

The Microscopic Filtering Unit

Inside the Nephron: The Blueprint of Human Osmoregulation.

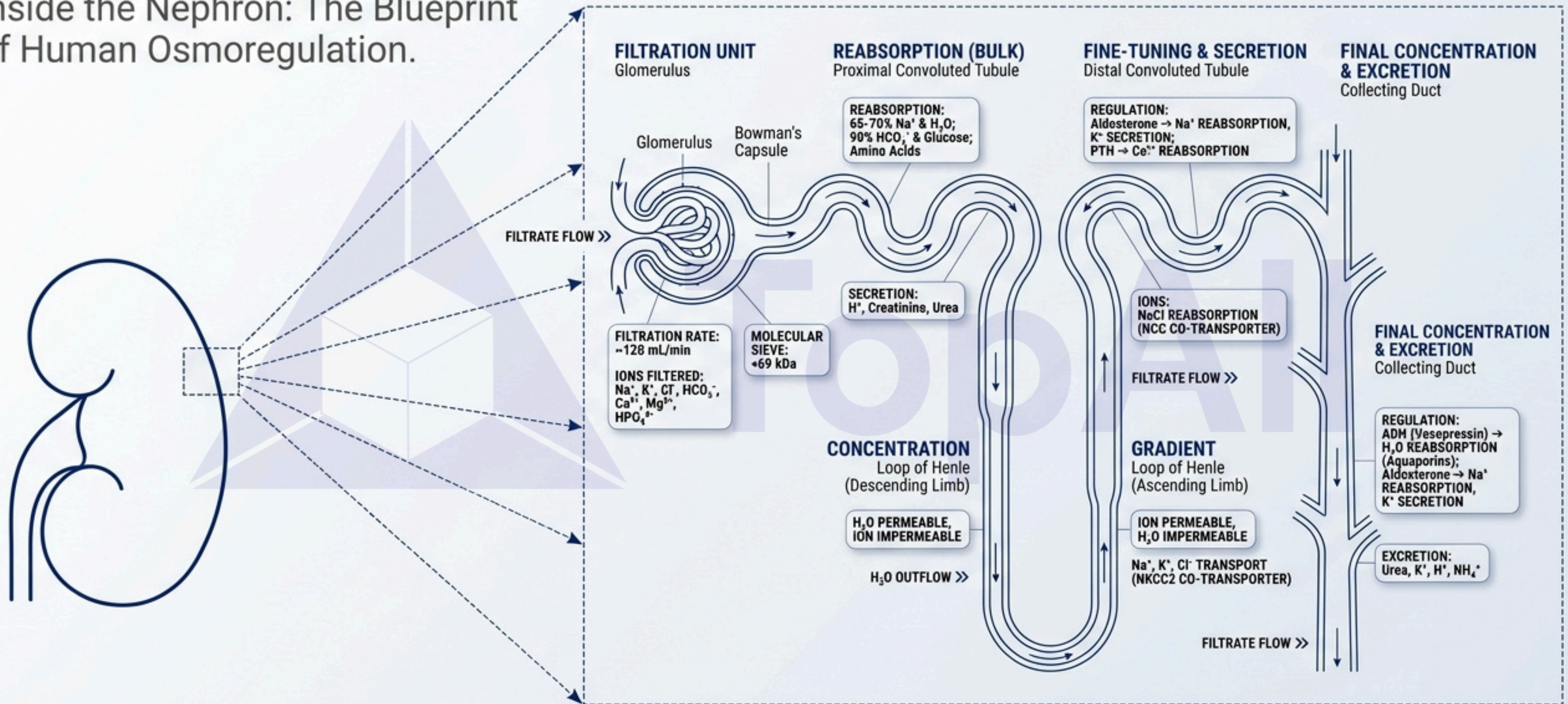
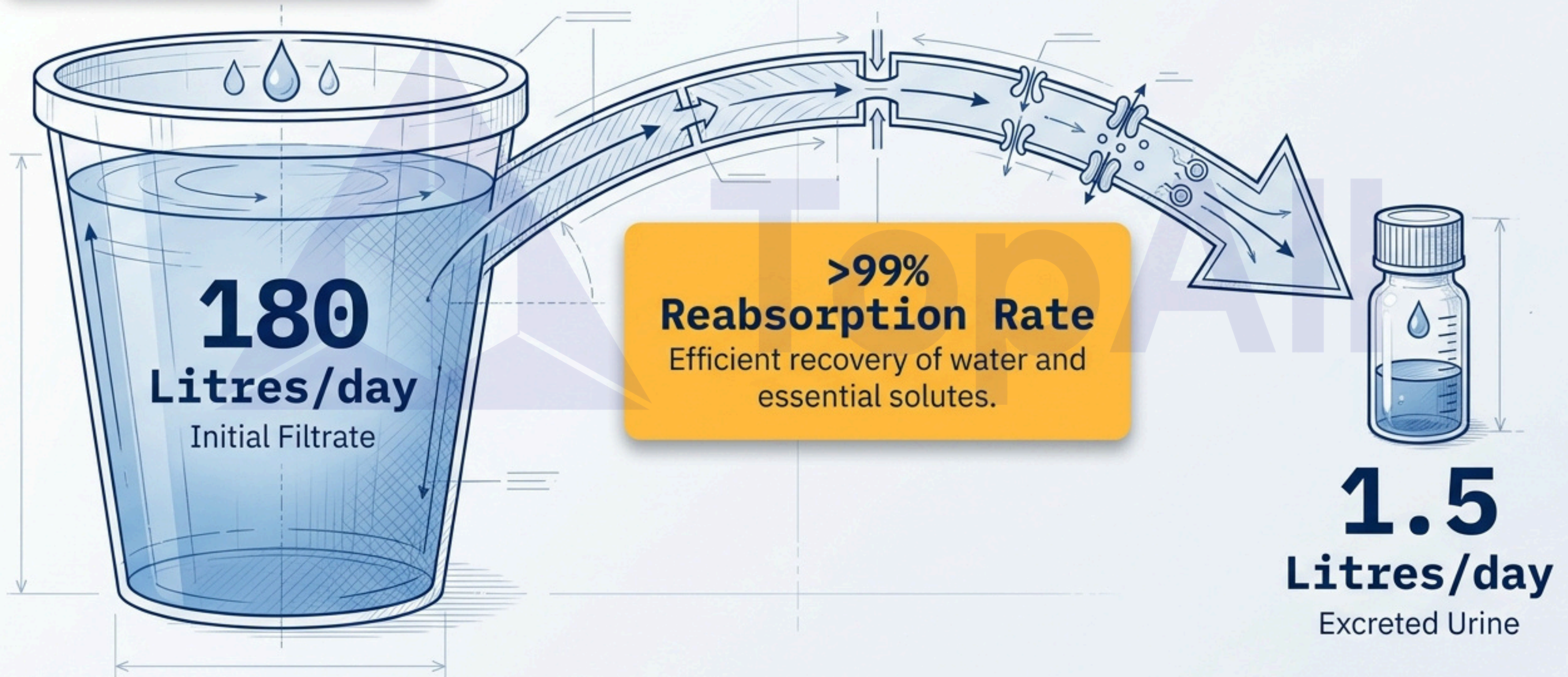


FIGURE 1.1: ENGINEERING SCHEMATIC OF A SINGLE HUMAN NEPHRON, SHOWING SEGMENTAL FUNCTION IN OSMOREGULATION AND WASTE PROCESSING. ALL VALUES ARE APPROXIMATE AVERAGES.

Nearly One Million Nephrons Per Kidney

GFR = 125 ml/min



The Complete Structural Map

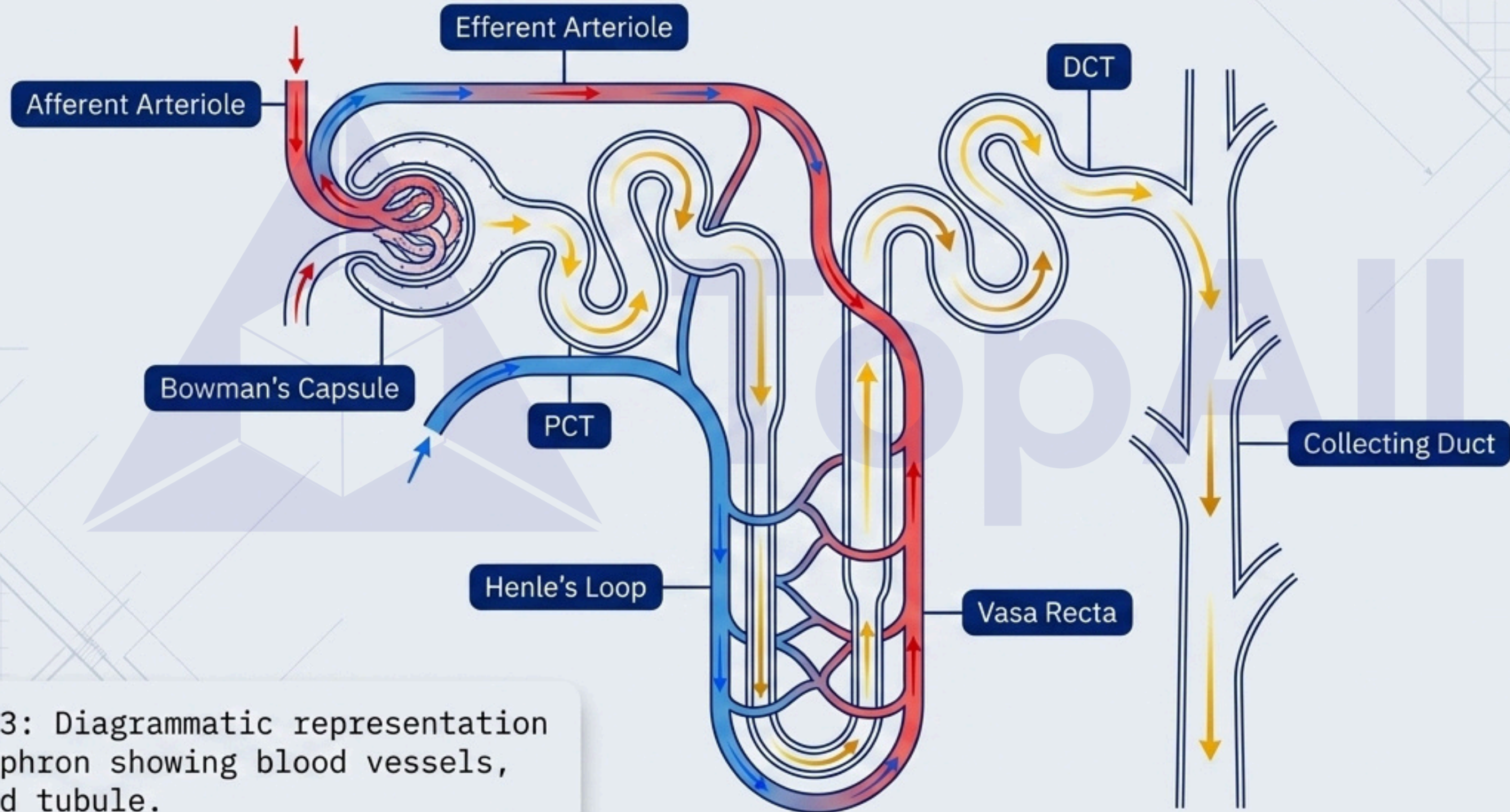


FIG 16.3: Diagrammatic representation of a nephron showing blood vessels, duct and tubule.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



At prep.topall.app

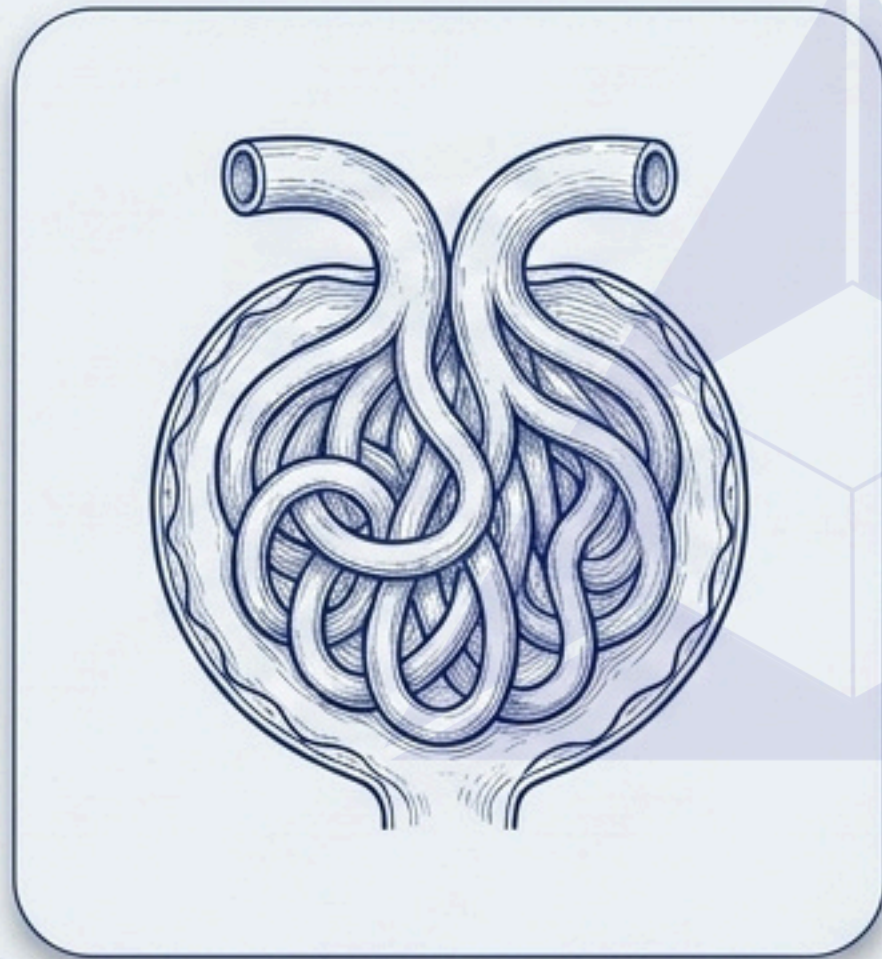
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



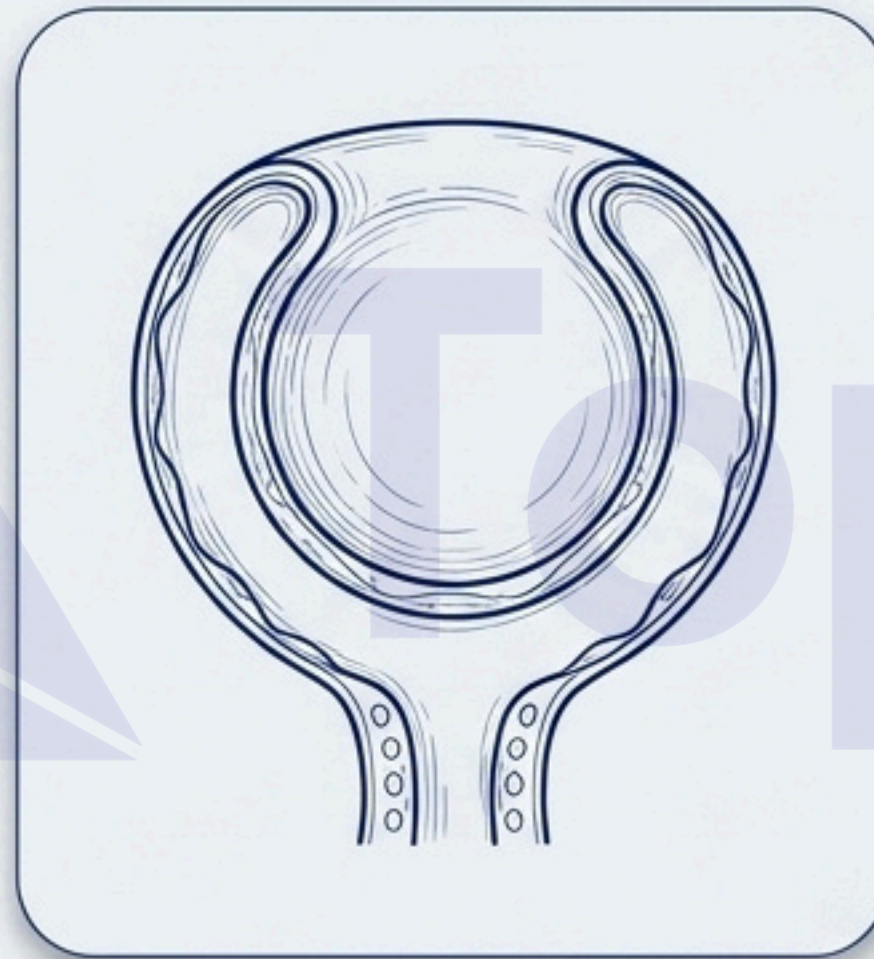
The Filtration Engine: Renal Corpuscle

Located exclusively in the cortical region of the kidney.



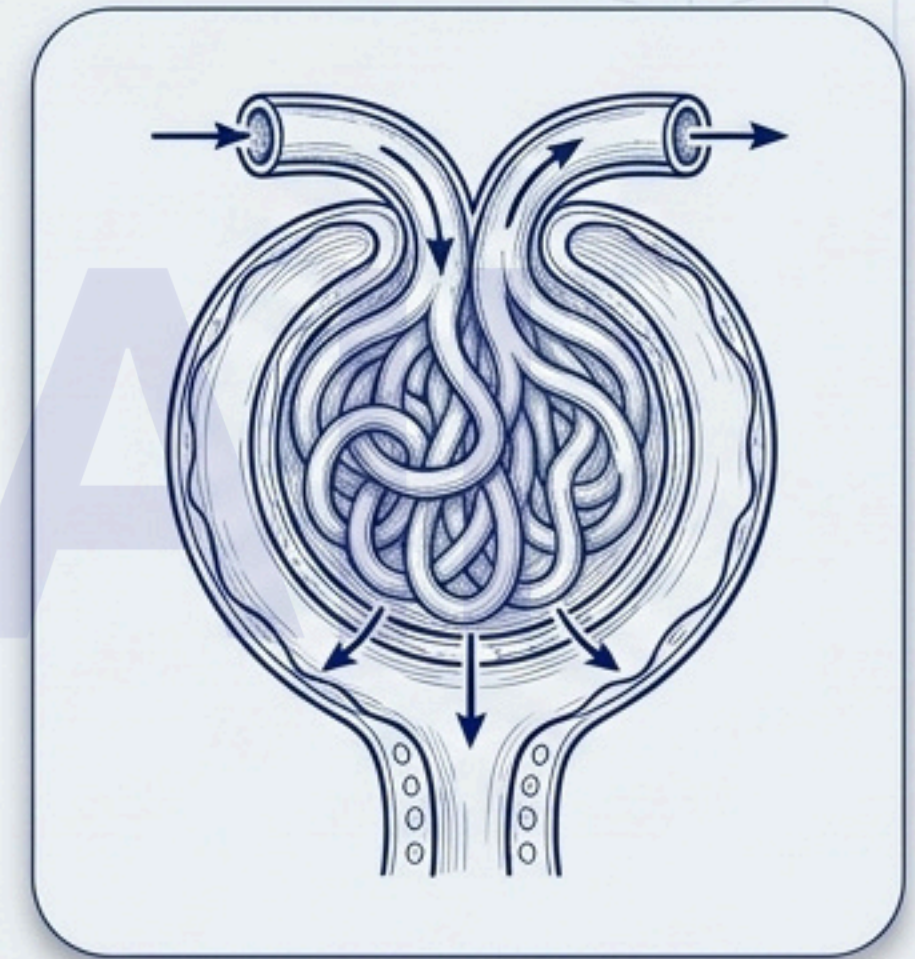
[Glomerulus]

+



[Bowman's Capsule]

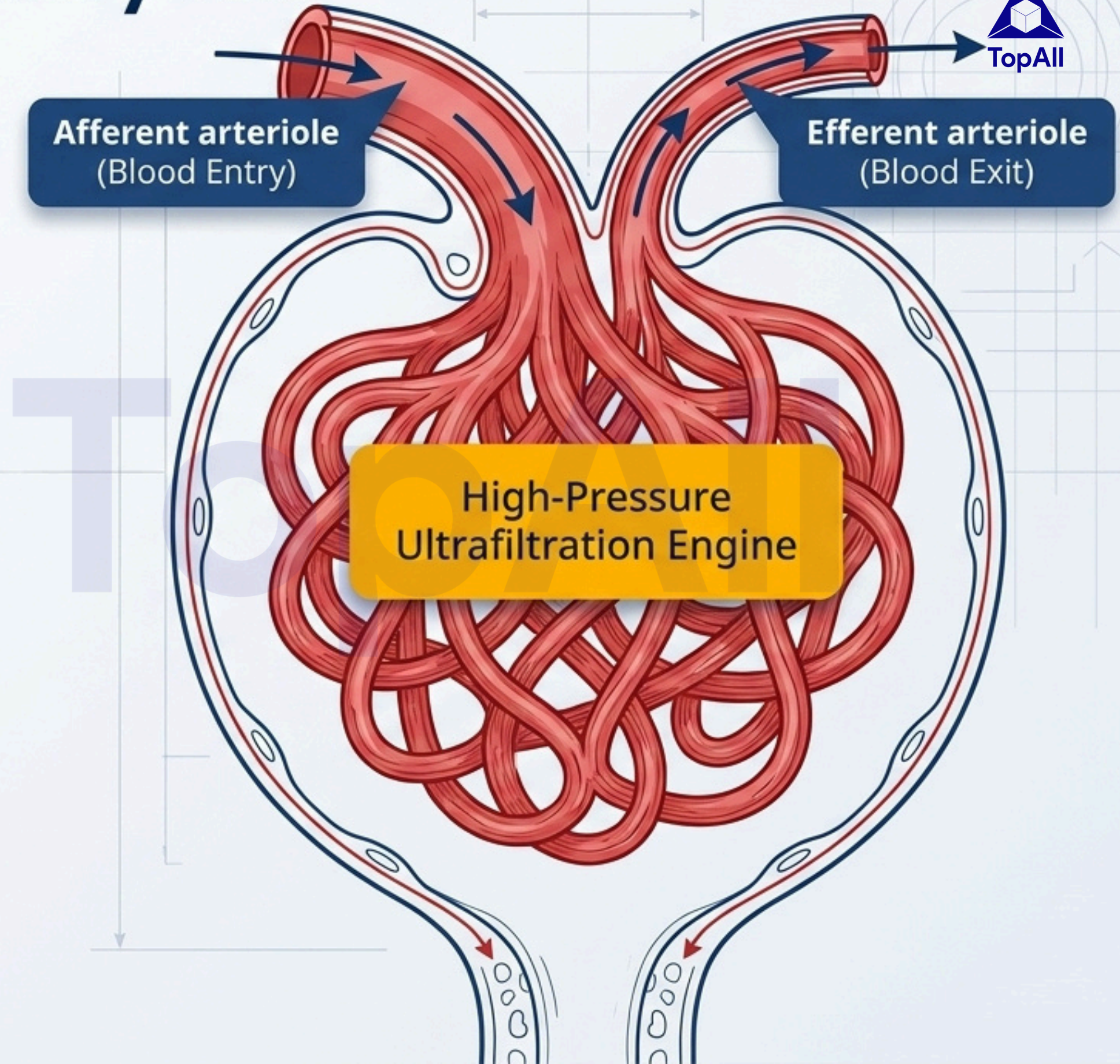
=



[Malpighian Body]

The Glomerulus: The Capillary Tuft

- Formed by a fine branch of the renal artery.
- High glomerular capillary blood pressure drives the filtration process.



Bowman's Capsule: The Catching Cup

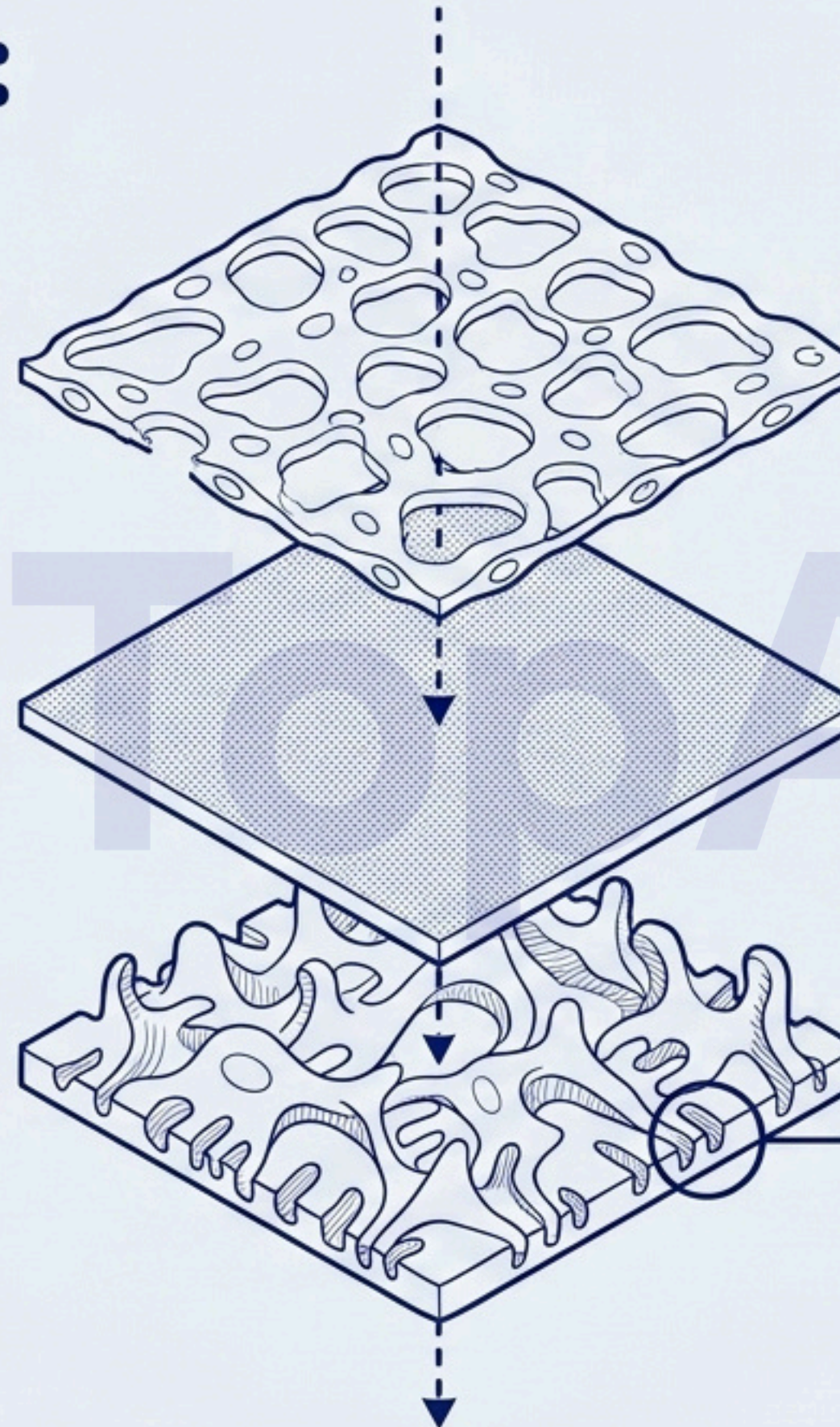
Blood is filtered so finely that all plasma constituents (except proteins) pass into the lumen.

Epithelium of
Bowman's capsule

Endothelium of
glomerular blood
vessels

Basement Membrane

Podocytes interlock
to create minute
filtration slits /
slit pores.



The Tubular Journey: Reabsorption & Secretion

Micro-filtration schematic



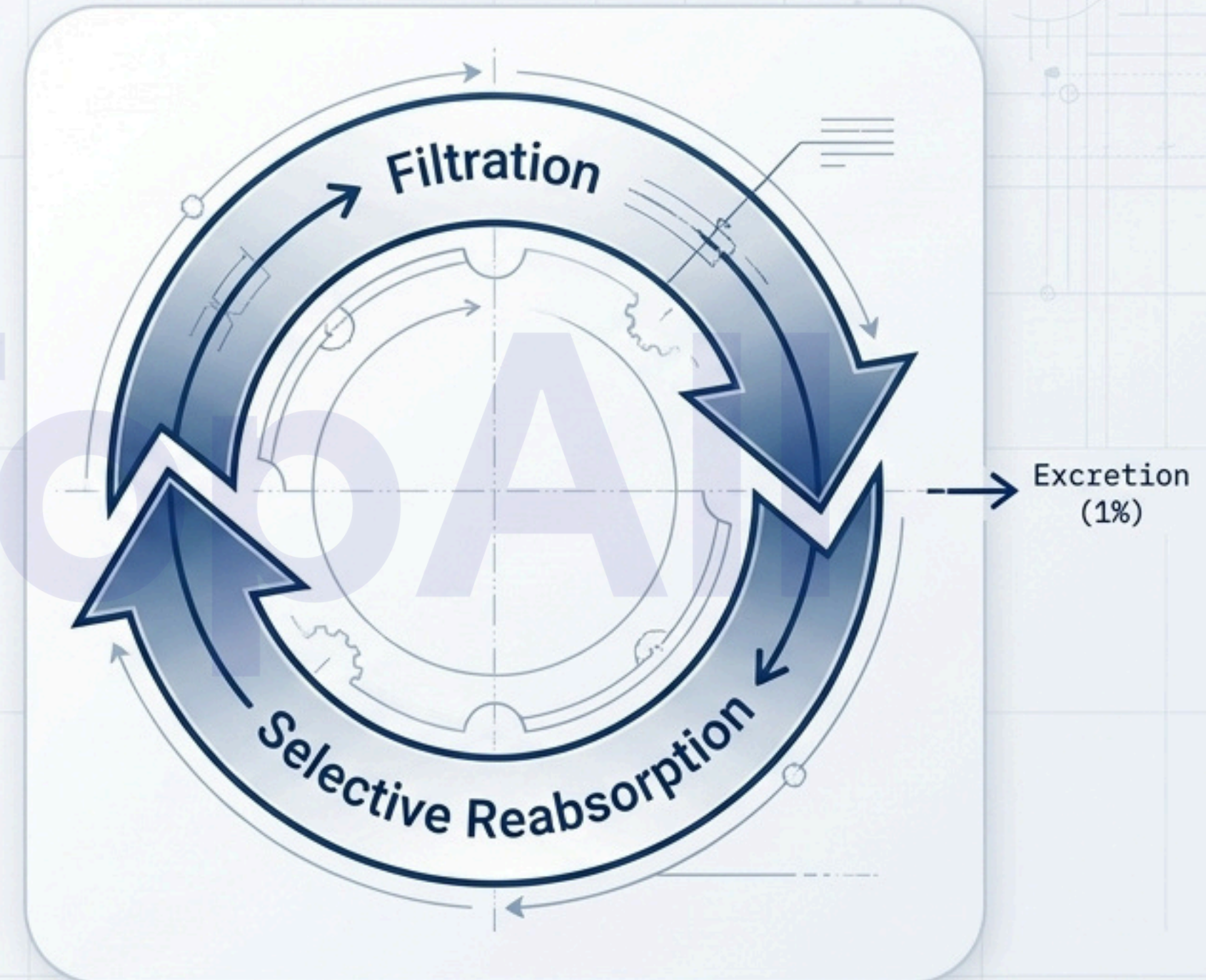
	PCT	Henle's Loop	DCT	Collecting Duct
Primary Function	Reabsorbs 70-80% electrolytes/water	Maintains high medullary osmolarity	Conditional reabsorption	Produces concentrated urine
Water Permeability	 High	 Descending: Yes / Ascending: No	 Conditional	 High
Key Ions Handled	 Na^+ , HCO_3^- , H^+ , NH_3	 NaCl	 Na^+ , K^+ , HCO_3^-	 H^+ , K^+

Micro-filtration schematic

Tubular System Blueprint

Synthesis: Precision Homeostasis

The nephron is not merely a disposal system—it is a highly selective recycling facility. Through precisely engineered active and passive transport, it perfectly balances blood pH, fluid volume, and ionic composition.



Micro-Engineering Schematic
Fluid Dynamic Balance Loop



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis