

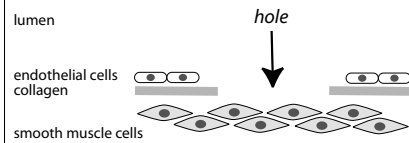
Blood

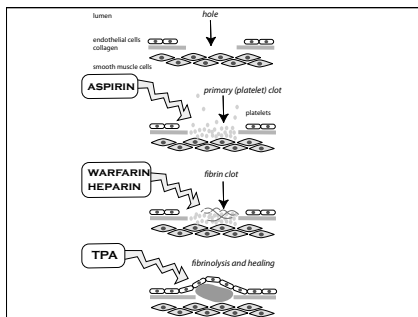
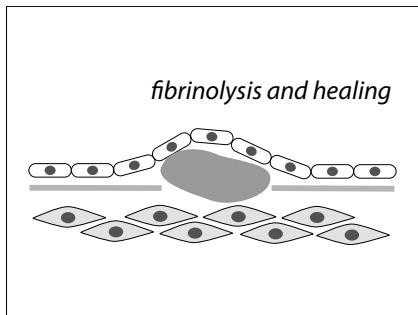
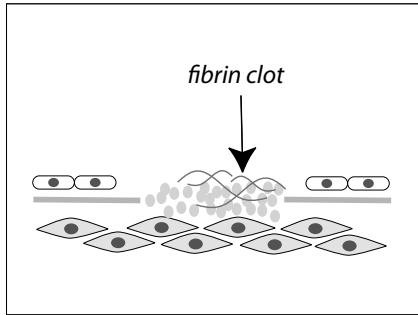
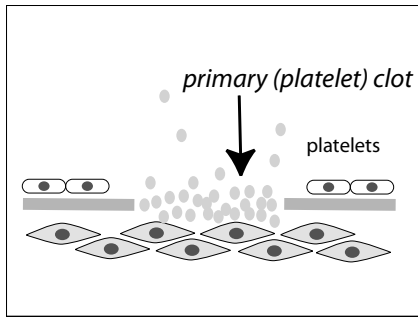
things that can go wrong

- **bleeding**
 - surgery
 - fluids
 - blood
 - plasma / substitutes
 - coagulants / anticoagulant antidotes
- **clotting in blood vessels**
 - anticoagulants
- **anaemia**

clotting

- **blood vessel damage**
- **platelet clot**
- **fibrin clot**
- **fibrinolysis**





aims of treatment

- encourage clotting at site of injury
- prevent clotting in circulation

haemostasis

- good surgical technique
- pressure

haemostasis

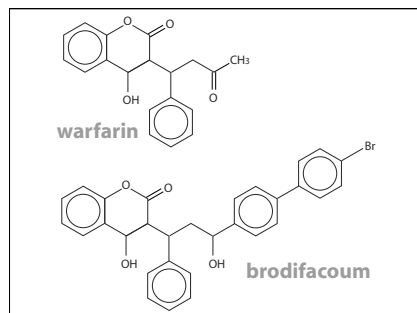
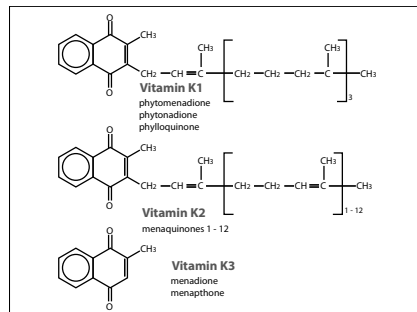
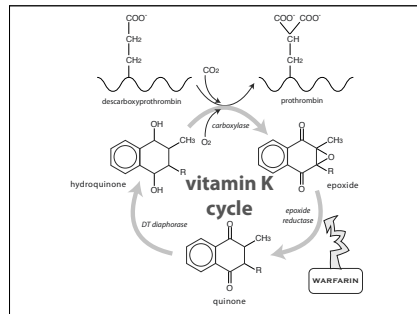
- **blood vessels**
 - topical vasoconstrictors
- **platelets**
 - artificial substrates
- **clotting factors**
 - fresh frozen plasma
 - fresh whole blood

parenteral haemostatics

- **generally useless**
 - tranexamic acid for plasminogen overdose

preventing clots

- **anti platelet drugs**
 - aspirin
- **parenteral anticoagulants**
 - heparin – antidote protamine
- **oral anticoagulants**
 - warfarin – antidote vit K1 – phytonadione



treating clots

- alteplase (rTPA)
- streptokinase
- urokinase
- must be given within minutes
- overdose fatal
- too expensive to use

***in vitro* anticoagulants**

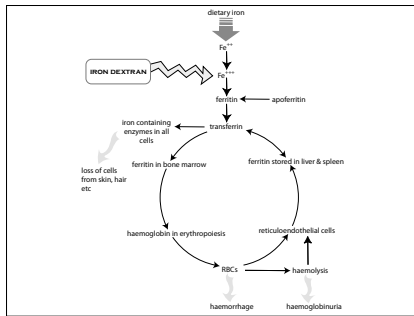
- **used for blood collection**
 - acid citrate dextrose
 - citrate phosphate dextrose
 - citrate
 - (EDTA)
- **chelate calcium**
 - also after administration

anaemia

- **iron**
- **vitamin B12 / cobalt**
- **folic acid**

anaemia

- **iron**
 - piglets
 - (chronic bleeding)
 - overdose – give desferrioxamine
- **vitamin B12 / cobalt**
- **folic acid**



anaemia

- **iron**
- **vitamin B12 / cobalt**
 - gut disease / antibiotics in small animals
 - Co deficiency in ruminants
- **folic acid**
 - gut disease

anaemia

- **anabolic steroids**
 - nandrolone etc
 - do not use in food animals
 - abused by people
- **erythropoietin**
 - too expensive to use
 - counterproductive in horses
 - abused by people
- **lithium?**

1 yr old labrador

- **being speyed**
- **ovarian artery ruptures**
- **massive bleeding**

problems

- hypovolaemia

treatment

- surgical ligation
- iv fluids

30 mins later...

- artery finally ligated
- 3L fluids given
- PCV 12%



problems

- anaemia
- diluted clotting factors
- prolonged clotting times

treatment?

- wait and hope
- whole blood
 - ACD / PCD?
- fresh frozen plasma

monitoring

- CVP
- PCV
- clotting times

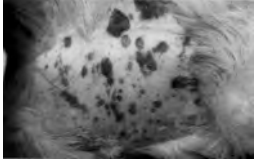
5 yr old collie

- farm dog
- sudden collapse

examination

- pale mucous membranes
- pulse 220 bpm
- harsh lung sounds
- petechial haemorrhages

dog's neck



problems

- clotting disorder

diagnosis

- access to rat poison?
 - brodifacoum
- autoimmune haemolytic anaemia?

treatment?

- whole blood?
- fresh frozen plasma?
- vitamin K?

blood

- in vivo anticoagulants – aspirin, heparin, warfarin
- catheters – heparin
- blood collection – ACD / CPD
- coumarin poisoning – fresh whole blood & vitamin K1
- anaemia – blood, iron, vit B12, anabolic steroids