

Lecture notes

URINARY SYSTEM

two retroperitoneal organs:

- **kidneys** - where functional units (nephron) are located
 - formation of urine
- **excretory passages**
 - (renal pelvis, ureter, urinary bladder, urethra)
 - for temporary storage and periodic evacuation

functions:

- water and electrolyte homeostasis
- excretion of many toxic metabolic waste products (nitrogenous compounds \rightarrow uree and creatinine)
- osmoregulation
- production of renin (regulation of blood pressure) and erythropoietin (stimulates RBC synthesis)

KIDNEYS

- bean-shaped paired organs situated retroperitoneally
- **hilus** \rightarrow concavity found in the medial border w/c serves as a point of entrance for the renal artery and exit for the renal vein and ureter
- gland is classified morphologically as **compound tubular**
- parenchyma \rightarrow compact mass of uriniferous tubules
- stroma \rightarrow scanty fibroreticular CT
- **Renal Cortex** (peripheral portion)
 - darker reddish brown cortex
 - numerous radiating dark lines from the outer boundary to the capsule leaving a narrow zone \rightarrow cortex cortices
- **Pars Radiata / Cortical Rays / Medullary Rays of Ferrein**
 - straight portions of the uriniferous tubules
 - continuous with the striate medulla
- **Pars Convoluta / Cortical Labyrinth**
 - intervening portions between the pars radiata
- **Renal Corpuscle / Malpighian Corpuscle**
 - convoluted portions of the uriniferous tubules
- **Renal Columns of Bertin / Cortical Septae**
 - narrow strips of cortical tissues deep down between the bases of the renal pyramids
 - inward extension of the darker cortical tissue which defines the lateral boundaries of each pyramid
- **Renal Medulla** (inner portion)
 - lighter or paler staining medulla
 - made up of 8-15 conical subdivisions \rightarrow renal pyramids
 - no renal corpuscles
 - contains only the straight portions of the uriniferous tubules together with the loops of Henle

Boundary Zone

- a very vascular outer zone which joins the cortex

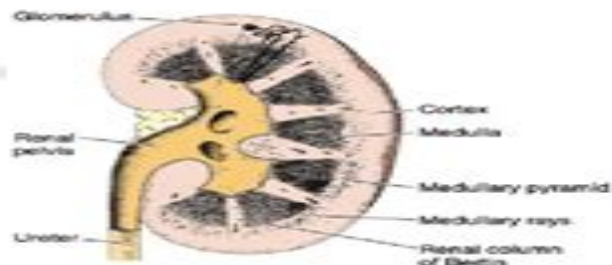
Papillary Zone

- inner zone, composed of the apices of the renal pyramids

Renal Lobe

Renal Lobule

- renal pyramid with cortical tissue
- smaller functional unit comprising a cortical ray and adjacent tissues



cortex	medulla
presence of renal corpuscles	absence of renal corpuscles
prominent alterations of pars radiata and convoluta	no alterations, straight parts only
acidophilic and brighter which contains more of the secretory portions	lighter in staining; contains the excretory tubules

- Uriniferous Tubules

- structural and functional unit of the kidneys
- principal portions:

- nephron

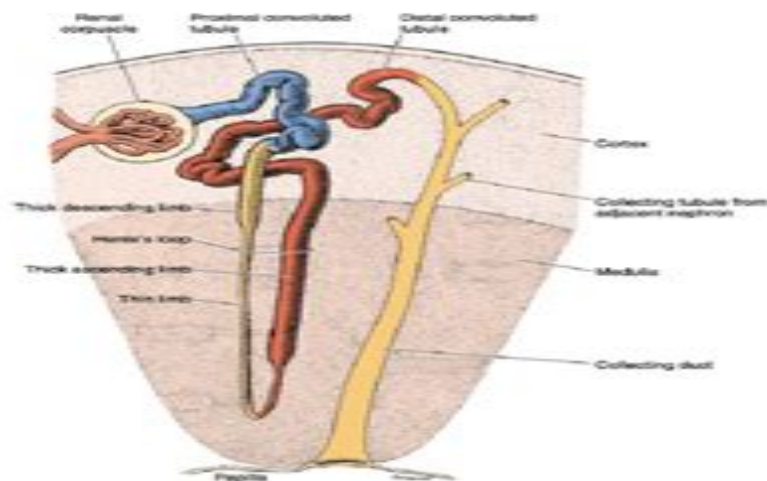
- tubular unit of the kidney
 - corresponds to the secretory elements
 - each segment is lined with specific type of epithelium specialized for a particular role in the formation of urine
- renal / Malpighian corpuscle (Bowman's capsule and Glomerulus)
 - proximal convoluted tubule
 - loop of Henle
 - distal convoluted tubule

- collecting tubules / excretory portion

- ducts that convey the urine to the renal pelvis
- carries out hypertonic urine

- arched collecting tubule
- straight collecting tubule
- papillary duct of Bellini

	secretory portion	excretory portion
staining	acidophilic granular	basophilic non granular
nucleus	pale staining	dark staining
lumen	small, irregular	round and clear
cell boundaries	indistinct	distinct



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