

## Unit II – Problem 6 – Pharmacology (1): Tuberculosis Treatment



- It is a six-month chemotherapy regimen recommended by World Health Organization (WHO):
  - **Phase 1 (first 2 months) includes the following drugs:**
    - ✓ Isoniazid (INH).
    - ✓ Rifampicin/Rifampin.
    - ✓ Pyrazinamide.
    - ✓ Ethambutol or Streptomycin.
  - **Phase 2 (second 4 months) includes the following drugs:**
    - ✓ Isoniazid (INH).
    - ✓ Rifampicin/Rifampin.
- Why do we use combination of drugs?
  - To prevent resistance of bacteria against a specific drug and because combination of these drugs make them work better (becoming more effective).
- What are the drugs which are used to treat Multi-Drug Resistant Tuberculosis (MDR-TB)?
  - **Group 2: injectable agents (aminoglycosides)**
    - ✓ Kanamycin (Km).
    - ✓ Amikacin (Am).
    - ✓ Capreomycin (Cm).
    - ✓ Streptomycin (S). Notice that this drug is also considered as a first-line drug for Tb and belongs to group 1.
  - **Group 3: fluoroquinolones**
    - ✓ Levofloxacin.
    - ✓ Moxifloxacin.
    - ✓ Ofloxacin.
  - **Group 4: oral bacteriostatic second-line agents**
    - ✓ Para-aminosalicylic acid (PAS).
    - ✓ Cycloserine (Cs).
    - ✓ Ethionamide (Eto).
- Why are anti-Tb drug given for this long period of time?
  - **Because there are several populations of bacteria and not all of them will be killed at once:**
    - ✓ Extracellular bacteria (continuously growing and replicating): these are killed by INH, streptomycin and rifampicin.
    - ✓ Semi-dormant bacteria (replicating slowly): they can live in environment with acidic pH (such as in phagosomes) and they are killed by pyrazinamide.
    - ✓ Semi-dormant (intermittent) bacteria: they are killed by rifampicin.
    - ✓ Dormant bacteria: no drug can work on them, so we just observe and wait.
- What are the problems which can be faced with Tb chemotherapy?
  - Bacterial resistance to drugs (this explains why we use combinations).
  - Drug-resistant bacteria can exist in populations of bacilli which have never been exposed previously to anti-Tb drugs.
  - Semi-dormant populations of bacteria which grow slowly (this explains why we give the drugs for long period of time).
  - chronic nature of the disease which requires a prolonged therapy. This might result in toxicity!
  - **Poor compliance of patient: this can be reduced or prevented by**
    - ✓ Directly Observed Treatment – Short Course (DOTs).
    - ✓ Fixed-dose combinations of drugs (multiple drugs in 1 pill).