

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 I 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

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

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- Infliximab
 - 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

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- **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
 - 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

- **Complications**

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

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- 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
- **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

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- **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

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- **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 osteoporosis

- **Complications**

- Nausea
- Nasal dryness and irritation with intranasal route
 - Alternate nostrils daily

- **Contraindications**

- Clients who have hypersensitivity to fish protein

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- Intranasal spray is only meant for postmenopausal osteoporosis
- **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

Chapter 37: Adjuvant Medications for Pain

Usually an opioid agonist to increase pain relief while increasing pain relief and reducing opioid dosage
Antagonists. 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 of cerebral blood vessels. These can be abortive or prophylactic.

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

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- Ergotamine
- **Therapeutic action**
 - Stop migraine after they have shown signs of beginning or already begun
- **Complications**
 - Acetaminophen
 - 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
 - Ergot alkaloids
 - GI discomfort
 - Acute or chronic toxicity
 - Muscle pain, paresthesias in fingers and toes
 - Physical dependence
 - Fetal harm or abortion
 - Category X
- **Contraindications**
 - Ergotamine
 - Renal or liver failure
 - Pregnancy category X
 - Triptans
 - Never used with ergotamine
- **Nursing administration**

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- 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 circumscribed 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

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- **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 where the colonies grow 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

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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 on the 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

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- **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

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- 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
 - Nafcillin
 - 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

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- 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

- **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

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- 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:**

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- 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
- **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

Chapter 45: Antibiotics Affecting Protein Synthesis

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

Tetracyclines

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

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- 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

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

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- 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

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- 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
- **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

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- 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

Ciprofloxacin (floxacin)

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- **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

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- 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

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- 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 impaired liver function

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- **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 ridging 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

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- Facial flushing, vomit, dyspnea, tachycardia

Antifungals

- **Drugs**

- Nystatin
- Amphotericin
- Ketoconazole
- 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

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- **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

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- Lactic acidosis
 - Hyperventilation
 - Nausea
 - Abdominal pain
- Nausea, Vomit, Diarrhea
- Hepatomegaly
 - Monitor enzymes
- **Nursing Administration**
 - Obtain baseline CBC and platelets
 - AST and ALT monitoring
 - Take 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

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

Sympathetic vs Parasympathetic

- Sympathetic
 - Stress response

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

Adrenergic Agonists

Stimulate the sympathetic nervous system.

- **Alpha 1**
 - 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
- **Beta 2**
 - Primarily in the lungs
 - Causes bronchodilation
 - Increase blood flow to skeletal muscles
- **Adrenergic Uses/Side effects**

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- 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

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- Urinary retention, Alzheimer's, Myasthenia gravis
- Examples
 - Urecholine, bethanechol, donepezil, neostigmine, edrophonium
- **Side Effects**
 - **SLUDGE**
 - Salivation
 - Lacrimation
 - Urinary incontinence
 - Diarrhea
 - Gastrointestinal cramps
 - Emesis

Anticholinergics

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

- **Effects**
 - **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:**

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- 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