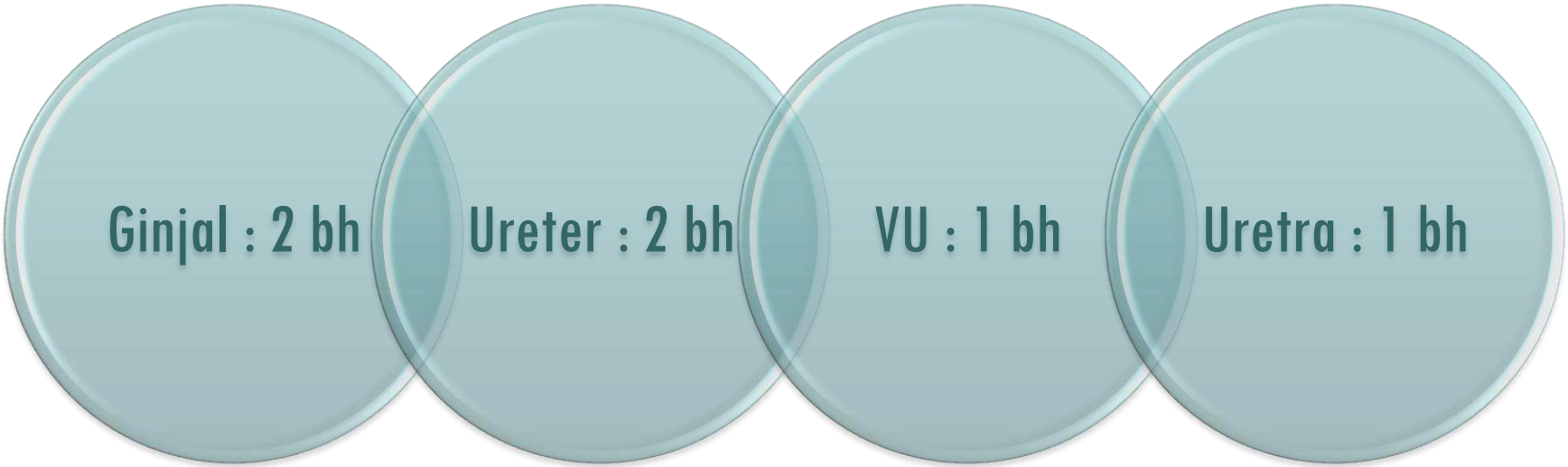
Traktus Uropoetika (TUP)

Desy Andari
FK-UMM


Ginjal : 2 bh
Ureter : 2 bh
VU : 1 bh
Uretra : 1 bh

GINJAL

Sebagai Kel. Eksokrin

- Jenis : Compound tubular gland
- Bagian sekresi : nephron
- Bagian ekskresi :tubulus kolektivus sampai urethra
- Hasil : Urine

Sebagai Kel. Endokrin

- JG Cell : Renin & Renal Erithropoietin Factor (REF)
- Macula Densa : Bahan yang membantu osmolaritas urine

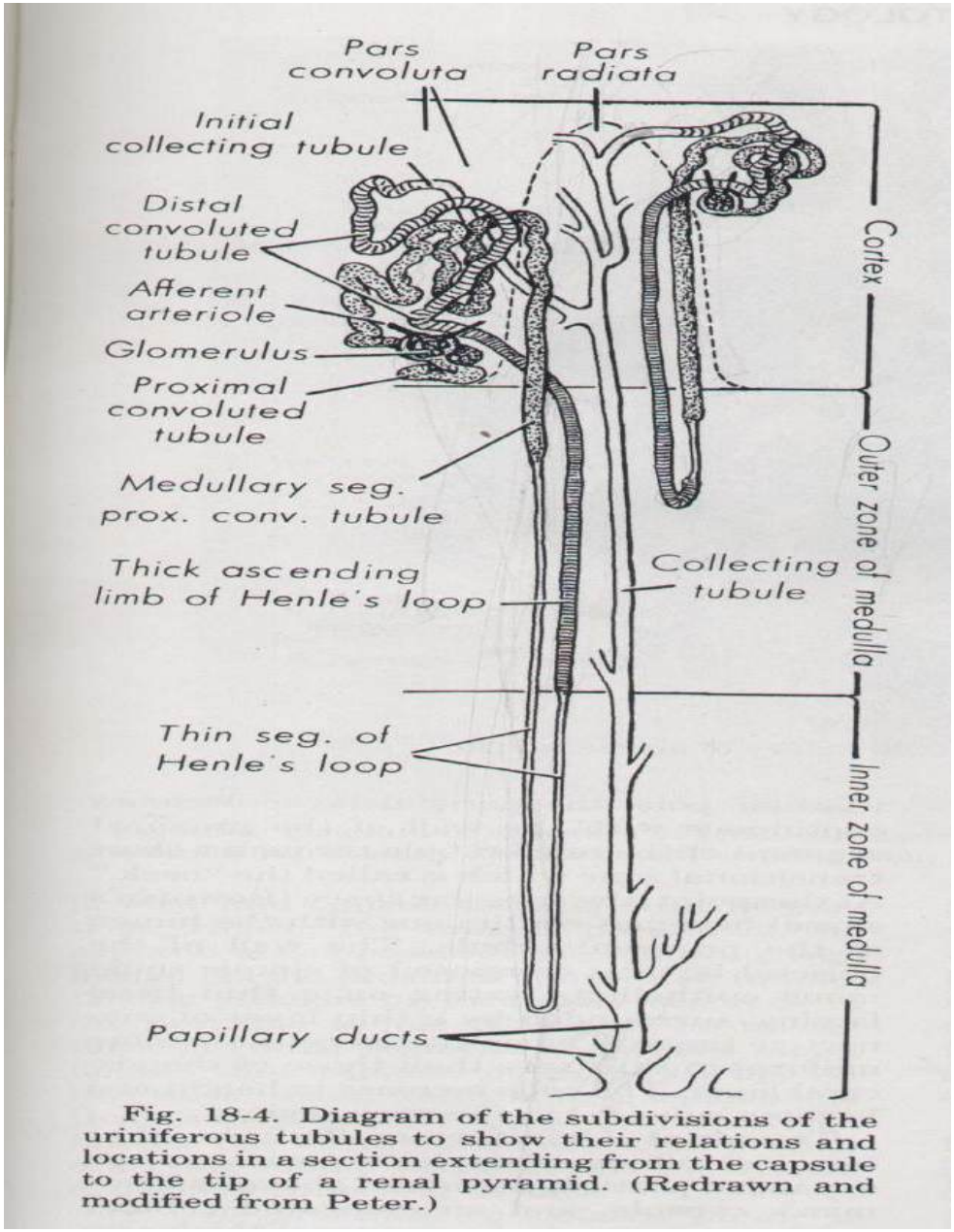


Fig. 18-4. Diagram of the subdivisions of the uriniferous tubules to show their relations and locations in a section extending from the capsule to the tip of a renal pyramid. (Redrawn and modified from Peter.)

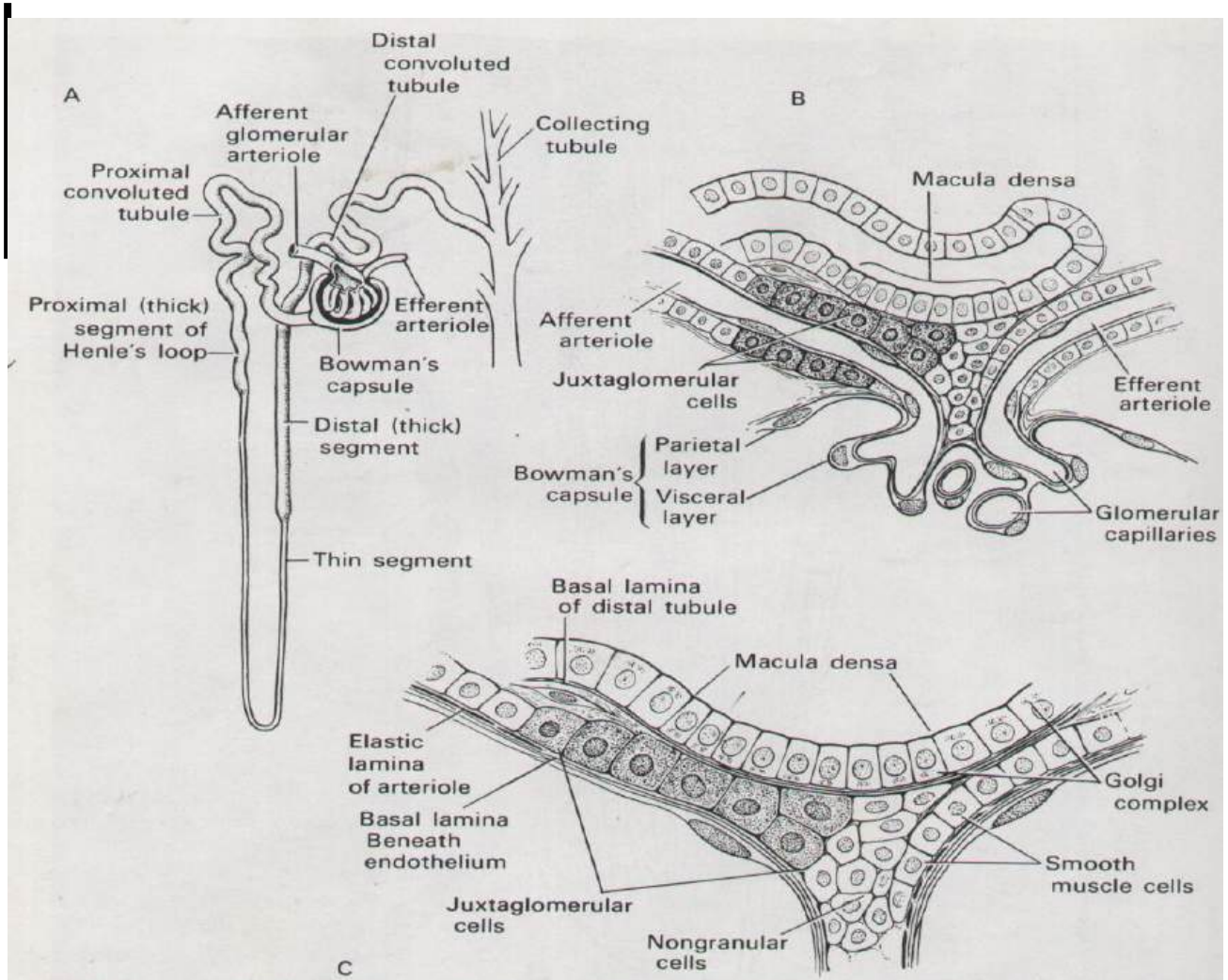


Fig. 18-19. Diagrams of a uriniferous tubule and its glomerular arterioles to show the locatio and structure of the juxtaglomerular cells and macula densa. *A*, a diagram of the relationshi between the glomerular arterioles and the uriniferous tubule at the point where the distal segmen of Henle's loop continues into the distal convoluted tubule. *B*, a portion of the region at highe magnification. The *macula densa* in the wall of the distal tubule is apposed to portions of th afferent and efferent glomerular arterioles and is particularly close to the *granular juxtaglomerula cells*. *C*, an enlargement of a portion of *B* showing that the internal elastic lamina of the arteriol and most other connective tissue elements are absent from the region where the macula densa cell and granular juxtaglomerular cells are apposed.

GINJAL

- Struktur → kapsul, korteks, medulla.
- Kapsul → jaringan ikat tdk teratur, tdd. serabut kolagen dan elastis.
- hilus ginjal
- sinus renalis

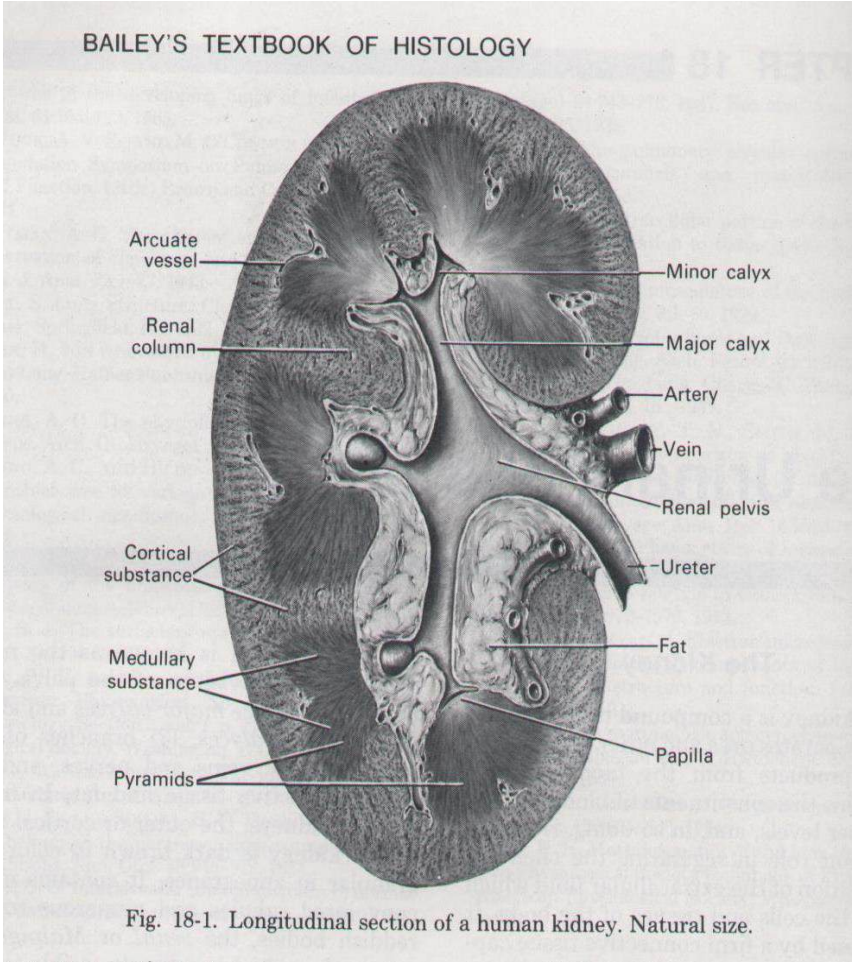


Fig. 18-1. Longitudinal section of a human kidney. Natural size.

HILUS GINJAL

- Bagian cekung ginjal
- Masuknya : A. Renalis, syaraf
  Keluarnya : V. Renalis, ureter, p. limfe
- Muara sinus renalis

Sinus Renalis :

- Ruangan yang dikelilingi oleh kortex dan medulla
- Bermuara di hillus
- Mengandung :
    - Pelvis renalis
    - Kaliks major (2-5 buah) dan kaliks minor (8-12 buah)
    - Percabangan A,V,N Renalis
    - Jaringan ikat longgar

Korteks Ginjal

Bagian korteks yg menjulur ke seluruh kedalaman medulla → Columna Renalis Bertini

1. Pars radiata/pars recta/medullary rays of ferreini/ processus ferreini

→ Mengandung duktus/tubulus kolektivus dan loop of henle

2. Pars convulata : labyrinth cortex

→ Mengandung Corpusculum Renalis Malpighi (CRM), Tubulus Contortus Proximalis (TCP), Tubulus Contortus Distalis (TCD), initial/arc collecting tubule.

- 1 lobus ginjal=1 piramid ginjal → lobulus-lobulus
- 1 lobulus ginjal=1 pars radiata+2x½ pars convulata yg berdekatan

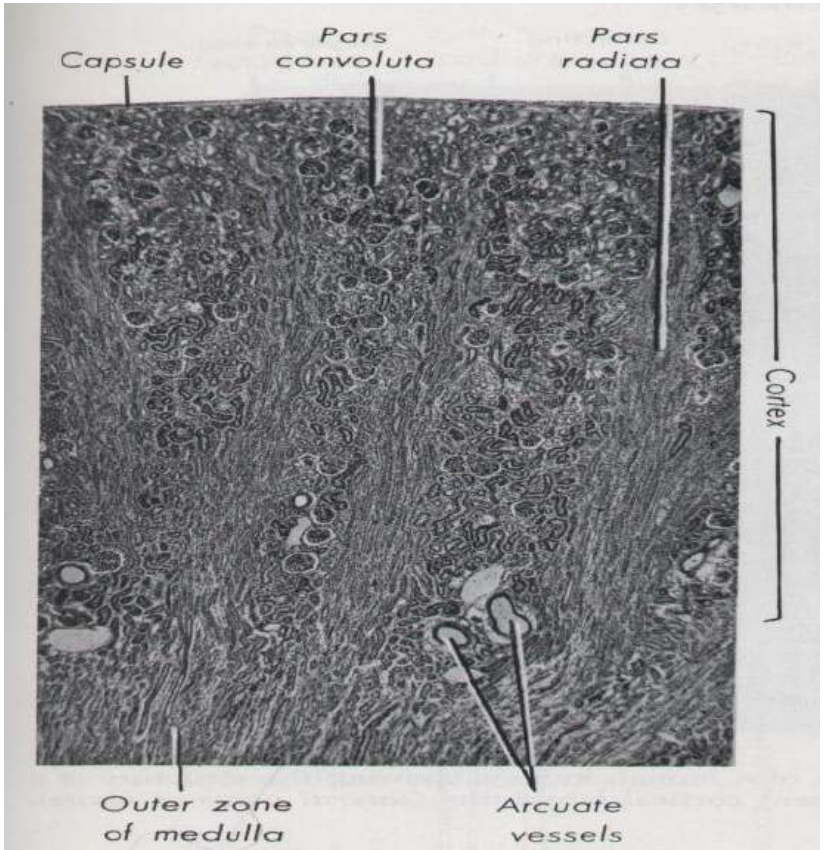


Fig. 18-2. Low power photomicrograph of a section of a kidney from an infant of 8 months, showing topography of the cortex and a part of the outer zone of the medulla. ×28.

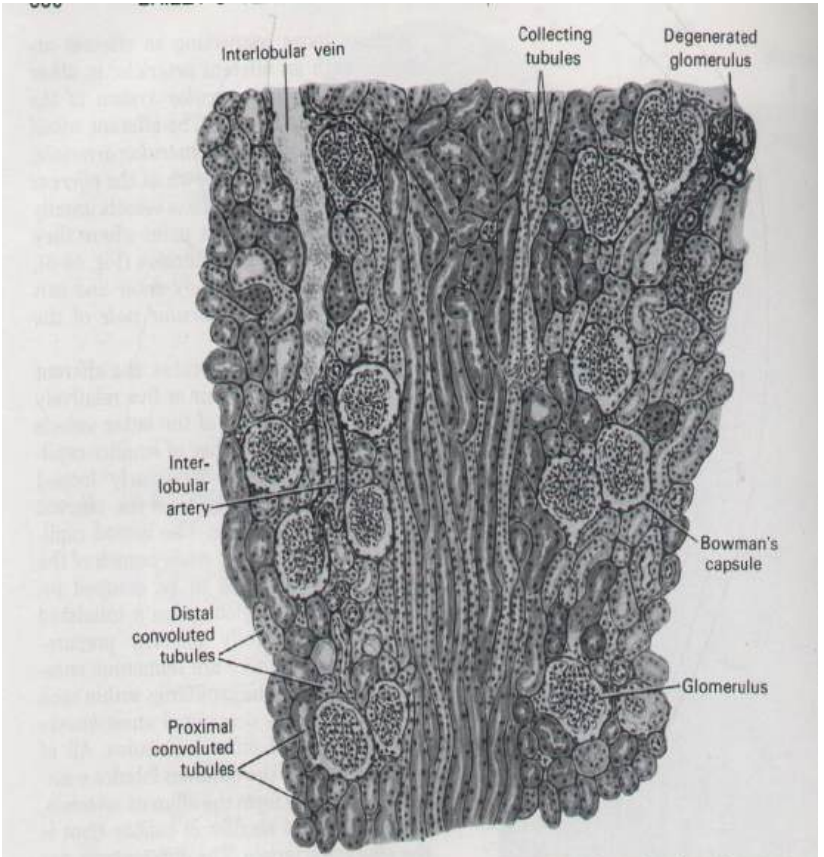


Fig. 18-3. Section through a part of the cortex of a human kidney, showing the structure pars radiata (*central part of figure*) and of adjacent cortical labyrinths (*lateral parts of fi* ×55.

Medulla Ginjal

Berbentuk piramid → medullary pyramid → 8-18 medulla piramid=piramid malpighi

2-3 piramid bersatu membentuk 1 apeks piramid ke arah hilus → papilla

Ujung papilla seperti suatu saringan di area kribosa : 10-25 lubang/pori-pori=foramina papilaris → duktus kolektivus yg berada di papil piramid

BAILEY'S TEXTBOOK OF HISTOLOGY

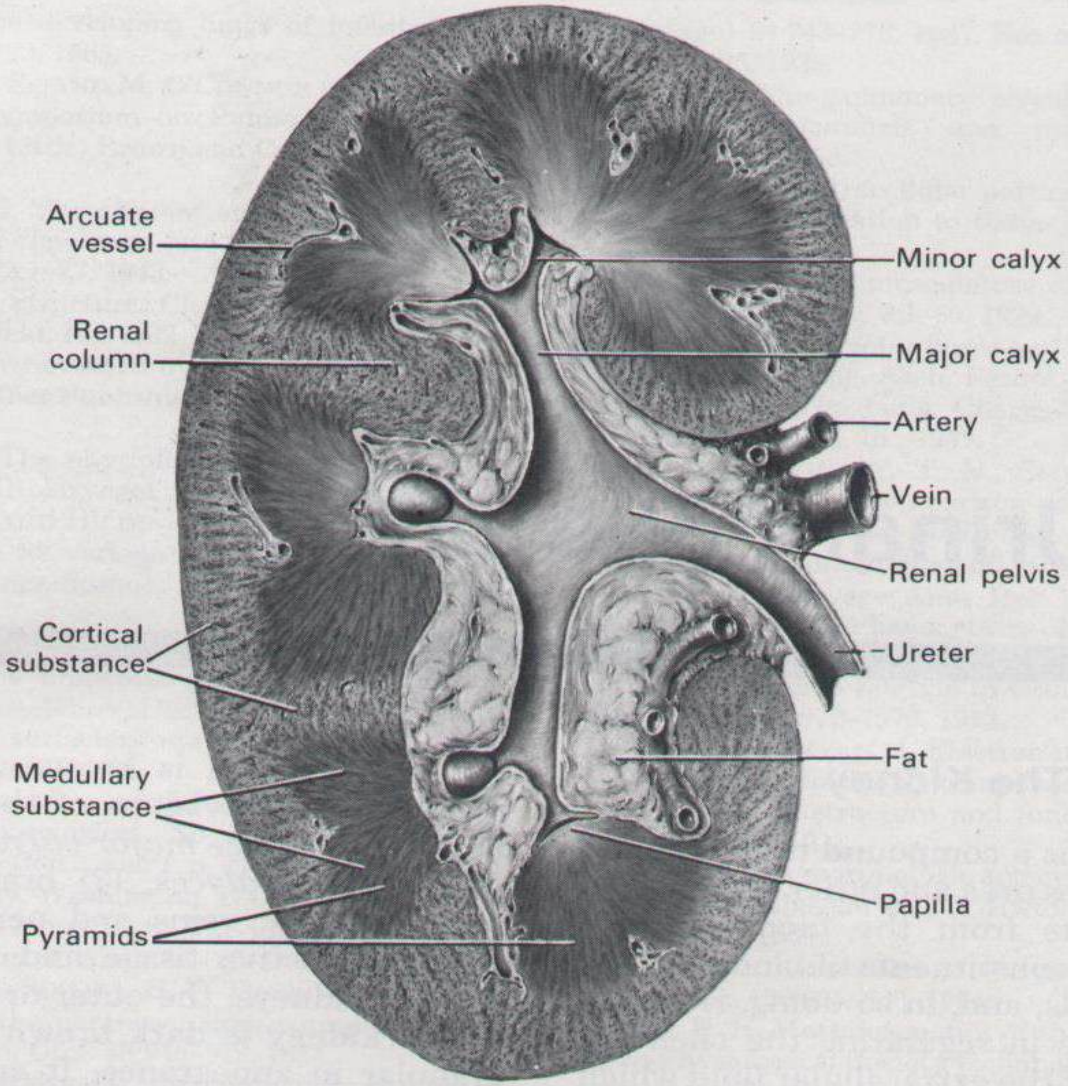


Fig. 18-1. Longitudinal section of a human kidney. Natural size.

Medulla tdd. 2 daerah :

- **Outer zone = subcortical zone = medulla bagian luar = medulla yang berdekatan dengan korteks**
- **Inner zone = daerah papilla**

TABLE 18-1

Locations of portions of uriniferous tubules

Location of kidney	Portion of tubule
CORTEX	
Cortical labyrinth	Malpighian corpuscles Proximal convoluted tubules Distal convoluted tubules Arched collecting tubules
Medullary ray	Straight portions (medullary segments) of proximal tubules Thick segments of ascending arms of Henle's loops Straight collecting tubules
MEDULLA	
Outer zone	Straight portions (medullary segments) of proximal tubules Thick segments of ascending arms of Henle's loops Thin segments of Henle's loops Crests of shorter loops Straight collecting tubules
Inner zone	Thin segments of Henle's loops Crests of long loops Straight collecting tubules Fusions of straight collecting tubules Papillary ducts

STRUKTUR YANGTERDAPAT DI KORTEKS DAN MEDULLA GINJAL

LOCATION OF KIDNEY	PORTION OF TUBULE
CORTEX : Cortical Labyrinth	- Malpighian corpuscles - Proximal convulated tubules - Distal convulated tubules - Arched collecting tubules
Medulla ray	- Straight portions (medullary segments) of proximal tubules - Thick segments of ascending arms of Henle's Loop - Straight collecting tubules

Lanjutan…..

LOCATION OF KIDNEY	PORTION OF TUBULE
Medulla : Outer Zone	- Straight portions(medullary segments) of proximal tubules - Thick segments of ascending arms of Henle's loops - Crest of shorter loops - Straight collecting tubules
Inner Zone	- Thin segments of Henle's Loops - Crest of long loops - Straight collecting tubules - Papillary ducts

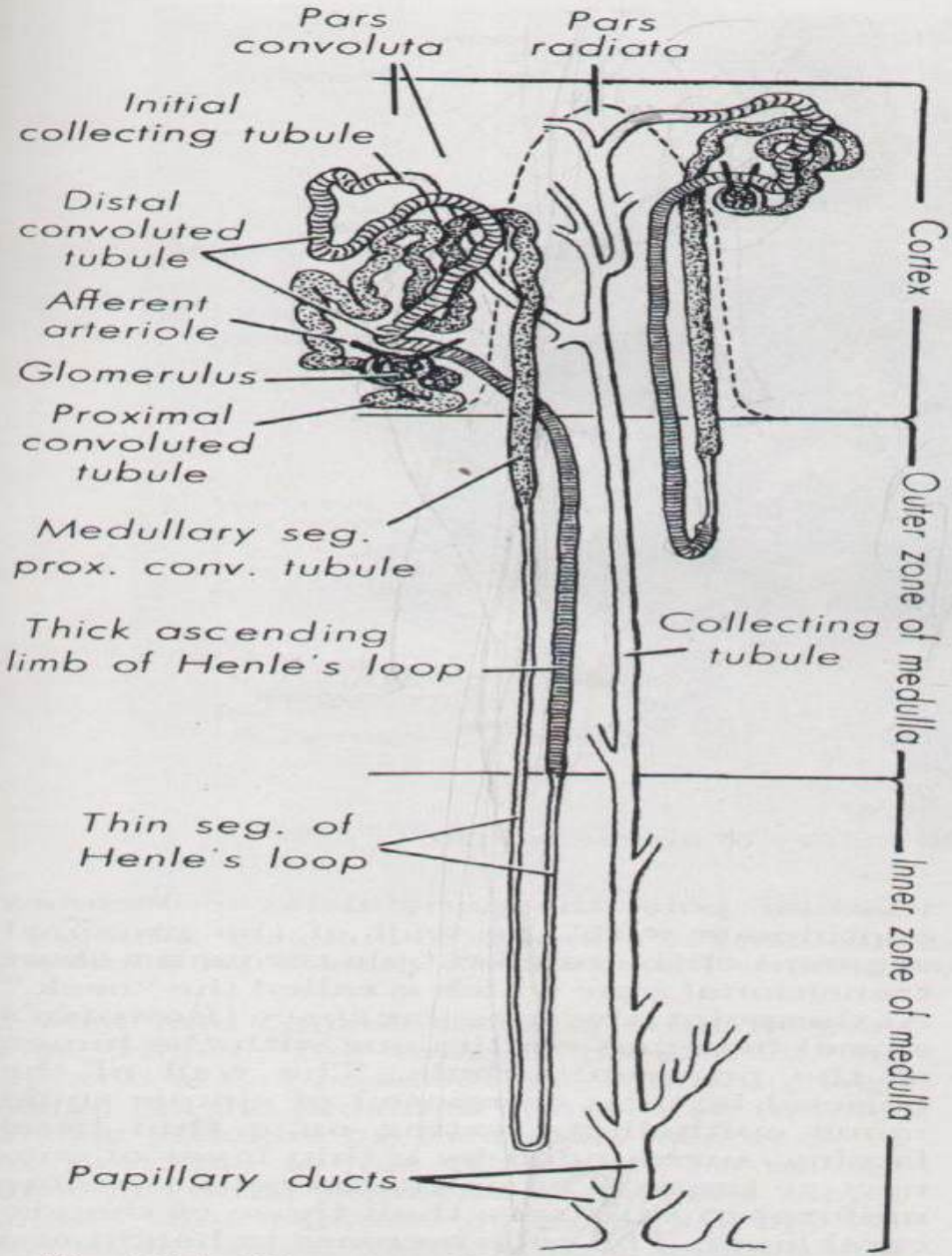


Fig. 18-4. Diagram of the subdivisions of the uriniferous tubules to show their relations and locations in a section extending from the capsule to the tip of a renal pyramid. (Redrawn and modified from Peter.)

Nephron

Merupakan unit fungsional dr ginjal

1. Bagian tabung : Tubuli renalis

2. Bagian melebar : Corpusculum Renalis Malpighi (CRM)

Tubuli renalis

Thick Segment Proksimal	• Berkelok → Tubulus Contortus Proximalis (TCP) • Lurus → Proximal Thick Segment (PTS)=pars descenden loop of henle
Thick Segment Distal	• Berkelok → Tubulus Contortus Distalis (TCD) • Lurus → Distal Thick Segment (DTS)=pars ascenden loop of henle
Thin Segment	• Lurus → mirip kapiler darah, epitel selapis pipih.

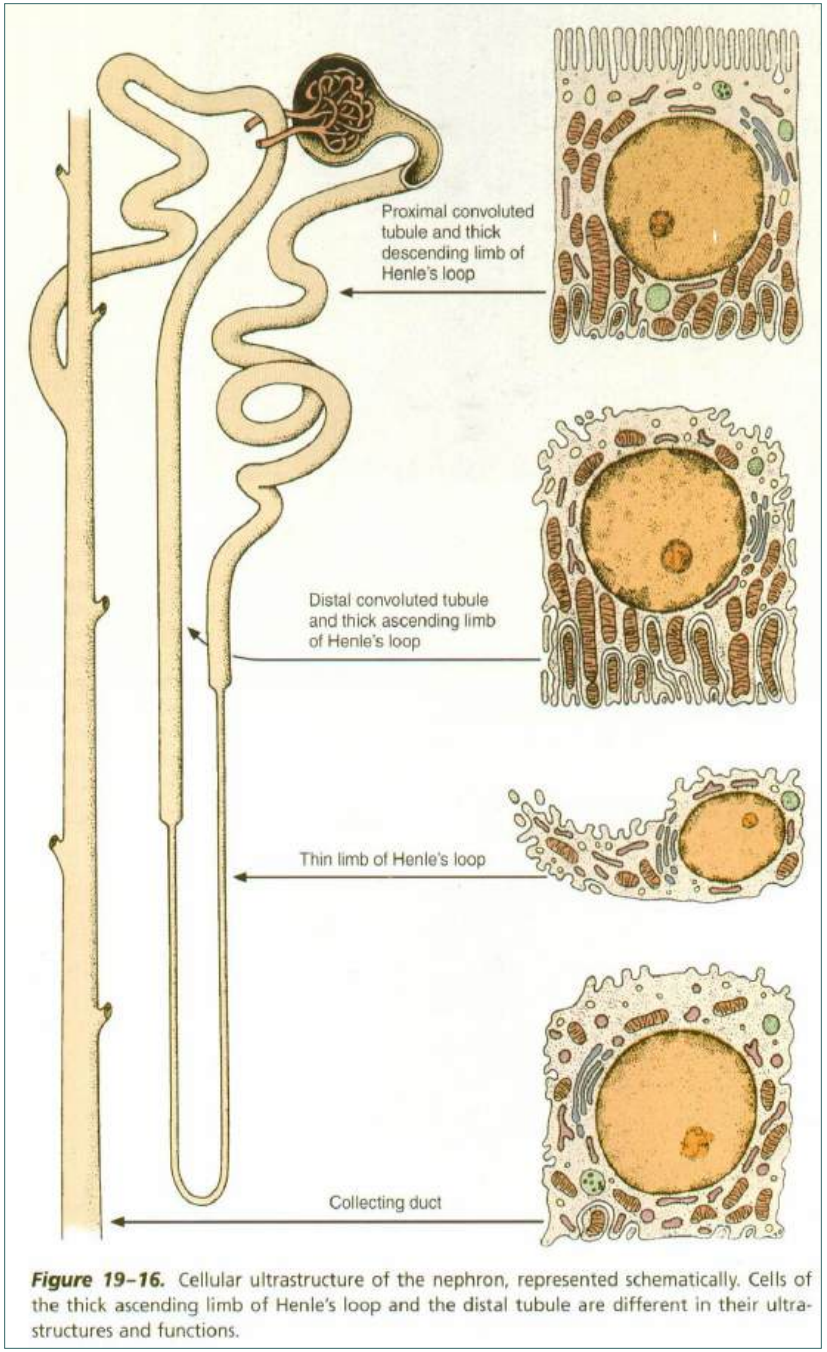


Figure 19–16. Cellular ultrastructure of the nephron, represented schematically. Cells of the thick ascending limb of Henle's loop and the distal tubule are different in their ultrastructures and functions.

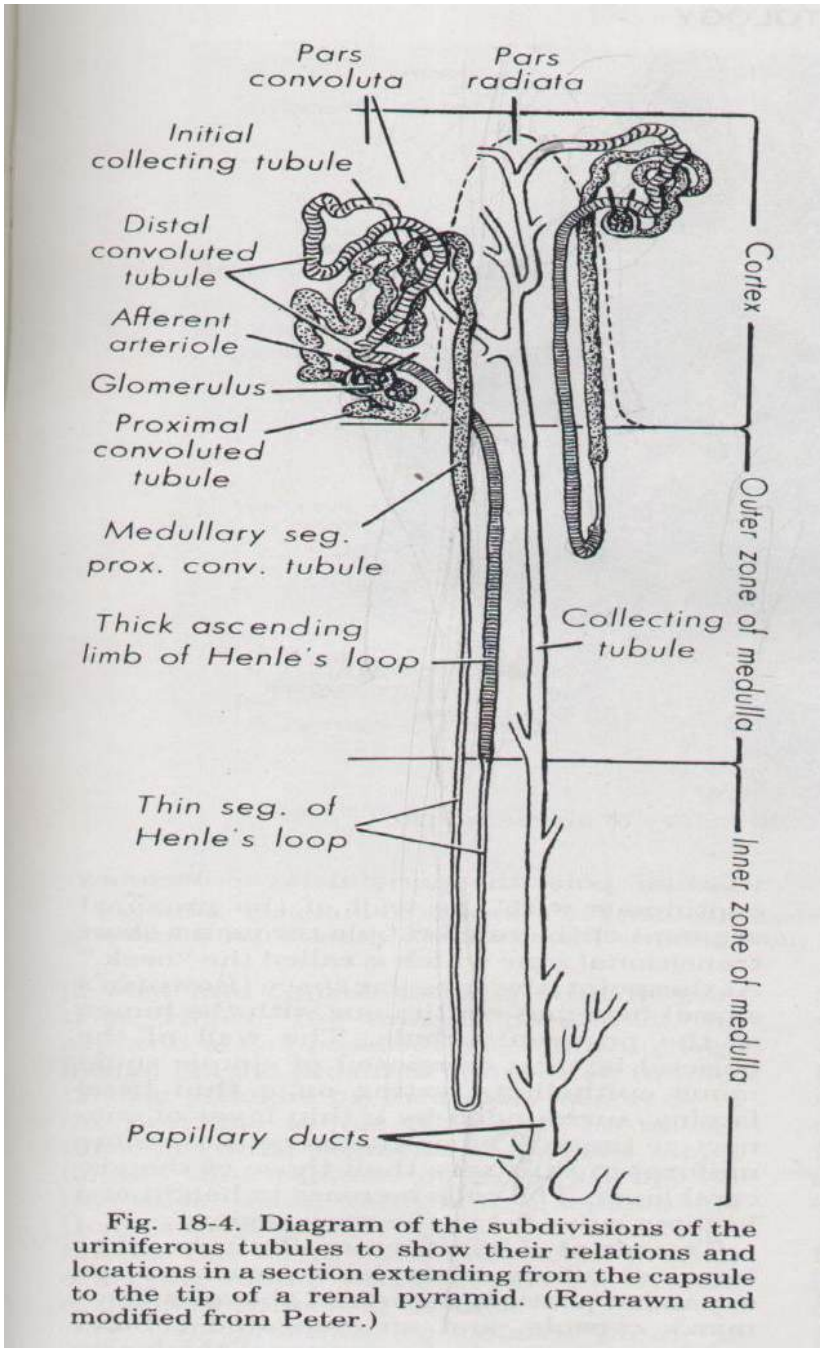


Fig. 18-4. Diagram of the subdivisions of the uriniferous tubules to show their relations and locations in a section extending from the capsule to the tip of a renal pyramid. (Redrawn and modified from Peter.)

Perbedaan antara TCP dan TCD

Perbedaan	TCP	TCD
1. Panjang	- Terpanjang - Sangat berkelok-kelok	- Panjang < - Kelokan <
2. Lumen	- Relatif sempit/kecil - Tidak teratur	- Relatif besar
3. Epitel	Selapis columnar rendah/kuboid/prisma terpancung	Selapis kubis

Perbedaan	TCP	TCD
3.1. Inti	Bulat, besar, pucat	Kecil, saling berdekatan
3.2. Sitoplasma	Granula (+) sangat asidofil	Kurang asidofil
3.3. Batas sel	Tidak jelas	Lebih jelas
4. Lokalisasi	- TCP : cortical labyrinth - TRP : cortex (medullary ray of ferreini), medula (bag. outer zone)	- TCD : cortical labyrinth - TRD : cortex (medullary ray of ferreini), medulla (bag. outer zone)
5. Khas	Brush border (+) → tdd. mikrovili	Brush border (-)

Corpusculum Renalis Malpighi (CRM)

Sistem arteri bukan vena : menghubungkan arteriol afferen dan efferen

Vascular pole : tempat masuk afferen dan keluar efferen

Urinary pole : tempat paling awal keluarnya urine

Endotel → Sel kapsula bowmann → Sel mesangial

Sel kapsula bowmann →

Lap. parietal

- Selapis pipih → dr urinary pole : selapis kuboid

Lap. viscerale

- Sel besar, inti menonjol ke dalam bowmann space.
- Mempunyai prosesus :
  - Primer
  - Sekunder/pedicle → melekat pd LB → juga tempat melekat endotel

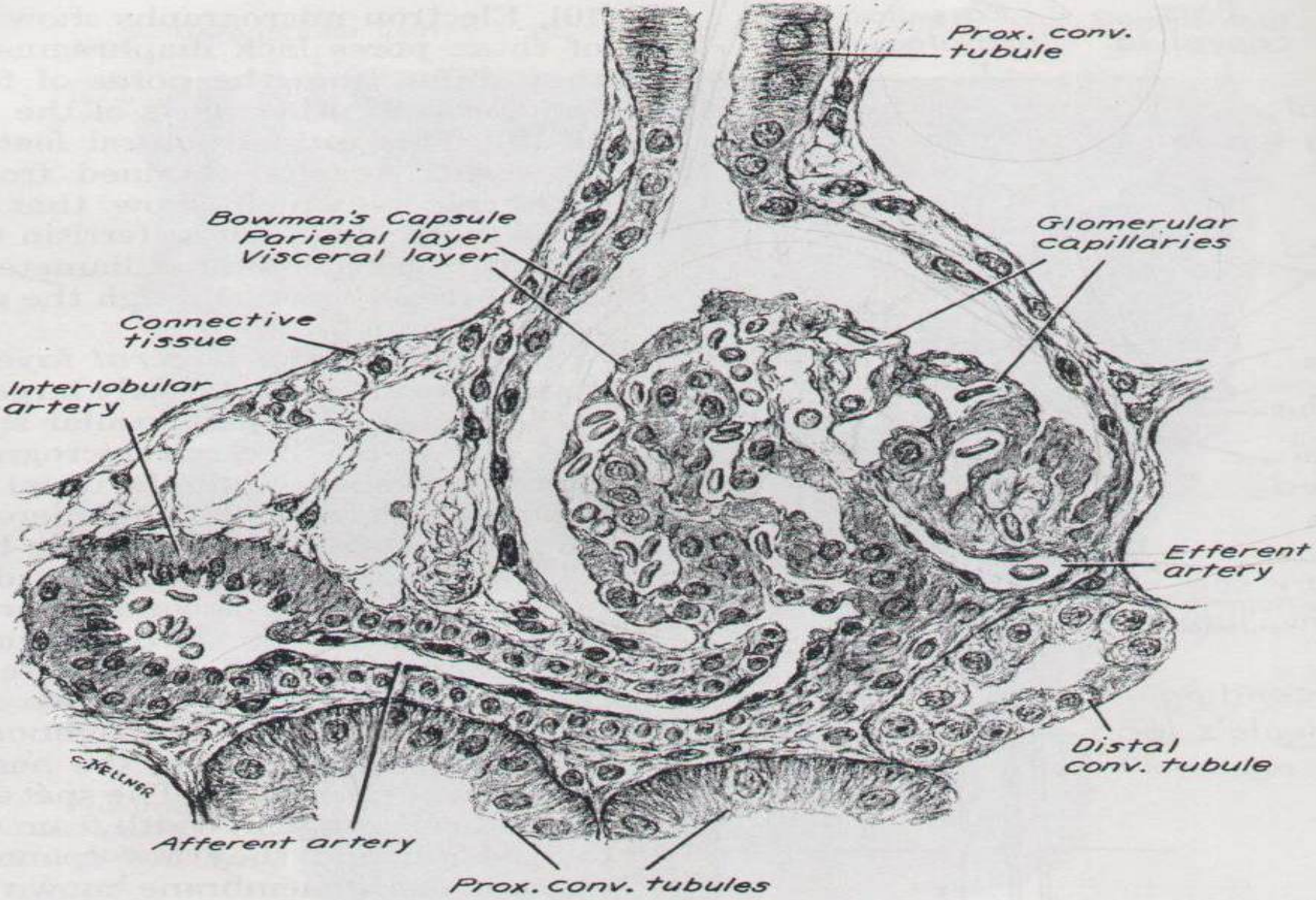
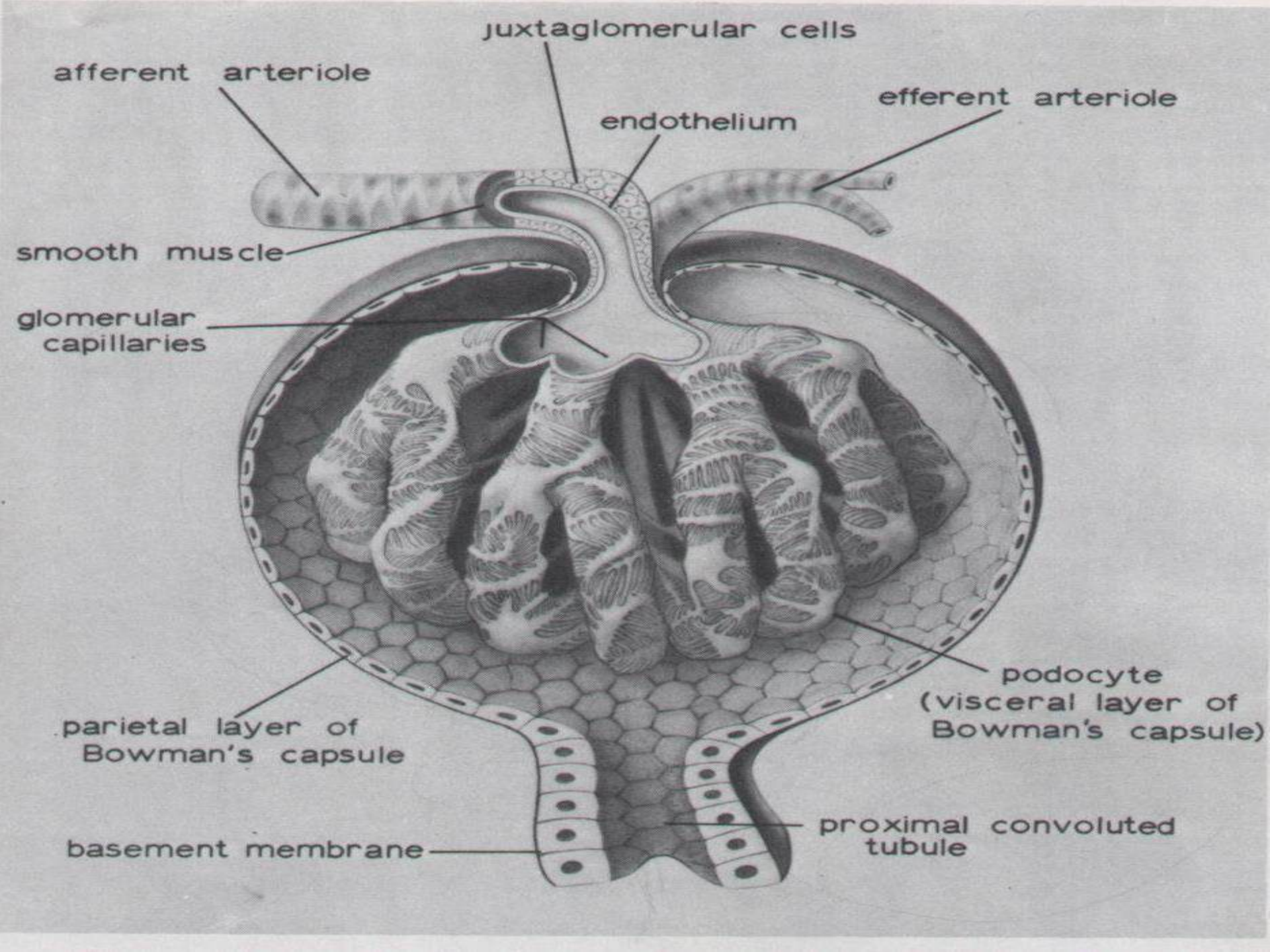
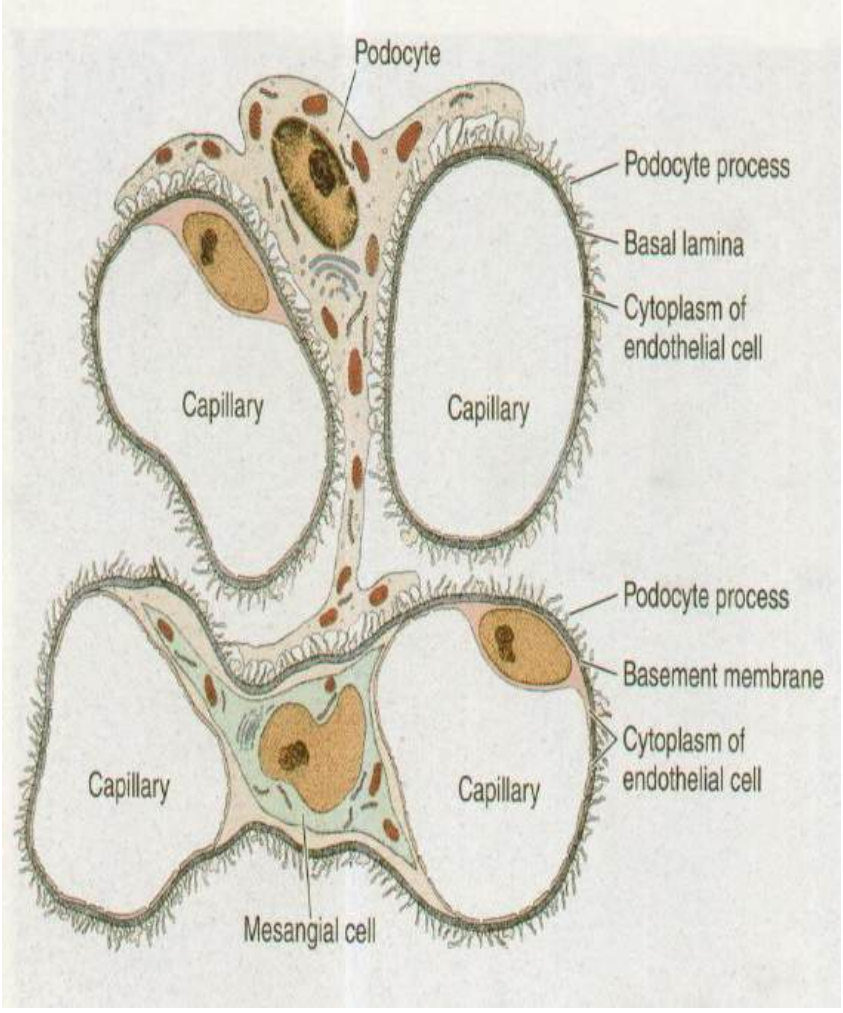


Fig. 18-5. Renal corpuscle from kidney of mouse. ×1320.


juxtaglomerular cells
afferent arteriole
efferent arteriole
endothelium
smooth muscle
glomerular capillaries
podocyte (visceral layer of Bowman's capsule)
parietal layer of Bowman's capsule
proximal convoluted tubule
basement membrane

SEL MESANGIAL

- Letak : diantara 2 glomerulus
- Fungsi : fagositosis



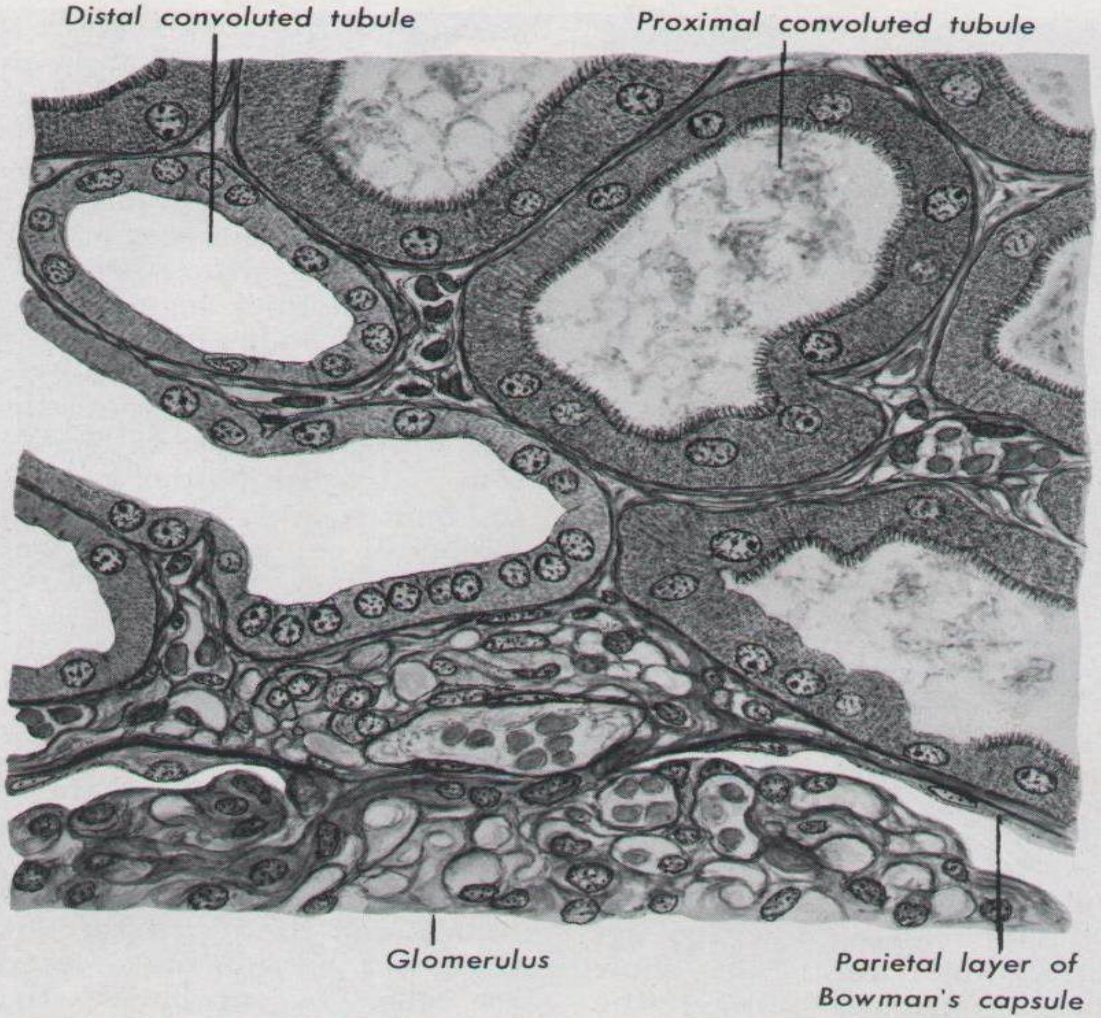


Fig. 18-13. Portion of a glomerulus and adjacent tubules from the cortex of a human kidney. One of the segments of a distal convoluted tubule shows a modification, known as the macula densa, where it borders on the vascular pole of the glomerulus. In this region, there is an increase in the height and number of cells with a concentration of nuclei. ×635. (The slide from which this drawing was made was kindly supplied by Dr. T. E. Hunt.)

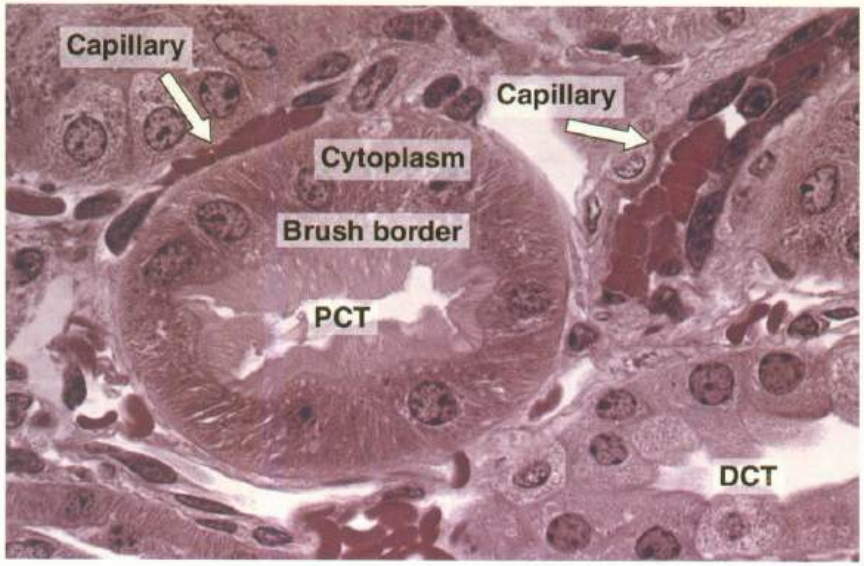


Figure 19–14. Renal cortex section showing a proximal convoluted tubule (PCT) with its large cuboidal cells presenting a brush border formed by numerous microvilli. Distal convoluted tubules (DCT) are also present. PT stain. Medium magnification.

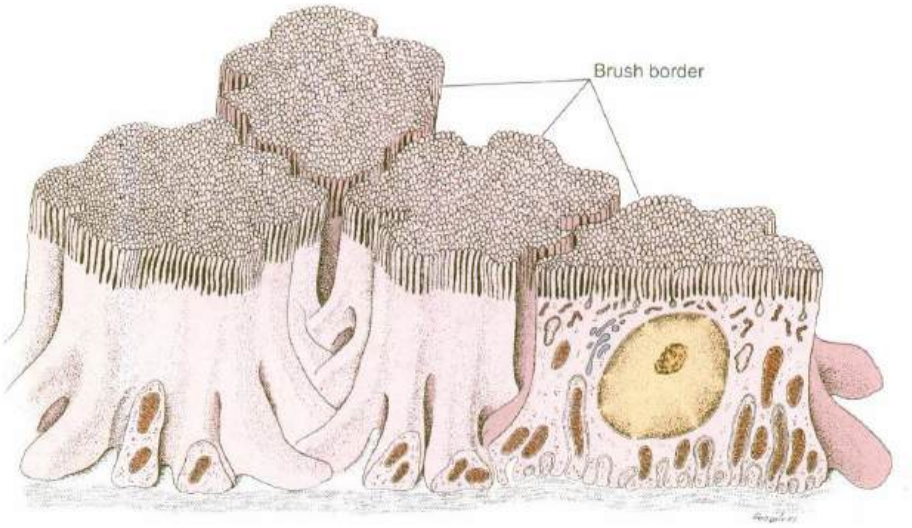


Figure 19–15. Schematic drawing of proximal convoluted tubule cells. The apical surfaces of these cuboidal cells have abundant microvilli constituting a brush border. Note the distribution of mitochondria and associated basilar infoldings of the cell membrane. The latter processes are longer than the former and penetrate deeply among the neighboring cells. Artificial spaces between the cells are shown to make the drawing easier to understand. (Modified from Bulger R: Amer J Anat 1965;116:237.)

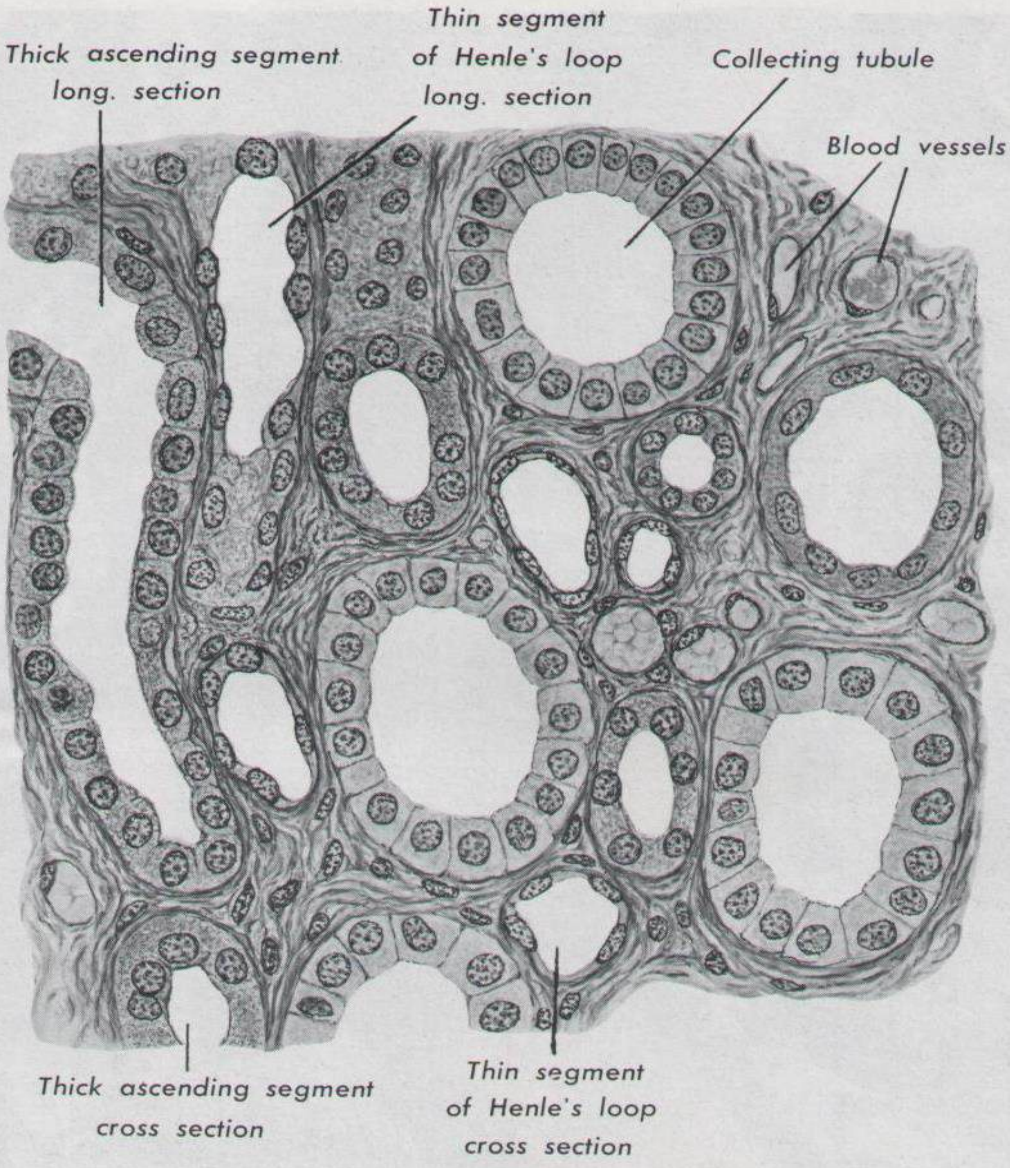


Fig. 18-16. Section from the medulla of a human kidney. ×575.

Tubulus kolektivus

Bagian eksokrin

3 bagian → initial (epitel kuboid), straight dan terminal (epitel kolumnar tinggi)

Batas sel paling jelas oleh karena lipatan plasma

Perbedaan antara Thin Segment (TS) dan kapiler

Perbedaan	T S	Kapiler
Penampang	> lebar (15 mikron)	< lebar (7 mikron)
Isi	Urine	Darah
Sitoplasma	Lebih tipis	Lebih tebal
Inti : - Bentuk - HE	 Menonjol ke lumen Kurang tercat	 (-) (-)
EM : mikrovili	(+), pendek	(-)
Persamaan : epitel selapis pipih		

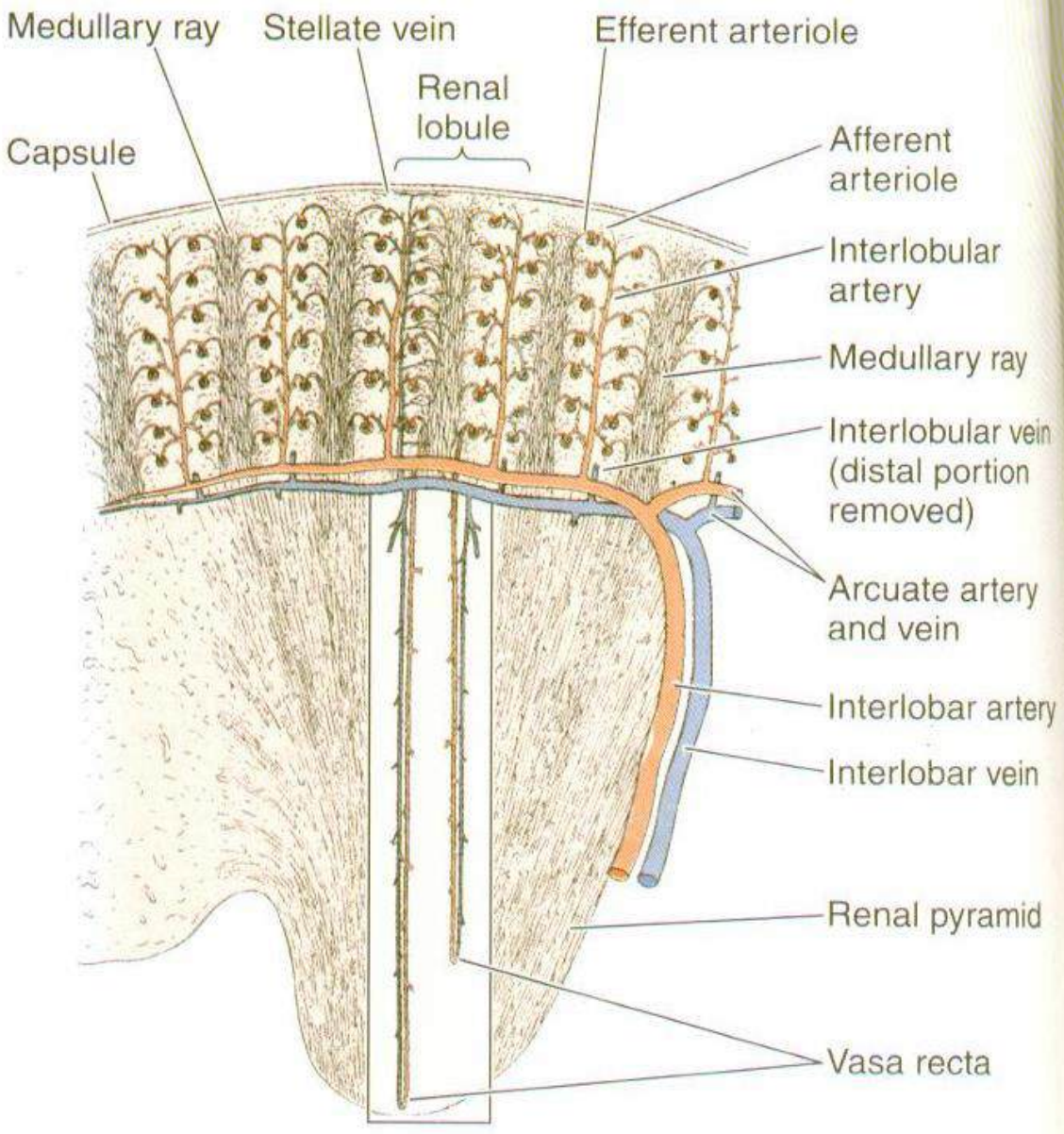


Figure 19–26. Circulation of blood in the kidney. Arcuate arteries are seen in the border between the cortex and the medulla.

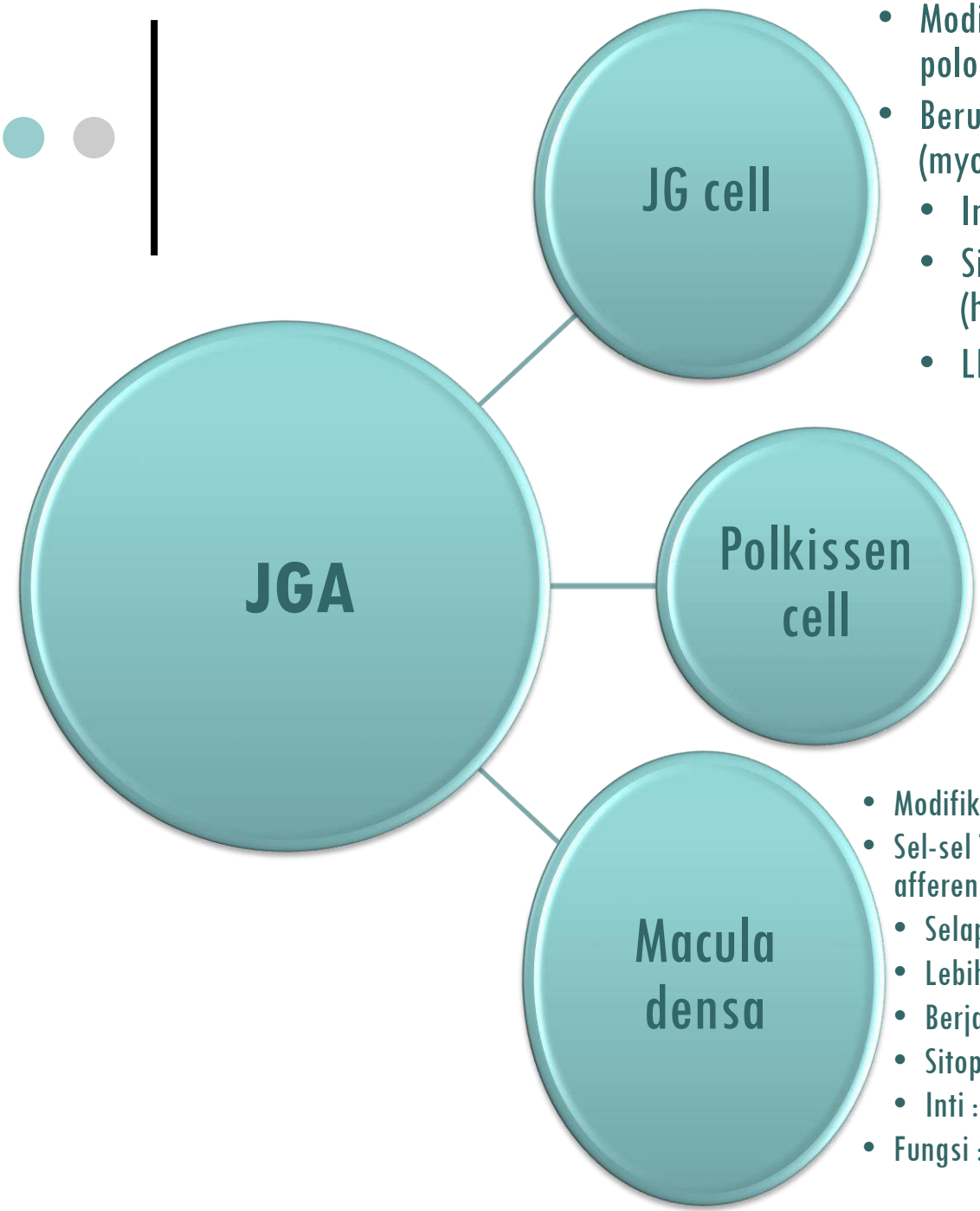
Sirkulasi darah

A. renalis → cab anterior → A. interlobaris → A. arcuata → A. interlobularis → Arteriole afferent → Arteriole efferent → V. interlobularis → V. arcuata → V. interlobaris → V. renalis

- Cortex

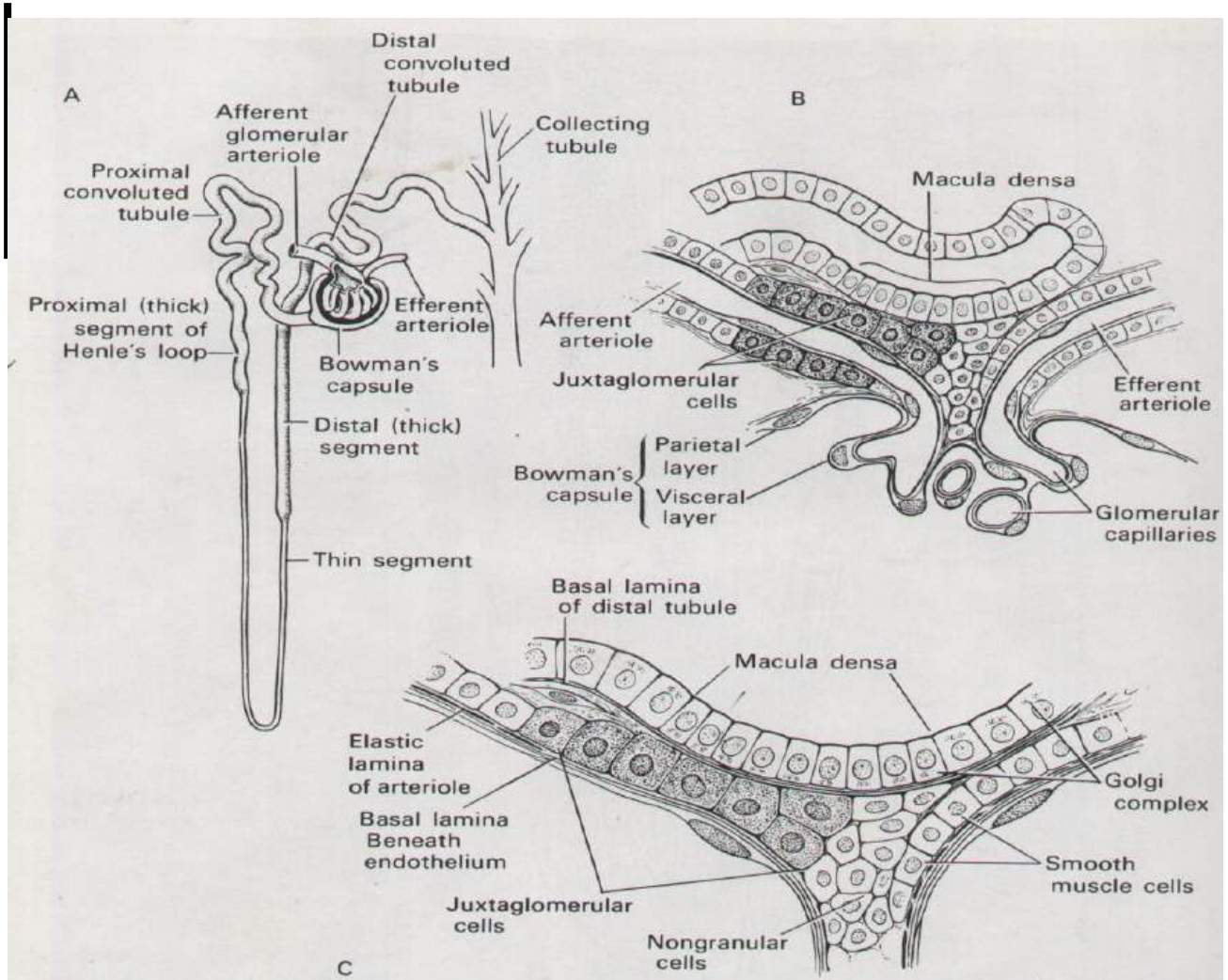
Arteriole efferent juxta medullaris → Arteriole recta → Venule recta → V. arcuata → V. interlobaris → V. renalis

- Medulla



- Modifikasi tunica media (sel otot polos) arteriol afferen
- Berubah menjadi bentuk epiteloid (myoepithelial) :
  - Inti : bulat, besar
  - Sitoplasma : sekitar inti terang (halositoplasma)
  - LEI (-)

- Modifikasi distal thick segment
- Sel-sel TCD/TRD bersinggungan dg arteriol afferen berubah :
  - Selapis kolumnar
  - Lebih rapat satu sama lain
  - Berjajar seperti pagar
  - Sitoplasma lebih gelap
  - Inti : bulat dan lebih gelap
- Fungsi : mengatur osmolaritas urine



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Berdasar butir sekresi :

1. JG cell granular :

- Butir sekresi (+)
- Bersifat sekretoris : granula (++), RER (++), golgi app. (++)

2. JG cell non-granular :

- Butir sekresi (-)
- Sitoplasma pucat

URETER

Lanjutan dr pelvis renalis, bermuara pd VU.

Tunica mucosa :

- Epitel transisional 4-5 lapis dg sel payung
- Lamina propria → jar. ikat

Tunica muscularis :

2 lapis otot polos (D:longitudinal, L:circular)

Tunica adventitia : jar. ikat fibroelastis

VESICA URINARIA

Struktur mikroskopis=ureter

Sel superficial=facet cell=sel payung → fungsi barier osmotik

Tunica mucosa :

Distensi 2-3 lapis, relaksasi 6-8 lapis

Tunica muscularis :

- Proksimal : ke segala arah
- Distal : long-circ-long.

URETRA

Pria

Panjang 15-20 cm, tdd. :

- Pars prostatika : 3-4 cm
- Pars membranosa : 1 cm
- Pars cavernosa (pars spongiosa)

Wanita

Lebih pendek, ±4 cm

- Epitel terutama stratified squamous, di beberapa tempat pseudo stratified columnar.
- Tunica muscularis : 2 lapis (D:longitudinal, L:circular)

Pars prostatika

- Mulai orificium uretra internum, menembus prostat
- Bermuara : 2 duktus ejakulatorius, duktus kelenjar prostat.
- Epitel : transisional
- Tunica muscularis : 2 lapis (D:longitudinal, L:circular)

Pars membranosa

- Mulai apex prostat → menembus membran perineal sampai bulbus cavernosus uretra
- Epitel : stratified columnar/ps. str. columnar

Pars cavernosa

- Terpanjang
- Muara : glans penis
- Bagian distal melebar : fossa naviculare
- Epitel : ps. str. columnar s/d fossa naviculare

Lacuna morgagni

- Ruangan berbentuk kantong, berasal dr mucosa uretra.
- Hasil : musin

Kelenjar littre

- Lanjutan dr lacuna morgagni
- Terutama di bagian dorsal pars cavernosa
- Bentuk kelenjar tubular bercabang/compound tubular gland
- Kelanjutan mukosa uretra
- Epitel=uretra pars cavernosa
- Letak di lamina propria
- Hasil : musin

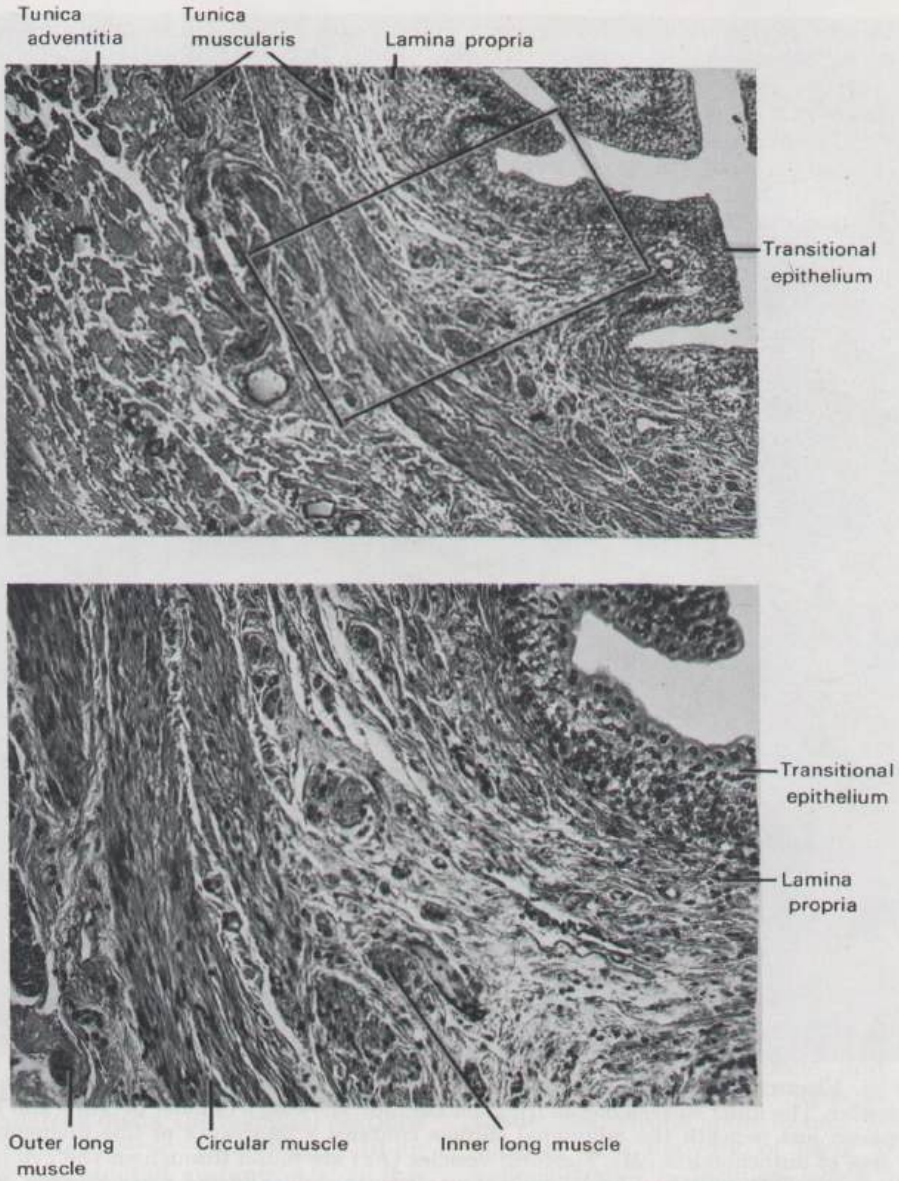

Fig. 18-24. Portions of a transverse section of a human ureter. The area outlined in the *upper* figure is shown at higher magnification in the *lower* figure. The inner and outer longitudinally (long) oriented smooth muscle fibers do not form continuous layers. *Upper figure*, ×60; *lower figure*, ×145.

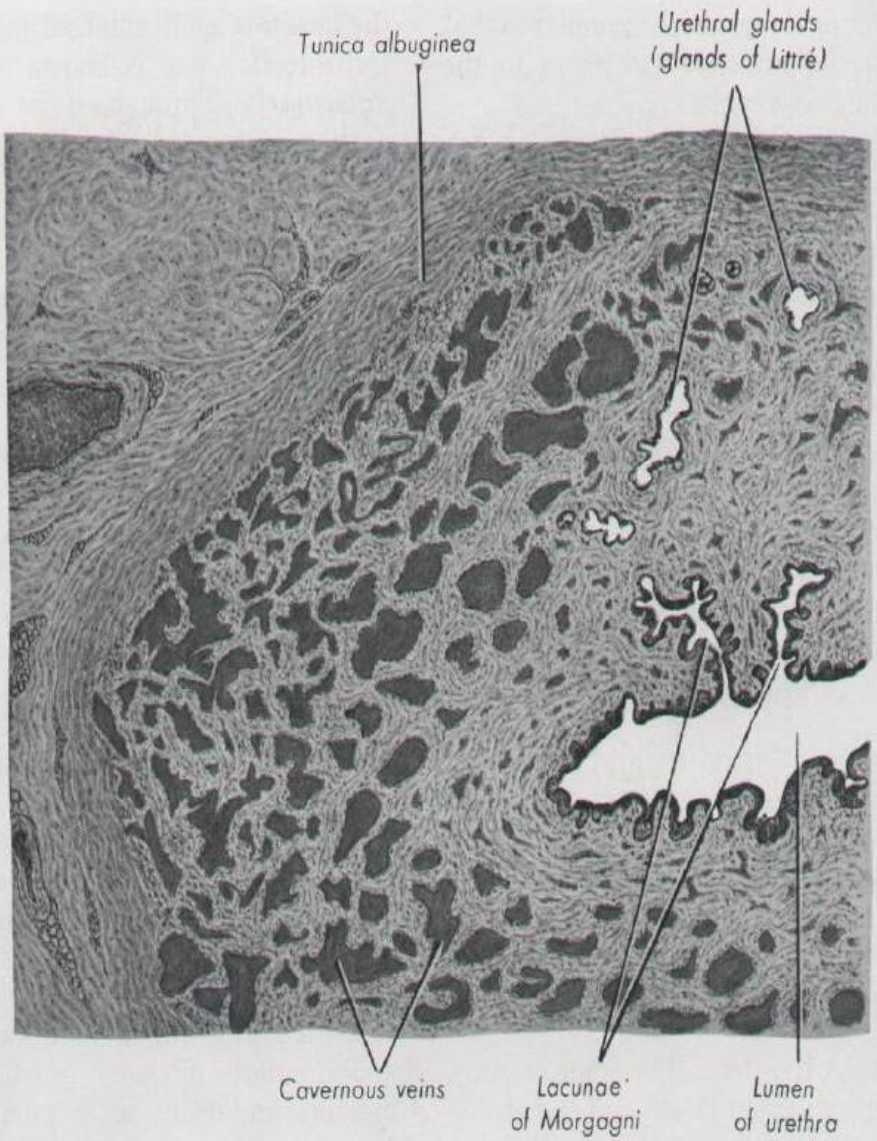

Fig. 18-26. Transverse section of a part of the cavernous portion of the urethra. See Figure 19-29 for lower magnification, showing complete section of penis. ×19.

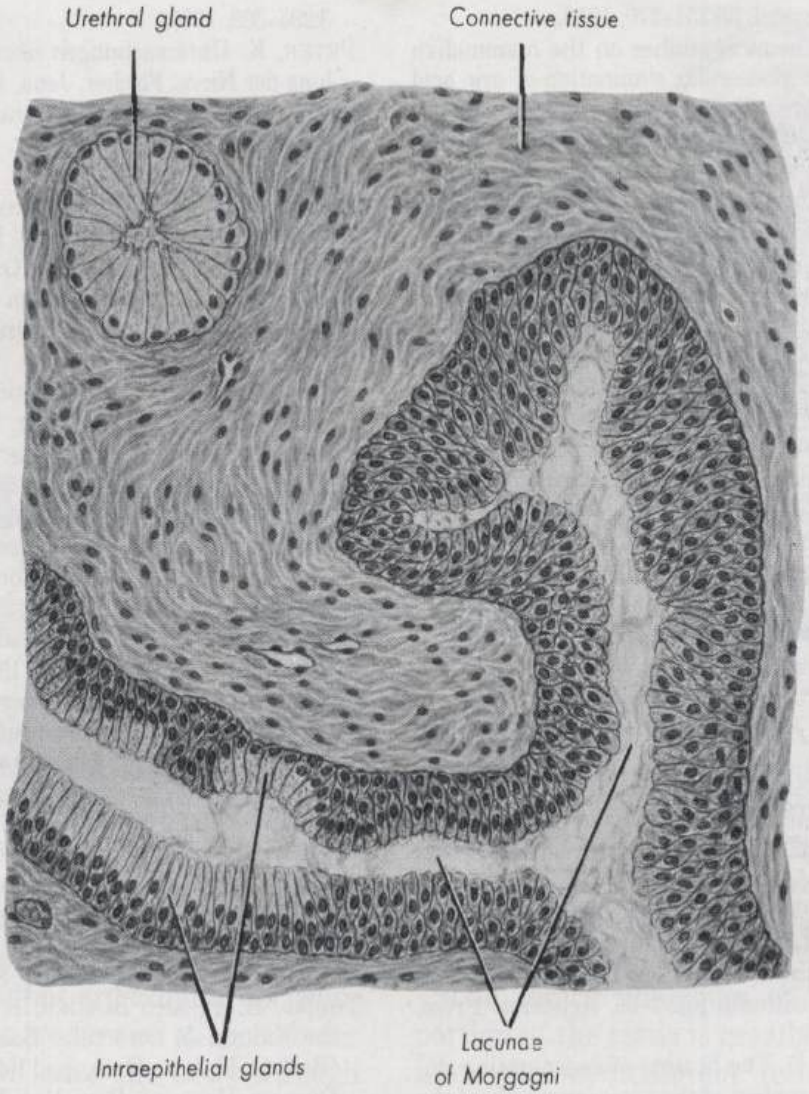

Fig. 18-27. Section through the dorsal portion of the corpus cavernosum urethrae, showing clear, mucous-secreting cells in a tubule of the urethral glands (glands of Littré) and groups of similar cells (intraepithelial glands) in the lacunae of Morgagni. ×294.


Wassiam