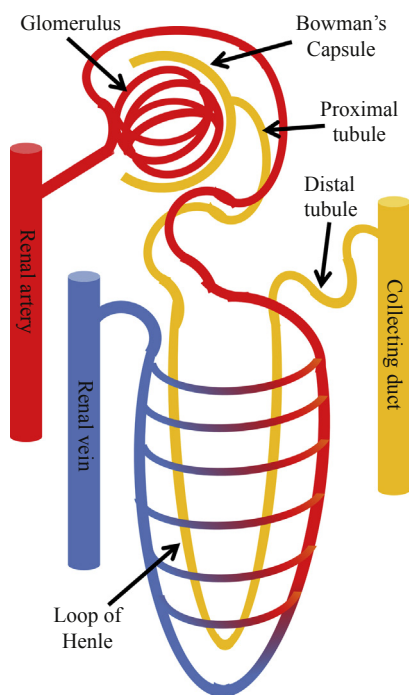


FIGURE 6.42 The nephron is the working unit of the kidney. Its interlocking system of blood vessels and renal tubes regulates body water level and the concentration of soluble material.



in the blood and water levels in the body is the nephron (Figure 6.42). In simple terms, the nephron can be described as an interlocking system of blood vessel and the renal tubules. The proximal portion of the nephron contains an intricate network of blood vessels called the glomerulus, which is surrounded by Bowman's capsule, a cup-like sack that is the beginning of the tubular portion of the nephron. The tubules of the nephron extend off of Bowman's capsule to form the proximal tubule, which feeds into the loop of Henle, the distal tubule, and eventually the cortical collecting duct that carries fluid out of the nephron and towards the bladder. Each of these sections of the nephron is paralleled by blood vessels.

As blood flows through the nephrons of the kidneys, approximately 10% of the blood flow (120–130 mL/min, the glomerular filtration rate) is diverted into the glomerulus. The membranes of the glomerulus are porous enough to allow diffusion of water and dissolved material to filter into the Bowman's capsule that surrounds the glomerulus. Plasma water and compounds with a molecular weight below 60,000 AMU are effectively filtered out of the blood in this process. Proteins and protein-bound drugs are not filtered by this process, so compounds with higher protein binding will be less susceptible to this process. The filtered fluid in Bowman's capsule collects and moves through the proximal tubule, which runs in parallel to the blood vessels that exit the glomerulus and rejoin the blood vessels that extend through the rest of the nephron. Further compound elimination can