• The urine
  – Is formed in the nephrons
  – Flows and collects in the pelvis
  – Leaves the kidneys via the ureter
  – Is stored in the bladder
  – Is discharged thru the urethra
KIDNEYS
Internal Anatomy

• A frontal section shows three distinct regions
  – Renal capsule – the outside covering or layer
  – Cortex – the outer region
  – Medulla – the inner region, consists of the pyramids
  – Renal pelvis – flat, funnel-shaped tube leading to the ureter

• Inside the cortex and medulla are nephrons – the structural functional units that form urine
Frontal section of right kidney

- Renal capsule
- Renal cortex
- Renal column
- Renal pyramid in renal medulla
- Renal papilla
- Renal sinus
- Adrenal (suprarenal) gland
- Minor calyx
- Major calyx
- Renal artery
- Renal pelvis
- Renal vein
- Ureter

LATERAL

SUPERIOR

MEDIAL
• Consists of a tuft of capillaries
• Lies in the cortex
• The high blood pressure in the capillaries
  – Pushes the lymph in the blood to filter through the basement membrane of the Bowman’s capsule
Figure 26-7 Principles of Anatomy and Physiology, 11/e
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Mechanism of Urine Formation
Collecting duct

• The filtrate from the distal collecting tubule passes on to the collecting duct
  – where further reabsorption of water and Na ions takes place

  • According to the need of the body to maintain internal homeostasis

• The urine then travels down the ureter
  – to be stored in the urinary bladder

  • before passing thru the ureter to the outside during micturition (urination) process
KIDNEYS

Regulation of Na Ions

• Important to maintain osmotic pressure in the body fluids, including plasma

• A decrease of Na ions in the blood plasma provokes the following events:
  – Increase of aldosterone secretion
  – Aldosterone acts on the distal and collecting tubules
    • To increase Na ion reabsorption
    • Water follows Na reabsorption
    • This prevents water loss
Mechanisms of Urine Formation

• The kidneys filter the body’s entire plasma volume 60 times each day

• The filtrate:
  – Contains all plasma components except protein
  – Loses water, nutrients, and essential ions to become urine

• The urine contains metabolic wastes and unneeded substances
Loop of Henle: descending limb and thin ascending limb

Table 26-1 figure 2  Principles of Anatomy and Physiology, 11/e
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Loop of Henle: thick ascending limb
Last part of DCT and all of collecting duct (CD)

Intercalated cell

Principal cell
Figure 27-2 Principles of Anatomy and Physiology, 11/e
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