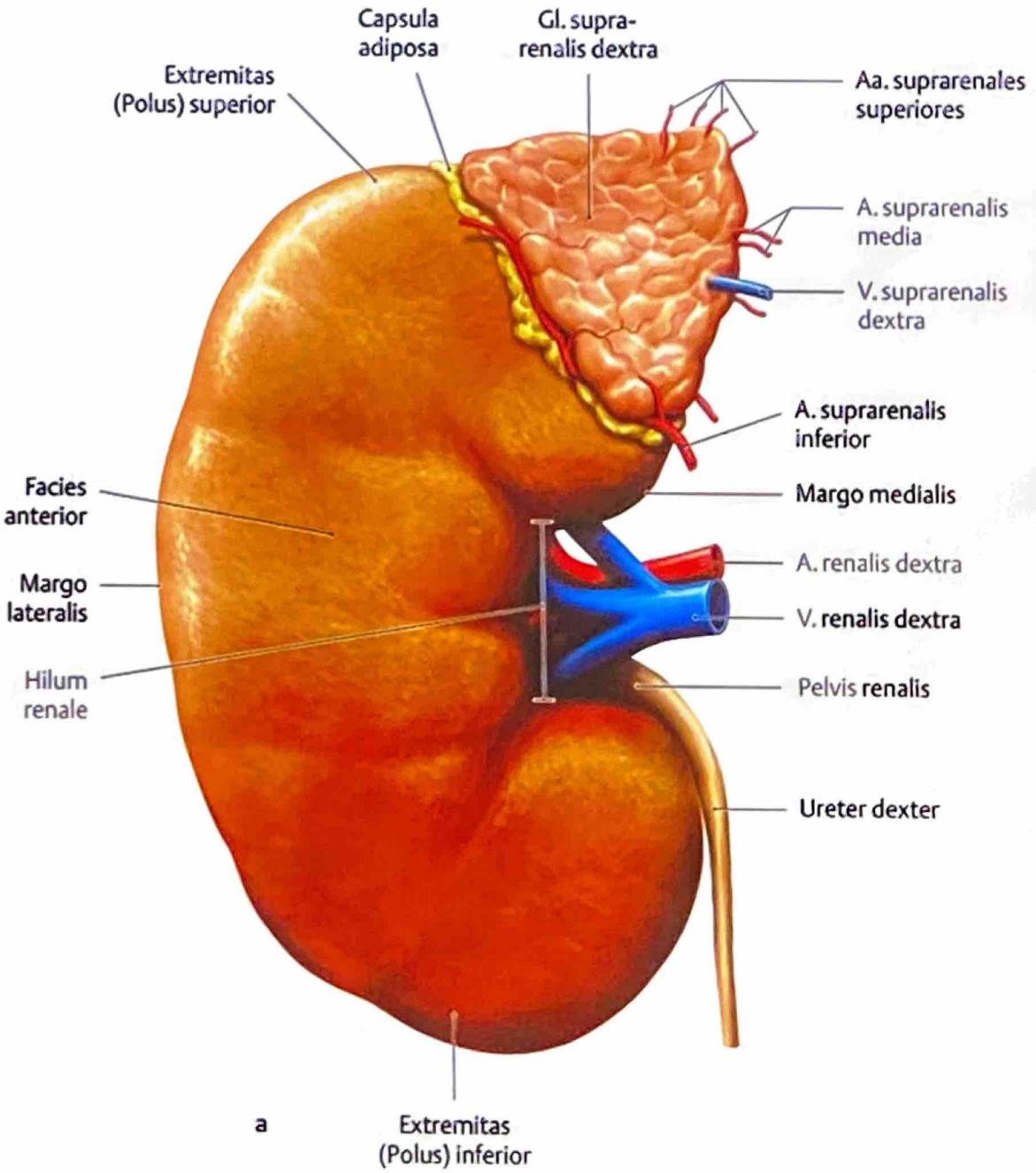
Niere (Nephros)



Niere (Nephros)

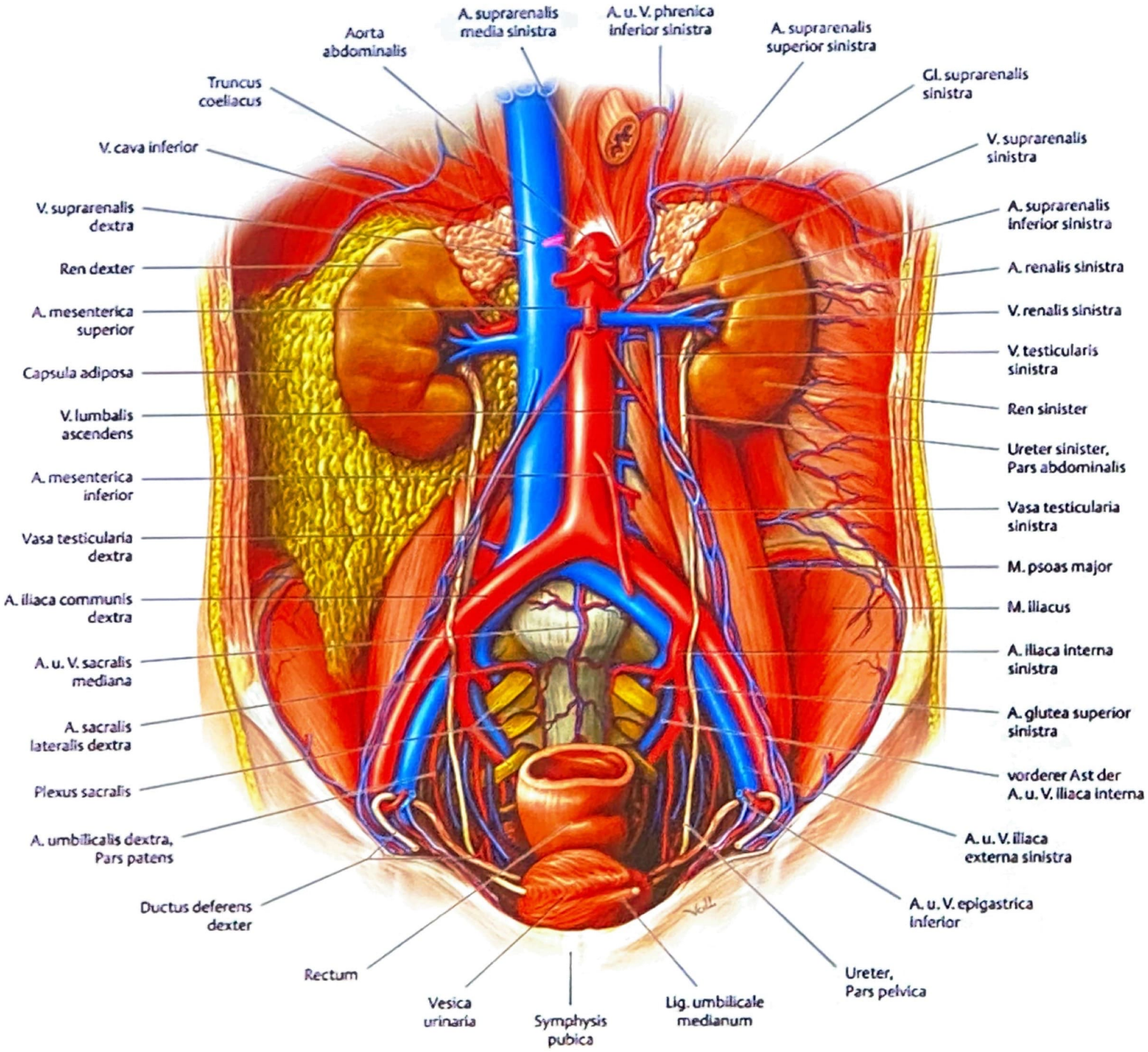
Gewicht: 120-200g

Lage: primär retroperitoneal

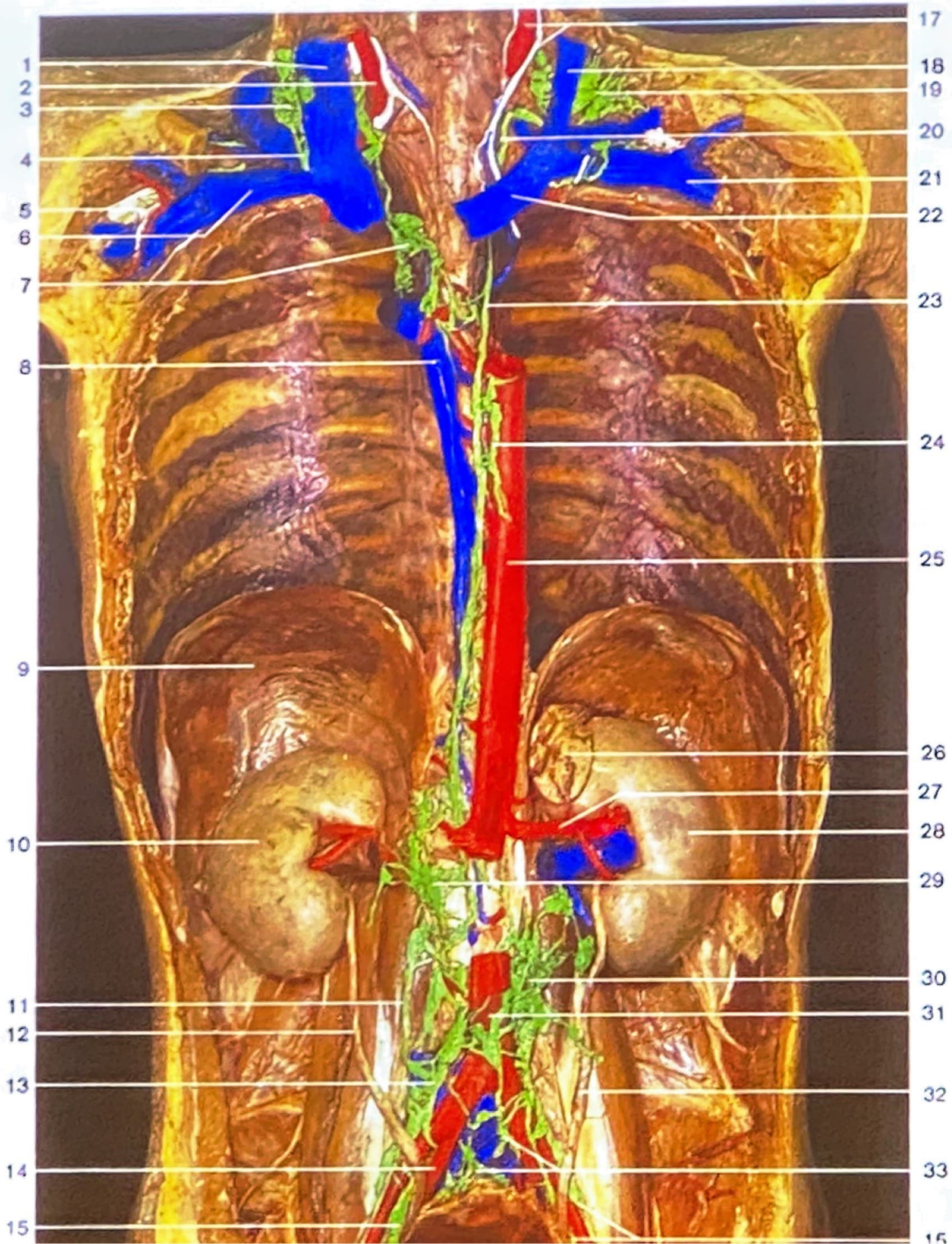
Funktion:

- Homöostase der Zusammensetzung der Körperflüssigkeiten in Bezug auf Menge, Osmolarität, pH-Wert, Ionenkonzentration
- Ausscheidung von Stoffwechselprodukten und körperfremden Stoffen
- Endokrine Funktion

Niere


Aorta abdominalis
A. suprarenalis media sinistra
A. u. V. phrenica inferior sinistra
A. suprarenalis superior sinistra
Truncus coeliacus
Gl. suprarenalis sinistra
V. cava inferior
V. suprarenalis sinistra
V. suprarenalis dextra
A. suprarenalis inferior sinistra
Ren dexter
A. renalis sinistra
A. mesenterica superior
V. renalis sinistra
V. testicularis sinistra
Capsula adiposa
Ren sinister
V. lumbalis ascendens
Ureter sinister, Pars abdominalis
A. mesenterica inferior
Vasa testicularia sinistra
Vasa testicularia dextra
M. psoas major
A. iliaca communis dextra
M. iliacus
A. u. V. sacralis mediana
A. iliaca interna sinistra
A. sacralis lateralis dextra
A. glutea superior sinistra
Plexus sacralis
vorderer Ast der A. u. V. iliaca interna
A. umbilicalis dextra, Pars patens
A. u. V. iliaca externa sinistra
Ductus deferens dexter
A. u. V. epigastrica inferior
Rectum
Ureter, Pars pelvica
Vesica urinaria
Symphysis pubica
Lig. umbilicale medianum

Niere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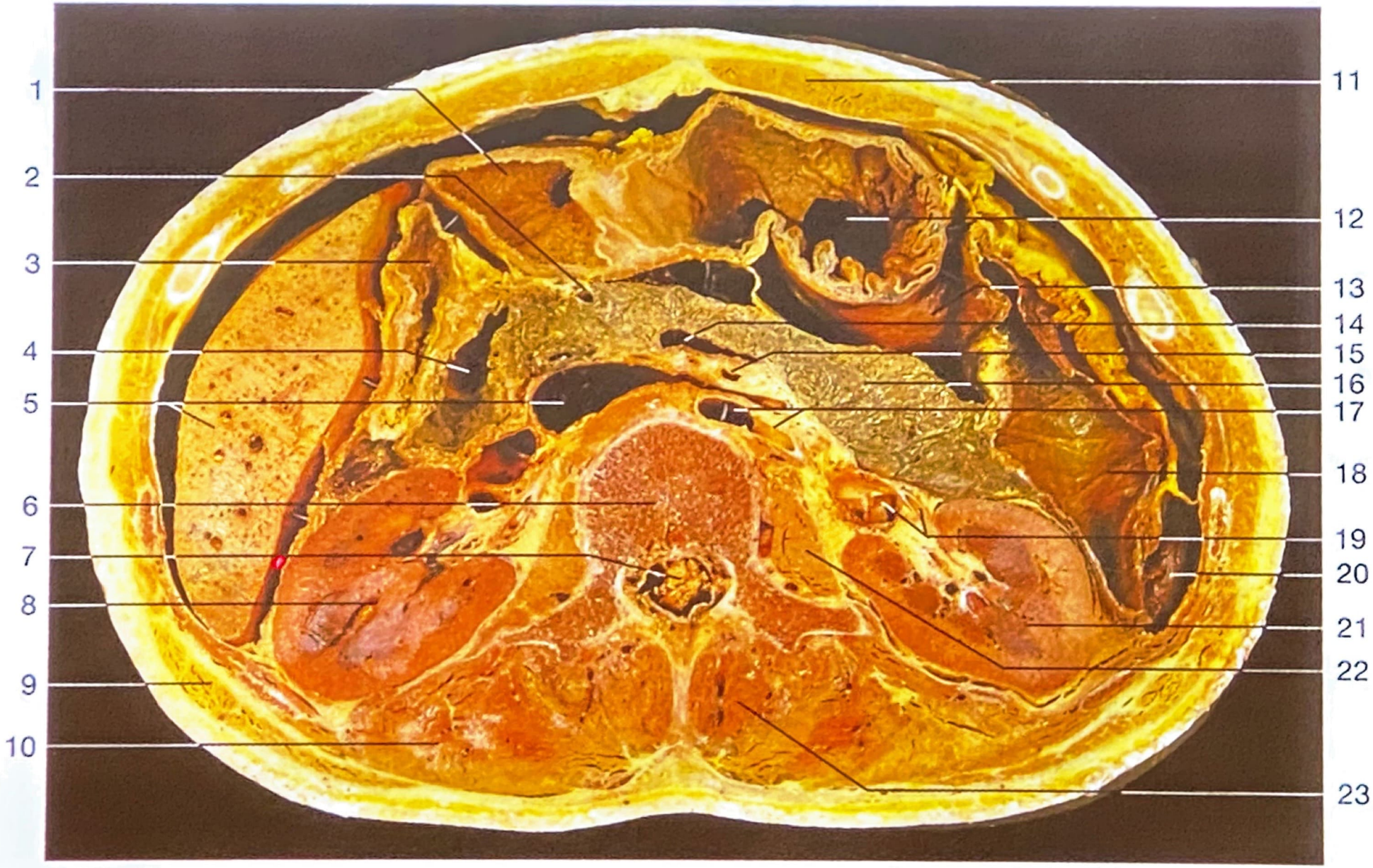
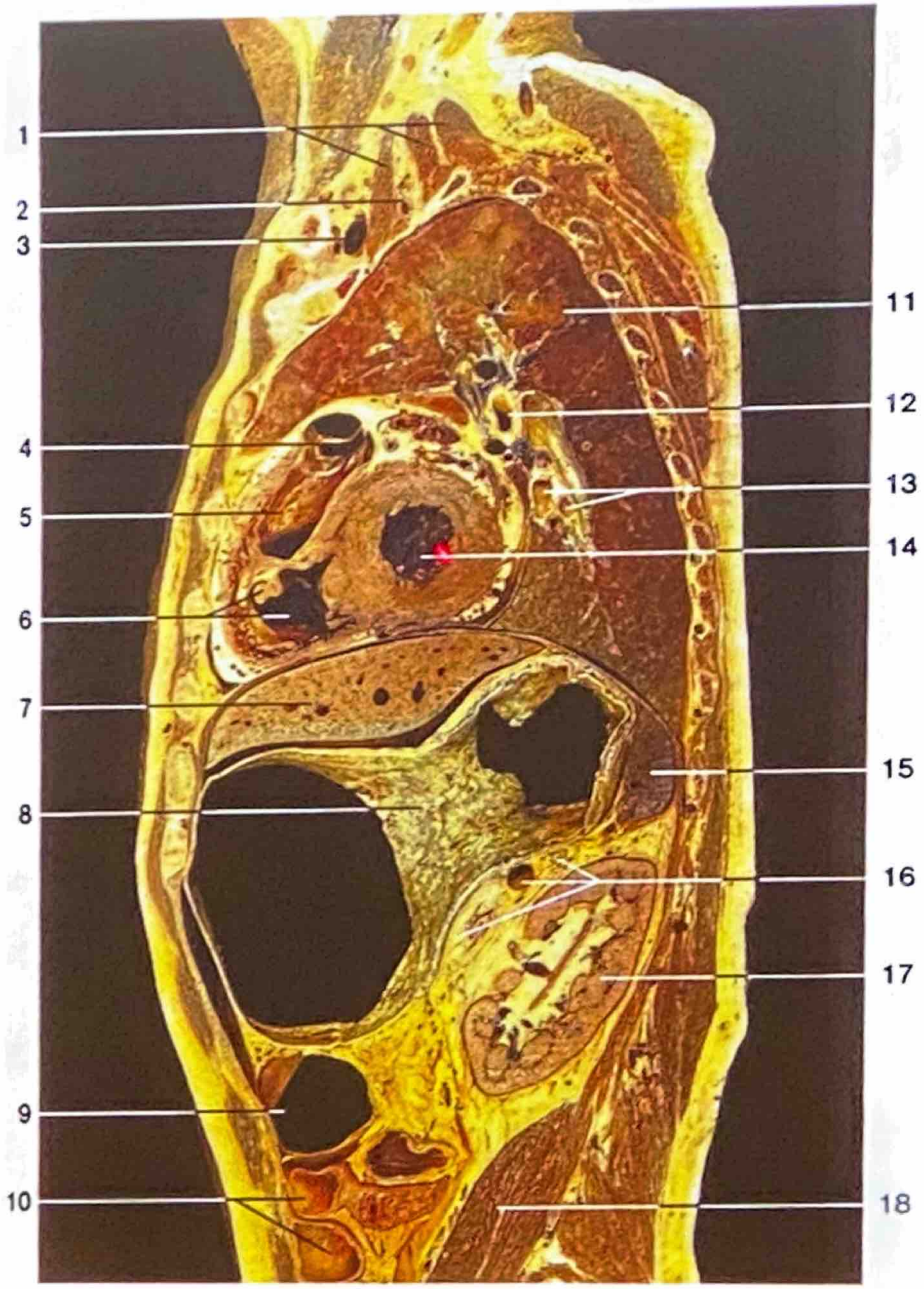
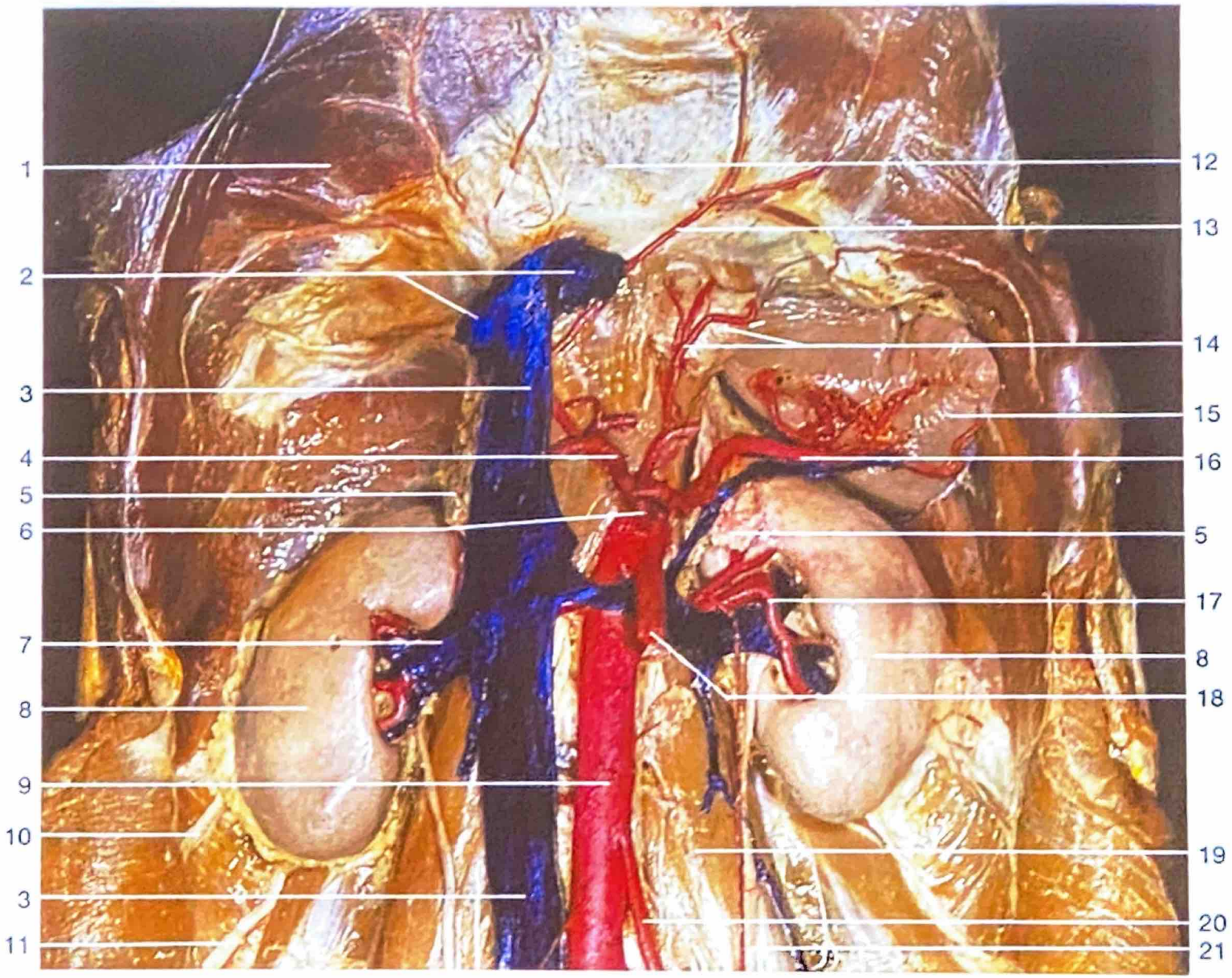
Niere



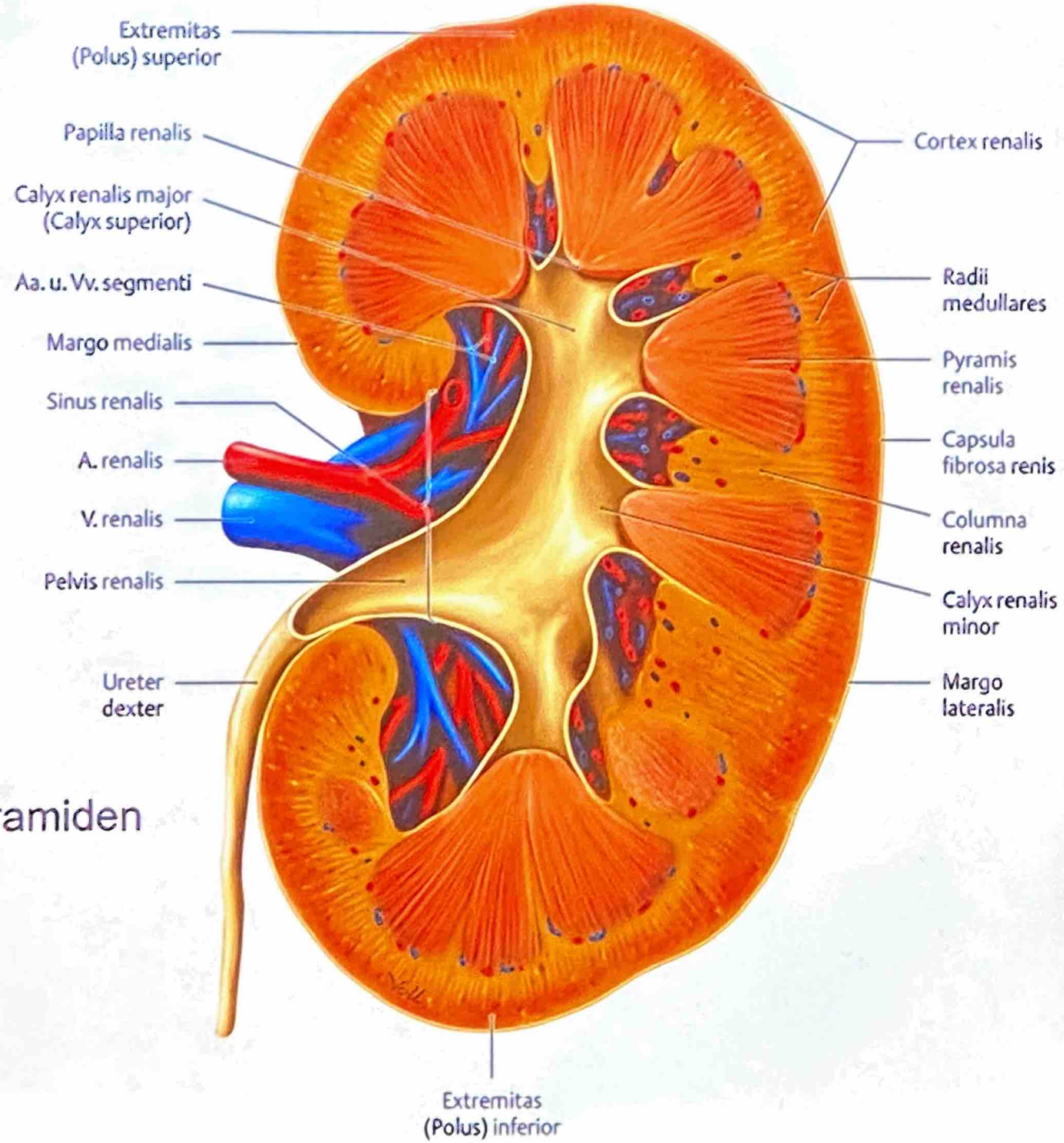
Niere



Niere

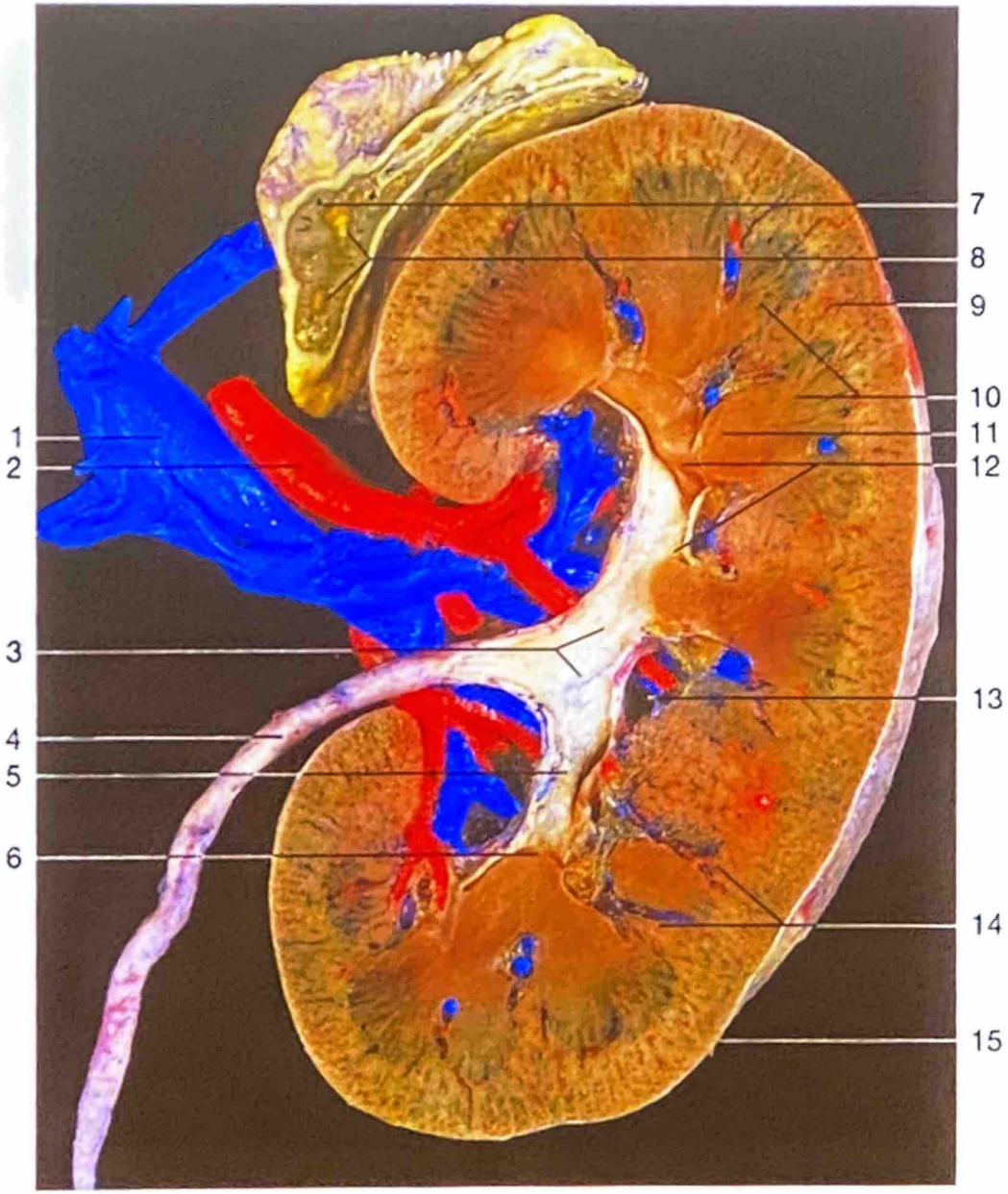


Niere



10 bis 12 Markpyramiden

Niere



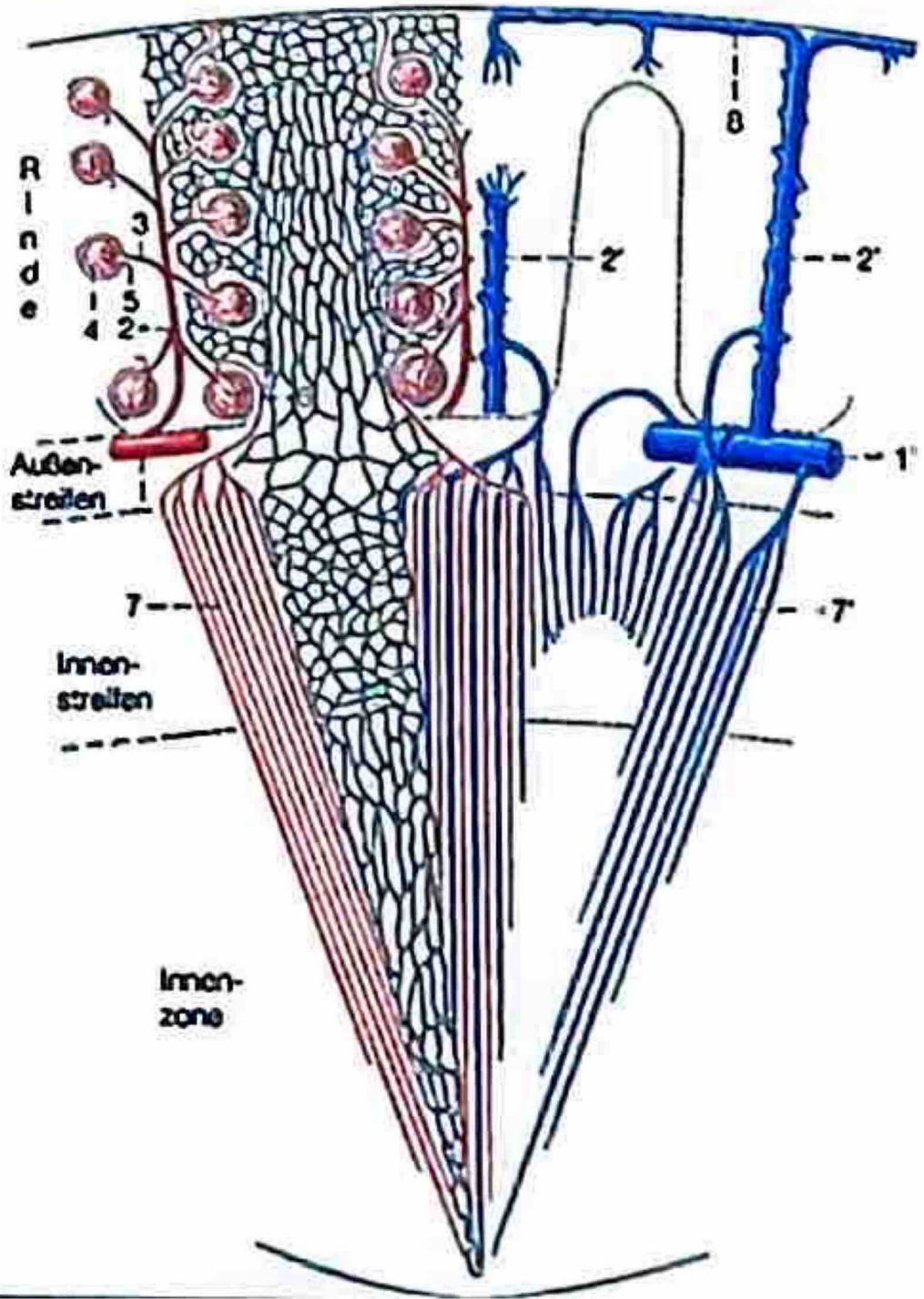
Aufbau der Niere

Cortex renalis

Medulla renalis

Außenzone (Zona externa)
Außenstreifen
Innenstreifen

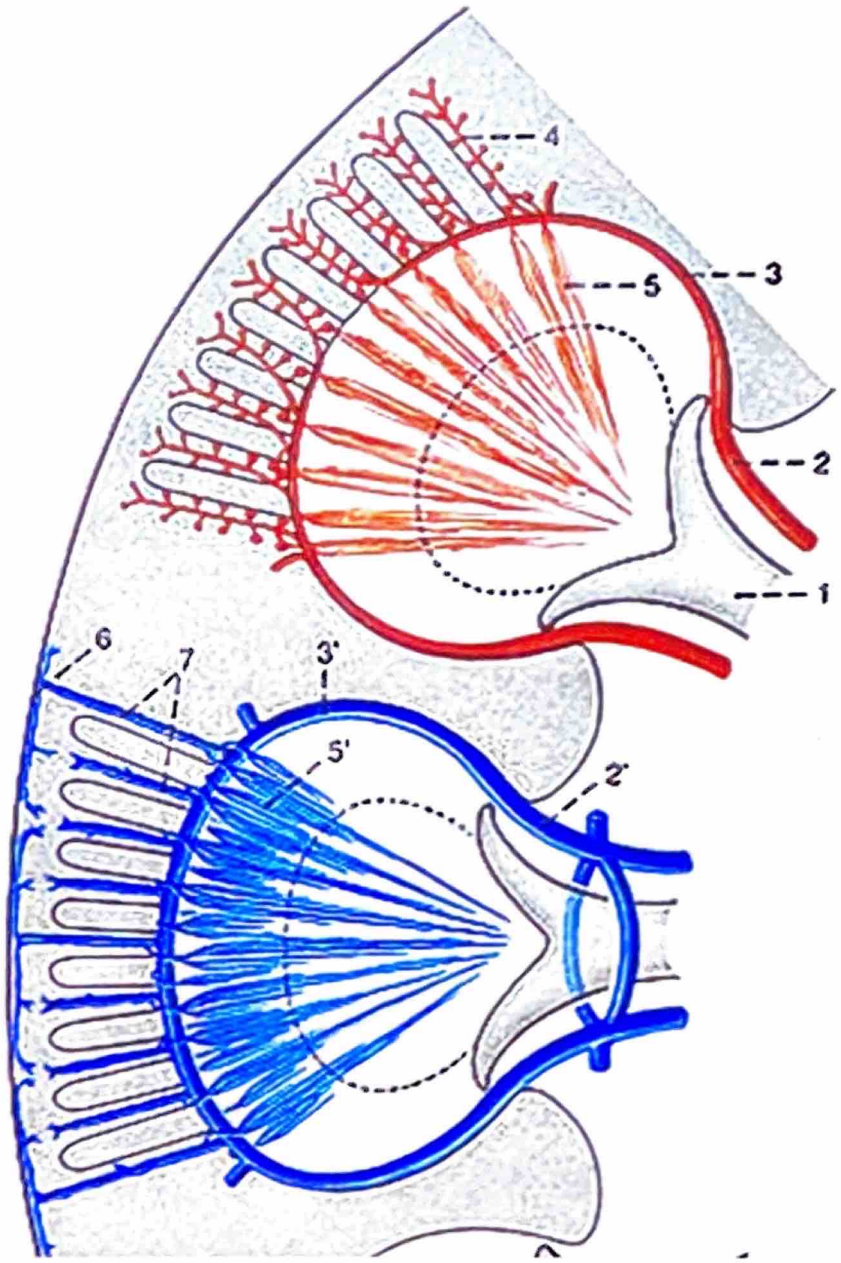
Innenzone (Zona interna)



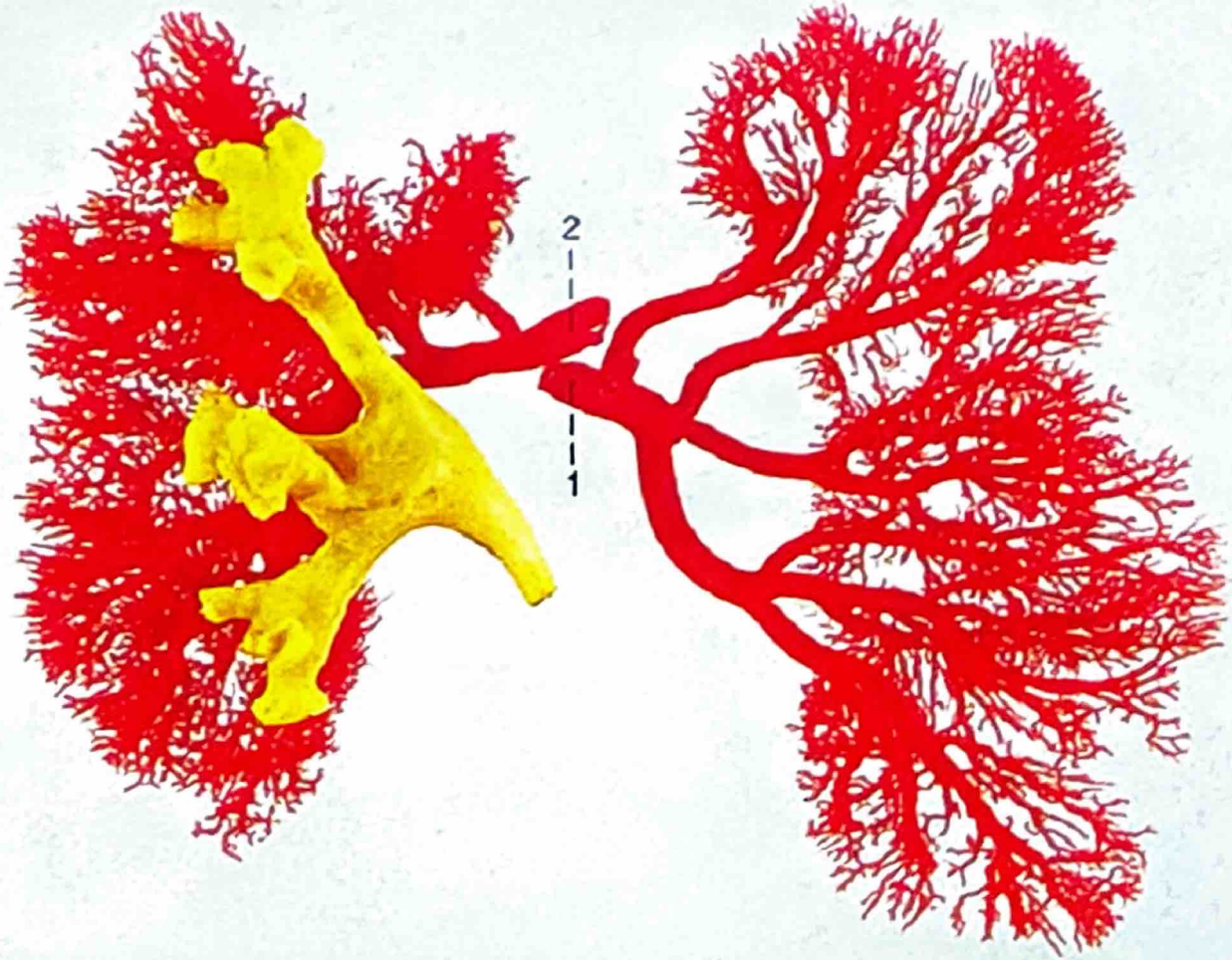
Filtrations- und Resorptionsleistung

- Glomeruläre Ultrafiltration
  - H_2O: ~170 l/Tag ⇒ Primärharn
  - Na^+: ~25 Mol/Tag ⇒ ~575 g!
- Reabsorption im proximalen Tubulus
  - H_2O: ~65%
  - Na^+: ~65%
- Reabsorption in der Henle-Schleife
  - H_2O: ~15%
  - Na^+: ~25%
- Reabsorption im distalen Tubulus und Sammelrohr
  - H_2O: ~19% ⇒ ~1% Endharn, ~1,7 l/Tag
  - Na^+: ~ 9% ⇒ ~1% Exkretion, ~5,75 g

Gefäßversorgung



2	A./V. interlobaris
3	A./V. arcuata
4/7	A./V. corticales radiata (interlobularis)
5	Vasa recta


2
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Niere

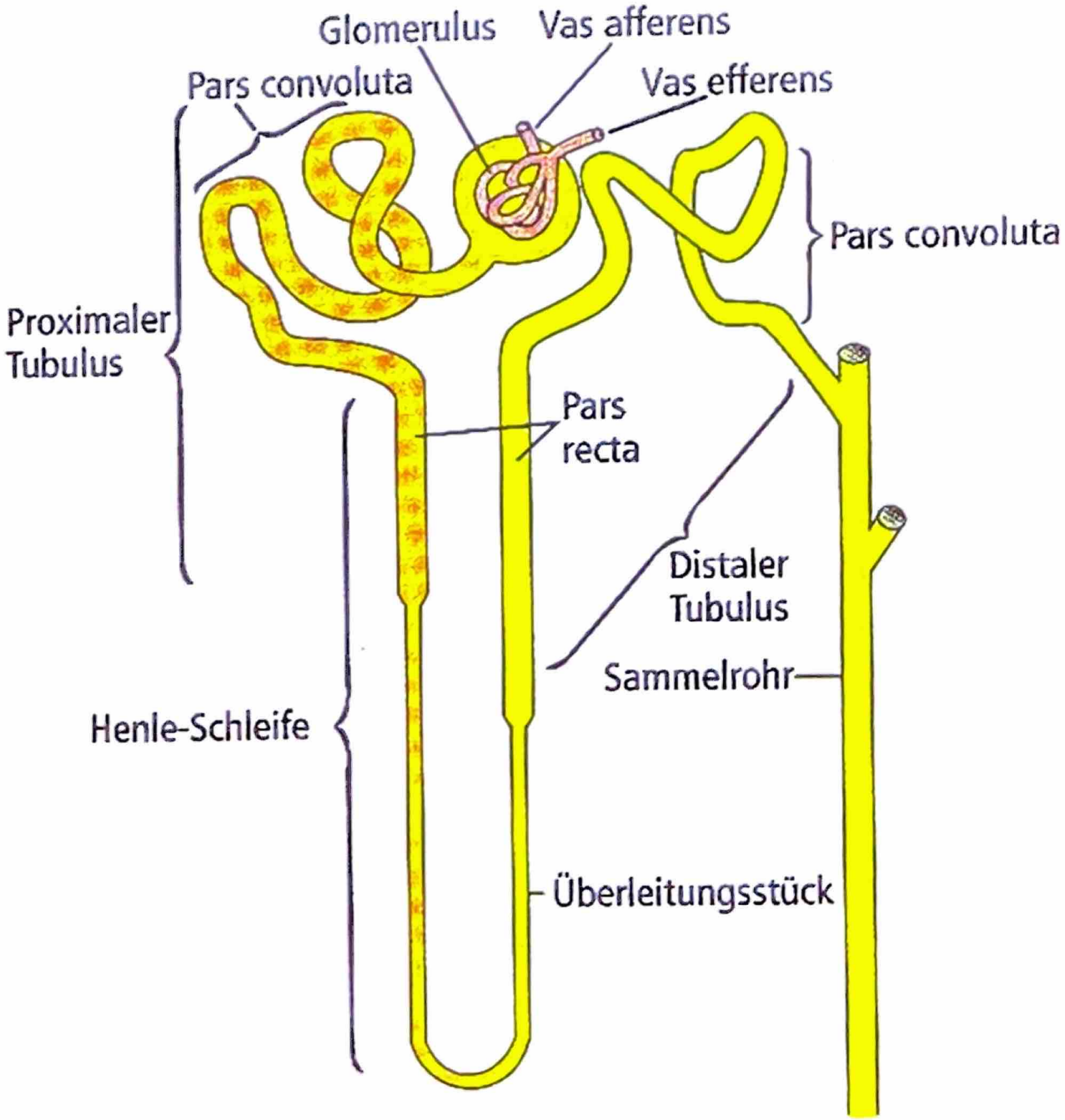
Niere

Nephron: 1 Million pro Niere

- Nierenkörperchen (Corpusculum renale)
  Glomerulus
  BOWMANsche Kapsel

- Nierentubuli

Nephron


Glomerulus
Vas afferens
Pars convoluta
Vas efferens
Pars convoluta
Proximaler Tubulus
Pars recta
Distaler Tubulus
Sammelrohr
Henle-Schleife
Überleitungsstück

Nierentubuli

Proximaler Tubulus (Tubulus proximales)
- Pars convoluta (proximales Konvolut)
- Pars recta (dicker absteigender Schleifenschenkel)

Intermediärer Tubulus (Tubulus intermedius)
- Pars descendes (dünner absteigender Schleifenschenkel)
- Pars ascendens (dünner aufsteigender Schleifenschenkel)

Distaler Tubulus (Tubulus distalis)
- Pars recta (dicker aufsteigender Schleifenschenkel)
- Pars convoluta (distales Konvolut)

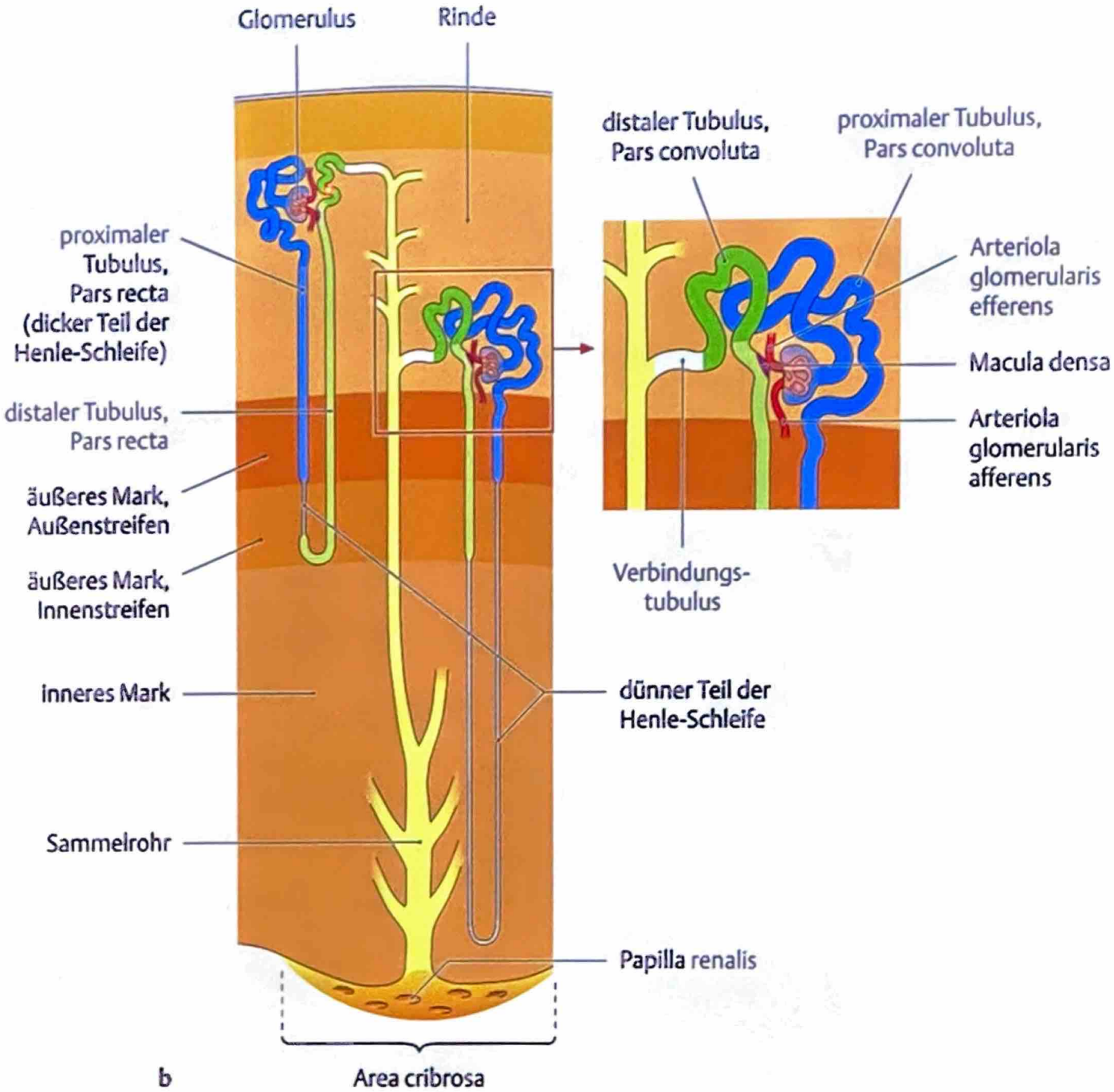
Henlesche Schleife (Ansa nephroni)

Sammelrohrsystem

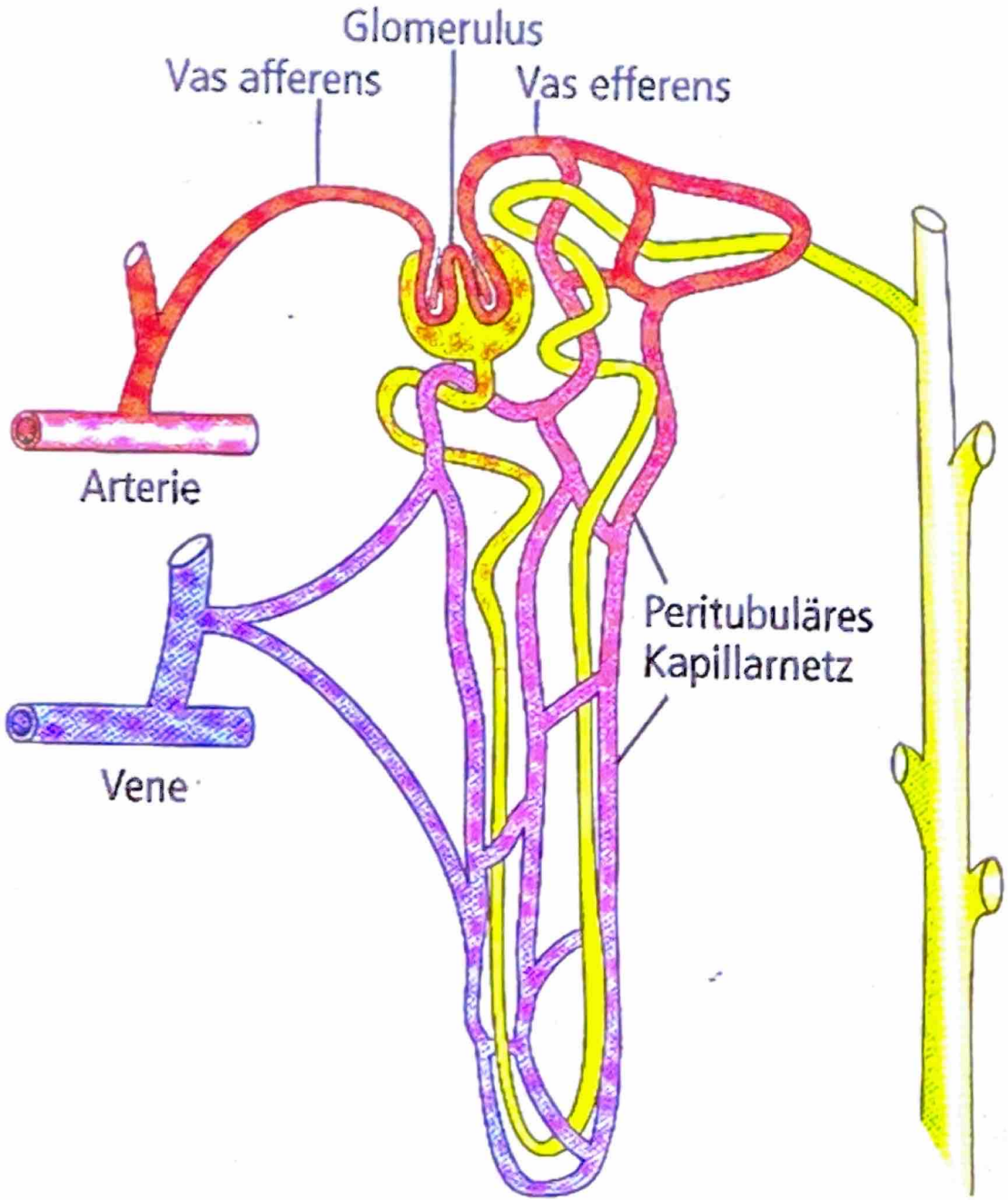
Verbindungstubulus (Tubulus reuniens)

Sammelrohr (Tubulus renalis colligens)
- Korticale Sammelrohre
- Meduläre Sammelrohre

Niere


Glomerulus
Rinde
distaler Tubulus, Pars convoluta
proximaler Tubulus, Pars convoluta
proximaler Tubulus, Pars recta (dicker Teil der Henle-Schleife)
Arteriola glomerularis efferens
Macula densa
distaler Tubulus, Pars recta
Arteriola glomerularis afferens
äußeres Mark, Außenstreifen
äußeres Mark, Innenstreifen
Verbindungs-tubulus
inneres Mark
dünner Teil der Henle-Schleife
Sammelrohr
Papilla renalis
b
Area cribrosa

Niere


Glomerulus
Vas afferens
Vas efferens
Arterie
Vene
Peritubuläres
Kapillarnetz

Nierenkörperchen

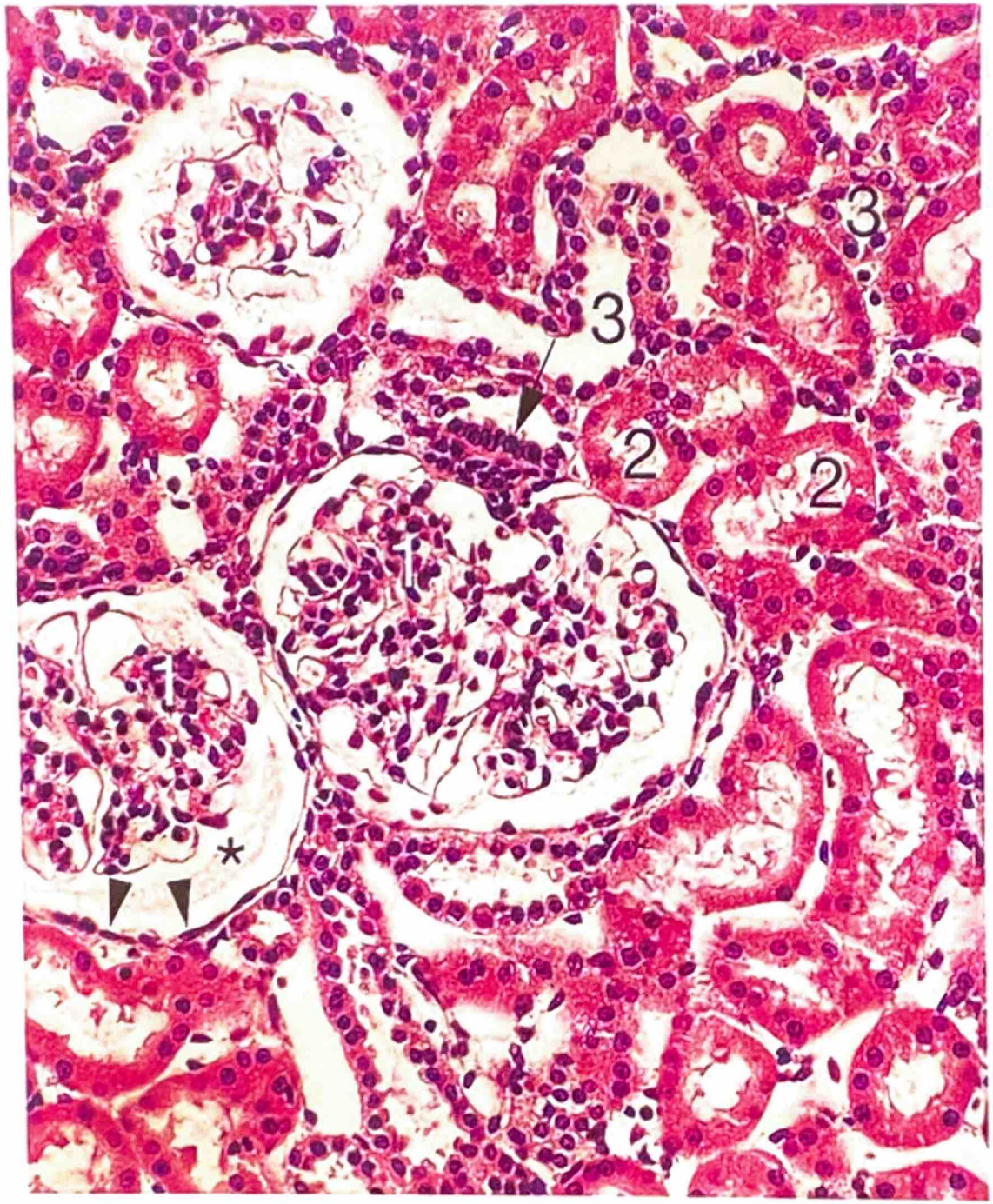
A

Distaler Tubulus
Macula densa
Epitheloidzellen
Vas afferens
Vas efferens
Glomeruluskapillare
Proximaler Tubulus
Bowman-Kapsel

B

Podozyt
Basalmembran
Endothel
Kapillarlumen
Fußfortsatz
Mesangiumzelle

Nierenkörperchen



Nierenkörperchen

1: BOWMANsche Kapsel

2: Kapselraum

3: Kapillarschlinge

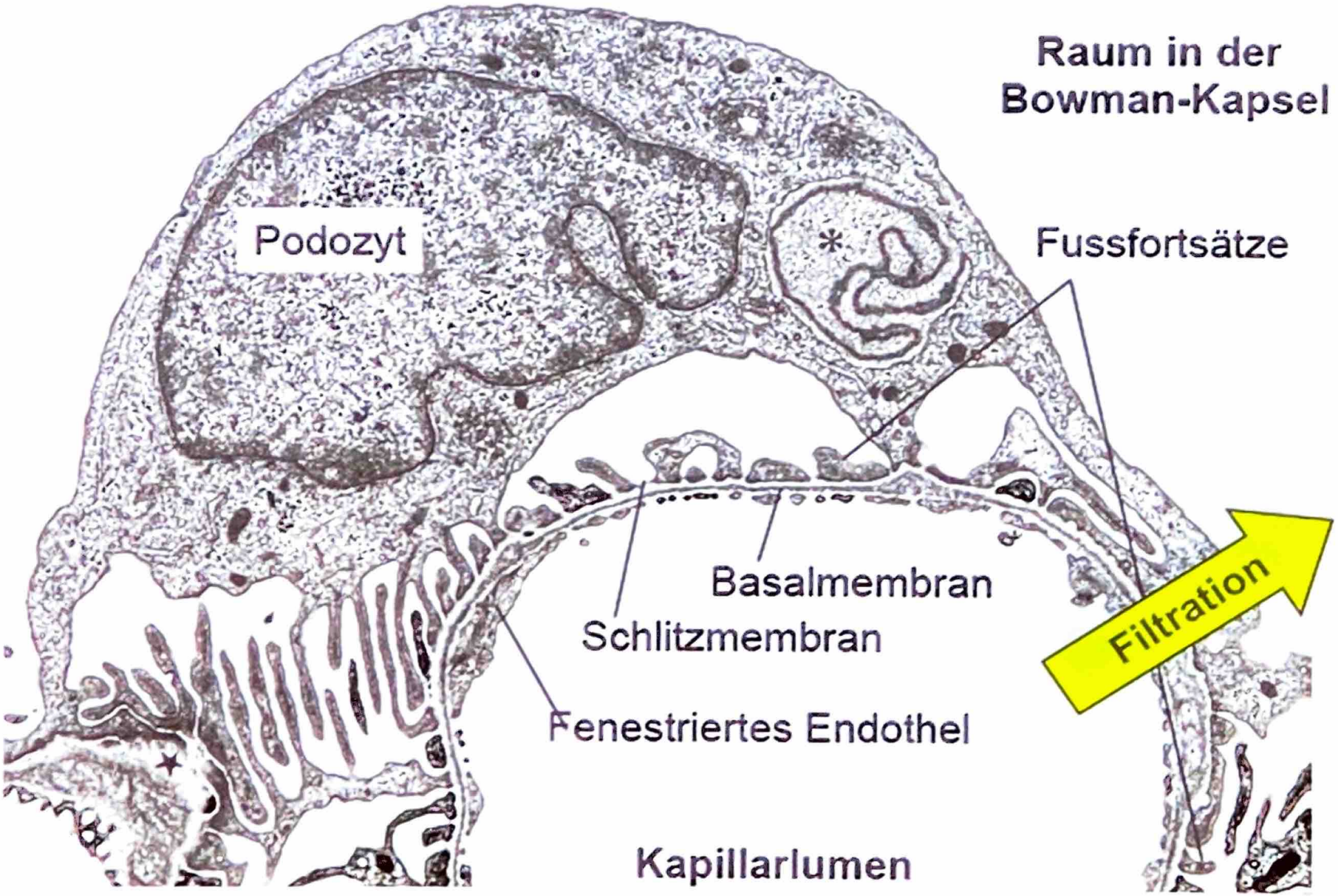
4: Vas efferens

5: distaler Tubulus

6: proximaler Tubulus

Glomeruläre Filtration

Querschnitt durch eine Kapillarschlinge

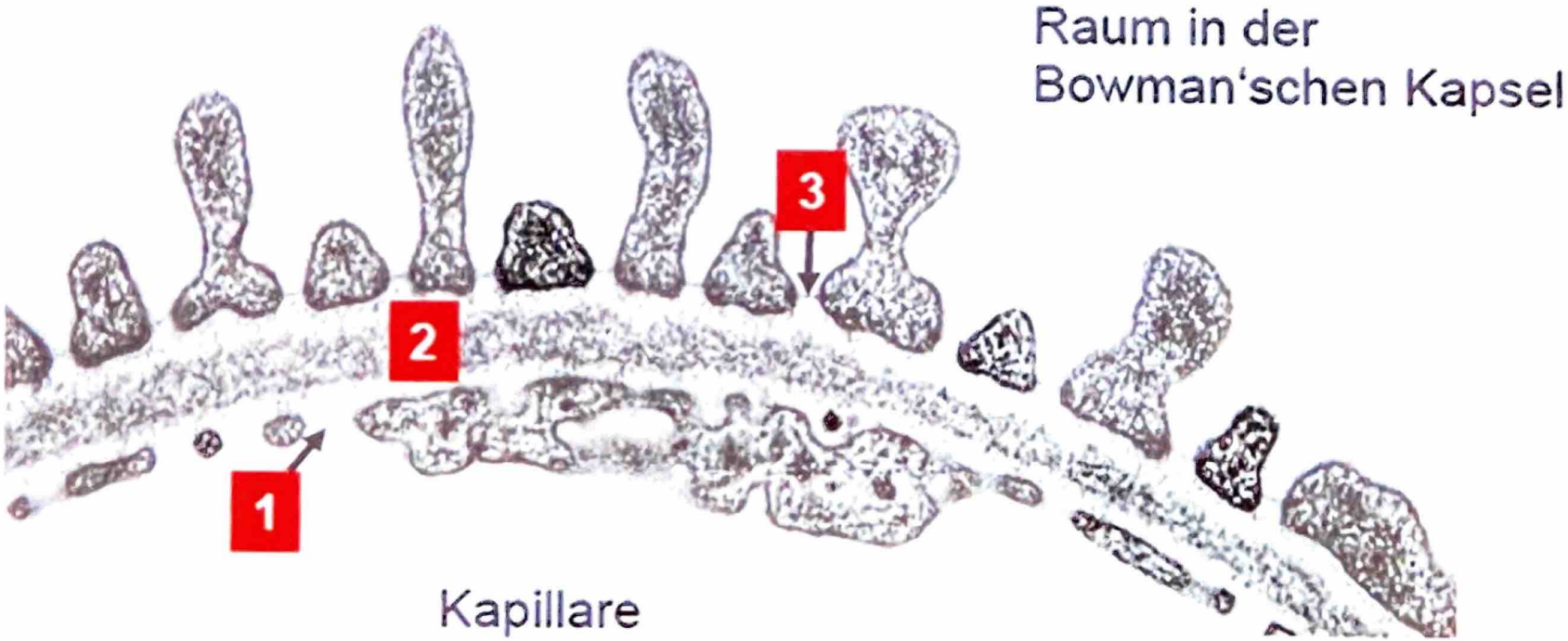


Filtration der Moleküle über Größe und (Ladung)

Substanz	Molekulargewicht [Da]	Molekülradius [nm]	Siebkoeffizient [Filtrat]/[Plasma]
Wasser	18	0,10	1,0
Harnstoff	60	0,16	1,0
Glucose	180	0,36	1,0
Saccharose	342	0,44	1,0
Inulin	5500	1,48	0,98
Myoglobin	17000	1,95	0,75
Ovalbumin	43500	2,85	0,22
Hämoglobin	68000	3,25	0,03
Serumalbumin	69000	3,55	<0,01

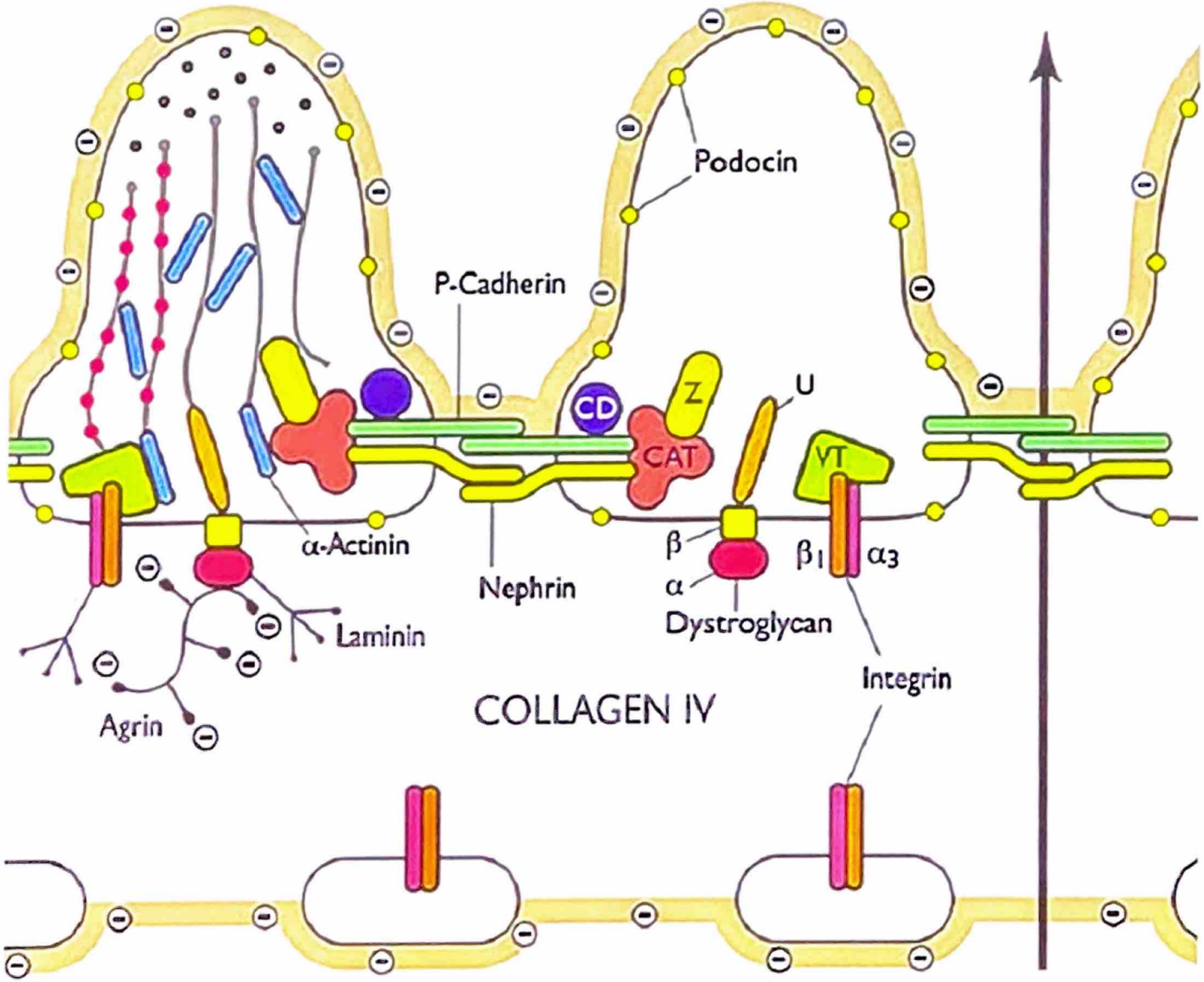
Dreischichtiger Aufbau des glomerulären Filters

1. **Fenestriertes Endothel**
2. **Basalmembran**
3. **Schlitzmembran**



Aus Welsch: Lehrbuch Histologie. © 2006 Elsevie

Glomerulärer Filter



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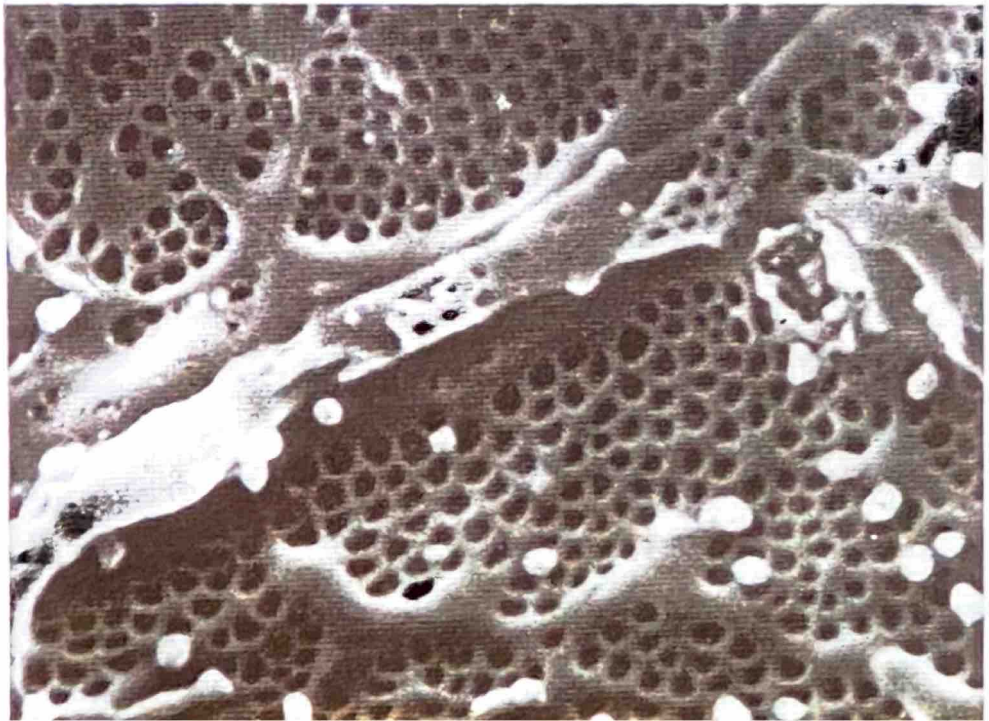
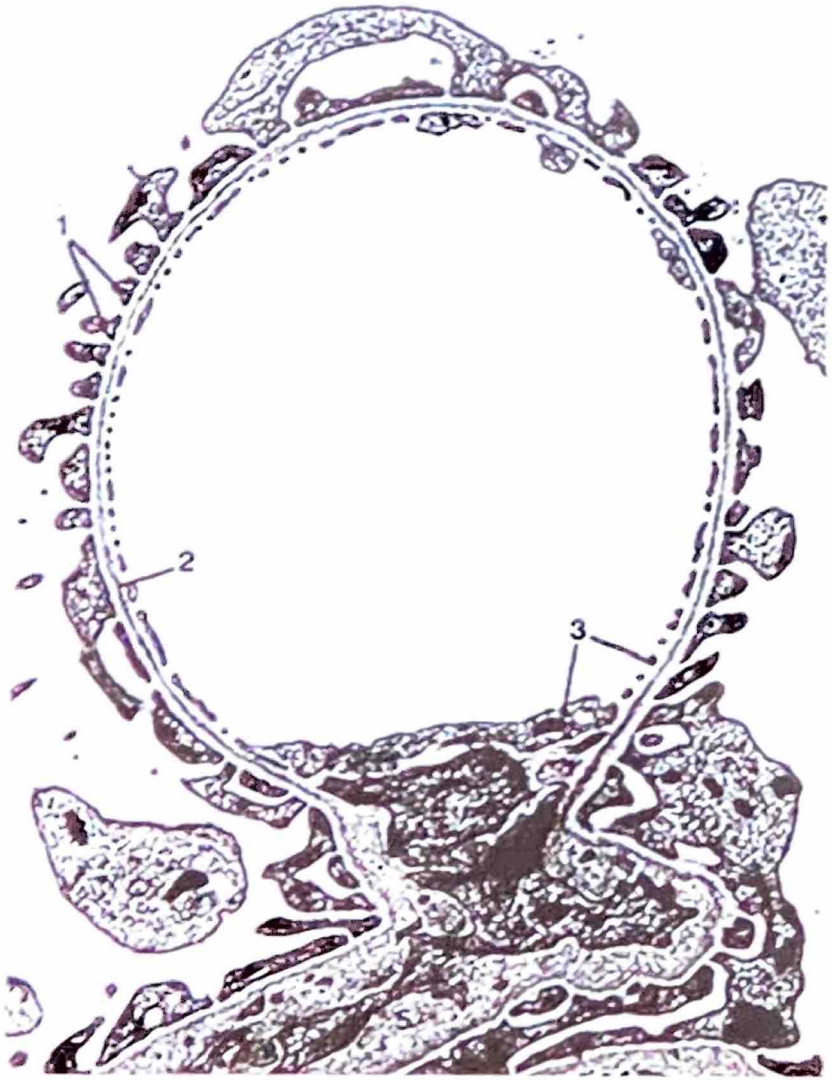
Podozyten

Epitheliale Zellen
Teilungs**un**fähig
Breite der Filtrationsschlitze: 30-40 nm



Endothelzellen

Fenestrierter Typ
Durchmesser der Poren: 50-100 nm



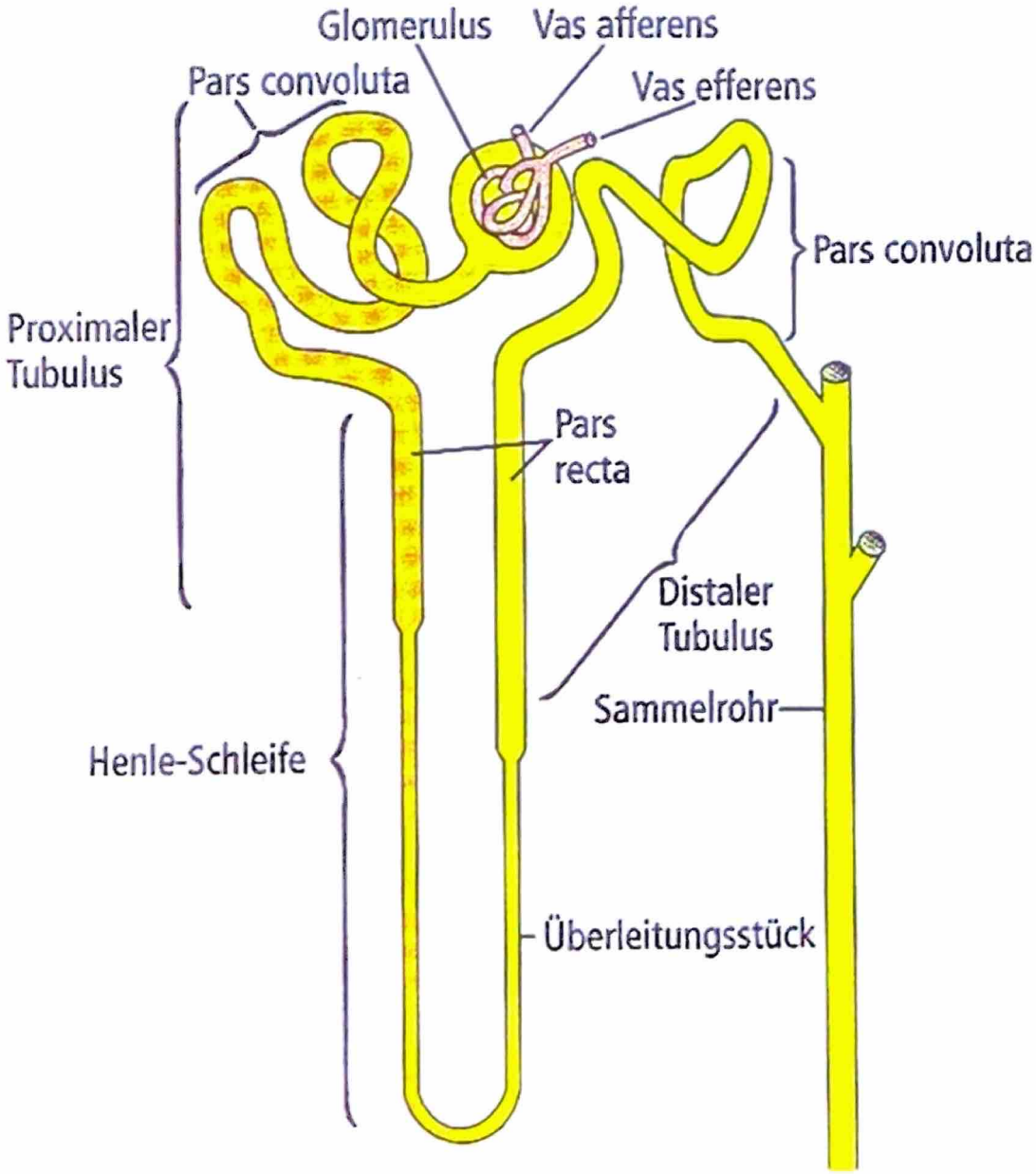
Mesangiumzellen

Stark verzweigte Zellen

Funktion:

Stabilisierung und Regulation der Glomerulären Kapillaren

Phagozytosefunktion

Stützfunktion

Tubulussystem