2010b(16): Outline the clinical laboratory assessment of liver function

General: The liver provides an interface between the enteric and systemic circulations. Liver blood flow is approx. 1500mls/min. Specific measures of liver function are not easily obtained.

Standard Liver Function Tests (LFTs) include:
ALP (alkaline phosphatase)
- normal range 30-120 units/L
- enzyme in cells lining biliary duct
- rise in ALP may indicate biliary obstruction
- also found in bone and placental tissue, will be elevated in children and Paget’s Dx (due to increased bone turnover)

GGT (gamma glutamyl transferase)
- range differs for males (11-50 units/L) and females (7-30 unit/L)
- enzyme also found in cells lining biliary duct
- along with ALP will indicate a possible cholestatic problem
- also elevated with recent EtOH

ALT/AST (alanine and aspartate transaminases)
- normal range ALT (<54 units/L) and ALT (<35 units/L)
- both enzymes associated with parenchymal cells
- elevated in acute liver damage, not as useful in determining liver function

Albumin
- protein synthesized exclusively in the liver
- normal range 29-58 g/L
- levels decrease with liver dysfunction
- also decreased in malnutrition and with renal losses (i.e. nephrotic syndrome)
- half-life 20 days

Bilirubin
- usually measured as total, can also be measure as direct (conjugated)
- breakdown product of heme
- liver conjugates, as well as excretes in bile
- will be elevated in both obstructive and impaired synthetic function, ratio of direct/total will assist determining which

Other tests
INR (International Normalised Ratio), being a standardised Prothrombin Time
- in-vitro test of extrinsic pathway
- the liver’s syntheses of Vit K dependant proteases impaired in liver disease
- initial increased INR in liver disease due, in part, to short half-life of Factor VII (3-6 hours)
- not a particularly sensitive marker

LDH (lactate dehydrogenase)
- enzyme found in liver, but also many other tissue, may be elevated in liver disease

BSL (blood sugar level)
- the liver’s glucostat function may be impaired
- hypoglycaemia is usually a late sign of fulminant liver failure
- MEGX (monoethylglycinexylidide)
  - metabolite of lignocaine via CYP34A
  - levels after a standardised dose of lignocaine can be used directly
to measure liver function, not practical for day to day use