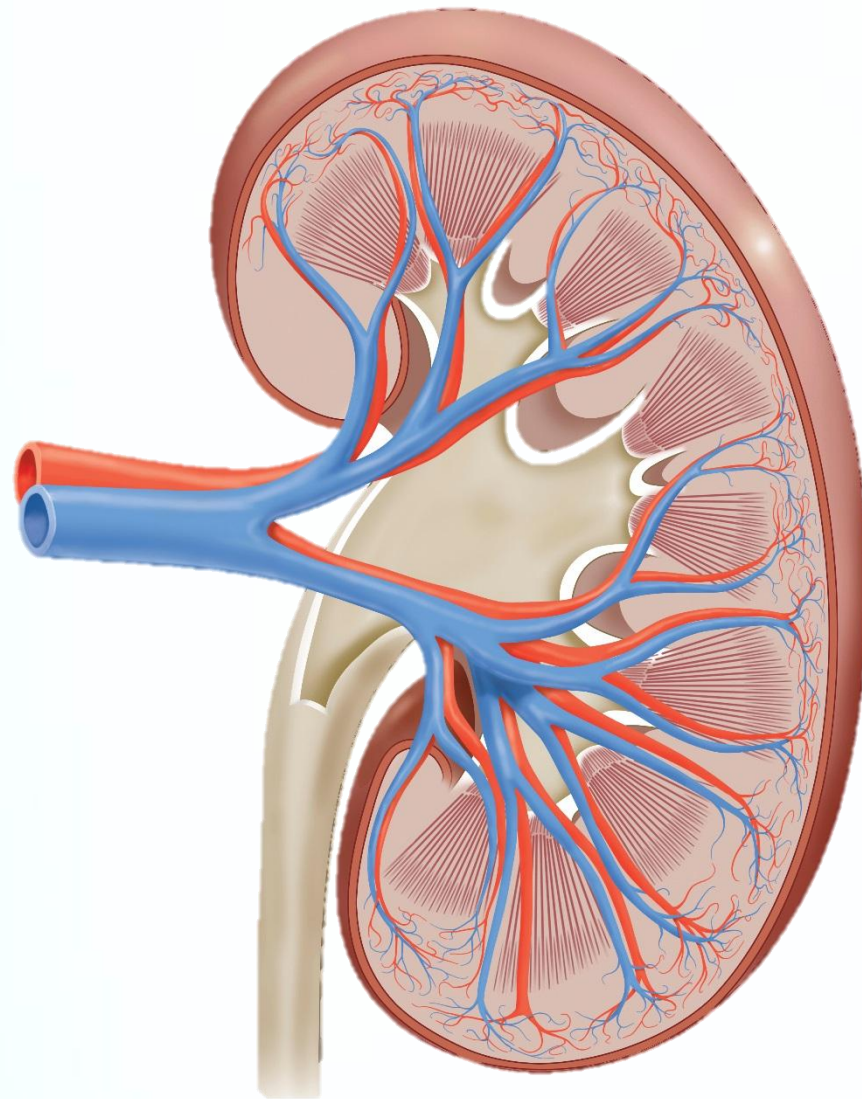
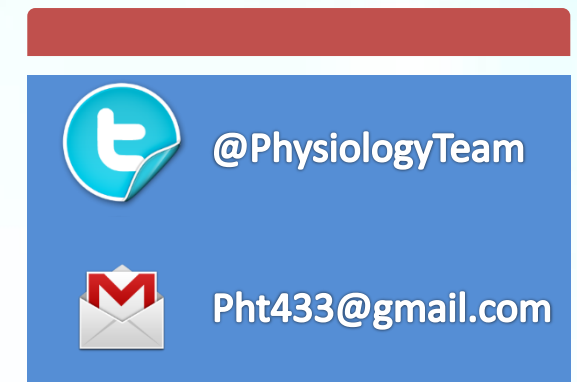


PHYSIOLOGY PRACTICAL REVISION



Renal Block

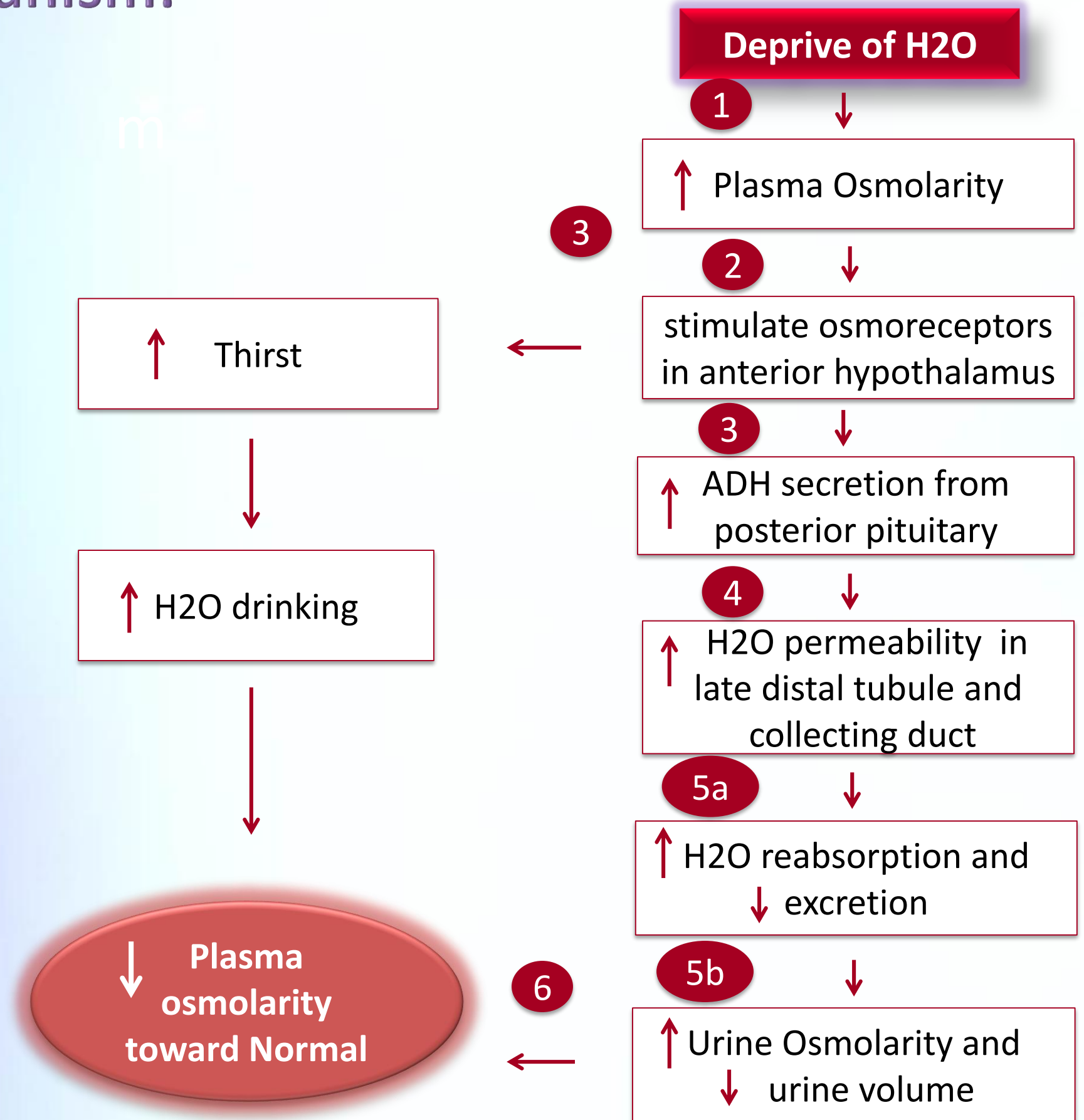


Questions after each case
are very important and
mentioned by doctor

Case 1

Fasting

Mechanism:



In Person who did not drink water for long time, answer the following questions, which based on body control for his condition:

Where are the different between Osmotic diuresis and Water diuresis?

Osmotic diuresis: increase osmolarity and volume of urine

Water diuresis: increase volume of urine ONLY (decrease osmolarity)

What are the changes in his plasma?

1. Increase plasma osmolarity
2. Decrease plasma volume

What happened if the osmolarity of plasma increased?

Stimulate osmoreceptors from anterior hypothalamus

What happened if osmoreceptors activated?

1. Stimulate secretion of ADH
2. Stimulate Thirst center

What is the hormonal regulation that will take place in his condition?

Increase ADH secretion from posterior pituitary gland

What is the role of ADH in his condition?

Increase permeability of H₂O in late distal convoluted tubules and collecting ducts (increase H₂O reabsorption)

What are the changes in his urine?

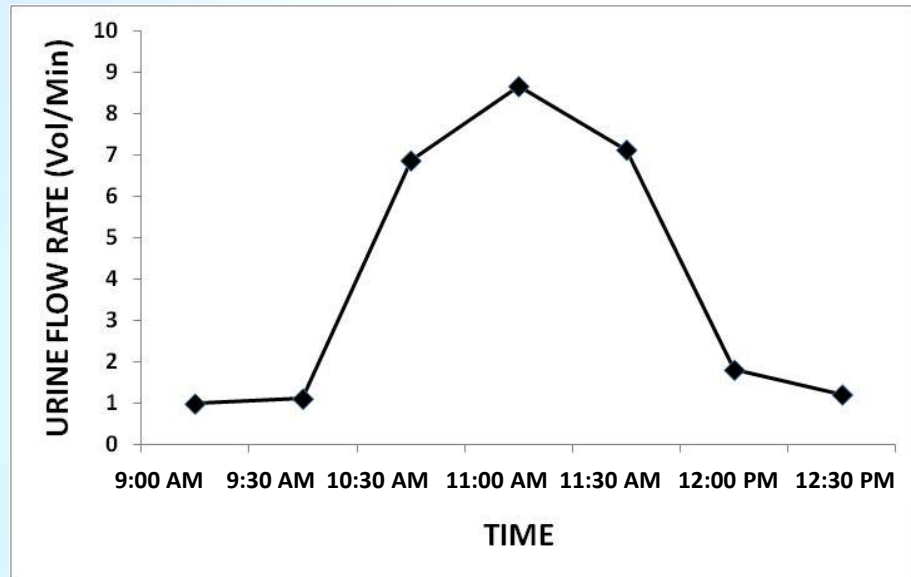
1. Increase urine osmolarity
2. Decrease urine volume

What is the consequences in his condition?

Plasma volume and osmolarity will back to normal

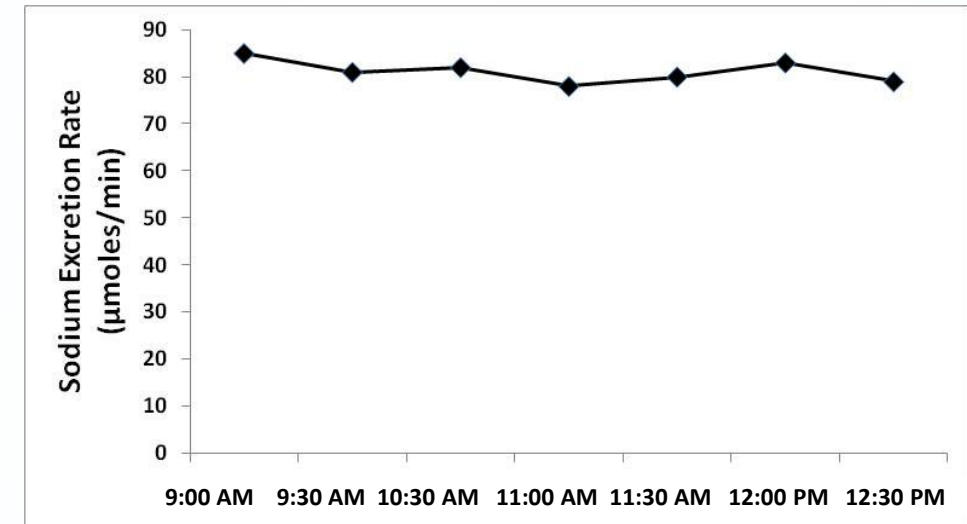
Case 2

Drink 1 L of water



Description:

- Urine volume will be about the **same in the first post-experimental** sample as of the pre-experimental sample.
- Then will **increase** dramatically in the subsequent samples and will again **decrease** back to the level of pre- experimental sample in the last samples.



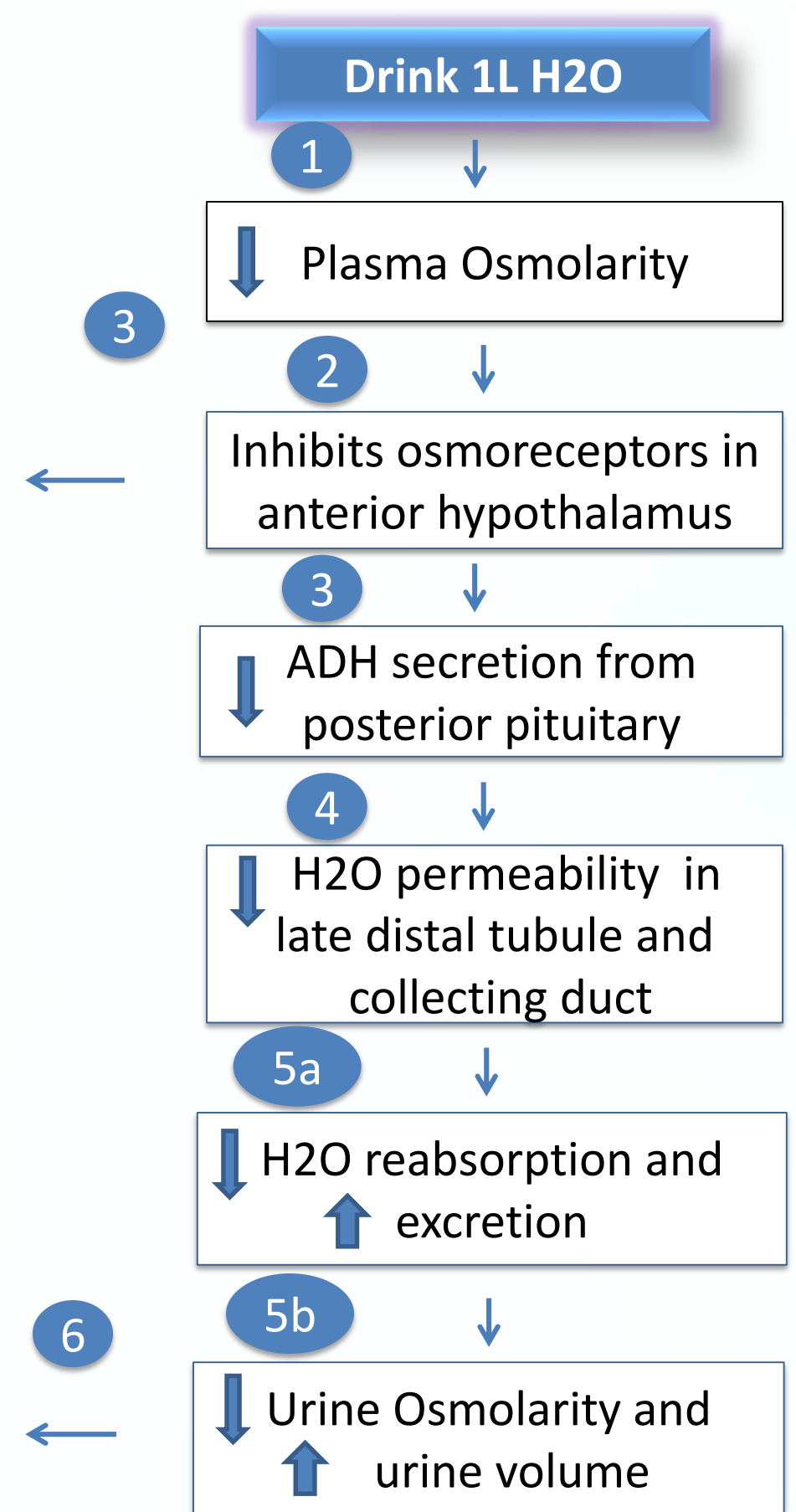
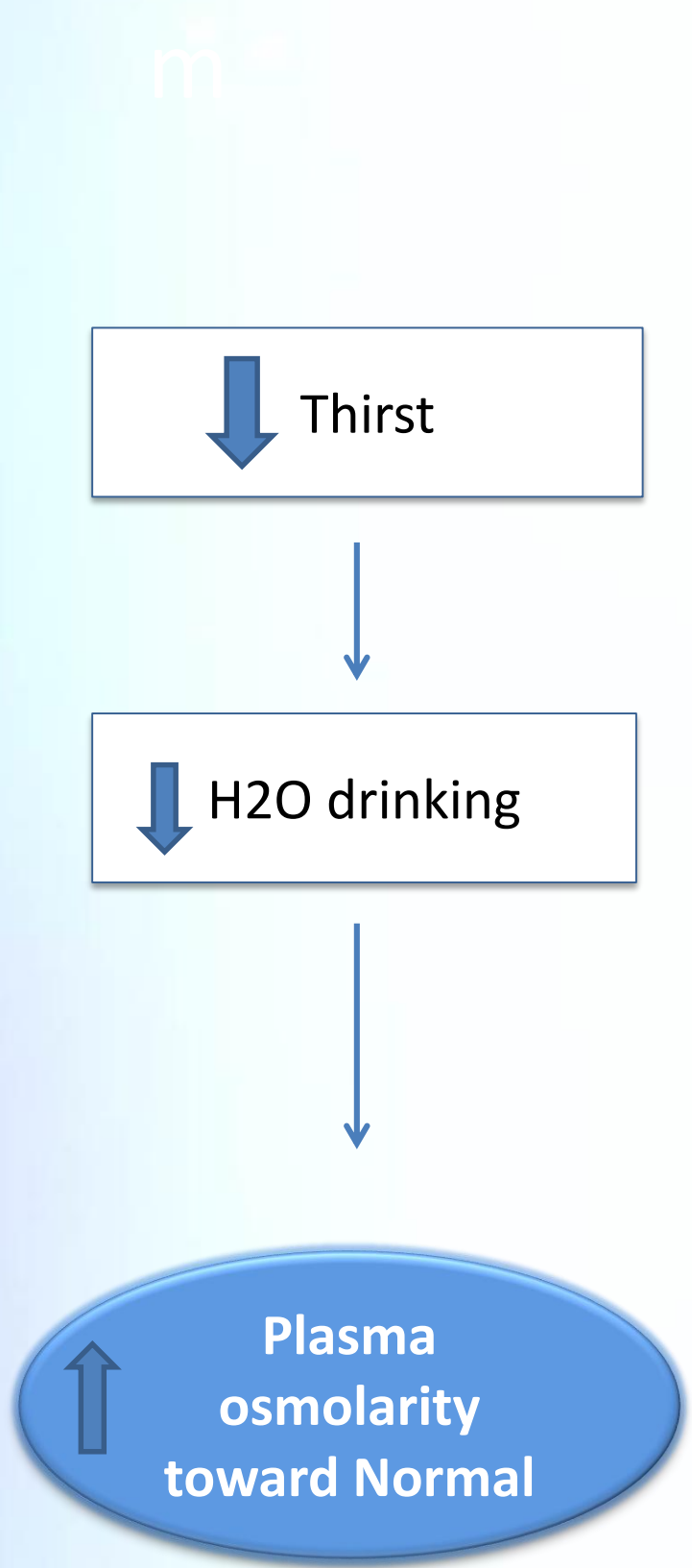
Description:

sodium excretion in these volunteers will remain **constant** .

- **Result:** healthy kidneys get rid of this 1 liter of water ingested and it starts after **30 minutes**

- **Duration: 3 hours**

Mechanism:



Q1: when does the change in the urine volume start ?
after 30 minutes .

Q2: How much time does it take to back to normal?
3 hours

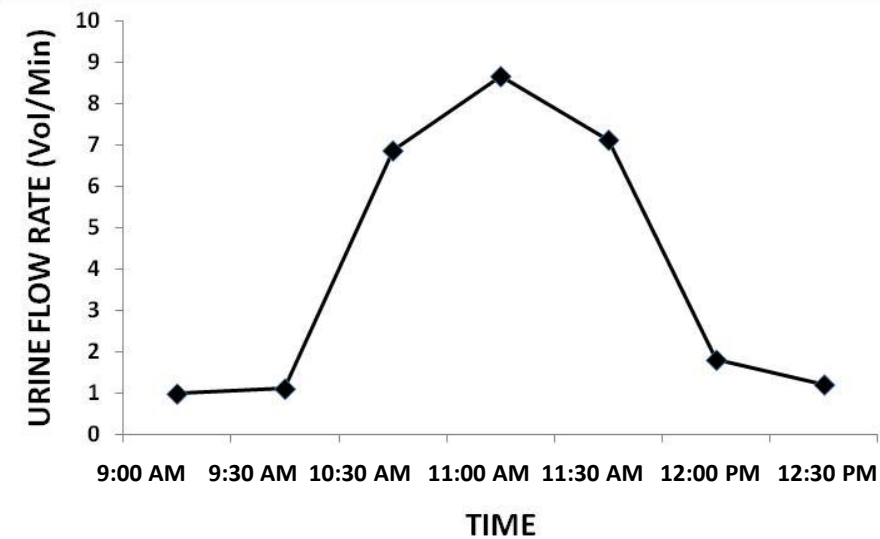
Q3: Dose the sodium excretion constant or variable ?
Constant

Q4: what is the name of this case ?

DRINKING 1 LITER OF WATER

Q5: Is it water diuresis or osmotic diuresis ?

Water diuresis



In Person who drink 1 liter of water, answer the following questions, which based on body control for his condition:

What are the changes in his plasma?

1. Decrease plasma osmolarity
2. Increase plasma volume

What happened if the osmolarity of plasma decreased?

Inhibits osmoreceptors from anterior hypothalamus

What happened if osmoreceptors inhibited?

1. Decrease secretion of ADH
2. Inhibit Thirst center

What is the hormonal regulation that will take place in his condition?

decrease ADH secretion from posterior pituitary gland

What is the role of ADH in his condition?

Decrease permeability of H₂O in late distal convoluted tubules and collecting ducts (decrease H₂O reabsorption)

What are the changes in his urine?

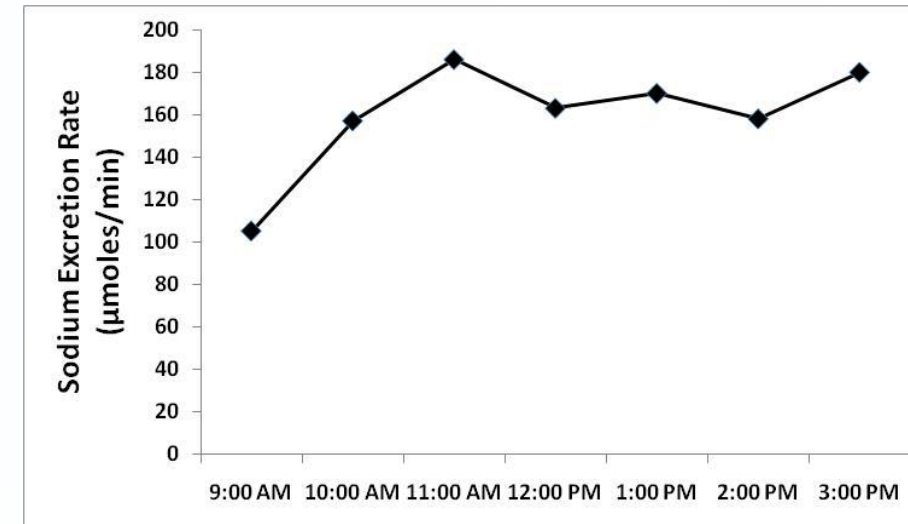
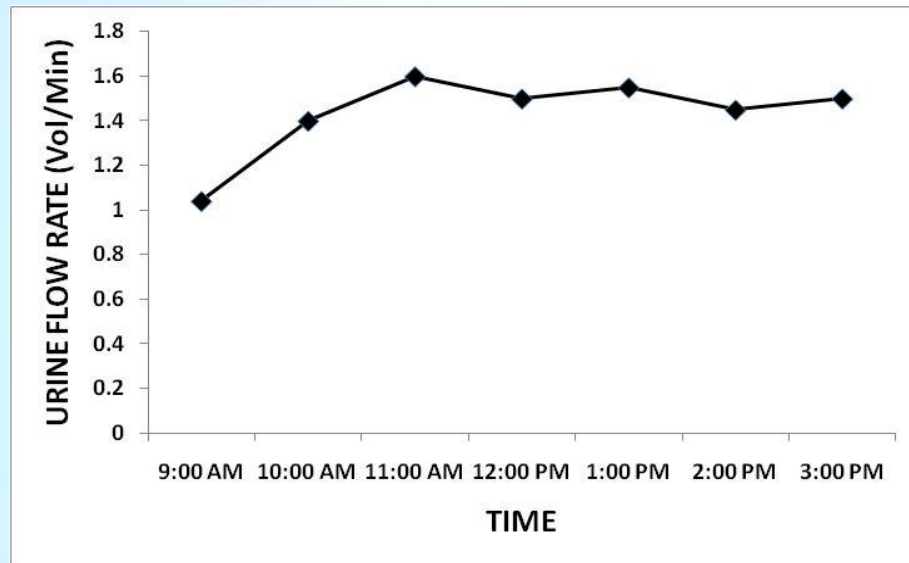
1. decrease urine osmolarity
2. increase urine volume

What is the consequences in his condition?

Plasma volume and osmolarity will back to normal

Case 3

Drink 1 L of isotonic saline



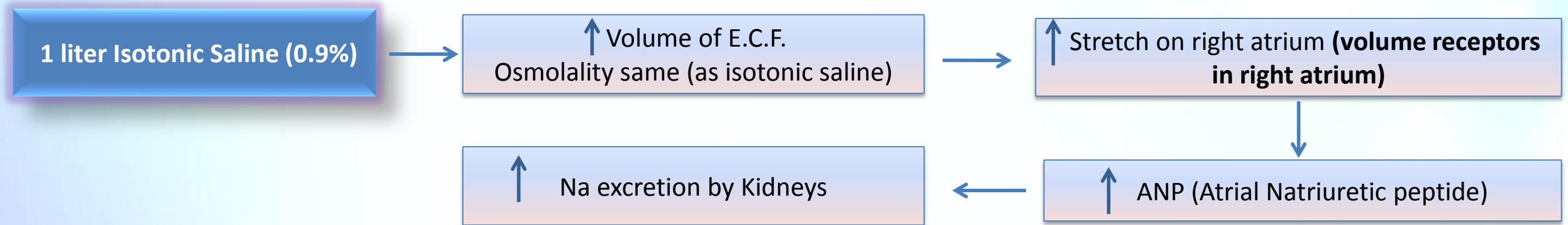
Description:

- Urine volume and osmolality will remain slightly increased in the post-experimental samples as compared to pre-experimental samples.

- **Result** : the kidneys are trying to get rid of this extra sodium chloride and water that has been ingested.

- **Duration** : 24 hours

Mechanism:



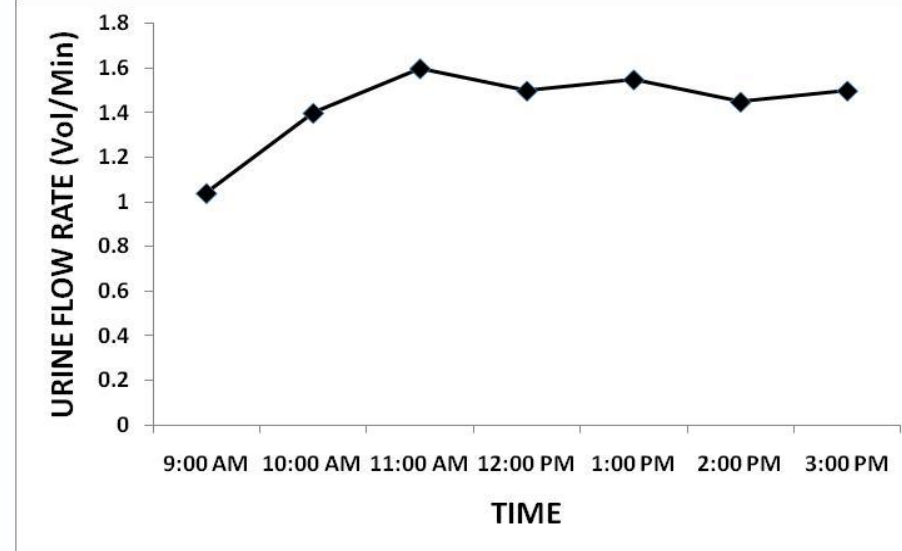
Q1: when does the change in the urine volume start ?
immediately

Q2: How much time does it take to back to normal?
24 hours

Q3: Dose the sodium excretion constant or variable ?
Variable (slightly increase)

Q4: what is the name of this case ?
Drinking 1 liter of isotonic saline

Q5: Is it water diuresis or osmotic diuresis ?
Osmotic diuresis



In Person who drink 1 liter of isotonic saline (sodium chloride), answer the following questions, which based on body control for his condition:

What is the components of isotonic saline?

0.9% of Sodium chloride

What are the changes in his plasma?

1. Plasma osmolarity remains the same
2. Increase plasma volume

What happened if the volume of plasma increased?

Stimulate stretch receptors in the right atrium

What happened if stretch receptors activated?

Secretes ANP (Atrial natriuretic peptides)

What is the role of ANP in his condition?

Increase excretion of Sodium

What are the changes in his urine?

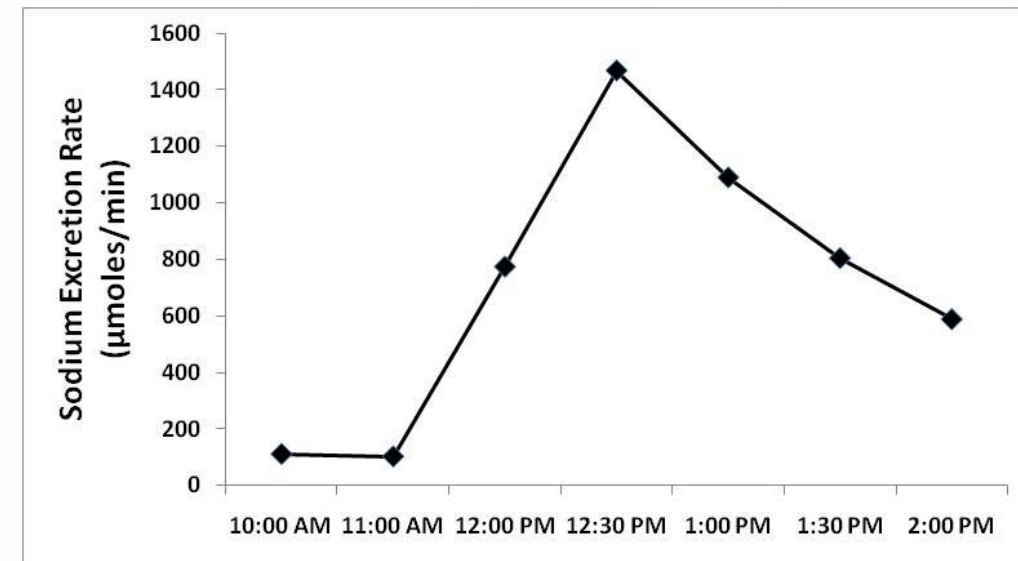
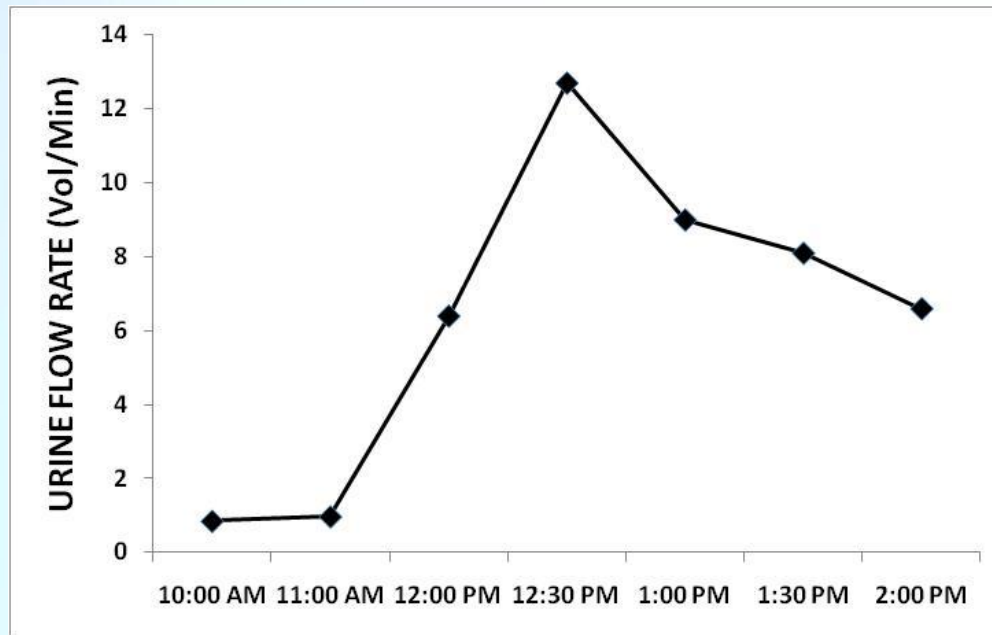
1. Increase urine osmolarity (by increase sodium excretion)
2. Increase urine volume (by increase water excretion)

What is the consequences in his condition?

Plasma volume ONLY will back to normal

Case 4

**Taking 1 tablet of Lasix
(furosemide)**

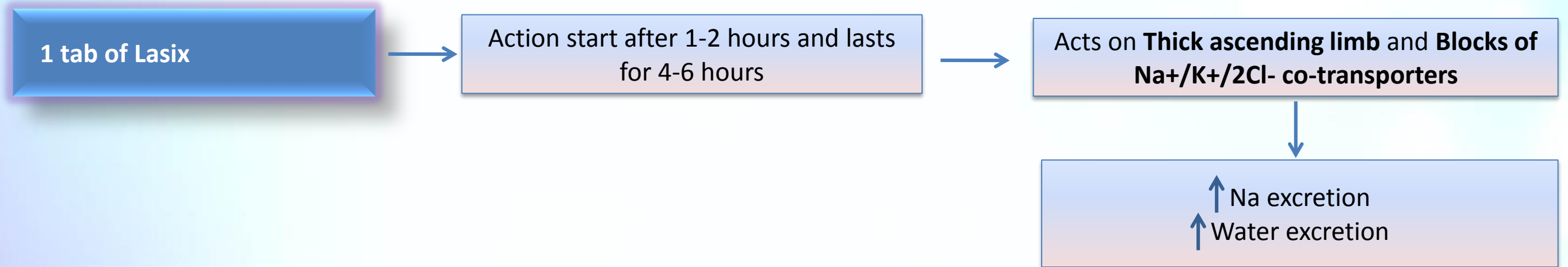


Description:

- Urine volume and osmolality dramatically increased after 1 hour of taking Lasix tablet and remained increased for further duration of experiment.

- Duration : 4-6 hours

Mechanism:



Q1: when does the change in the urine volume start ?

After 1 hour

Q2: How much time does it take to back to normal?

4-6 hours

Q3: Dose the sodium excretion constant or variable ?

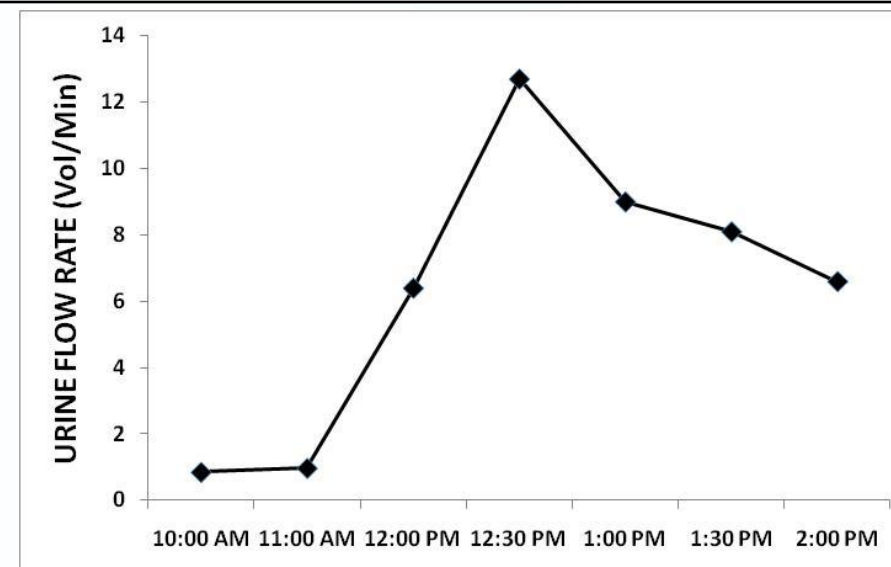
Variable (sharply increase)

Q4: what is the name of this case ?

Taking 1 Tablet Of Lasix

Q5: Is it water diuresis or osmotic diuresis ?

Osmotic diuresis



In Person who takes Lasix (furosemide) answer the following questions, which based on body control for his condition:

Where does it work?

In Thick ascending limb of loop of henle

What its action in Thick ascending limb?

Blocks of $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporters

What are the changes in his urine due to this drug?

1. Increase urine osmolarity (by increase sodium excretion)
2. Increase urine volume (by increase water excretion)

SODIUM EXCRETION & EXCRETION RATE

SAMPLE NO.	1	2	3	4	5	6	7
COLLECTION TIME (minutes)	120	30	30	30	30	30	30
VOLUME OF URINE (ml)	118	33	200	280	240	60	50
URINE FLOW RATE (ml / min)	0.98	1.1	6.66	9.33	8	2	1.66
SODIUM CONCENTRATION (mmoles/liter)	87	65	12	10	8	30	40
TOTAL SODIUM EXCRETION (mmoles)	10.3	2.2	2.4	2.8	1.9	1.8	2.00
SODIUM EXCRETION RATE (μmoles/min)	85.6	71.5	80	93.3	64	60	66.7

These values what u should to find in the exam

The **sodium concentration** is obtained by an analyser machine which is called **flame photometer**.

Total sodium excretion is obtained by applying following equation:

$$\text{Sodium excretion} = \frac{\text{Sodium concentration} \times \text{Volume of urine}}{1000}$$

Sodium excretion rate is obtained by applying the following equation:

$$\text{Sodium excretion rate} = \frac{\text{Sodium concentration} \times \text{Volume of urine}}{\text{Time}}$$

Complete the following table:

SAMPLE NO.	1	2	3	4	5	6	7
COLLECTION TIME (minutes)	120	30	30	30	30	30	30
VOLUME OF URINE (ml)	118	33	200	280	240	60	50
URINE FLOW RATE (ml / min)	0.98	1.1	6.66	9.33	8	2	1.66
SODIUM CONCENTRATION (mmoles/liter)	87	65	12	10	8	30	40
TOTAL SODIUM EXCRETION (mmoles)	10.3		2.4		1.9	1.8	2.00
SODIUM EXCRETION RATE (μ moles/min)	85.6		80	93.3	64	60	

Answers

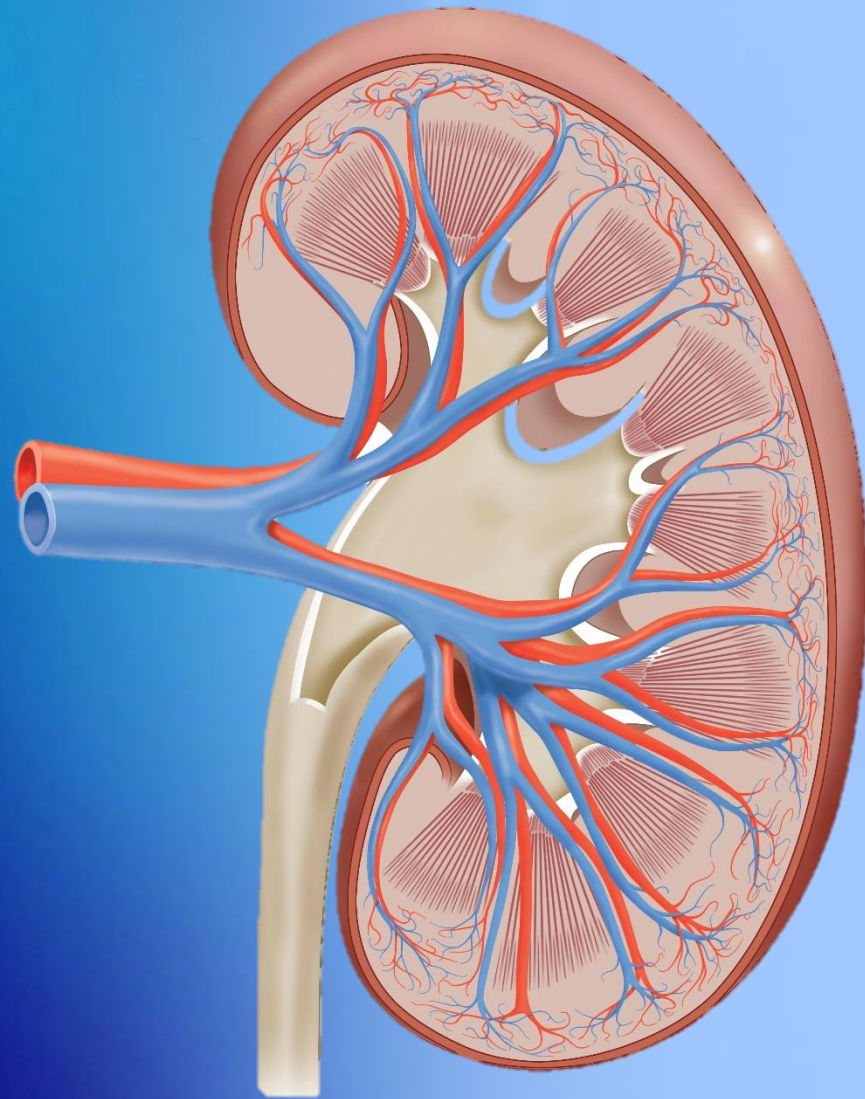
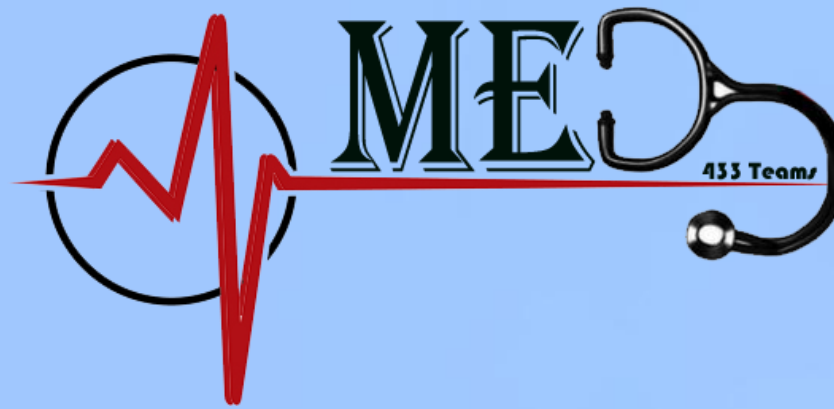
SAMPLE NO.	1	2	3	4	5	6	7
COLLECTION TIME (minutes)	120	30	30	30	30	30	30
VOLUME OF URINE (ml)	118	33	200	280	240	60	50
URINE FLOW RATE (ml / min)	0.98	1.1	6.66	9.33	8	2	1.66
SODIUM CONCENTRATION (mmoles/liter)	87	65	12	10	8	30	40
TOTAL SODIUM EXCRETION (mmoles)	10.3	2.2	2.4	2.8	1.9	1.8	2.00
SODIUM EXCRETION RATE (μ moles/min)	85.6	71.5	80	93.3	64	60	66.7

What is the name of machine that used to obtain sodium concentration?

Flame photometer

في نهاية هذا العام نسأل من الله عزوجل أن نكون قد أدينا وصدقنا ما علينا من
الجهد والعمل، وقد حاولنا بقدر استطاعتنا أن نخرج لكم الأعمال بأفضل صورة،
فإن أصبنا فمن الله وإن أخطأنا فمن أنفسنا والشيطان ولا نرجوا منكم سوى
خالص الدعوات

مع تحيات فريق عمل مادة الفسيولوجي



Renal Block

Done by :
Mojahed Otayf
Rahma alshehri
Maha alzeheary



@PhysiologyTeam



Pht433@gmail.com