Q4 Describe the pharmacology of tranexamic acid (March 2013)

Tranexamic acid is a competitive inhibitor of plasminogen activation used to control bleeding due to excessive fibrinolysis which may be local (prostatectomy or surgical procedures in haemophiliacs) or systemic (DIC or IV thrombolytic therapy). It is also used to control menorrhagia, as a mouthwash for dental procedures, and as prophylaxis against bleeding in orthopaedic and cardiac surgery.

PHARMACEUTICAL - available in oral tablets (500mg strength) or IV formulation (100mg/ml), brand name Cyklokapron

PHARMACODYNAMICS
MECHANISM OF ACTION → a competitive inhibitor of plasminogen activation. Acts by inhibiting the binding of plasminogen and plasmin to fibrin, and thus inhibiting the fibrinolytic effects of plasmin. It is ten times more potent in vitro than aminocaproeic acid.

SIDE EFFECTS - dose adjustment necessary in renal impairment. May cause GI upset (nausea, vomiting, diarrhea) and allergic dermatitis

PHARMACOKINETICS
ADMINISTRATION
Route - PO or IV
Dose - 1g QID for menorrhagia, 15-25mg/kg IV dose for surgery
Bioavailability - 50% for PO dosing

DISTRIBUTION
Protein binding – minimal (3%, accounted for by the fact that tranexamic acid is mostly bound to plasminogen)
VD - 9-12L/kg
Cross the blood brain barrier
Passes through the placenta, to sperm and to breast milk

METABOLISM - minimal metabolism (possible acetylation or deamination)

ELIMINATION - excreted 95% unchanged in urine