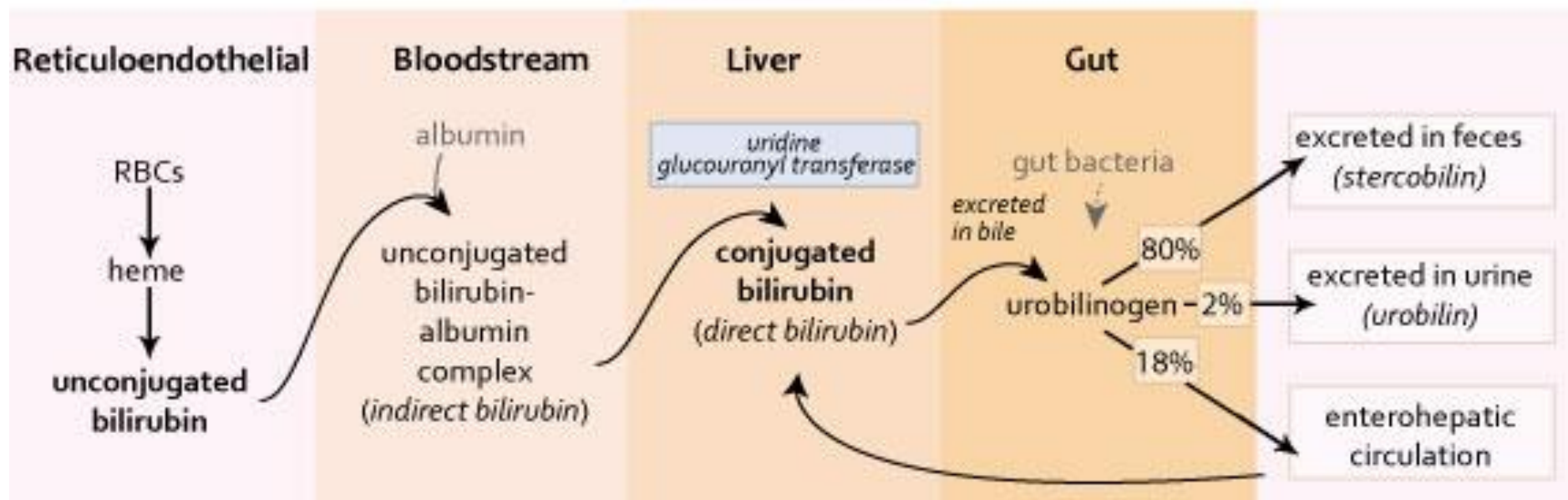


BILIRUBIN METABOLISM

Bilirubin



**BLOOD
CELLS**

Hemoglobin

↓
Globin

Heme

O_2

↓
Heme oxygenase

CO

Biliverdin IX α

NADPH

↓
**Biliverdin
reductase**

NADP⁺

Bilirubin
(*water-insoluble*)

*via blood
to the
liver*

**Stercobilin
excreted in feces**

Urobilinogen
formed by bacteria

INTESTINE

*reabsorbed
into blood*

**Urobilin
excreted in urine**

KIDNEY

via bile duct to intestines

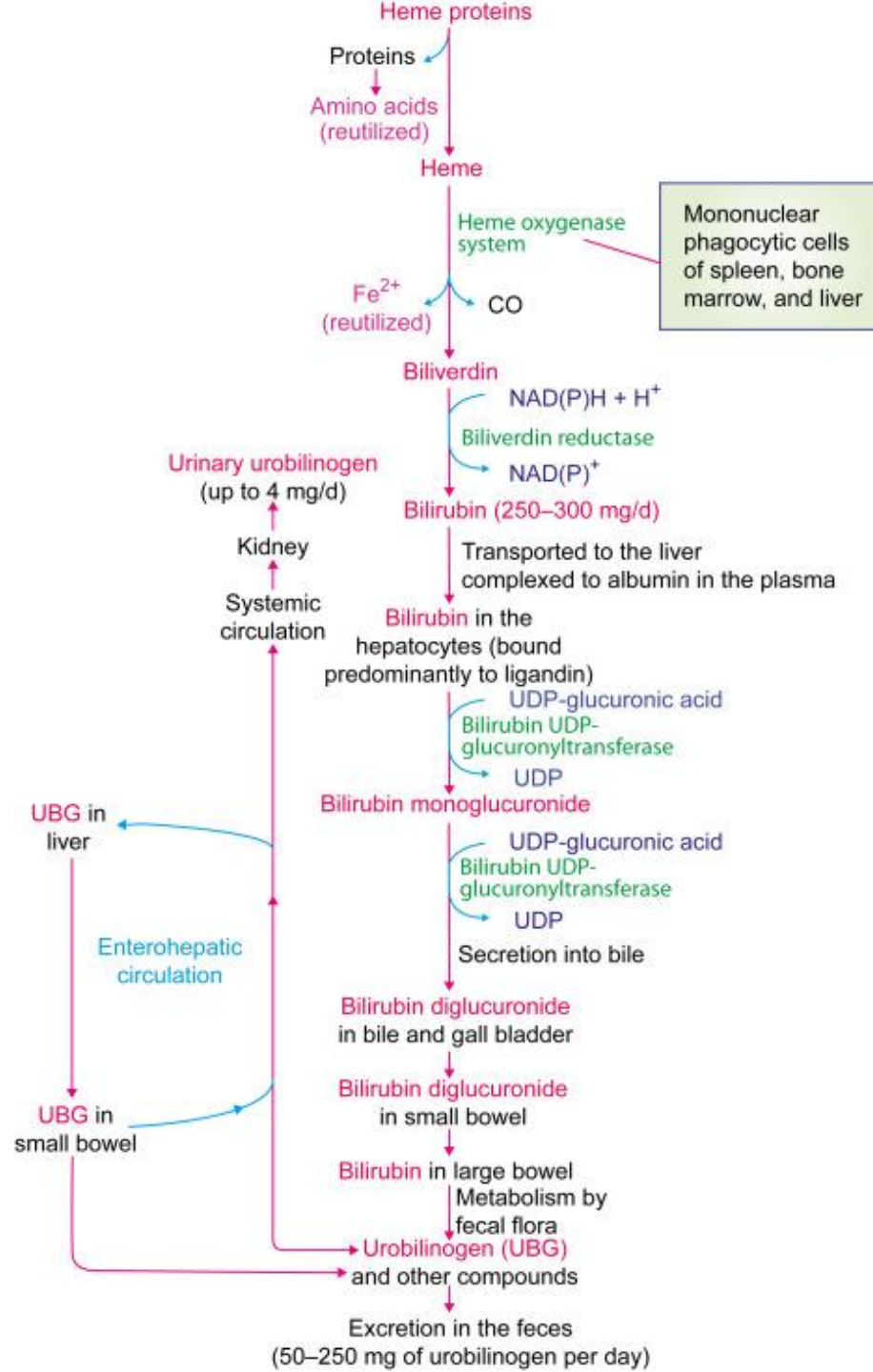
Bilirubin diglucuronide
(*water-soluble*)

2 UDP-glucuronic acid

Bilirubin
(*water-insoluble*)

LIVER

Figure 2. Catabolism of hemoglobin



Uptake of Bilirubin by the liver

Bilirubin is only slightly soluble in plasma thus transported to the liver by binding non-covalently to **albumin**.

Bilirubin dissociates from the carrier albumin molecule and enters a hepatocyte and binds to intracellular proteins; **ligandin** and **Z protein**.

Note: drugs, such as salicylates and sulfonamides can displace bilirubin from albumin, permitting bilirubin to enter the central nervous system. This causes the potential for neural damage in infants.

Formation of Bilirubin diglucuronide (conjugated bilirubin)

The solubility of bilirubin is increased by the addition of two molecules of glucuronic acid. This conjugation process is catalyzed by **bilirubin (UDP) glucuronyltransferase**.

UDP (uridine diphosphate)-glucuronic acid is the glucuronate donor.

Varying degrees of deficiency of this enzyme result in Crigler-Najjar I and II and Gilbert syndrome, with Crigler-Najjar I being the most severe deficiency.

Excretion of Bilirubin

Enterohepatic urobilinogen and urobilin excretion in the urine:

Some of the urobilinogen is reabsorbed from the gut and enters the portal blood.

A portion participates in the enterohepatic urobilinogen cycle, i.e. taken up by the liver, and then resecreted into the bile.

The remainder is transported by the blood to the kidney, where it is converted to yellow urobilin and excreted, giving urine its characteristic color.

Summary of Bilirubin Metabolism

