Class 6:

Erythrocyte hemolysis

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Objectives for this lecture

- Discuss the RBC life span.
- understand the how hem is degraded.

Erythrocyte hemolysis *(Normal red cell destruction)*

- Occurs after a mean lifespan of 120 days.
  - *Note that RBC enzymes function:*
    - ✓ *Maintain cell membrane*
    - ✓ *Maintain transport of ions*
    - ✓ *keep Hb iron in the ferrous form*
    - ✓ *prevent oxidation of the proteins*
- Cell enzymes are degraded (no DNA for reproduction) and the cells become less active and membrane is fragile.

Erythrocyte hemolysis *(Normal red cell destruction)*

- cells are removed extravascularly by the *macrophages* of the reticuloendothelial (RE) system.
- *removed* in marrow also in the liver and spleen.

Blood-Cleansing Function of the Spleen: *Removal of Old Cells*

- Blood cells passing through the splenic pulp undergo *thorough squeezing*.
- Therefore, fragile RBCs will not withstand the trauma, and will be destroyed in the body.
- After the cells rupture, the released Hb is digested by the *phagocytic* reticuloendothelial cells of the spleen *(similar Kupffer cells in liver).*
- Digested products are reused by the body as nutrients, or for making new blood cells.

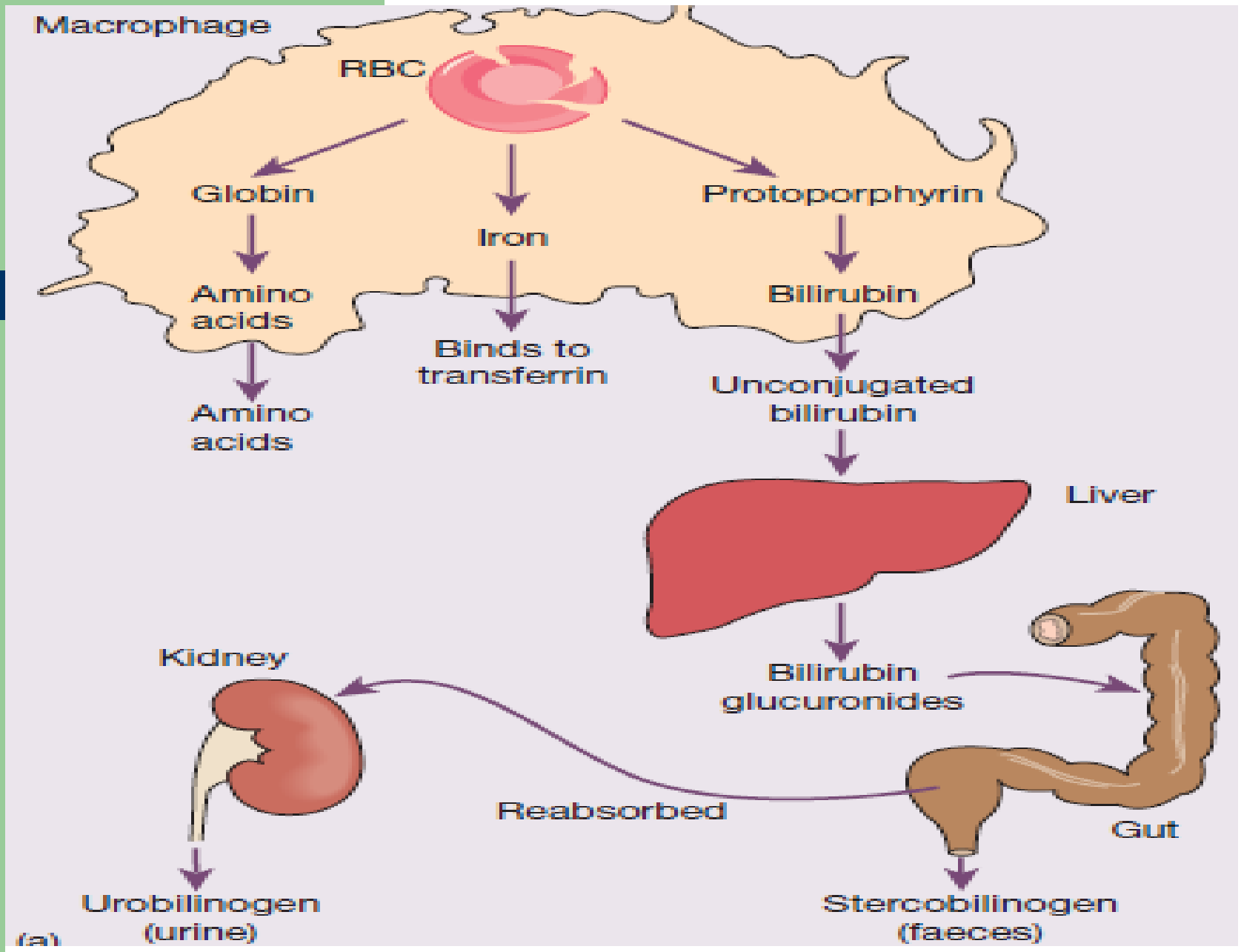

Figure 6.1 (a) Normal red blood cell (RBC) breakdown.

(Normal red cell destruction)

- ***haem*** from haemoglobin liberates *iron* for recirculation via plasma transferrin to marrow erythroblasts, or stored in liver.
- ***protoporphyrin***, is broken down to bilirubin, and circulates to the liver.
- In liver, *bilirubin* is conjugated to glucuronides, excreted into the gut via bile and converted to urobilinogen (excreted in faeces, urine).

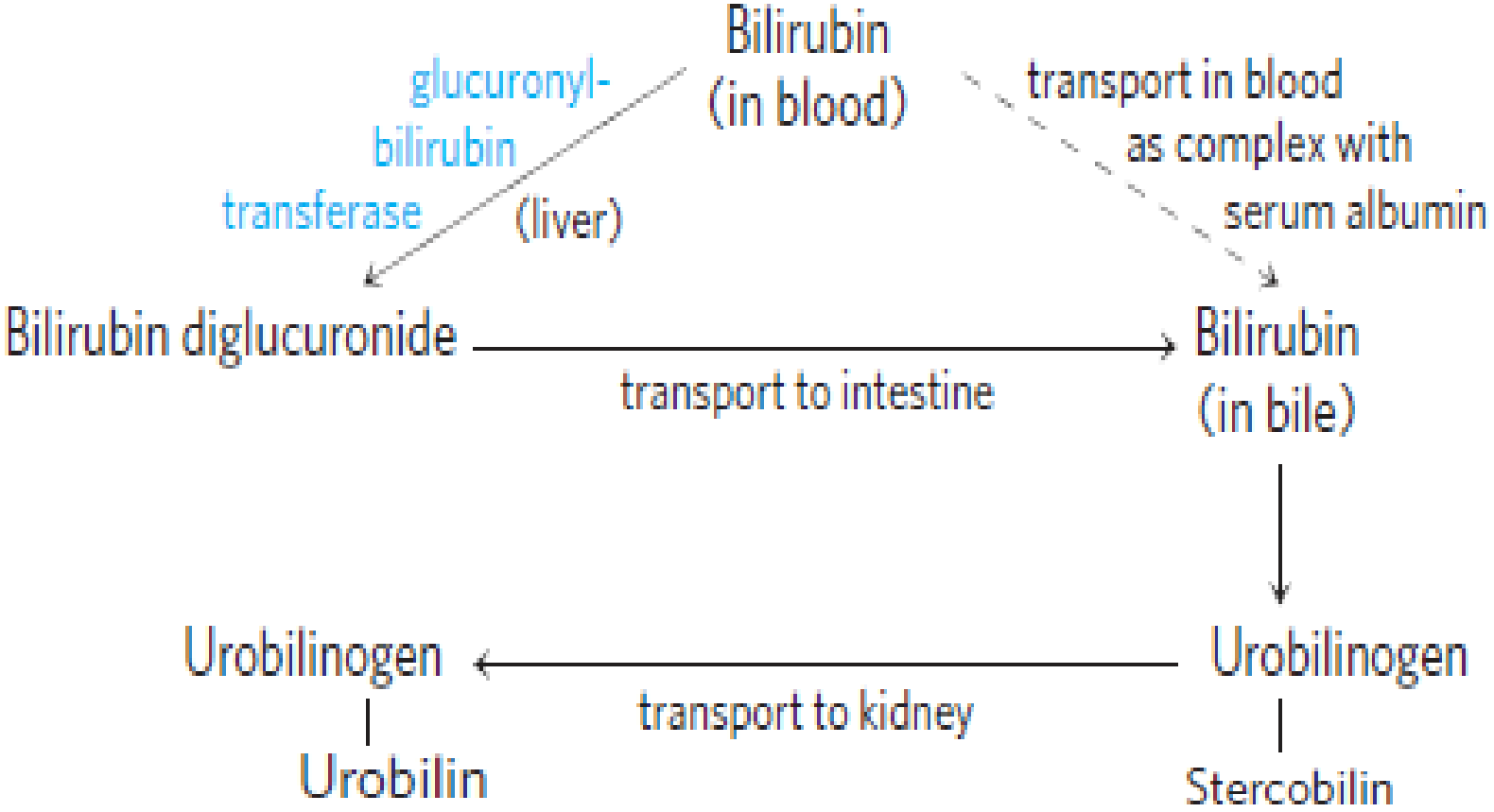

FIGURE 22–27 Bilirubin and its breakdown prod·

(Normal red cell destruction)

- ***Globin chains*** are broken down to amino acids and reutilized for protein synthesis in the body.

References

- Victor A Hoffbrand, Paul Moss, J Pettit; ***Essential Haematology***. Essentials Series Blackwell Science, New York; 2008.
- Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. ***Harper's Illustrated Biochemistry.*** McGraw-Hill Ed, 31 ed, 2018.