

# Antiarrhythmic Drugs

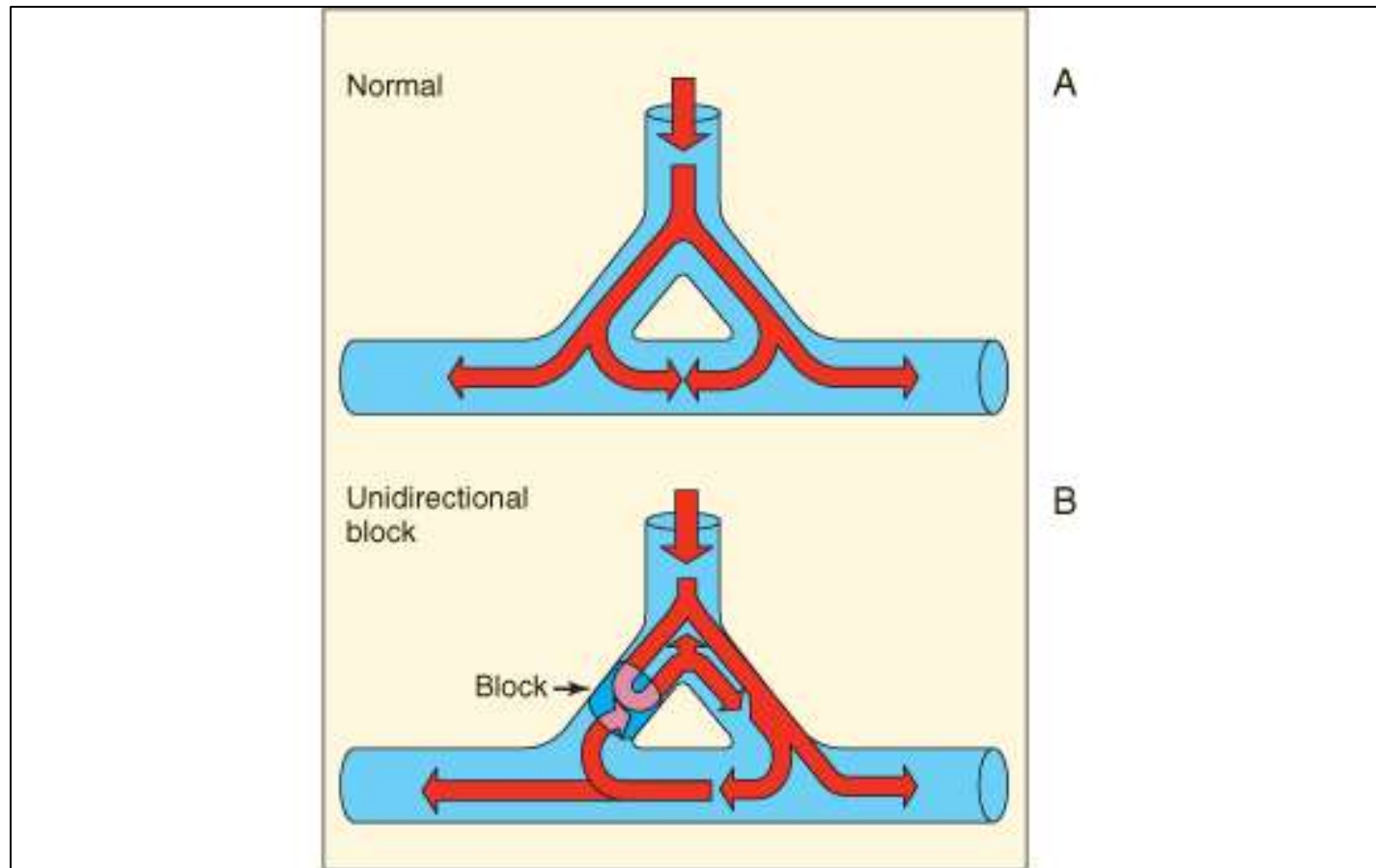
# Arrhythmia

- **Definition:**
  - Disturbances in the heart rate, rhythm, impulse generation or conduction of electrical impulses responsible for membrane depolarization
  - These disturbances can lead to alterations in overall cardiac function that can be life threatening.
- **Antiarrhythmic drugs:**
  - Compounds used to prevent or treat cardiac arrhythmias

# Mechanism of arrhythmias

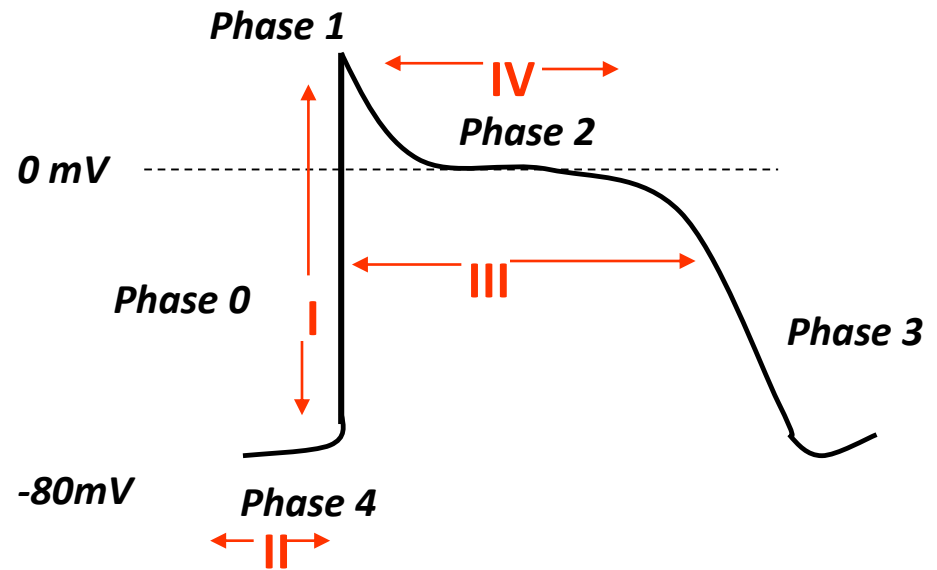
- **Disturbances in impulse generation** may be due to
  - Abnormal automaticity
  - Delayed after depolarizations
- **Disturbances of impulse conduction**
  - The impulse may recirculate in heart causing repeated activation (re-entry)
  - Conduction blocks

# Re-entry phenomenon



# Phases of action potential of cardiac cells

- **Phase 0** rapid depolarisation (inflow of  $\text{Na}^+$ )
- **Phase 1** partial repolarisation (inward  $\text{Na}^+$  current deactivated, outflow of  $\text{K}^+$ )
- **Phase 2** plateau (slow inward calcium current)
- **Phase 3** repolarisation (calcium current inactivates,  $\text{K}^+$  outflow)
- **Phase 4** pacemaker potential (Slow  $\text{Na}^+$  inflow, slowing of  $\text{K}^+$  outflow) 'autorhythmicity'
- **Refractory period** (phases 1-3)



# Classification of antiarrhythmics

- **Class I:** Sodium channel blockers
- **Class II:**  $\beta$ -Adrenergic blockers
  - Propranolol, acebutolol, esmolol
- **Class III:** Potassium channel blockers
  - Amiodarone, bretylium, sotalol
- **Class IV:** calcium channel blockers
  - Verapamil, diltiazem
- **Miscellaneous**
  - PSVT: Adenosine, Digoxin
  - AV block: Atropine