The Kidney

Nephron—the functional unit of the kidney.
Proximal tubule—freely permeable to HCO_3^-, H_2O, K^+ (move out of the tubule), and NH_3 (moves into the tubule); actively permeable to NaCl, nutrients (move out of the tubule), and H^+ (moves into the tubule).
Descending loop of Henle—water passively out.
Ascending loop of Henle—NaCl passively out (thin segment), NaCl actively out (thick segment).
Distal tubule—freely permeable to water (move out of tubule), actively pumps NaCl and HCO_3^- out of tubule; actively pumps K^+ and H^+ into tubule.
Collecting duct—actively pumps NaCl out (outer medulla, under hormonal control), water and urea (small amounts) passively move out in the inner medulla.
Cortical nephrons—(80% of nephrons) have reduced loops of Henle and are found in the renal cortex.
Juxtamedullary nephrons—(20% of nephrons) have long extended loops of Henle that extend far into the medulla of the kidney. These are key adaptations that allow for the production of hypertonic urine. They are only found in birds and mammals.
Afferent arteriole—supplies blood to the nephron and is the artery that enters Bowman's capsule.
Efferent arteriole—is the artery that exits Bowman's capsule as it leaves the nephron.
Peritubular capillaries—surround the proximal and distal tubules and are involved in exchange of materials (via the interstitial fluid that bathes these structures).
Vasa recta—are the vessels that surround the descending and ascending limbs of the loop of Henle and are involved in the exchange of materials (again, via the interstitial fluid).
Anti-diuretic hormone (ADH)—prevents water from leaving the epithelial cells of the kidney. It is produced in the hypothalamus and released by the pituitary.
ADH release—acts on distal tubules and collecting ducts increasing their permeability and promoting the uptake of water. Released in response to the blood osmolarity getting too much above the 300 milliosmoles/L set point.
RAAS hormones and the JGA—Renin-Angiotensin II-Aldosterone System, juxtaglomerular apparatus.
The juxtaglomerular apparatus (JGA)—is simply a structure on the afferent arteriole which contains modified smooth muscle cells that secrete the hormone renin in response to a decrease in blood pressure.
Renin—converts angiotensinogen to angiotensin I and then another enzyme converts this into angiotensin II.
Angiotensin II–has two main functions: it constricts the arterioles increasing blood pressure, and it stimulates the release of aldosterone from the adrenal glands.
Aldosterone—acts mainly on the distal tubules of the nephron, but also on the cells of the collecting duct to stimulate reabsorption of NaCl and water (which is then reabsorbed by the peritubular capillaries) which acts to increase blood pressure.