

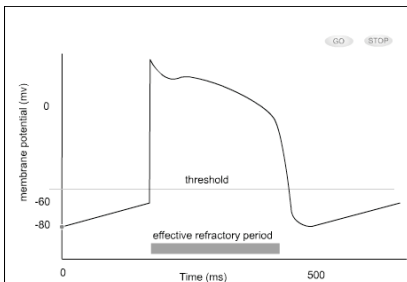
## Antiarrhythmic Drugs

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### arrhythmias

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

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### arrhythmia mechanisms

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

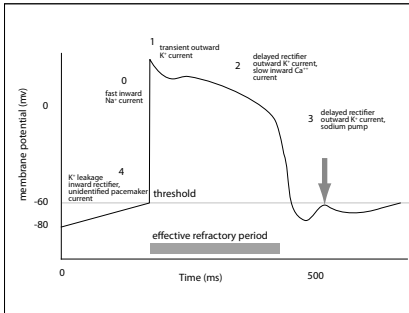
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## arrhythmias

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

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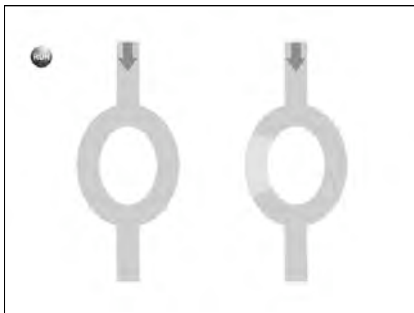
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## arrhythmias

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

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## arrhythmias

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

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## 7 year old mare



- gradual loss of performance
- unwilling to gallop
- coughs

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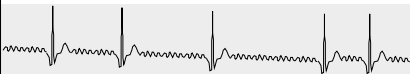
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## examination

- irregular pulse
- pulse rate 24 bpm
- otherwise normal

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## ECG lead II



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### **problems**

- atrial flutter / fibrillation

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### **treatment?**

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

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### **treatment?**

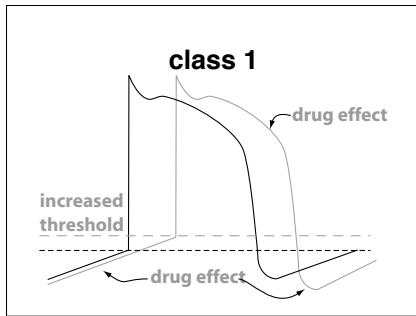
- antiarrhythmics
  - quinidine

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### **Vaughan Williams**

- 1 sodium channel blockers
- 2  $\beta$  blockers
- 3 potassium channel blockers
- 4 calcium channel blockers
- others

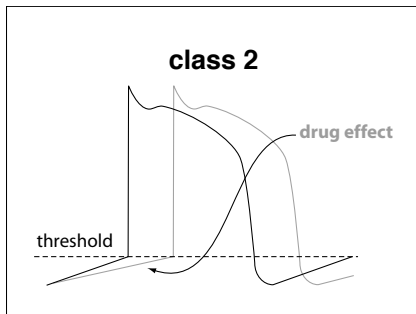
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- class 1**
- 1a - quinidine
  - 1b - lignocaine
  - 1c - flecainide

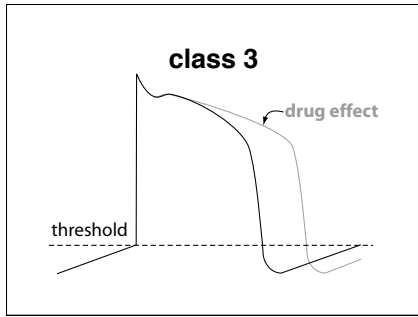
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- class 2**
- propranolol
  - labetolol
  - atenolol
  - esmolol
  - etc,etc

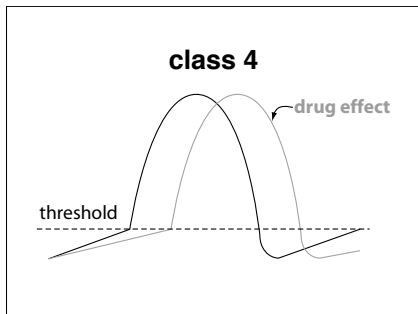
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- class 3**
- amiodarone
  - bretylium
  - sotalol

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- class 4**
- verapamil - iv
  - diltiazem - po

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### **others**

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

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### **antimuscarinics**

- atropine
- glycopyrrolate
- bradyarrhythmias

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### **digoxin**

- AF with tachycardia

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### **isoprenaline**

- bradyarrhythmias
- last resort when pacemaker not available

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### **adenosine**

- supraventricular tachycardias

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### **calcium**

- hyperkalaemia only
- sort out K<sup>+</sup> as well!

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### **magnesium**

- blocks Ca<sup>++</sup> channels
- use proper channel blocker instead

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### **non drug methods**

- pacing
- dc cardioversion
- CPR

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### dog under anaesthesia



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### history

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

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### routine monitoring

- irregular pulse, 35 bpm
- saturation 97%
- ET CO<sub>2</sub> 4.1kPa
- depth - light

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### ECG lead II



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### problems

- **sinus bradycardia**
  - vagal stimulation?

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### treatment

- **do nothing**
- **atropine**

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### antiarrhythmics

- class 1 sodium channel blockers - 1a atrial fibrillation
  - quinidine, 1b ventricular ectopic beats - lignocaine
- class 2  $\beta$  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!**

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