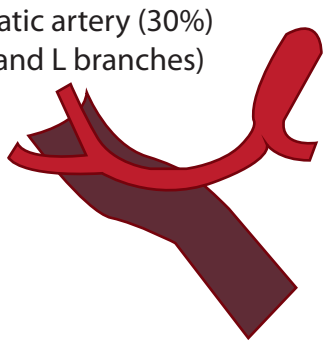
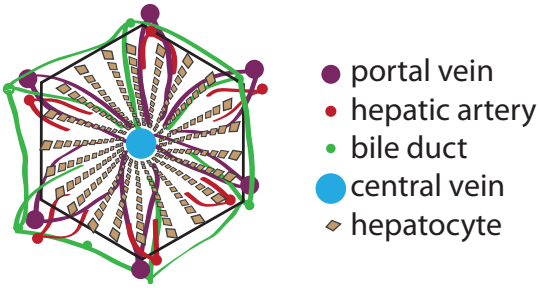
FEB 2008
QUESTION 16

Describe the blood supply to the liver

Anatomy
- extensive anastamoses
- Hepatic
  - high pressure/flow
  - sats 98%
  - pulsitile
- Portal
  - low pressure/resistance
  - sats 85% (fasting)
  - non pulsitile, valveless
  - high protien content



- functional anatomy
  - basic unit is the liver lobule
  - consists of central vein in the middle of hexagon
  - triad of hepatic artery, bile duct and portal vein
  - bile canaliculi radiate out from central vein



Physiology
- total blood flow is 1500ml (25% of CO)
- has a capacitance function, storing 450mL of blood which is utilised during hypovolaemia
- consists of 30% hepatic artery supply and 70% portal vein supply
- both contribute to oxygenation (hepatic artery 50%, portal vein 50%)
- the liver demonstrates variable oxygen extraction to adapt to changes in portal vein oxygenation

Regulation
- Intrinsic
  - Hepatic artery demonstrates some autoregulation
  - Portal vein does not demonstrate autoreulation
  - there is a semireciprocal relationship -
    - hepatic artery resistance varies due to portal vein flow
    - this maintains flow with portal vein fluctuations but not with hepatic artery decreases
- Extrinsic
  - Neural control via adrenergic nervous system control
    - hepatic artery has beta and alpha receptors
    - portal vein has only alpha receptors
  - Hormonal control
    - glucagon, VIP, secretin dilate vasculature and increase flow (mainly hepatic art.)
    - angiotensin II, vasopressin constrict both portal v. and hepatic art.
- Other
  - Feeding increases GIT blood flow and indirectly increases hepatic flow
  - Exercise reduces GIT blood flow and indirectly decreased hepatic flow
  - Positive pressure ventilation decreases blood flow secondary to decreased CO

Measurement
- by indirect clearance methods such as indocyanine green