

# Urinary System

刘佳梅

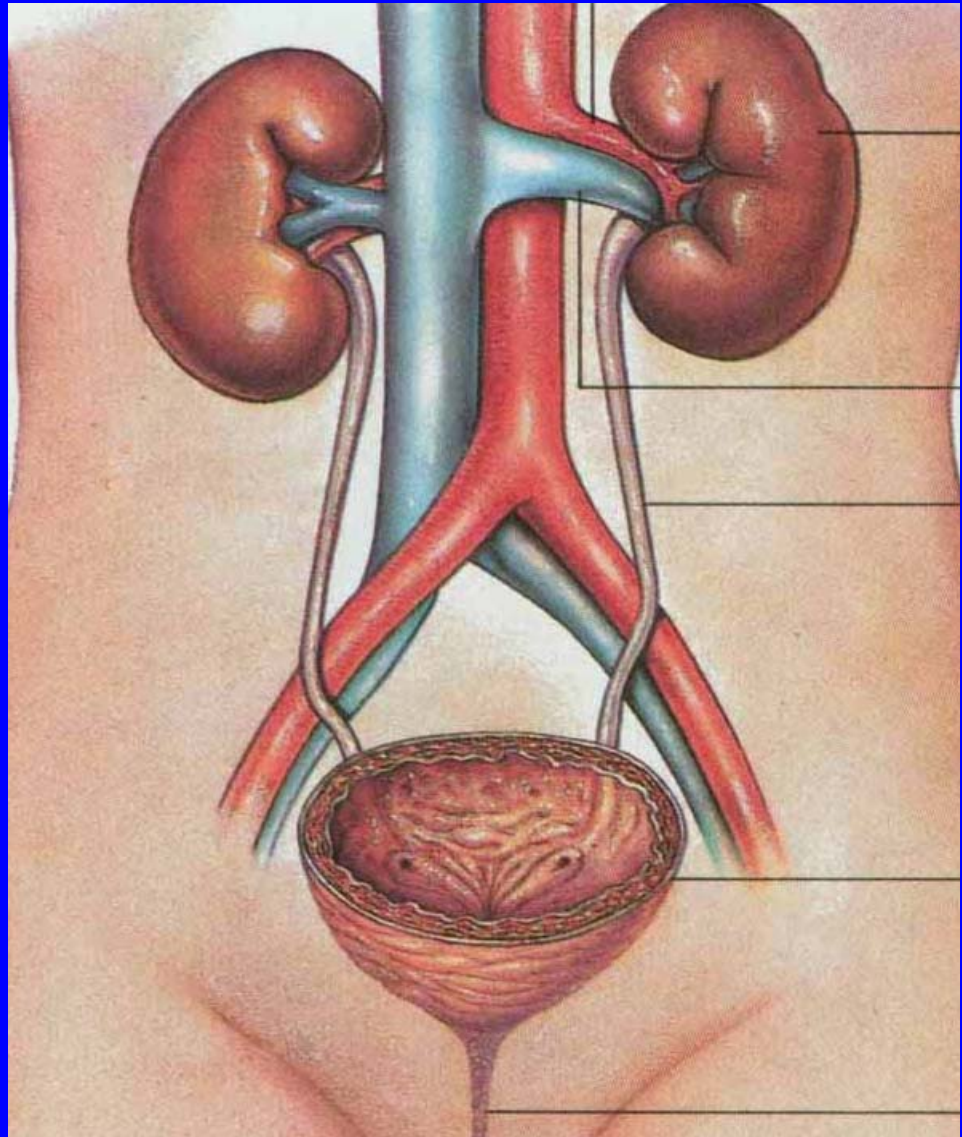
# Components

**Kidney**

**urinary  
bladder**

**Ureter**

**urethra**



# KIDNEY

capsule —————

parenchyma { cortex —————  
                  medulla —————

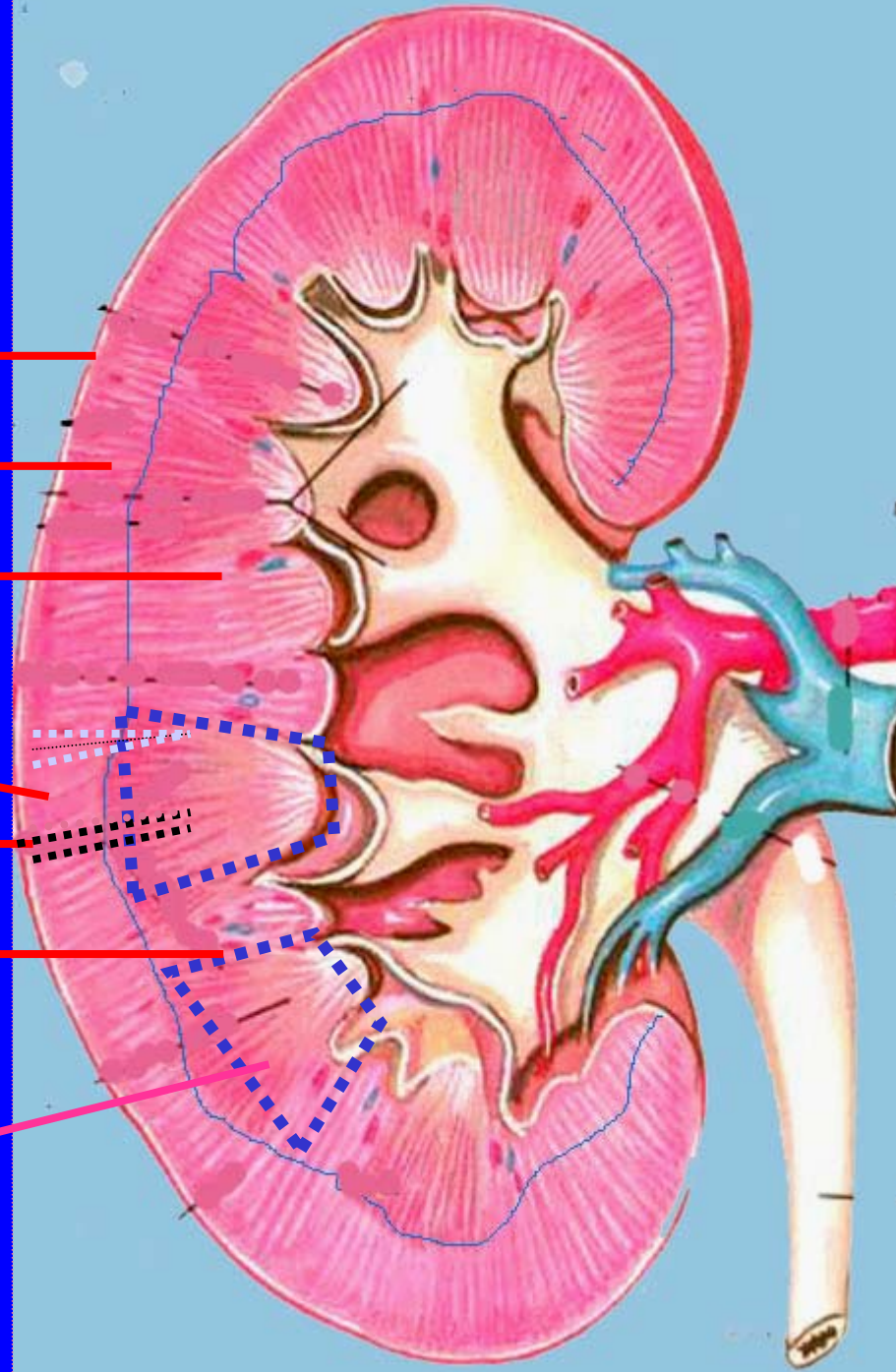
Cortical labyrinth —————

medullary ray —————

Renal column —————

renal pyramid —————

**Renal lobe**



## Renal lobe

A renal lobe consists of a renal pyramid, together with its closely associated cortical tissue

## Renal lobule

A renal lobule consists of a single medullary ray and the cortical tissue that surround it

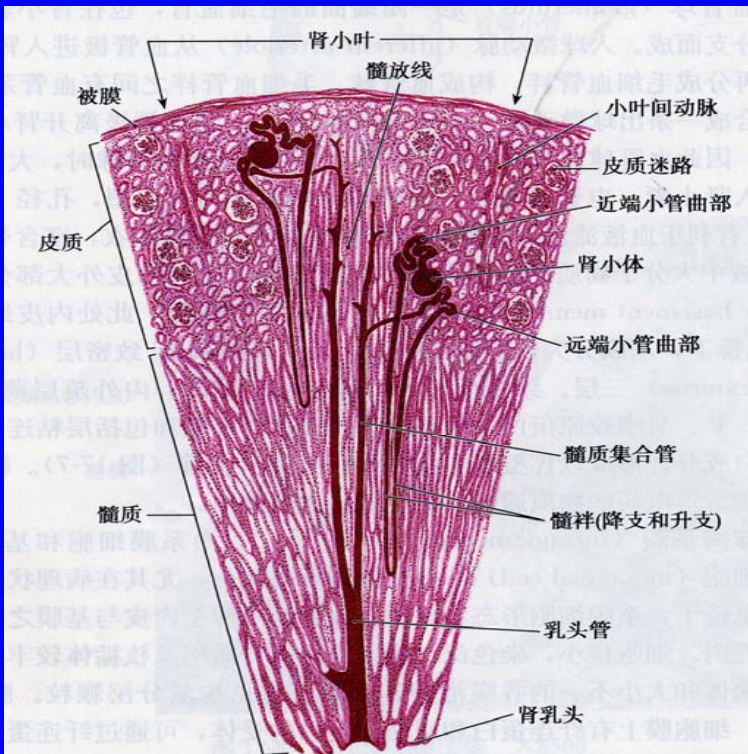
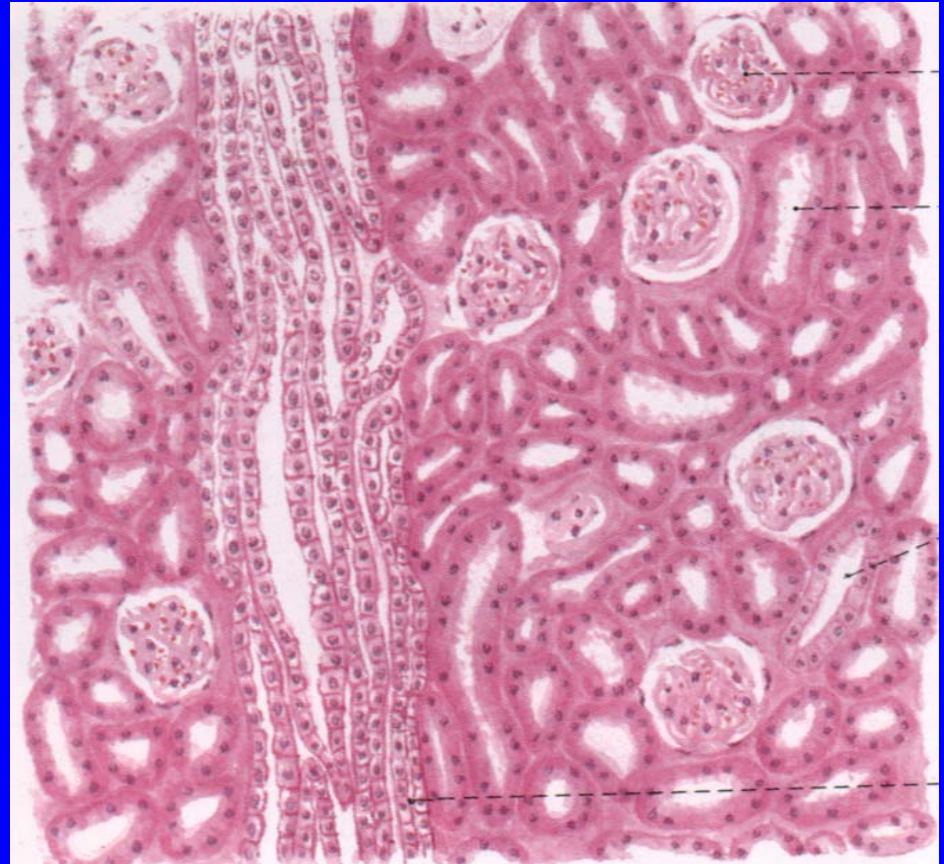
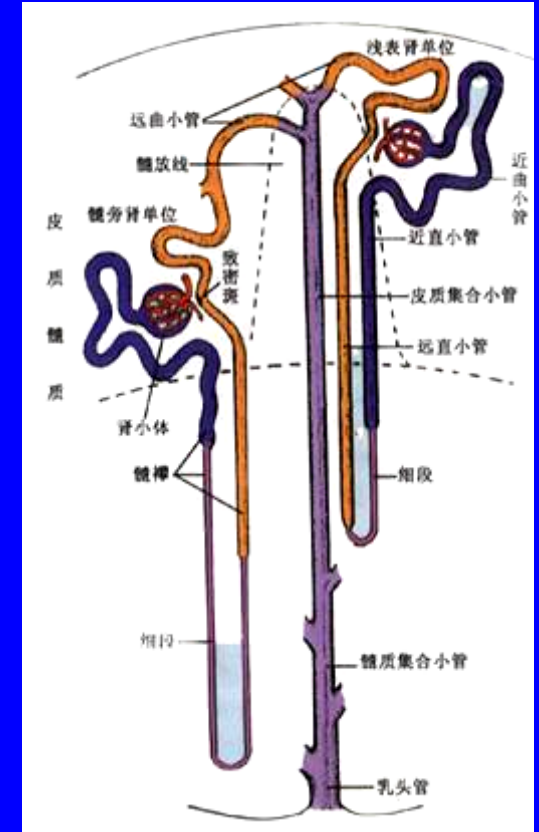
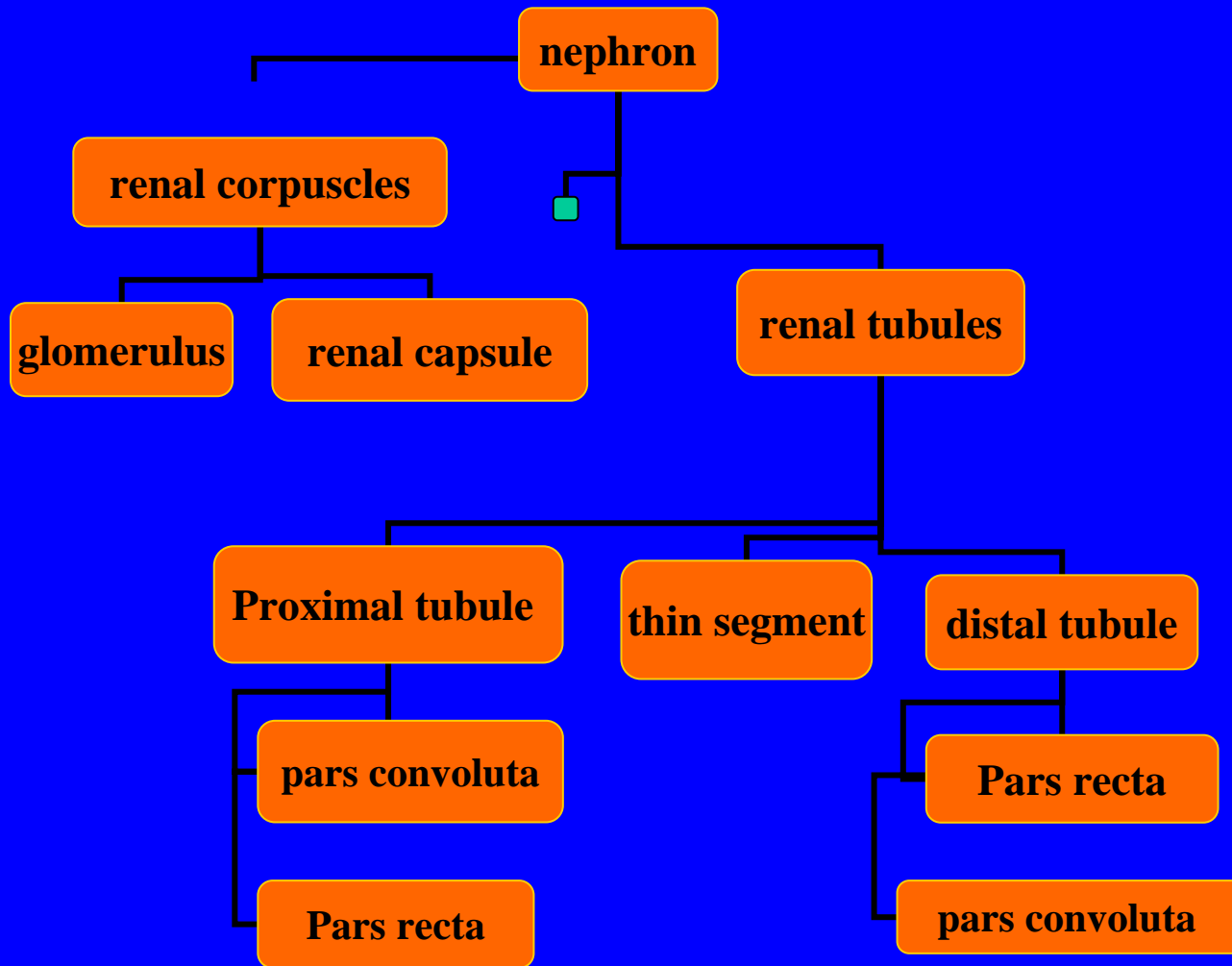


图 17-2 泌尿小管组成及其在肾内分布示意图

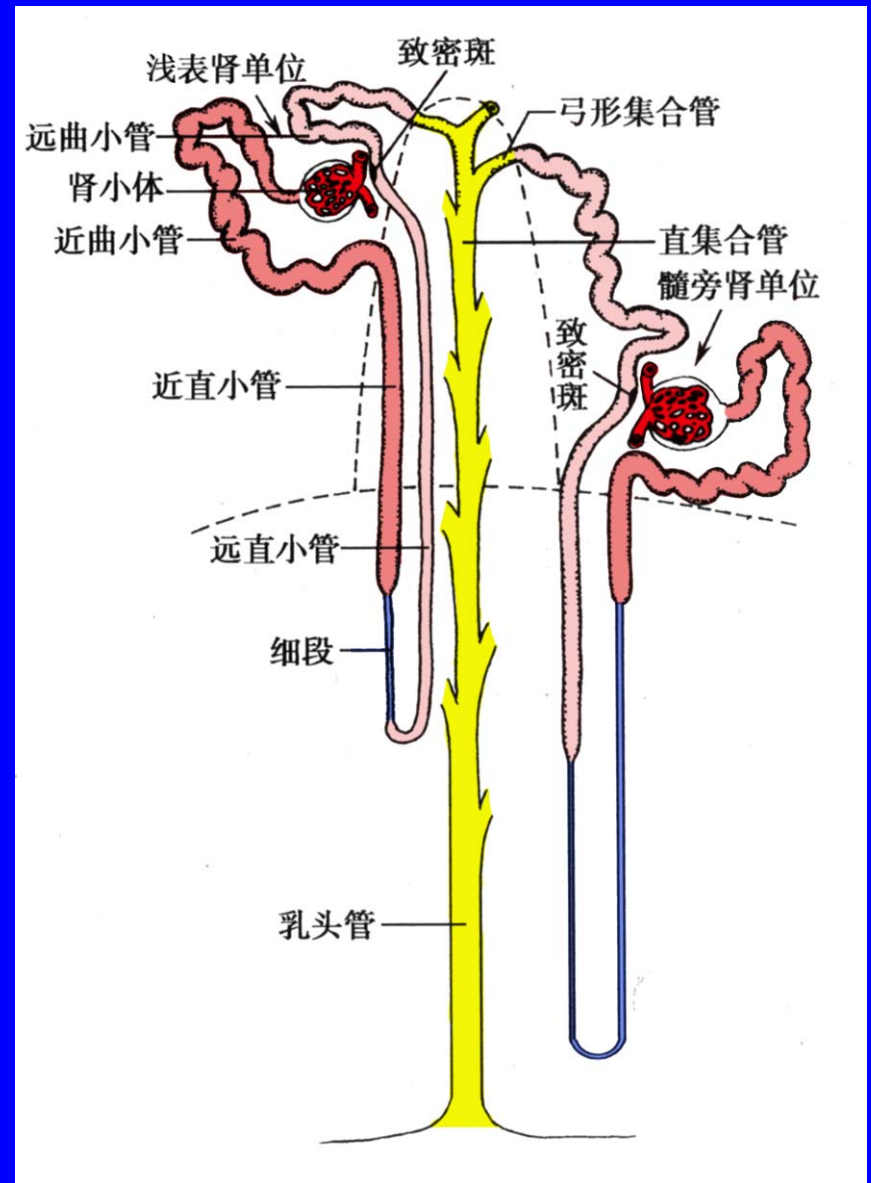


# Nephron



# Juxtamedullary nephron

## superficial nephron



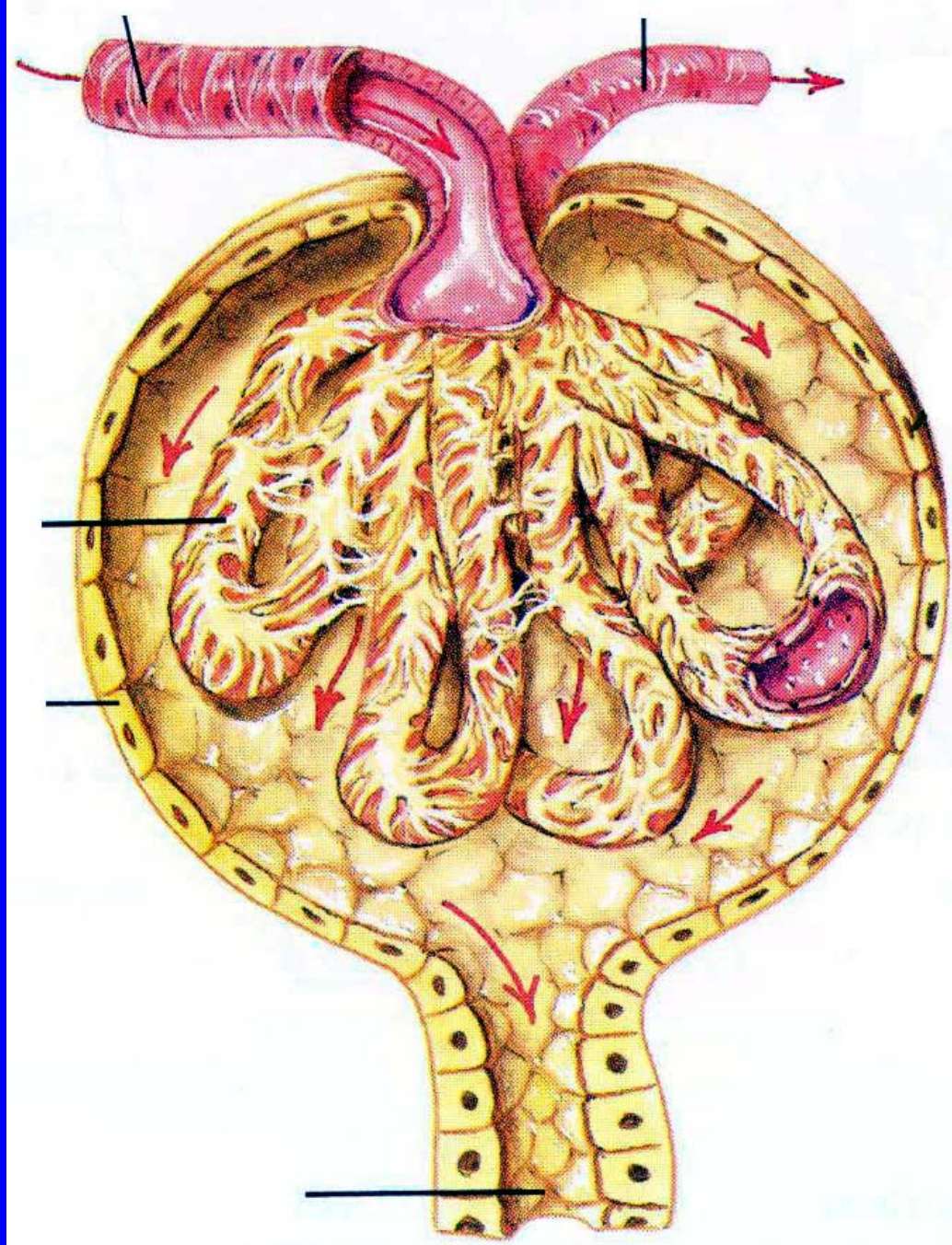
# 1. Renal Corpuscles

renal capsules

glomerulus

vascular pole

urinary pole



# 1.1 Glomerulus:

Afferent arteriole    Efferent arteriole

Capillaries network

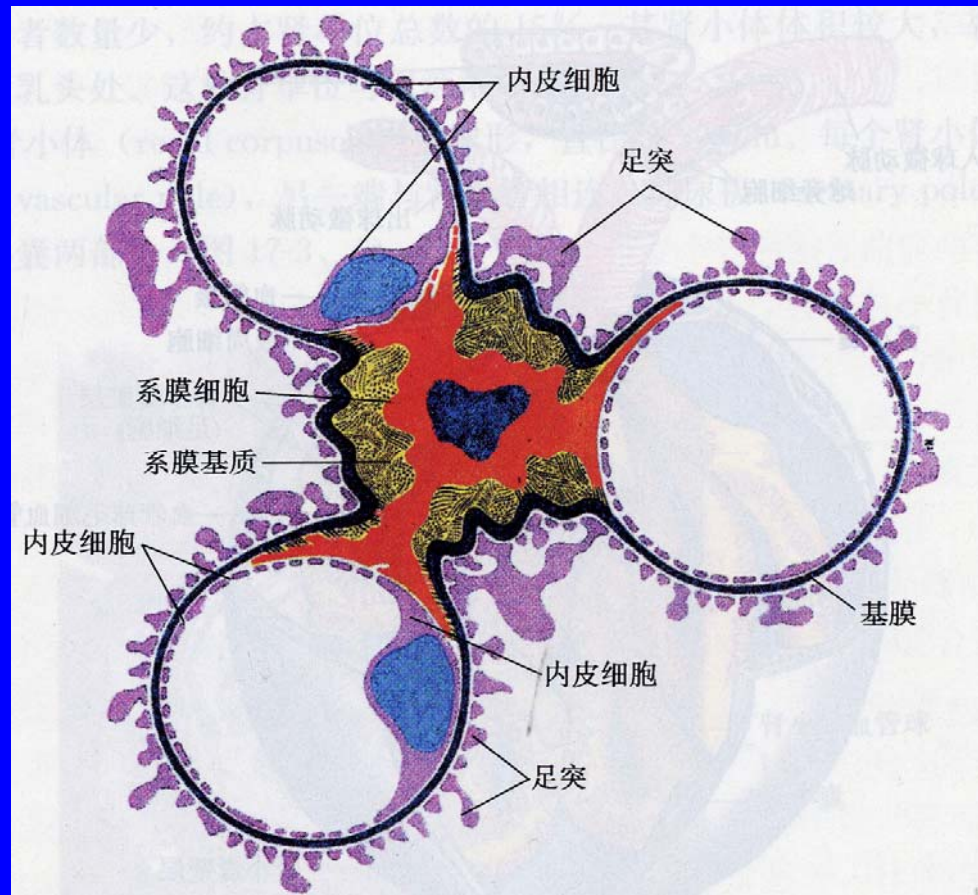




# Glomerular basement membrane

mesangium :

**mesangial cells**

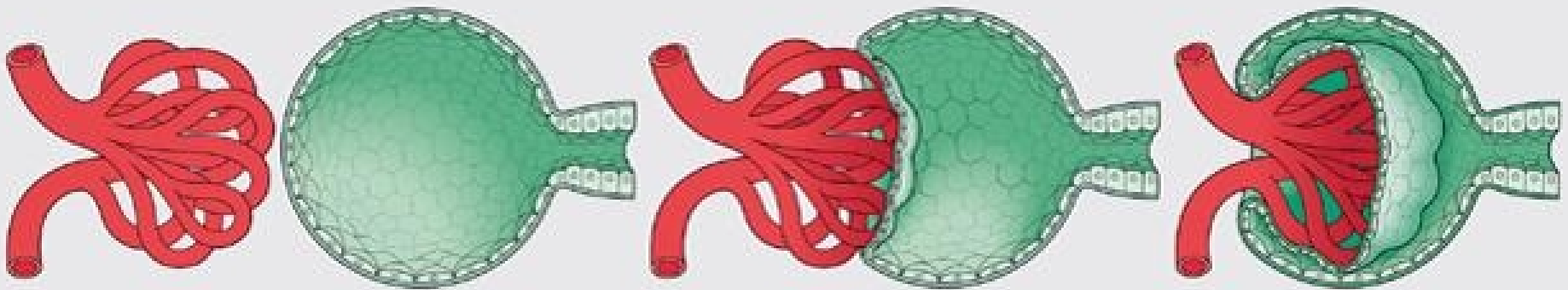


# 1.2 Renal Capsule

**Parietal layer : simple squamous epithelium**

**Visceral layer: podocytes**

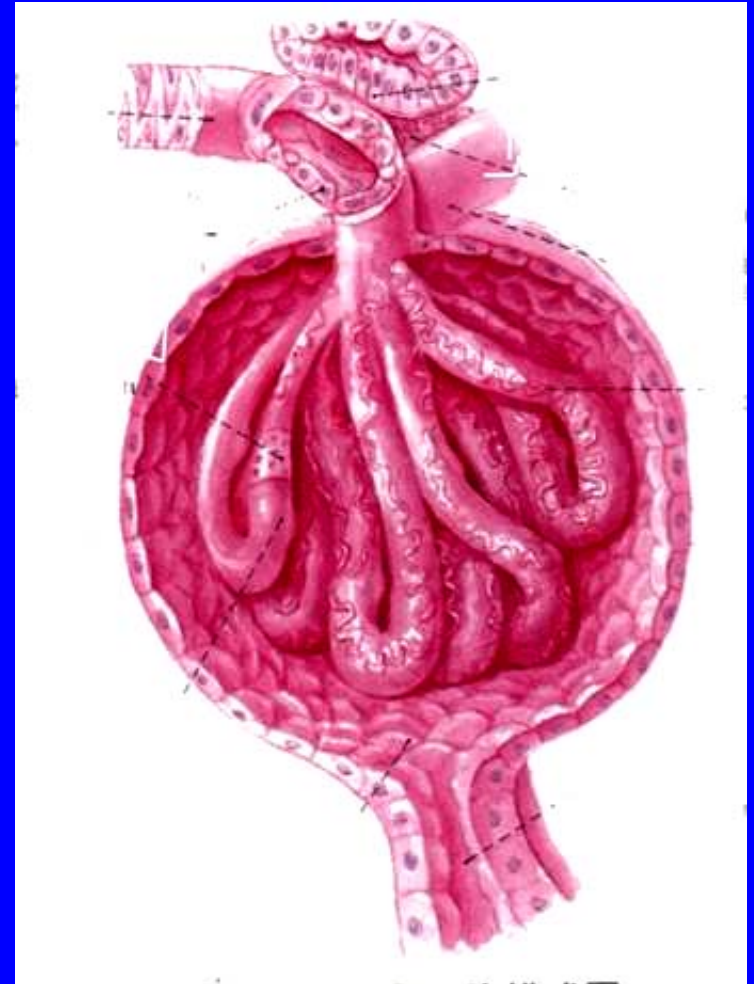
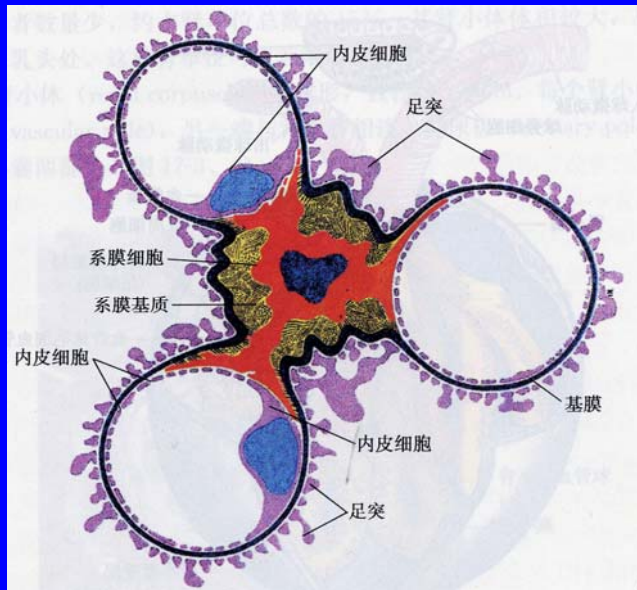
**capsular space**



# 1.2 Renal Capsule

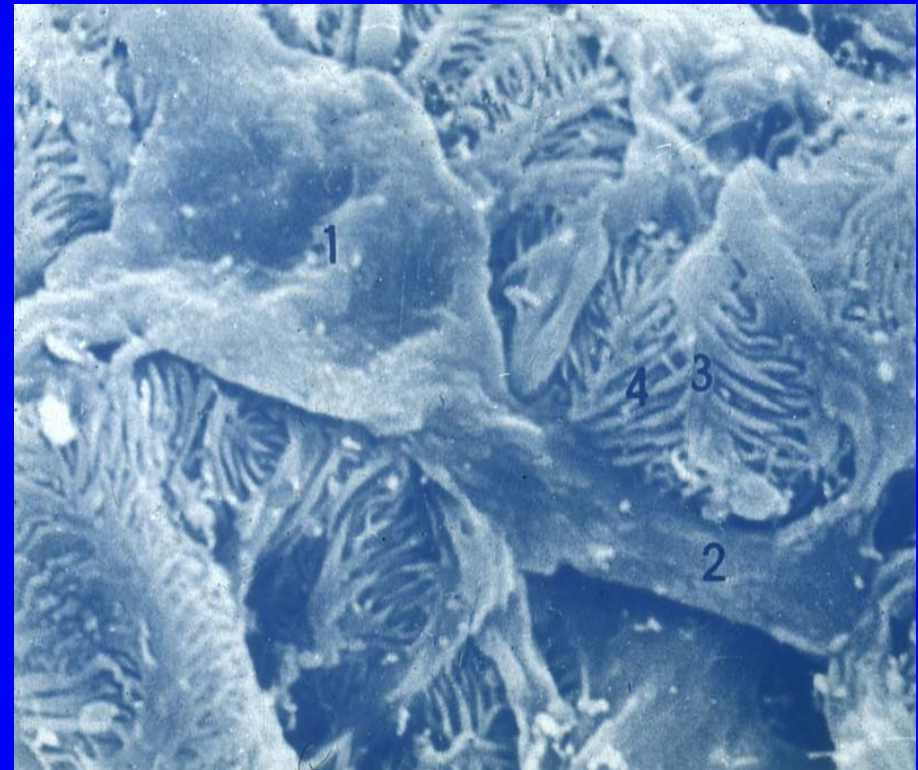
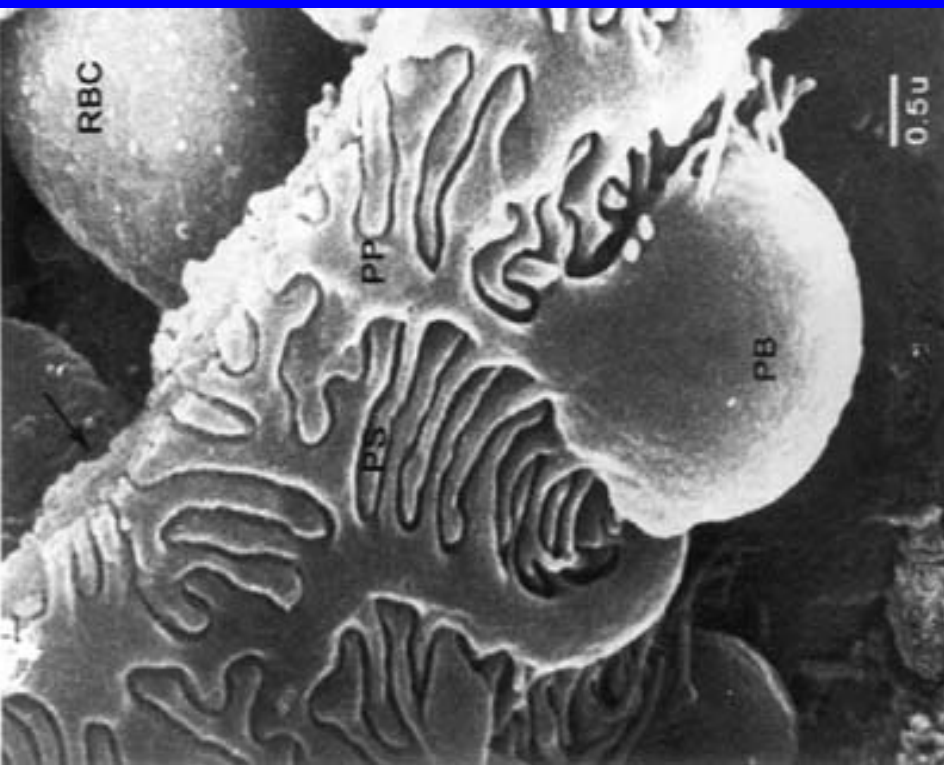
**Parietal layer : simple squamous epithelium**

**Visceral layer: podocytes**  
**capsular space**



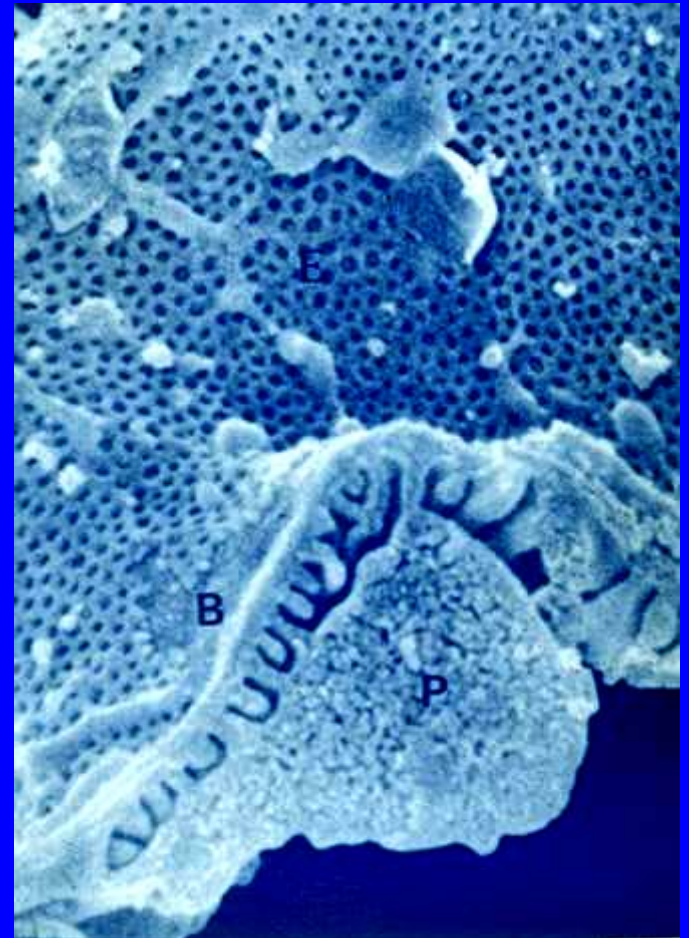
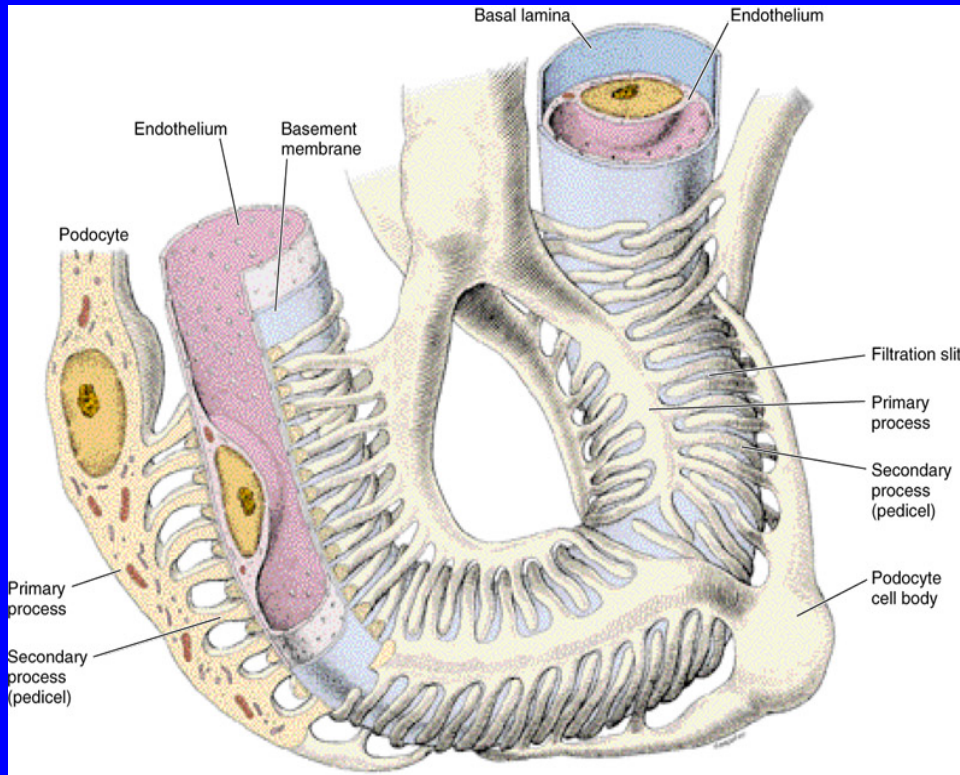
# Podocytes

primary processes, Secondary processes  
slit pore , slit membrane



# Podocytes

primary processes, Secondary processes  
Slit pore

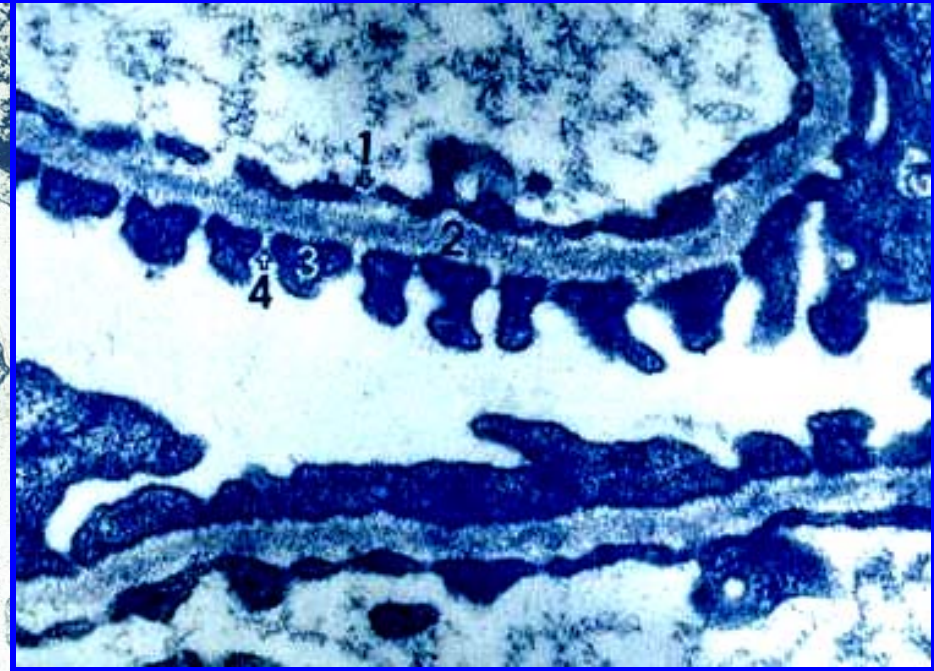
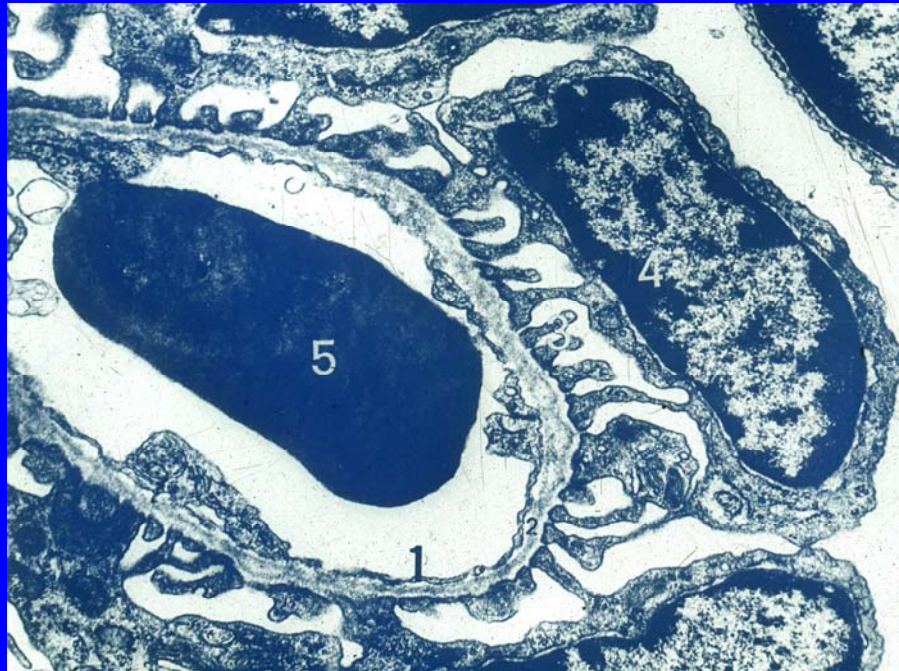


# filtration barrier

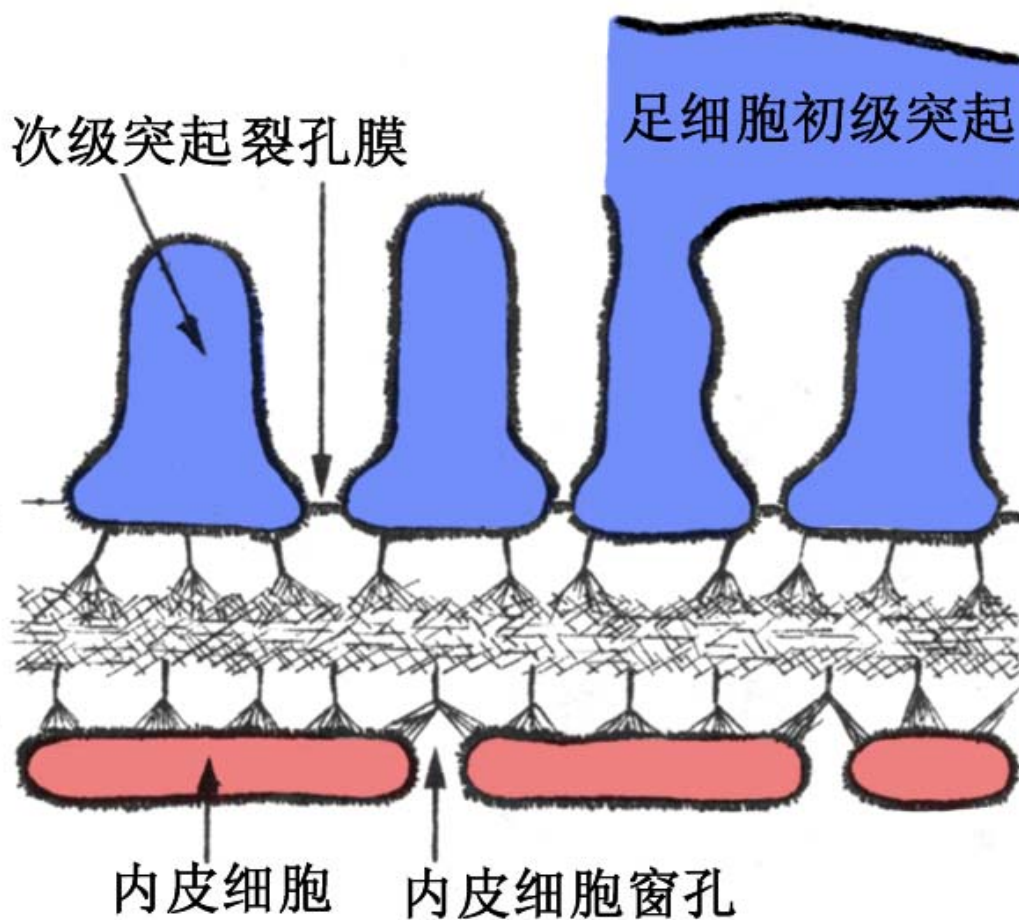
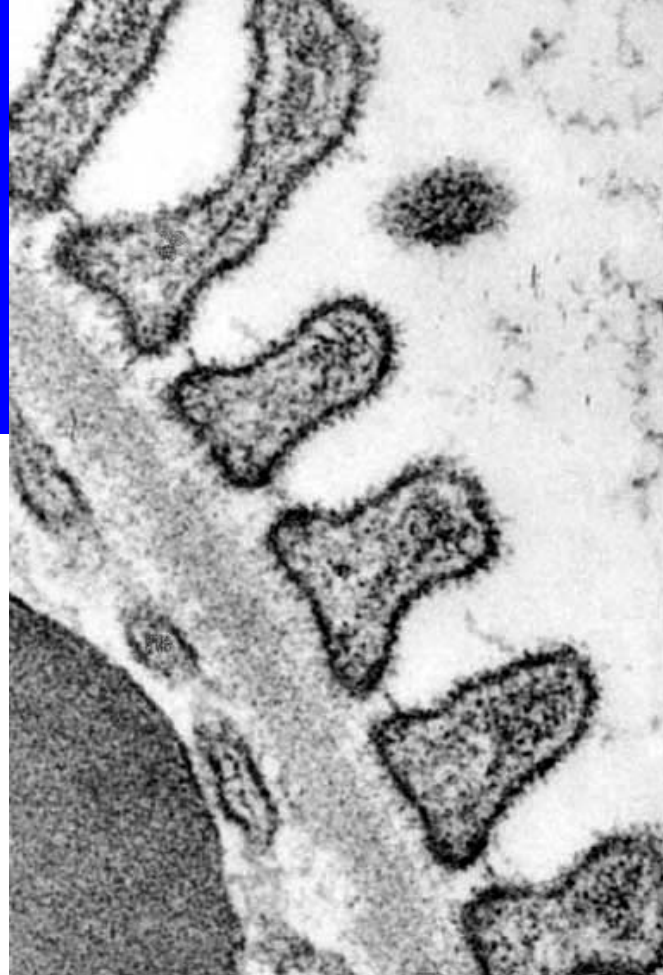
Fenestrated endothelium

slit membrane of podocytes

basement membrane



# filtration barrier



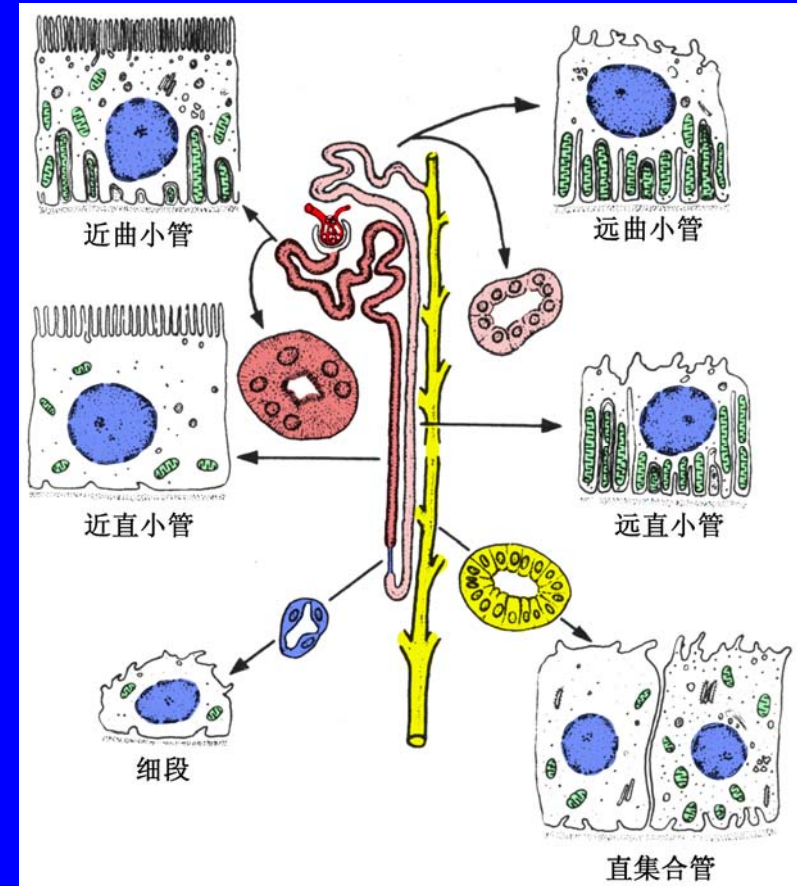
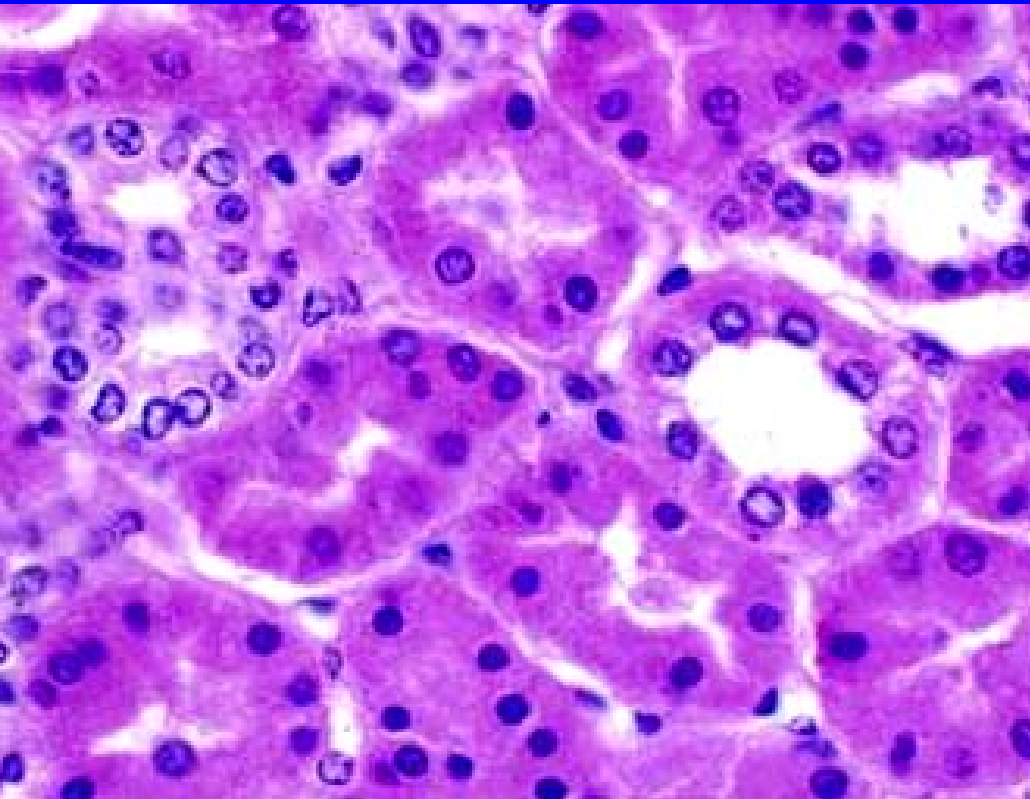
## 2. Renal Tubules

### 2.1 Proximal Tubules

(1) pars convoluta:

LM: strongly acidophilic cytoplasm, brush border

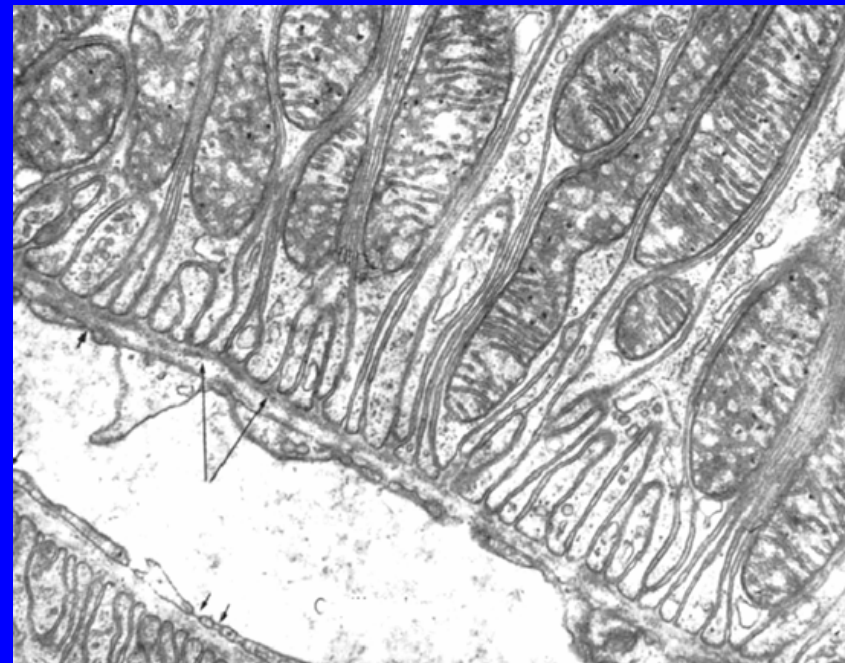
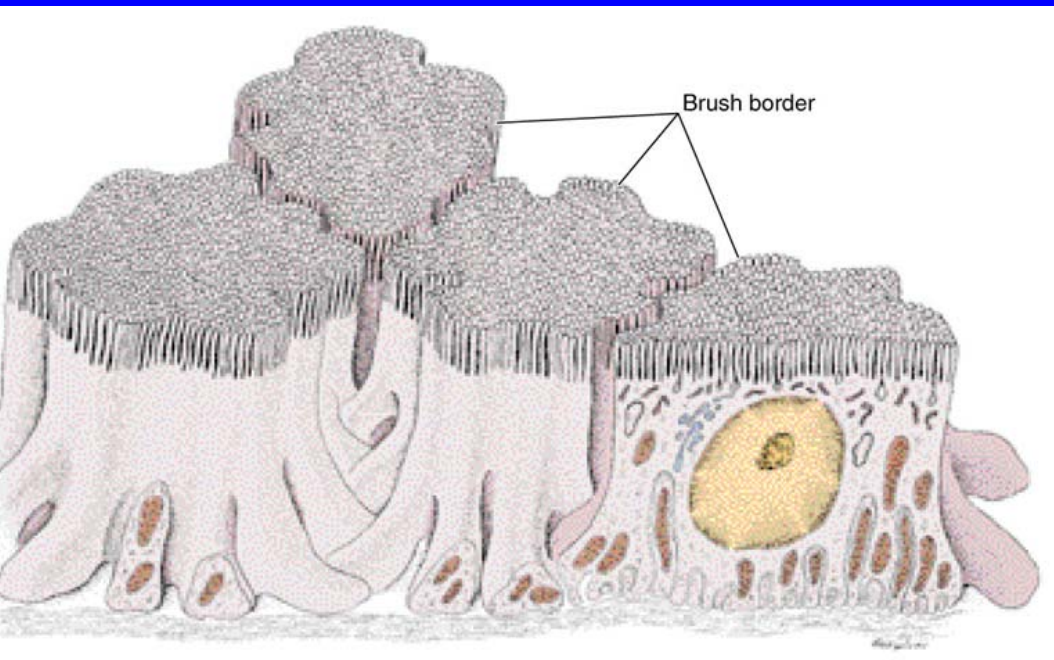
(2) pars recta:





**EM: microvilli, canaliculi and small vesicles,  
lateral processes, plasma membrane infolding,  
numerous mitochondria**

**Function: repeated absorption 85% Na<sup>+</sup> and H<sub>2</sub>O  
all glucose, amino acid, polypeptide and  
small molecule protein**



## 2.2 Thin Segment

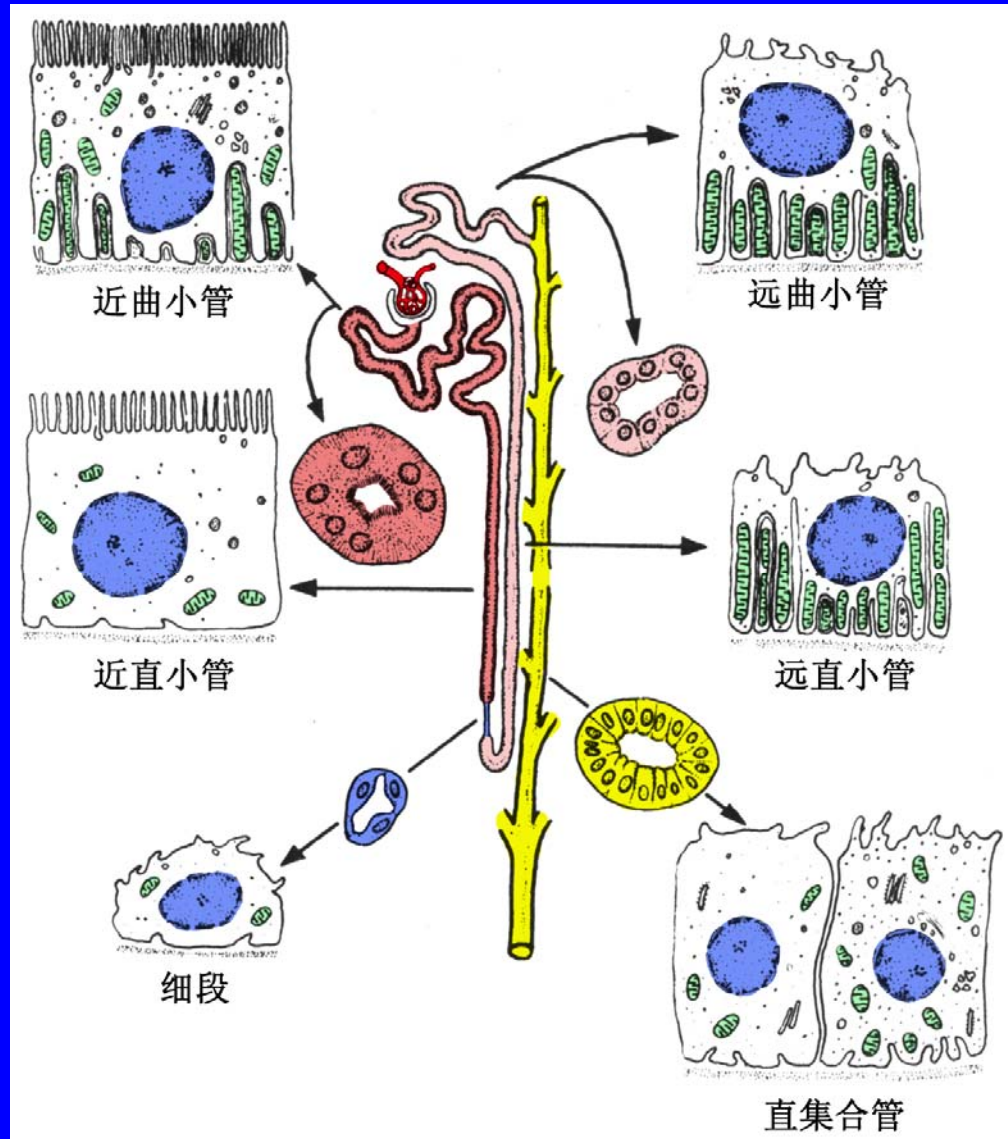
## 2.3 Distal Tubules

pars recta:

pars convoluta:

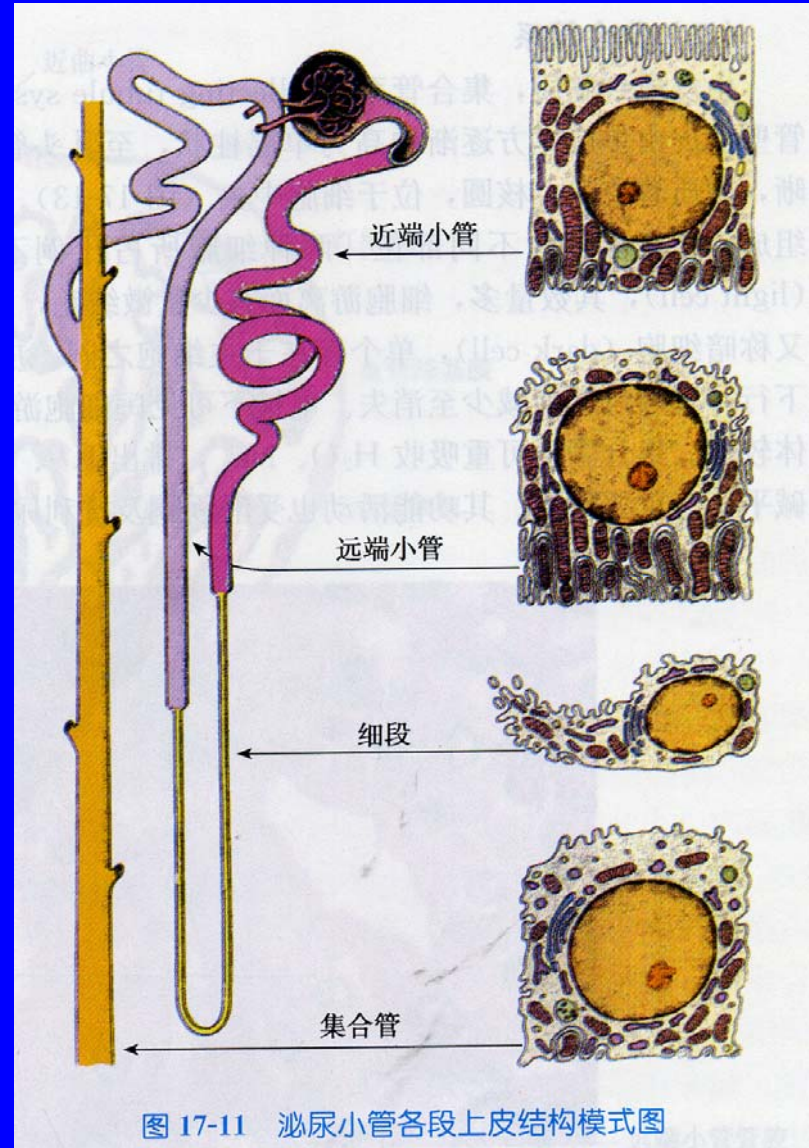
Function:

ion exchange



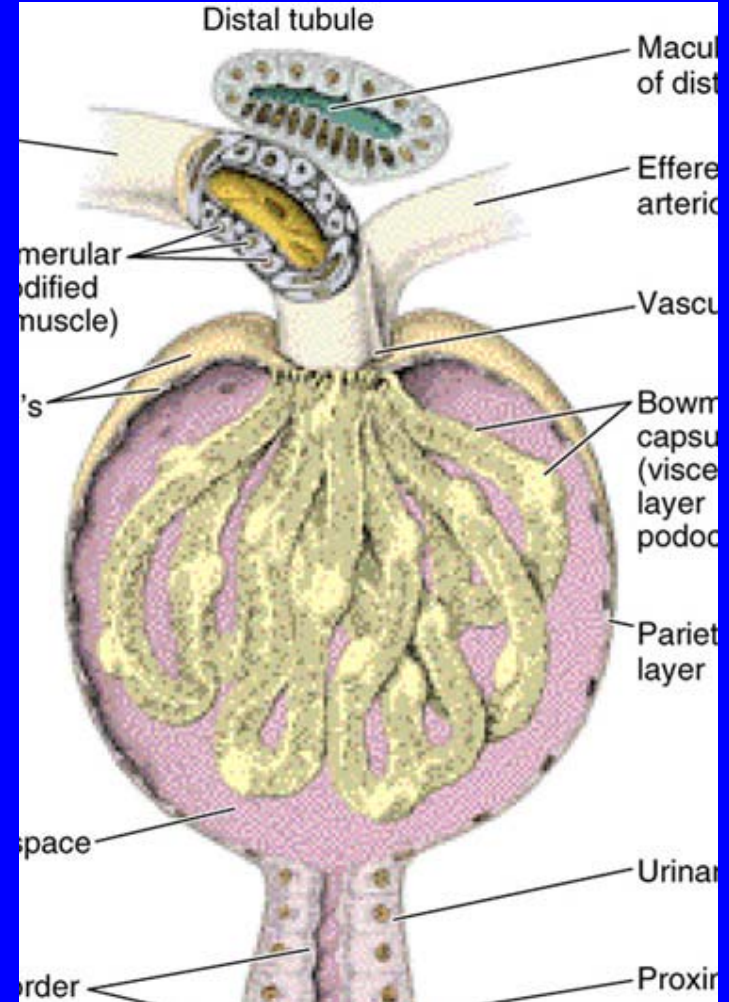
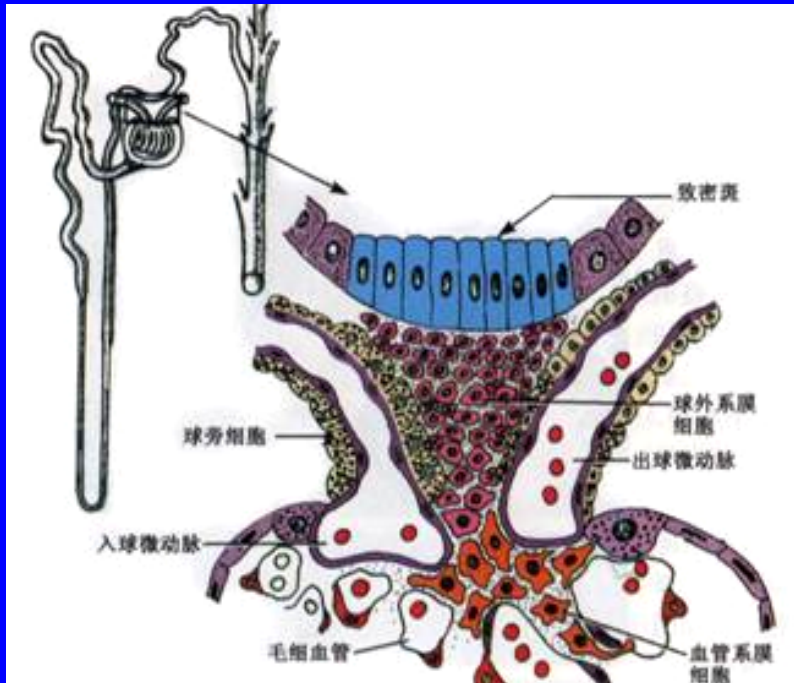
# Collecting Tubule System

- Arched collecting tubules
- Cortical collecting tubules
- Medullary collecting tubules
- **Function: ion exchange**



# Juxtaglomerular Complex

1. Juxtaglomerular Cells
2. Macula Densa
3. Extraglomerular mesangial cells



# Blood Circulation of Kidney

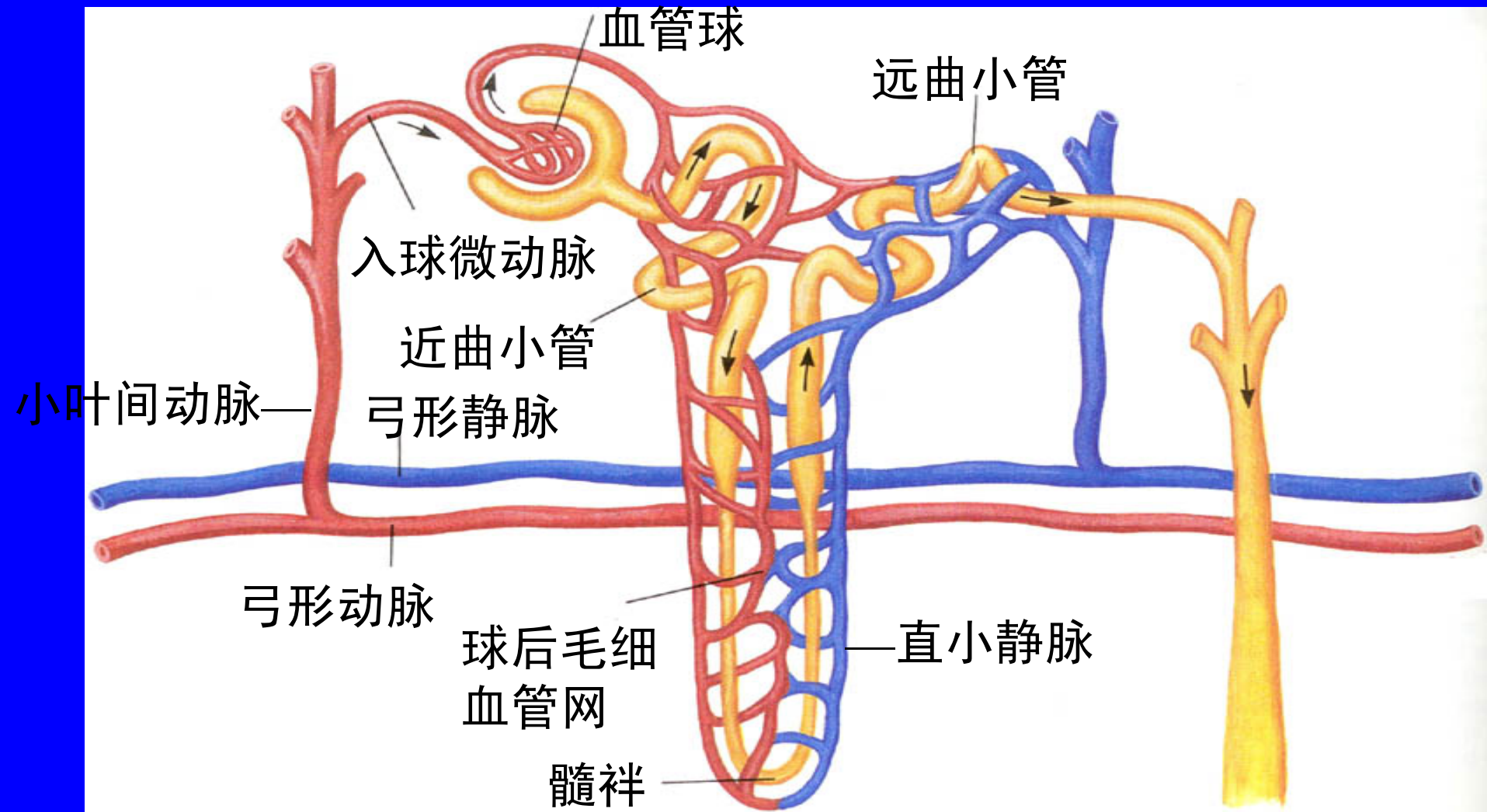
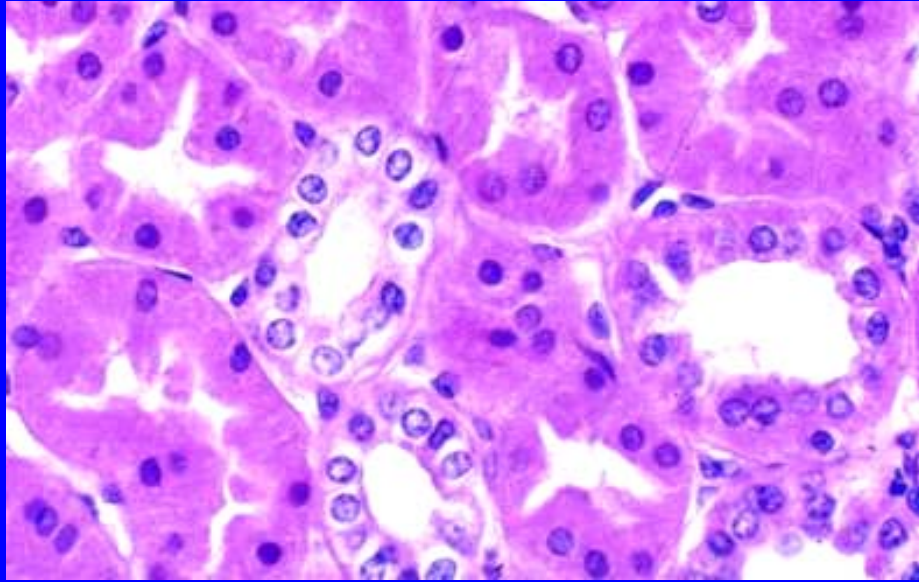
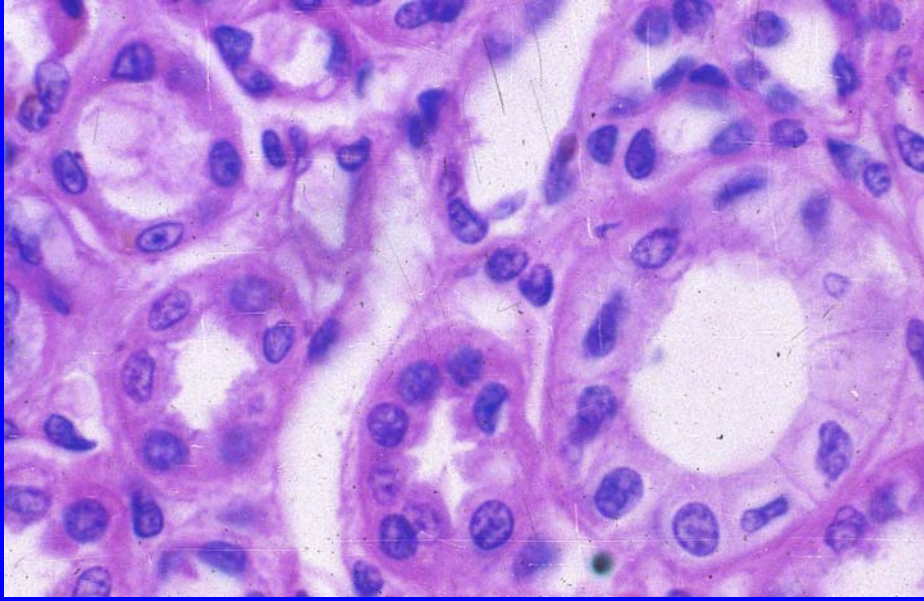
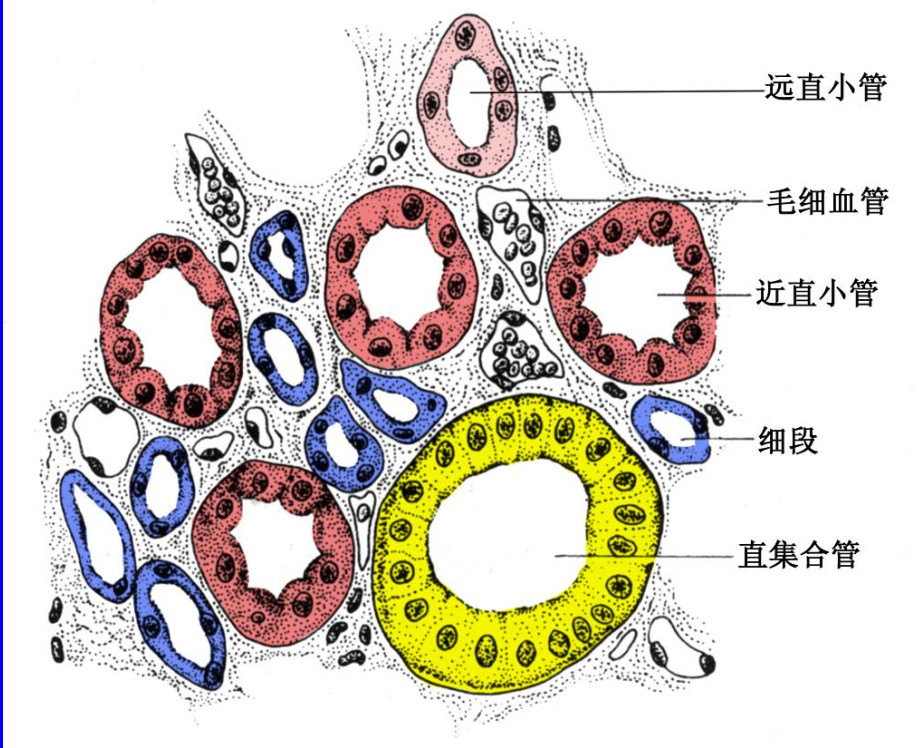
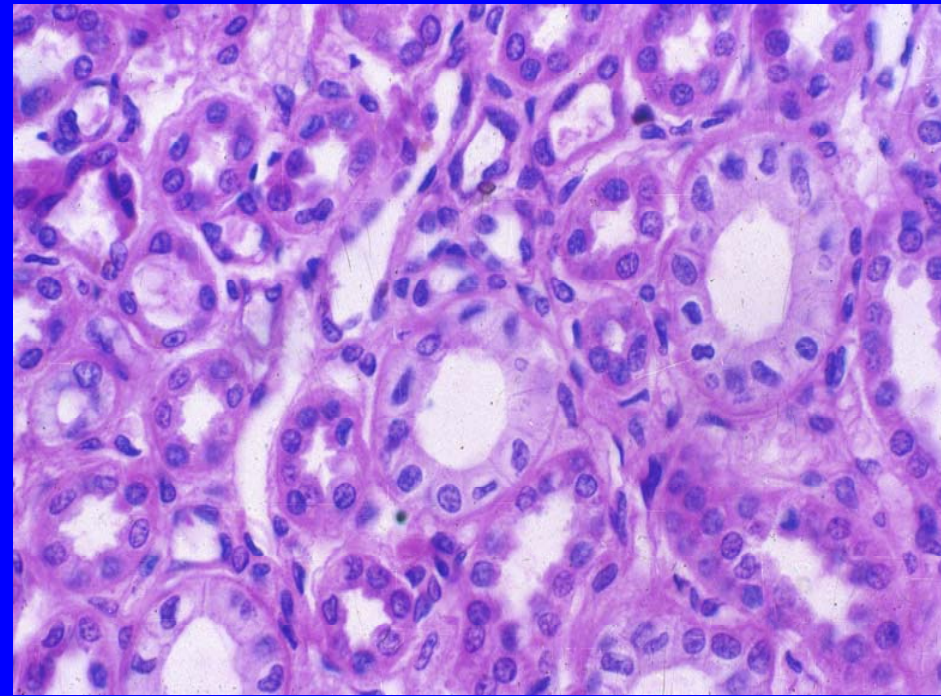
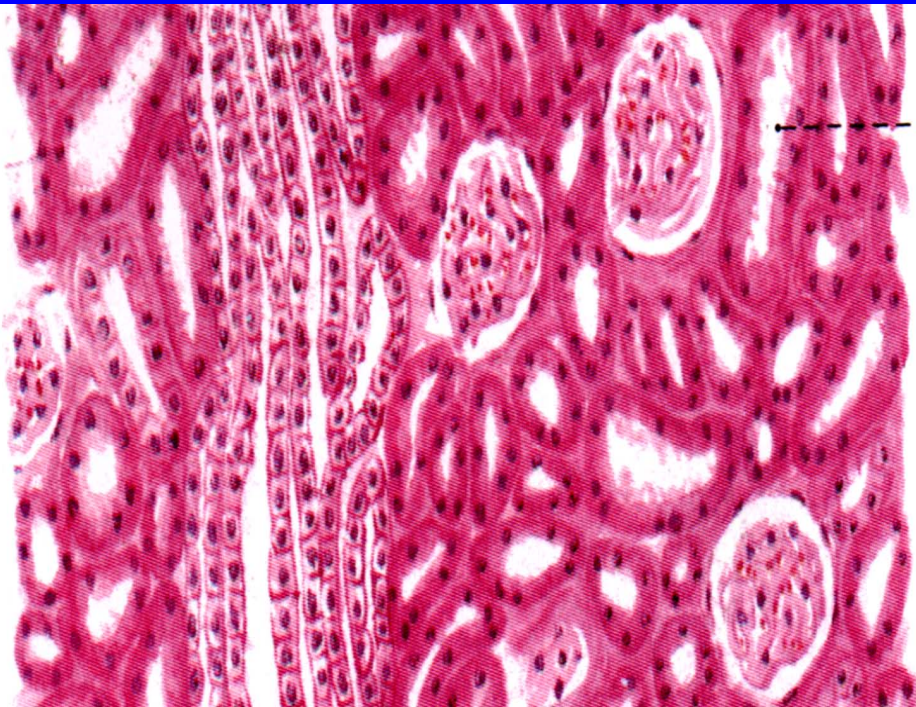


图21 肾血液循环模式图

# **Blood Circulation of Kidney of characteristics**

- ① Renal artery deriving from abdominal main artery, and having larger blood stream;**
- ② Forming double capillary network in the pathway of blood vessels;**
- ③ Straight small blood vessels accompany medullar loops in the medulla.**





collecting tubules in renal cortex



