



FIGURE 25-1 **A**, Gross anatomy of the kidney. **B**, Schematic representation of the vasculature within a column of Bertin. **C**, Structural components of the glomerulus. **D**, Schematic representation of a superficial and a juxtamedullary nephron based on the location of their glomeruli. The tubules are intimately intertwined with the capillary system. The peritubular capillaries come off the efferent arteriole leaving the glomerular capillary. The capillaries that bathe the long descending and ascending limbs of Henle's loop are called the vasa recta due to their straight nature. The tubular segments are named axially: CCD, Cortical collecting duct; CNT, connecting tubule; DCT, distal convoluted tubule; IMCD, inner medullary collecting duct; LOH, loop of Henle; OMCD, outer medullary collecting duct; PCT, proximal convoluted tubule; PST, proximal straight tubule; TAL, thick ascending limb; tAL, thin ascending limb; tDL, thin descending limb.

TABLE 25-1 CHARACTERISTICS OF THE RENAL CIRCULATION

FEATURE	IMPLICATIONS
Few or no anastomoses	Very prone to regional disruption of blood supply
Among the highest blood flow rates per gram of tissue	Lowest oxygen extraction (lowest arteriovenous O ₂ difference)
Functional arteriovenous shunts	Solutes and gases (e.g., O ₂) can diffuse directly from artery to vein without passing through capillaries
Two capillary systems in tandem	The two capillaries serve completely different functions, in the glomeruli and tubules in sequence

decrease renal blood flow, and promote renal retention of sodium (Na⁺). Renal sympathetic denervation has been proposed as a novel treatment of resistant hypertension using radiofrequency energy delivered via an intrarenal arterial catheter radially to disrupt the nerve fibers on the renal artery.

Walk the Nephron

The functional unit of the kidney is the nephron. Each human kidney has approximately 1 million nephrons. Approximately 30% of these have their glomeruli situated deep in the cortex and are referred to as *juxtamedullary nephrons*; the rest are in the outer cortex and are referred to as *superficial nephrons*. Each nephron is