

**Table 26–7. Principal functions of the liver.<sup>1</sup>**

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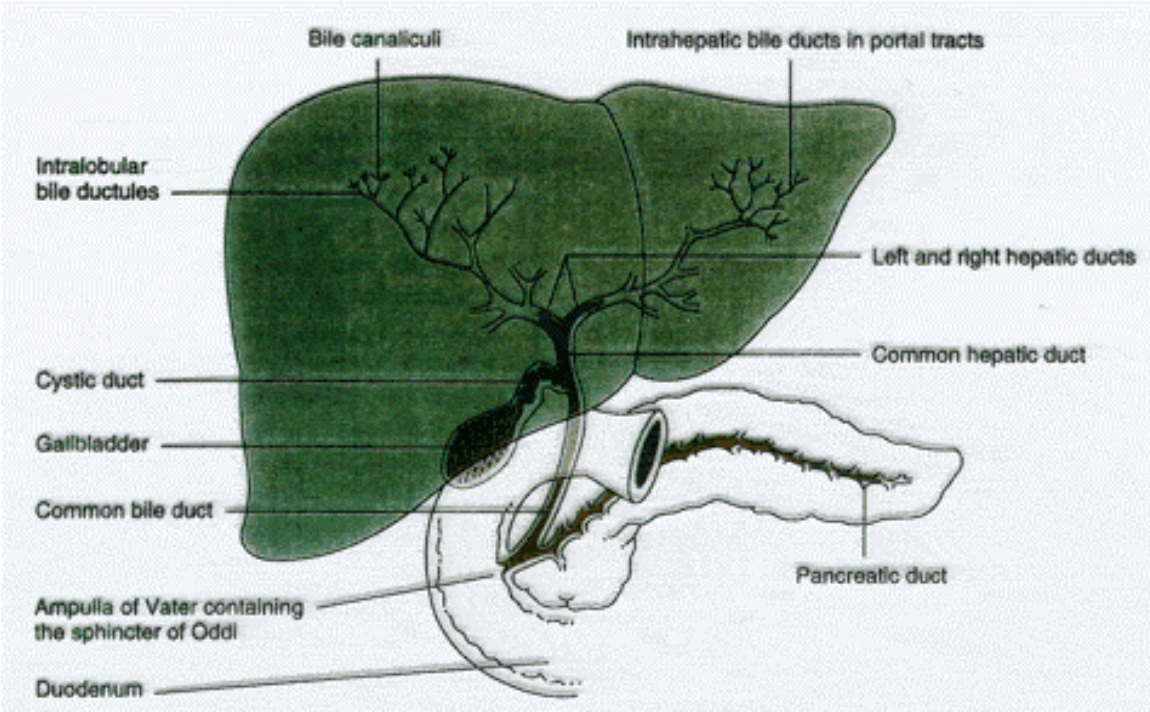
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<b>Formation and secretion of bile (26)</b>
<b>Nutrient and vitamin metabolism (17,27)</b>
Glucose and other sugars
Amino acids
Lipids
Fatty acids
Cholesterol
Lipoproteins
Fat-soluble vitamins
Water-soluble vitamins
<b>Inactivation of various substances</b>
Toxins (17)
Steroids (20,23,26)
Other hormones (14,18)
<b>Synthesis of plasma proteins (26,27; see Table 27–10)</b>
Acute-phase proteins
Albumin
Clotting factors
Steroid-binding and other hormone-binding proteins
<b>Immunity (27)</b>
Kupffer cells

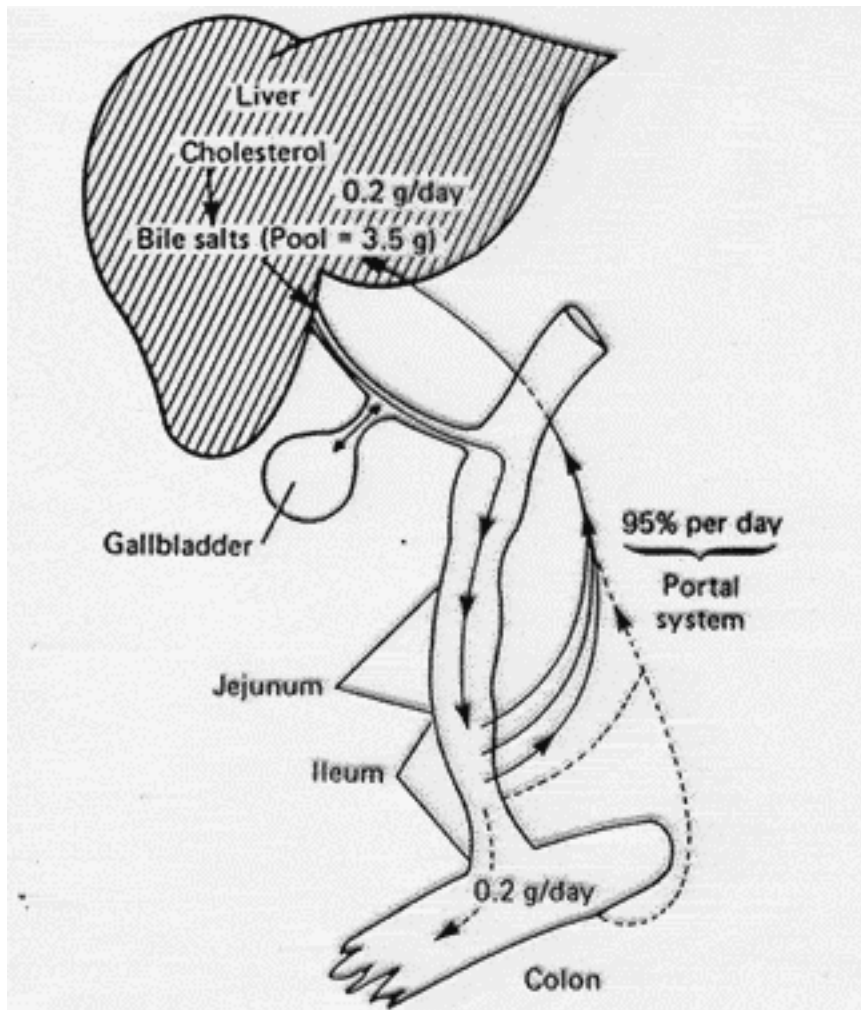
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<sup>1</sup> Numbers in parentheses are chapters in this book in which the functions are considered.

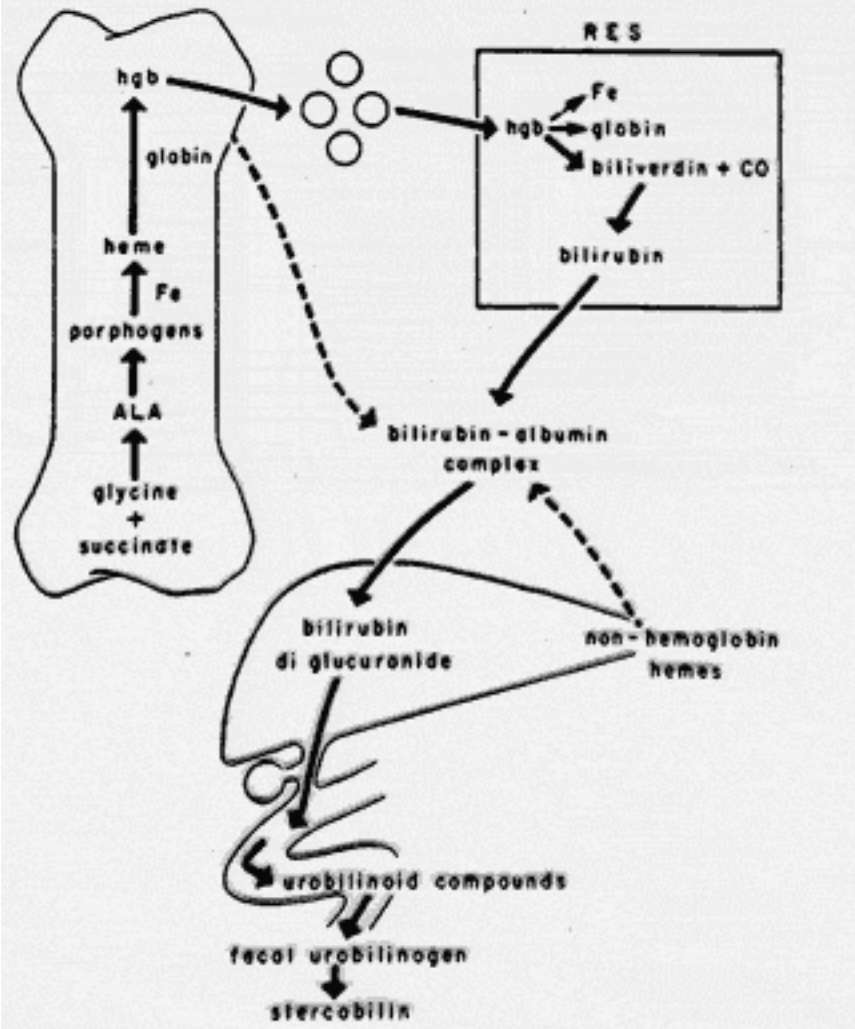


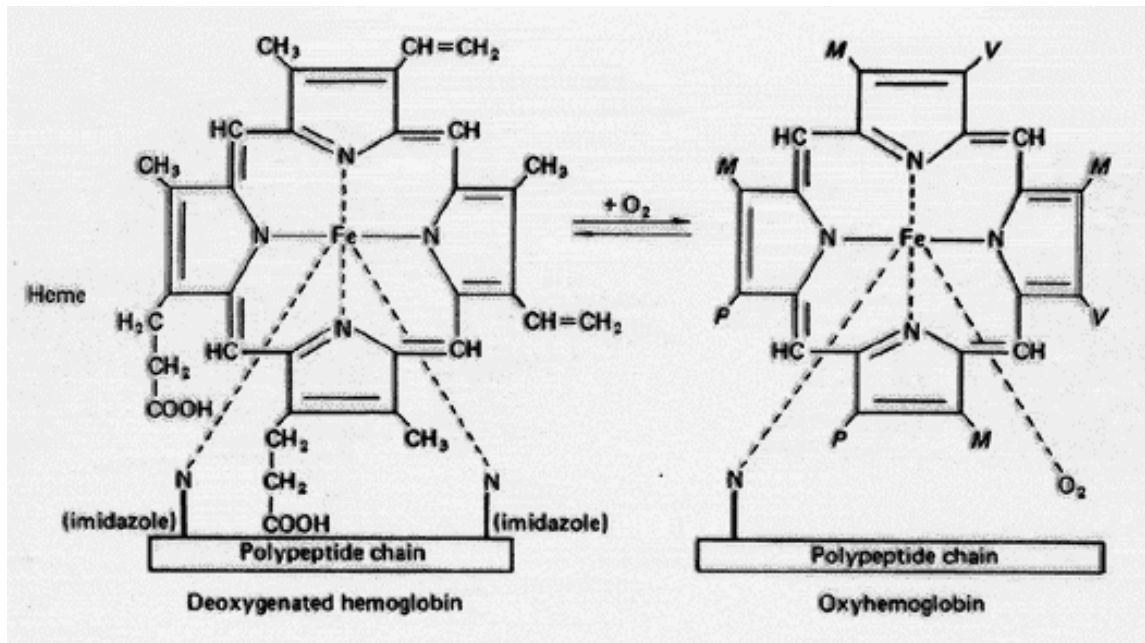
29b



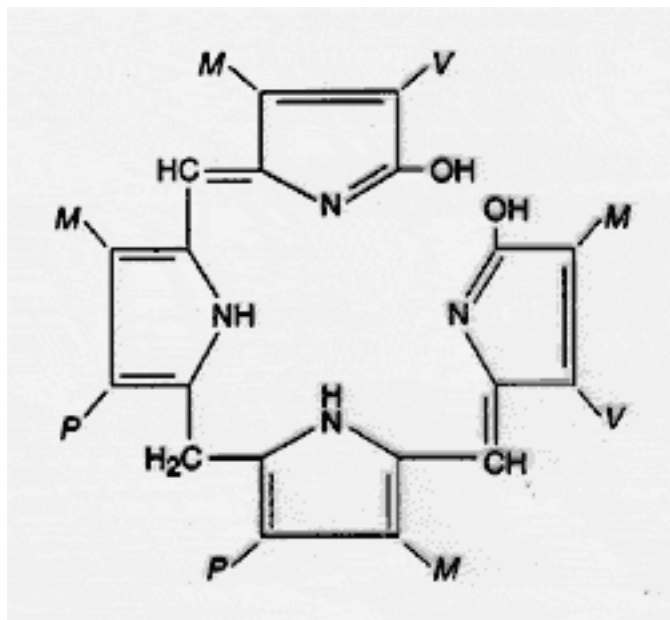
**Figure 26–23.** Enterohepatic circulation of bile salts. The solid lines entering the portal system represent bile salts of hepatic origin, whereas the dashed lines represent bile salts resulting from bacterial action. (Courtesy of M Tyor. Modified from Way LW [editor]: *Current Surgical Diagnosis & Treatment*, 10th ed. Appleton & Lange, 1994.)

# Heme Degradation and Bile Pigment Production





29e



29f

**TABLE 62-1 Comparative Features of Hepatitis Viruses**

FEATURE	HEPATITIS A	HEPATITIS B	HEPATITIS C	HEPATITIS D	HEPATITIS E
Common name	"Infectious"	"Serum"	"Non A, non B-posttransfusion"	"Delta agent"	"Enteric non A, non B"
Virus structure	Picornavirus; capsid, RNA	Hepadnavirus; envelope, DNA	Flavivirus; envelope, RNA	Viroidlike; envelope, circular RNA	Calicivirus-like; capsid, RNA
Transmission	Fecal-oral	Parenteral, sexual	Parenteral, sexual	Parenteral, sexual	Fecal-oral
Onset	Abrupt	Insidious	Insidious	Abrupt	Abrupt
Incubation period (days)	15-50	45-160	14-180	15-64	15-50
Severity	Mild	Occasionally severe	Usually subclinical	Co-infection with HBV occasionally severe; superinfection with HBV often severe	Normal patients, mild; pregnant women, severe
Mortality	<0.5%	1%-2%	0.5%-1%	High to very high	Normal patients, 1%-2%; pregnant women, 20%
Chronicity/carrier state	No	Yes	Yes	Yes	No
Other disease associations	None	Primary hepatocellular carcinoma, cirrhosis	Primary hepatocellular carcinoma, cirrhosis	Cirrhosis, fulminant hepatitis	None
Laboratory diagnosis	Symptoms and anti-HAV IgM	Symptoms and serum levels of HBsAg, HBeAg, and anti-HBc IgM	Symptoms and anti-HCV EUSA	Anti-HDV EUSA	—

29g

**Table 35-1. Characteristics of hepatitis viruses.<sup>1</sup>**

Virus	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Family	Picornaviridae	Hepadnaviridae	Flaviviridae	Unclassified	Caliciviridae <sup>2</sup>
Genus	<i>Hepatovirus</i>	<i>Orthohepadnavirus</i>	Unnamed	<i>Deltavirus</i>	Unnamed
Virion	27 nm, icosahedral	42 nm, spherical	30-60 nm, spherical	35 nm, spherical	30-32 nm, icosahedral
Envelope	No	Yes (HBsAg)	Yes	Yes (HBsAg)	No
Genome	ssRNA	dsDNA	ssRNA	ssRNA	ssRNA
Genome size	7.5 kb	3.2 kb	9.5 kb	1.7 kb	7.6 kb
Stability	Heat- and acid-stable	Acid-sensitive	Ether-sensitive, acid-sensitive	Acid-sensitive	Heat-stable
Transmission	Fecal-oral	Parenteral	Parenteral	Parenteral	Fecal-oral
Prevalence	High	High	Moderate	Low, regional	Regional
Fulminant disease	Rare	Rare	Rare	Frequent	In pregnancy
Chronic disease	Never	Often	Often	Often	Never
Oncogenic	No	Yes	Yes	?	No

<sup>1</sup>Hepatitis G virus has been isolated but has not been characterized enough to be included here. Preliminary results suggest that it resembles HCV.

<sup>2</sup>Provisional classification.

29h

## Stable to:

Acid at pH 1

Solvents (ether, chloroform)

Detergents

Saltwater, groundwater (months)

Drying (stable)

Temperature

4° C: weeks

56° C for 30 minutes: stable

61° C for 20 minutes: partial inactivation

## Inactivated by:

Chlorine treatment of drinking water

Formalin (0.35%, 37° C, 72 hours)

Peracetic acid (2%, 4 hours)

B-propiolactone (0.25%, 1 hour)

Ultraviolet radiation ( $2 \mu\text{W}/\text{cm}^2/\text{min}$ )

29i

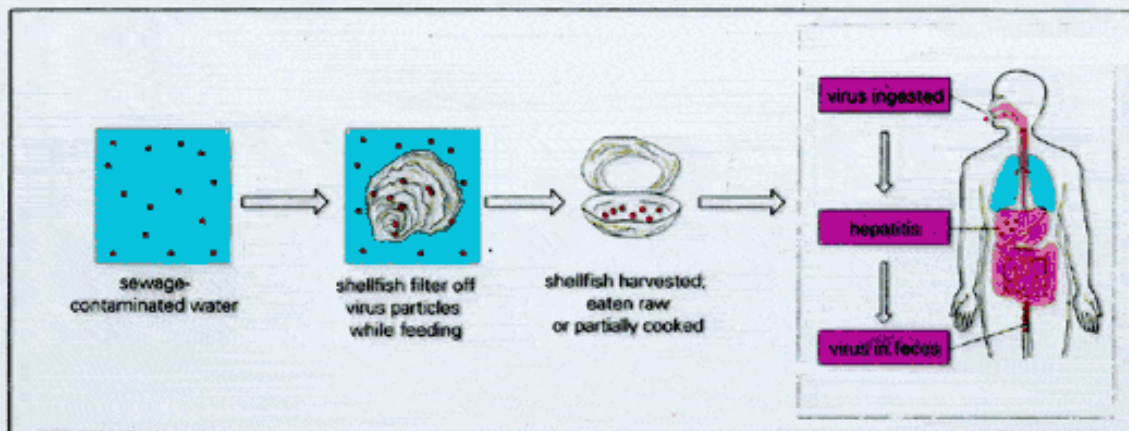
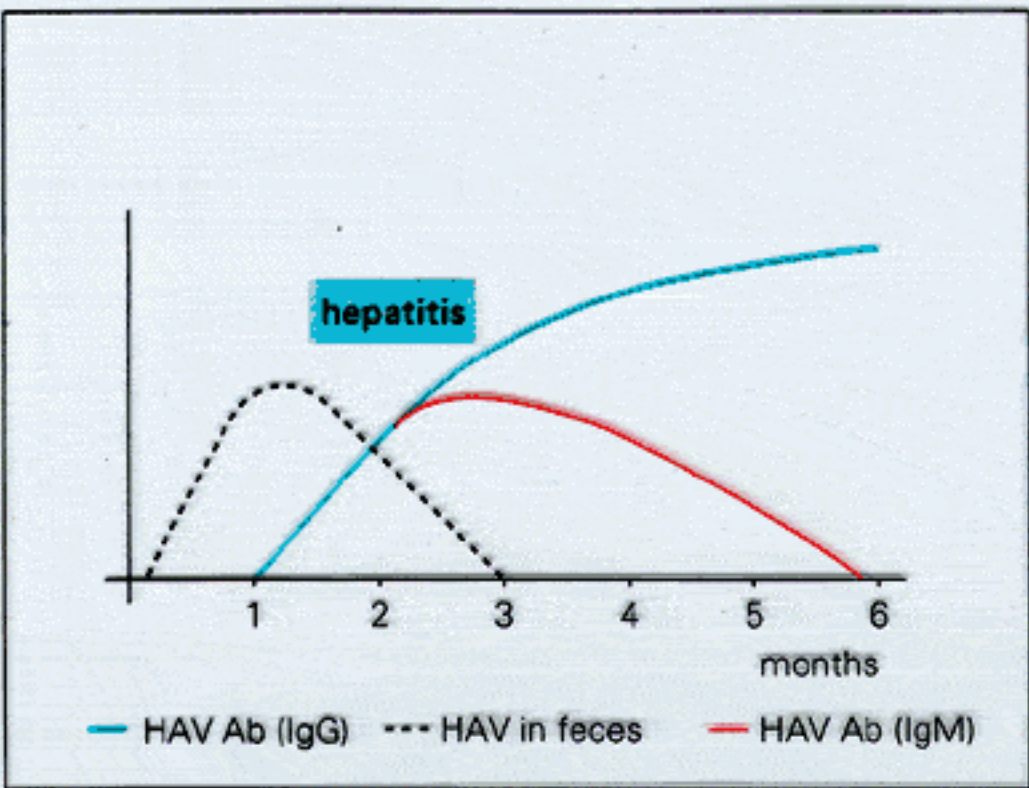


Fig. 20.47 Contamination of shellfish by HAV can lead to human infection.

29j



**Fig. 20.48** The clinical and virologic course of hepatitis A virus (HAV). (Ab, antibody.)