Liver –Functions, Disorders and Diagnostic Tests

By:

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BIOCHEMICAL TESTS FOR LIVER DISEASE

- Hepatocyte damage:
- Strictly speaking, changes in plasma enzyme activity

generally indicate liver cell membrane damage rather than hepatic function capacity.

Because these enzymes are also present in other tissues, changes in plasma activities may reflect damage to those tissues rather than to the liver

- Aminotransferases (alanine and aspartate)(AST; ALT)

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Synthetic functions

- Hepatocytes synthesize:
- *plasma proteins*, excluding immunoglobulins and complement,
- most *coagulation factors*, including fibrinogen and factors II (prothrombin), V, VII, IX, X, XI, XII and XIII – of these, prothrombin (II) and factors VII, IX and X cannot be synthesized without vitamin K,

- *primary bile acids*,
- the *lipoproteins*, such as VLDL and high-density lipoprotein (HDL)

Hepatic synthetic function

- The measurement of plasma albumin and prothrombin time may be used to assess function.
- The hepatic synthetic and secretory capacities are large;
- Only severe and usually prolonged liver disease, for example cirrhosis, demonstrably impairs albumin and prothrombin synthesis.

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- Albumin: A plasma albumin concentration
- below the lower reference limit may imply hepatic disease chronicity.
- However, there are many other causes of Hypoalbuminaemia that are not due to hepatic disease

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- Prothrombin time:
- The prothrombin time may be prolonged by cholestasis:
- fat-soluble vitamin K cannot be absorbed normally if fat absorption is impaired due to intestinal bile salt deficiency.

Excretion and detoxification

- The excretion of bilirubin, Other substances that are inactivated and excreted by the liver include the following:
- *Cholesterol* – excreted in the bile either unchanged or after conversion to bile acids.
- *Amino acids* – which are deaminated in the liver.
- Amino groups, and the ammonia produced by intestinal bacterial action and absorbed into the portal vein, are converted to urea.
- *Steroid hormones* – which are metabolized and inactivated by conjugation with glucuronate and sulphate and excreted in the urine in these water soluble forms.

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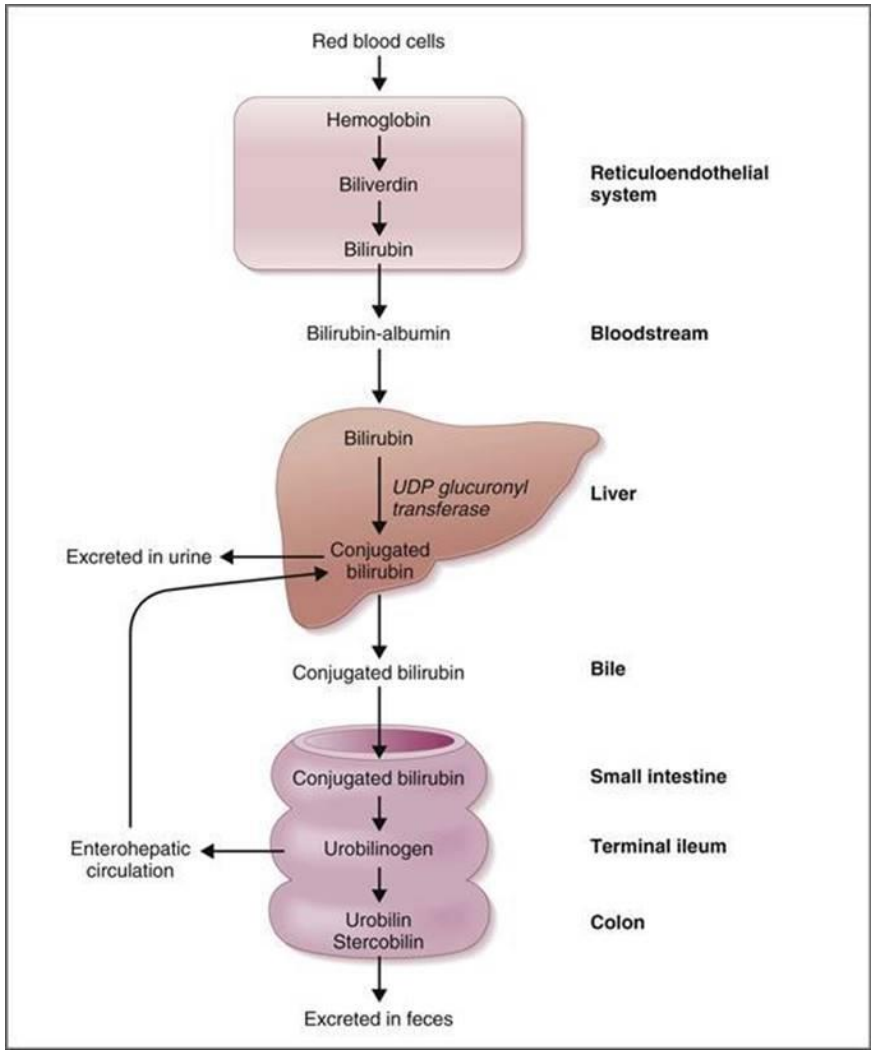
Bilirubin metabolism



UDP, uridine diphosphate

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Urobilinogen

- Urobilinogen, unlike bilirubin, is often detectable in the urine of normal people by testing with commercial strip tests.

-When haemolysis is very severe

- When liver damage impairs re-excretion of normal amounts of urobilinogen into the bile.

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Hepatic excretory function

- A high plasma conjugated bilirubin concentration indicates impaired hepatic excretory function but,

as this is also raised in hepatocellular disease it is not specific for cholestasis.

This may be accompanied by a high plasma alkaline phosphatase (ALP) activity.

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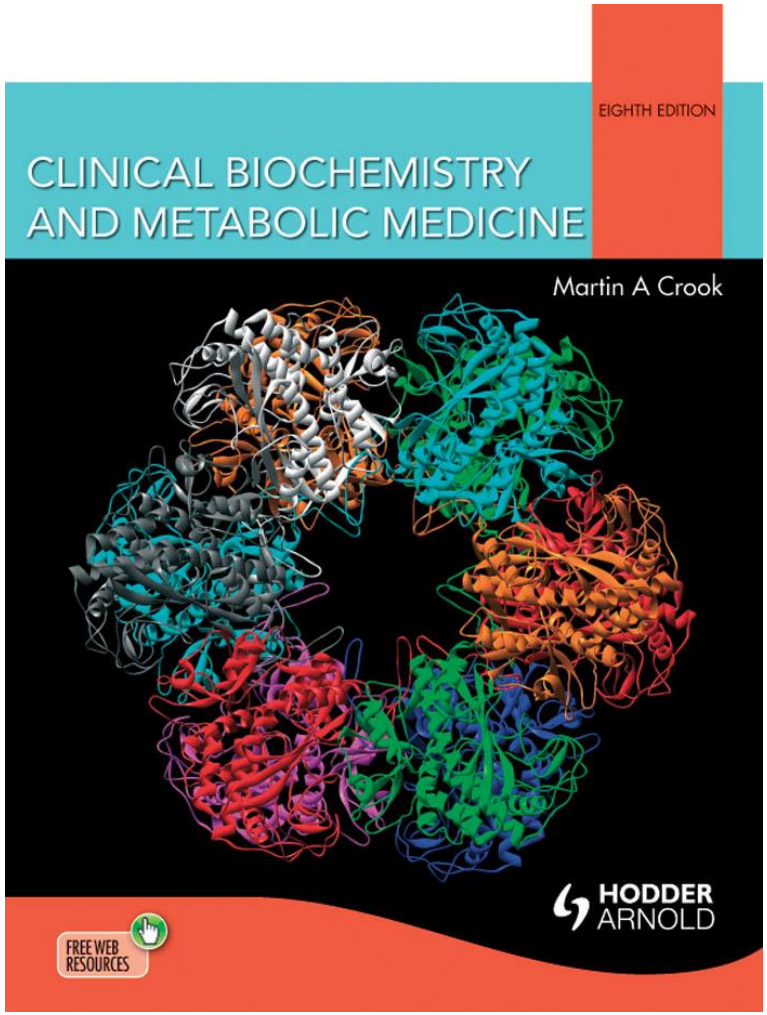
Reference: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