

# DIURETICS

Dr. Shariq Syed

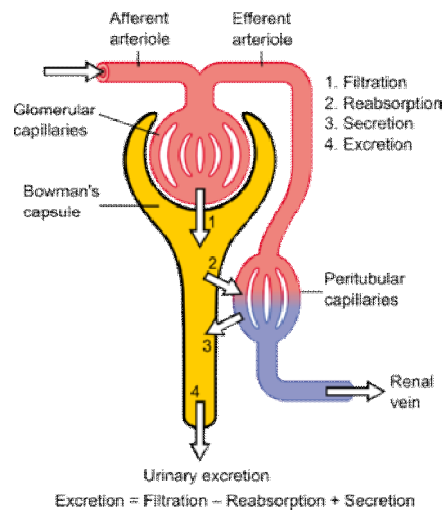
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## Diuretics !!, What are they ??

- Class of drugs/Substances that promote urine
- Simplistically also called “Water Pill or Water tablet”
- Clinically used in conditions where there is a need to lower total water load
- Major Indications
  - Hypertension
  - Edema due to heart failure

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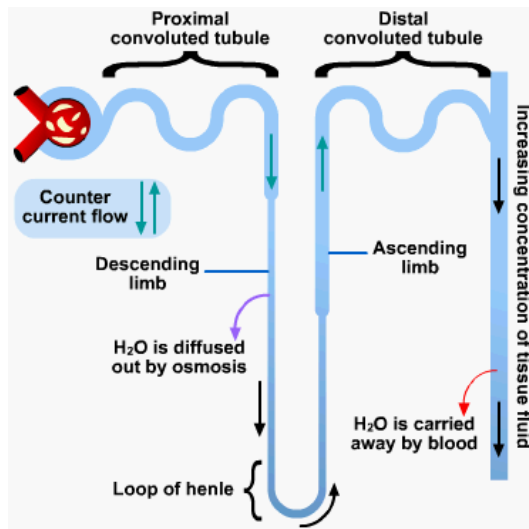
# Structure of Kidney



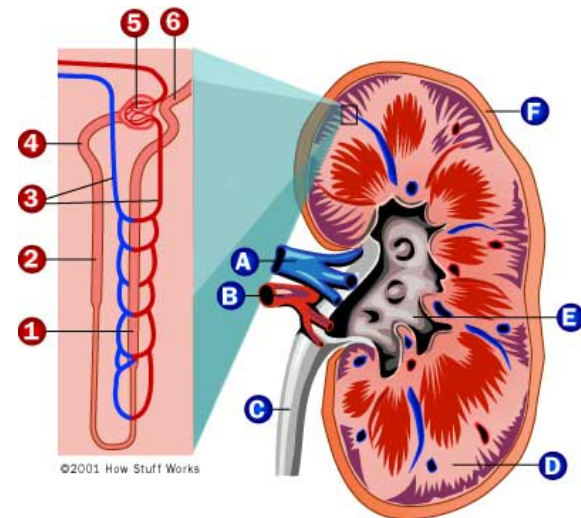
- Blood filtered by functional unit: Nephron
- Except for cells, proteins , other large molecules, rest gets filtered

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# Structure of Kidney



- 3 major regions of nephron
  - PCT (Proximal Convoluted Tubule)
  - Loop of Henle
  - DCT (Distal convoluted Tubule)



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## Role of Kidneys

- Acts as filter to remove waste products and excess substances
- In addition it also
  - Controls blood pressure
  - Maintain internal water balance
  - Make RBC
  - Maintain strong & healthy bones

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## Pop Quiz !!

- How much of blood is approximately filtered every day

10 L

50 L

200 L

I Don't know, too  
tired after Sports  
week !

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## Pop Quiz !!

- How many times your blood gets filtered every day

1

2

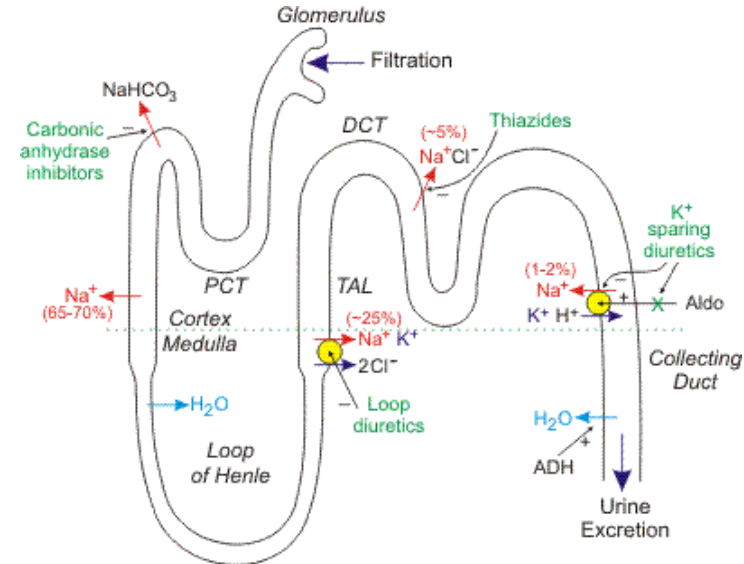
20-25

I Don't know, too  
tired after Sports  
week !

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# Role of Kidneys in Water/ Na reabsorption

- 20 % of plasma filtered in to PCT
- 65- 70 % of filtered Na removed iso-osmotically
- Medulla hyperosmotic , loop is permeable to water, water reabsorption takes
- The TAL, which is impermeable to water, has a cotransport system that reabsorbs sodium, potassium and chloride
- Approximately 25% of the sodium load of the original filtrate is reabsorbed at the TAL

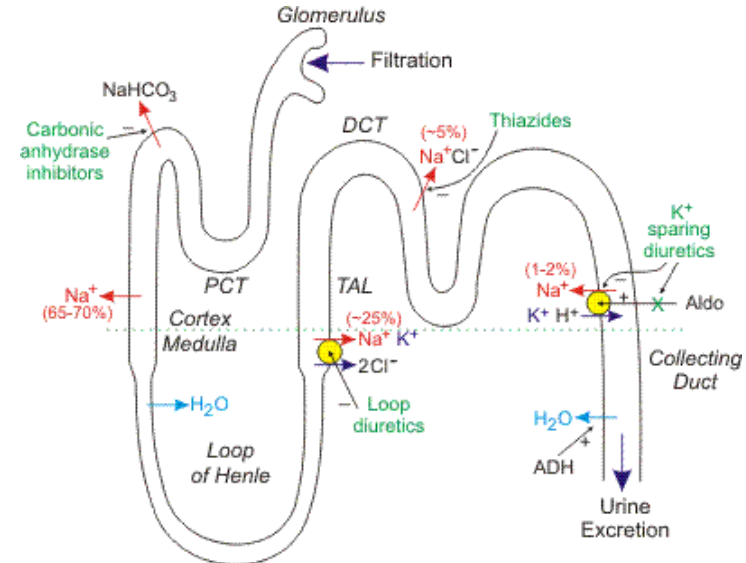


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# Role of Kidneys in Water/ Na reabsorption

- 5 % Na reabsorbed in DCT
- 1-2 % Na reabsorbed in remaining region



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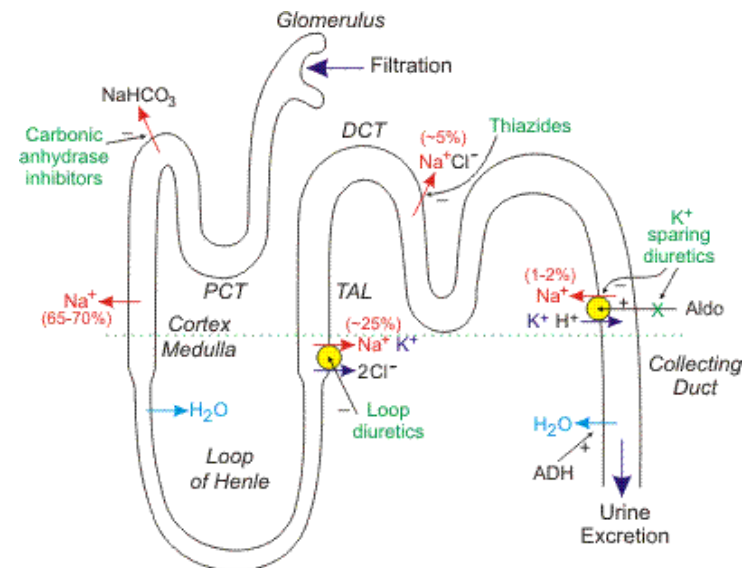
## Mechanism of Action

- Diuretic act by changing the way kidney handles Sodium
- Most Diuretics acts by blocking reabsorption of Sodium
- Sometimes a combination of two diuretics is given because this can be significantly more effective than either compound alone (synergistic effect) of Na

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# Different Classes of Diuretics

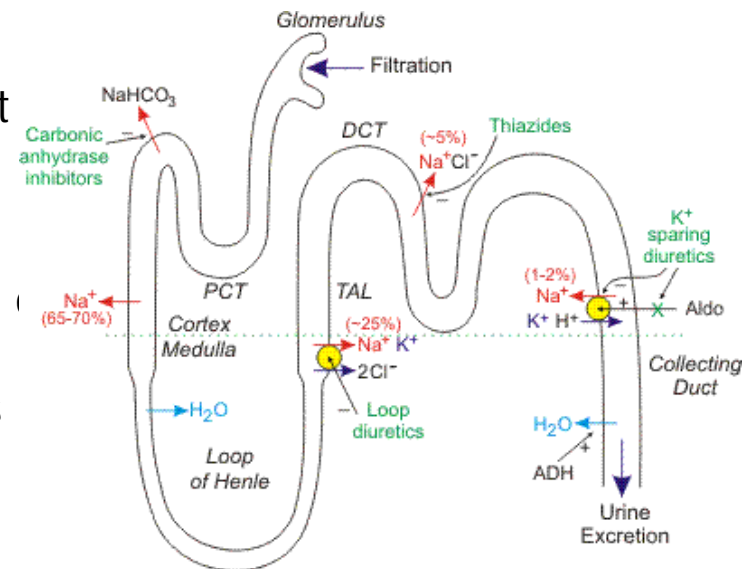
- Loop Diuretics:
  - inhibit the sodium-potassium-chloride co-transporter in the thick ascending limb
  - This transporter normally reabsorbs about 25% of the sodium
- Thiazide Diuretics:
  - Commonly used, act in DCT (5% Na)
  - Less powerful



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# Different Classes of Diuretics

- K Sparing Diuretics:
  - Some do not act directly on Na transport
  - Antagonize the actions of aldosterone
- Carbonic anhydrase inhibitors:
  - Inhibit the transport of bicarbonate out the proximal convoluted tubule
  - leads to less sodium reabsorption at this site and therefore greater sodium, bicarbonate and water loss in the urine
  - Weakest in class



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# Summary

- Defined what are Diuretics, what are their uses
- Briefly reviewed Structure, function of Kidney
- How Kidney handles water/Na reabsorption
- Basic mechanism of Diuretics
- Different Classes
- We will look at specific classes starting next class
  - Structure, MOA, Clinical uses, Side effects

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