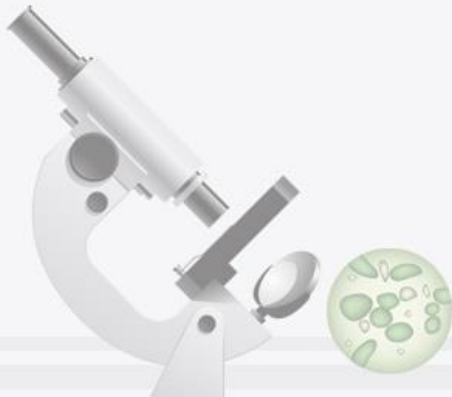


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# Chapter 8

## Antibacterial Drugs That Interfere With Protein Synthesis



# Tetracyclines

- Anti-infectives composed of natural and semisynthetic compounds
- **Actions:** inhibit bacterial protein synthesis
- **Used as broad-spectrum antibiotic** when penicillin is contraindicated
- **Treat the following infections:** Rickettsial diseases; intestinal amebiasis; skin and soft tissue infections; uncomplicated urethral, endocervical, or rectal infections; adjunctive treatment; and infection with *Helicobacter pylori*



# Tetracyclines: Adverse Reactions

- Gastrointestinal/other body system reactions:

- Nausea and/or vomiting
- Diarrhea
- Epigastric distress
- Stomatitis
- Sore throat
- Skin rashes
- Photosensitivity reaction



# Tetracyclines: Contraindications

- Contraindicated in patients:
  - With hypersensitivity; during pregnancy, lactation; children younger than 9 years
- Nursing alert:
  - Not given to children younger than 9 years of age
  - Prolonged therapy: Bacterial/fungal overgrowth of nonsusceptible organisms



# Tetracyclines: Precautions

- Used cautiously in patients with:
  - Impaired renal function
  - Liver impairment
- Chronic care alert:
  - May reduce insulin requirements in patients with diabetes. Blood glucose levels should be monitored frequently.



# Tetracyclines: Interactions #1

Interacting drug	Effect of interaction
Antacids containing aluminum, zinc, magnesium, or bismuth salts	Decreases effectiveness of tetracyclines
Oral anticoagulants	Increases risk for bleeding
Oral contraceptives	Decreases effectiveness of contraceptive agent



# Tetracyclines: Interactions #2

Interacting drug	Effect of interaction
Digoxin	Increases the risk for digitalis toxicity
Calcium-rich foods	Causes potentially impaired absorption of tetracycline



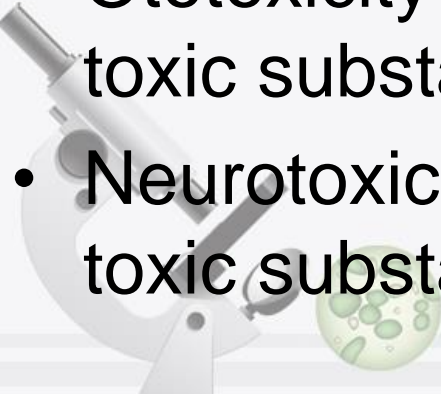
# Aminoglycosides: Actions and Uses

- Blocks step in protein synthesis necessary for bacterial multiplication
- Used against gram-negative microorganisms
- Bowel preparation
- Hepatic coma



# Aminoglycosides: Adverse Reactions

- Nausea
- Vomiting
- Anorexia
- Rash
- Urticaria
- Nephrotoxicity (damage to the kidneys by a toxic substance)
- Ototoxicity (damage to the hearing organs by a toxic substance)
- Neurotoxicity (damage to the nervous system by a toxic substance)



# Aminoglycosides: Contraindications and Precautions

- Contraindicated in patients:
  - With hypersensitivity to aminoglycosides, pre-existing hearing loss, myasthenia gravis, parkinsonism; during lactation and pregnancy (category C and D). Long-term therapy risk: ototoxicity and nephrotoxicity.
- Used cautiously in:
  - Elderly patients; patients with renal failure and neuromuscular disorders



# Aminoglycosides: Interactions

- Cephalosporins
- Loop diuretics
- Pavulon or Anectine



# Macrolides

- Effective against a wide variety of pathogenic organisms, particularly infections of the respiratory and genitourinary tracts
- Actions:
  - Act by causing changes in protein function and synthesis



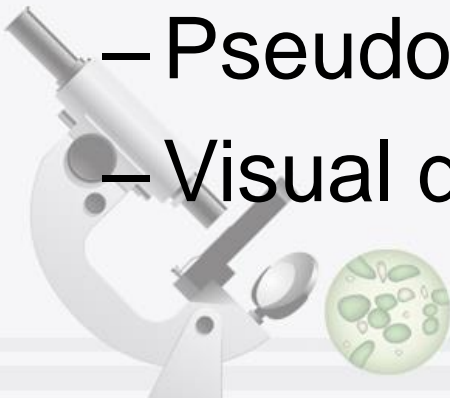
# Macrolides: Uses

- Used as prophylaxis before dental or other procedures in patients allergic to penicillin and in the treatment of:
  - A wide range of gram-negative and gram-positive infections
  - Acne vulgaris and skin infections
  - Upper respiratory infections caused by *Haemophilus influenzae*



# Adverse Reactions of Macrolides

- Gastrointestinal (GI) and other reactions:
  - Nausea
  - Vomiting
  - Diarrhea
  - Abdominal pain or cramping
  - Pseudomembranous colitis
  - Visual disturbances



# Macrolides: Contraindications and Precautions

- Contraindicated in patients:
  - With a hypersensitivity to the macrolides; with pre-existing liver disease; prescribed cisapride (Propulsid) or pimozide (Orap)
- Used cautiously in patients:
  - With liver dysfunction; with myasthenia gravis; during pregnancy or lactation (pregnancy category B and C)



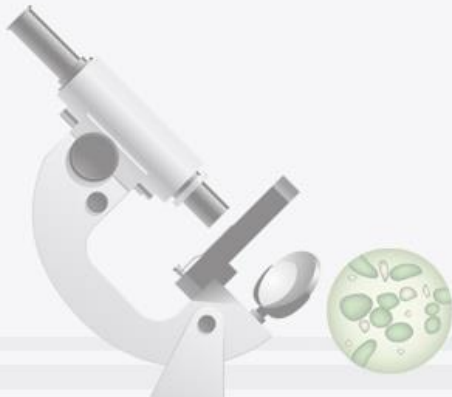
# Macrolides: Interactions #1

Interacting Drug	Effect of Interaction
Antacids (kaolin, aluminum salts, or magaldrate)	Decreases absorption and effectiveness of macrolide
Digoxin	Increases serum levels of digoxin
Anticoagulants	Increases risk of bleeding



# Macrolides: Interactions #2

Interacting Drug	Effect of Interaction
Clindamycin, lincomycin, or chloramphenicol	Decreases therapeutic activity of the macrolide
Theophylline	Increases serum theophylline level



# Lincosamides

- Used for treating serious infections in which penicillin or erythromycin is not effective
- Used for the more serious infections
- Used in conjunction with other antibiotics
- Actions: Inhibits protein synthesis in susceptible bacteria, causing cell death
- Effective in the treatment of infections caused by a wide range of gram-negative and gram-positive microorganisms



# Lincosamides: Adverse Reactions

- Gastrointestinal/other body reactions:
  - Abdominal pain
  - Esophagitis
  - Nausea
  - Vomiting
  - Diarrhea
  - Skin rash
  - Blood dyscrasias



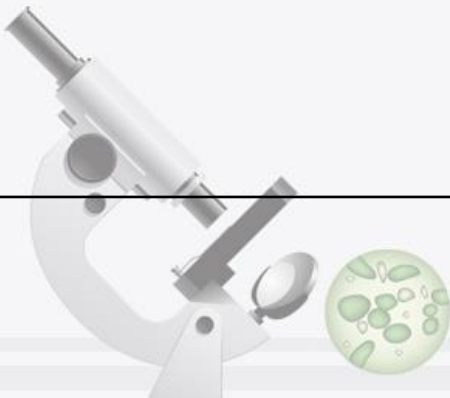
# Lincosamides: Contraindications and Precautions

- Contraindicated in patients:
  - With hypersensitivity to the lincosamides; prescribed cisapride (Propulsid) or the antipsychotic drug pimozide (Orap); having minor bacterial or viral infections
- Used cautiously in patients with:
  - History of GI disorders; renal disease; liver impairment; myasthenia gravis



# Lincosamides: Interactions

Interacting Drug	Effect of Interaction
Kaolin or aluminum-based antacids	Decreases absorption of the lincosamide
Neuromuscular blocking drugs	Increases action of neuromuscular blocking drug, possibly leading to severe and profound respiratory depression



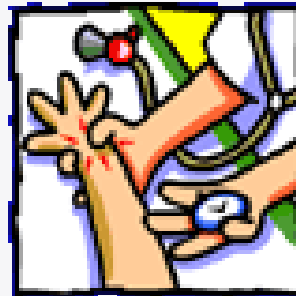
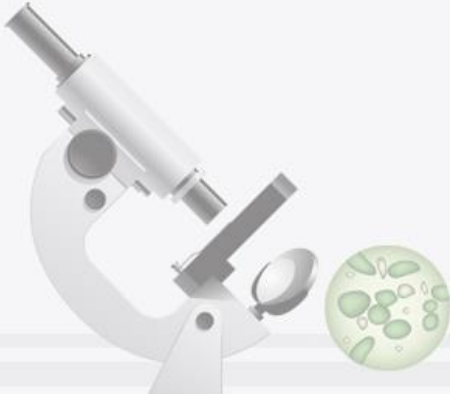
# Nursing Process: Assessment # 1

- Preadministration assessment:
  - Establish an accurate database before the administration of any antibiotic
  - Obtain general health history
  - Record vital signs and obtain description of signs and symptoms
  - Note patient's general appearance
  - Obtain culture and sensitivity test results



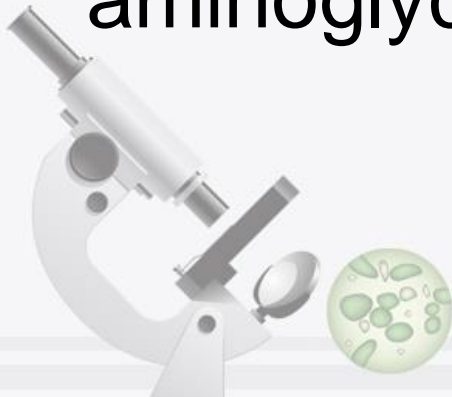
# Nursing Process: Assessment #2

- Ongoing assessment:
  - Take vital signs every 4 hours or as ordered
  - Notify the primary health care provider if there are changes in the vital signs or if signs and symptoms worsen
  - Compare current signs and symptoms of infection and record any specific findings



# Nursing Process: Nursing Diagnoses #1

- **Impaired Comfort:** increased Fever related to ineffectiveness of anti-infective therapy
- **Acute Confusion** related to increased ammonia blood levels
- **Ineffective Tissue Perfusion:** renal related to adverse drug reactions to aminoglycosides



# Nursing Process: Nursing Diagnoses

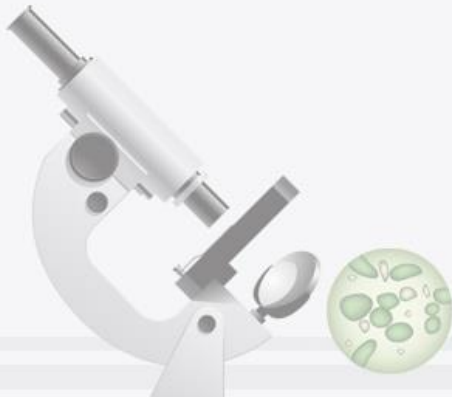
## #2

- **Risk for Injury** related to visual disturbances from telithromycin treatment, paresthesia secondary to neurotoxicity, or auditory damage from aminoglycosides
- **Diarrhea** related to superinfection secondary to anti-infective therapy, adverse drug reaction



# Nursing Process: Planning

- The expected outcome includes an optimal response to therapy:
  - Controlling the infectious process or prophylaxis of bacterial infection
  - Management of adverse drug effects
  - Understanding of and compliance with the prescribed treatment regimen



# Nursing Process: Implementation

## # 1

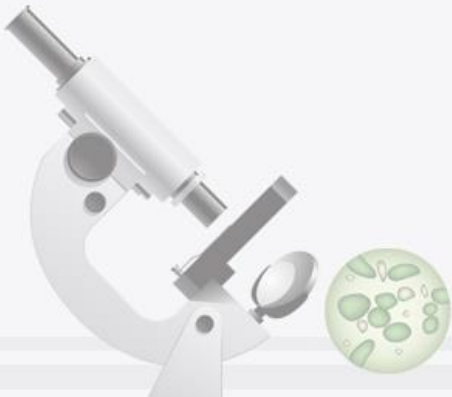
- Promoting an optimal response to therapy:
  - Oral administration: tetracyclines
    - On an empty stomach and with a full glass of water (exceptions: minocin and terramycin)
  - Nursing alert: do not give with dairy products, antacids, laxatives, or products containing iron; if prescribed, give 2 hours before/after administration of tetracycline



# Nursing Process: Implementation

## #2

- Promoting an optimal response to therapy (cont.)
  - Oral administration: aminoglycosides: enteric-coated erythromycin given with neomycin
  - Drug delivery timing is critical for optimal response of suppression of intestinal bacteria when preparing a patient for surgery with kanamycin or neomycin



# Nursing Process: Implementation

## # 3

- Promoting an optimal response to therapy (cont.)
  - Oral administration: macrolides
    - Administered without regard to meals and with milk
    - Exceptions: azithromycin, dirithromycin, erythromycin



# Nursing Process: Implementation

## #4

- Promoting an optimal response to therapy (cont.)
  - Oral administration: lincosamides
    - Food impairs absorption
    - Patient should not take anything by mouth for 1 to 2 hours before and after
    - Give clindamycin with food or a full glass of water



# Nursing Process: Implementation

## #5

- Promoting an optimal response to therapy (cont.)
  - Parenteral administration:
    - Intramuscularly: inspect previous injection sites for signs of pain or tenderness, redness, and swelling
      - Antibiotics: temporary local reactions
      - Rotate injection sites; record site



# Nursing Process: Implementation

## #6

- Promoting an optimal response to therapy (cont.)
  - Parenteral administration (cont.)
    - Intravenously: inspect needle site and area around needle for signs of extravasation of the IV fluid or tenderness, pain, and redness
      - In case of symptoms: restart the IV in another vein; report to primary health care provider



# Nursing Process: Implementation

## #7

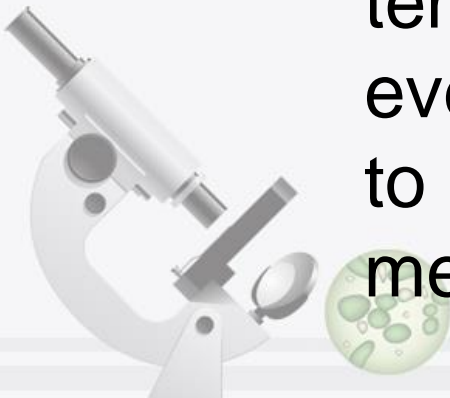
- Monitoring and managing patient needs:
  - Observe patient: frequent intervals, especially first 48 hours of therapy
  - Report: any adverse reaction before next dose
  - Serious adverse reactions: severe hypersensitivity reaction, respiratory difficulty, severe diarrhea, severe drop in blood pressure



# Nursing Process: Implementation

## #8

- Monitoring and managing patient needs (cont.):
  - Impaired comfort: increased fever
    - Monitor: temperature at frequent intervals
    - Elevated temperature: check temperature, pulse, and respirations every hour until temperature returns to normal; administer antipyretic medication if prescribed



# Nursing Process: Implementation

## #9

- Monitoring and managing patient needs (cont.)
  - Risk for injury:
    - Telithromycin: causes difficulty in focusing and accommodating light
    - Caution patients: potential for accidents or injury when driving, operating machinery, or engaging in other hazardous activities



# Nursing Process: Implementation

## #10

- Monitoring and managing patient needs (cont.)

- Diarrhea: superinfection

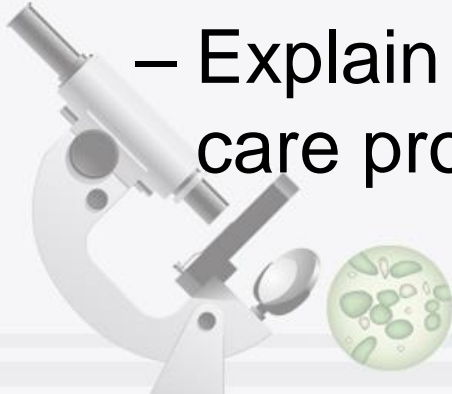
- Inspect stools: for blood or mucus
- Encourage: drinking fluids
- Maintain: accurate intake, output record
- Observe: signs or symptoms of bacterial or fungal superinfection



# Nursing Process: Implementation

## #11

- Educating the patient and family:
  - Advise to take drug at prescribed time intervals and to not increase or omit dosage unless advised
  - Explain the importance of completing the entire course of treatment
  - Advise taking dose with full glass of water
  - Explain necessity of notifying primary health care provider if symptoms worsen



# Nursing Process: Implementation

## #12

- Educating the patient and family (cont.):
  - Advise to avoid alcoholic beverages during therapy
  - If tetracycline is prescribed: advise to avoid exposure to the sun or tanning lamps or beds; completely cover arms and legs and wear wide-brimmed hat to protect face and neck; sunscreen: may or may not be effective; consult primary health care provider



# Nursing Process: Evaluation

- The therapeutic effect is achieved; infection is controlled; normal vision unaffected; no diarrhea
- Adverse reactions: identified, reported, and managed
- Patient and family demonstrate understanding of drug regimen
- Patient verbalizes the importance of complying with prescribed therapeutic regimen

