

血 Hematology 血



Histology

Biochemistry

Pathology

Pharmacology

Physiology

Microbiology

Handout

Slide 9

Sheet

Dr. name :
Dr Nayef Karadsheh

Lecture number :

Done BY :

Degradation of HEME

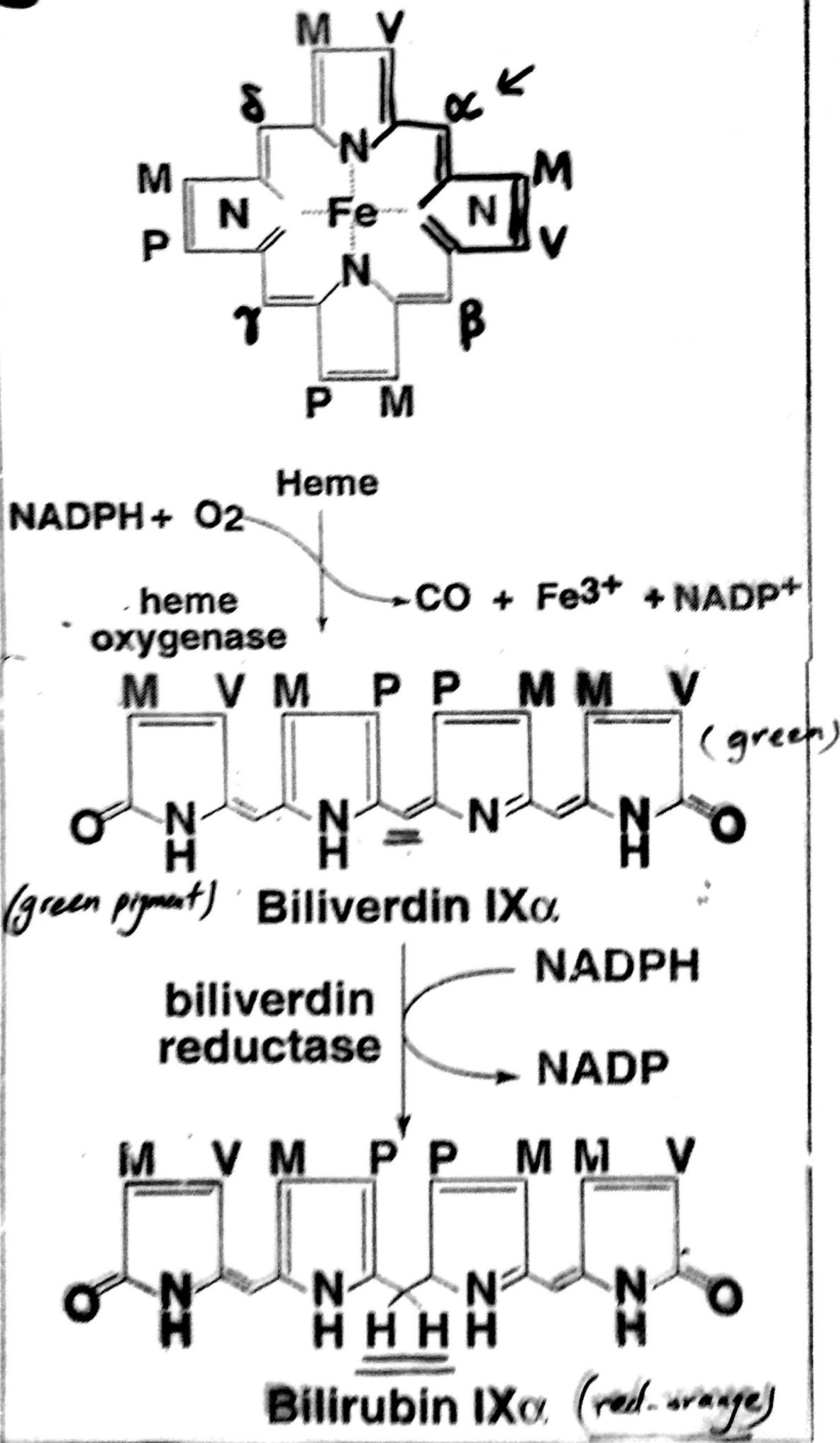
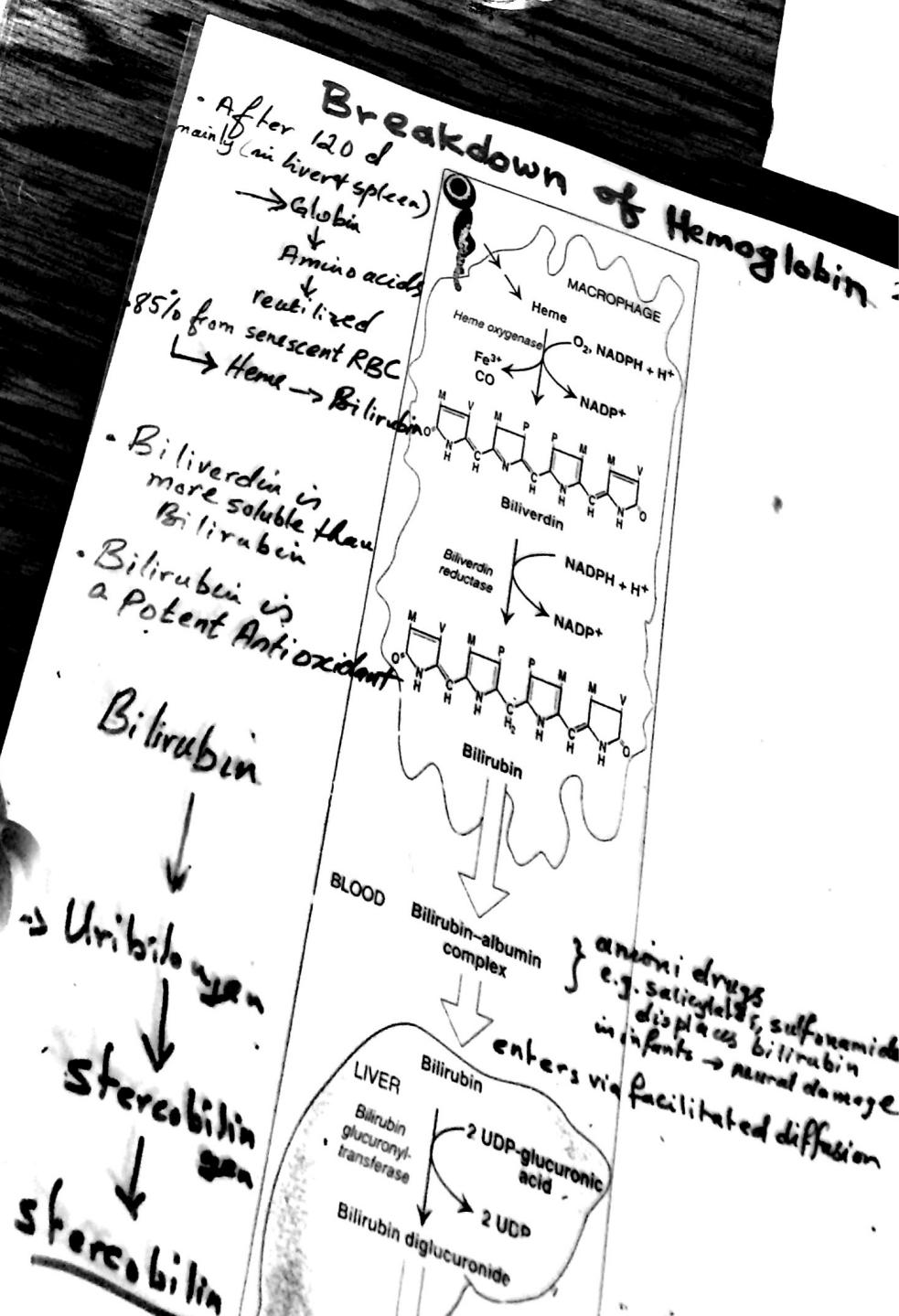
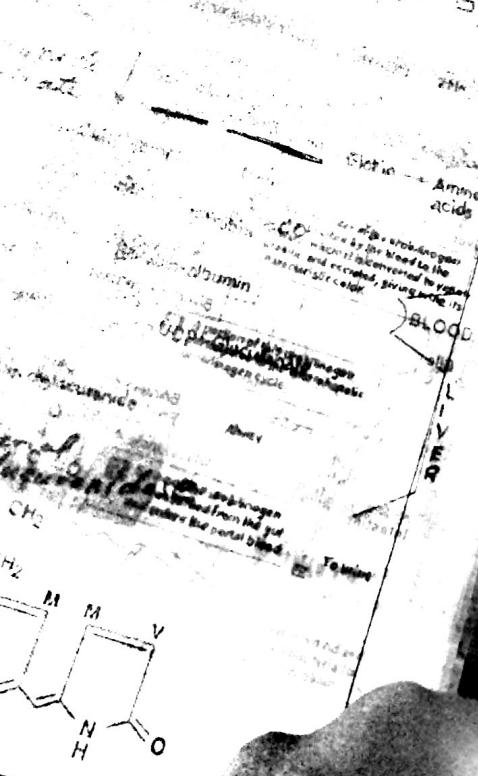


Figure 24-12b
Formation of bilirubin from heme.

Formation of Bilirubin



2

Breakdown of Hemoglobin

- After 120 d mainly (in liver & spleen)

→ Globin

↓
Amino acids

↓
reutilized

85% from senescent RBC

→ Heme → Bilirubin

- Biliverdin is more soluble than Bilirubin

- Bilirubin is a Potent Antioxidant

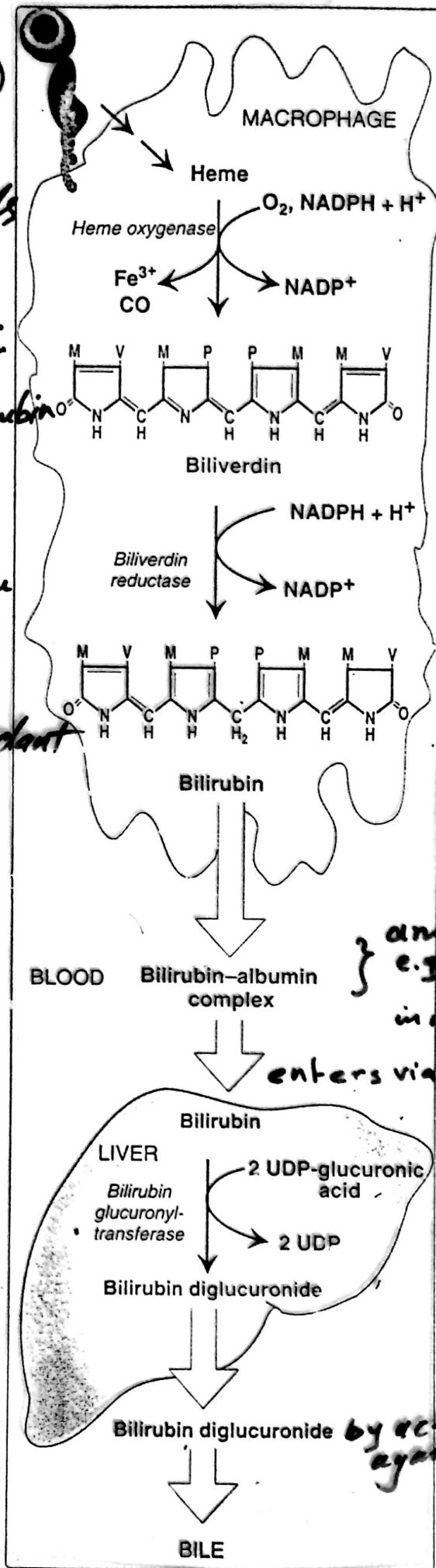
Bilirubin



→ Urobilogen

↓
Stercobilinogen

↓
Stercobilin

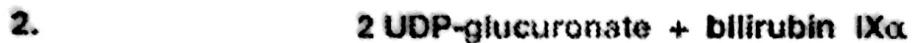
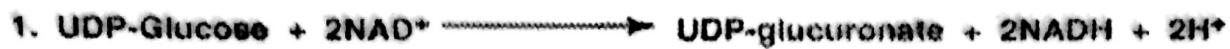


} anionic drugs
e.g. salicylates, sulfonamides
displaces bilirubin
in infants → neural damage
enters via facilitated diffusion

by active transport
against gradient

Conjugation of Bilirubin (CB)

3
UDP-glucose
dehydrogenase



• Monoglucuronide
is an intermediate

Bilirubin UDP
glucuronyltransferase

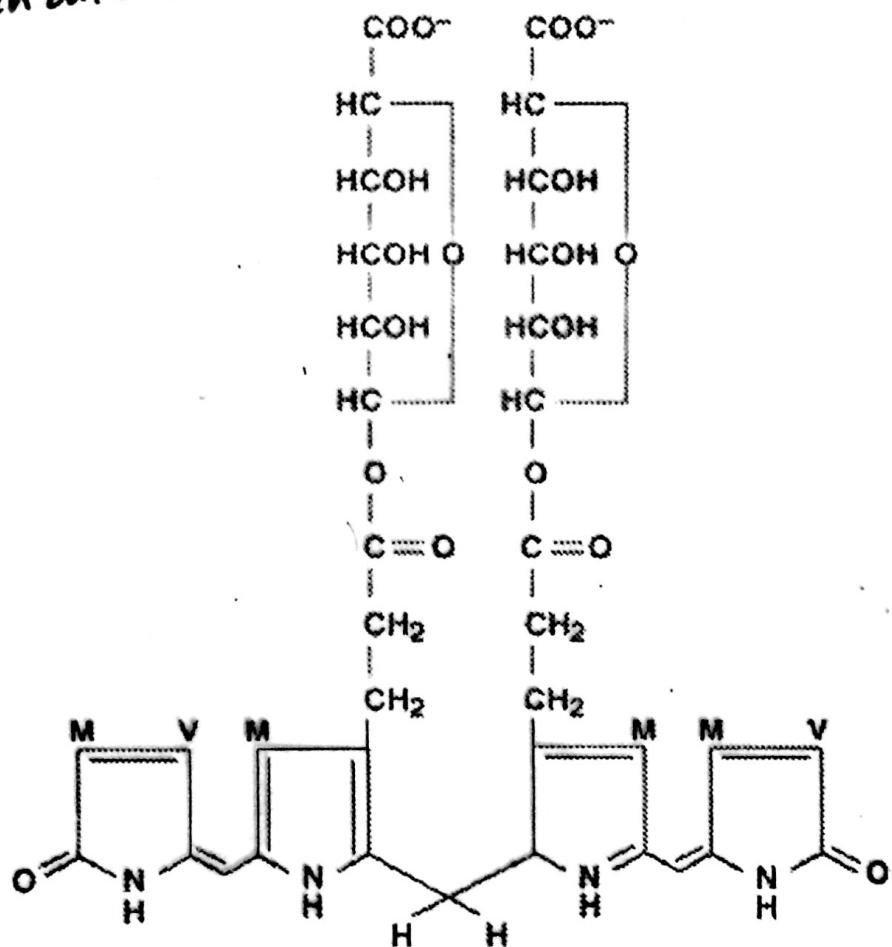
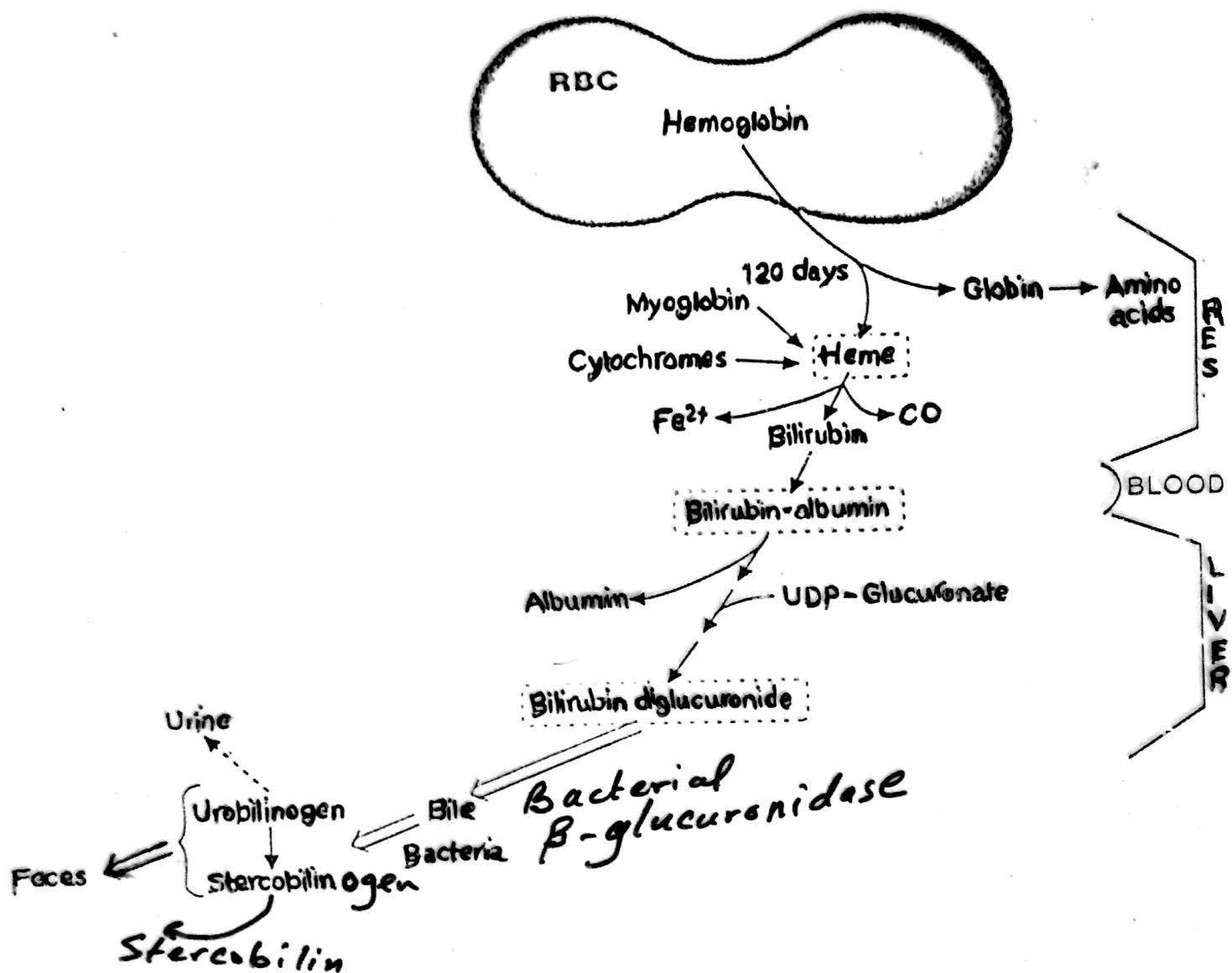


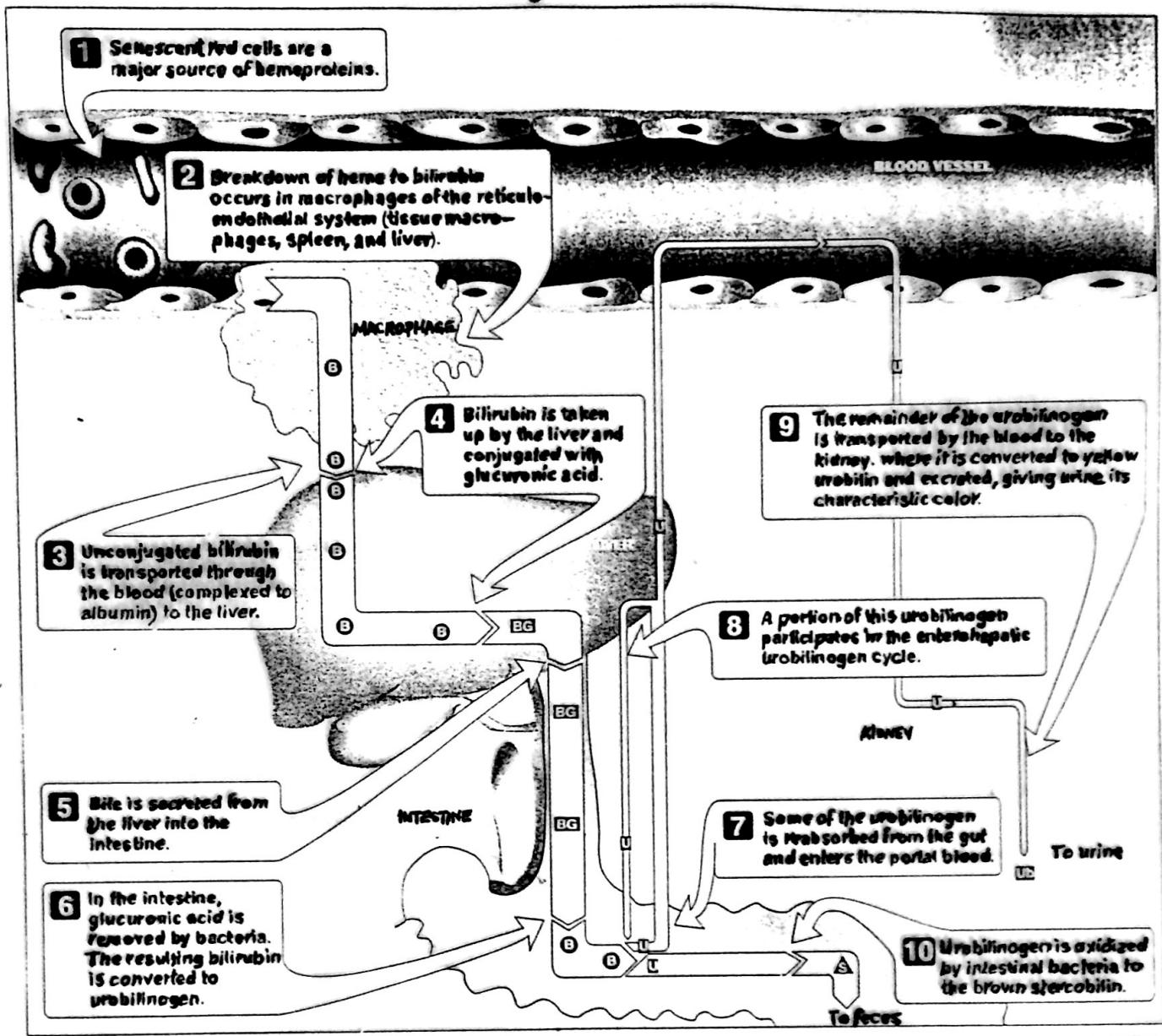
Figure: 24_13
Biosynthesis of bilirubin diglucuronide.
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Overview of Heme Degradation

4.8



CATABOLISM of HEME



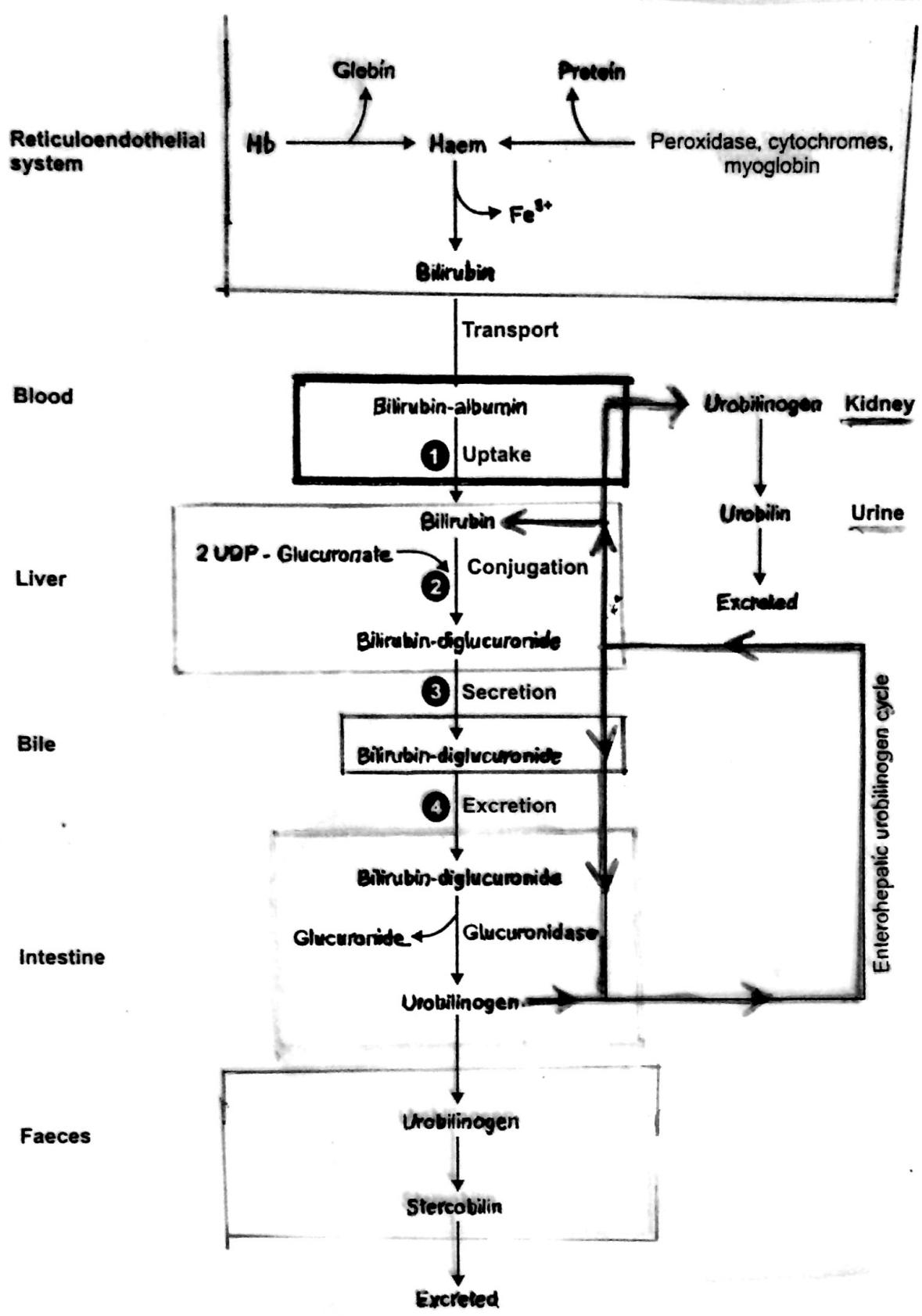
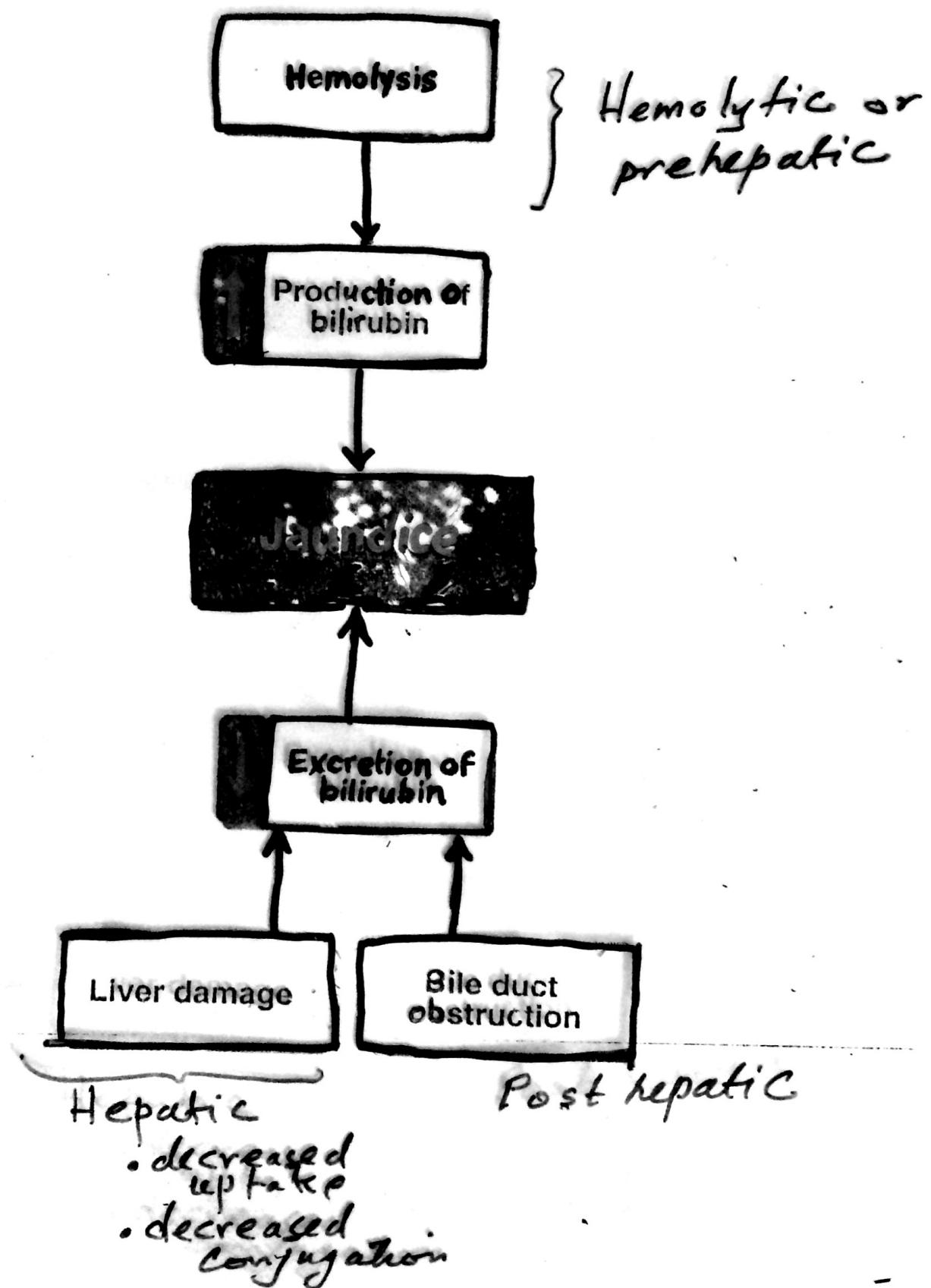
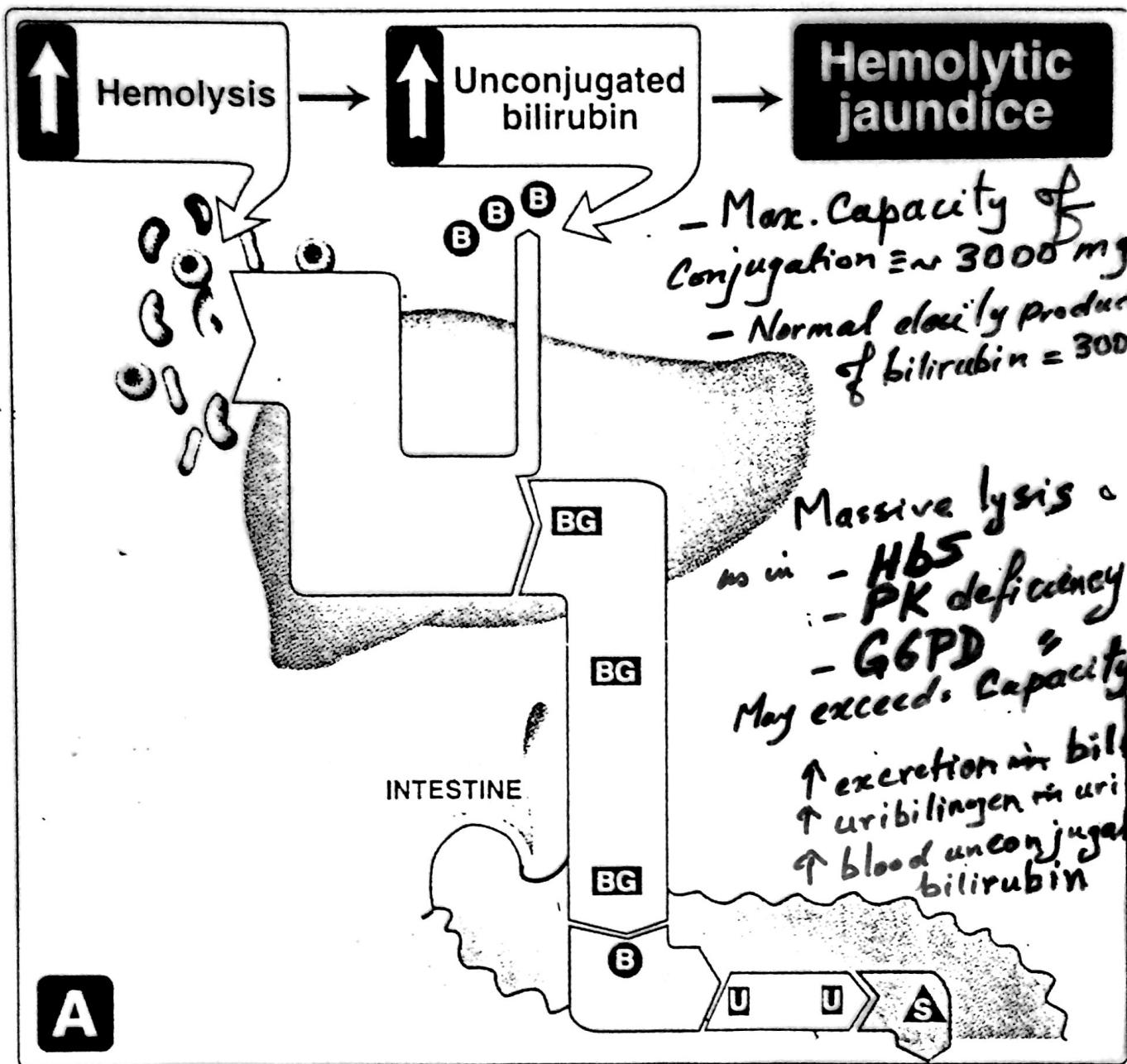


Figure 18.6: Schematic representation of normal bilirubin metabolism

Total Bilirubin
0.1 to 1.0 mg/dl

- Conjugated bilirubin 0.1 to 0.4 mg/dl
- Unconjugated " 0.2 to 0.7 mg/dl





- Hepato-Cellular jaundice
Damage to liver
↑ unconjugated blood bilirubin
↓ secretion of conjugated +
↑ Urobilinogen in urine
- Obstructive Jaundice

Jaundice in Newborns

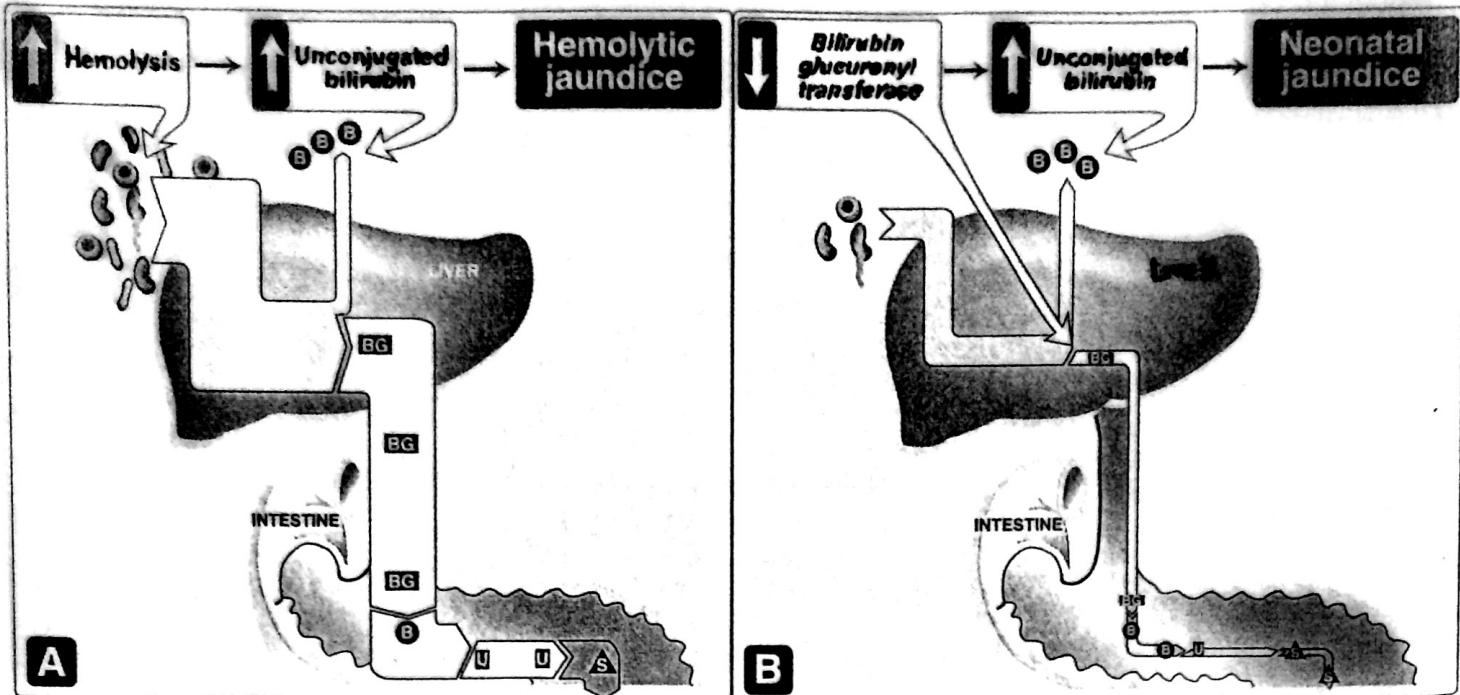


Figure 21.11

Alterations in the metabolism of heme. A. Hemolytic jaundice. B. Neonatal jaundice. [Note: The enterohepatic circulation of urobilinogen is omitted for simplicity.] BG = bilirubin glucuronide; B = bilirubin; U = urobilinogen; S = stercobilin.

- Genetic Deficiency of Conjugation:-

Varying degree of transferase deficiency

→ Crigler-Najjar I + II } more severe
→ Gilbert → mild

- Dubin-Johnson & Rotor syndromes (rare deficiency in Protein)
→ defective secretion of conjugated Bilirubin level ↑ Total Direct
Indirect

- Laboratory test for Bilirubin level

The Van der Bergh reaction

Diazotized sulfanilic acid →

- Methanol → D red azocidipyrroles

+ Methanol → Total

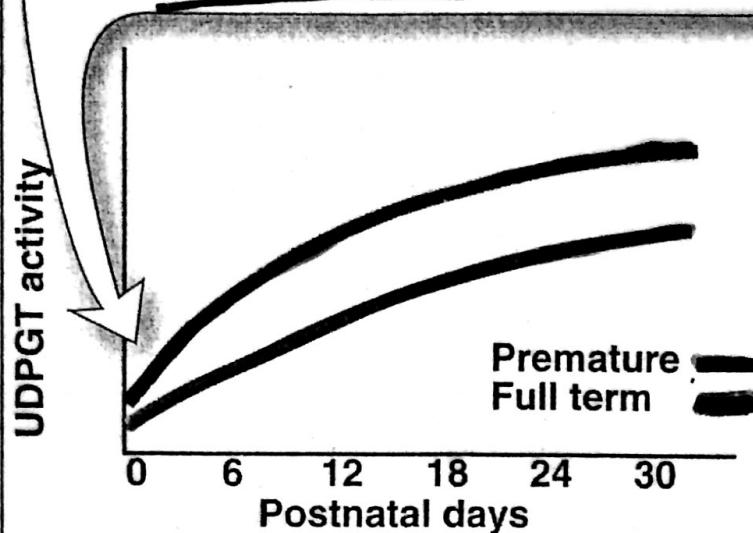
- Phototherapy

Blue fluorescent light

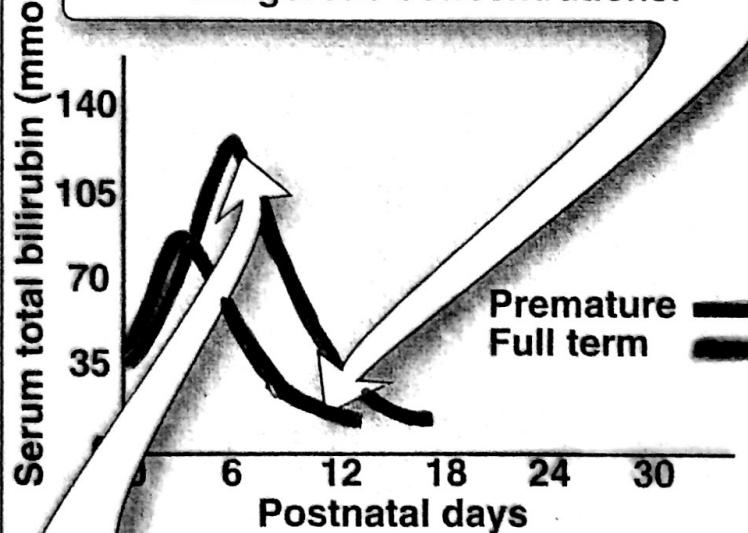
Bilirubin

Polar & water soluble isomer

1 Activity of the enzyme that conjugates bilirubin with glucuronic acid, UDP-glucuronyl transferase (UDPGT), is low in newborns and especially low in premature babies.



2 Serum levels of bilirubin rise after birth in full-term infants, although usually not to dangerous concentrations.



3 Serum levels of bilirubin in premature infants may rise to toxic levels.

Figure 21.12
Neonatal jaundice.