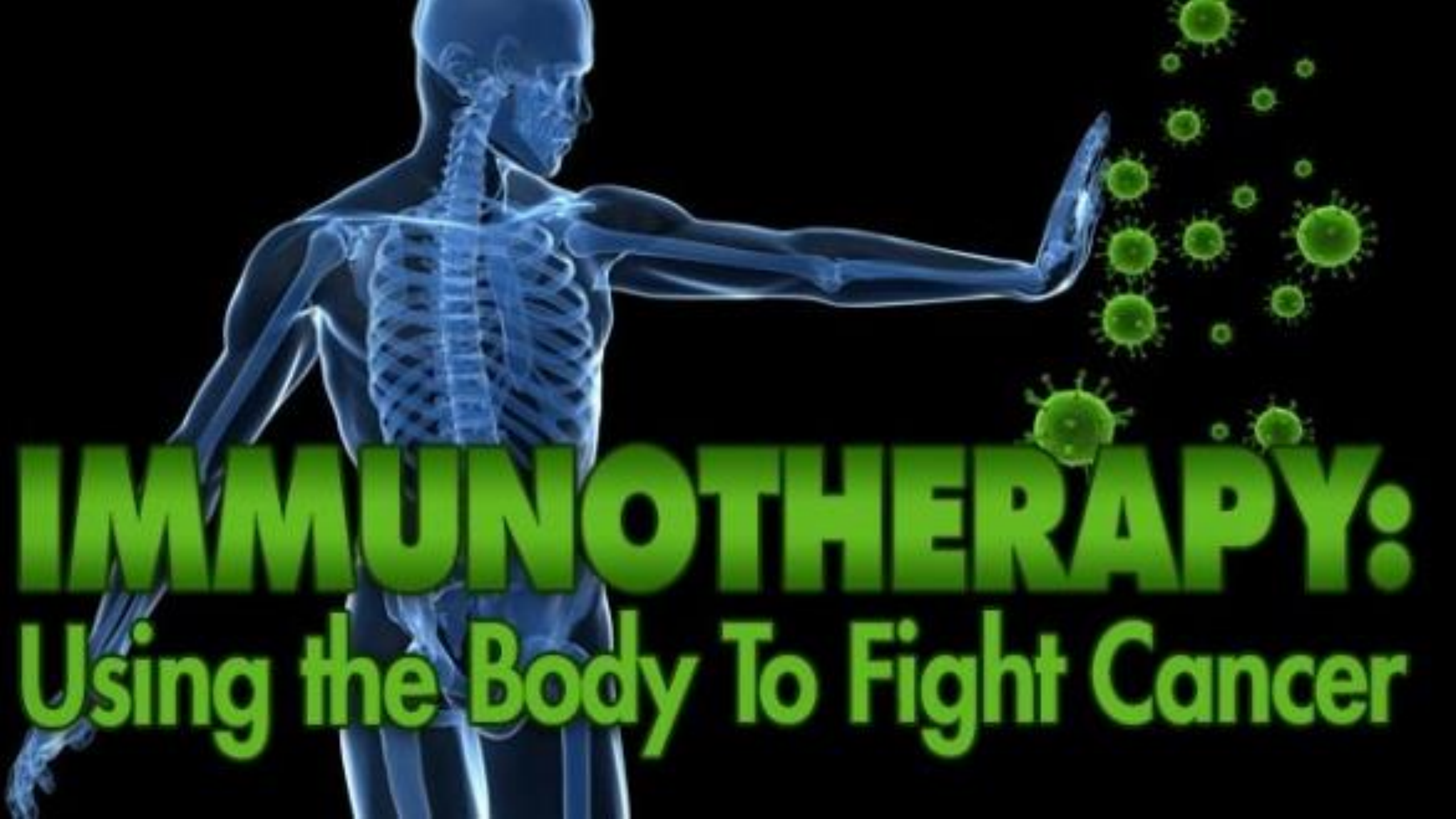
- Mechanism of action: lowers the amount of estrogen which signals hormone receptors.
- Slows tumor growth by inhibiting this process.
- Used in **post-menopausal** women with hormone receptor positive breast cancer
- **Toxicities:** Arthralgia, vaginal dryness, accelerated bone loss (dexa scan)

Estrogen Receptor Antagonist

- Mechanism of action: Binds to estrogen receptors and down regulates estrogen receptor protein producing anti-estrogenic effects
- **Toxicities:** Injection site pain, hot flashes, arthralgia

Selective Estrogen Receptor Modulator (SERM)

- Mechanism of action: Selectively binds to estrogen receptors producing anti-estrogenic effects
- Toxicities: Hot flashes, vaginal dryness
- tamoxifen; **need baseline GYN exam**; Breast, **premenopausal**
- raloxifene; Post menopausal high risk for invasive breast cancer


IMMUNOTHERAPY:
Using the Body To Fight Cancer

Immunotherapy

Treatment that uses certain parts of the immune system to fight cancer. Modifies the relation between the tumor and the host

Stimulates or restores immune system to fight be more effective and efficient cancer cells

May give the immune system components, such as man-made proteins

Includes antibodies, cytokines, and other substances that stimulate immune function

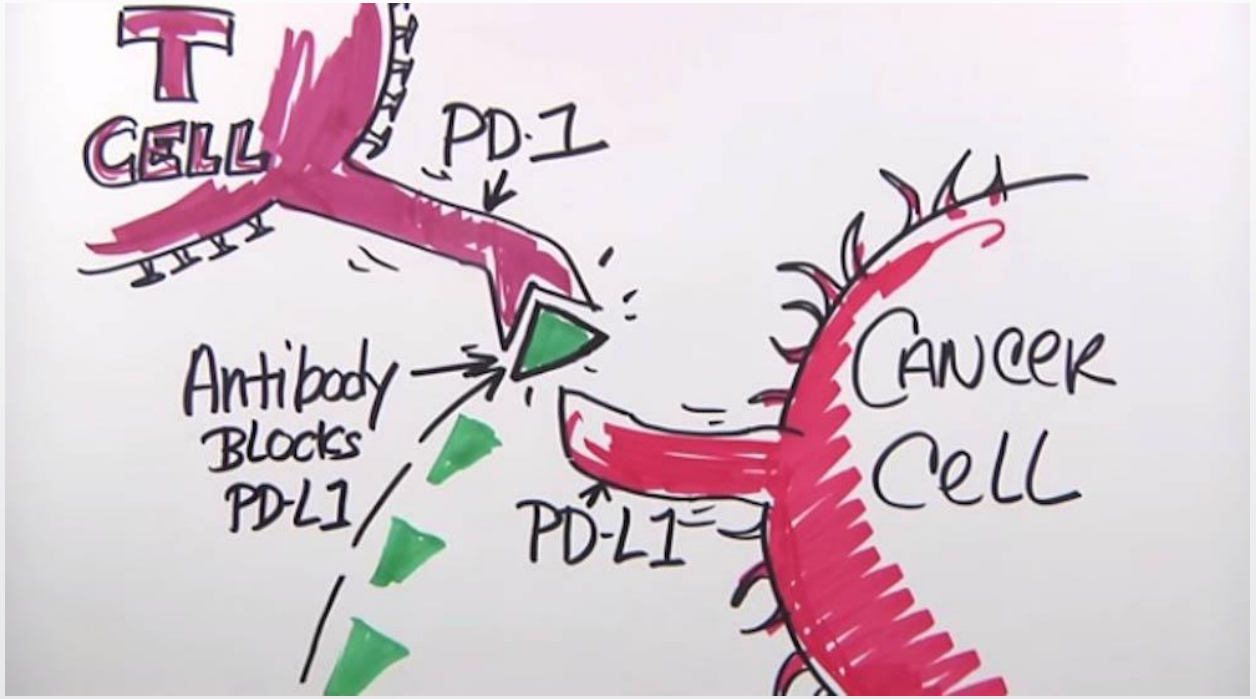
Immunotherapy Side Effects

- Pulmonary-pneumonitis
- GI/hepatic-diarrhea, increased AST/ALT-monitor levels
- Endocrine-thyroiditis-monitor thyroid
- Renal-monitor kidney function
- Neuro-physical exam
- Ocular
- Dermatological-rash
- Hypersensitivity reactions

Targeted Therapy

Checkpoint Inhibitors

- Immune checkpoints
  - molecules that prevent the immune response from damaging normal tissues in the body.
  - Involved in suppression of the immune system
- Checkpoint Inhibitors
  - A type of immunomodulator that manipulate the immune system.
- PD-1
  - Programed cell death protein
  - On T-cells
- PD-L1
  - programmed death ligand 1
  - Levels have been found to predict response
  - On some cancer cells



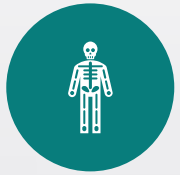
Retrieved from https://blog.dana-farber.org/insight/2015/09/what-is-a-checkpoint-inhibitor/

Therapeutic Antibodies

- Engineered antibodies produced by a single clone of cells that are specific for a given antigen
- Passive immunotherapy
- Enhance, restore, immune function
- Names end in “mab”
- Possible allergic reactions-hives/itching
- Flu-like symptoms, rash, GI changes, hypotension

Therapeutic Antibodies

Murine-mouse



Humanized-human

Human Anti-Murine Antibody (HAMA)

Chimeric-part mouse/human

Conjugated-a chemotherapy drug, radioactive particle, or toxin is connected to monoclonal antibody

Unconjugated-monoclonal antibody without any drug, radioactive particle, or toxin attached

Kinase Inhibitors

- Mechanism of action: Enzyme inhibitor that blocks the action of one or more protein kinase which alters biological processes including but no limited to modulate cell function
- Most names end in “nib”
- Toxicities: Vary based on target

ALK

- ALK (anaplastic lymphoma kinase)
  - ALK receptor tyrosine kinase is a protein that transmits signals from the cell surface into the cell through a process called signal transduction
- ALK inhibitors block
  - Blocks the ALK-dependent tumor cell proliferation
  - Multiple generations
    - each generation of ALK inhibitors is more potent, more selective, and more brain-penetrant compared with the prior generation
  - Side effects
    - Nausea, vomiting, diarrhea, constipation, vision changes

BRAF

- BRAF
  - human gene that encodes a protein called B-Raf
  - gene is also referred to as proto-oncogene B-Raf and v-Raf murine sarcoma viral oncogene homolog B
  - BRAF protein is also know as serine/threonine-protein kinase B-Raf
  - BRAF protein is involved in sending signals in cells and in cell growth
- BRAF inhibitors
  - Inhibits BRAF V600E and V600K protein kinases leading to blocking tumor cell proliferation
  - Side effects
    - LFT's, electrolytes, rash

EGFR

- EGFR (epidermal growth factor receptor)
  - transmembrane protein that is a receptor for members of the epidermal growth factor family (EGF family) of extracellular protein ligands
  - regulate cell growth, survival, and differentiation via multiple signal transduction pathways and participate in cellular proliferation and differentiation
  - over-expression is associated with the development of a wide variety of tumors
- EGF family
  - Four members: EGFR (ErbB1, HER1); ErbB2 (HER2, *neu* in rodents); ErbB3 (HER3); ErbB4 (HER4)

EGFR Antagonists

- EGFR Antagonists
  - Interrupts EGFR signaling
    - either by blocking EGFR binding sites on the extracellular domain of the receptor or by inhibiting intracellular tyrosine kinase activity
    - interference with the signaling pathways that modulate mitogenic and other cancer-promoting responses (cell motility, cell adhesion, invasion and angiogenesis)
  - Side effects
    - Rash, infusion reactions, hypomagnesemia

HER2

- HER2 (ERBB2/ne/HER2/neu)
  - HER 2 (Human epidermal growth factor receptor 2)
  - a growth-promoting protein on the outside of all breast cells
  - role is to facilitate excessive/uncontrolled cell growth and tumorigenesis
  - cancer cells with higher than normal levels of HER2 are called HER2-positive.
- HER2 Antagonist
  - Blocks HER2 activity to decrease tumor cell proliferation

KIT

- c-KIT (Mast/stem cell growth factor receptor, SCFR or CD117)
  - a protein that serves as an important cell surface marker used to identify certain types of hematopoietic(blood) progenitors in the bone marrow.
  - Involved in intracellular signaling
  - oncogene
- c-Kit inhibitors
  - Inhibit c-kit proteins to

PARP

- poly ADP ribose polymerase (PARP)
  - an enzyme that assists in DNA repair
- PARP inhibitors
  - Alters DNA repair pathways leading to cancer cell death
  - Side effects
    - Fatigue, nausea, GI upset, myelosuppression with high doses

VEGF

- Vascular endothelial growth factor (VEGF)
  - Protein produced by cells that stimulates the formation of blood vessels
- VEGF Antagonists
  - Binds and inhibits vascular endothelial growth factor, decreases microvascular growth and metastatic progression
  - Side effects
    - Hypertension, rash, epistaxis, proteinuria, GI bleed

Breast Cancer

- Stage/Treatment Intention
  - Neoadjuvant
  - Adjuvant
  - Metastatic
- Types
  - non-invasive, invasive
  - ductal/lobular/mammary/inflammatory/papillary
  - Paget's disease
- Pre/peri/post menopausal
- Receptor status
  - ER/PR/HER2

Breast Cancer Chemotherapy

- Alkylating Agents
  - Platinum analog
    - Carboplatin
      - Neoadjuvant/adjuvant/metastatic, given IV infusion
      - Hypersensitivity reactions (increases after #6 treatment)-pre-medications
      - Myelosuppression-monitor CBC with diff, thrombocytopenia
      - AUC (Area under the curve), monitor creatinine
      - Often given with a taxane
  - Nitrogen Mustard
    - Cyclophosphamide
      - Neoadjuvant, adjuvant, metastatic, given IV infusion
      - Myelosuppression, monitor CBC with diff; n/v/d
- Antimetabolites
  - Pyrimidine antagonists
    - Fluorouracil, Gemcitabine
      - Adjuvant, metastatic, IV push
      - Myelosuppression, n/v/d, mucositis, hand-foot syndrome, photosensitivity
  - Folate analogs
    - Methotrexate
      - Adjuvant, Yellow
      - GI toxicity

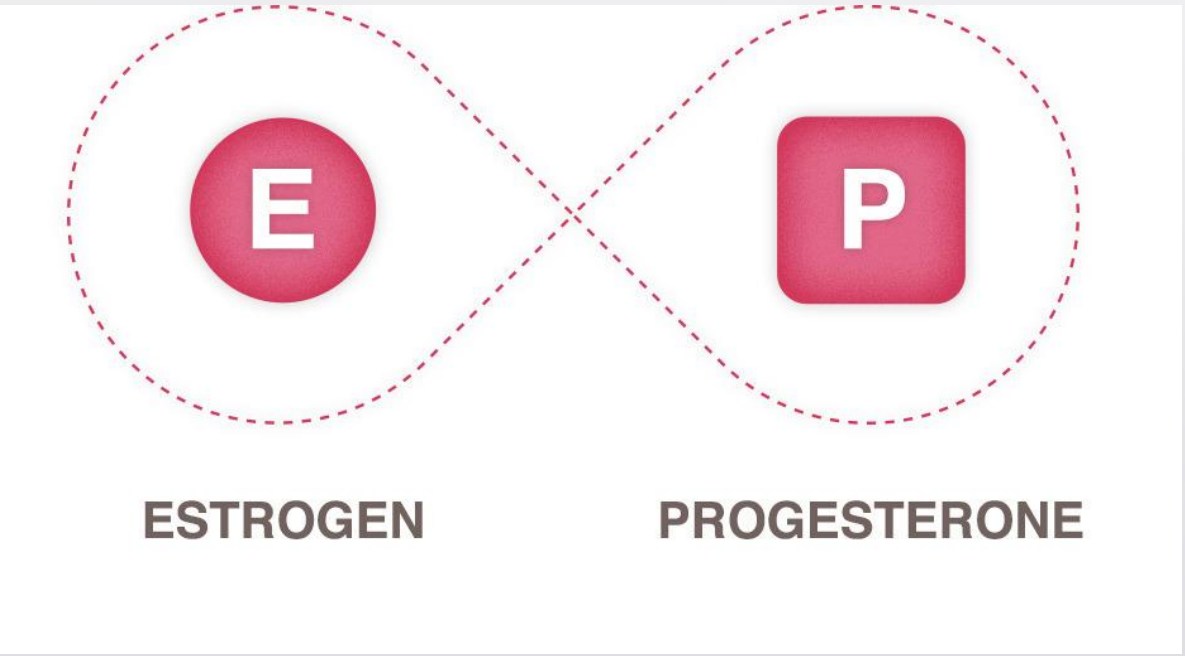
Breast Cancer Chemotherapy

- Antimicrotubules
  - Epothilones
    - Ixabepilone
      - Locally advanced/metastatic
      - May be combined with capecitabine
      - Hepatic toxicity-monitor LFT's; myelosuppression
  - Halichonrin B analogue
    - Eribulin
      - Refractory metastatic
      - CBC/Creatinine baseline, monitor CBC, peripheral neuropathy
  - Taxane
    - Paclitaxel
      - Neoadjuvant/adjuvant/metastatic-
      - Severe hypersensitivity reactions-pre-medications, myelosuppression-monitor CBC, hepatotoxicity-monitor LFT's , peripheral neuropathy
    - Docetaxel
      - Severe hypersensitivity reaction, fluid retention, hepatic impairment, neutropenia, peripheral neuropathy
      - Due to ethanol in some formulations-avoid/minimize alcohol
    - Paclitaxel nanoparticle albumin-bound
      - Refractory metastatic
      - Myelosuppression-monitor CBC, peripheral neuropathy

Breast Cancer Chemotherapy

- Topoisomerase II inhibitors
  - Anthracyclines
    - Doxorubicin
      - neoadjuvant/adjuvant
      - RED color (alter urine color)
      - cardiotoxicity-baseline EF (Echo/MUGA)
      - Secondary AML or MDS
      - Myelosuppression-severe
      - Lifetime dose- 550 mg/m2 IV; 450 mg/m2 IV in patients who have received previous mediastinal radiation

Breast Cancer Hormonal Therapy ER/PR Positive



- Selective Estrogen Receptor Modulator (SERM)
  - Tamoxifen
    - Given po
    - Reduce risk of recurrence, developing cancer in the other breast, and the risk of distant recurrence.
    - May be used pre/peri/post menopausal.
    - Possible side effects-vaginal dryness, discharge or bleeding, hot flashes
    - Increased risk of cancer of the lining of the uterus. Patients need a **baseline gyn exam**
    - Thromboembolism (DVT, PE)

Breast Cancer Hormonal Therapy ER/PR Positive

- Estrogen Receptor Antagonist
  - Fulvestrant
    - Given IM
    - May be combined with ribociclib
    - Possible injection site pain
    - Hot flashes, vaginal dryness

Breast Cancer Hormonal Therapy ER/PR Positive

- Aromatase Inhibitors
  - Given PO
  - **Post-**menopausal
  - Baseline bone density and every 2 years, may need calcium supplementation and support with a bisphosphonate (risk for ONJ, assess dentition, monitor calcium and phosphate levels, monitor creatinine)
  - **Arthralgias**, hot flashes, vaginal dryness, discharge or bleeding
  - anastrozole, exemestane, letrozole

Breast Cancer HER2 Positive

- HER2
  - Overexpression occurs in approximately 15–30% of breast cancers
  - prognostic and predictive biomarker.
- Her2 antagonists
  - Trastuzumab
    - Used adjuvant, metastatic, often given with a taxane, carboplatin
    - Given IV, infusion reactions
    - Cardiomyopathy-monitor EF baseline, during treatment, after treatment
  - Pertuzumab
    - Neoadjuvant, adjuvant, metastatic, given IV
    - Cardiomyopathy-monitor EF (baseline and throughout care)
  - Lapatinib
    - advanced or metastatic, hepatoxicity monitor LFT, baseline ECG, monitor magnesium level, may be combined with capecitabine, letrozole or trastuzumab
  - Neratinib
    - extended adjuvant, oral agent, monitor LFT's at baseline and prior to each cycle, antidiarrheal prophylaxis during first 8 weeks of treatment
  - ado-trastuzumab emtansine or T-DM1
    - adjuvant, metastatic, given IV, hepatotoxicity, cardiotoxicity-monitor LVEF at baseline and every 3 months

Breast Cancer Therapy

- PARP Inhibitor
  - olaparib
    - oral drug
    - metastatic HER2-negative breast cancer and a *BRCA1* or *BRCA2* gene mutation who have previously received chemotherapy
    - Baseline CBC and then monthly
  - talazoparib
    - Oral
    - locally advanced or metastatic HER2-negative breast cancer and a *BRCA1* or *BRCA2* gene mutation
    - Baseline CBC and then monthly

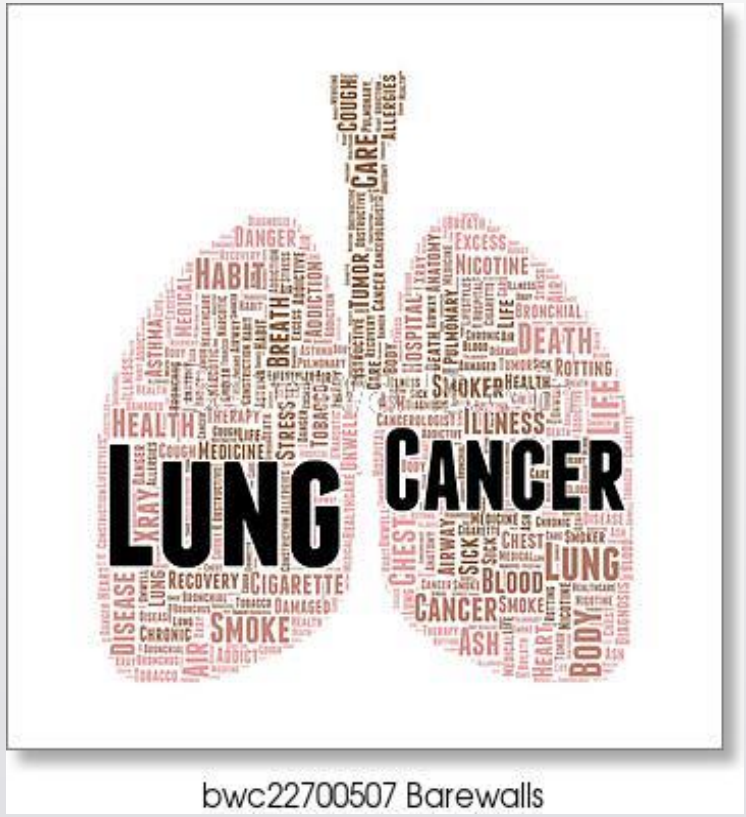
Breast Cancer Therapy

- Target the CDK4/6 protein in breast cancer cells, which may stimulate cancer cell growth.
  - ER-positive, HER2-negative, advanced or metastatic breast cancer, may be combined with some types of hormonal therapy
    - Abemacicli
      - monotherapy, with hormonal therapy, baseline CBC and LFT's and then every 2 weeks for 2 months, then every month for 2 months then as clinically indicated
    - Palbociclib
      - oral, post-menopausal, give with LHRH agonist if pre/perimenopausal
    - Ribociclib
      - advanced/metastatic/progressive disease, oral, give with aromatase inhibitor or fulvestrant,
      - give with LHRH agonist if pre/perimenopausal, baseline CBC with diff and LFT's, repeating every 2 weeks for first 2 cycles then monthly, ECG at baseline, Cycle 1 Day 14 and Cycle 2 Day 1, monitor electrolytes including calcium, magnesium and phosphate
      - Ribociclib and letrozole co-pack (28 day supply, 21 days of ribociclib and 28 days letrozole)
- NTRK
  - Larotrectinib
    - breast cancer with an *NTRK* fusion that is metastatic or cannot be removed with surgery and has worsened with other treatments
    - Baseline LFT's and monitor

Breast Cancer Regimens

- AC-Adriamycin, cyclophosphamide)
- CMF-cyclophosphamide, methotrexate, 5-fluorouracil
- FAC-5-fluorouracil, Adriamycin, cyclophosphamide
- TAC-taxane, Adriamycin, cyclophosphamide
- ACTH-Adriamycin, cyclophosphamide, taxane, trastuzumab
- ACTHP-adriamycin, cyclophosphamide, taxane, trastuzumab, pertuzumab

Lung Cancer



bwc22700507 Barewalls

- Intention
  - Neoadjuvant
  - Adjuvant
  - Metastatic
- Stage
- Type-Small Cell/Non-Small Cell (adeno, squamous, large cell)
- Receptor Status
  - VEGF
  - ALK
    - About 5%
    - common in non-smokers
  - BRAF
  - EGFR inhibitors
    - T790M mutation

Lung Cancer Chemotherapy

- Alkylating Agents
  - Platinum analogs
    - Cisplatin
      - Nephrotoxicity-monitor creatinine
      - Peripheral neuropathy
      - Nausea/vomiting
      - myelosuppression
    - carboplatin
      - hypersensitivity reactions (increases after #5 treatment)-pre-medications
      - Myelosuppression-monitor CBC with diff, platelets
      - AUC (Area under the curve), monitor creatinine
      - Often given with a taxane
- Antimetabolites
  - Folate antagonists
    - pemetrexed-non-squamous NSC, locally advanced, maintenance, metastatic, folic acid/B12 supplementation, monitor CBC and LFT's
  - Pyrimidine analogs
    - gemcitabine-NSC, locally advanced, metastatic, delayed thrombocytopenia, rash,

Lung Cancer Chemotherapy

- Microtubule Agents
  - Vinca alkaloids
    - vinorelbine-NSC, locally advanced, metastatic, vesicant, peripheral neuropathy, myelosuppression, injection site pain, alopecia, CBC and LFT's
  - Taxane
    - paclitaxel-infusion reactions, pretreat with premedication's, myelosuppression, peripheral neuropathy
    - albumin-bound paclitaxel-myelosuppression, peripheral neuropathy, monitor CBC
    - docetaxel-hepatic impairment, neutropenia, hypersensitivity reaction (pre-medications), peripheral neuropathy, fluid retention, minimize ethanol use, CBC and LFT's
- Topoisomerase II Inhibitors
  - Epipodophyllotoxins
    - etoposide-hypotension, myelosuppression, monitor CBC, alopecia

Lung Cancer Targeted Therapy

- ALK Inhibitors
  - about 5 % of lung cancers
  - ALK positive cancers are common in non-smokers,
  - NSC, metastatic, oral agents
  - Monitor Creatinine, LFT's, CBC with diff, electrolytes, mg, vision changes/light sensitivity
    - 1st generation
      - crizotinib-NSC, metastatic, oral,
    - 2nd generation
      - certitinib-NSC, metastatic, oral
      - alectinib-NSC, metastatic, oral
      - brigatinib
    - 3rd generation
      - lorlatinib-3rd generation

Lung cancer Immunotherapy

- Checkpoint Inhibitors
  - PD-1
    - pembrolizumab
      - first line, Stage III/metastatic with high PD-L1 expressing tumor with no EGFR or ALK aberrations
      - First line for squamous metastatic
      - First line non-squamous with no EGFR or ALK aberrations
      - Progressive disease with PD-L1 expressing tumor
      - creatinine, LFT's, TFT's, electrolytes
    - nivolumab-monitor creatinine, LFT's, TFT's, electrolytes
    - durvalumab-
      - Stage II NSC, unresectable, given after concurrent platinum-based chemo and radiation

NSC Lung Cancer

- VEGF Antagonists
  - Stops the formation of new blood vessels
  - Monoclonal antibody
    - Bevacizumab
      - Non-squamous, NSC locally advanced or metastatic
      - Many be given with or without chemo
      - GI perforation
      - Delayed wound healing, hold prior to surgery
      - Hemorrhage
      - **Hypertension, proteinuria, TFT's**
    - ramucirumab
      - Refractory, metastatic
      - Given IV

NSC Lung Cancer

- EGFR antagonist
  - Metastatic
  - Oral agents
  - Monitor creatinine and LFT's
    - erlotinib
      - Exon 19 deletions or exon 21 (L858R)substitution mutations
      - Metastatic, titrate dose,
    - afatinib
      - non resistant to EGFR mutations, squamous type
    - gefitinib
      - Exon 19 deletions or exon 21 L858R
      - metastatic

NSC Lung Cancer

- EGFR Antagonist's continued
    - osimertinib
        - First line EGFR exon 19 deletions or exon 21 L858R
        - Subsequent for EGFR T790M mutations
        - **Baseline LVEF**, monitor electrolytes
    - dacomitinib
        - Exon 19 deletions or exon 21 L858R mutations
    - necitumumab
        - Squamous, untreated metastatic
        - Given IV

Small Cell Lung Cancer

- Limited Stage
  - Chemotherapy/radiation
    - Cisplatin/carboplatin
- Extensive Stage
  - Cisplatin/carboplatin
  - etoposide
- Subsequent
  - Irinotecan
  - Paclitaxel, vinorelbine
  - Nivolumab, Pembrolizumab
  - gemcitabine

Colon Cancer

- Treatment intention
  - Neoadjuvant, adjuvant, metastatic
- Stage
- Targets
  - VEGF
  - EGFR
- Biomarker status
  - RAS-KRAS/NRAS
  - BRAF
  - microsatellite instability (MSI-H) or mismatch repair deficiency (dMMR).

Colon Cancer Chemotherapy

- Alkylating Agents
  - Platinum Analogs
    - Oxaliplatin-3rd generation, anaphylactic reactions, **cold phenomenon-mixed in dextrose, peripheral neuropathy,** monitor CBC with diff, LFT's , CMP, Mg
- Antimetabolites
  - Pyrimidine antagonists
    - 5-fluorouracil-IV bolus/IV continuous infusion, need central line, leucovorin often given for potentiation, n/v/d/mucositis, photosensitivity
    - Capecitabine-oral agent, warfarin interaction, hand-foot syndrome, mucositis, n/v/d
    - Trifluridine/tipiracil-oral agent, metastatic, refractory, trifluridine inhibits DNA synthesis and cellular proliferation; tipiracil blocks the metabolism of trifluridine, myelosuppression, monitor CBC with diff, GI-abdominal cramping, diarrhea
- Topoisomerase I Inhibitors
  - Calprotectin derivatives
    - Irinotecan-diarrhea (early, delayed), abdominal cramping, may give atropine, myelosuppression

Colon Cancer Targeted Therapy

- VEGF Antagonists
  - Bevacizumab-IV infusion, GI perforation, surgery/wound healing complications, hemorrhage, monitor BP (hypertension), UA-proteinuria
  - Regorafenib-oral agent, metastatic and failed other therapies, hepatotoxicity (monitor LFT's, electrolytes, lipase)
  - Ziv-aflibercept-Injection, metastatic refractory, hemorrhage, GI perforation, monitor BP, UA
  - Ramucirumab-IV, refractory metastatic, monitor CBC, BP, proteinuria, rash

Colon Cancer Targeted Therapy

- EGFR Antagonists
  - Cetuximab-IV infusion, metastatic, patient's without RAS mutations infusion reactions, hypomagnesemia, monitor Mg levels, rash (acneiform),
  - Panitumumab-IV, metastatic, patients without RAS mutations, dermatologic toxicities (severe), hypomagnesemia

Colon Cancer Immunotherapy

- Pembrolizumab
  - targets PD-1, a receptor on tumor cells, preventing the tumor cells from hiding from the immune
  - metastatic colorectal cancers that have a molecular feature called microsatellite instability (MSI-H) or mismatch repair deficiency (dMMR).
- Nivolumab
  - MSI-H or dMMR metastatic colorectal cancer that has grown or spread after treatment with chemotherapy with a fluoropyrimidine (such as capecitabine and fluorouracil), oxaliplatin, and irinotecan
- Nivolumab and ipilimumab combination
  - MSI-H or dMMR metastatic colorectal cancer that has grown or spread after treatment with chemotherapy with a fluoropyrimidine, oxaliplatin, and irinotecan

Colon Cancer Regimens

Adjuvant/Metastatic

- FOLFOX
  - 5-flourouracil, oxaliplatin, leucovorin
  - Multiple doses and ways given (FOLFOX-4, FOLFOX-6, modified FOLFOX-6 (mFOLFOX-6), and FOLFOX-7
- FOLFOX +/- bevacizumab
- FOLFURI
  - 5-flourouracil, leucovorin, irinotecan
- FOLFURI +/- bevacizumab
- CAPEOX-
- XELIRI/CAPIRI: Capecitabine with irinotecan
- XELOX/CAPEOX: Capecitabine with oxaliplatin
- Cetuximab (metastatic)

Supportive Care Medications

- IV hydration
- Electrolyte replacement
- Antiemetic's, Antidiarrheal, Stool softeners/laxatives
- Nutritional support
- Appetite stimulants
- Antidepressants/Antianxiety
- Pain management


Google

Advanced Practice Considerations

Maintain awareness of cancer agents and treatment options

Utilize Package Insert for drug details including dosing and toxicity management

Encourage supportive care to minimize toxicity

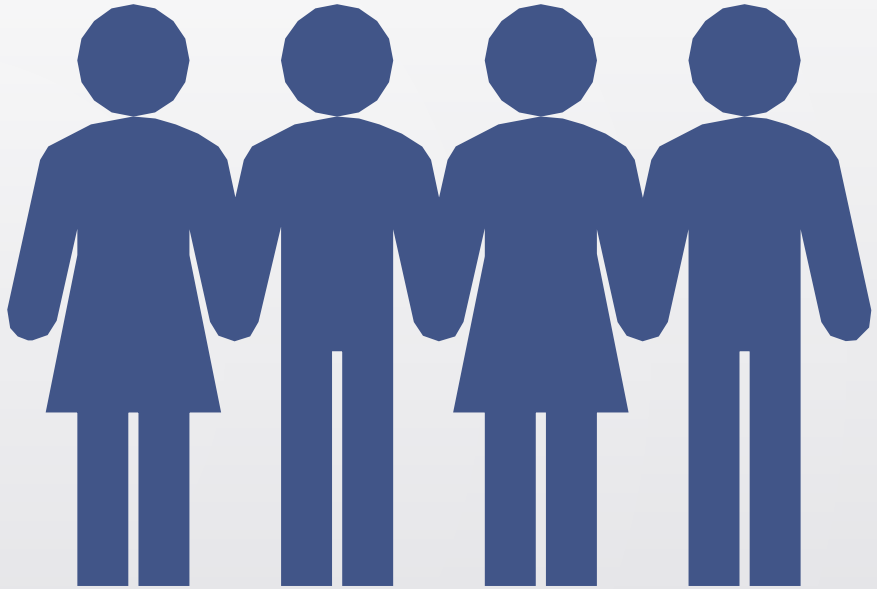
Collaborate with respective disciplines

Support patients physically (symptom management), psychosocially (referrals to social work/case management), emotionally (referrals to psychology/support groups) and spiritually (refer to chaplain/spiritual counselor)

Spend time with other team members

Resources

- **FLASCO**
- chemocare.com
- uptodate.com
- ASCO
- American Cancer Society
  - 1-800-813-HOPE (4673)
  - http://www/cancer.org/
- National Cancer Institute
  - 1-800-4-CANCER (422-6237)
  - http://www.cancer.gov/
  - https://www.cancer.gov/about-cancer/treatment/drugs
- National Comprehensive Cancer Network
  - http://www.nccn.org/
- Vanderbilt My Cancer Genome
  - www.mycancergenome.org




Taking care of your mind & thoughts
Taking care of your physical health & body
Self-Care
Increasing your own well-being through self-care behaviors
Taking care of your spiritual health
Taking care of your emotions
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