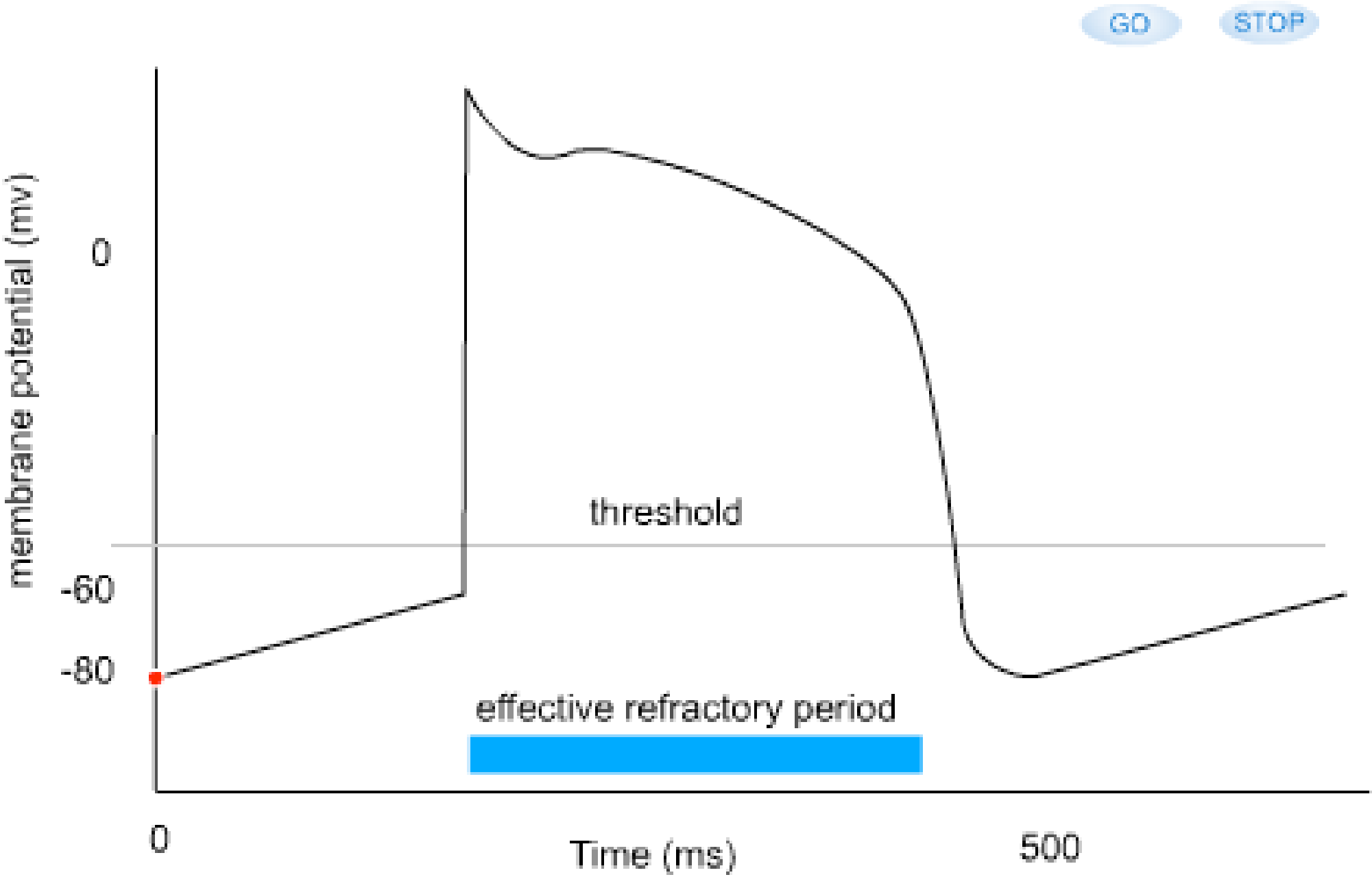
Antiarrhythmic Drugs

arrhythmias

- = dysrhythmias
- abnormal cardiac rhythm
- may be spectactular but not significant

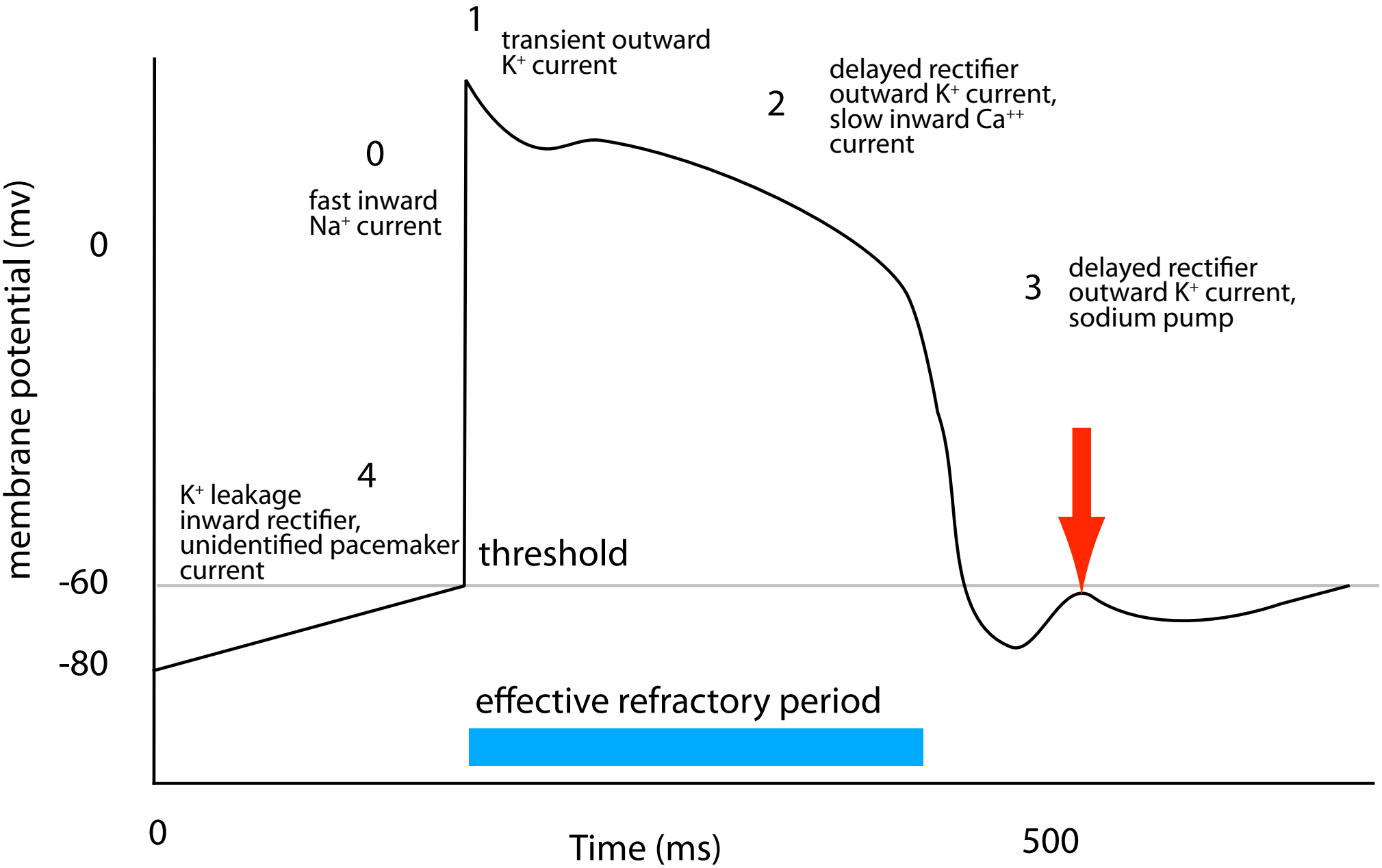

GO
STOP
membrane potential (mv)
0
-60
-80
threshold
effective refractory period
0
Time (ms)
500

arrhythmia mechanisms

- delayed afterdepolarisation
- re-entry
- abnormal pacemaker
- heart block

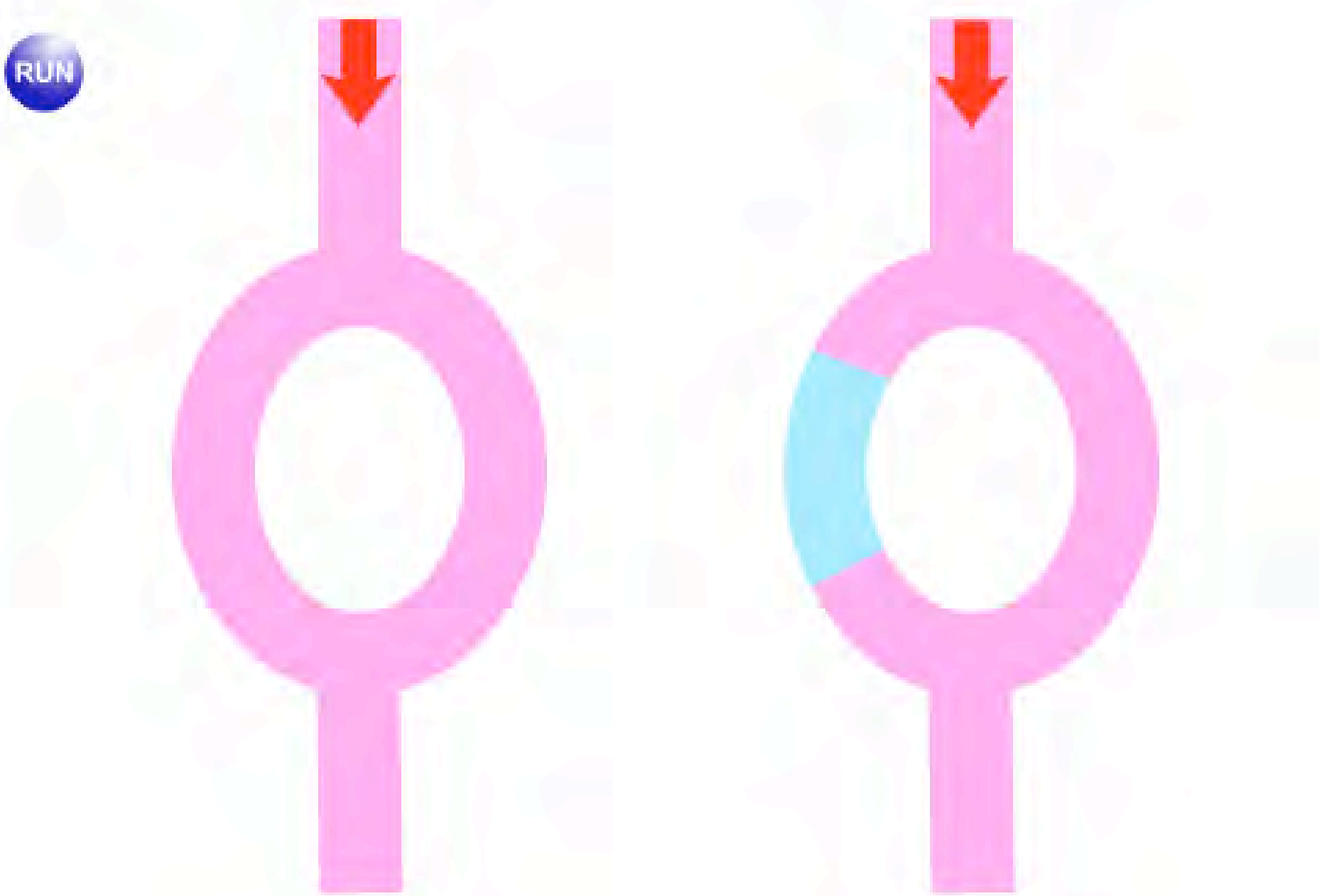
arrhythmias

- **delayed afterdepolarisation**
  - excess intracellular calcium
    - excess adrenergic stimulation
    - digitalis overdose
- **re-entry**
- **abnormal pacemaker**
- **heart block**


1
transient outward
K+ current
2
delayed rectifier
outward K+ current,
slow inward Ca++
current
0
fast inward
Na+ current
3
delayed rectifier
outward K+ current,
sodium pump
4
K+ leakage
inward rectifier,
unidentified pacemaker
current
threshold
membrane potential (mv)
0
-60
-80
effective refractory period
0
Time (ms)
500

arrhythmias

- delayed afterdepolarisation
- re-entry
- abnormal pacemaker
- heart block


RUN

arrhythmias

- delayed afterdepolarisation
- re-entry
- abnormal pacemaker
- heart block

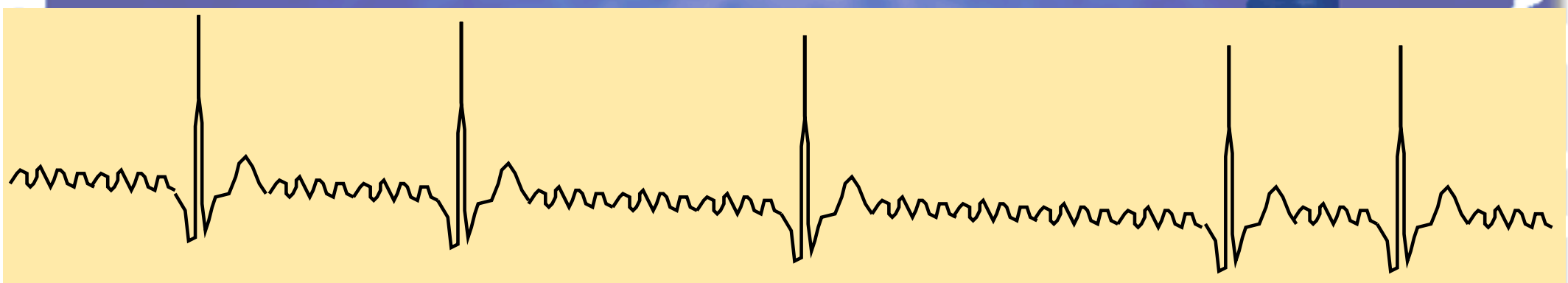
7 year old mare

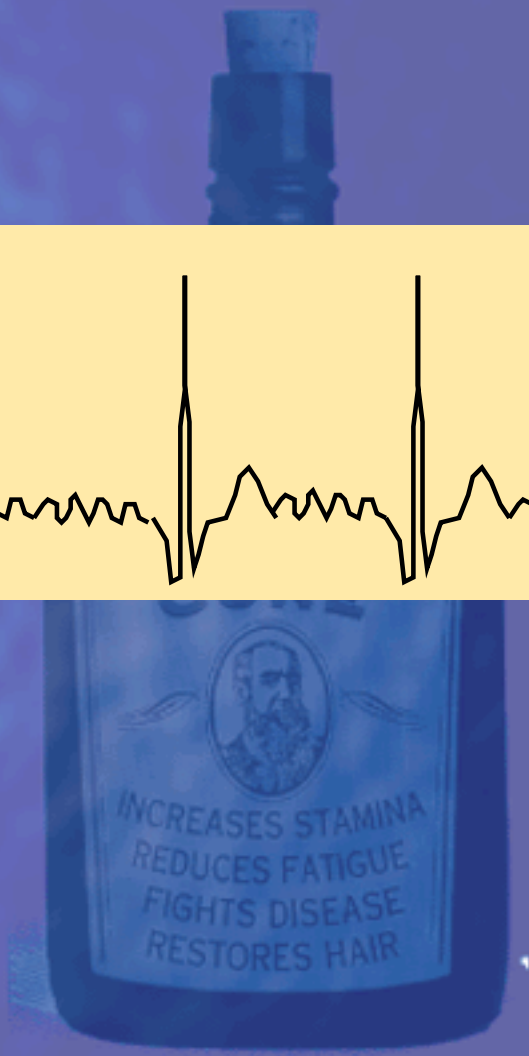
- gradual loss of performance
- unwilling to gallop
- coughs

examination

- irregular pulse
- pulse rate 24 bpm
- otherwise normal

ECG lead II




INCREASES STAMINA
REDUCES FATIGUE
FIGHTS DISEASE
RESTORES HAIR

problems

- atrial flutter / fibrillation

treatment?

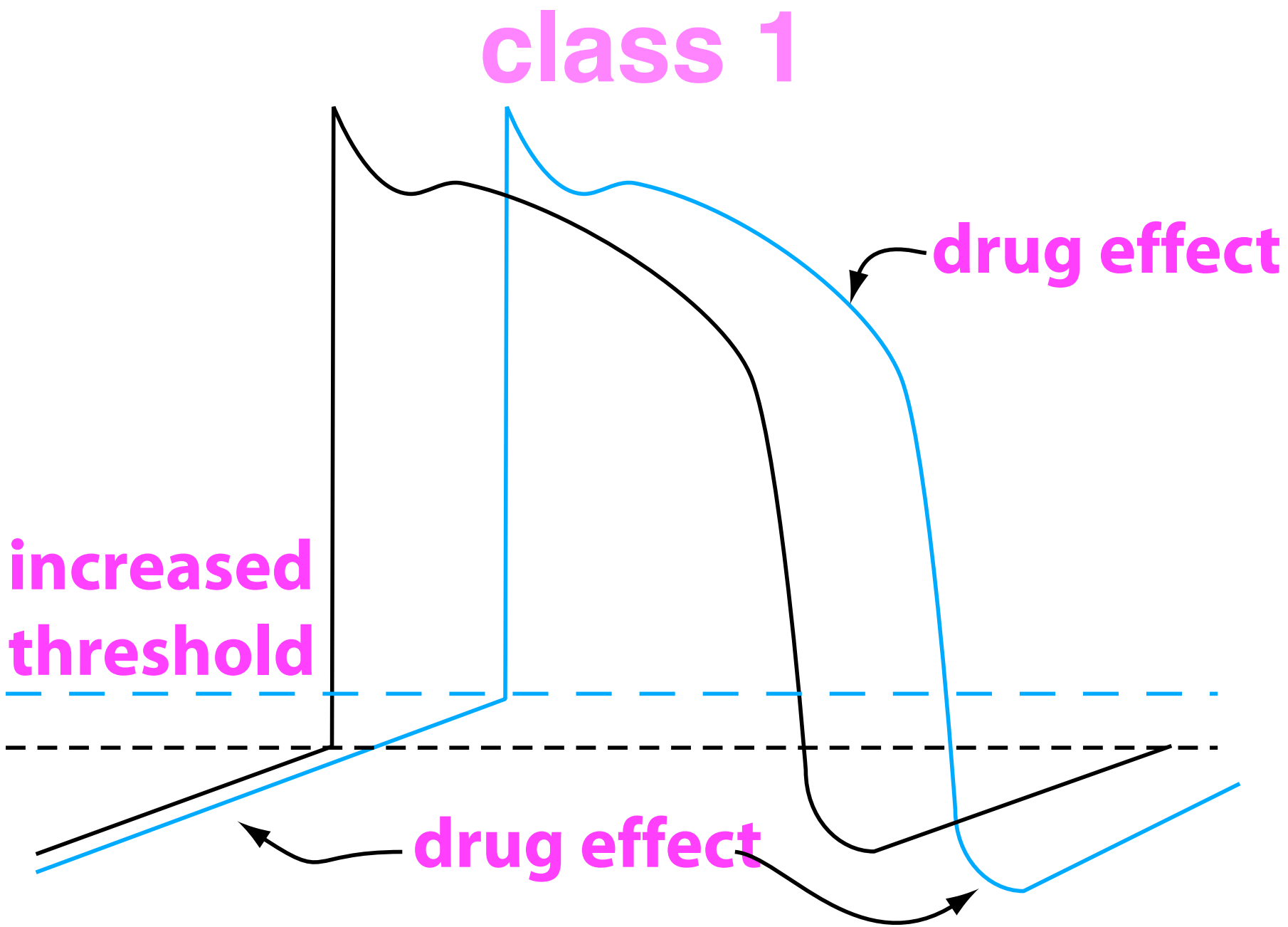
- identify and remove cause
- establish goals of treatment
- decide on best treatment

treatment?

- **antiarrhythmics**
  - quinidine

Vaughan Williams

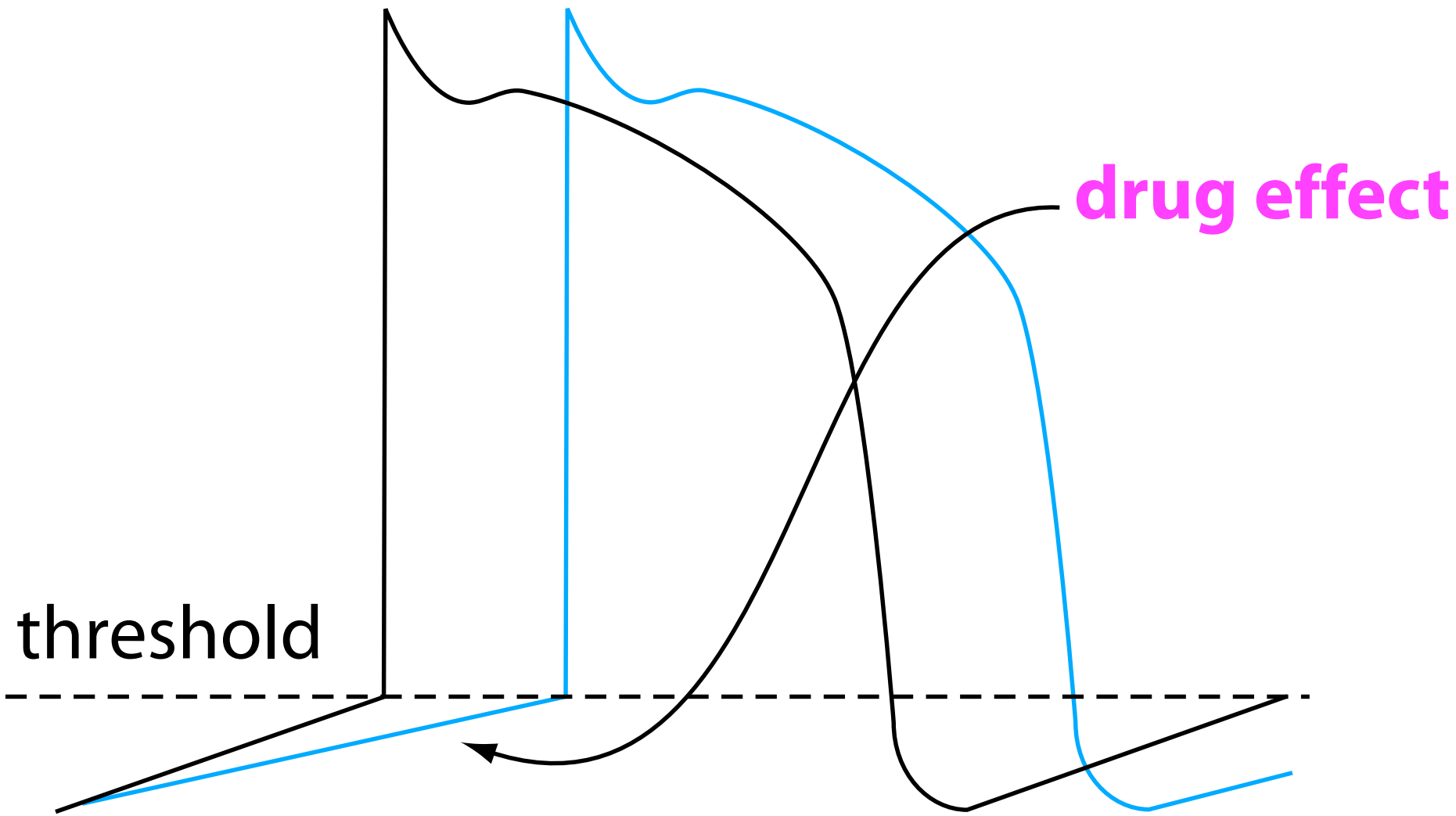
- 1 sodium channel blockers
- 2 β blockers
- 3 potassium channel blockers
- 4 calcium channel blockers
- others


class 1
drug effect
increased
threshold
drug effect

class 1

- 1a - quinidine
- 1b - lignocaine
- 1c - flecainide

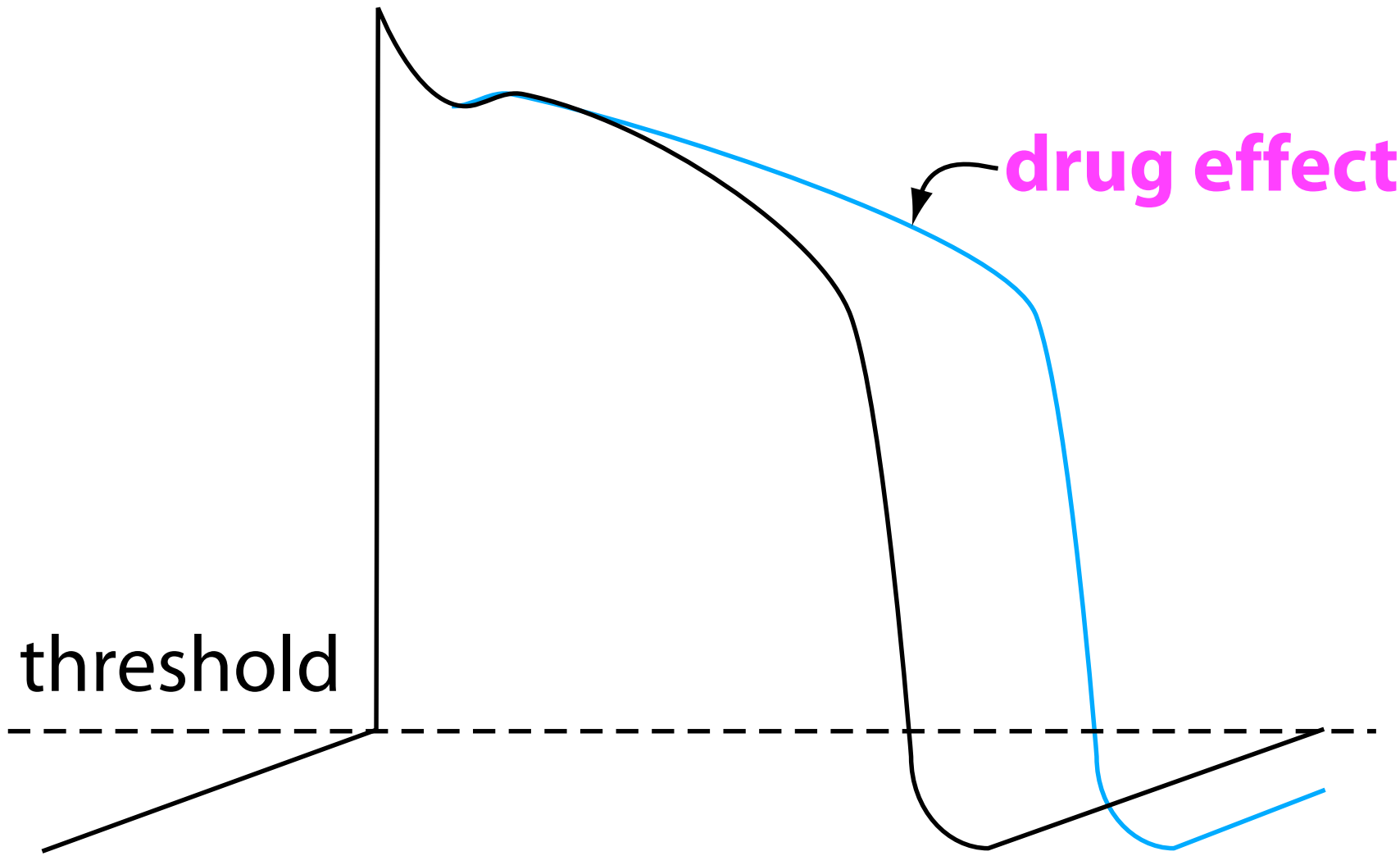
class 2



class 2

- propranolol
- labetolol
- atenolol
- esmolol
- etc,etc

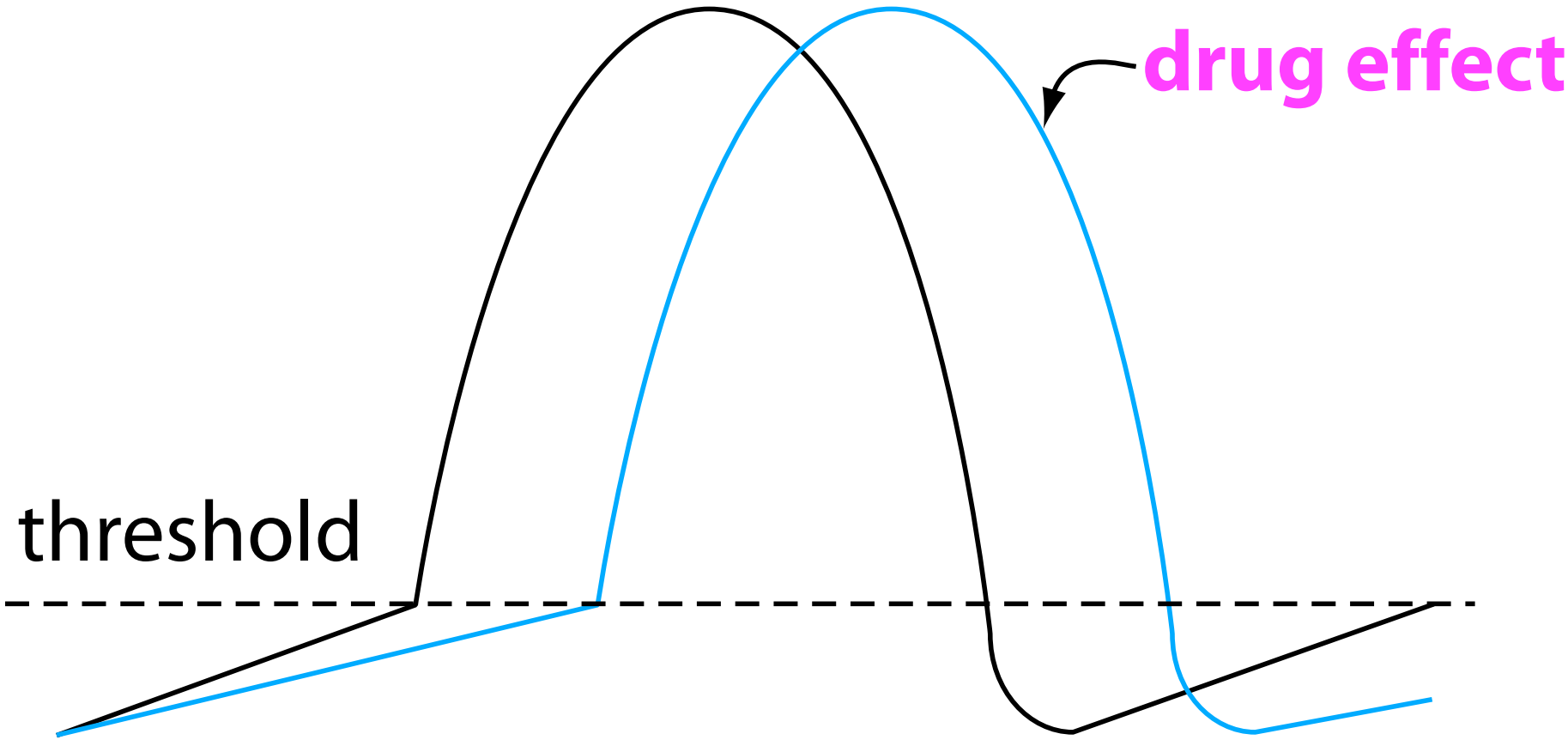
class 3



class 3

- amiodarone
- bretylium
- sotalol

class 4



class 4

- verapamil - iv
- diltiazem - po

others

- muscarinic antagonists
- digoxin
- isoprenaline
- adenosine
- calcium
- magnesium

antimuscarinics

- atropine
- glycopyrrolate
- bradyarrhythmias

digoxin

- AF with tachycardia

isoprenaline

- bradyarrhythmias
- last resort when pacemaker not available

adenosine

- supraventricular tachycardias

calcium

- hyperkalaemia only
- sort out K^+ as well!

magnesium

- blocks Ca^{++} channels
- use proper channel blocker instead

non drug methods

- pacing
- dc cardioversion
- CPR

dog under anaesthesia

history

- 2 yr old, no obvious problems
- submandibular lymph node biopsy

routine monitoring

- irregular pulse, 35 bpm
- saturation 97%
- ET CO_2 4.1kPa
- depth - light

ECG lead II


FUKUDA ME KOGYO CO., LTD.


CURE
INCREASES STAMINA
REDUCES FATIGUE
FIGHTS DISEASE
RESTORES HAIR

problems

- **sinus bradycardia**
  - vagal stimulation?

treatment

- do nothing
- atropine

antiarrhythmics

- class 1 sodium channel blockers - 1a atrial fibrillation - quinidine, 1b ventricular ectopic beats - lignocaine
- class 2 β blockers - tachyarrhythmias
- class 3 potassium channel blockers - resistant ventricular tachyarrhythmias
- class 4 calcium channel blockers - supraventricular tachyarrhythmias
- digoxin - atrial fibrillation in dogs
- adenosine - supraventricular tachyarrhythmias
- calcium - V tach from hyperkalaemia

- **all antiarrhythmics can make things worse!**