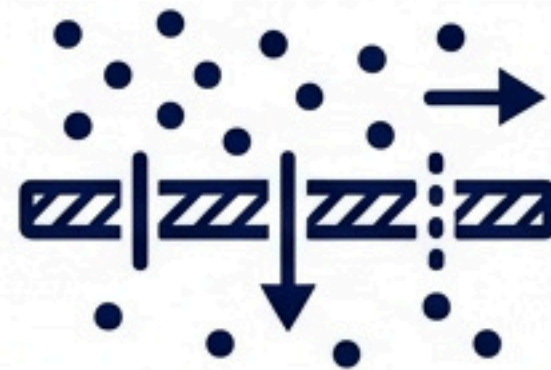


Filtration, Reabsorption and Secretion

The biological architecture and metrics of human urine formation.



Three Steps of Urine Formation

01

Glomerular Filtration

Direction:
Blood → Lumen

Selectivity:
Non-selective
(bulk flow)

Primary Action:
Ultra-filtration of
plasma driven by
capillary blood
pressure.

02

Reabsorption

Direction:
Lumen → Blood

Selectivity:
Highly selective

Primary Action:
Reclaiming 99% of
water and essential
nutrients (glucose,
amino acids, Na^+).

03

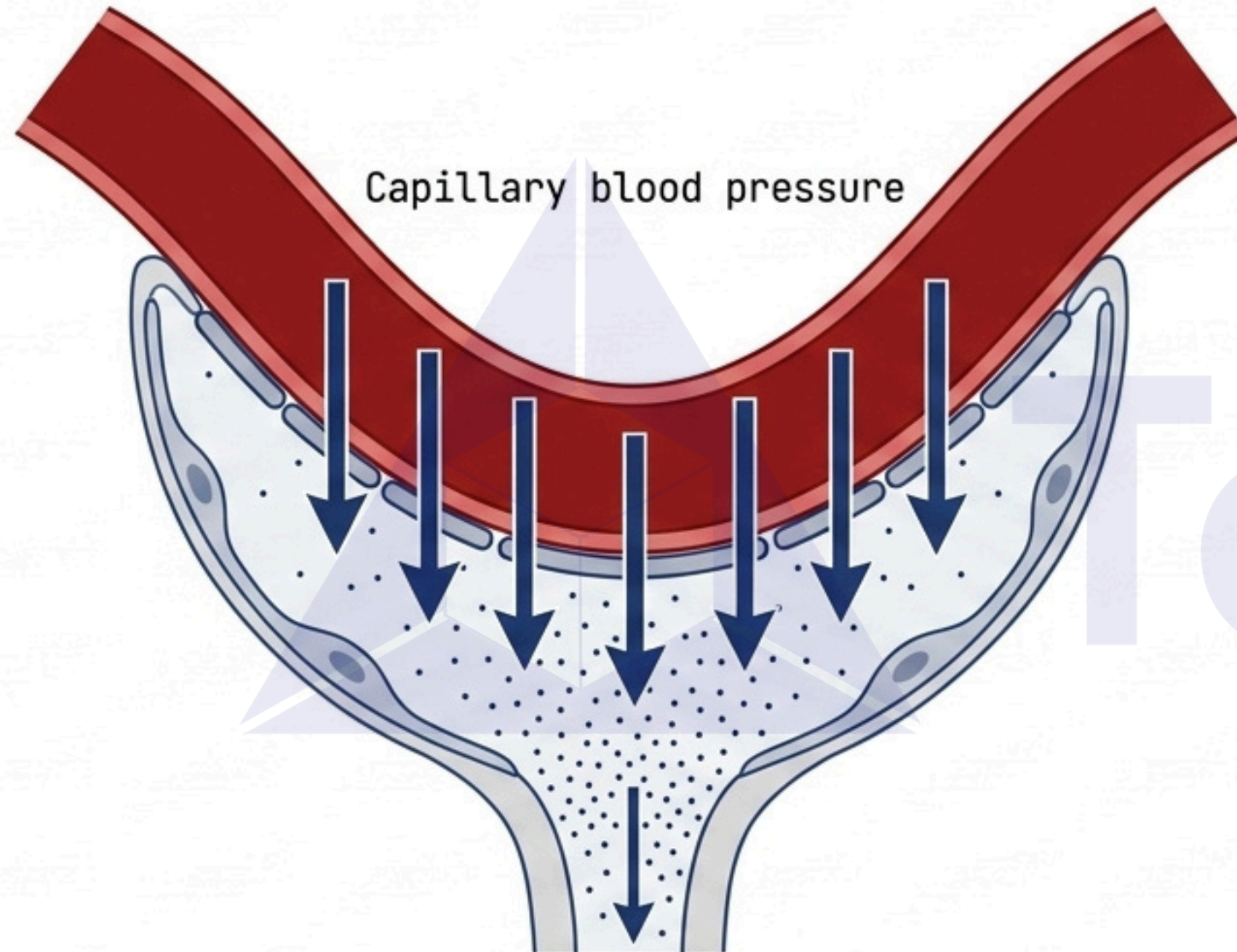
Secretion

Direction:
Blood → Lumen

Selectivity:
Highly selective

Primary Action:
Targeted removal of
 H^+ , K^+ , and ammonia
to maintain acid-base
and ionic balance.

Glomerular Filtration: The Pressure Engine



**1100-1200
mL/min**

Blood filtered by the kidneys.

~20%

Represents roughly 1/5th of
the total blood pumped out by
each ventricle of the heart in
a minute.

Almost all constituents of the plasma—except proteins—pass into the lumen through this bulk flow.



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



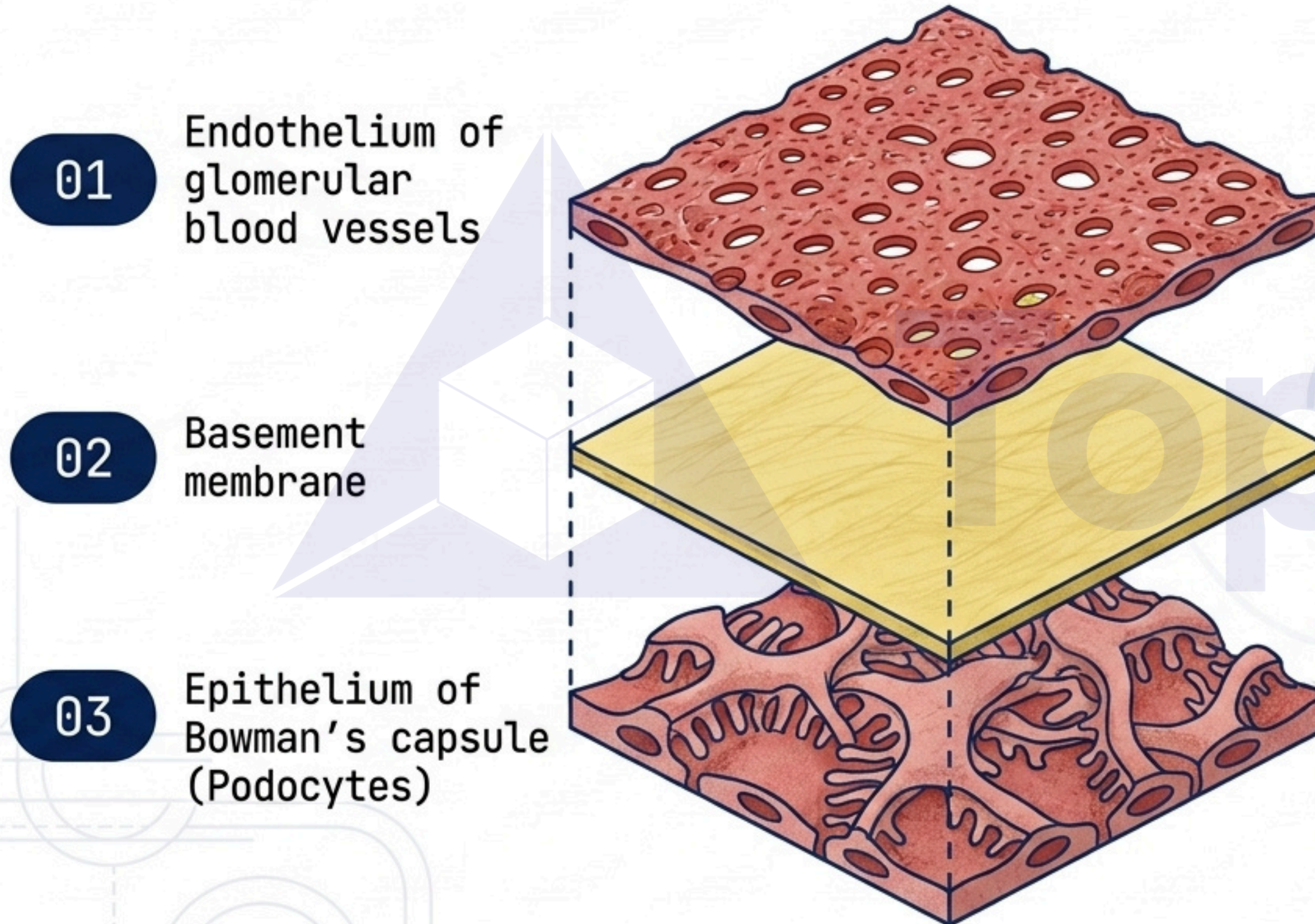
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Key Highlights

- » 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



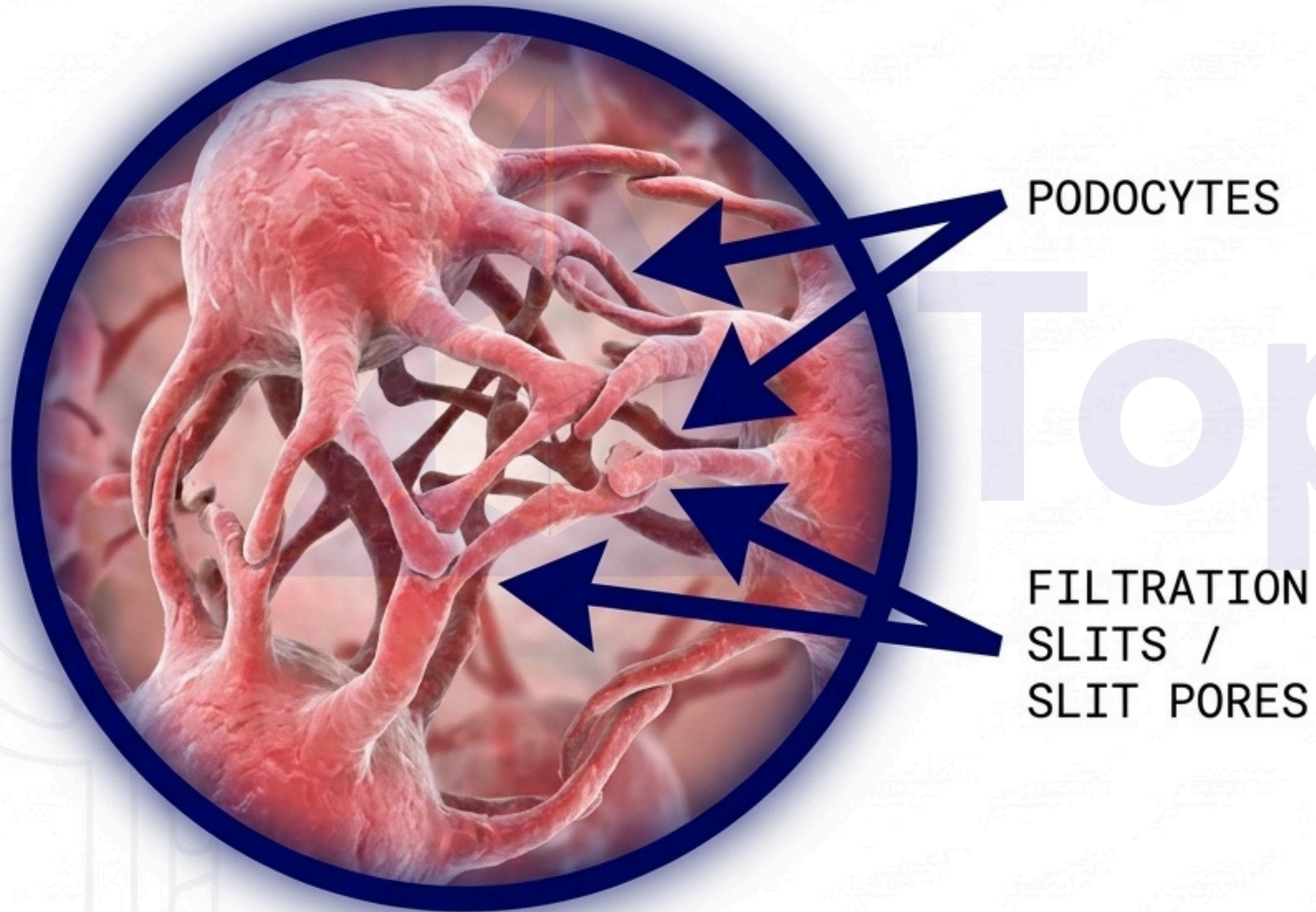
The Three Ultrafiltration Layers



Biological Sieve:

The combined structure of these three membranes facilitates 'Ultra Filtration', completely blocking large protein molecules.

Podocytes and Filtration Slits



Epithelial cells are arranged in an intricate manner to leave minute spaces. These slit pores act as the final, finest filter for the fluid entering the lumen.

Glomerular Filtration Rate (GFR)



JGA Autoregulation

The Juxta Glomerular Apparatus (JGA) monitors this rate. A fall in GFR activates JG cells to release **renin**, stimulating glomerular blood flow and bringing the GFR back to the baseline of 125 mL/min.

The Reabsorption Imperative

99% Reabsorption Efficiency

180 L
Filtrate Formed Daily

1.5 L
Actual Urine Released

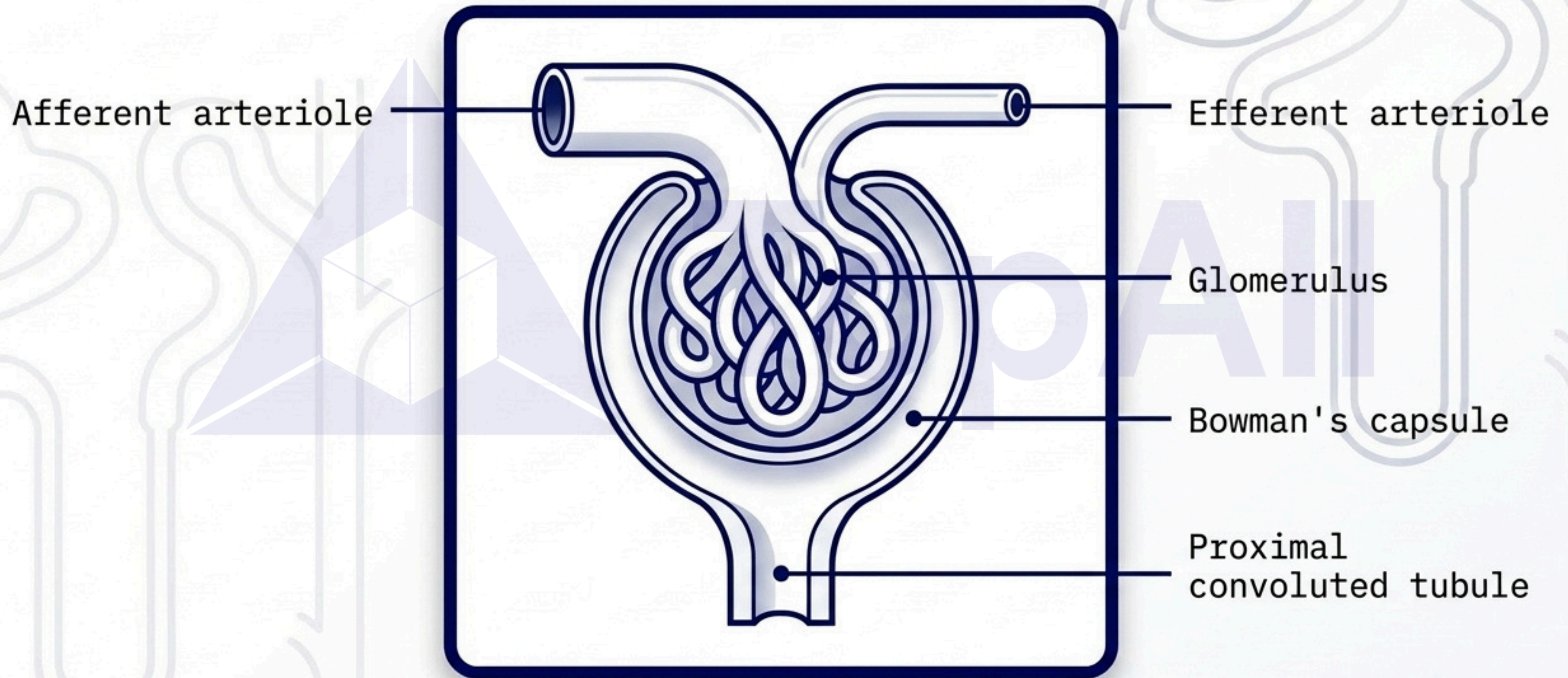
Active Transport

- Glucose, amino acids, and Na^+ are actively reclaimed by the tubular epithelial cells.

Passive Transport

- Nitrogenous wastes and initial water segments are absorbed passively.

The Malpighian Body



System Synthesis



Urine formation is an evolutionary masterclass in continuous bulk-clearing and selective reclamation. By **aggressively filtering 180 liters of plasma daily but selectively rescuing 99% of it**, the kidneys maintain absolute command over the body's **fluid volume, ionic balance, and acid-base homeostasis.**

01. FILTER BULK



02. RECLAIM 99%



03. SECRETE TO BALANCE



You've Learned the Theory.

Now Let's Test It.

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