occur in the proximal tubule via active tubular secretion. Transport proteins capable of actively transporting various drugs, primarily weakly acidic and weakly basic compounds, out of the blood and into the urine can further increase the renal rate of elimination of compounds.

If these were the only processes that occurred within the nephron, everything that exited the blood via glomerular filtration or active transport would exit the body through the urine. While this would be acceptable for undesirable material or metabolic waste products, the same could not be said of essential materials such as glucose. Fortunately, many compounds, both good and bad, are reabsorbed into the blood in the loop of Henle and the distal tubule. Neutral compounds can be reabsorbed via passive diffusion, so lipid soluble materials reenter the systemic circulation. Compounds that are highly charged in the urine, on the other hand, are not capable of passive diffusion, but can be reabsorbed via active transport. Some vitamins, electrolytes, and amino acids are actively reabsorbed in this region of the nephron, and compounds capable of accessing the available transport proteins can be reabsorbed through the same pathways. Tubular reabsorption can also be affected by urine flow rate, as changes in this rate will alter the tubular residence time of potentially reabsorbed compounds. In summary, renal elimination is a function of glomerular filtration, passive diffusion (both into and out of the renal tubules), active secretion, and active reabsorption.[67]

Compounds can also be removed from the body by secretion into bile fluids that are produced by the liver, stored in the gall bladder, and eventually released into the intestinal tract. This material is composed of a mixture of water, various electrolytes, cholesterol, phospholipids, and bile acids (Figure 6.43). An average adult produces between 400 and 800 mL

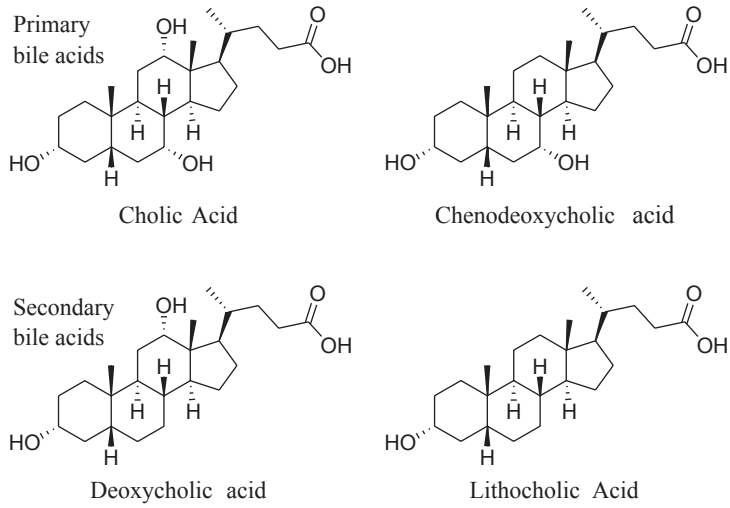


**FIGURE 6.43** Examples of primary and secondary bile acids.