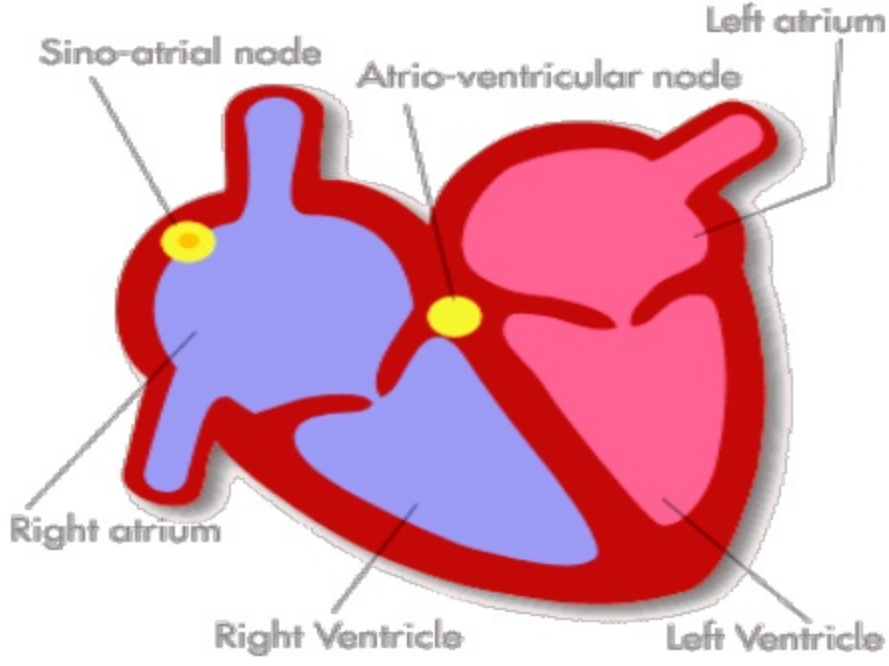
Antiarrhythmic drugs

Antiarrhythmics ????

- In a textbook → Interesting but sedative.
  - Try it if you have insomnia
- In the lecture → Confusion ??????????
  - As always
- In the exam hall → Panic!
  - Don't worry rarely asked

- # A-RHYTHM –IA
- *Defn*- Arrhythmia is deviation of heart from normal RHYTHM.



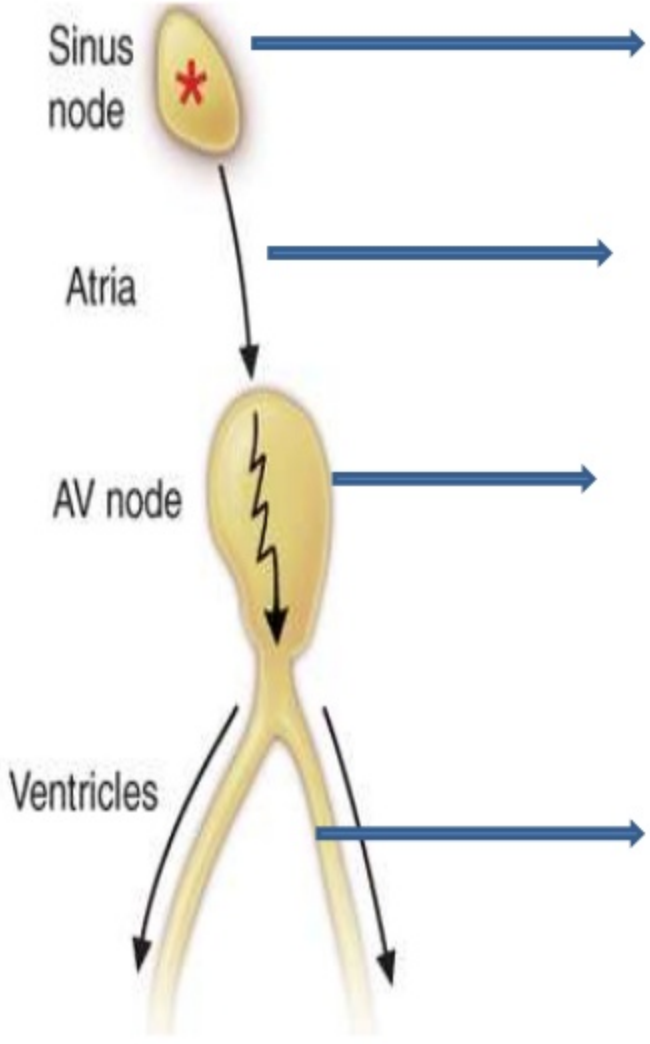
- *RHYTHM*

1) HR- 60-100
2) Should origin from SAN
3) Cardiac impulse should propagate through normal conduction pathway with normal velocity.

- **CLASSIFICATION OF ARRHYTHMIAS**

500	Atrial fibrillation
350	Atrial flutter
200	Paroxysmal TA
150	Simple tachyarrythmia
100 60	Normal range
40	Mild bradyarrhythmias
20	moderate BA
	Severe BA

ARRHYTHMIAS



Sinus arrythmia

Atrial arrhythmia

Nodal arrhythmia (junctional)

SVT

Ventricular arrhytmia

Electrophysiology of cardiac tissue

- Impulse generation and transmission
- Myocardial action potential
- Depolarization and repolarization waves as seen in ECG

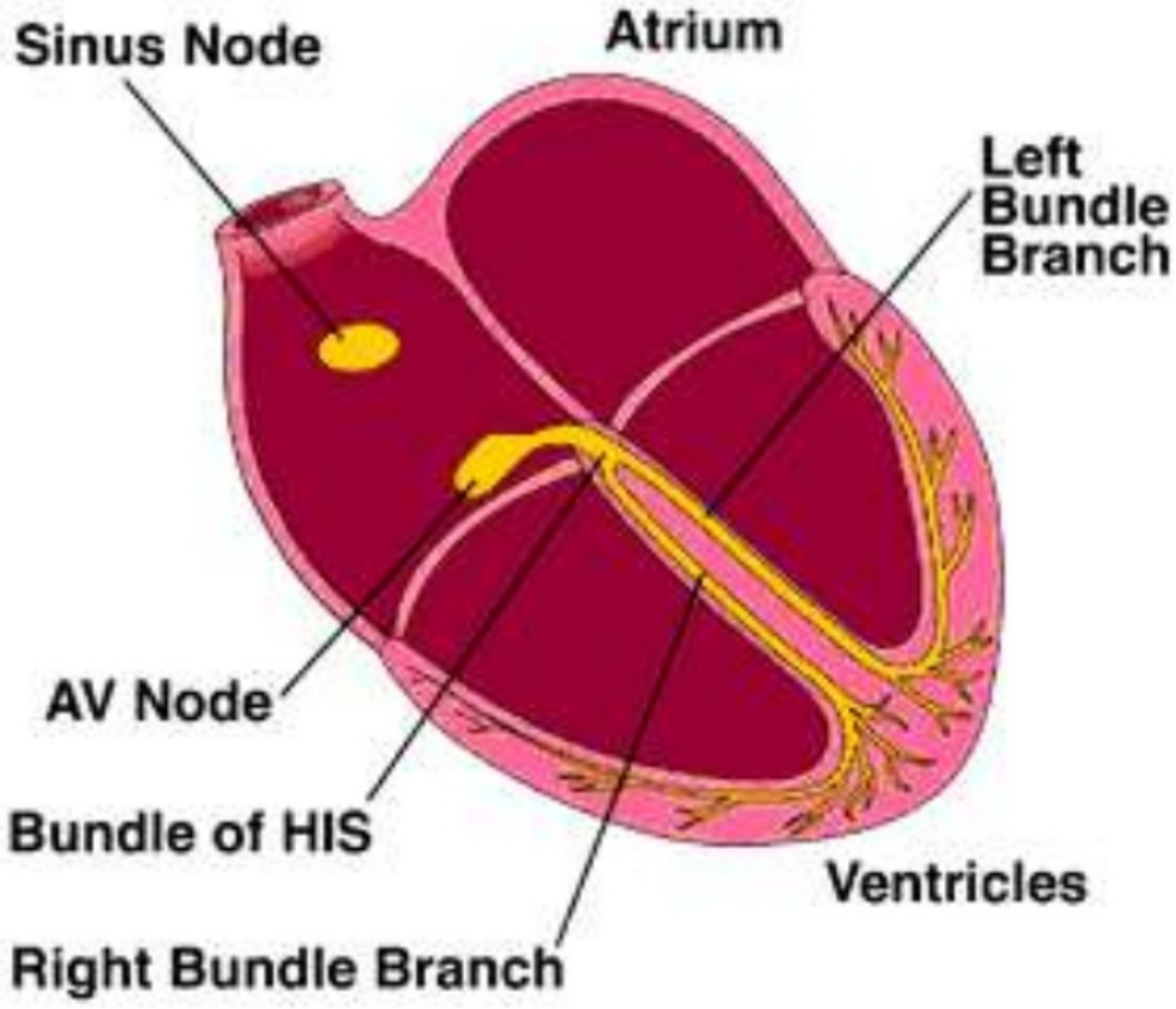
Types of cardiac tissue (on the basis of impulse generation)

- **AUTOMATIC/ PACEMAKER/ CONDUCTING FIBRES**

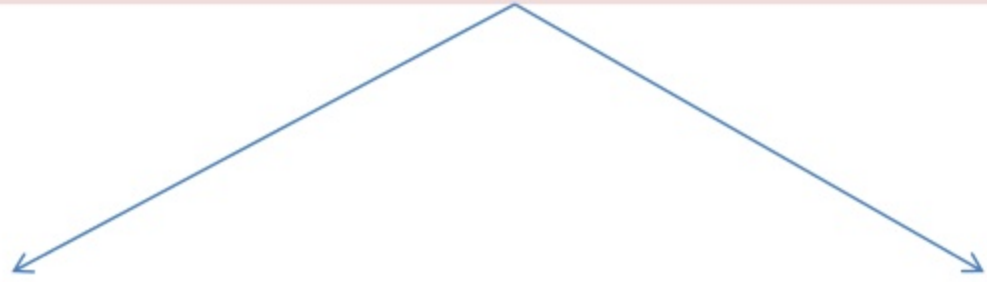
  (Ca++ driven tissues)

  - Includes SA node, AV node, bundle of His, Purkinje fibres
  - Capable of generating their own impulse
  - Normally SA node acts as Pacemaker of heart
- **NON-AUTOMATIC MYOCARDIAL CONTRACTILE FIBRES** (Na+ driven tissues)
  - Cannot generate own impulse
  - Includes atria and ventricles

Impulse generation and transmission



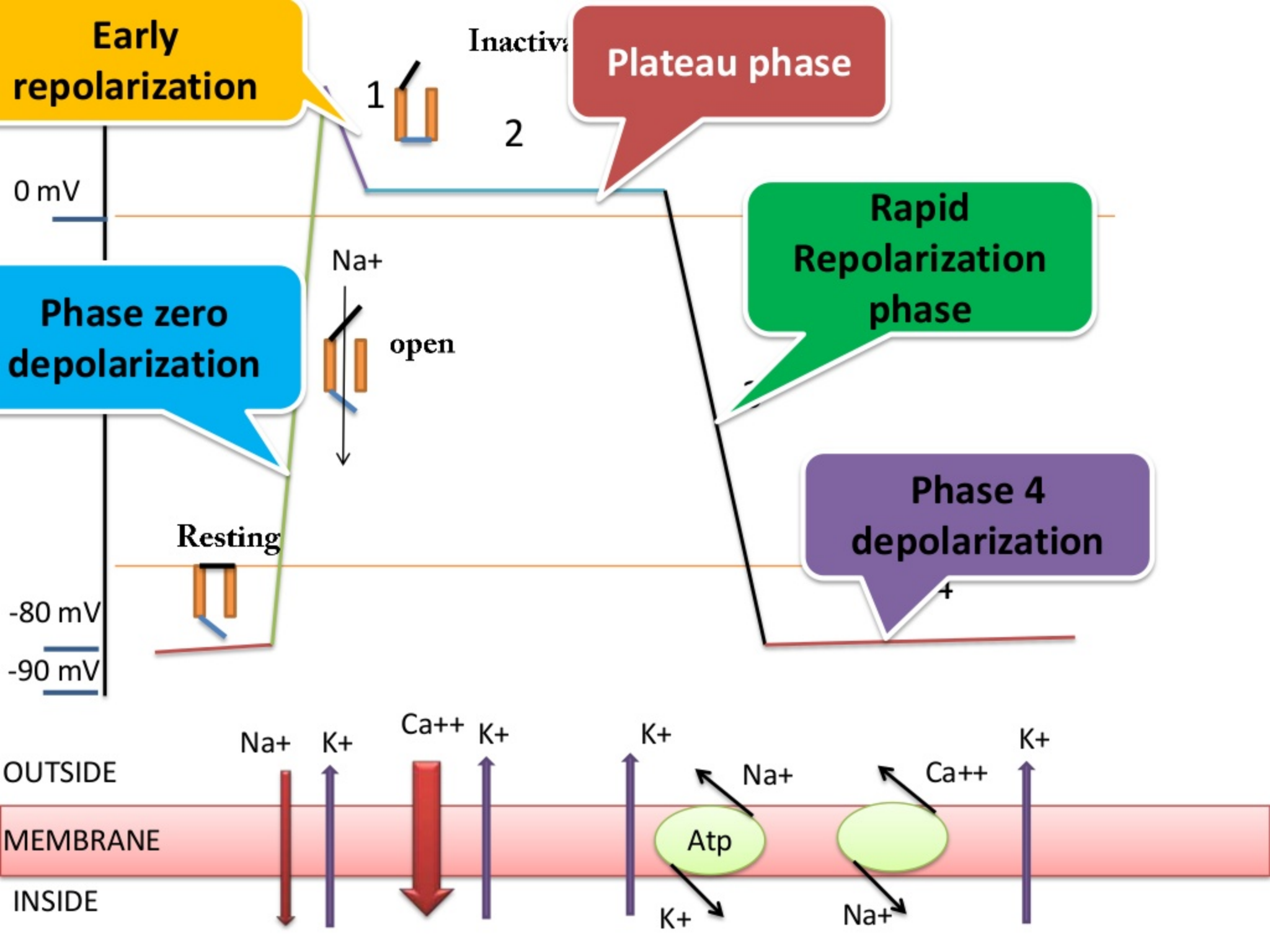
Myocardial action potential



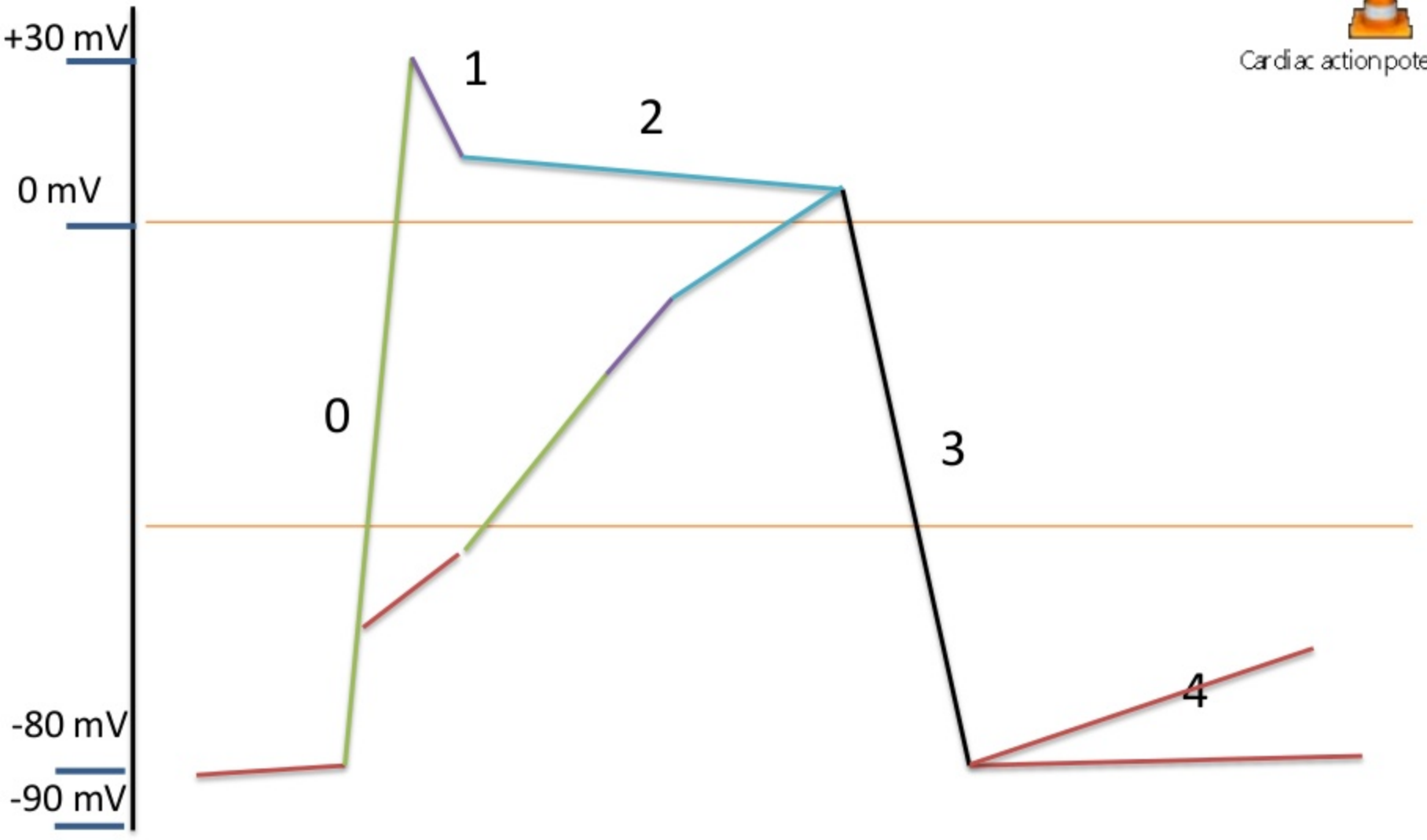
In automatic tissues

In non-automatic tissues

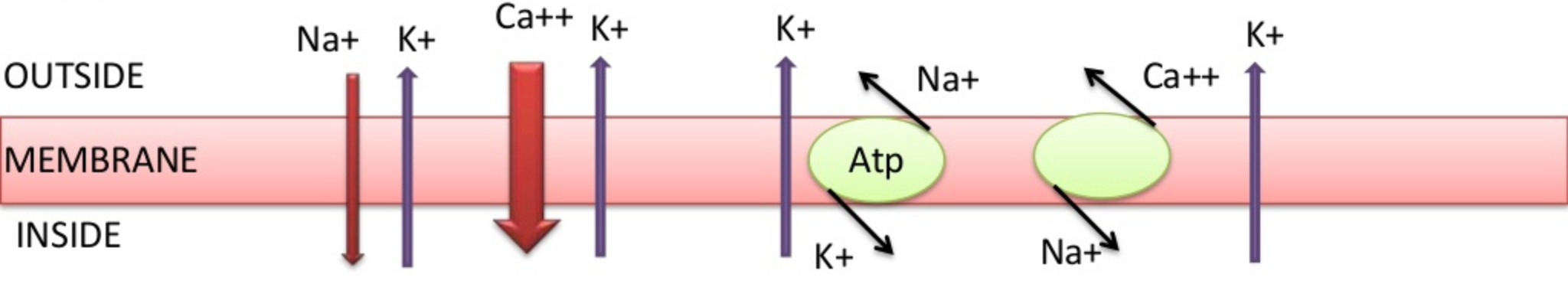
Action potential in Non automatic myocardial contractile tissue


Early repolarization
Plateau phase
Rapid Repolarization phase
Phase zero depolarization
Phase 4 depolarization
Inactiva
1
2
0 mV
Na+
open
Resting
-80 mV
-90 mV
Na+
K+
Ca++
K+
K+
Na+
Ca++
K+
OUTSIDE
MEMBRANE
INSIDE
Atp
K+
Na+

Action potential in nodal tissues



Cardiac action potential.mp4



Fast channel Vs slow channel AP

Fast channel AP

- Occurs in atria, ventricles, PF
- Predominant ion in phase-0 is Na+
- Conduction velocity more
- Selective channel blocker is tetradotoxin , LA

Slow channel AP

- Occurs in SA node, A-V node
- Predominant ion in phase-0 is Ca^{2+}
- Less
- Selective channel blockers are calcium channel blockers

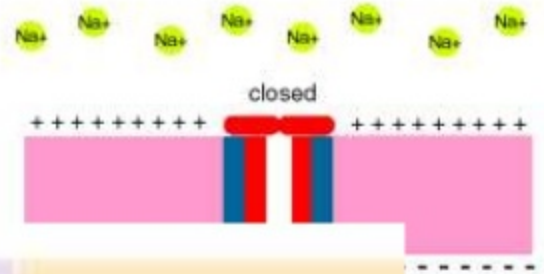
Common terms

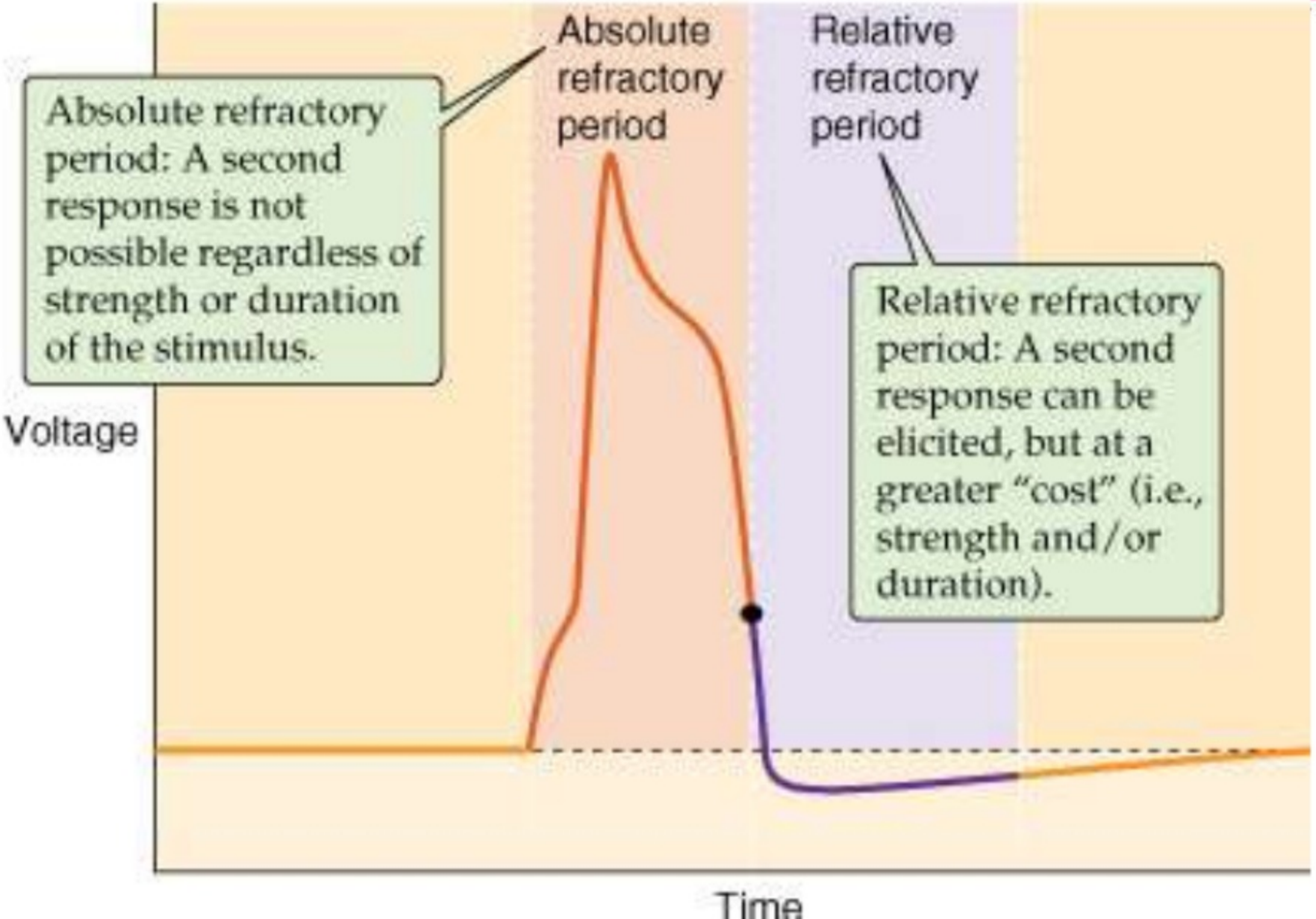
- Automaticity
  - Capacity of a cell to undergo spontaneous diastolic depolarization
- Excitability
  - Ability of a cell to respond to external stimulus by depolariztion
- Threshold potential
  - Level of intracellular negativity at which abrupt and complete depolarization occurs

Common terms

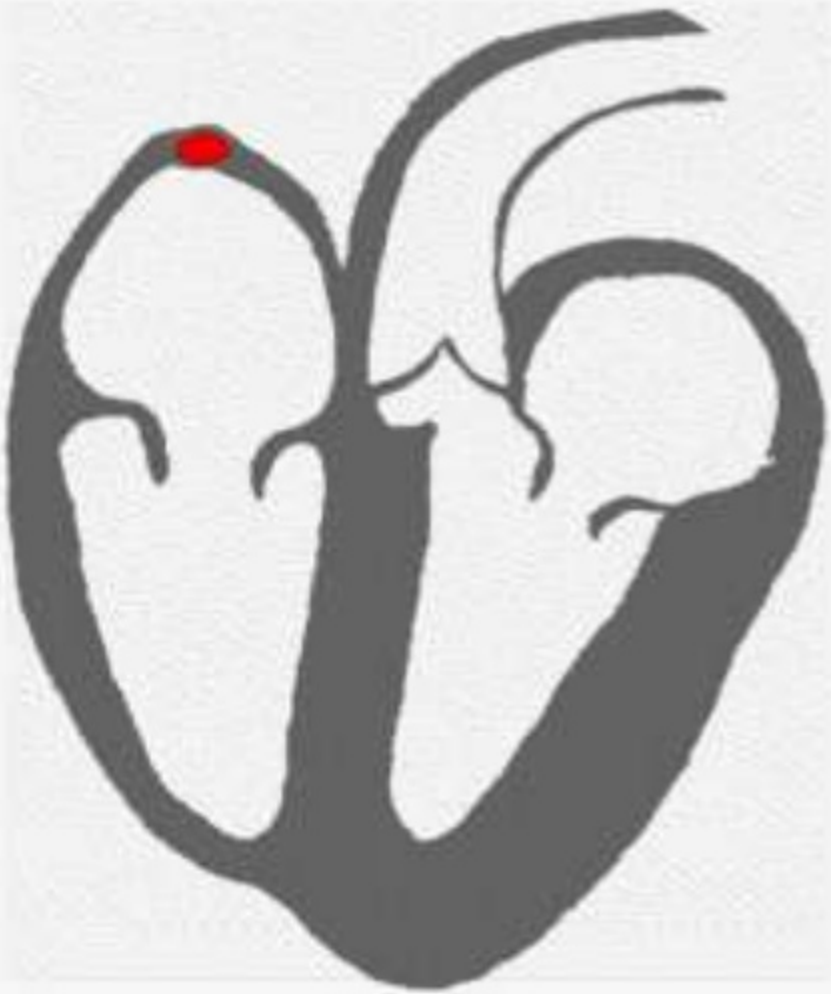
- Conduction velocity of impulse
  - Determined primarily by slope of action potential and amplitude of phase-0, any reduction in slope leads to depression of conduction
- Propagation of impulse
  - Depends on ERP & Conduction velocity

Refractory period





Depolarization & Repolarization waves seen in ECG



ECG is used as a rough guide to some cellular properties of cardiac tissue

- P wave: atrial depolarization
- PR-Interval reflects AV nodal conduction time
- QRS DURATION reflects conduction time in ventricles
- T-wave: ventricular repolarization
- QT interval is a measure of ventricular APD