Concept Review

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Adrenergic & Cholinergic Overview

We can only INCREASE (Agonist) or DECREASE (Antagonist or Block) the Body's Response

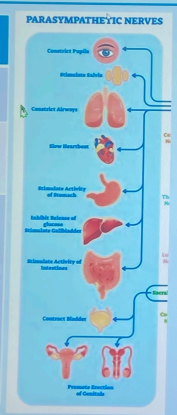
Adrenergic	Cholinergic
Sympathetic (Fight or Flight/Rest Digest)	**Parasympathetic** "Slug or Dry"
Neurotransmitter: Catecholamines (Epinephrine, Norepinephrine, etc.)	**Neurotransmitter**: Acetylcholine
When Activated: **Alpha 1**: Contracts Smooth Muscle **Alpha 2**: DWARN **Beta 1**: (**HEART**) Increases Heart Rate and Contraction Strength. **Beta 2**: (**LUNGS**) Relaxes Smooth Muscle **Beta 3**: DWARN	• Don't worry about different Receptors. • THINK Either **ON** (Cholinergic) or **OFF** (anti-Cholinergic).

Adrenergic Response

Adrenergic	Medication	Receptor & Action	Clinically Presentation	Side Effects
Sympathetic (Fight)				
Neurotransmitter: Catecholamines (Epinephrine, Norepinephrine, etc.)				
When Activated: **Alpha 1**: Contracts Smooth Muscle **Alpha 2**: DWARN **Beta 1**: (**HEART**) Increases Heart Rate and Contraction Strength. **Beta 2**: (**LUNGS**) Relaxes Smooth Muscle **Beta 3**: DWARN	**Phenylephrine** (Sudafed)	Alpha 1 Agonist **What is it going to do?**	Decreased Congestion **Why?**	Hypertension **Caused by What?**
	Albuterol	Beta 1 and Beta 2 Agonist	Improve Breathing	Tachycardia
	Metoprolol	Beta 1 Antagonist (Blocker)	Decrease the Blood Pressure	Bradycardia

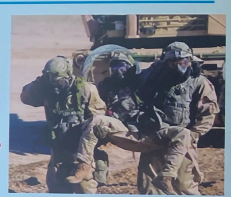
Cholinergic Response

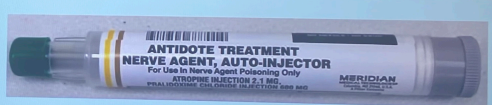
Cholinergic
Parasympathetic (Slug or Dry)
Neurotransmitter: Acetylcholine
• Don't worry about different Receptors. • THINK Either ON (Cholinergic) or OFF (anti-Cholinergic).



Sarin Gas
- Strong Cholinergic Agonist
- Used as Chemical Weapon
- Causes a Cholinergic Crisis

What S/Sx Would You Expect?
How Would You Treat It?



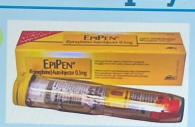


Anti-Cholinergic (Dry's You Up) "DRY"
Can't Spit
Can't Pee
Can't See
Cant Poop

Anaphylaxis

Signs and Symptoms

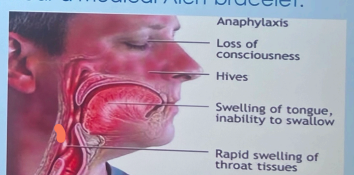
- Respiratory Distress
- "I feel like my throat is swelling"
- Rash/Hives
- Swelling of the Face
- Red Flush Skin
- Loss of consciousness
- Extreme Hypotension
- Tachycardia
- Cardiac Arrest



Priority Actions

In Hospital
- **STOP** the Medication
- Administer **Epinephrine** IM

Outside of Hospital & Patient Education
- Teach S/Sx
- Call **911** if S/Sx occur.
- Carry an Epi-Pen.
- Wear a Medical Alert bracelet.



Home:
Call 911

Hospital:
Epi -

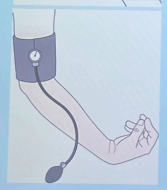
Bone Disorders

Calcium Citrate

- Increases Calcium in the blood.
- Hypercalcemia
  - CA+ > 10.5
  - Muscle **Weakness**

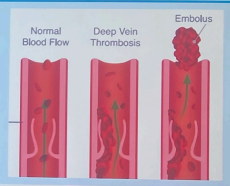
CAlcitonIN

- Lower blood Calcium. Pushes Calcium into the bone.
- Hypocalcemia
  - CA+ < 9
  - Increased Muscle Activity
  - **Chvostek's Sign**
  - **Trousseau's Sign**



Raloxifene

- Increases bone density by acting on **Estrogen** receptors.
- **Thrombotic Events**
  - DVT **S/Sx**
  - PE **S/Sx**
- **Pregnancy Category X**
- Contraindicated in patients with Hx. Of thrombotic event.
- Educate patient not to remain immobile and to report S/Sx of DVT/PE.



Bone Disorders

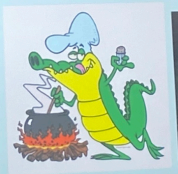
Bisphosphonates -dronate

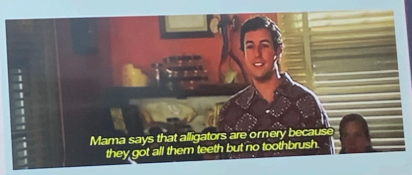
Alendronate

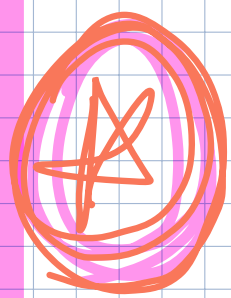
- Decrease the breakdown of bone. Improves bone density.
- **Esophageal Ulceration**
  - Sit-up **30 min**. after taking medication.
- **Vision Changes**
  - Report to Provider
- **Osteonecrosis of the Jaw**
  - Seek dental care prior to starting the med.
  - Avoid dental work.
- **Labs**
  - Monitor Kidney Function
  - Calcium – Hold if CA is low.

AL DONE ATE through the esophagus!!!

- **Education**
  - Weight Baring Exercise
  - Take in the morning and **stay upright for 30 min.**
  - Take with a full glass of water.
  - **DC and report new heartburn or difficulty swallowing.**
  - Don't give to patients with swallowing problems.







Pharmacology Module 2 Exam Review

Safe Medication Administration and Error Reduction

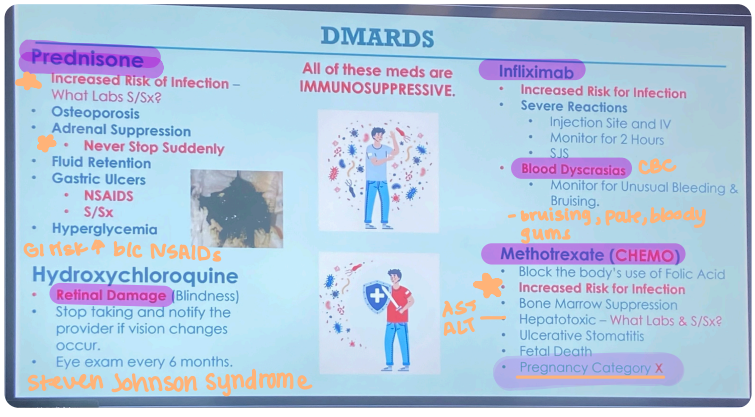
- Chemical Name:
  - Reflects chemical composition
- Generic:
  - Official non proprietary name that United States has given to one medication
- Trade:
  - Brand name, name company decided for a given medication
- Uncontrolled Substances:
  - Do not generally pose a risk for misuse or addiction
  - High therapeutic index
  - Need prescription
- Controlled Substance:
  - Pose a risk for addiction or misuse so they require medical supervisions
  - Ex: Morphine
  - Low therapeutic index
- Schedule 1 Medications:
  - No therapeutic use at all
  - Ex: heroine
- Schedule II - V Medications:
  - Medications with legitimate application use

Chapter 33: Connective Tissue Disorders (DMARDS) Including Glucocorticoids; Anti Gout Meds

Disease modifying antirheumatic drugs

* immunosupressant

- **Drugs**
  - Methotrexate
    - DMARDS I
  - Etanercept
    - DMARDS II



- Infliximab ↑risk infection, blood dyscrasias
    - DMARDS II
- **Therapeutic action:**
    - DMARDS slow joint degeneration
    - Analgesia for
        - Pain, swelling and joint stiffness
    - Used with short term therapy of NSAIDs until long-acting DMARDS take place
    - Management of inflammatory bowel disease
- **Complications**
    - Methotrexate
        - Increased risk of infection
        - Hepatic fibrosis and toxicity
            - Liver and kidney function tests
        - Bone marrow suppression
            - Baseline CBC, repeat every 3-6 months
        - Ulcerative stomatitis/other GI ulceration
- **Contraindications**
    - Methotrexate
        - Pregnancy category X
            - Fetal death
        - Interactions with NSAIDs, sulfonamides, penicillin, and tetracyclines
        - Concurrent with immunosuppressants
            - Increase risk of infection
    - Etanercept
        - Avoid live vaccines
        - Caution in clients with heart failure, CNS demyelinating disease, pre-existing liver dysfunction
        - Concurrent with live vaccines and increase risk of infection

- **Nursing administration:**
    - Can take 3-6 weeks for DMARDS effects
    - Can take several months for full effect

Antigout Medication

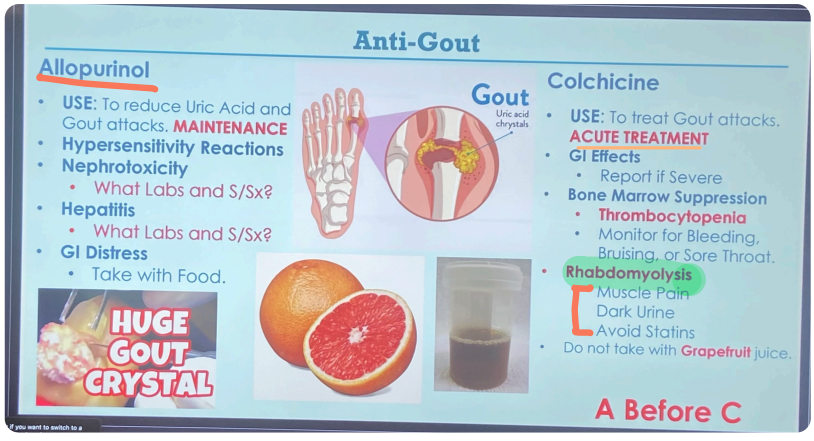
Anti-inflammatory Agents

- **Drugs:**
    - Colchicine
    - Glucocorticoids: Prednisone
- **Therapeutic action:**
    - Colchicine
        - Used for ACUTE gout attack
            - Decrease inflammation
    - Prednisone Black Tar Stool, abdominal Pain
        - Clients with acute gout that are unresponsive to NSAIDs
            - Not for those with hyperglycemia

Agents for Hyperuricemia

- **Drugs:**
    - Allopurinol
- **Therapeutic action:**
    - Used for CHRONIC gout attacks
    - Inhibit uric acid production
    - Secondary to chemotherapy

Prevent & Maintenance



- **Complications**
    - Colchicine
        - Mild GI distress
            - Can progress to GI toxicity
            - Abdominal pain, diarrhea, nausea, vomit

- Thrombocytopenia
  - Low platelets
- Rhabdomyolysis
  - Sudden onset of muscle pain and tenderness
- Allopurinol
  - Hypersensitivity reaction
    - Rash, fever, chills
  - Kidney injury
  - Hepatitis
  - GI distress
    - Nausea and vomiting

bleeding, bruising

know for exam

stay away statins & grapefruit juice

- **Contraindications:**
  - Colchicine
    - Severe renal, hepatic, cardiac or GI impairment
    - Statin drugs and high cholesterol
    - Interactions
      - No grapefruit juice
  - Allopurinol
    - Those with medication hypersensitivity
    - Interactions:
      - Slows metabolism of warfarin within liver, increasing risk of bleeding
- **Nursing Administration**
  - Should see a decrease in joint swelling, redness, uric acid levels
  - Decrease in number of gout attacks
  - Decrease in uric acid levels

Chapter 34: Bone Disorders

Calcium supplements

Pharmacology Module 2 Exam Review

- **Drugs**
  - Calcium citrate
- **Therapeutic action**
  - Maintenance of musculoskeletal, neurologic, and cardiovascular function
  - Used for patients with hypocalcemia
  - Those with deficient parathyroid hormone, vitamin D or calcium
- **Complications**
  - Hypercalcemia
    - Calcium levels >10.5
    - Muscle weakness, hypotonia, constipation, vomiting, abdominal pain, lethargy and confusion
- **Contraindications**
  - Clients with hypercalcemia
  - Kidney disease or decrease in GI function
  - Interactions
    - Glucocorticoids decrease absorption of calcium
    - Spinach, rhubarb, beets, bran, and whole grains an decrease calcium absorption
    - Concurrent with digoxin and can cause bradycardia
- **Nursing administration**
  - Chewable tablets provide higher bioavailability
  - IV infusions need to be room temperature
  - Calcium range should be 8.5-10.5

Selective Estrogen Receptor Modulator (agonist/antagonist)

- **Drugs**
  - Raloxifene
- **Therapeutic action**
  - Decreases bone resorption, which slows bone loss and preserves bone mineral density
  - Works as an antagonist on estrogen

- **Complications**
  - Risk for pulmonary embolism and deep-vein thrombosis (DVT)
    - Look for red, swollen extremity
    - Discourage long periods of sitting and inactivity
  - Hot flashes
- **Contraindications**
  - Pregnancy category X
    - Fetal death
  - Interactions
    - Concurrent use with estrogen therapy is discouraged
- **Nursing administration**
  - With or without food once a day
  - Bone density scan every 12-18 months
  - Consume adequate calcium and vitamin d
  - Look for increased bone density

Calcitonin

- **Drugs**
  - Calcitonin-salmon
- **Therapeutic action**
  - Decreases bone resorption by inhibiting the activity of osteoclasts in osteoporosis
  - Increases renal calcium excretion by inhibiting tubular resorption
  - Used for post menopausal osteoperosis
- **Complications**
  - Nausea
  - Nasal dryness and irritation with intranasal route
    - Alternate nostrils daily
- **Contraindications**
  - Clients who have hypersensitivity to fish protein

- Intranasal spray is only meant for postmenopausal osteoperosis

- **Nursing administration**
  - Chvostek's and Trousseau's signs to monitor for hypocalcemia
  - Look for increase in bone density
  - Calcium levels within 8.5-10.5

push calcium from blood → bone

Chapter 37: Adjuvant Medications for Pain

Usually an opioid agonist to increase pain relief while increasing pain relief and reducing opioid dosage

Antagonis. Usually NSAIDs with opioids.

NSAIDs

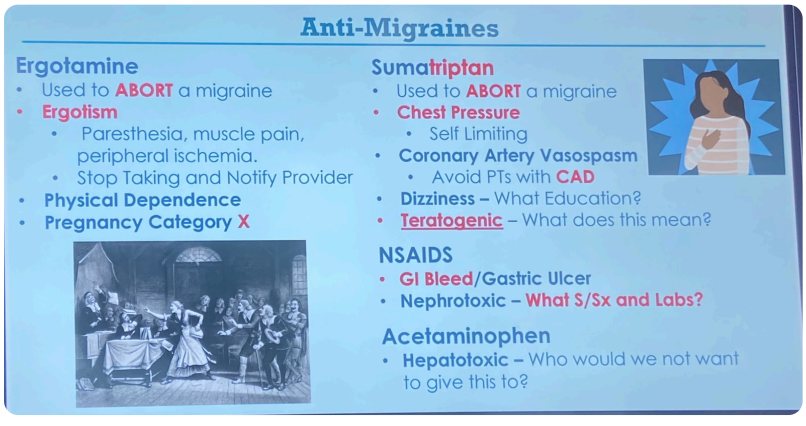
- **Complications:**
  - GI distress
    - Black tar
    - Abdominal pain
    - Ulcerations
  - MI or Stroke
  - Bone marrow suppression
- **Contraindications**
  - Use caution with clients with bleeding disorders
  - GI impairment

Chapter 38: Miscellaneous Pain Medications

Migraine headaches can be caused by inflammation and vasodilation or cerebral blood vessels. These can be abortive or prophylactic.

- **Drugs**
  - Acetaminophen
  - Triptans
  - Ergot Alkaloids

        - Ergotamine
- **Therapeutic action**
    - Stop migraine after they have shown signs of beginning or already begun
- **Compilations**
    - Acetaminophen — Hard on Kidneys
        - Bone marrow suppression
        - GI distress
            - Pain, ulceration, nausea, vomit, and diarrhea or constipation
    - Triptans
        - Chest pressure
            - Considered normal
            - Should go away
                - If it doesn't contact provider = bad
        - Dizziness or vertigo — sit on bed bf standing
    - Ergot alkaloids
        - GI discomfort
        - Acute or chronic toxicity
            - Muscle pain, paresthesias in fingers and toes — tingling, numb around mouth
        - Physical dependence
        - Fetal harm or abortion
            - Category X
- **Contraindications**
    - Ergotamine
        - Renal or liver failure
        - Pregnancy category X
    - Triptans — if they have coronary heart disease
        - Never used with ergotamine
- **Nursing administration**

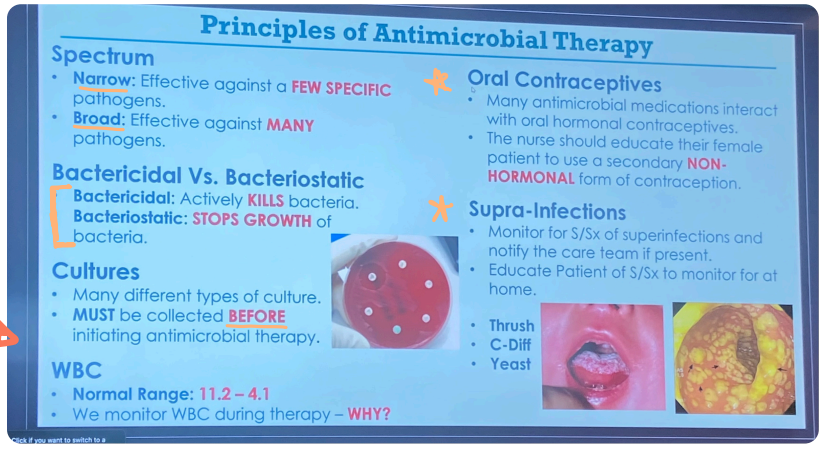


- Avoid migraine triggers
- Lay in a dark quiet room
- Should not be used frequently

Local anesthetics

- **Drugs**
  - Lidocaine
- **Therapeutic action**
  - Decrease pain by blocking conduction of pain impulse in circumcised area
  - Not for surgery
  - Not for lowering LOC
  - Used for dental or minor surgical procedures
- **Complications**
  - CNA excitation
    - Seizures, respiratory depression, leads to unconsciousness
  - Hypotension
    - Evidenced by bradycardia
  - Spinal headache
  - Urinary retention
    - Can occur with spinal anesthesia
- **Contraindications**
  - Supraventricular dysrhythmias
  - Liver and kidney dysfunction
  - Epinephrine is contraindicated for fingers, nose, and other body parts
    - Gangrene can result due to vasoconstriction
- **Client education**
  - Notify for any signs of infection

Chapter 43: Principles of Antimicrobial Therapy



- **Suprainfection:**
    - Resistance that results when antibiotic kills normal flora (good bacteria), resulting in the emergence of a new infection that is difficult to eliminate
    - Thrush
    - Vaginal yeast infection
    - C-diff

Classification of Antimicrobial Medications

- **Narrow Spectrum Antibiotics:**
    - Only a few types of bacteria are sensitive to
- **Broad-Spectrum Antibiotics:**
    - Wide variety of bacteria are sensitive
- **BacteriCIDAL medications:**
    - Are directly lethal to the micro-organism
- **BacterioSTATIC medications:**
    - Slow the growth of the micro-organism
    - Immune system response is what actually destroys the bacteria

Selection of Antimicrobials

- **Culture:**
    - Aspirate to a culture medium were the colonies grow over over several days
    - Nurses obtain specimens for culture prior to treatment with antimicrobials

Sensitivity of Microorganism to an Antimicrobial:

For commonly resistant organisms technicians will test against various antimicrobials

- **Minimum Inhibitory Concentration (MIC):**
    - Lowest concentration of antibiotic that inhibits bacterial growth completely but does not kill the bacteria
- **Minimum Bactericidal Concentration:**
    - Lowest concentration of the antibiotic that kills 99.9% of the bacteria

Providers adjust the antibiotic dosage to produce concentration equal to or greater than the MIC of the same antibiotic

Host Factors

- **Immune System:**
    - Intact immune system
        - An antimicrobial works with the host's immune system to suppress micro-organisms
        - Providers will prescribe bactericidal or bacteriostatic antibiotics

- **Site of Infection:**

Some sites are difficult for the antimicrobials to reach.

- Infections in Cerebrospinal Fluid:
    - Antimicrobials have to cross the blood-brain barrier (meningitis)
- Infections of the Heart
    - Endocarditis
    - Infectious bacteria vegetate on the thrombus that develops ot he injured endocardium
- Purulent abscesses anywhere:
    - This is due to low blood supply
    - Surgical removal of purulent drainage
        - Increases the effect of antimicrobials
- **Age**
    - Infants:
        - Increased risk for antimicrobial toxicity because of underdeveloped liver and kidney function
        - Causes slow excretion of medication and build up in the body
    - Older Adults:
        - Similar to infants… easily develop toxicity because of the reduction in medication metabolism and excretion

- **Pregnancy**
    - Antimicrobials can harm developing fetus by crossing over placenta
    - **Sulfonamides:**
        - Can produce kernicterus, severe neurological disorder in newborns
    - **Gentamicin:**
        - Causes hearing loss in infants
    - **Tetracyclines:**
        - Cause discoloration of developing teeth
    - Lactation
        - Usually a contraindication because the possible danger to breastfeeding infants
- **Presence of Previous Allergic Reaction:**
    - Allergy especially with **penicillin**
    - Watch the same class of medications the client is allergic to
    - Signs and Symptoms of allergy:
        - Hives, edema, wheezing
- **Combination Therapy:**
    - Combining more than one antimicrobial
        - Causes an additive, potentiating, or antagonistic effect
        - Prevents bacterial resistance

Prophylaxis

- Indications of prophylactic use include prevention of:
    - Infections for clients undergoing GI, cardiac, peripheral vascular, orthopedic, or gynecologic surgery

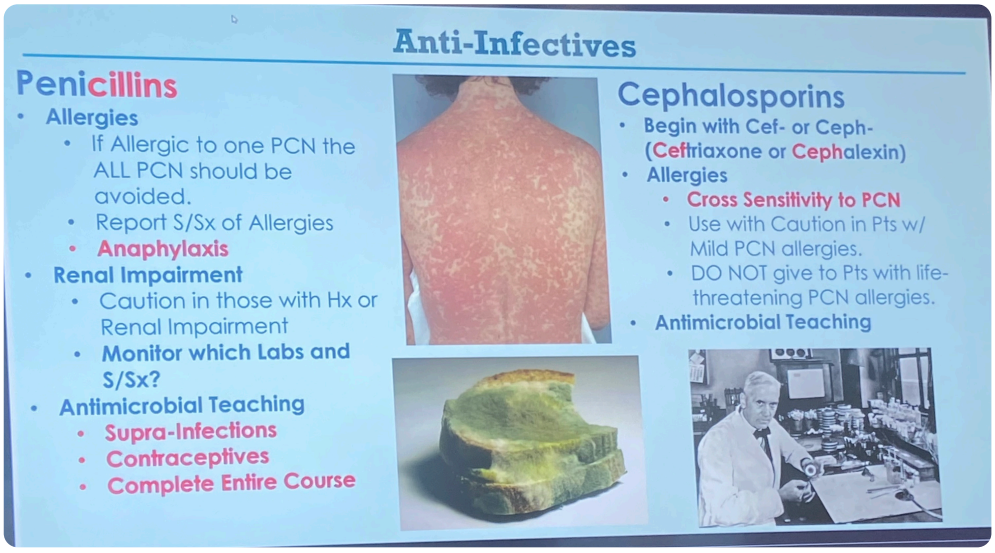
Preventative Measures

- Perform hand hygiene
- Recognize invasive procedures
    - Urinary catheter, IV catheter, cardiac catheterization, central line

- Instruct clients to take full course of antimicrobials to prevent medication resistance and the occurrence of the infection
- Evaluate for effectiveness of the medications
    - Monitor for clinical improvement
- Inform to take different form of birth control during medication

Chapter 44: Antibiotics Affecting Bacterial Cell Wall

Antibiotics that affect the cell wall are bactericidal. This includes penicillins, cephalosporins, carbapenems and monobactams.



Penicillins

- **Drugs:**
    - Amoxicillin
    - Ampicillin
    - Naficillin
    - Oxacillin
    - Ticarcillin
    - Piperacillin
- **Therapeutic action:**
    - Weaken bacterial cell wall
    - Considered beta-lactam antibiotic
        - Means mimics the bacterial structure
- **Complications:**
    - Allergic reaction
        - Anaphylaxis
            - Administer epinephrine
    - Renal impairment
        - Monitor kidney function

        - AST, ALT, BUN & Creatinine should be monitored
- **Contraindications:**
    - History of severe allergic reaction
    - Those with impaired kidney function
        - Acutely ill clients, older clients or younger children
    - Cross allergies
- **Nursing Administration:**
    - Take with meals
    - Complete entire course of medication

Cephalosporins - diet penicillin

- **Drugs:**
    - **First generation:** Cefazolin
    - **Second generation:** Cefaclor
    - **Third generation:** Ceftriaxone, cefotaxime
    - **Fourth generation:** Cefepime
- **Therapeutic action:**
    - Destroy cell wall
- **Complications:**
    - Allergy
        - Watch for cross- allergy to penicillin, don't administer
    - Bleeding tendencies
        - Observe for bleeding
    - Thrombophlebitis
        - Observe injection site
        - Administer dilute intermittent infusion slowly over 3-5 minutes
        - It is a thick shot
    - Renal insufficiency
        - Can give lower dosage to prevent toxicity

    - Antibiotic associated pseudomembranous colitis
        - Observe for diarrhea
        - Stop medication right away
        - C-diff = stop
- **Contraindications:**
    - Do not give to client's with severe allergic reaction to penicillin
    - Use cautiously with those who have renal impairment
    - Do not give to those with bleeding disorders
    - Do not use alcohol
- **Nursing Administration**
    - Complete entire course
    - Store in refrigerator

Carbapenems (NOT ON MEDICATION LIST)

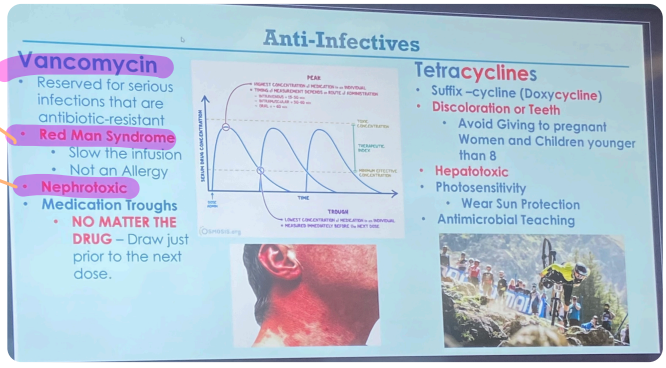
- **Drugs:**
    - Imipenem
    - Meropenem
- **Therapeutic actions:**
    - Beta-lactam antibiotics that destroy cell wall
    - Very broad spectrum antibiotics
- **Complications:**
    - Allergy, specifically cross-sensitivity
        - Monitor signs of allergic reaction
    - GI discomfort
        - Diarrhea, nausea, vomit
    - Suprainfection
        - Oral thrush, vaginal yeast infection
        - Fungal infection
- **Contraindications:**

- Use cautiously with those with renal impairment

Vancomycin

- **Therapeutic action:**
  - One of the strongest antibiotics, destroys cell wall
  - Used for c-diff or MRSA
- **Complications:**
  - Ototoxicity
    - Hearing loss
  - Red man syndrome:
    - Rashes, fever, tachycardia and hypotension
    - Administer slowly over 60 minutes
  - Renal toxicity
    - Draw peaks and troughs
    - Creatinine and BUN levels

Breathing = anaphylaxis



- **Contraindications:**
  - Allergy to corn
  - Use cautiously with older adults with renal impairment or hearing loss
  - Increased risk for ototoxicity for those who are taking meds that also have ototoxicity risk
- **Nursing Administration**
  - Watch renal output, BUN & Creatinine
  - Administer med very slowly
  - Watch for reduction in manifestations
    - Fever, pain, inflammation,
  - Resolution of infection

Peak $
Trough

Chapter 45: Antibiotics Affecting Protein Synthesis

Pharmacology Module 2 Exam Review

Antibiotics that affect protein synthesis are bacteriostatic. They treat respiratory, GI, urinary, and reproductive tract infections (UTI's)

Tetracyclines

T = teeth

- **Drugs:**
  - Tetracycline
  - Doxycycline
  - Minocycline
  - Demeclocycline
- **Therapeutic action:**
  - Broad spectrum, inhibit growth
  - Immune system takes over
  - Mainly UTI's
- **Complications:**
  - GI Discomfort
    - Cramping, nausea, vomiting, diarrhea and esophageal ulceration
  - Hepatotoxicity
    - Hard on the liver
    - tetra=hepato
  - Photosensitivity
    - Intense sunburn
  - Suprainfection
    - Pseudomembranous colitis (D-dif)
      - Diarrhea
    - Yeast infection
  - Dizzy

Teeth staining

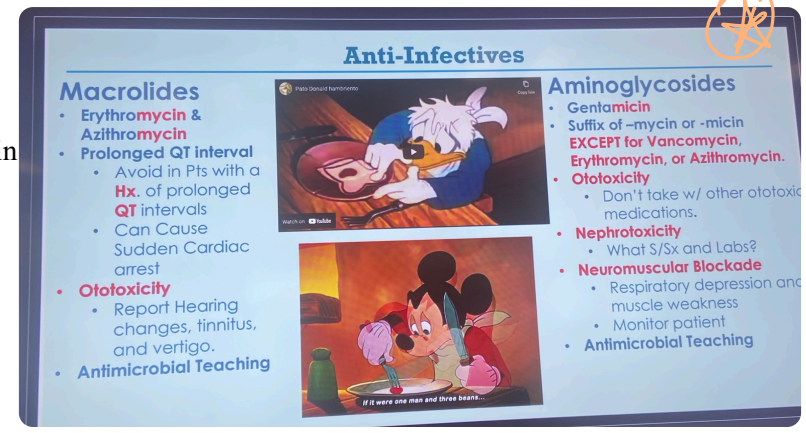
- **Contraindications:**
  - Pregnancy
    - Can stain the deciduous teeth of the child

- Use cautiously with liver and kidney disease
- Milk product use
  - Ensure ingested 1-2hrs prior to medication administration

- **Nursing Administration**
  - Take on empty stomach
  - Use other form of birth control
  - Do NOT take right before laying down, causes increased risk of esophageal ulceration

Erythromycin & Axithromycin

- **Therapeutic action:**
  - Inhibits growth by impeding protein synthesis, can be bactericidal in high doses
- **Complications:**
  - GI discomfort:
    - Nausea, vomit, epigastric pain
  - Prolonged QT intervals
    - Dysrhythmias
  - Ototoxicity



- **Nursing Administration:**
  - Use back up contraceptive
  - Monitor liver function periodically if using more than 2 weeks
    - AST, ALT
  - Look for resolution of urinary tract manifestations

Gentamicin

Ears & Kidney

- **Therapeutic action:**
  - Treats aerobic gram-negative bacilli
- **Complications: Big Ears and Kidneys**
  - Ototoxicity
  - Nephrotoxicity
    - Elevated BUN & Creatinine

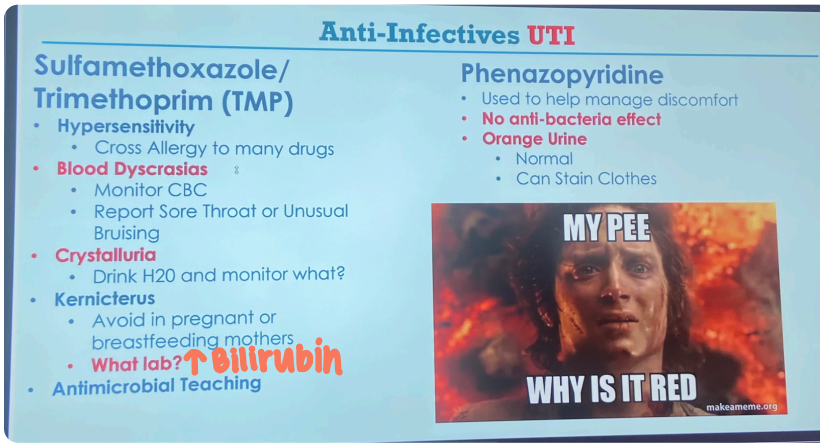
- Hypersensitivity
    - Paresthesia of hands and feet

- **Contraindications:**
    - Those with renal impairment
    - Do not mix with penicillin
- **Nursing Administration:**
    - Measure Creatinine and BUN
    - Peak:
        - 30 minutes after administration
    - Trough:
        - Right before next dose
    - Look for decrease in UTI manifestations

Chapter 46: Urinary Tract Infections Anti-infectives

Sulfamethoxazole/Trimethoprim (TMP)

- **Therapeutic action:**
    - Inhibit bacterial growth by preventing synthesis of folic acid derivative[treats UTI"s and c-diff
- **Complications:**
    - Hypersensitivity
        - Anaphylaxis
        - Steven Johnson syndrome
            - Rash
    - Blood dyscrasias
        - Hemolytic anemia
        - Agranulocytosis
        - Leukopenia



        - Thrombocytopenia
        - Aplastic anemia
            - Obtain blood samples as baseline then check periodically to detect hemolytic disorder
    - Crystalluria
        - Crystalline aggregates kidneys, ureters and bladder
        - Crystals in urine
        - Can cause acute kidney injury
    - Kernicterus
        - Jaundice
        - Increased bilirubin levels
        - Neurotoxic for newborns
    - Hyperkalemia
        - Muscle weakness
        - Monitor potassium levels
- **Contraindications**
    - Impaired kidney function
        - Increased toxicity risk
    - Increased effects of warfarin and hypoglycemics
        - Monitor lab levels
            - PT, INR, blood glucose, phenytoin levels

* avoid giving pregnant women & breast feeding

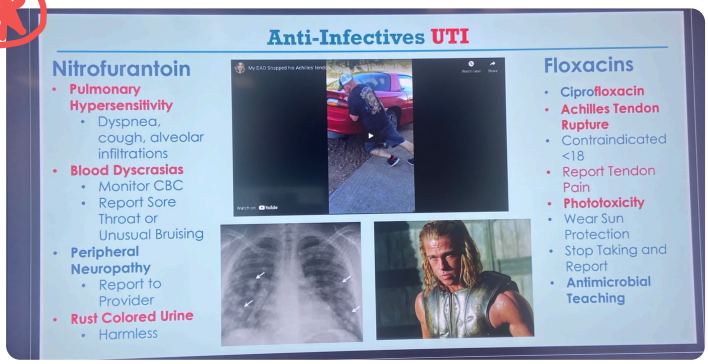
- **Nursing administration**
    - Take on empty stomach with at least 8 oz of water
    - Complete full course
    - CBC Test (full blood panel)
    - BUN and Creatinine
    - Glucose levels if diabetic
    - Monitor potassium levels

- Check for decrease in UTI manifestations

Nitrofurantoin

- **Therapeutic action:**
  - Broad spectrum urinary antiseptic with bacteriostatic and bactericidal. Injures cell by damaging DNA
- **Complications:**
  - **GI discomfort**
    - Anorexia, nausea, vomit, diarrhea
  - Hypersensitivity
    - Fever and chills
  - Blood dyscrasia
    - Hepatotoxicity
  - Peripheral neuropathy
    - Numbness, tingling of hands and feet
    - Chronic kidney disease should not have this medication
  - Headache and drowsiness
- **Contraindications:**
  - Should not be administered in third trimester of pregnancy can cause hemolytic anemia
- **Nursing administration**
  - Turns urine rusty yellow color
  - Take with food
  - Complete entire course
  - Avoid crushing
    - Will stain teeth
  - Avoid while pregnant
  - Follow up with CBC with differential
  - BUN and creatinine testing

Pulmonary



Ciprofloxacin (floxacins)

Pharmacology Module 2 Exam Review

- **Therapeutic action:**
    - Broad spectrum
    - Treats
        - Urinary, respiratory, GI, bone, joints, skin and soft tissue infections
    - Prevention of anthrax for those who inhale anthrax spores
- **Complications:**
    - Achilles Tendon Rupture
        - Observe for pain, swelling, and redness at achilles site
        - Stop medication and avoid exercise until inflammation subsides
    - Suprainfection
        - Thrush, vaginal yeast infection
            - Observe and report for signs of yeast infection
        - Phototoxicity
            - Severe sun burns
            - Stop medication if this occurs
- **Contraindications:**
    - Do not administer to those younger than 18 years old there is an increased risk of achilles rupture
    - There is an increase risk for c-difficile
    - There is a risk for
        - Dizziness, confusion and restlessness
- **Nursing Administration**
    - Give lower dose to those with impaired kidney function
    - Look for a decrease in UTI manifestations

Phenazopyridine

- **Therapeutic action:**
    - Treats symptoms of infection does NOT treat the infection
    - Anesthetic on the mucosa of urinary tract

- Relieves manifestations of
  - Burning with urination, pain, frequency and urgency

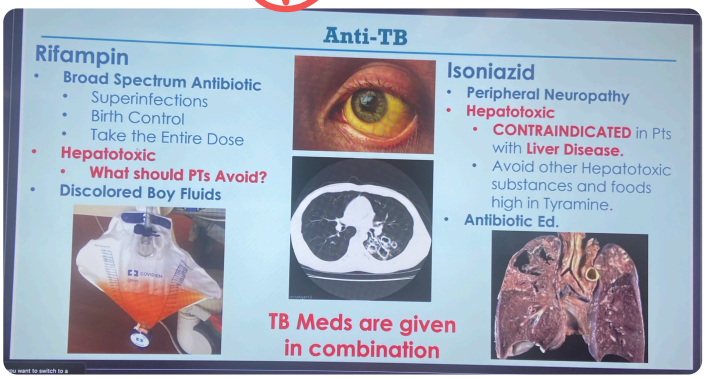
- **Nursing administration**
  - Changes urine to an orange-red color
  - Take it with or after meals
  - Can use with cranberry juice for additive effect

Chapter 47: Mycobacterial, Fungal, and Parasitic Infections

Mycobacterium tuberculosis is a slow-growing pathogen that requires long-term treatment. Treatment for TB requires the use of at least two medications at which the pathogen is susceptible. Isoniazid and rifapentine are two effective TB meds.

Isoniazid

- **Therapeutic action:**
  - Inhibits growth of mycobacteria by preventing synthesis of mycolic acid in the cell wall
  - Latent
    - Tests positive, no signs or symptoms of TB and cannot spread
    - Requires isoniazid daily for 9 months
  - Active
    - Tests positive, has signs and symptoms and can transmit TB to others
    - Several antimycobacterials are used to treat TB
  - Takes 6-9 months to treat TB
- **Complications:**
  - Peripheral neuropathy
    - Tingling and numbness in hands and feet
  - Hepatotoxicity
    - Anorexia, malaise, fatigue, nausea, and yellowish discoloration of skin and eyes



        - Monitor liver function
            - AST and ALT
    - Hyperglycemia
        - Clients with diabetes mellitus
- **Contraindications:**
    - Clients with liver disease
    - Clients with alcohol use disorder
    - Avoid alcohol consumption/use when taking meds
- **Nursing Administration:**
    - Administer orally
    - Direct observation therapy for active TB
    - Orange urine, sweat, and tears
    - Take 1-2hrs after meals
    - Complete full prescribed amount even if symptoms resolve

Rifampin

- **Therapeutic action:**
    - Always given in combination with at least one other anti tuberculosis medication to prevent resistance
    - Lower side effects with other meds
- **Complications:**
    - Hepatotoxicity
        - Monitor AST, ALT
        - Jaundice, anorexia, malaise
    - GI
        - Abdominal discomfort
- **Contraindications**
    - Use cautiously with those with imparied liver function

* discolored body fluids

- **Nursing Administration**
    - 1-2hr before meals
    - Complete full course
    - Look for improvement in symptoms
        - Clear breath sounds, no night sweats, increased appetite, no afternoon rise in temperature
    - Usually takes 3-6 months to achieve relief and riding TB

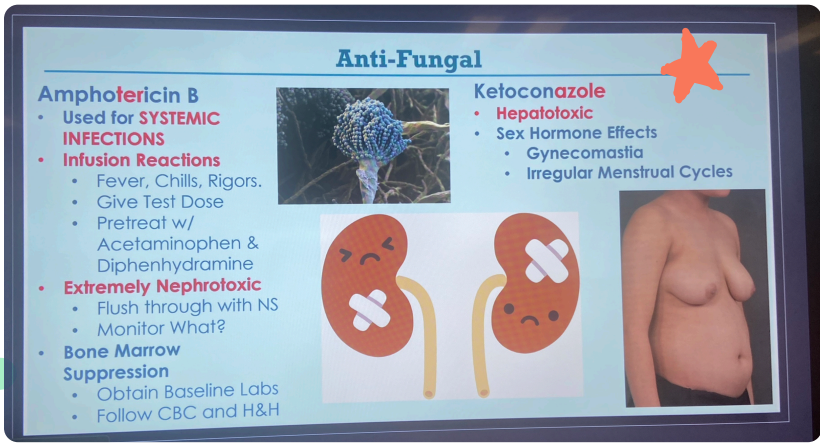
Antiprotozoals

- **Drugs:**
    - Metronidazole
- **Therapeutic action:**
    - Treat c-diff
    - Prophylaxis for clients who will have surgical procedures
        - Vaginal abdominal colorectal surgery
    - Treat H. pylori
- **Complications:**
    - GI discomfort
        - Dry mouth, and metallic taste
    - Darkening of Urine
    - Neurotoxicity (CNS effects)
        - Numbness of extremities, ataxia and seizures
            - Stop medication if this occurs
        - Pseudomembranous colitis
            - Fever, chills, diarrhea, abdominal pain, bloody stool
- **Contraindications**
    - Avoid any alcohol products
        - Causes disulfiram-like reaction

- Facial flushing, vomit, dyspnea, tachycardia

Antifungals

- **Drugs**
  - Nystatin
  - Amphotericin B Systemic
  - Ketoconazole - Hepatotoxic
  - Fluconazole
- **Therapeutic actions:**
  - Treat systemic fungal infection
- **Complications:**
  - Infusion reaction
    - Fever, chills, and headache
    - Do a test dose of 1 mg
  - Thrombophlebitis
    - Administer in a large vein
  - Nephrotoxicity
    - Flank pain
    - Obtain baseline BUN and Creatinine, follow with weekly kidney monitoring
  - Electrolyte imbalance
    - Monitor electrolyte levels
    - Specifically potassium
    - Administer supplements
  - Bone marrow Suppression
    - Obtain baseline CBC and Hct
      - Monitor weekly
- **Contraindications:**
  - Impaired kidney function due to higher risk for nephrotoxicity
  - Griseofulvin is pregnancy risk category X



Hepatotoxic

- **Nursing administration:**
    - Infuse slowly over 2-4 hours IV
    - Kidney injury is lessened when
        - Diluted in normal saline

Chapter 48: Viral Infections, HIV, and AIDs

Acyclovir

- **Therapeutic actions:**
    - Prevent reproduction of viral DNA thus interrupting cell replication
    - Treats herpes simplex and varicella-zoster viruses
- **Complications:**
    - Phlebitis at admin site
    - Nephrotoxicity
        - Administer slowly over 1 hour
        - Administer IV fluids and increase fluid intake
- **Contraindications**
    - No sexual activity should take place with lesions present, use condom at all times
- **Nursing administration**
    - IV slowly over at least one hour or longer
    - Expect relief but NOT A CURE

Antiretrovirals: NRTI's (HIV/AIDS)

Zidovudine

- **Therapeutic actions:**
    - Reduces HIV manifestations by inhibiting DNA
    - First-line antiretrovirals treat HIV infection in short-term care
- **Complications**
    - Suppressed bone marrow
        - Monitor for bleeding, easy bruising, sore throat, and fatigue

    - Lactic acidosis
        - Hyperventilation
        - Nausea
        - Abdominal pain
    - Nausea, Vomit, Diarrhea
    - Hepatomegaly
        - Monitor enzymes
- **Nursing Administration**
    - Obtain baseline CBC and platelets
    - AST and ALT monitoring
    - Tke exactly as prescribed
    - Reduction in manifestations

Autonomic Nervous System Agents

Neurons

- **Afferent**
    - Send impulses to CNS
    - Sensory
- **Efferent**
    - Receive the impulses from the brain
    - Motor

Adrenergic receptor organ cells

* only ↑ or decrease receptor

- Alpha 1
- Alpha 2
- Beta 1
- Beta 2

Sympathetic vs Parasympathetic

- Sympathetic
    - Stress response

        - Fight or flight
        - Increased heart rate
        - Breath shallow and fast
        - Inactive gut
        - Blood rushes away from brain
        - Expends energy
- Parasympathetic cholergic
    - Relaxation
        - Slowed heartbeat
        - Breath full and slow
        - Active gut
        - Conserves energy

Adrenergic Agonists

Stimulate the sympathetic nervous system.

- **Alpha 1** contract smooth muscle
    - Increases peripheral resistance
    - Increases preload, which improves circulation
    - Increased blood pressure
- **Alpha 2**
    - Blood pressure decreases
- **Beta 1**
    - Primarily in the heart
    - Increases heart rate tachycardia
- **Beta 2**
    - Primarily in the lungs * relax smooth muscle in lungs
    - Causes bronchodilation
    - Increase blood flow to skeletal muscles
- **Adrenergic Uses/Side effects**

- Asthma, anaphylaxis, hypotension/shock
- Restlessness, nervousness, tachycardia, angina, tremors, nausea/vomiting, hypertension, seizures

Adrenergic Blockers

Blocks sympathetic nervous system. Blocks epinephrine.

- **Beta blockers**
  - End in -lol
    - Propranolol
    - Atenolol
    - Metoprolol
- **Alpha blockers**
  - Clonidine
  - Phentolamine
  - Doxazosin
- **Side effects**
  - Bronchoconstriction
  - Decreased cardiac output and pulse rate
  - Hypotension

Cholinergic Agonists

"Rest and digest". Opposite of adrenergic medications. Similar to adrenergic blockers.

- **Effects**
  - Decreased pulse and blood pressure
  - nausea ,vomit, diarrhea (GI)
  - Sweating
  - Salivation
  - Excessive mucus
- **Uses/Examples**
  - Use

        - Urinary retention, Alzheimer's, Myasthenia gravis
    - Examples
        - Urecholine, bethanechol, donepezil, neostigmine, edrophonium

- **Side Effects**
    - **SLUDGE**
        - Salivation
        - Lacrimation
        - Urinary incontinence
        - Diarrhea
        - Gastrointestinal cramps
        - Emesis

cholenergic crisis
+Bradycardia
+too much mucons
+need anticholinergics

Anticholinergics

Works against the parasympathetic nervous system. Similar actions to adrenergic medications.

- **Effects** heart rate ↑
    - **Decreased secretions**
        - Can't see
        - Can't pee
        - Can't spit
        - Can't shit
- **Side effects**
    - "Hot as a hare"
    - "Mad as a hatter"
    - "Red as a beet"
    - "Dry as a bone"
    - "Blind as a bat"

Exam 2 Lab Value Ranges:

- **RBC:**

  - Men- 4.7 - 6.1 million cells/mcL
  - Women – 4.2 - 5.4 million cells/mcL.
- **WBC:**
  - 4,500 to 11,000 WBCs per microliter
- **PLT:**
  - 150,000 to 400,000 platelets/mcL
- **Vancomycin Peak/Trough**
  - Peak: 20–40 mg/L
  - Trough: 1-20 mg/L
- **Creatinine**
  - 0.9-1.3
- **BUN**
  - 10-20