

## Blood

### 1 yr old labrador

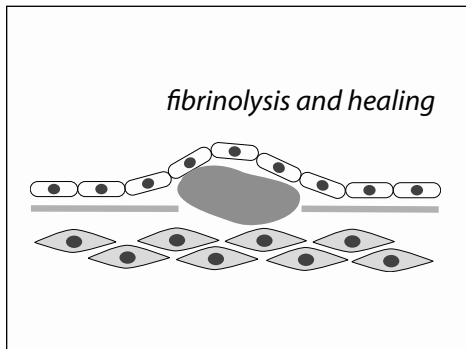
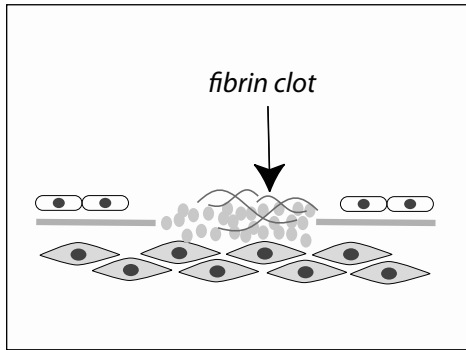
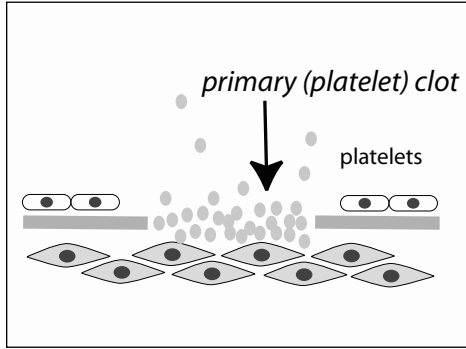
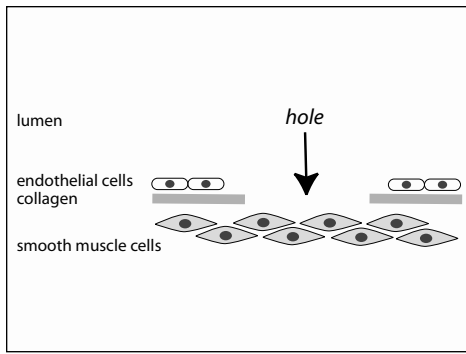
- being spayed
- ovarian artery ruptures
- massive bleeding

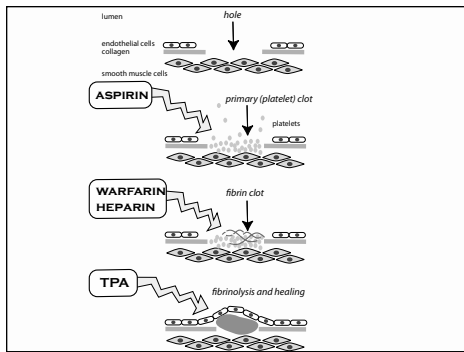
### things that can go wrong

- 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

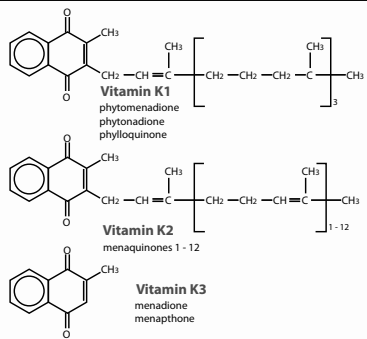
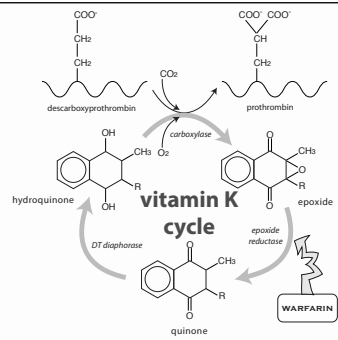
- blood vessels
  - topical vasoconstrictors
- platelets
  - artificial substrates
- clotting factors
  - fresh frozen plasma
  - fresh whole blood

## parenteral haemostatics

- generally useless
  - tranexamic acid for plasminogen overdose

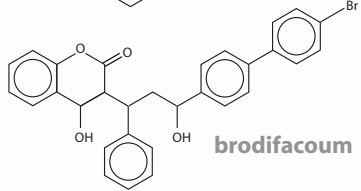
## preventing clots

- anti platelet drugs
  - aspirin
- parenteral anticoagulants
  - heparin - antidote protamine
- oral anticoagulants
  - warfarin
    - antidote vit K1 - phytomenadione





warfarin



brodifacoum

### **treating clots**

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

### ***in vitro* anticoagulants**

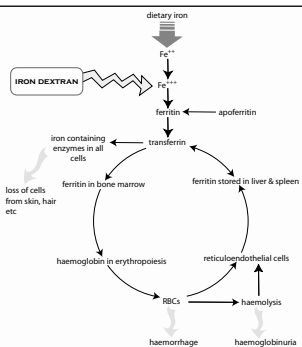
- used for blood collection
  - acid citrate dextrose
  - citrate phosphate dextrose
  - citrate
  - (EDTA)
- chelate calcium
  - also after administration

### **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

## **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