Unit V – Problem 11 – Pharmacology: Quinolones and Fluoroquinolones

- **Quinolones:**
  - **Examples:**
    - ✓ Nalidixic acid: 1st developed quinolone.
    - ✓ Cinoxacin.
  - **Why do quinolones have limited use?**
    - ✓ They are useful only as urinary antiseptics (an antiseptic is a substance which prevents the growth of disease-causing microorganisms) because they do not reach systemic bactericidal levels and rapidly develop resistance. They have largely been replaced by fluoroquinolones.
- **Fluoroquinolones:**
  - **Examples**: ciprofloxacin, levofloxacin and ofloxacin.
  - **Mechanism of action**: inhibition of DNA gyrase (in gram negative bacteria) or topoisomerase IV (in gram positive bacteria). Therefore, it is interfering with DNA replication.
  - **Spectrum**: broad-spectrum (including gram +, gram -, Anarobes and atypical bacteria). Examples include the following:
    - ✓ Salmonella.
    - ✓ Shigella.
    - ✓ Enterobacter.
    - ✓ Campylobacter.
    - ✓ Neisseria.
    - ✓ P.aeruginosa.
    - ✓ Staphylococci.
    - ✓ Streptococci.
    - ✓ Chlamydia.
    - ✓ Mycoplasma.
    - ✓ Legionella.
    - ✓ Brucella.
    - ✓ Anthrax.
    - ✓ Tuberculosis.
  - **Used for:**
    - ✓ Urinary Tract Infections (UTIs).
    - ✓ Sexually Transmitted Diseases (STDs).
    - ✓ Gastrointestinal infections (e.g. Shigella and Salmonella).
    - ✓ Bone and soft tissue infections (e.g. osteomyelitis and diabetic foot).
    - ✓ Respiratory infections (e.g. pneumonia).
    - ✓ Tuberculosis.
    - ✓ Anthrax.
  - **Adverse reactions:**
    - ❖ CNS effects: headache, dizziness and insomnia.
    - ❖ GI effects: diarrhea, nausea and abnormal liver function tests.
    - ❖ Photosensitivity.
    - ❖ Tendinitis or tendon rupture in adults.
  - **Can they be used in children**: they are contraindicated due to risk of arthropathy.
  - **Resistance against fluoroquinolones**: especially by staphylococcus through changes to the target enzyme or penetration of the drug.