Fisiología Tubular II

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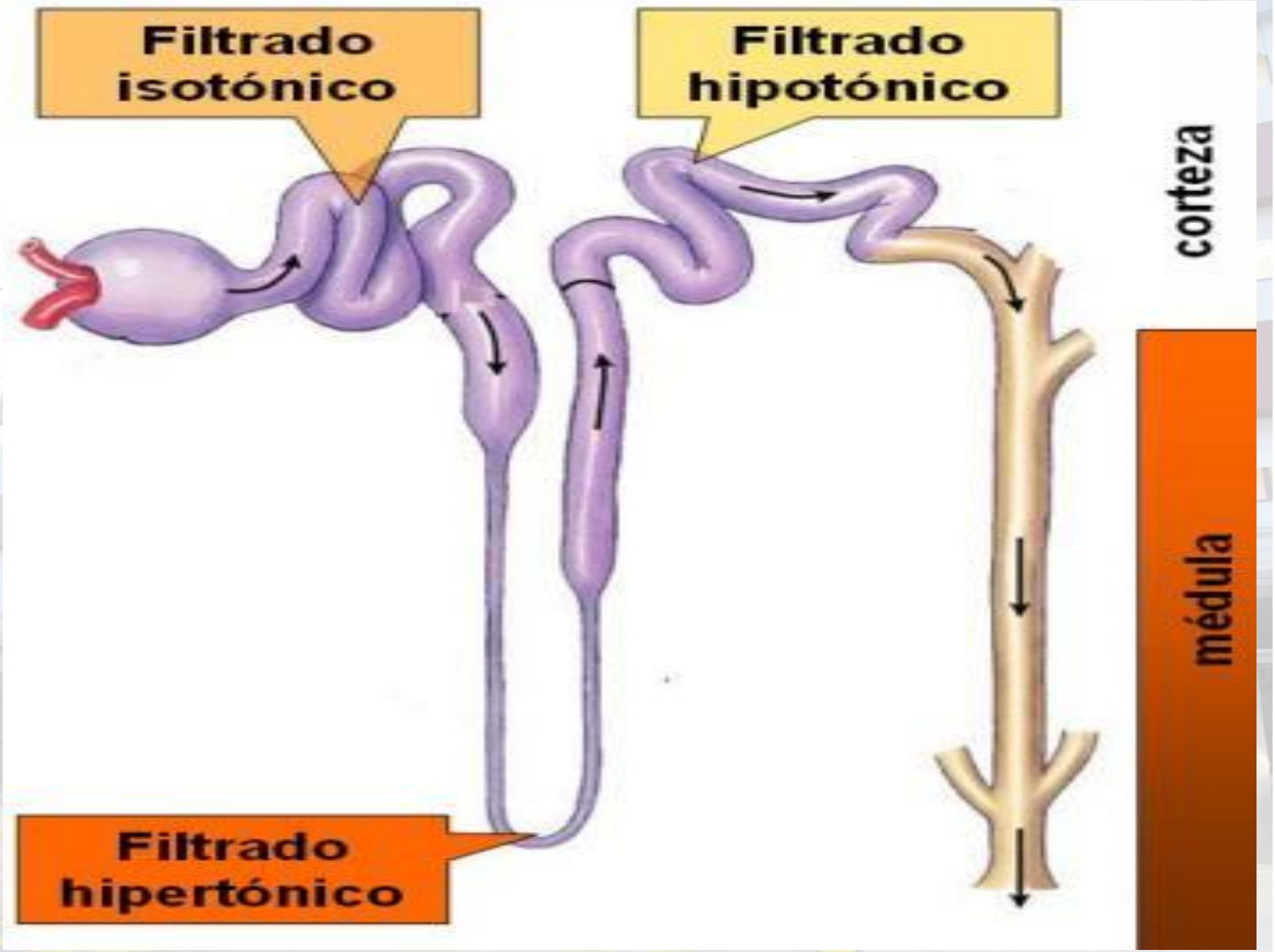
DEPARTAMENTO DE CARDIOLOGIA

CATEDRA DE FISIOLOGÍA

Universidad Abierta Interamericana



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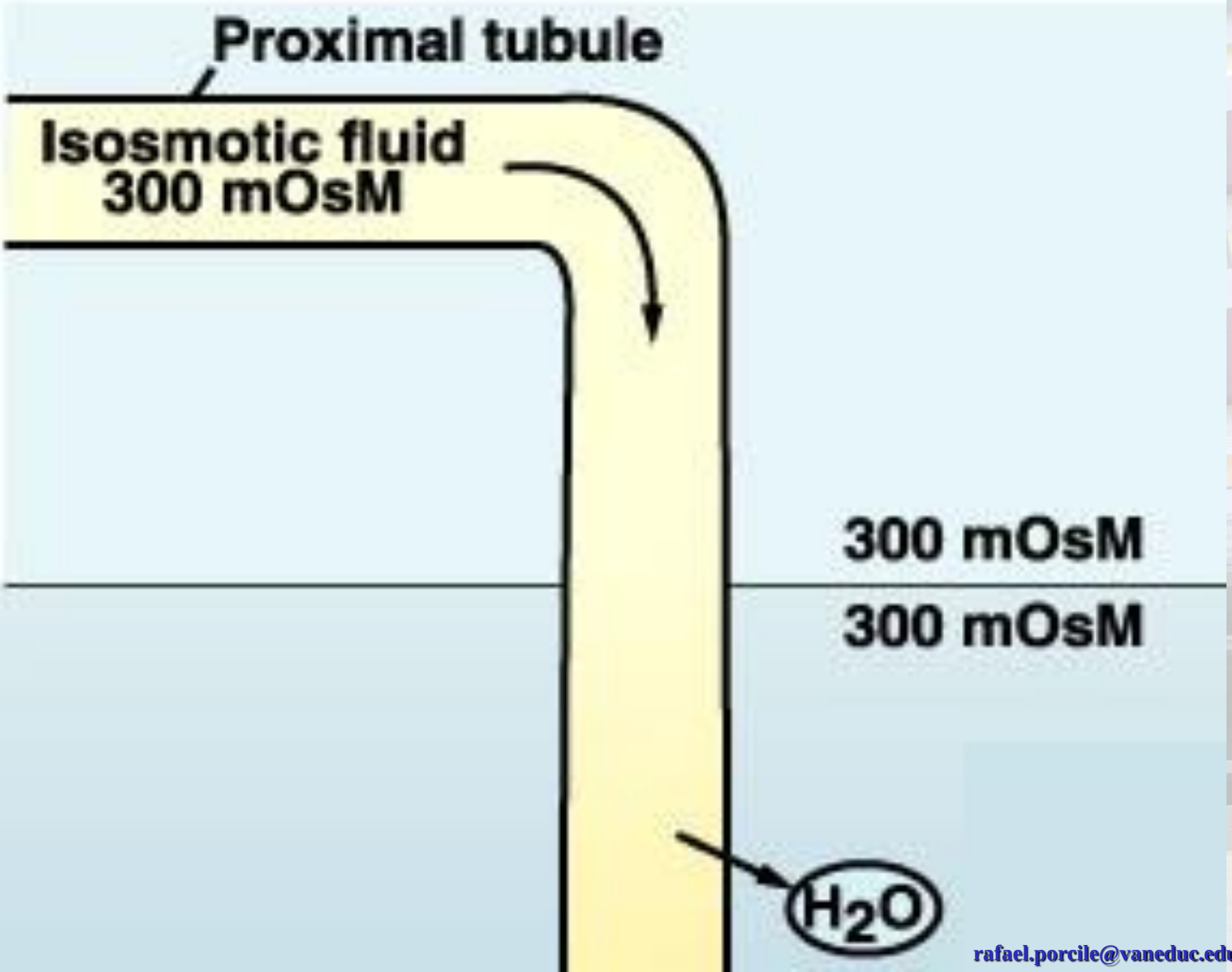

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ASA DE HENLE

MECANISMO DE CONTRA CORRIENTE

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PROXIMAL CONVOLUTED TUBULE

Reabsorption (into blood) of filtered:

Water	65% (osmosis)
Na^+	65% (sodium-potassium pumps, symporters, antiporters)
K^+	65% (diffusion)
Glucose	100% (symporters and facilitated diffusion)
Amino acids	100% (symporters and facilitated diffusion)
Cl^-	50% (diffusion)
HCO_3^-	80–90% (facilitated diffusion)
Urea	50% (diffusion)
Ca^{2+}, Mg^{2+}	variable (diffusion)

Secretion (into urine) of:

H^+	variable (antiporters)
NH_4^+	variable, increases in acidosis (antiporters)
Urea	variable (diffusion)
Creatinine	small amount

At end of PCT, tubular fluid is still isotonic to blood (300 mOsm/liter).

LOOP OF HENLE

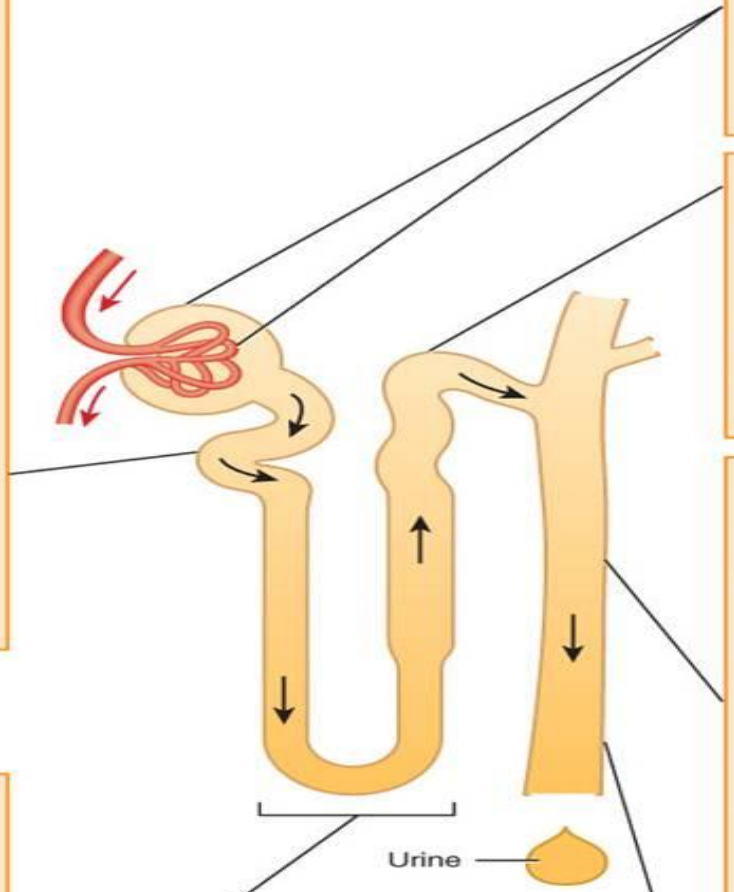
Reabsorption (into blood) of:

Water	15% (osmosis in descending limb)
Na^+	20–30% (symporters in ascending limb)
K^+	20–30% (symporters in ascending limb)
Cl^-	35% (symporters in ascending limb)
HCO_3^-	10–20% (facilitated diffusion)
Ca^{2+}, Mg^{2+}	variable (diffusion)

Secretion (into urine) of:

Urea	variable (recycling from collecting duct)

At end of loop of Henle, tubular fluid is hypotonic (100–150 mOsm/liter).



RENAL CORPUSCLE

Glomerular filtration rate: 105–125 mL/min of fluid that is isotonic to blood

Filtered substances: water and all solutes present in blood (except proteins) including ions, glucose, amino acids, creatinine, uric acid

DISTAL CONVOLUTED TUBULE

Reabsorption (into blood) of:

Water	10–15% (osmosis)
Na^+	5% (symporters)
Cl^-	5% (symporters)
Ca^{2+}	variable (stimulated by parathyroid hormone)

PRINCIPAL CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

Water	5–9% (insertion of water channels stimulated by ADH)
Na^+	1–4% (sodium-potassium pumps)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

K^+	variable amount to adjust for dietary intake (leakage channels)

Tubular fluid leaving the collecting duct is dilute when ADH level is low and concentrated when ADH level is high.

INTERCALATED CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

HCO_3^- (new)	varible amount, depends on H^+ secretion (antiporters)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

H^+	variable amounts to maintain acid-base homeostasis (H^+ pumps)

LOOP OF HENLE

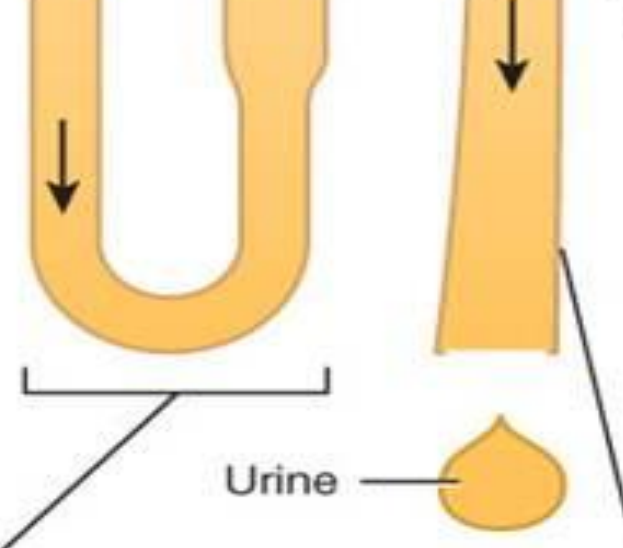
Reabsorption (into blood) of:

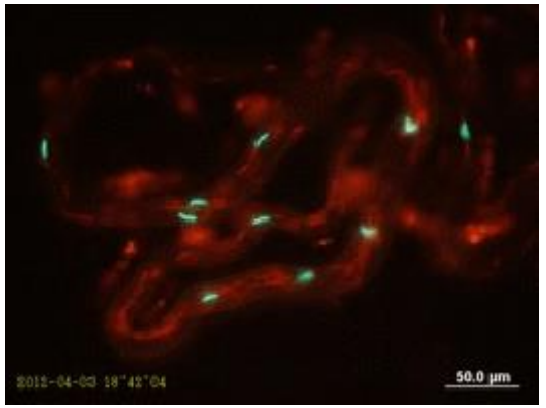
Water	15% (osmosis in descending limb)
Na^+	20–30% (symporters in ascending limb)
K^+	20–30% (symporters in ascending limb)
Cl^-	35% (symporters in ascending limb)
HCO_3^-	10–20% (facilitated diffusion)
Ca^{2+}, Mg^{2+}	variable (diffusion)

Secretion (into urine) of:

Urea	variable (recycling from collecting duct)

At end of loop of Henle, tubular fluid is hypotonic (100–150 mOsm/liter).





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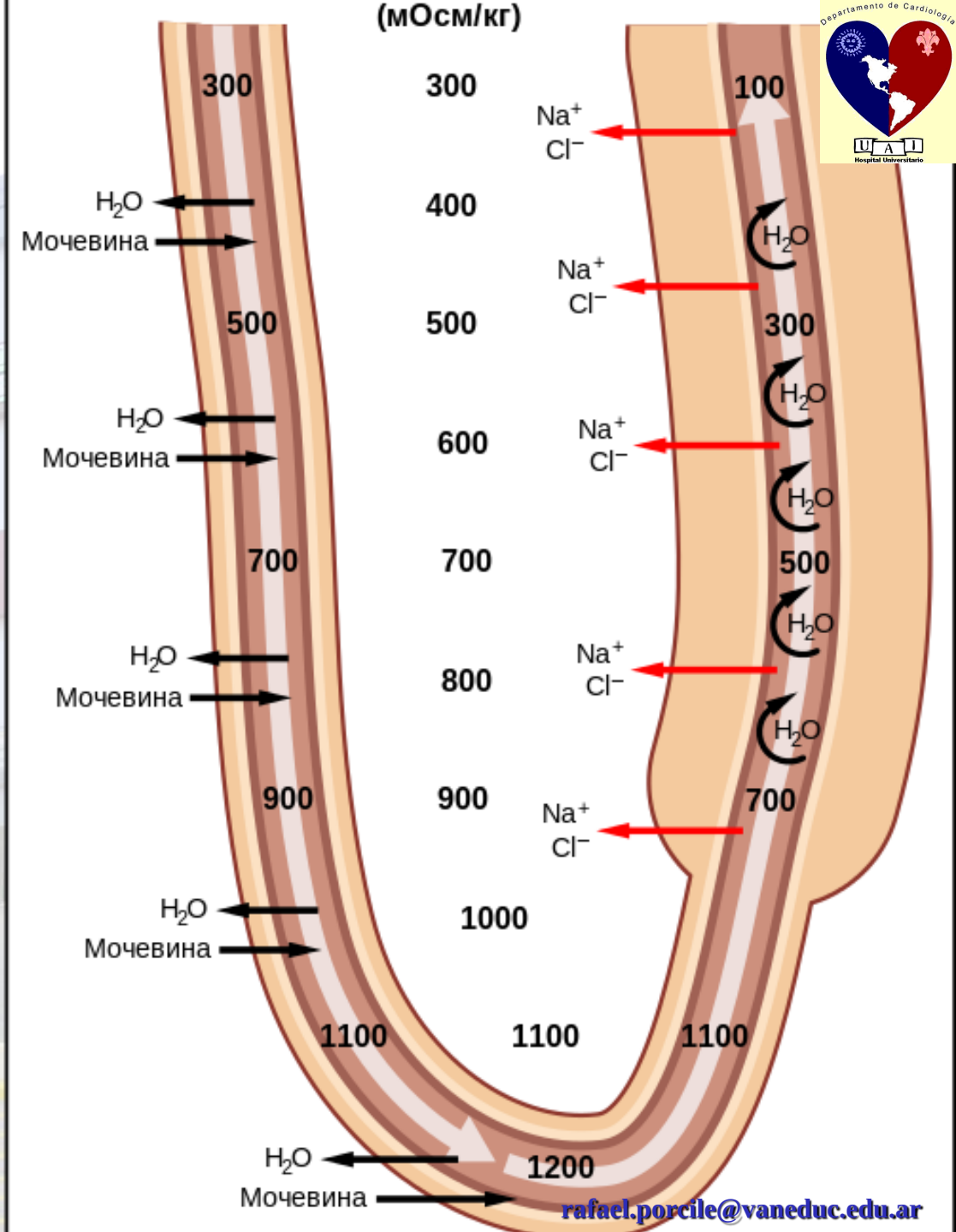

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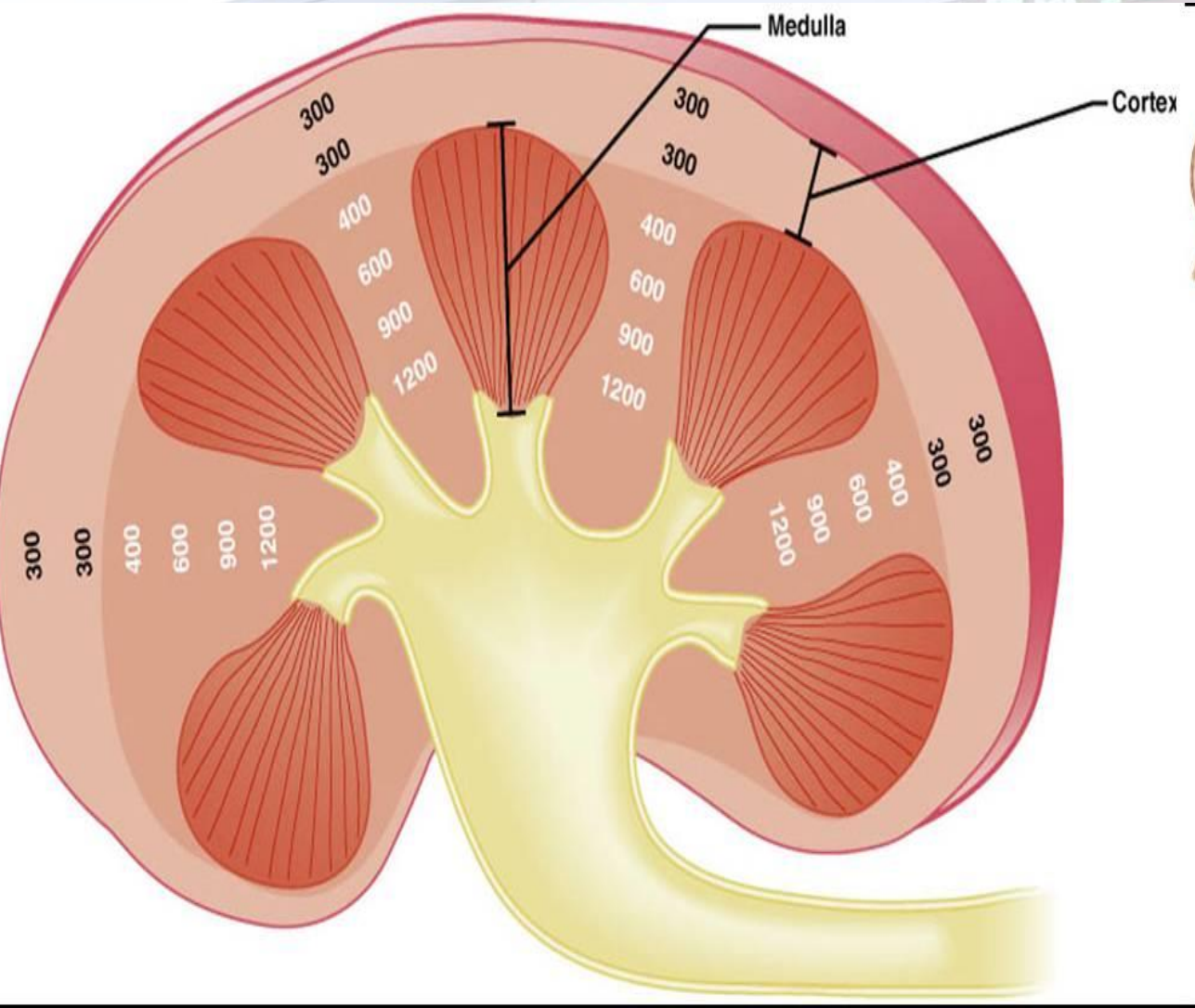
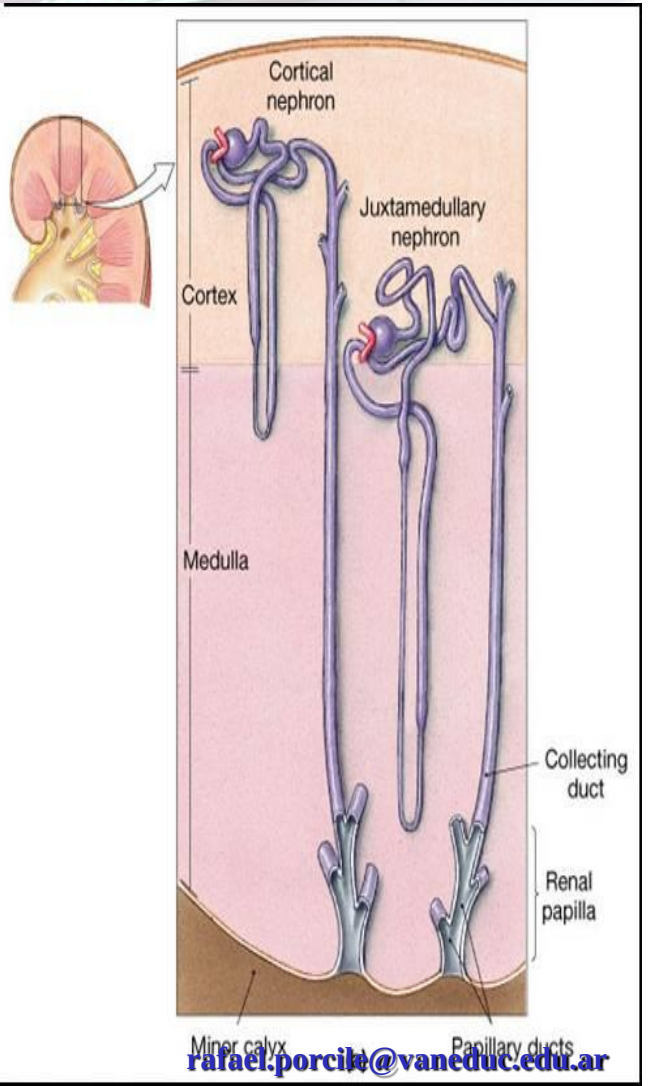
OSMOLARIDAD INTRA RENAL





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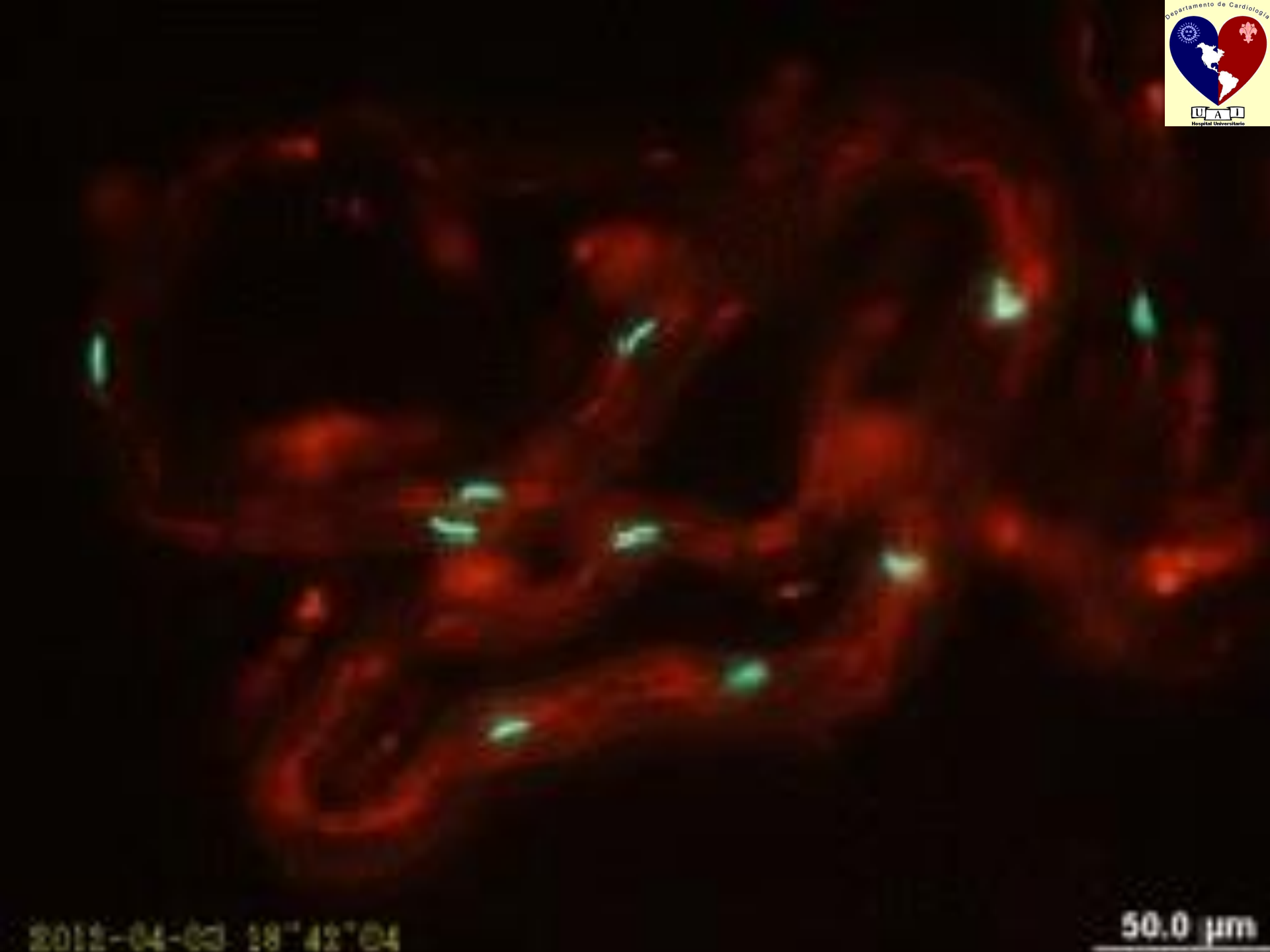
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U A I
Hospital Universitario
2012-04-03 18"43"04
50.0 µm

El gradiente osmótico existente en la médula renal, se genera por efecto del flujo de filtración opuesta en las dos ramas del asa de Henle Complejas interacciones entre las ramas ascendentes y descendentes del asa, forman y mantienen un gradiente osmótico en el intersticio medular, esencial para generar una orina concentrada.

La rama ascendente transporta activamente cloruro de sodio hacia el intersticio, incrementando la concentración medular. El medio intersticial circundante al túbulo se torna más concentrado a medida que el fluido tubular se diluye. La máxima concentración del soluto se encuentra próxima al fondo del asa.

El intersticio medular muestra un gradiente de 300 a 1200 miliosmoles. El fluido que ingresa en la porción cortical del asa ha sido diluido en aproximadamente 100 miliosmoles. El fluido tubular es 200 miliosmoles menos concentrado que el fluido intersticial.

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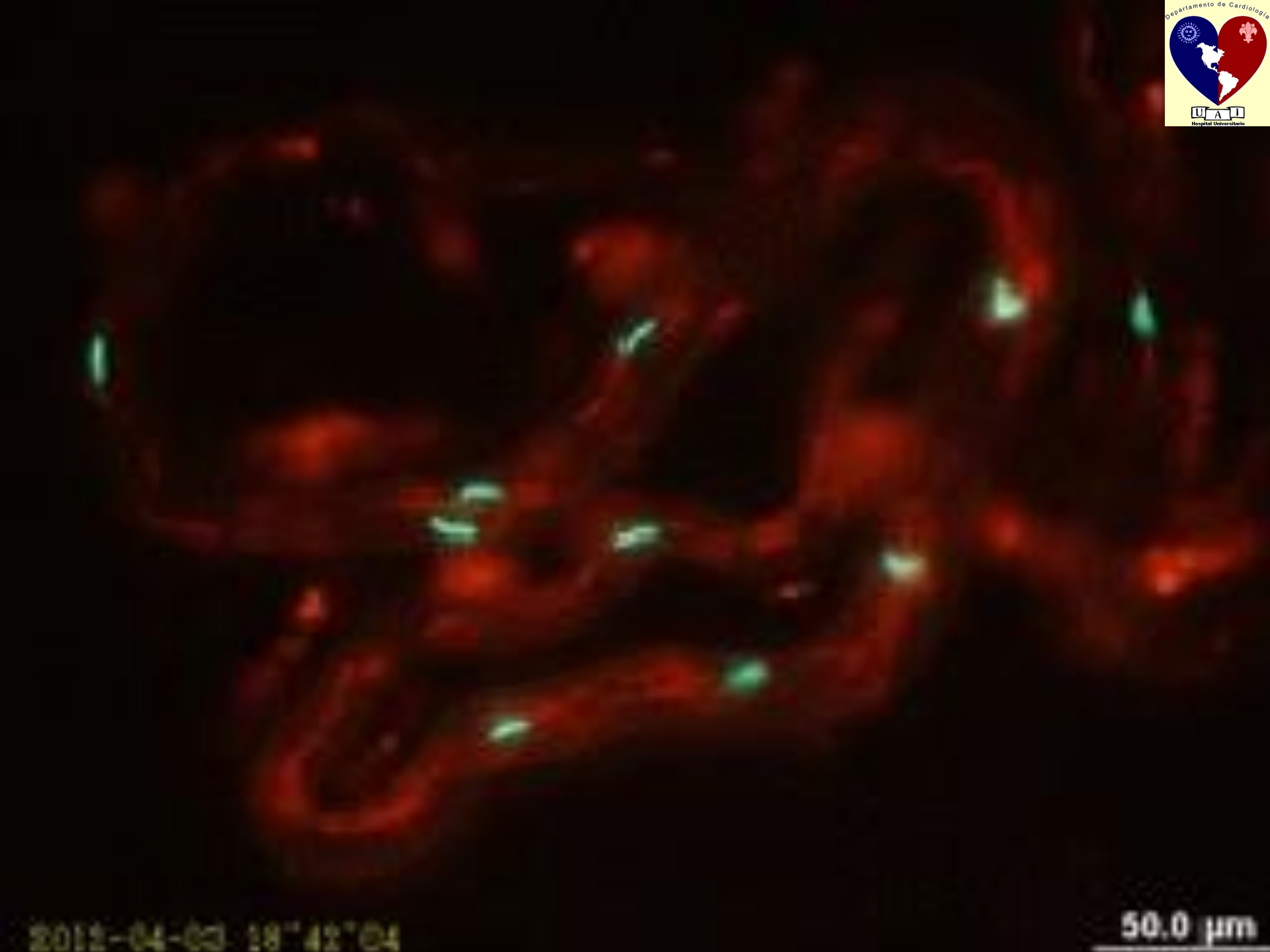
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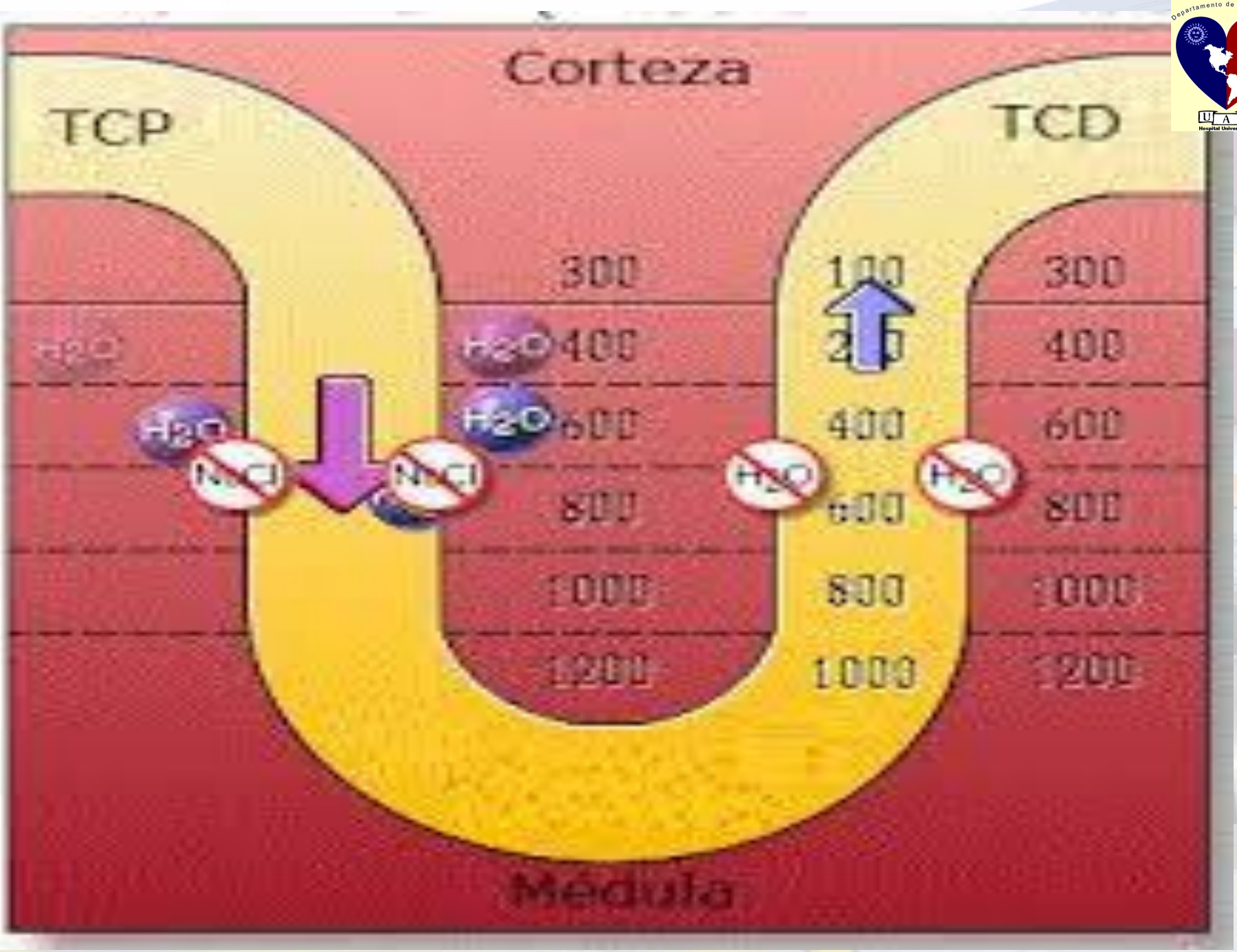

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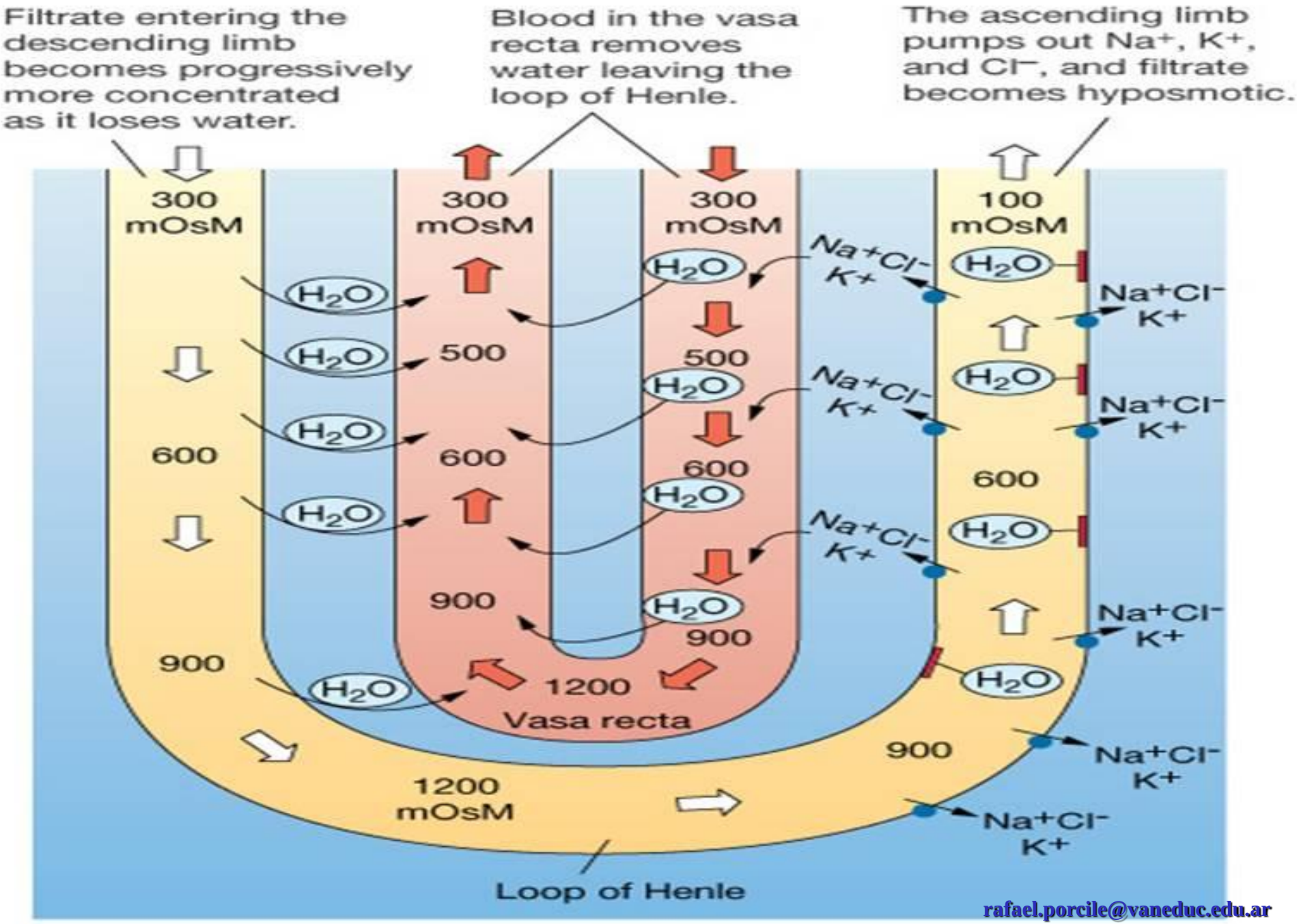

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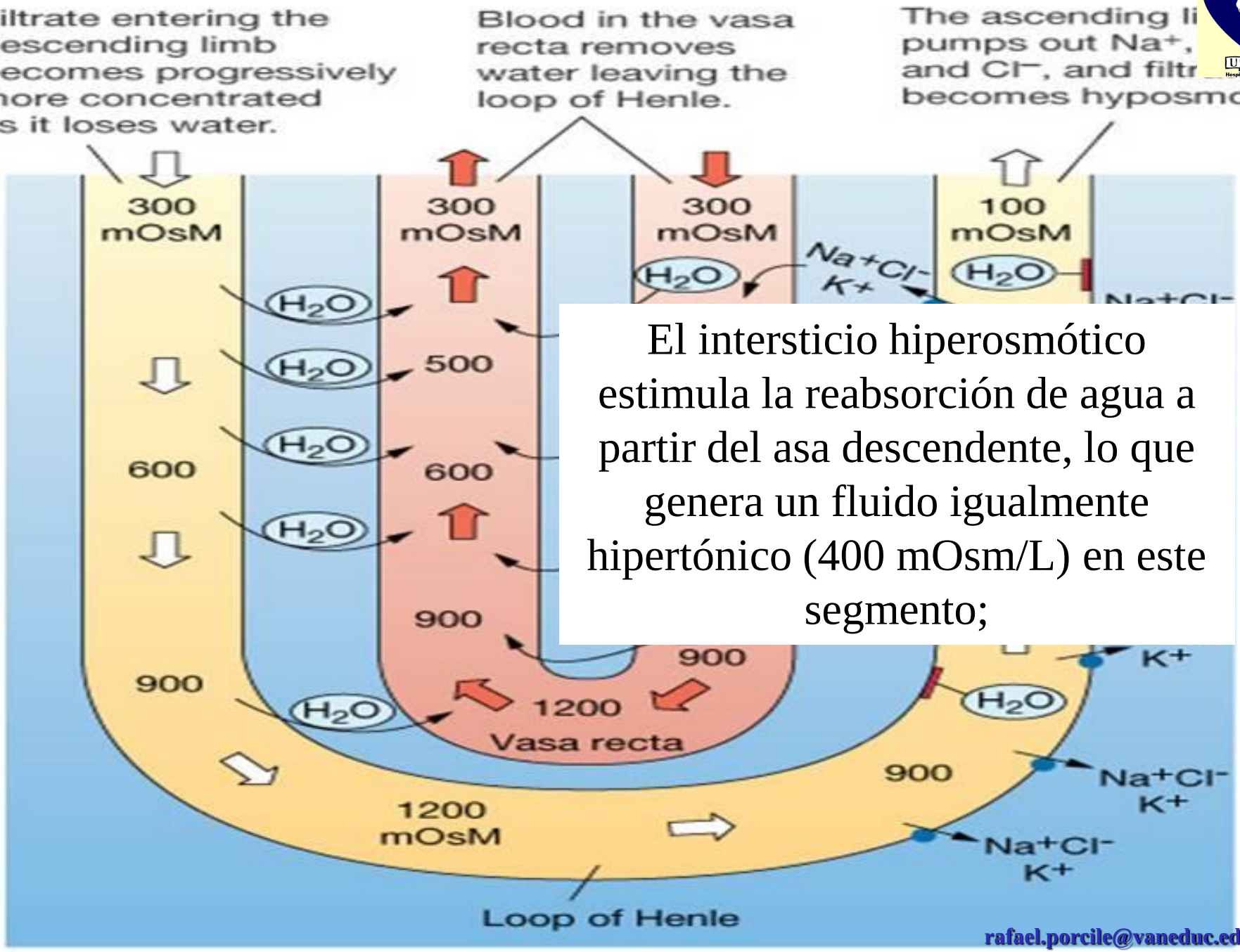

El intersticio hiperosmótico estimula la reabsorción de agua a partir del asa descendente, lo que genera un fluido igualmente hipertónico (400 mOsm/L) en este segmento;

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CORTEZA

MEDULA

ASA DE HENLE

TUBO COLECTOR

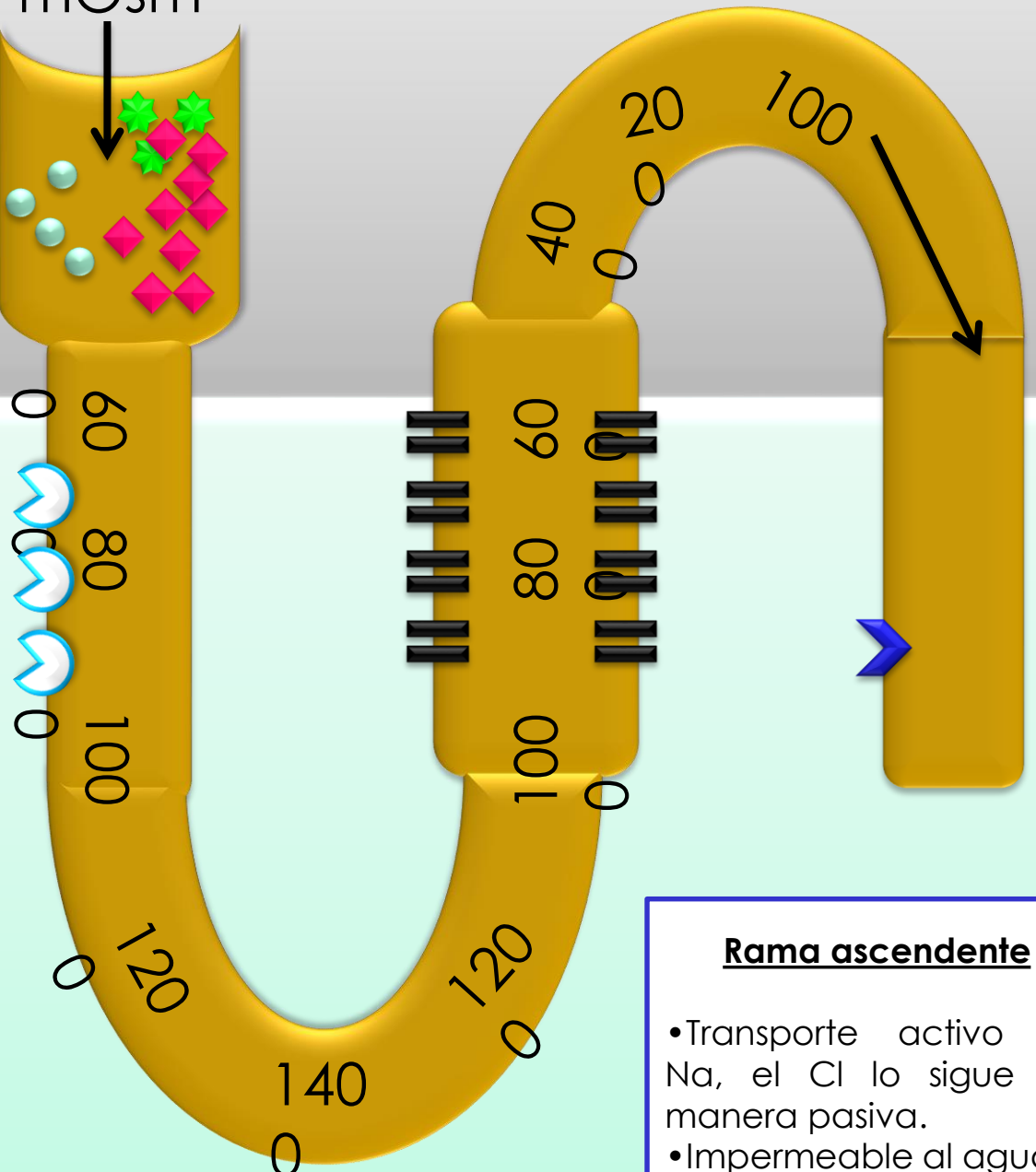
H2O

NaCl

Urea

300 mOsm

Capilar



Rama descendente

Pasivamente permeable al agua

Rama ascendente

- Transporte activo de Na, el Cl lo sigue de manera pasiva.
- Impermeable al agua.

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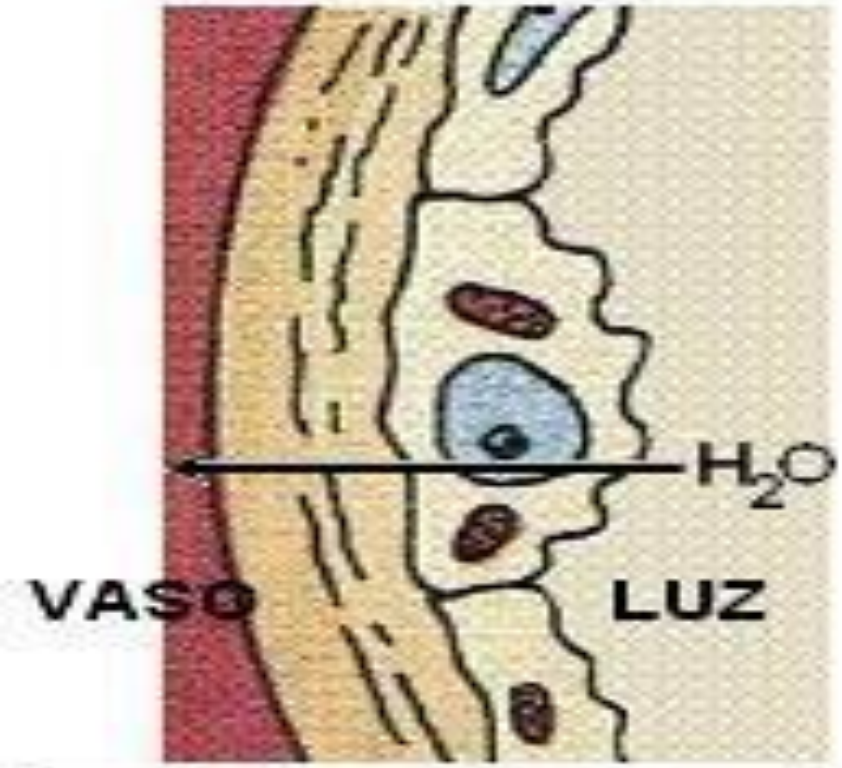
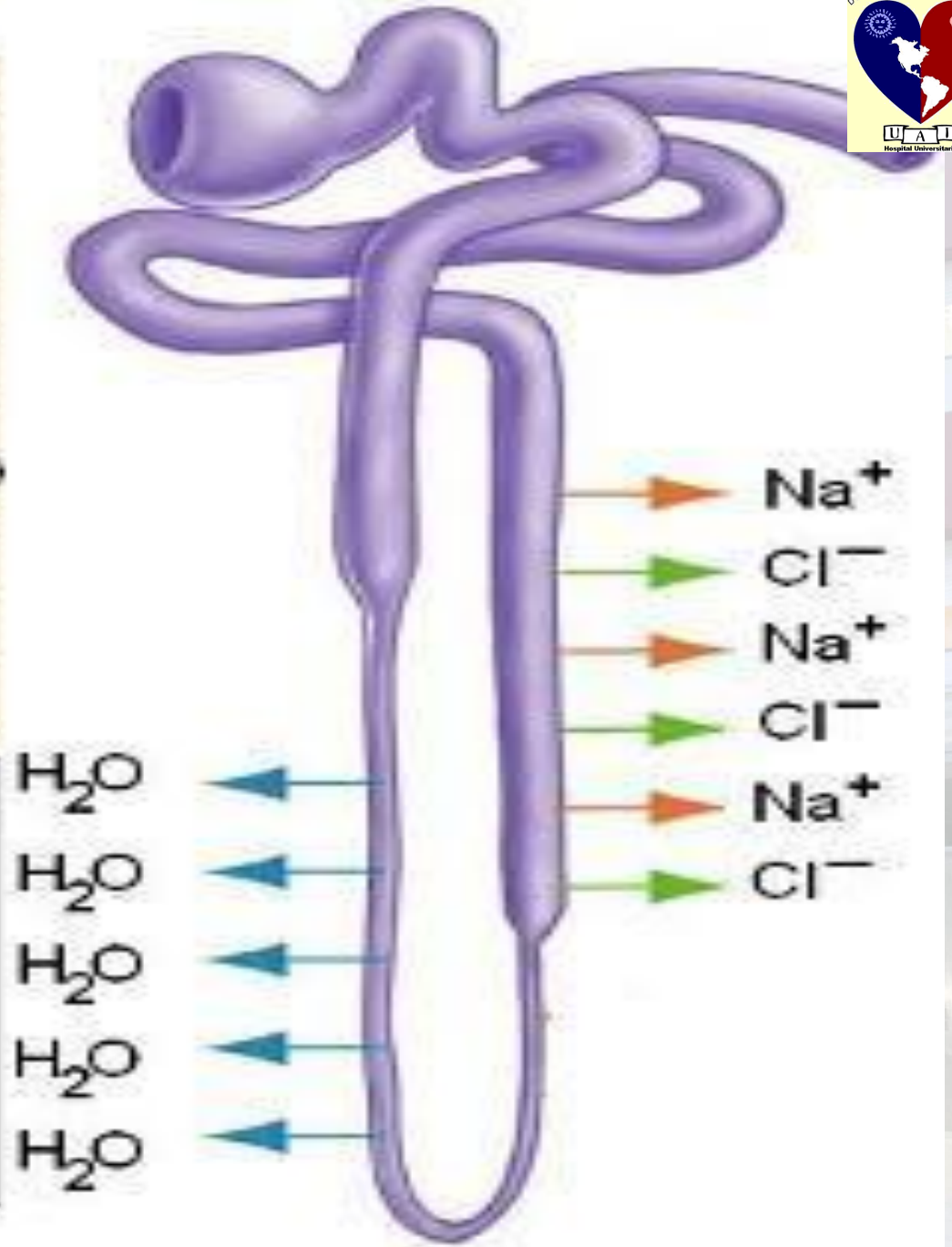


Rama descendente delgada del asa de Henle

- Reabsorción de agua
- Impermeable a solutos



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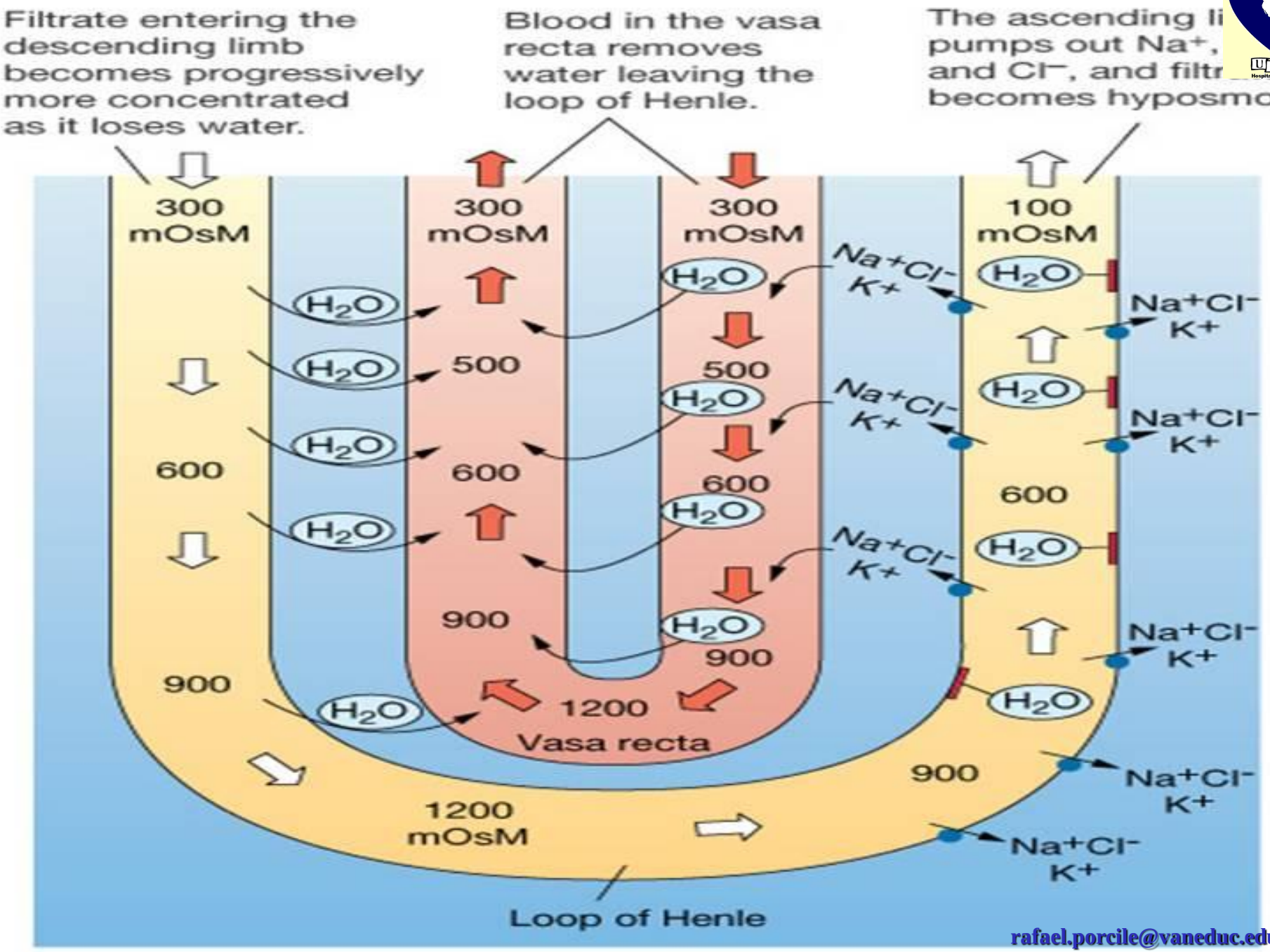

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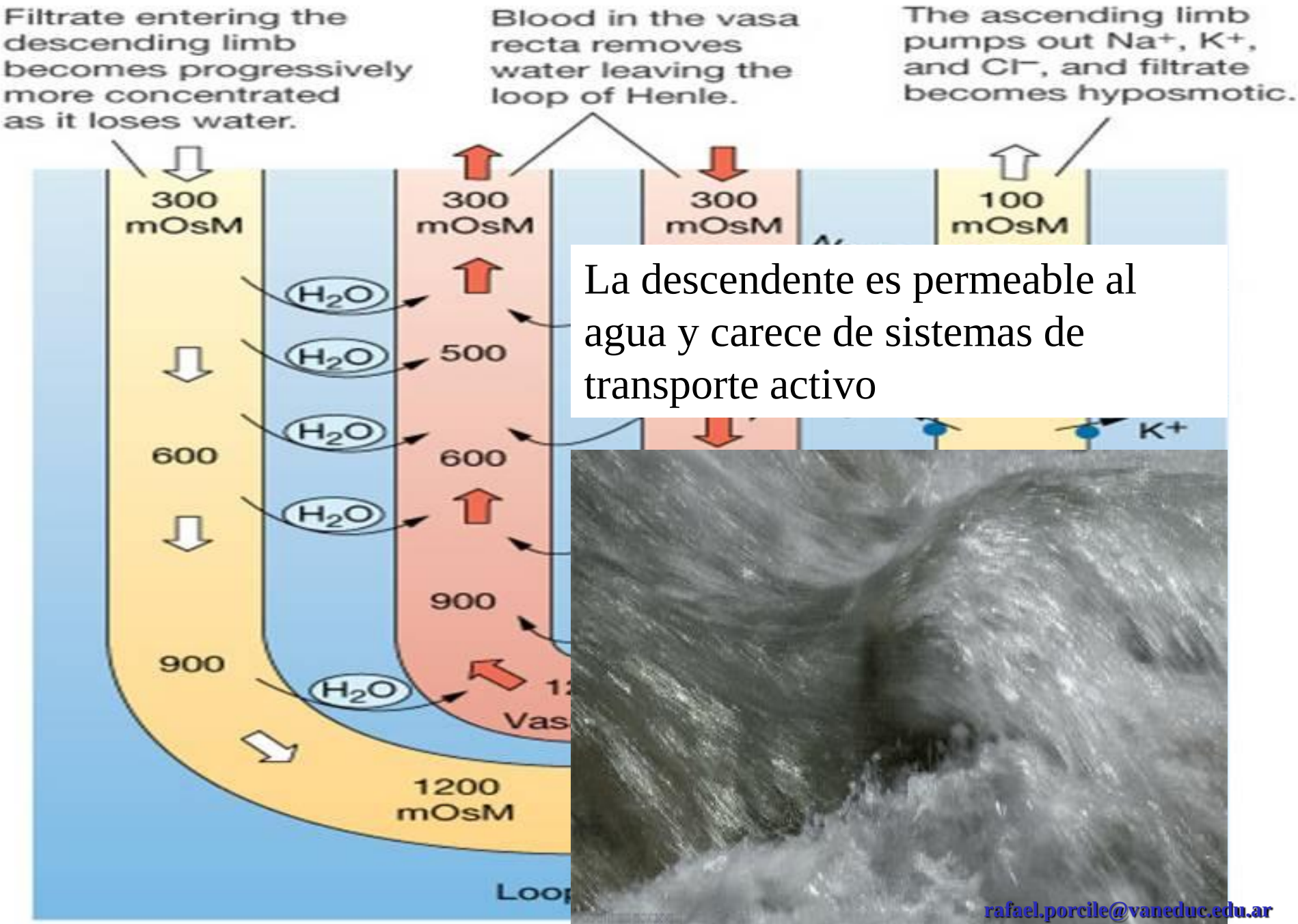

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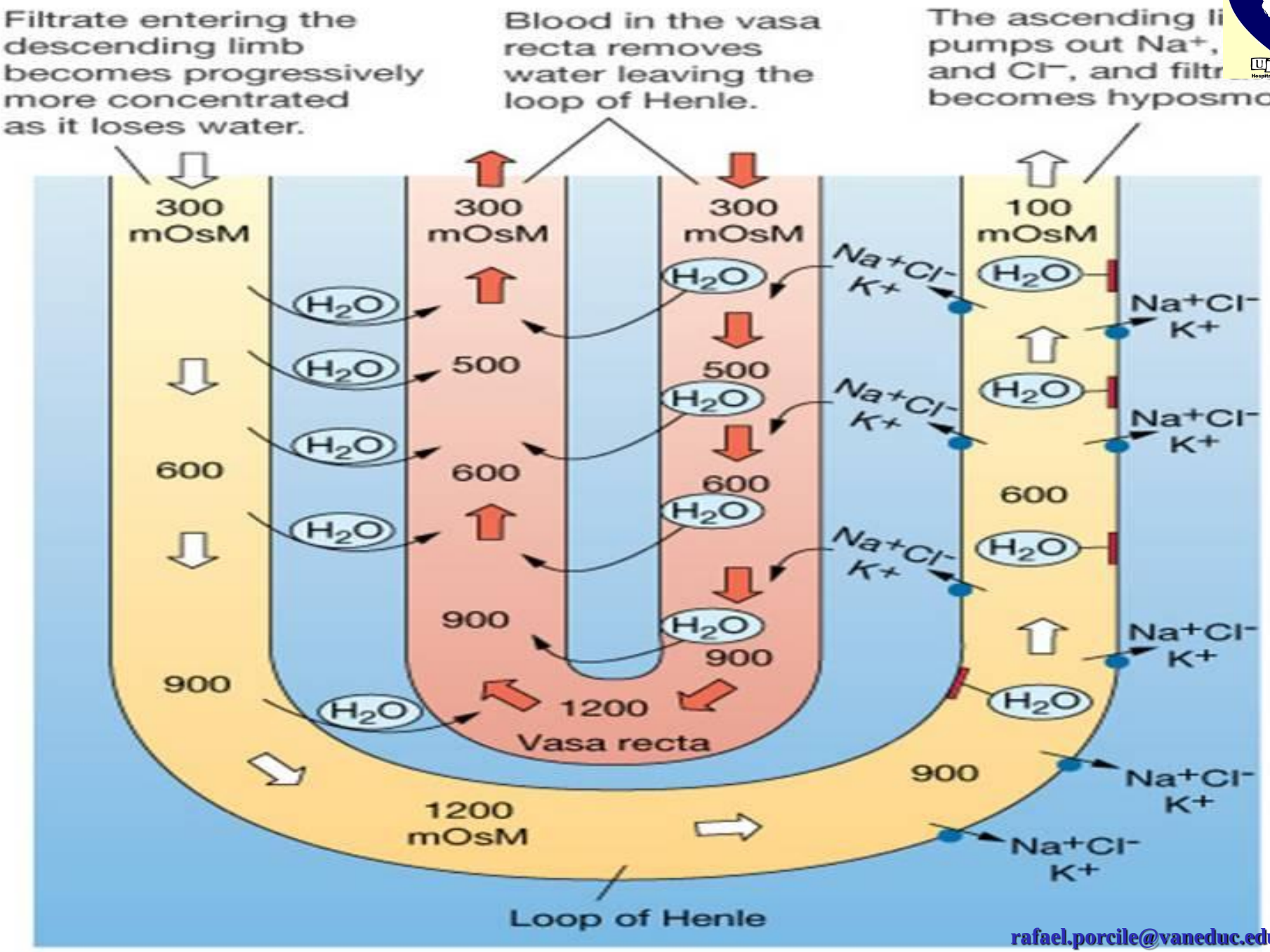

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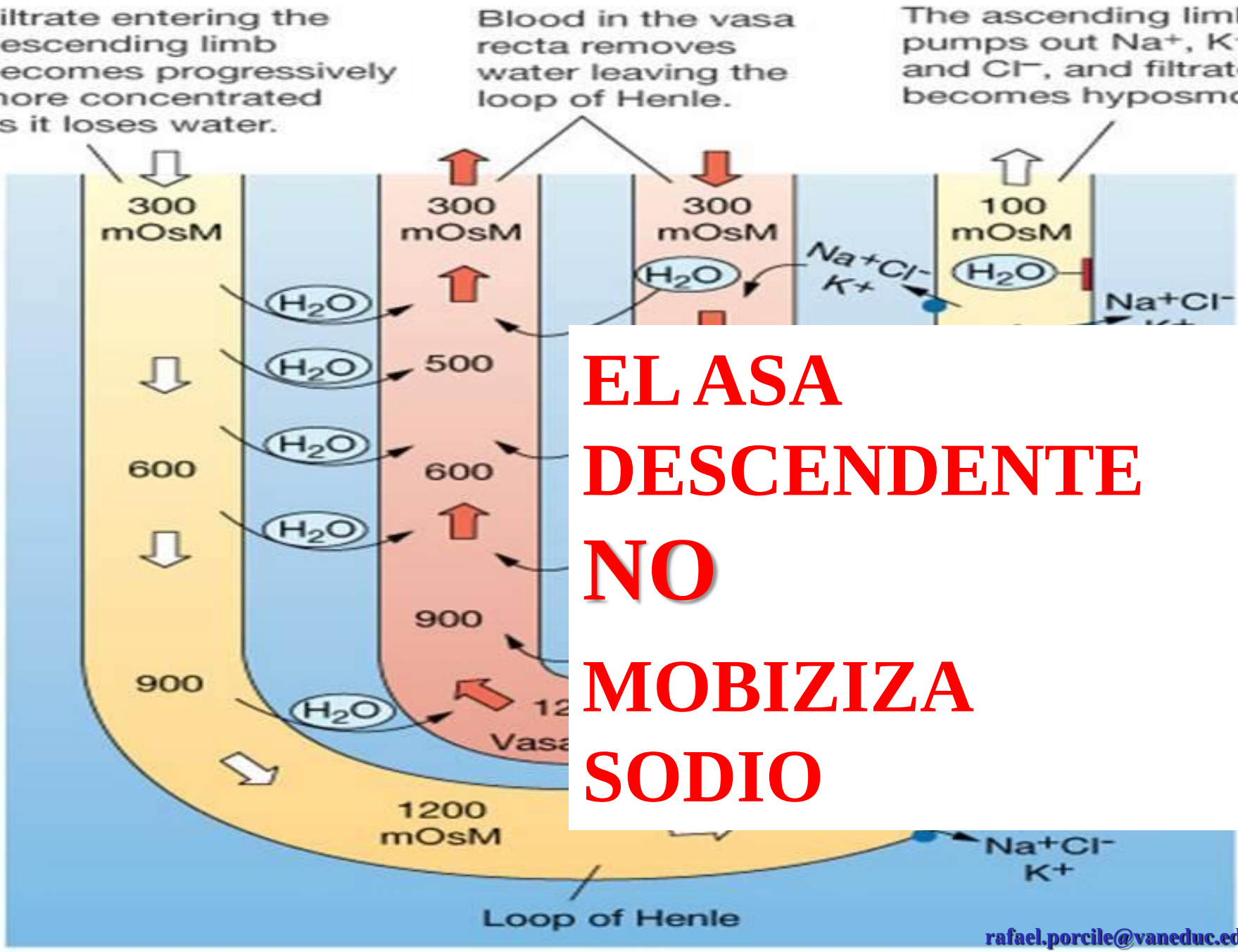

EL ASA DESCENDENTE NO MOBIZIZA SODIO

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CONCENTRA LA ORINA SOLO EXTRAYENDO AGUA POR GRADIENTE OSMOTICO

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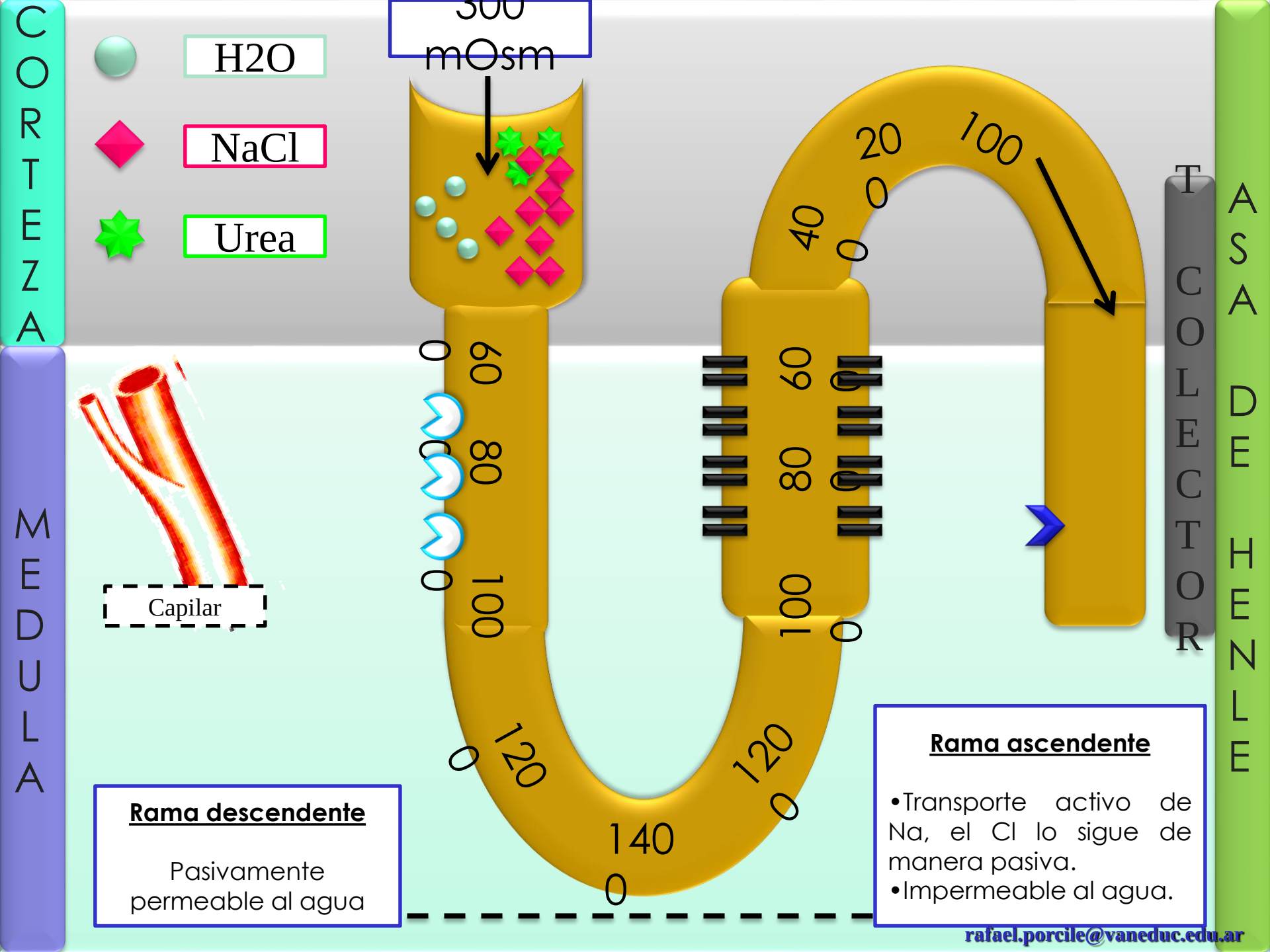

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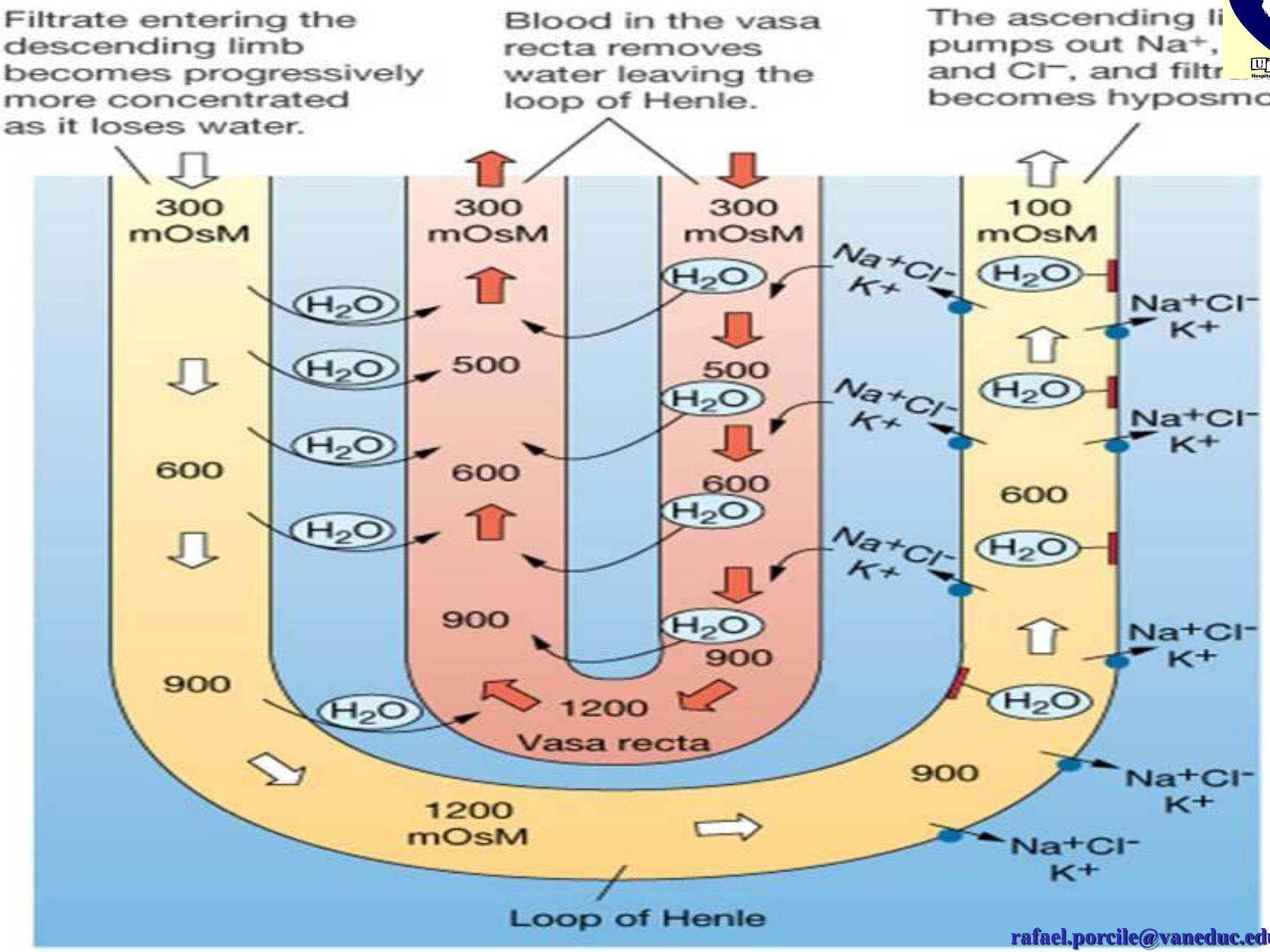

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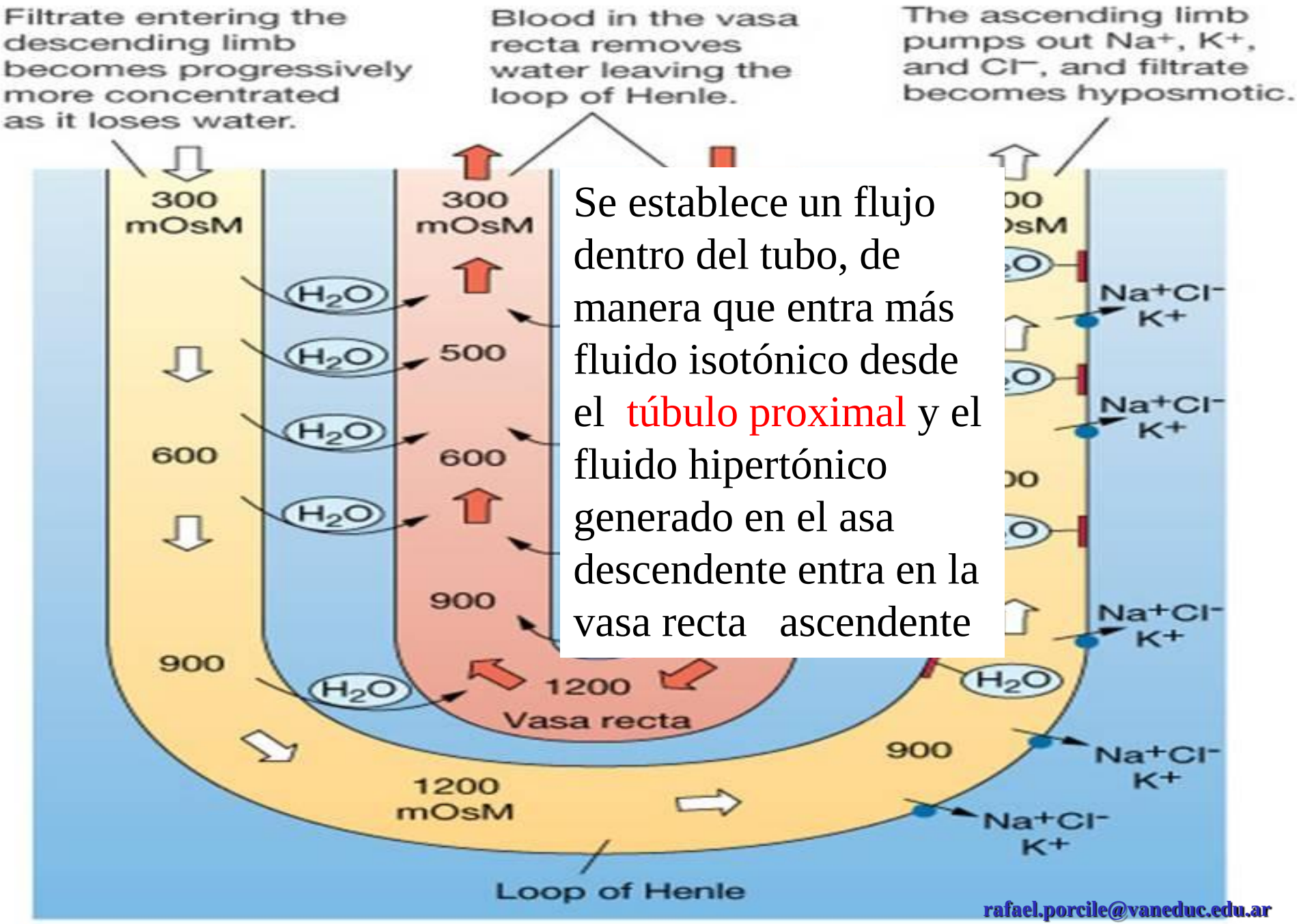

Se establece un flujo dentro del tubo, de manera que entra más fluido isotónico desde el túbulo proximal y el fluido hipertónico generado en el asa descendente entra en la vasa recta ascendente

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CORTEZA

MEDULA

ASA DE HENLE

TUBO COLECTOR

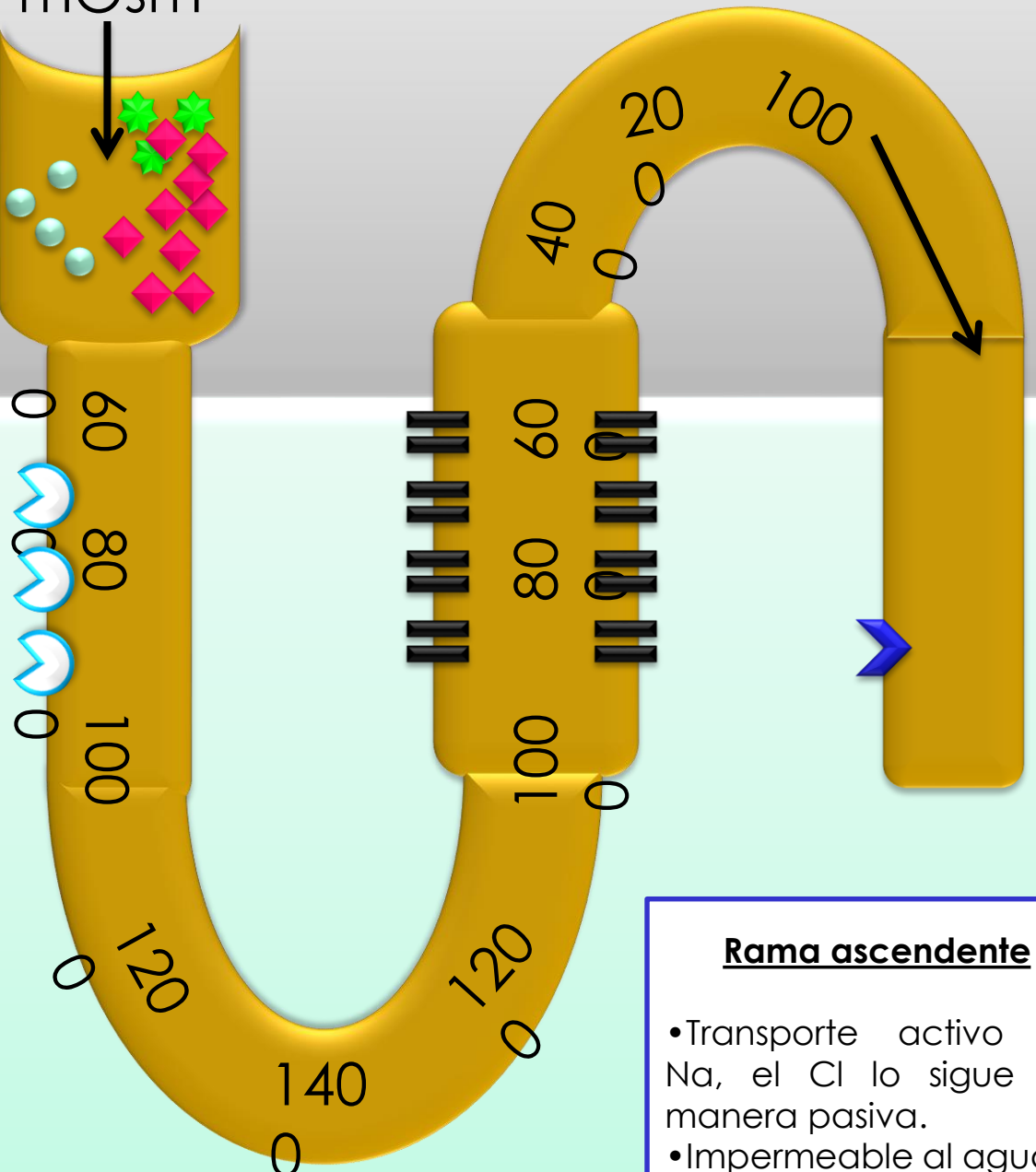
H2O

NaCl

Urea

300 mOsm

Capilar



Rama descendente

Pasivamente permeable al agua

Rama ascendente

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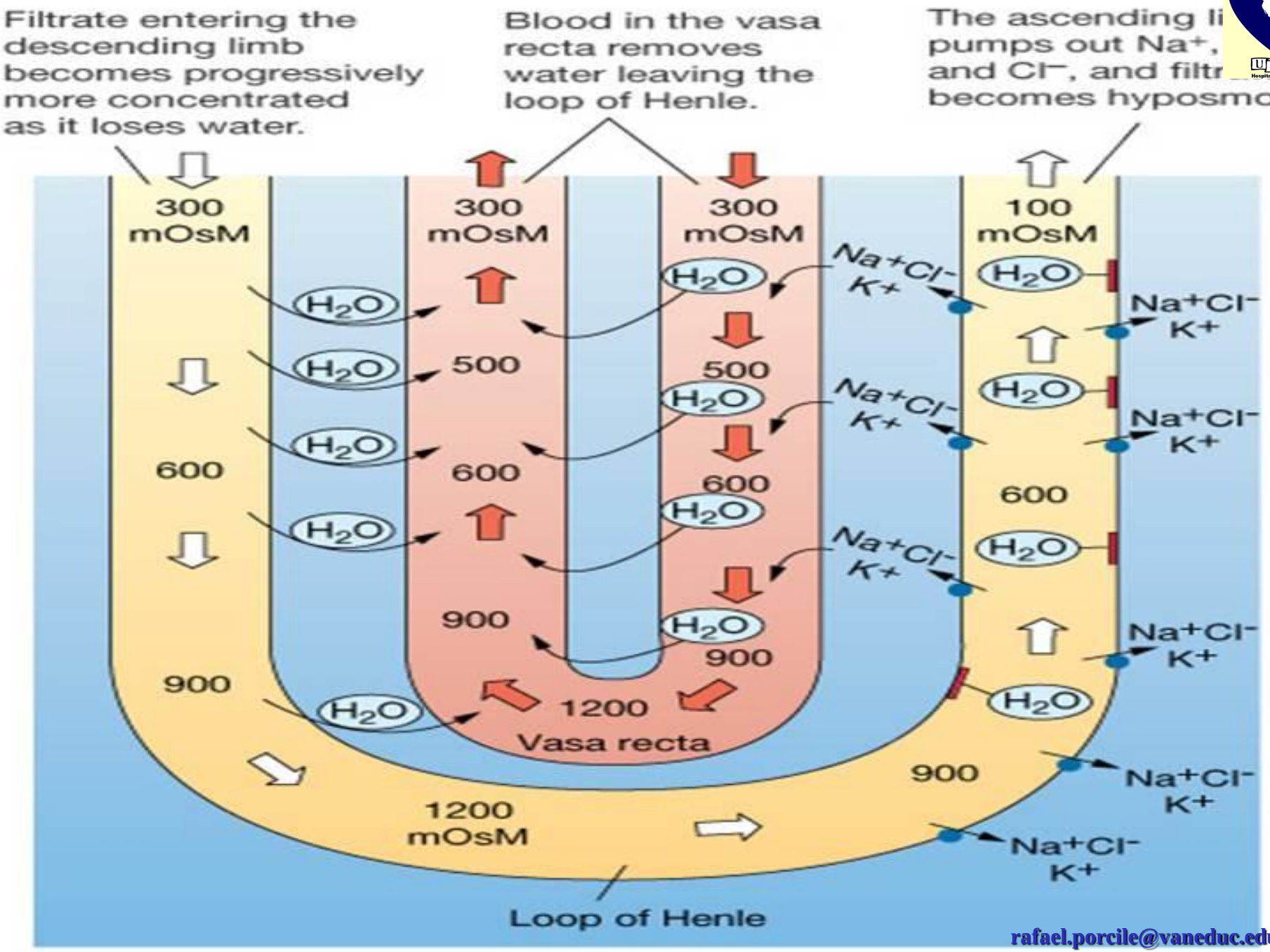

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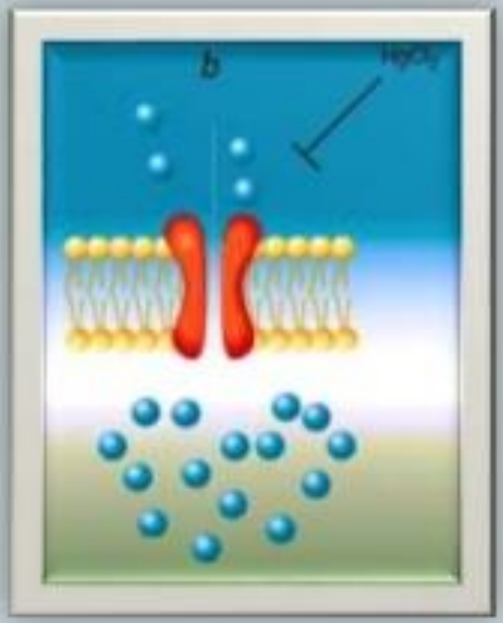
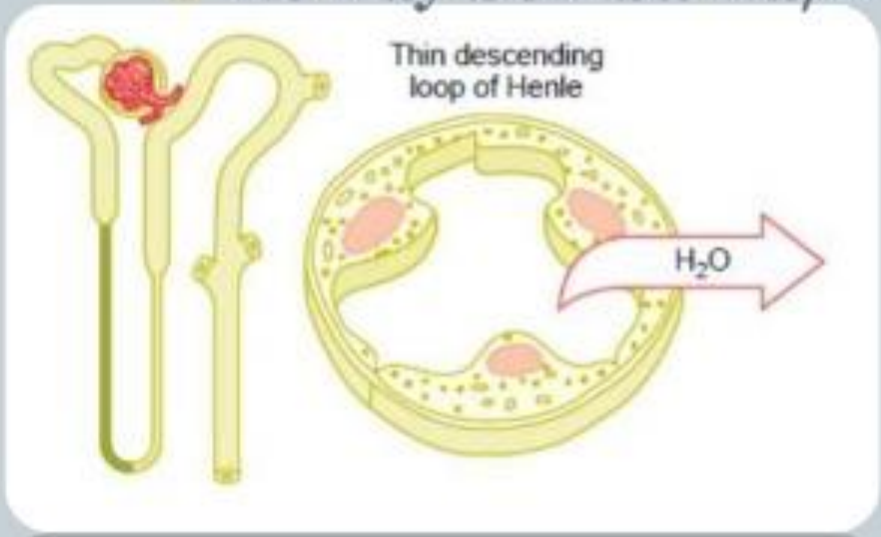
ASA DE HENLE: SEGMENTO DELGADO DESCENDENTE

- Reabsorción de Agua

- Acuaporinas 1



- Secreción de Urea
- No hay bomba Na/K AtP



Liquido Hipertónico

Echevarría M. Acuaporinas: los canales de Agua celulares. Investigación y Ciencia. Diciembre 2006

Jameson L. Harrison´s Nephrology and Acid Base Disorders. McGraw-Hill. 2010

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¿Como arreglamos esto?

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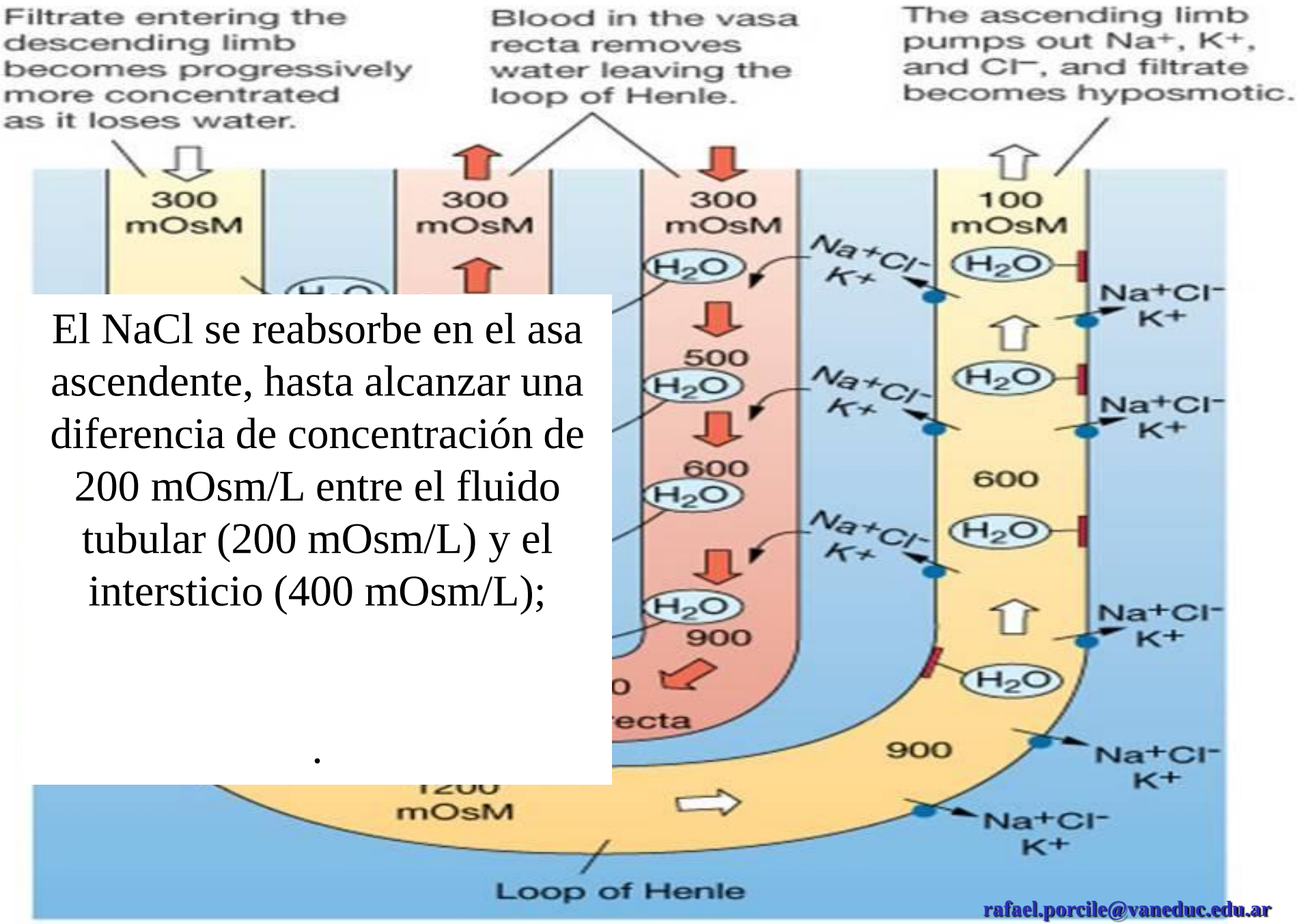

El NaCl se reabsorbe en el asa ascendente, hasta alcanzar una diferencia de concentración de 200 mOsm/L entre el fluido tubular (200 mOsm/L) y el intersticio (400 mOsm/L);

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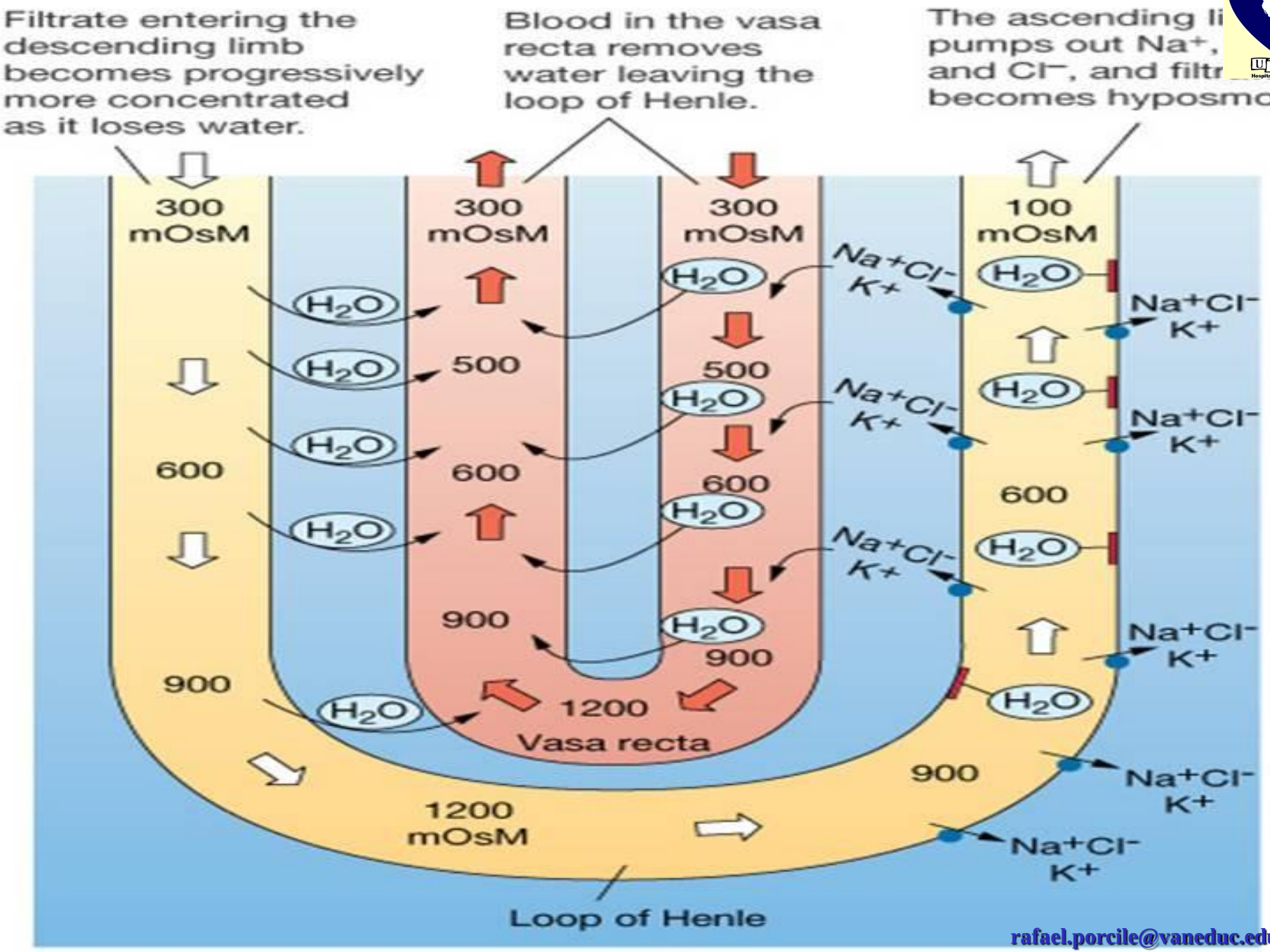

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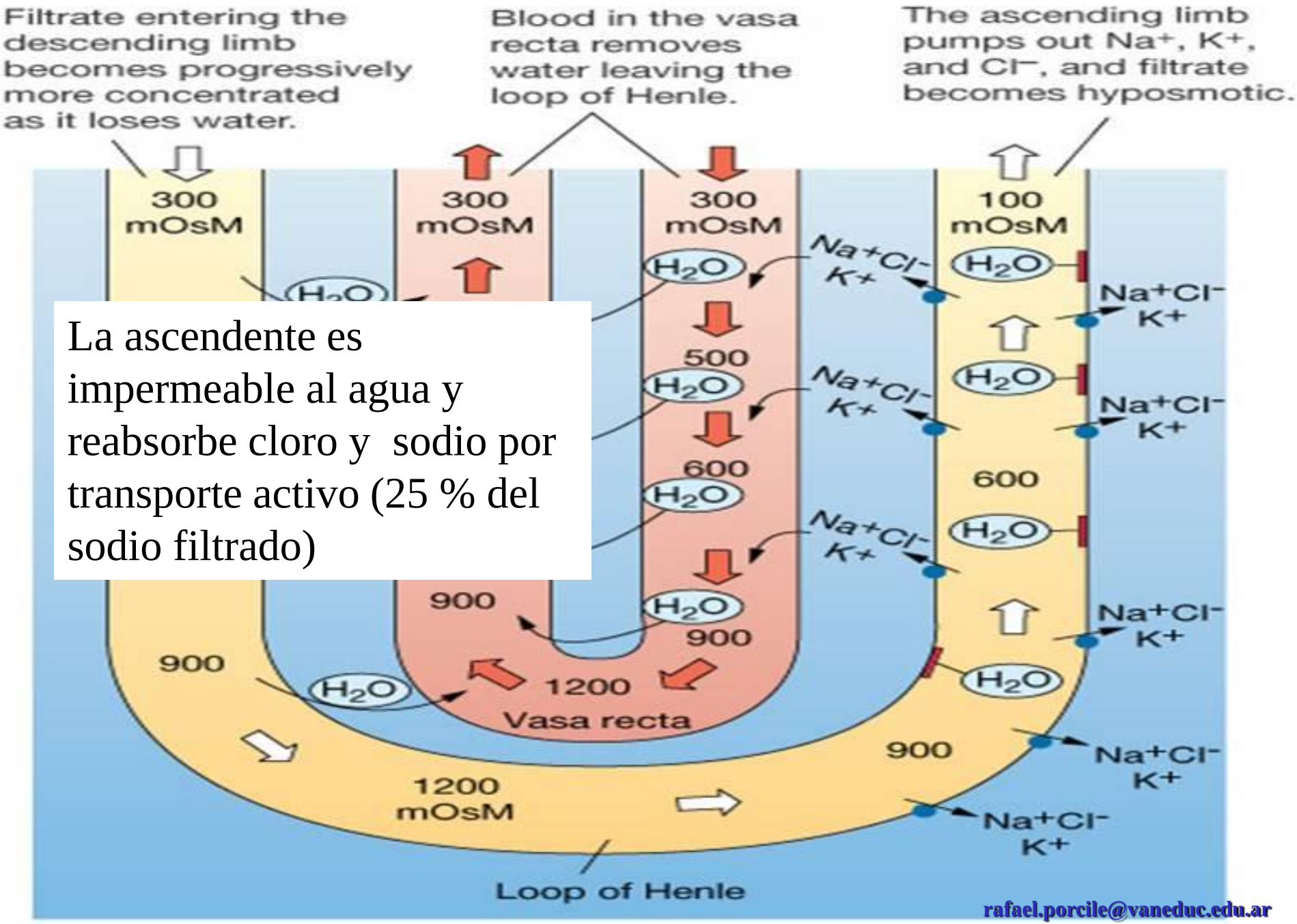

La ascendente es impermeable al agua y reabsorbe cloro y sodio por transporte activo (25 % del sodio filtrado)

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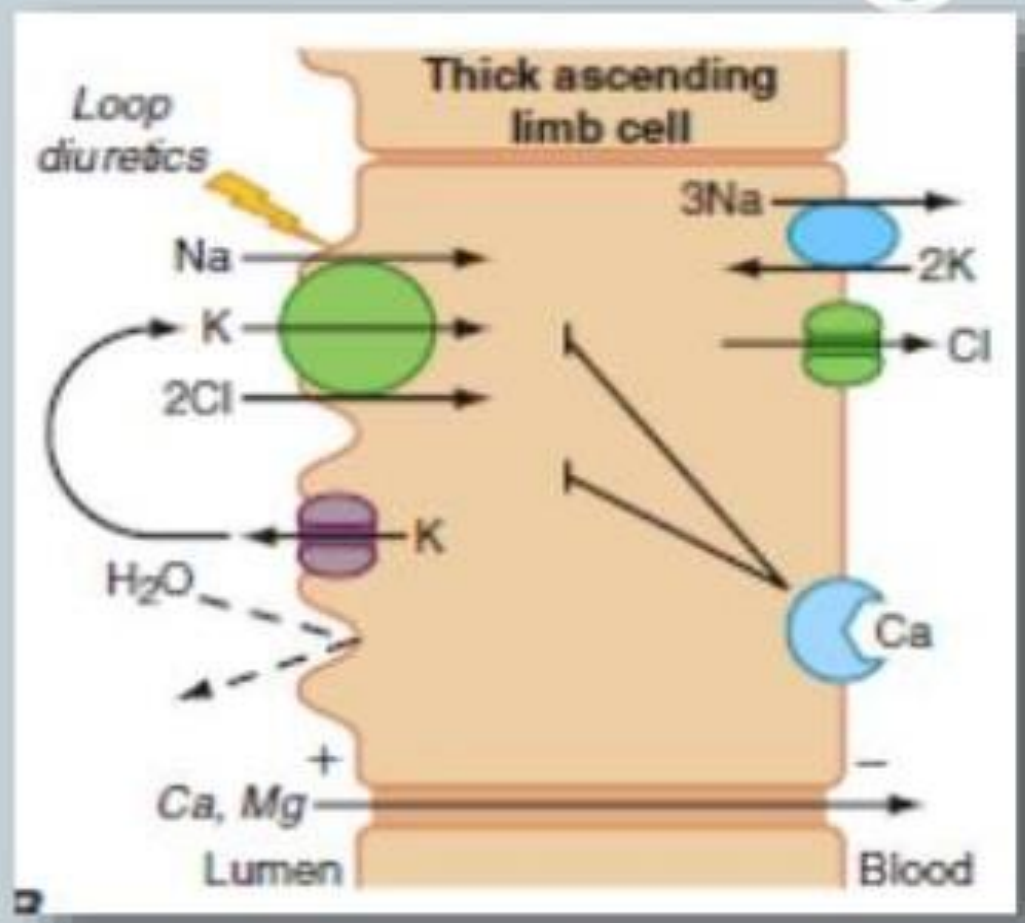
ASA DE HENLE: SEGMENTO GRUESO ASCENDENTE

- Reabsorción de Solutos



Na^+	25% (0.4)
K^+	10%–20%
Ca^{2+}	30%
Mg^{2+}	ca. 70%
Cl^-	ca. 20%
HCO_3^-	
Phosphate	15%
D-Glucose	4%
Urea	Secretion

De aquí sale liquido hipotonico

Jameson L. Harrison´s Nephrology and Acid Base Disorders. McGraw-Hill. 2010

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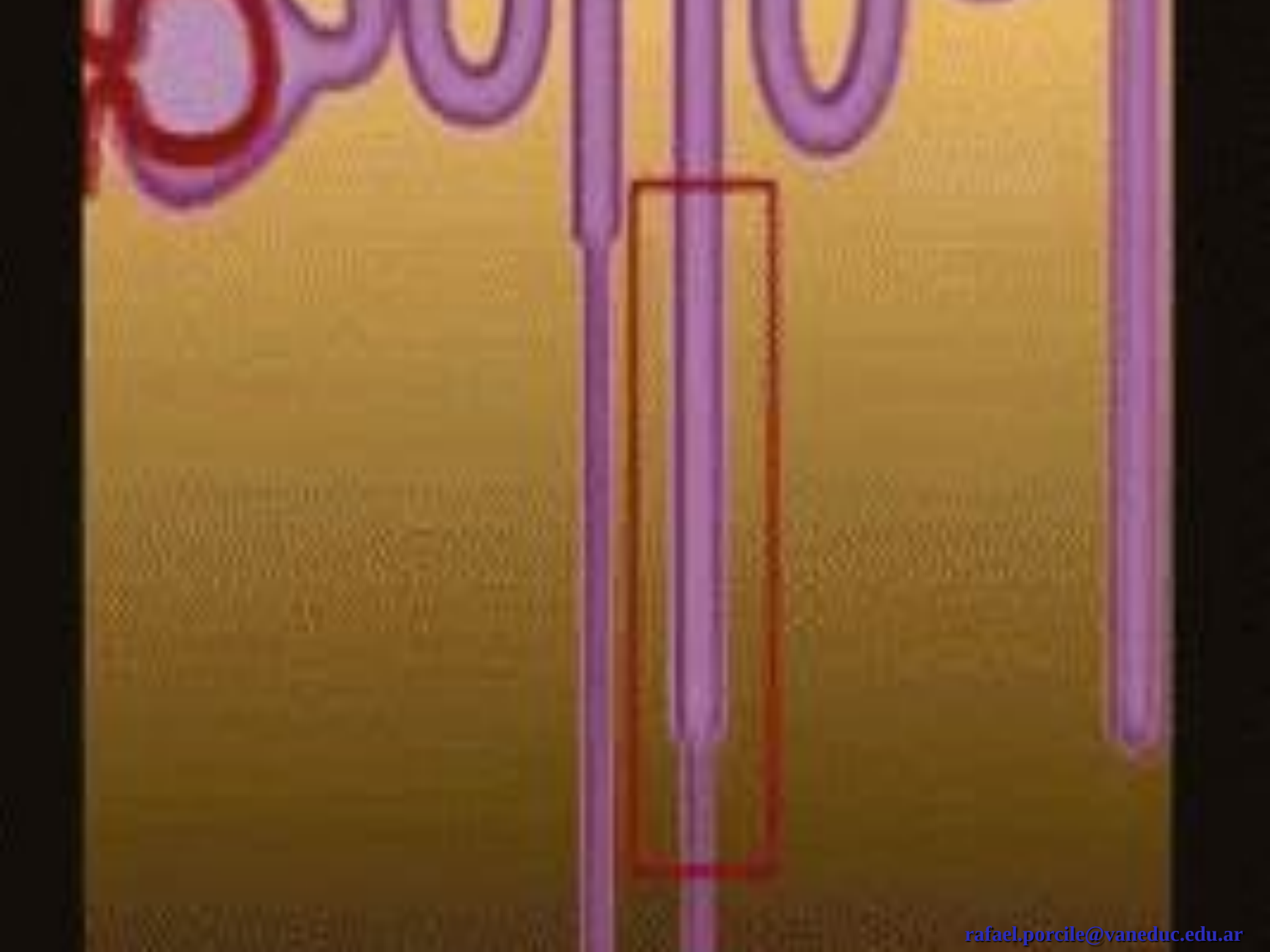

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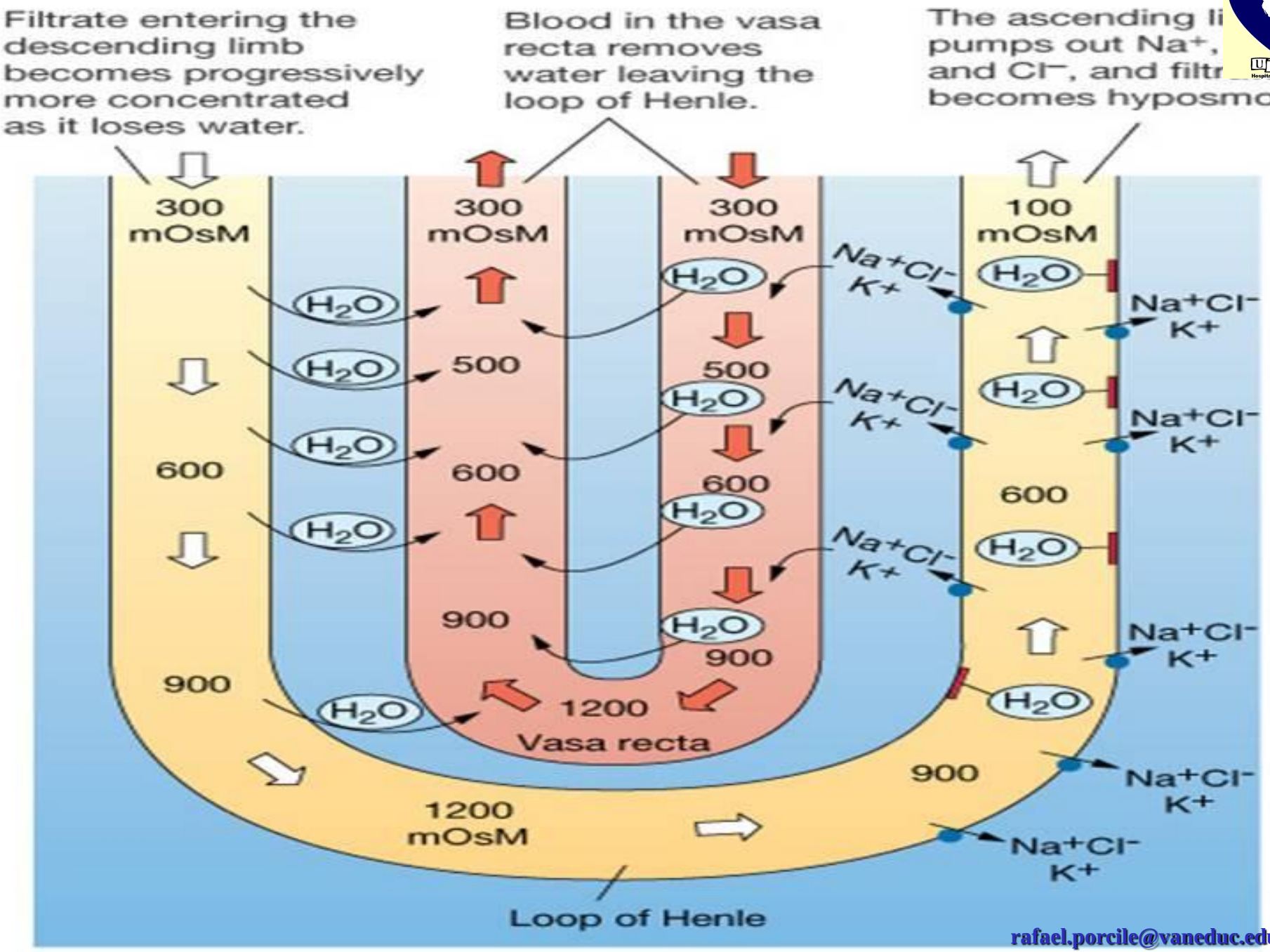

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CORTEZA

MEDULA

ASA DE HENLE

TUBO COLECTOR

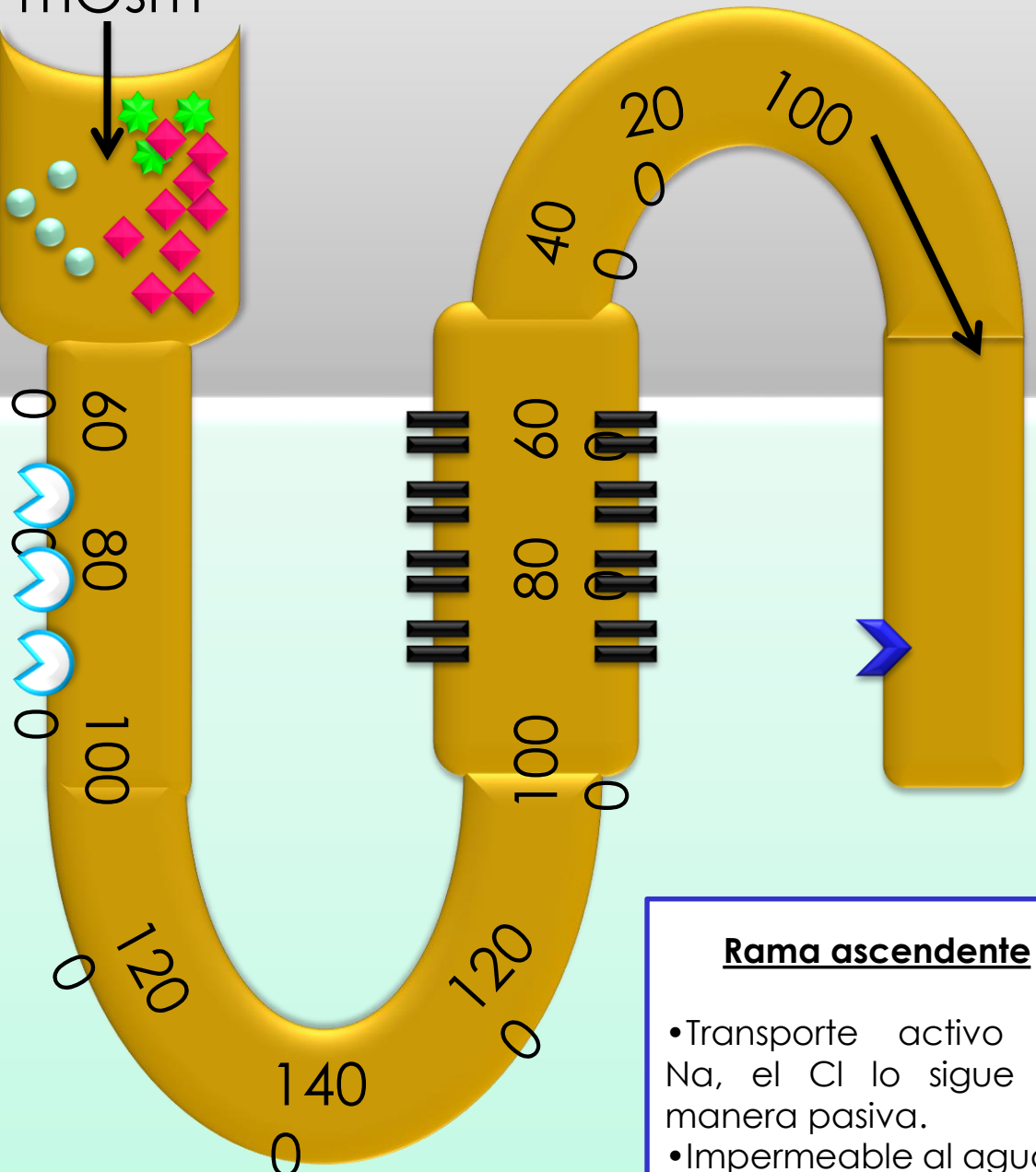
H2O

NaCl

Urea

300 mOsm

Capilar



Rama descendente

Pasivamente permeable al agua

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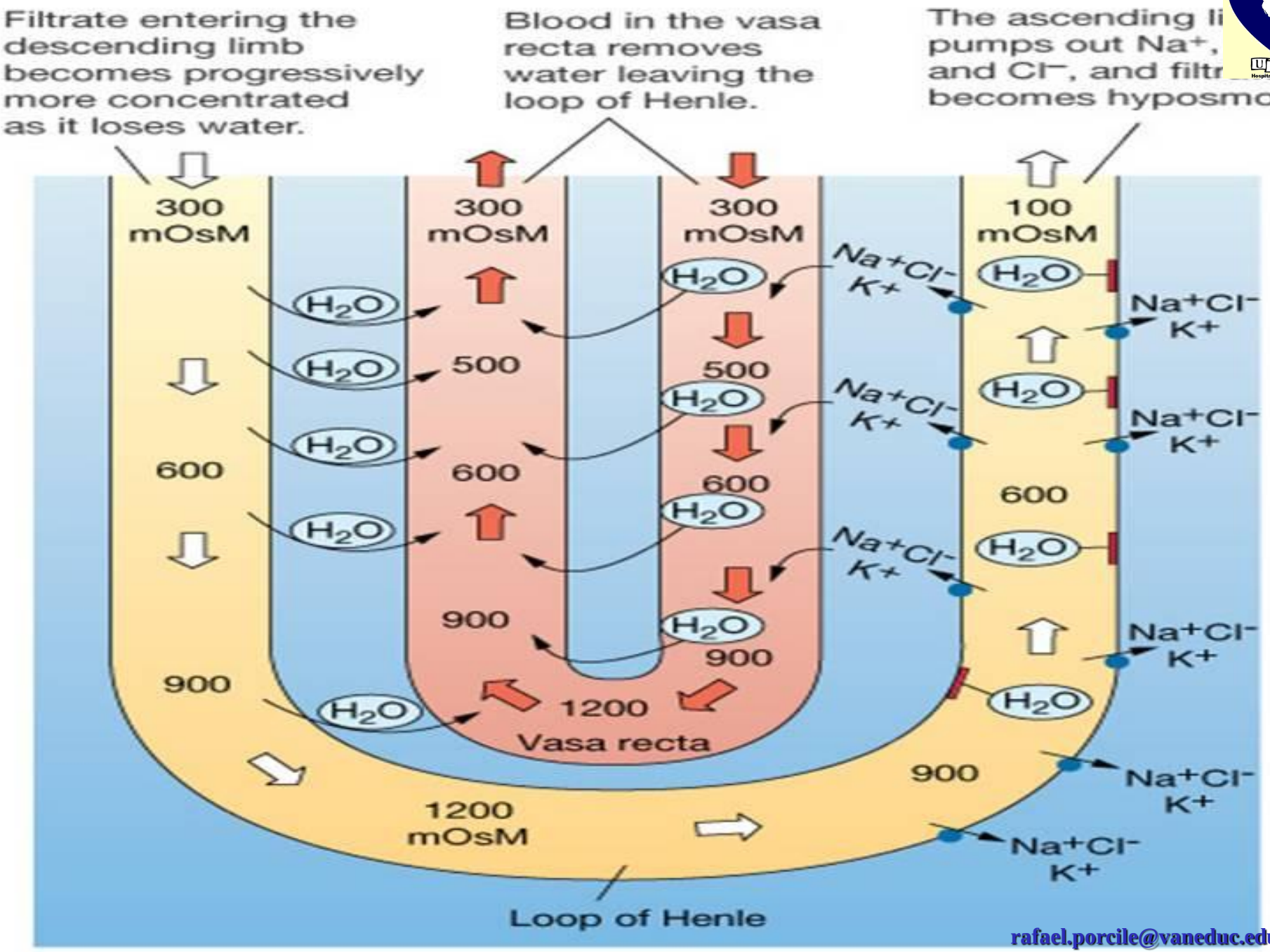

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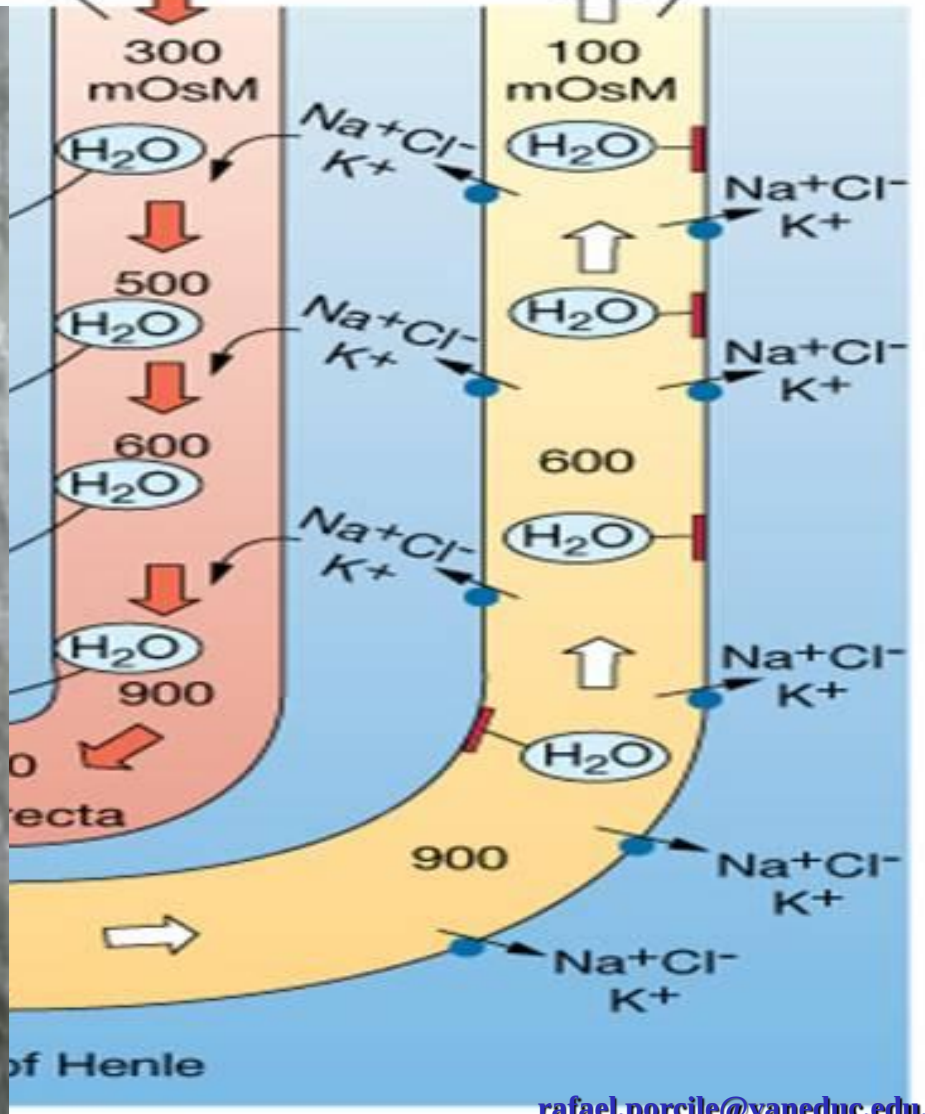
Filtrate entering the descending limb becomes progressively more concentrated as it loses water.

Blood in the vasa recta removes water leaving the loop of Henle.

The ascending l
pumps out Na+
and Cl−, and filt
becomes hyposmotic



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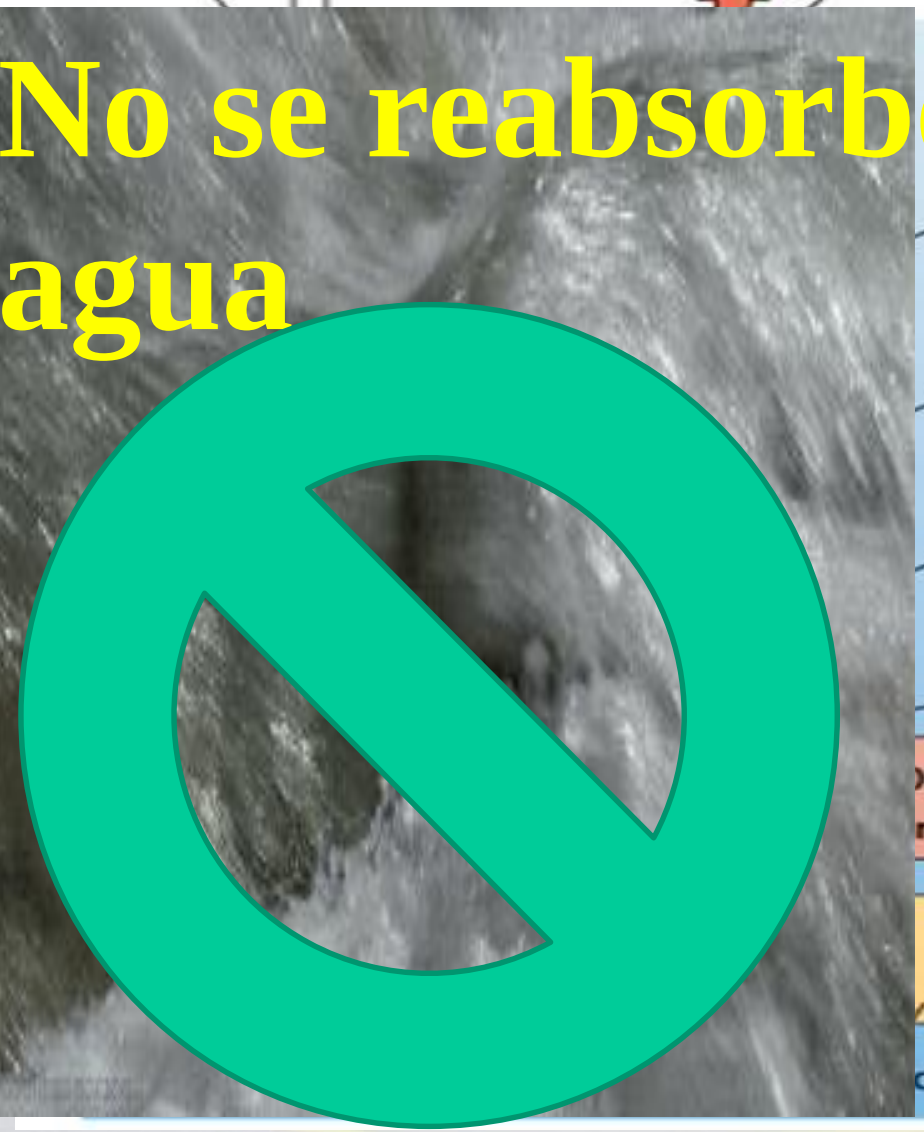
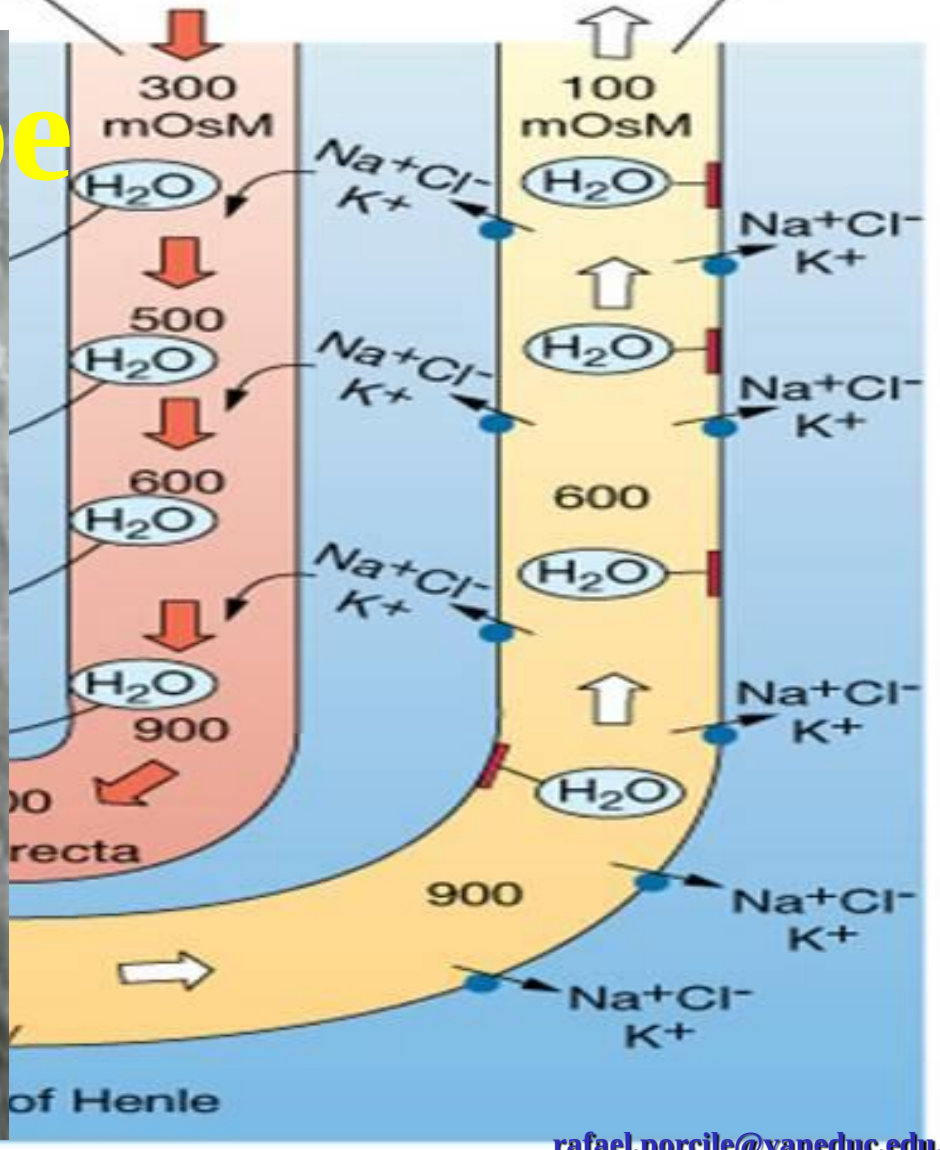
Filtrate entering the descending limb becomes progressively more concentrated as it loses water.

Blood in the vasa recta removes water leaving the loop of Henle.

The ascending l pumps out Na^+ and Cl^-, and filt becomes hyposmotic

No se reabsorbe agua





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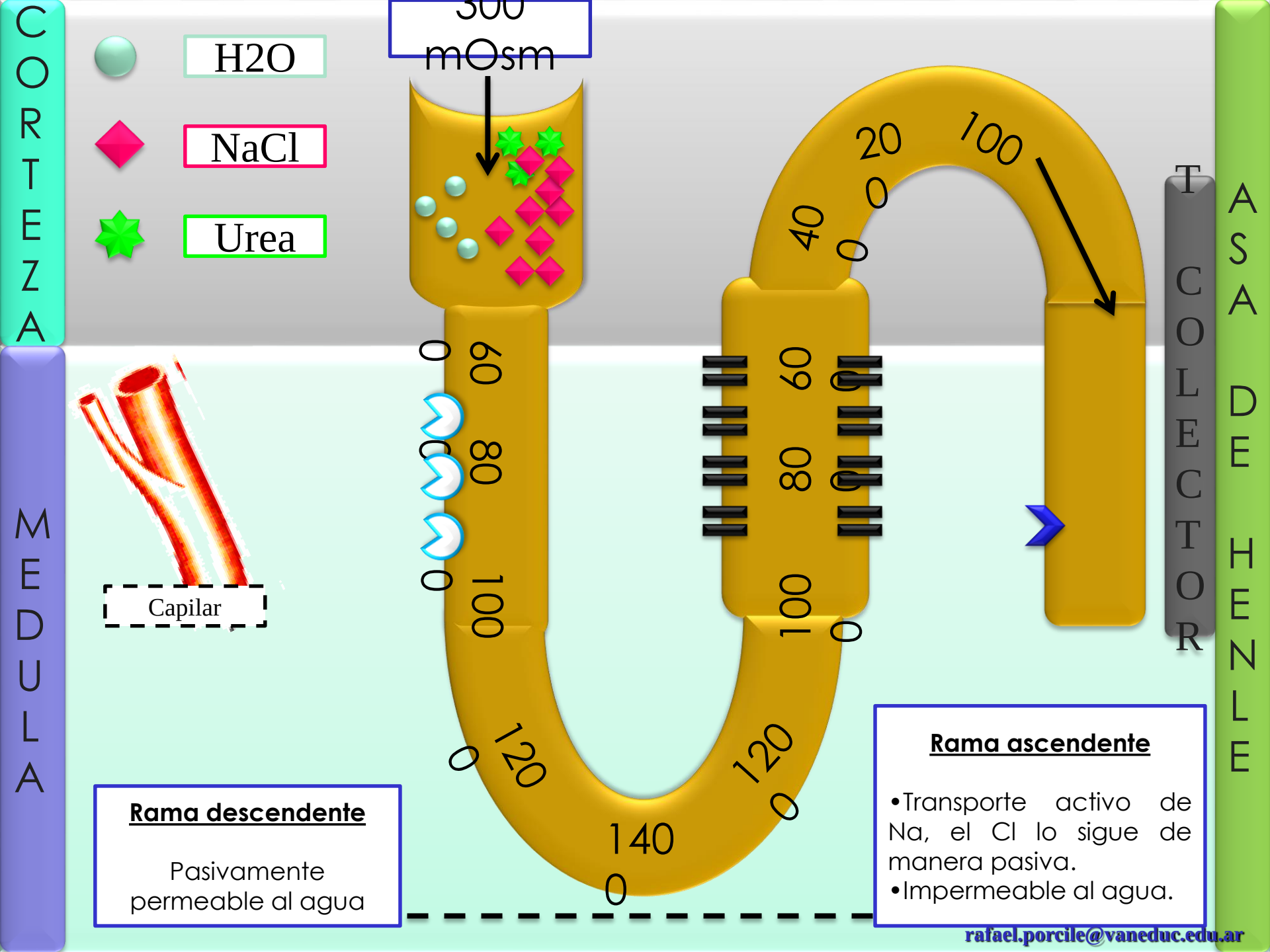

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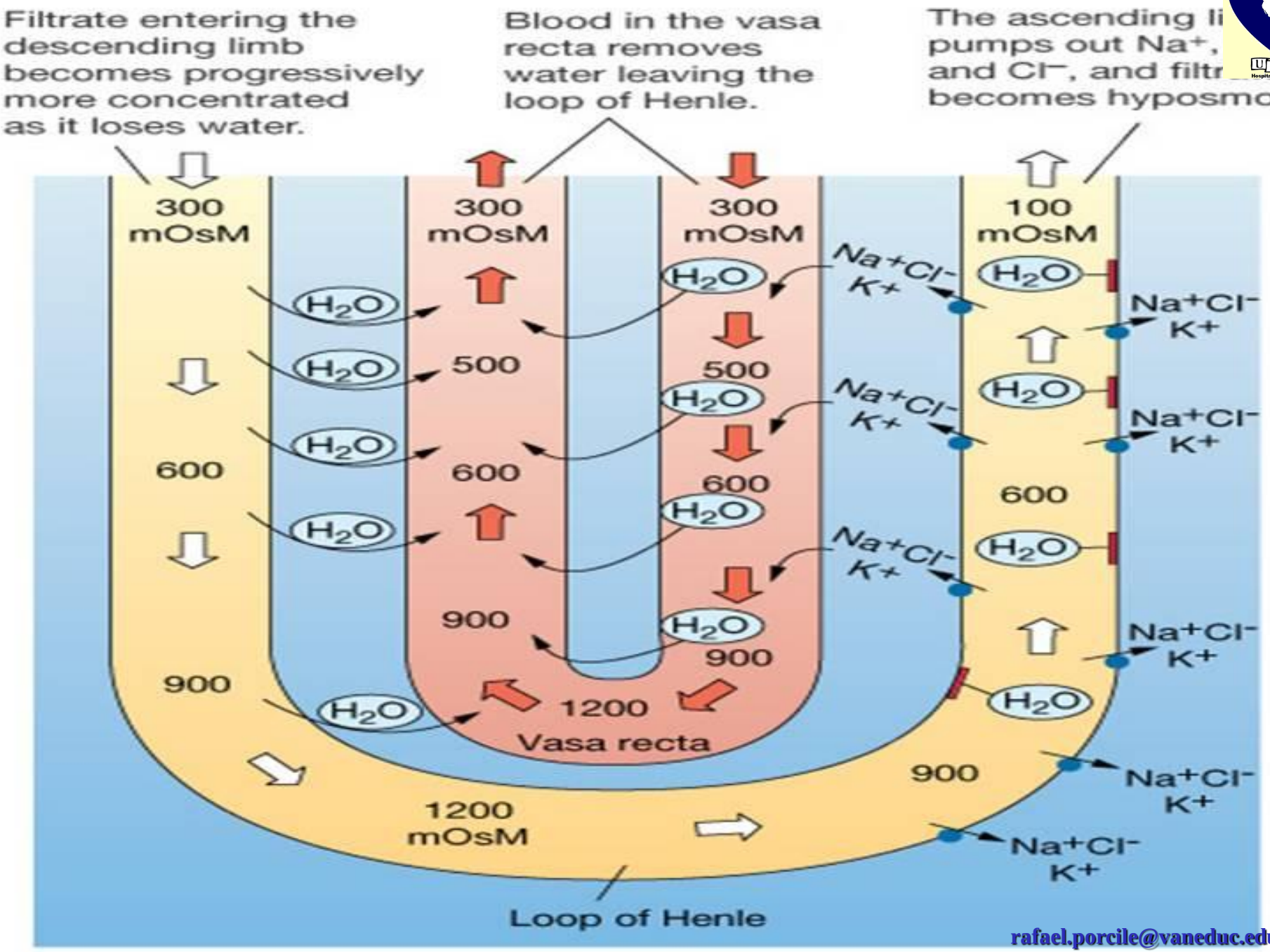

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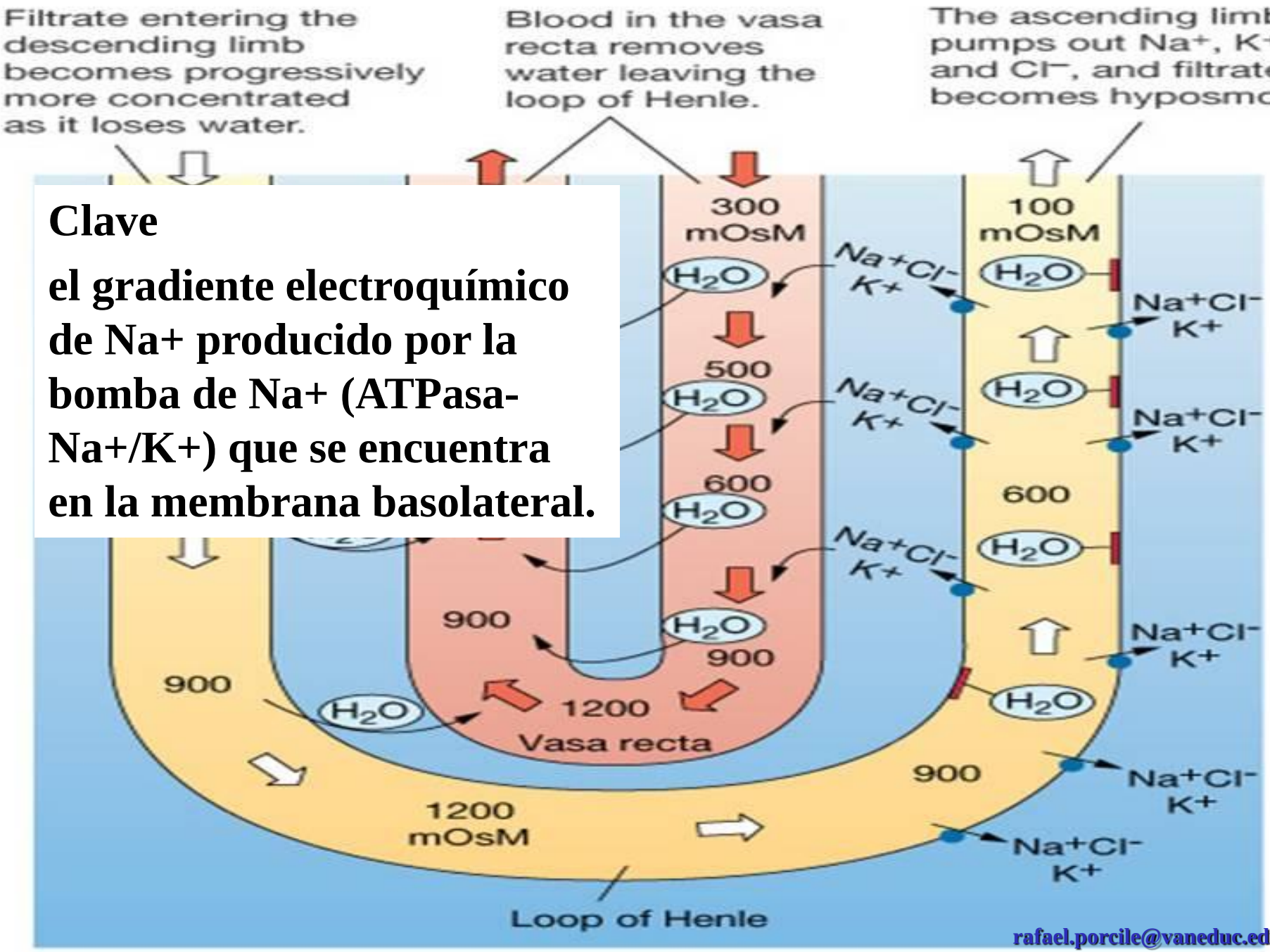

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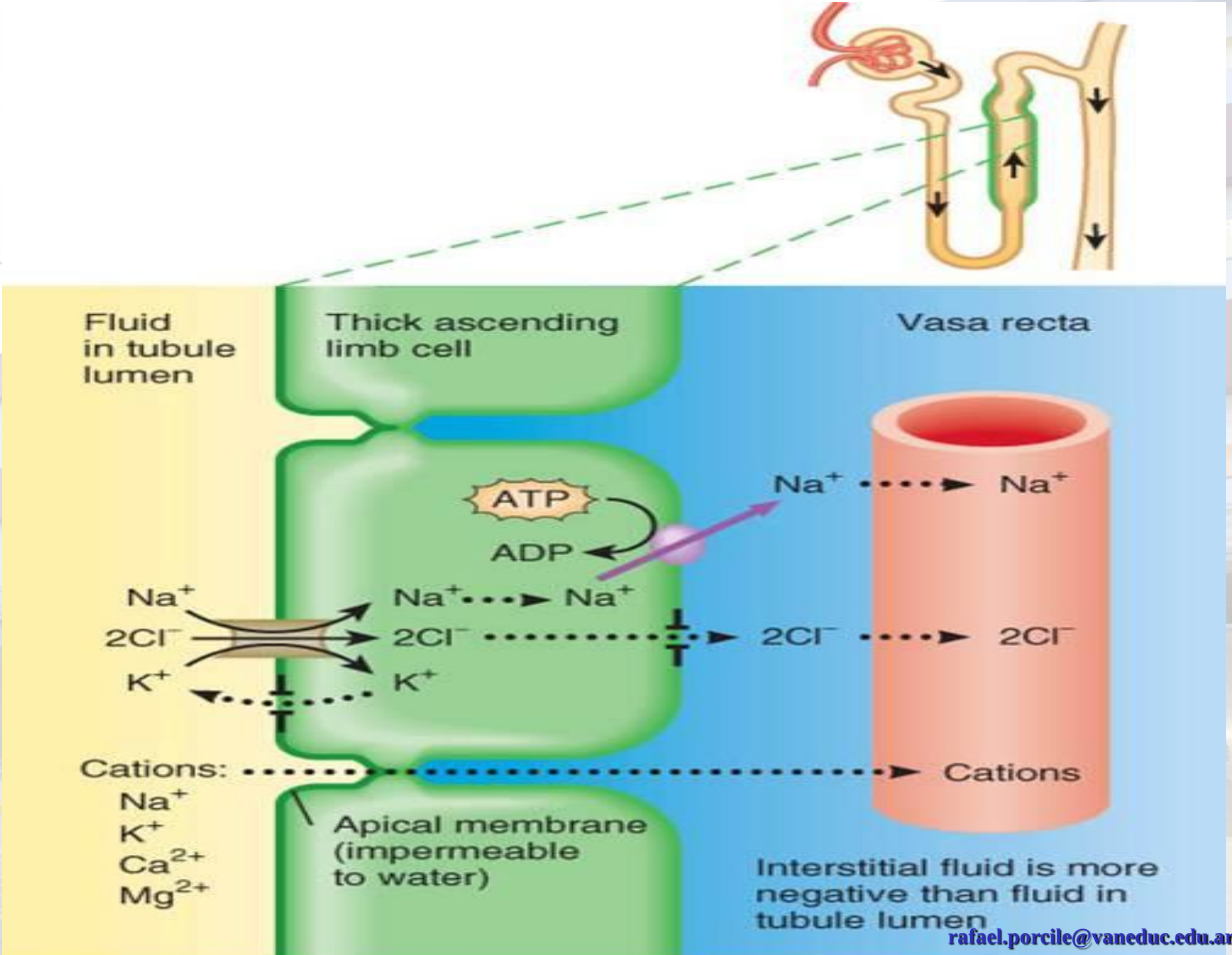

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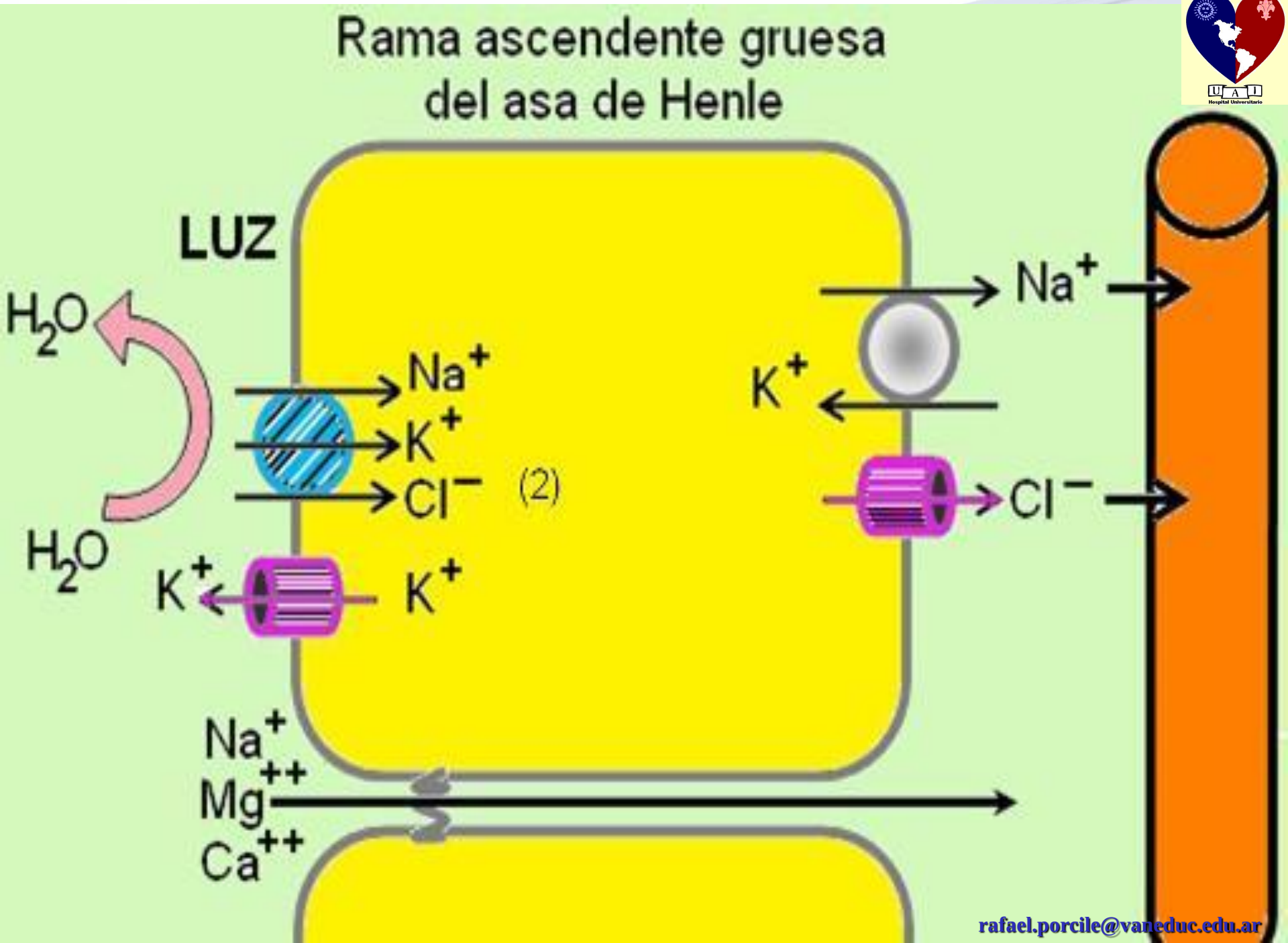

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CON GASTO ENERGETICO ESTO ES INACTIVADO EL LA ISQUEMIA RENAL Y EN LA NECROSIS TUBULAR AGUD A

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Circuito de la urea

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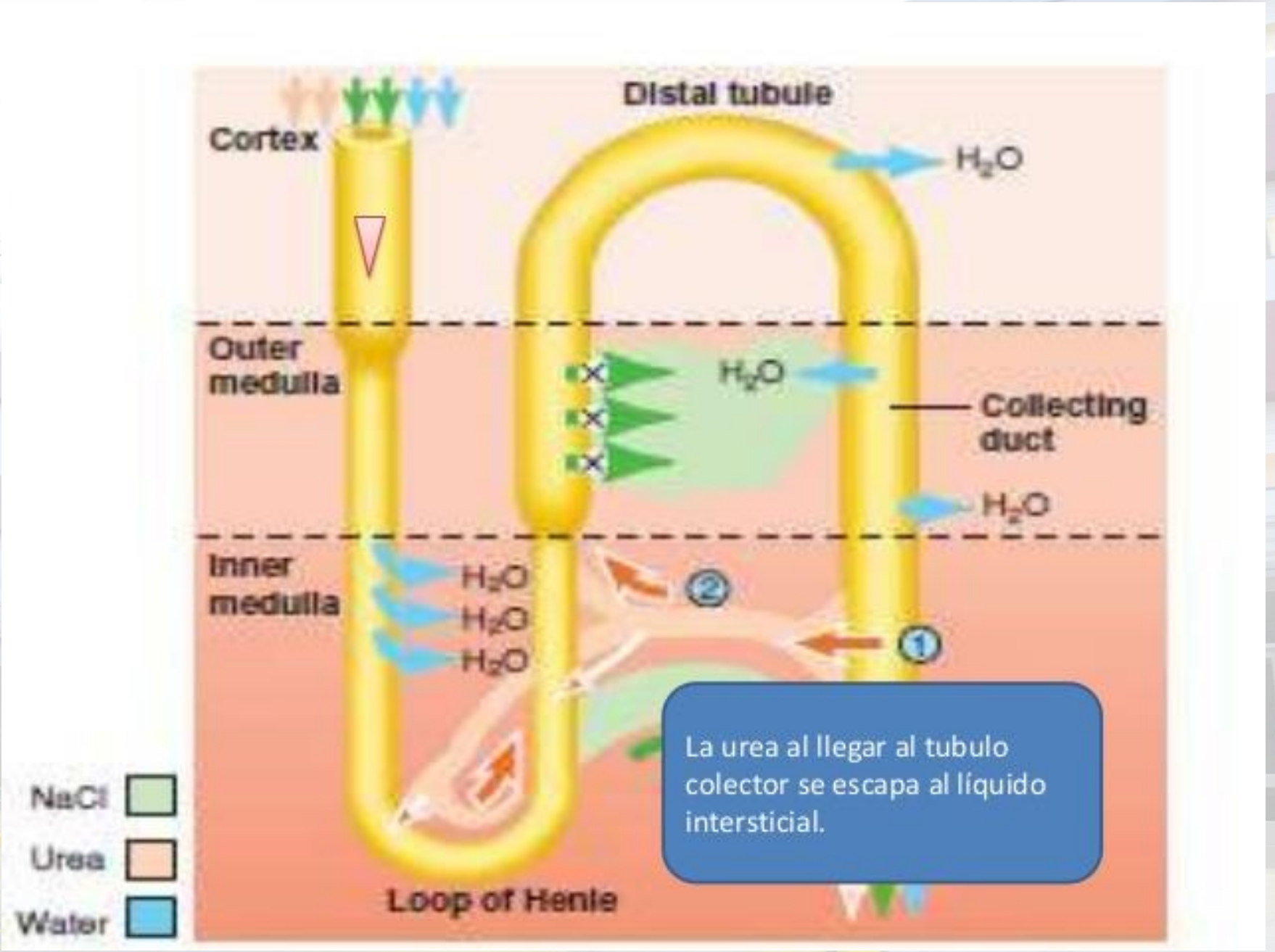

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Urea channel inhibitors: a new functional class of aquaretics

Mark A. Knepper[1] and Carlos A. Miranda[1]

- Canales Renales de Urea
  - Condicionan Permeabilidad de los tùbulos para el paso de la úrea
    - UT-A, Túbulos colectores medulares y asa de henle descendente
    - UT-B, Membrana de Eritrocito y rama descendente de vasa recta
- Inhibidores de Canales de urea: PU-14
  - En ausencia de canales, úrea se vuelve un potente agente diurético osmòtico.
  - Acuaretico: no altera excreción de electrolitos
- Rol Terapéutico: Hiponatremia
  - ICC, Cirrosis, SSIADH

Kidney International (2013) **83,** 991–993. doi:10.1038/ki.2013.94

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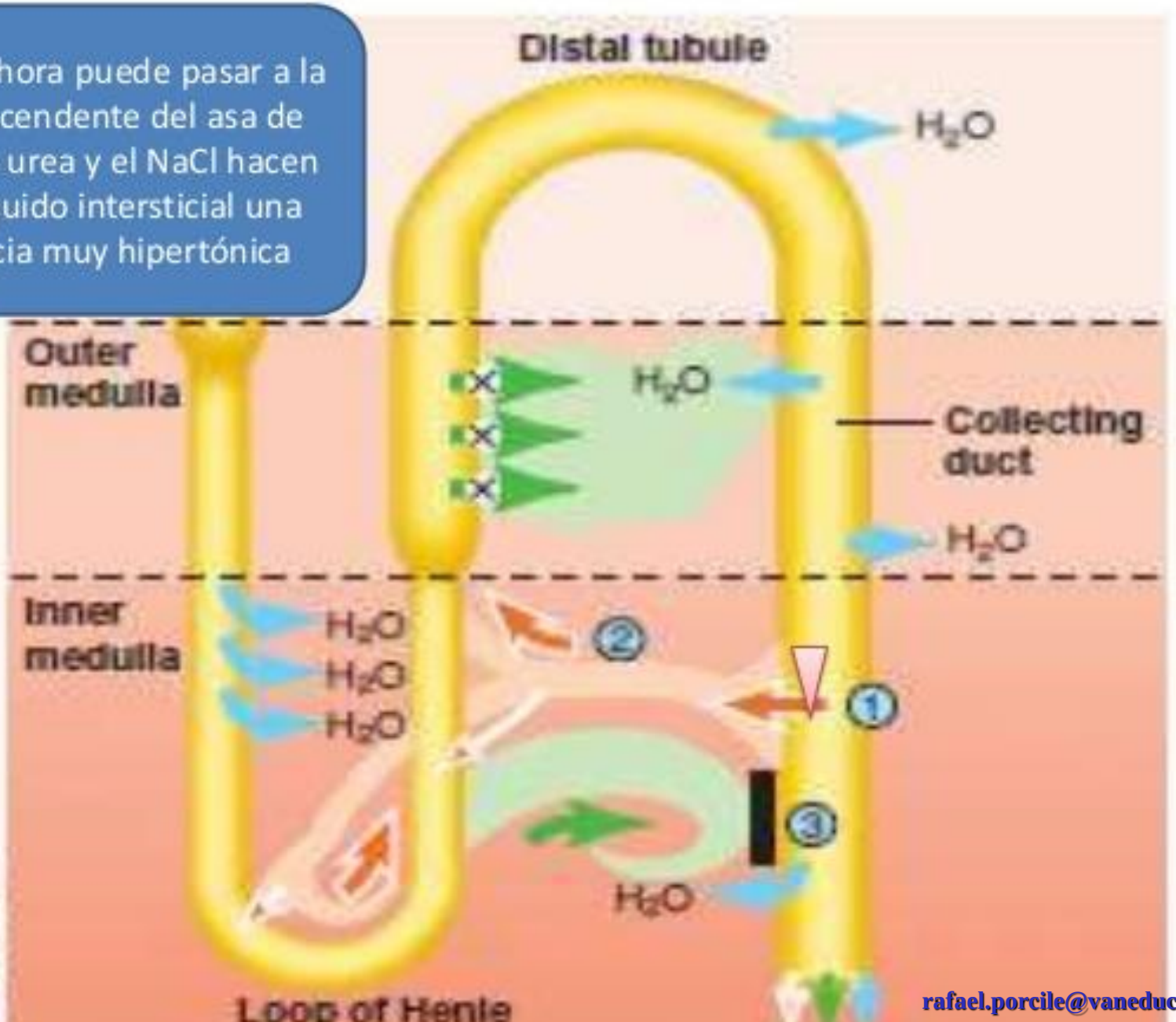
La urea ahora puede pasar a la rama ascendente del asa de Henle, la urea y el NaCl hacen de el líquido intersticial una sustancia muy hipertónica



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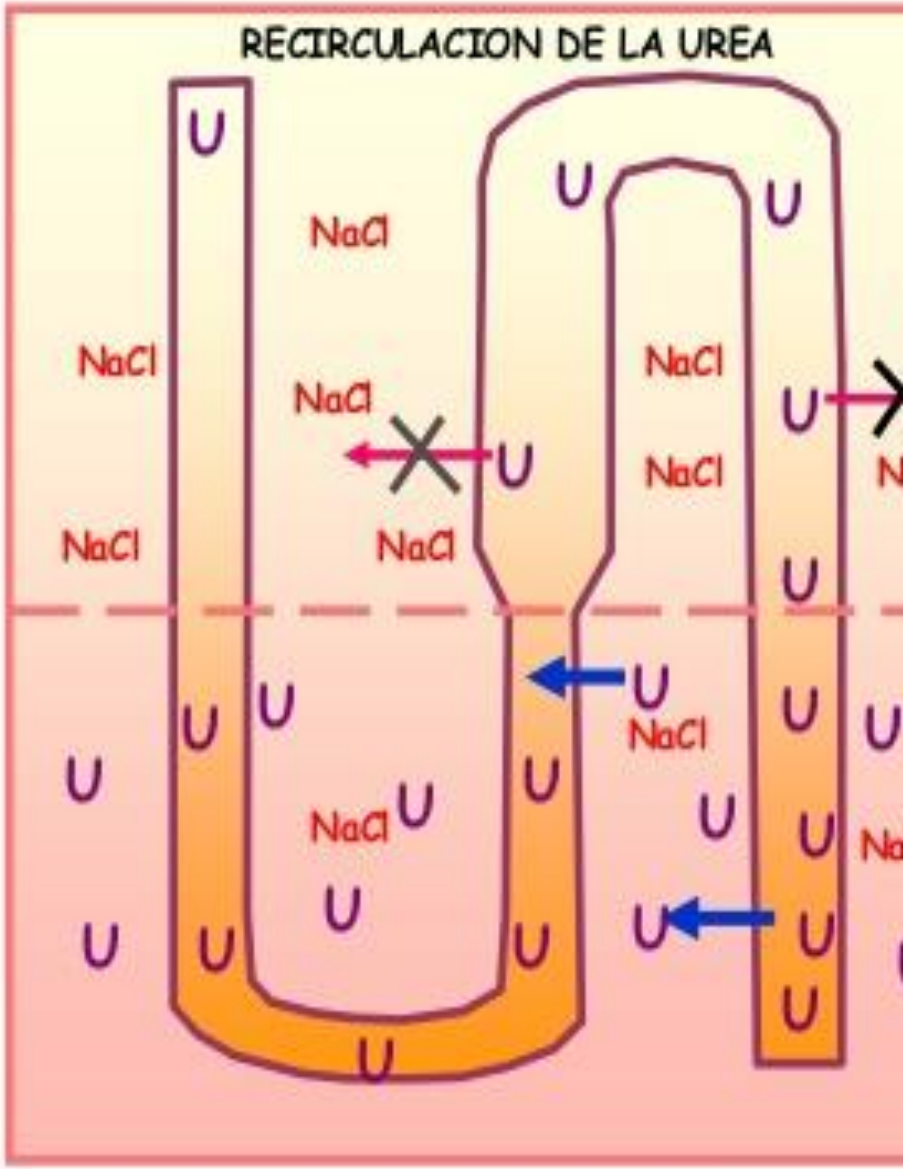
- T.P reabsorbe 40-60% la Urea
- Aumento de [Urea] en Seg. Descendente por salida de agua
- Segmento ascendente: [Urea] aumenta por reingresodelgado del asa, debido al reingreso de urea (secreción de urea)
- [Urea] aumenta en el T.Colector con la salida de agua dirigida por la ADH
- En la médula renal interna, la urea difunde al intersticio siguiendo su gradiente de concentración hacia los vasos rectos y otra parte reingresa al asa de Henle.



El reciclaje de urea en la médula interna contribuye en un 50 % a la osmolaridad del intersticio en esta zona, el resto se debe al NaCl.

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- Isquemia
- Necrosis tubular aguda
- Fase poliúrica

+

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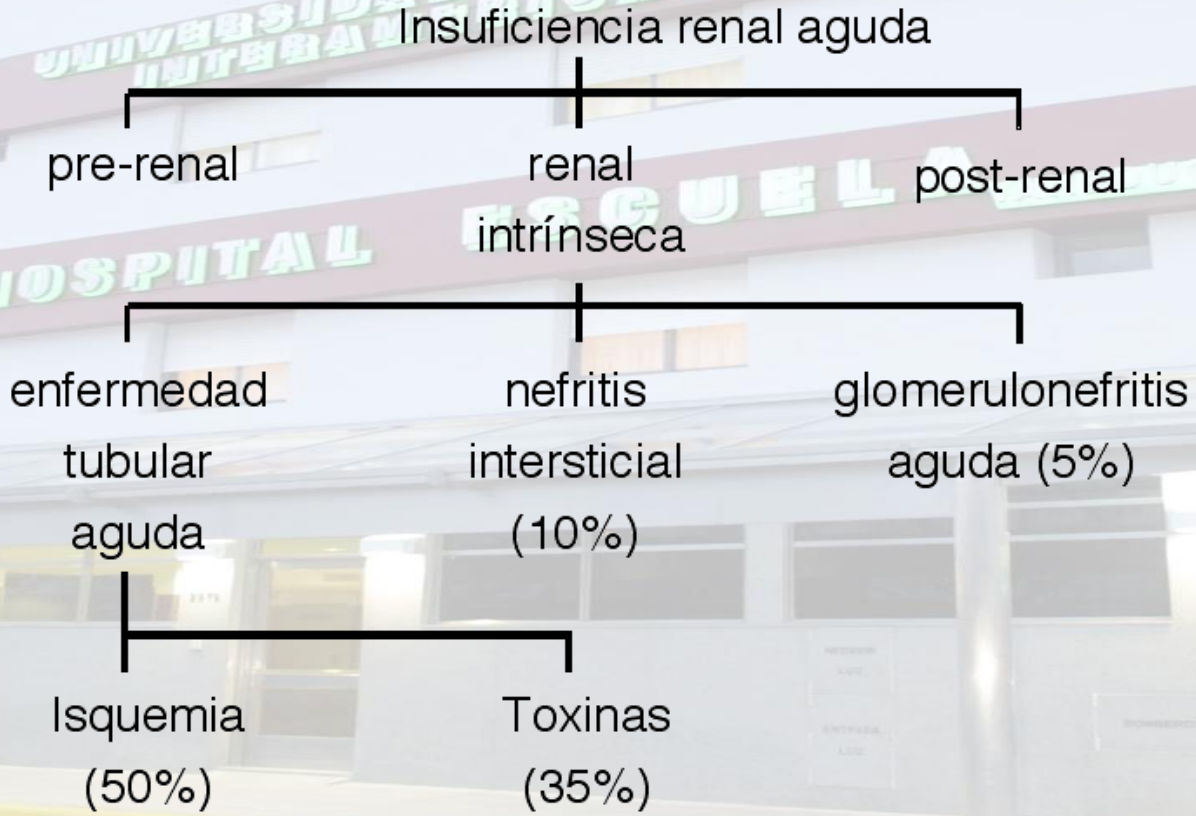
Insuficiencia renal aguda



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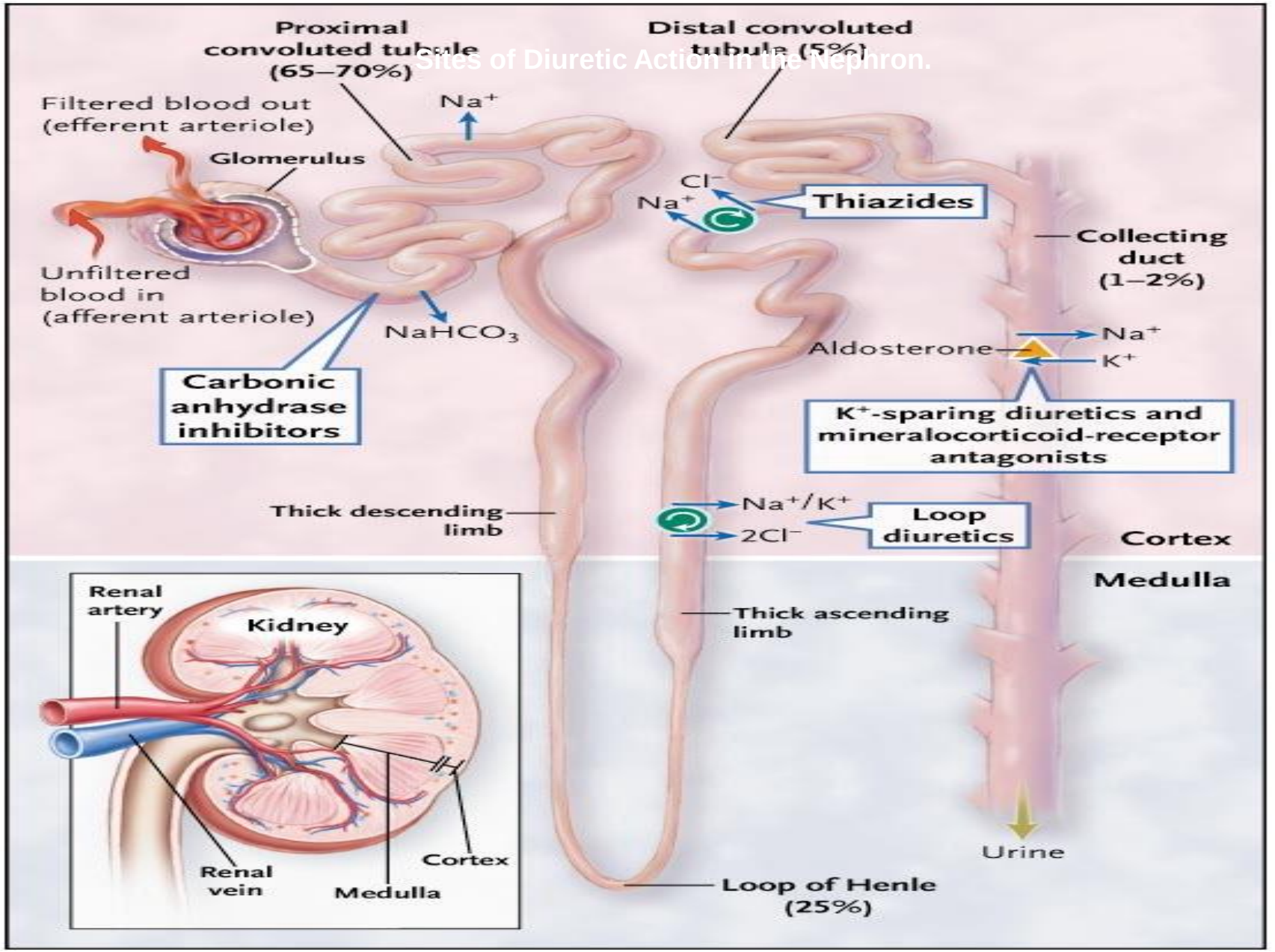

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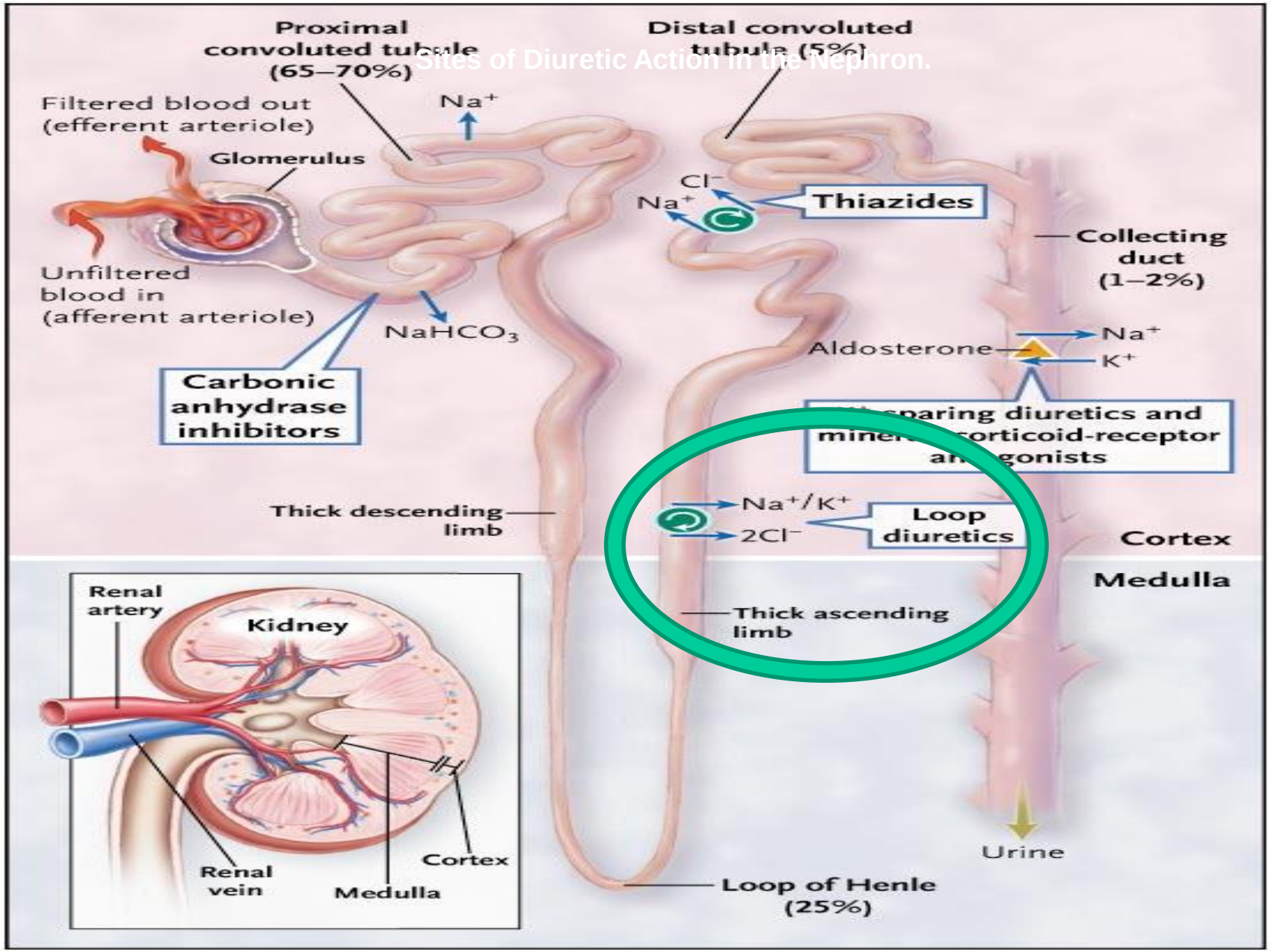

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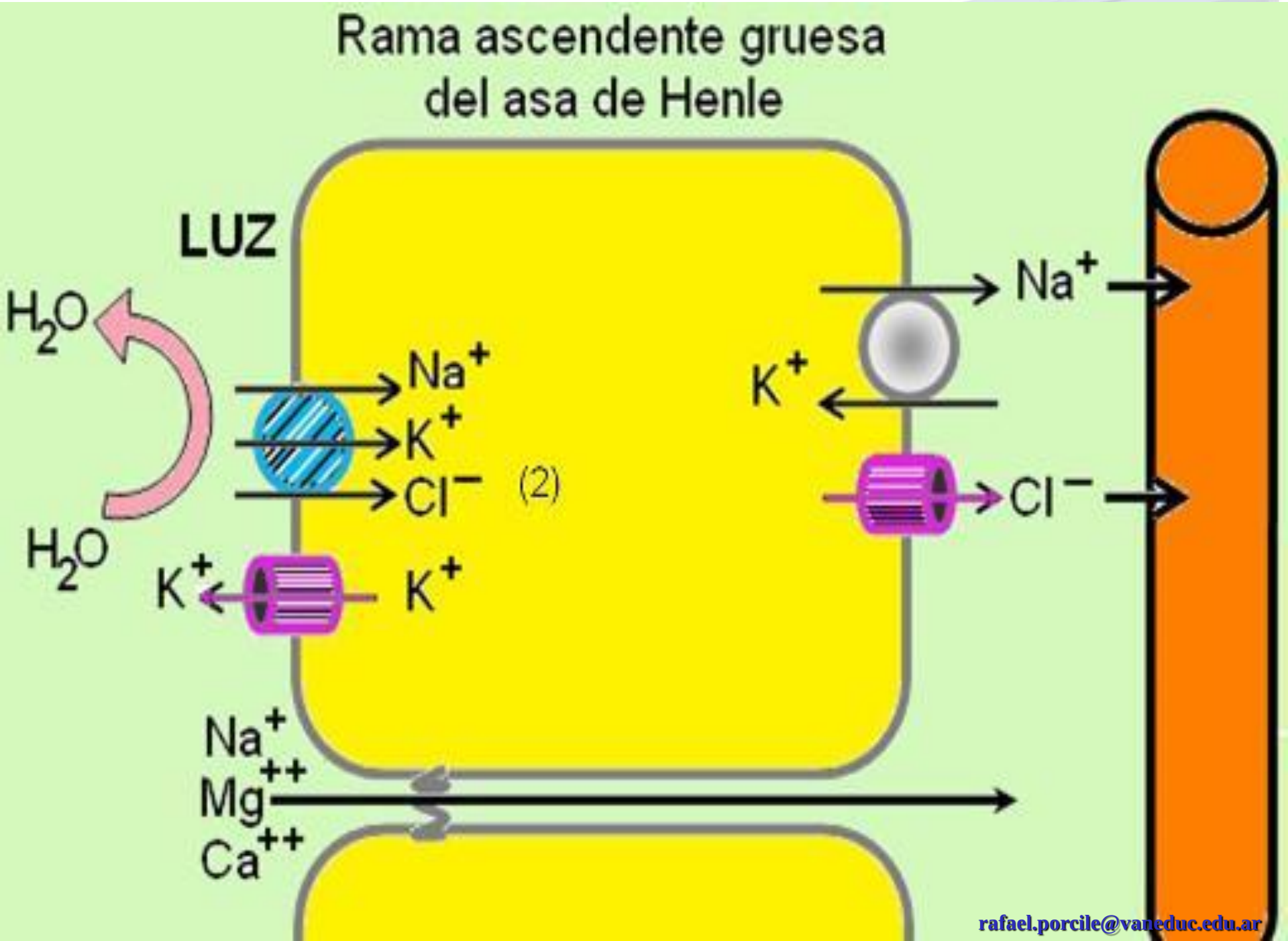

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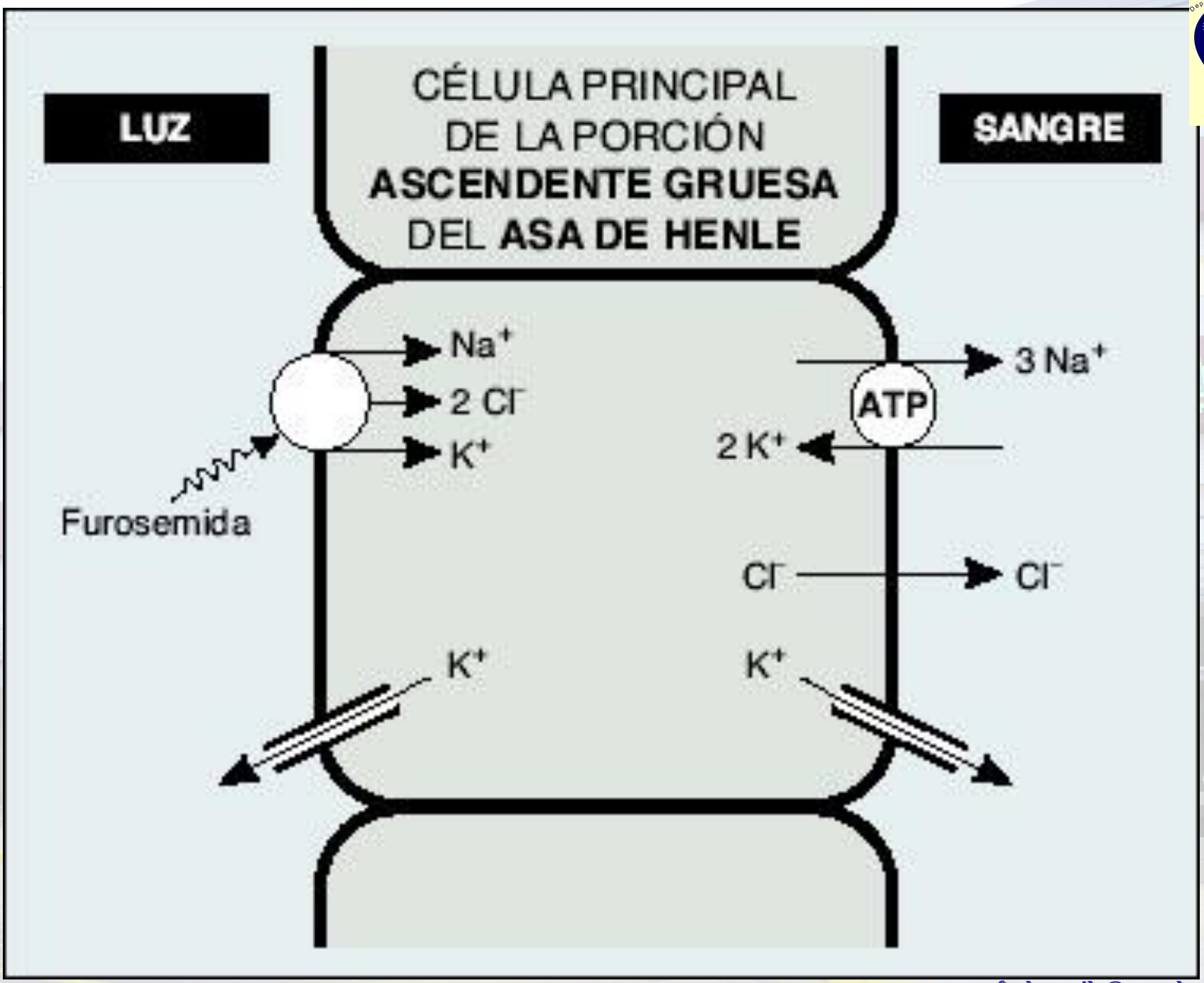

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Departamento de Cardiología
U A I
Hospital Universitario

LOOP DIURETICS

- Additional non-tubular effects
    1. Renal Vasodilation and redistribution of blood flow
    2. Increase in renin release
    3. Increase in venous capacitance

These effects mediated by release of prostaglandins from the kidney.

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Vuelca contenido hipertónico al TCD

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Vuelca contenido hipertónico al TCD

Aumenta la excresión de sodio cloro , potasio , magnesio y calcio

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Vuelca contenido hipertónico al TCD

Aumenta la excresión de sodio cloro , potasio , magnesio y calcio

Alcalosis hipocloremica

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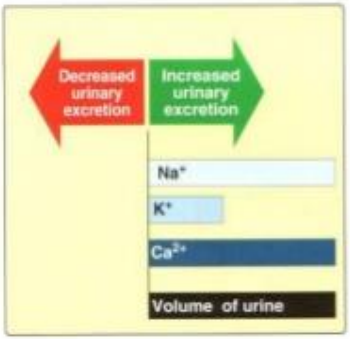
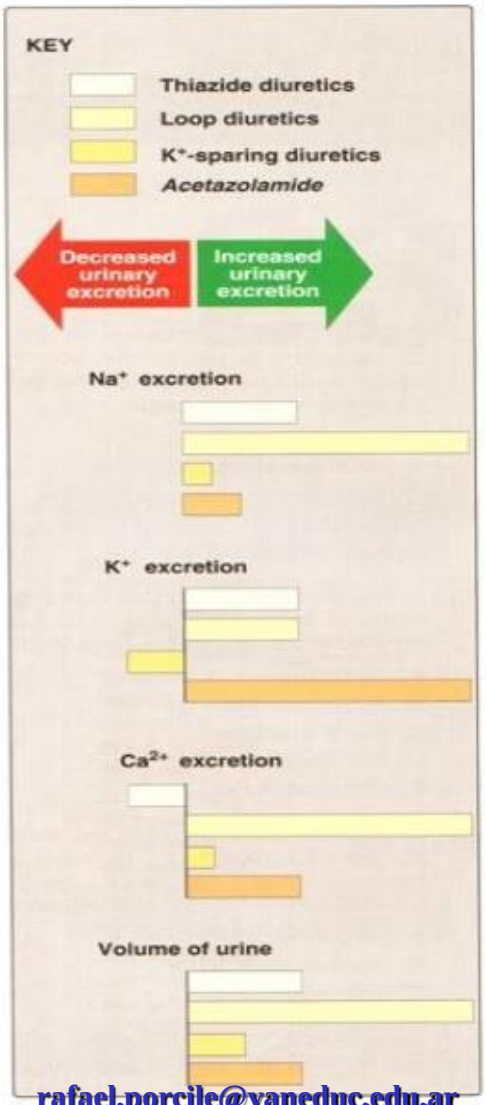
Furosemida, bumetanida: Usos

- Edema pulmonar agudo (por insuficiencia cardiaca congestiva)
- Síndrome nefrótico
- Edema refractario (resistente a otros fármacos), en combinación con tiazidas o ahorradores de K+
- Tratamiento de hipercalcemia
- Deportes, espectáculos, control de peso (uso autorizado?)

Efecto de los diuréticos del asa en la composición urinaria





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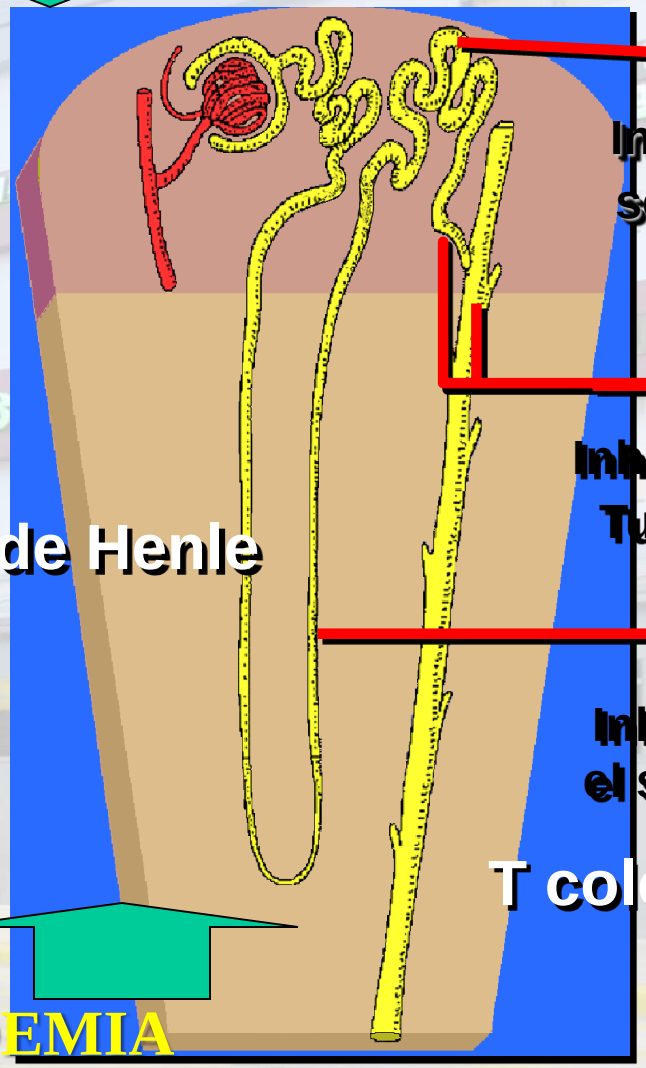
ISQUEMIA



Cortex

Asa de Henle

Medula

T colectores

ACIDEMIA
HIPONATREMIA

Tiazidas

Inhiben la reabsorción de Cl y Na segmento de dilucion cortical de Asa de Henle

Ahorradores de K

Inhiben la reabsorción de k en los Tubulos contorneados distales

Diureticos de asa

Inhiben el intercambio Na –Cl-K en el segmento delgado ascendente del asa

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5 minutos …

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Túbulo contorneado distal

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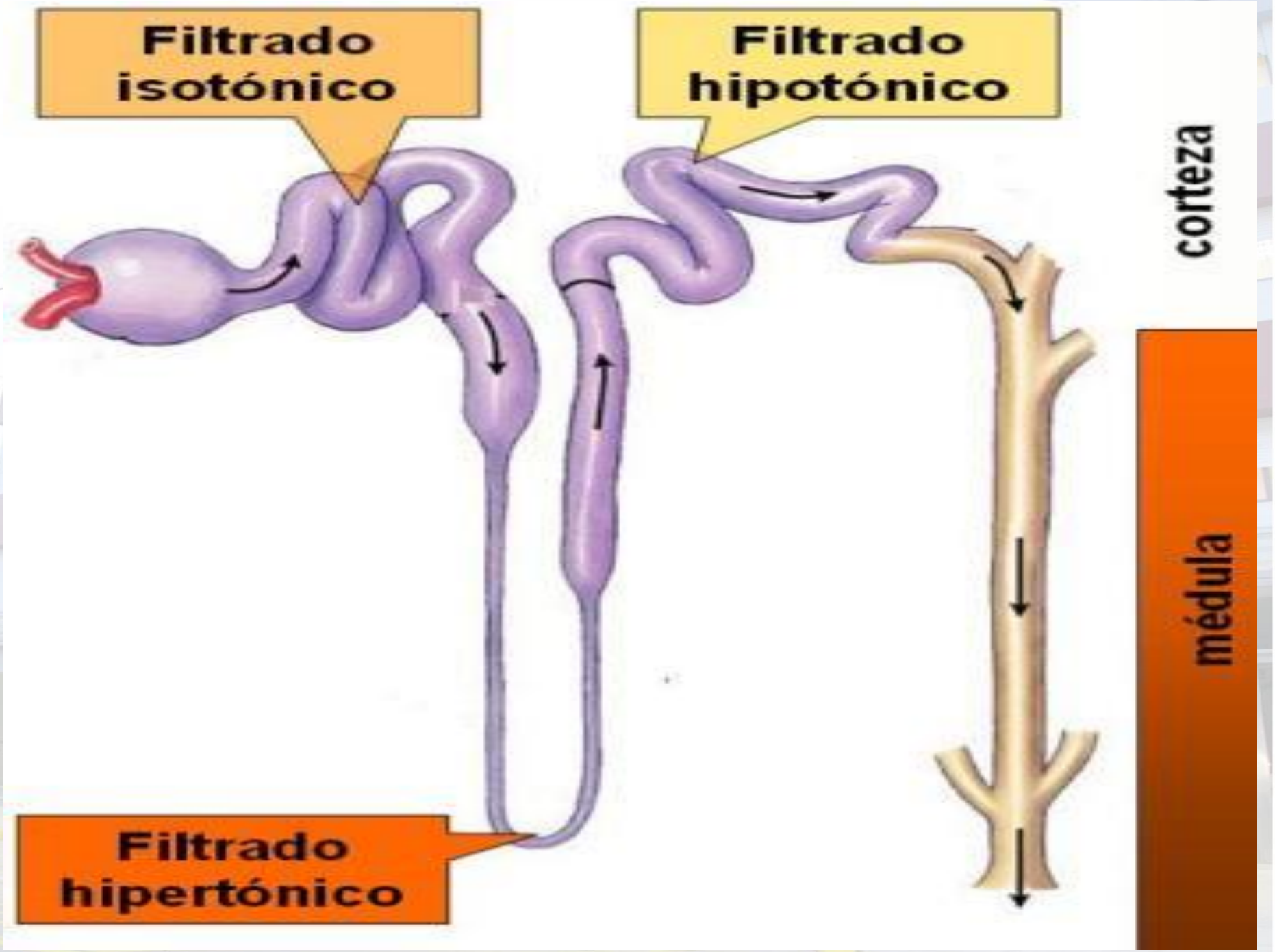

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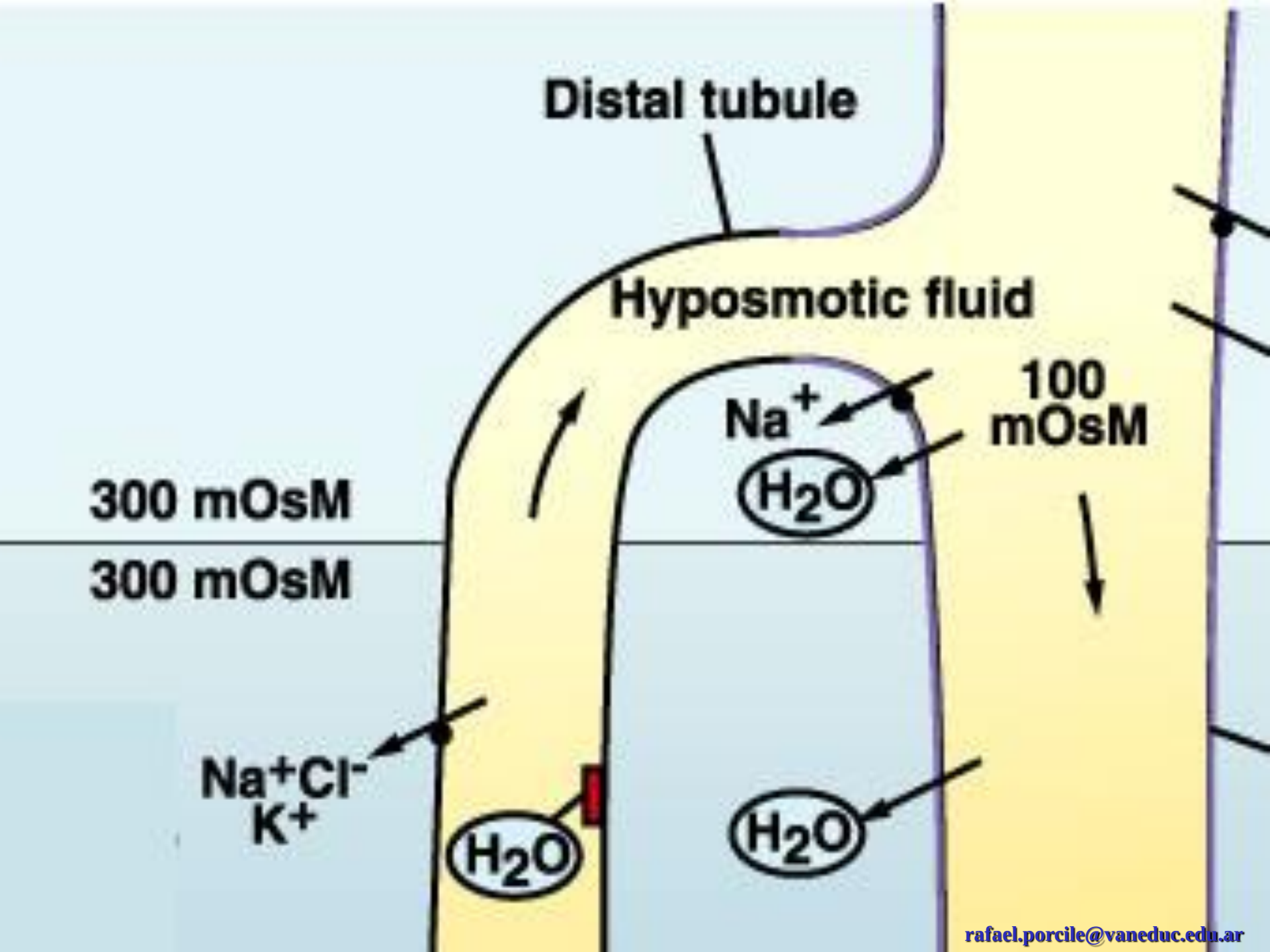

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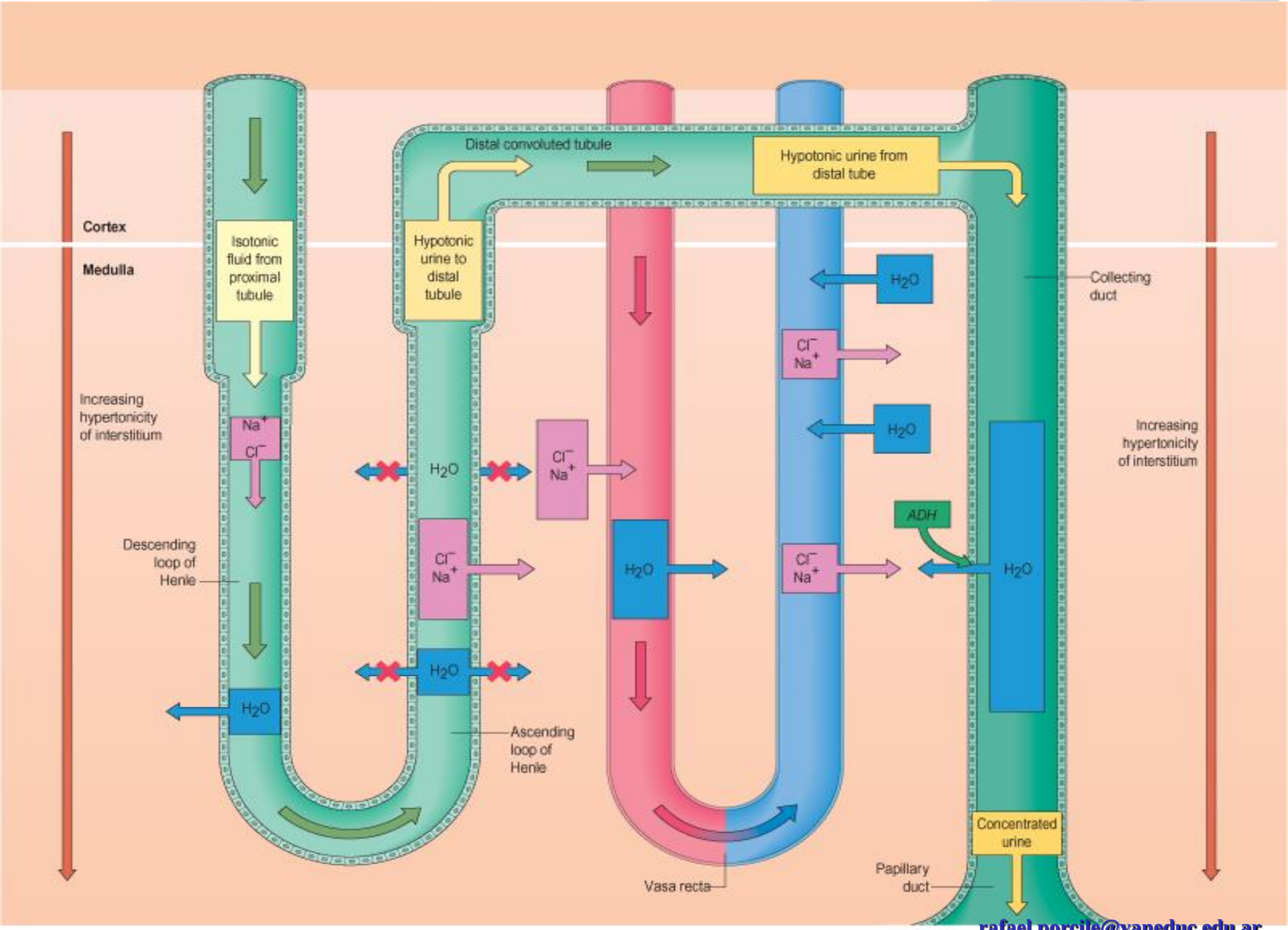


PROXIMAL CONVOLUTED TUBULE

Reabsorption (into blood) of filtered:

Water	65% (osmosis)
Na^+	65% (sodium-potassium pumps, symporters, antiporters)
K^+	65% (diffusion)
Glucose	100% (symporters and facilitated diffusion)
Amino acids	100% (symporters and facilitated diffusion)
Cl^-	50% (diffusion)
HCO_3^-	80–90% (facilitated diffusion)
Urea	50% (diffusion)
Ca^{2+}, Mg^{2+}	variable (diffusion)

Secretion (into urine) of:

H^+	variable (antiporters)
NH_4^+	variable, increases in acidosis (antiporters)
Urea	variable (diffusion)
Creatinine	small amount

At end of PCT, tubular fluid is still isotonic to blood (300 mOsm/liter).

LOOP OF HENLE

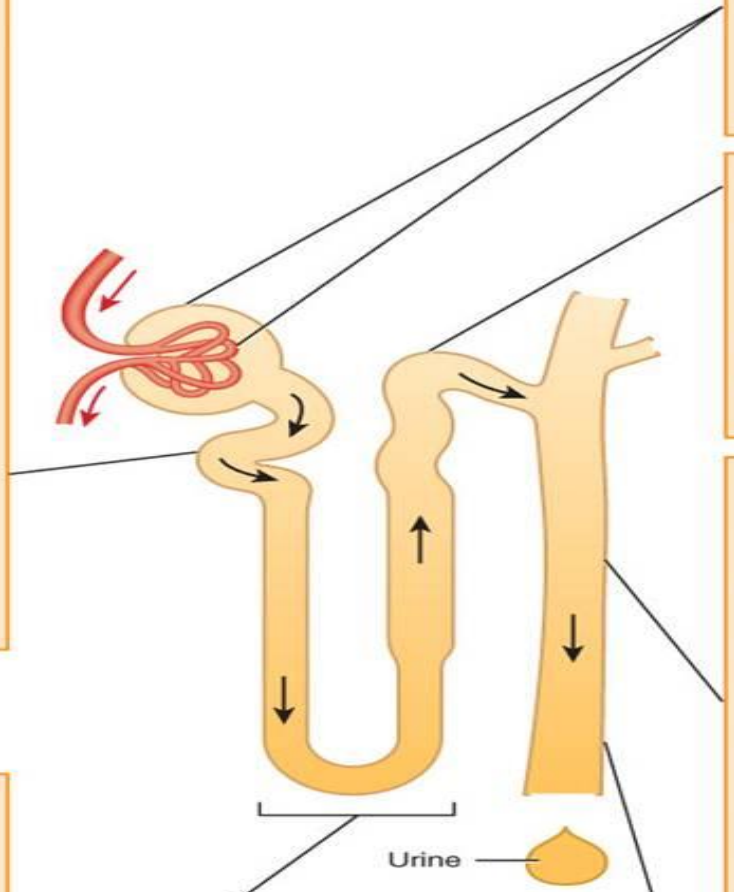
Reabsorption (into blood) of:

Water	15% (osmosis in descending limb)
Na^+	20–30% (symporters in ascending limb)
K^+	20–30% (symporters in ascending limb)
Cl^-	35% (symporters in ascending limb)
HCO_3^-	10–20% (facilitated diffusion)
Ca^{2+}, Mg^{2+}	variable (diffusion)

Secretion (into urine) of:

Urea	variable (recycling from collecting duct)

At end of loop of Henle, tubular fluid is hypotonic (100–150 mOsm/liter).



RENAL CORPUSCLE

Glomerular filtration rate: 105–125 mL/min of fluid that is isotonic to blood

Filtered substances: water and all solutes present in blood (except proteins) including ions, glucose, amino acids, creatinine, uric acid

DISTAL CONVOLUTED TUBULE

Reabsorption (into blood) of:

Water	10–15% (osmosis)
Na^+	5% (symporters)
Cl^-	5% (symporters)
Ca^{2+}	variable (stimulated by parathyroid hormone)

PRINCIPAL CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

Water	5–9% (insertion of water channels stimulated by ADH)
Na^+	1–4% (sodium-potassium pumps)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

K^+	variable amount to adjust for dietary intake (leakage channels)

Tubular fluid leaving the collecting duct is dilute when ADH level is low and concentrated when ADH level is high.

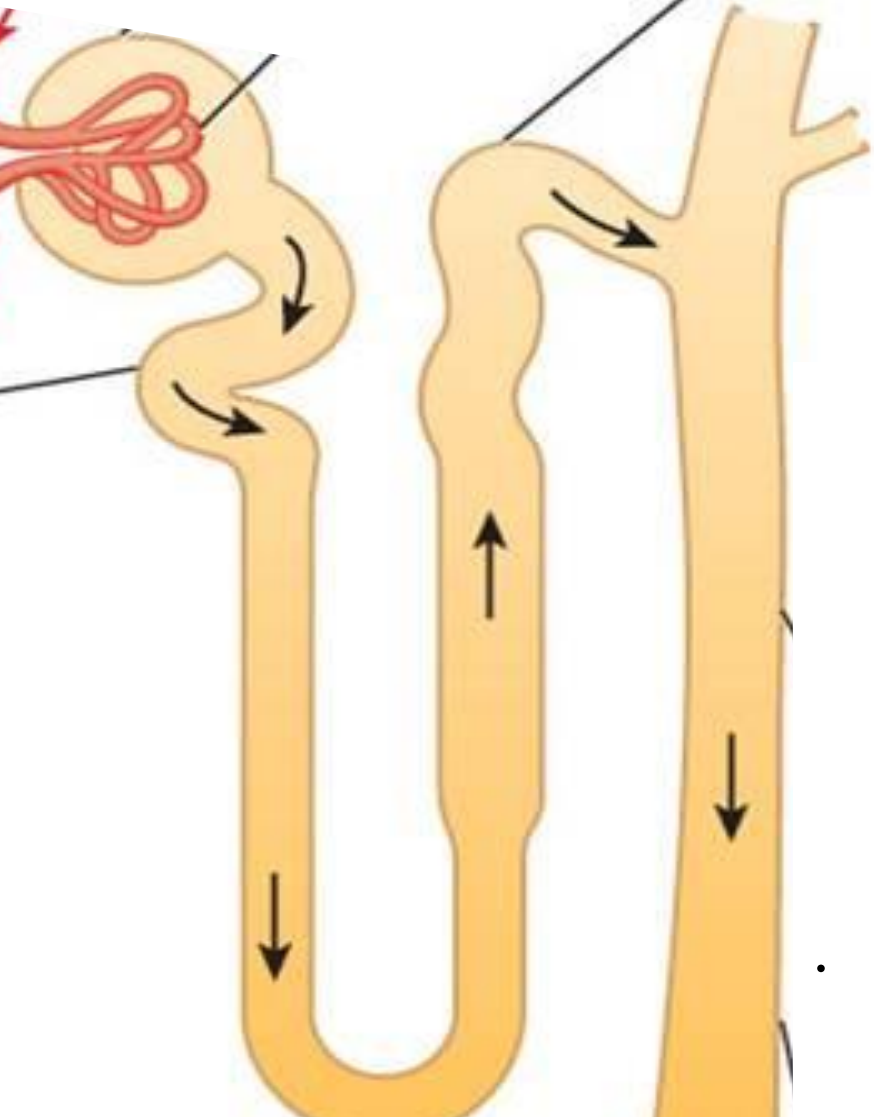
INTERCALATED CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

HCO_3^- (new)	varible amount, depends on H^+ secretion (antiporters)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

H^+	variable amounts to maintain acid-base homeostasis (H^+ pumps)



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Na^+	5% (symporters)
Cl^-	5% (symporters)
Ca^{2+}	variable (stimulated by parathyroid hormone)

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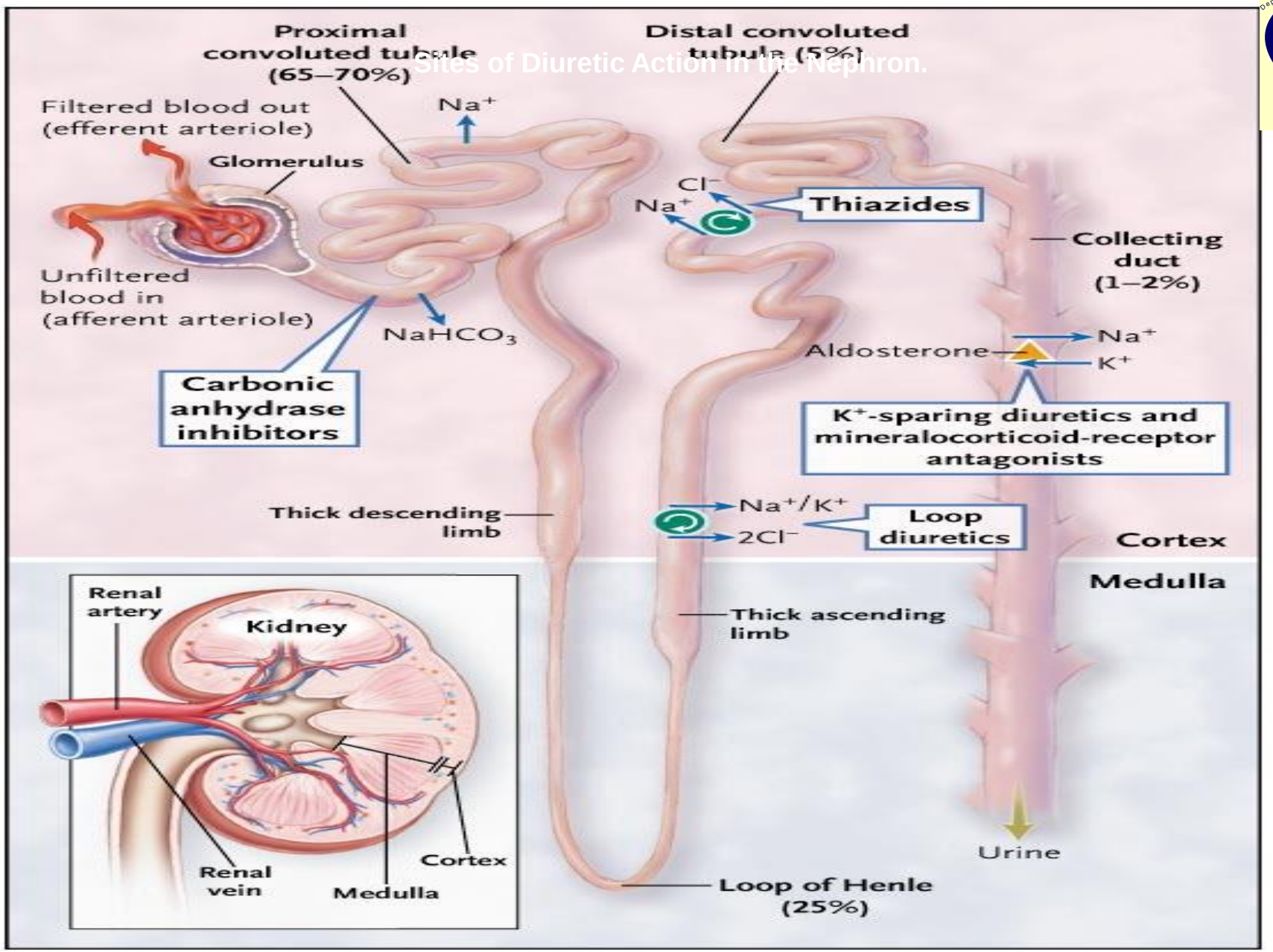

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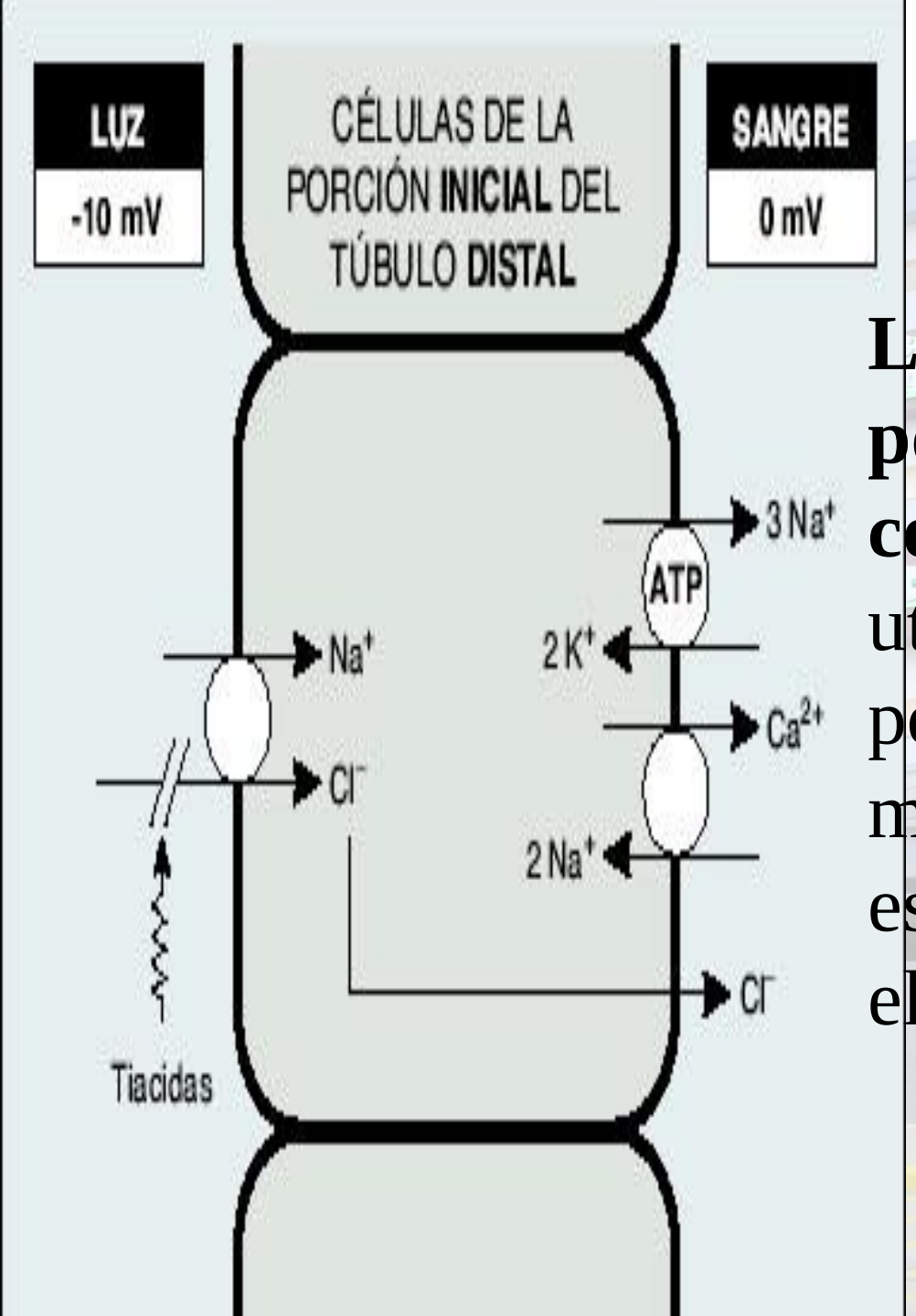

La membrana luminal posee también un cotransportador Cl–-K+. utiliza la energía originada por la bomba de Na+ de la membrana basolateral, que es la que crea el gradiente electroquímico para el Na

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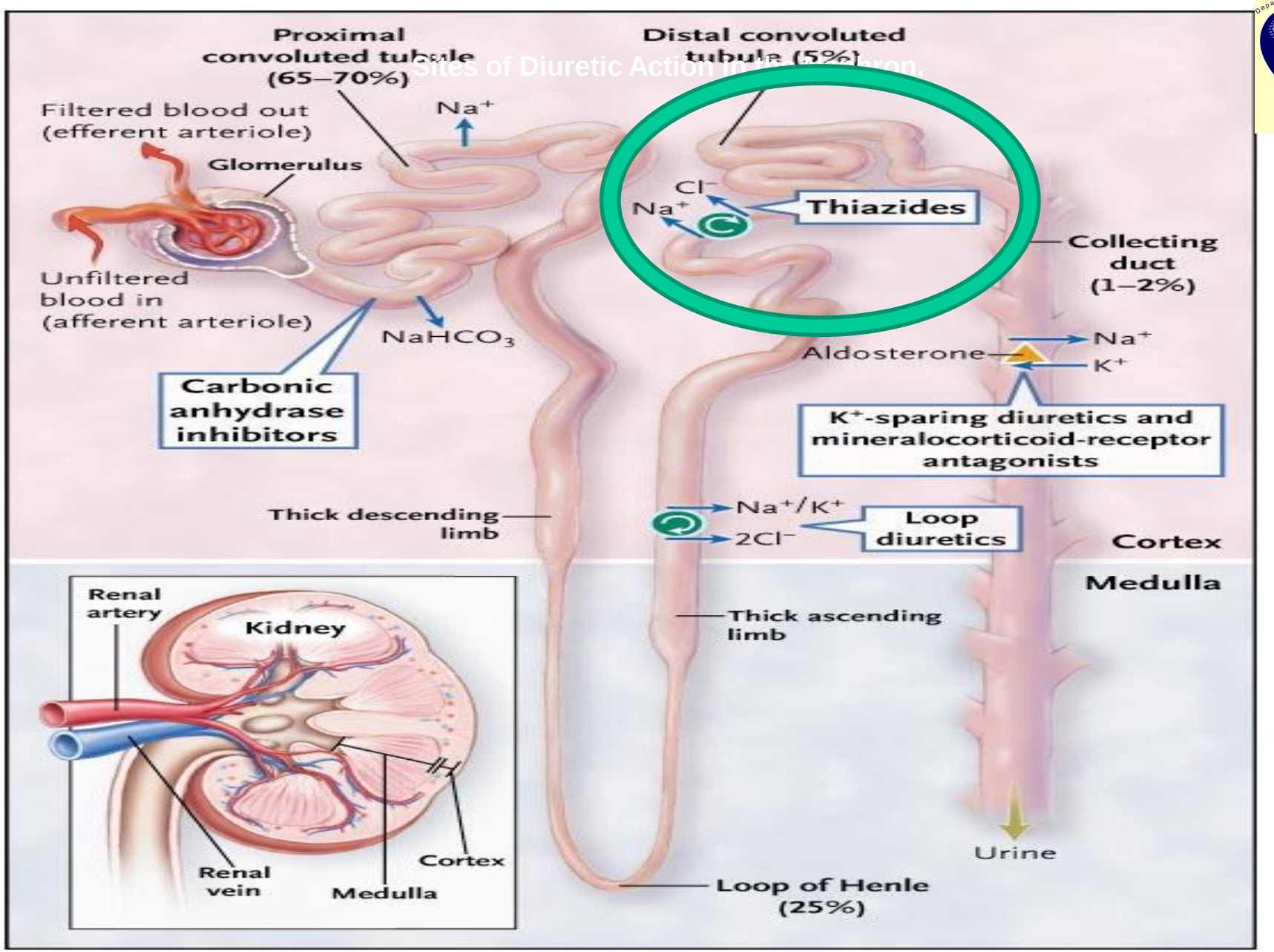

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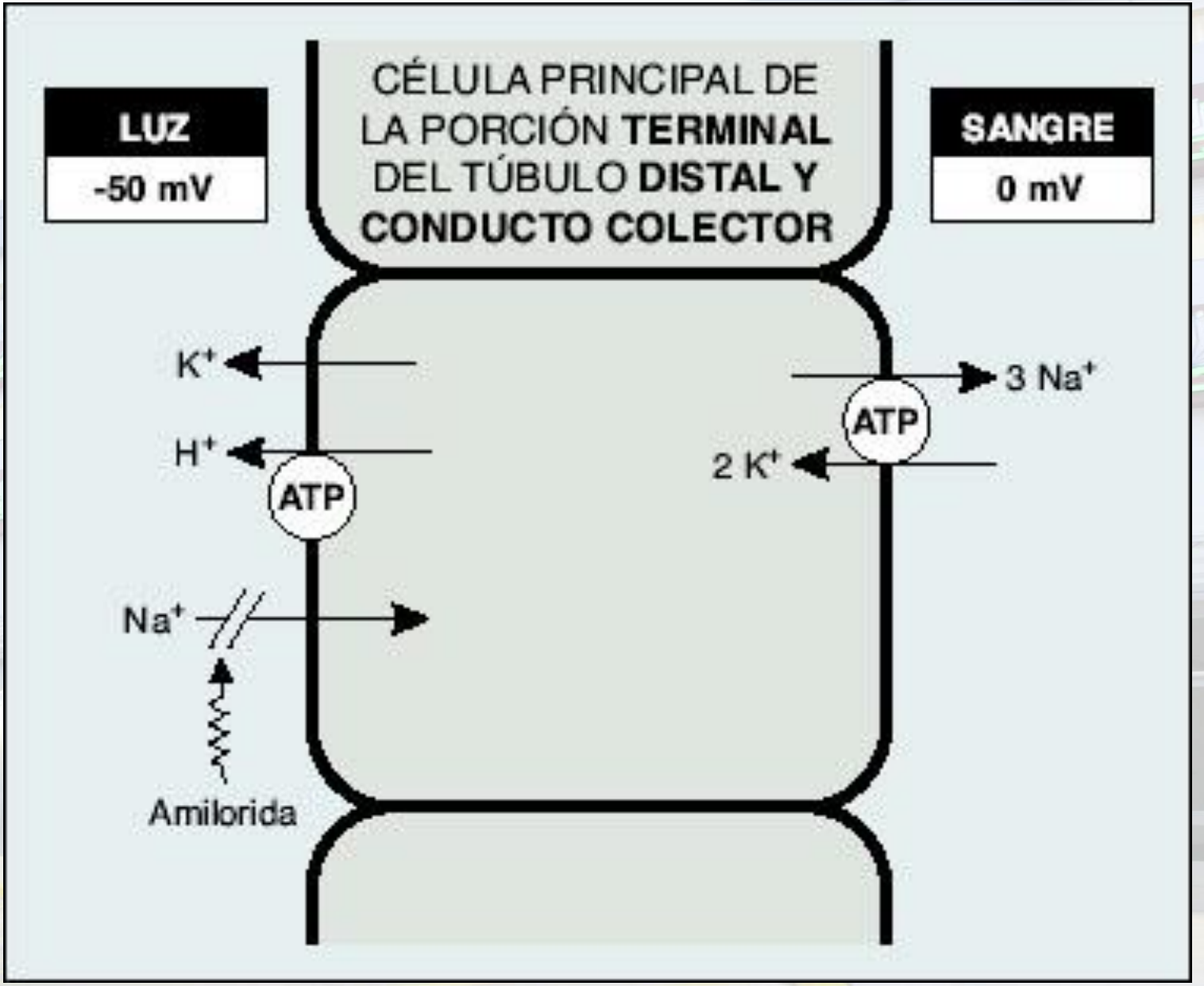

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ELIMINACION DE ACIDOS ORGANICOS Y ACIDIFICACION DE LA ORINA

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Anión Gap

- El anión restante se basa en el concepto de que: los aniones con cargas negativas y los cationes con cargas positivas del suero deben ser iguales en magnitud para mantener la neutralidad eléctrica.

La diferencia entre los aniones y cationes medidos y no medidos es el anión restante.

- Cuyo valor normal es de 12 +/- 2,
- Y es igual a: [Na+] - [Cl- + CO3H-]
- o de 14 +/- 2 si se utiliza [Na+ + K+] - [Cl- + CO3H-].

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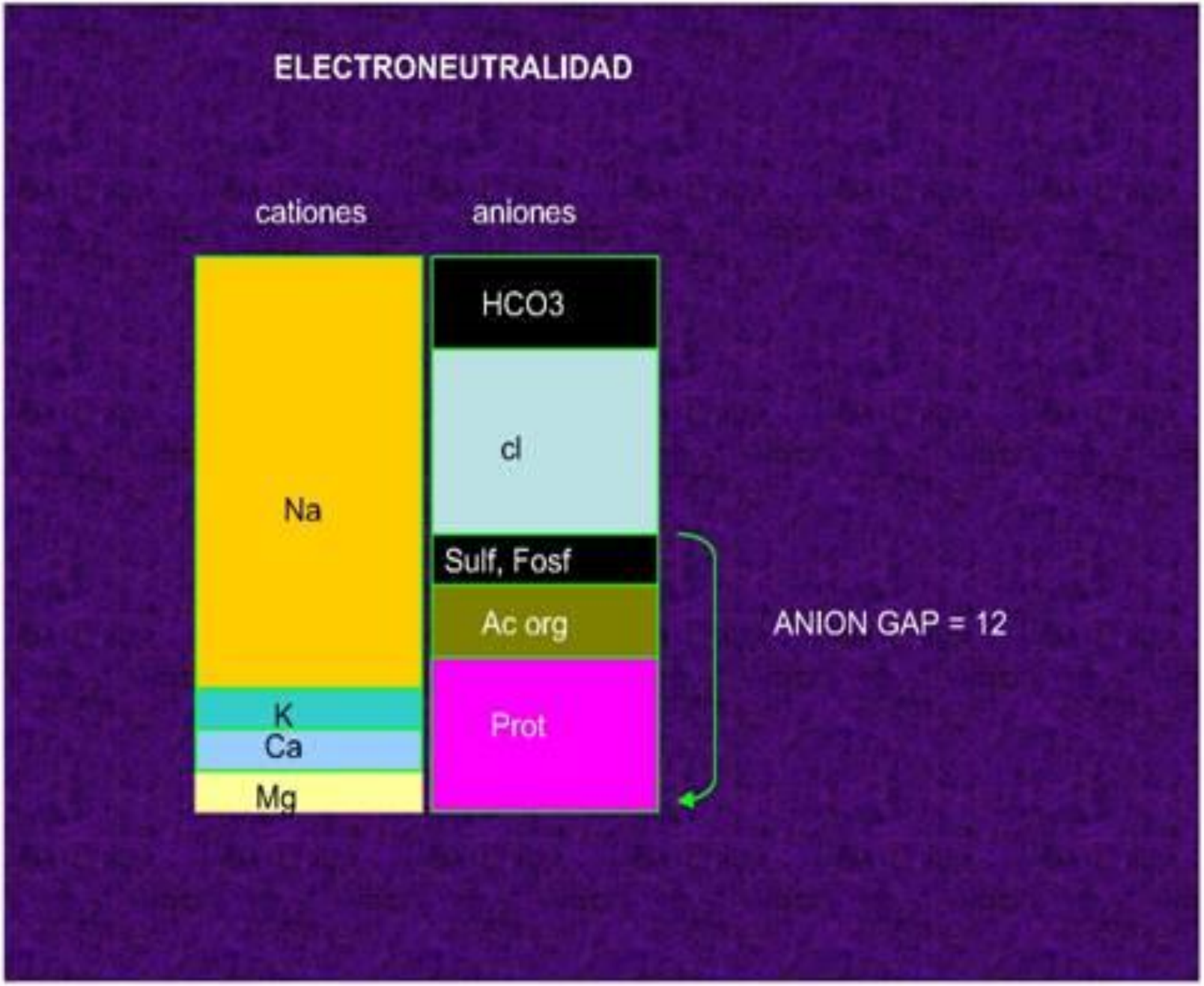

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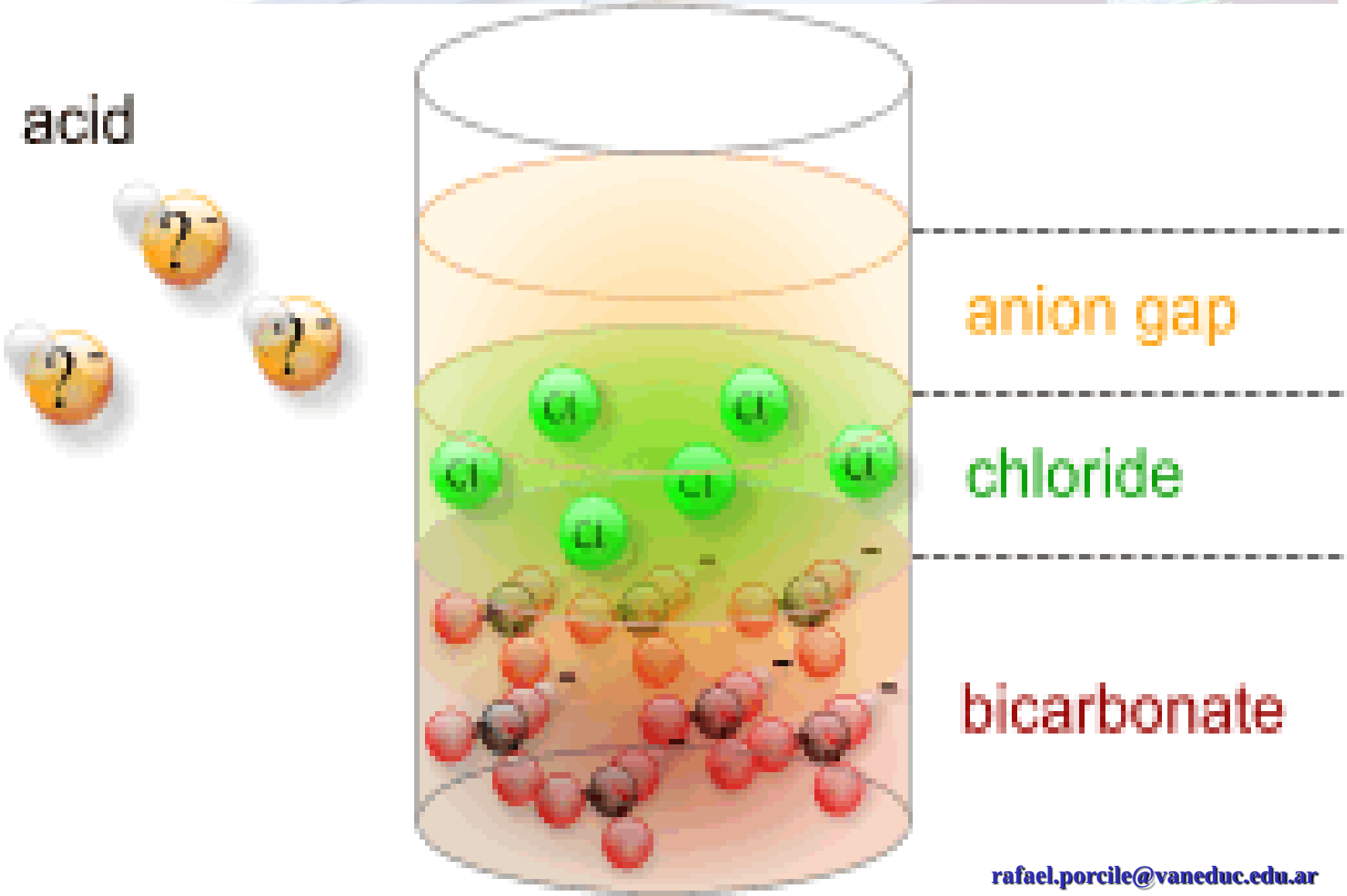

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Eliminación de substancias nitrogenadas

Amoniaco

Cloruro de amonio

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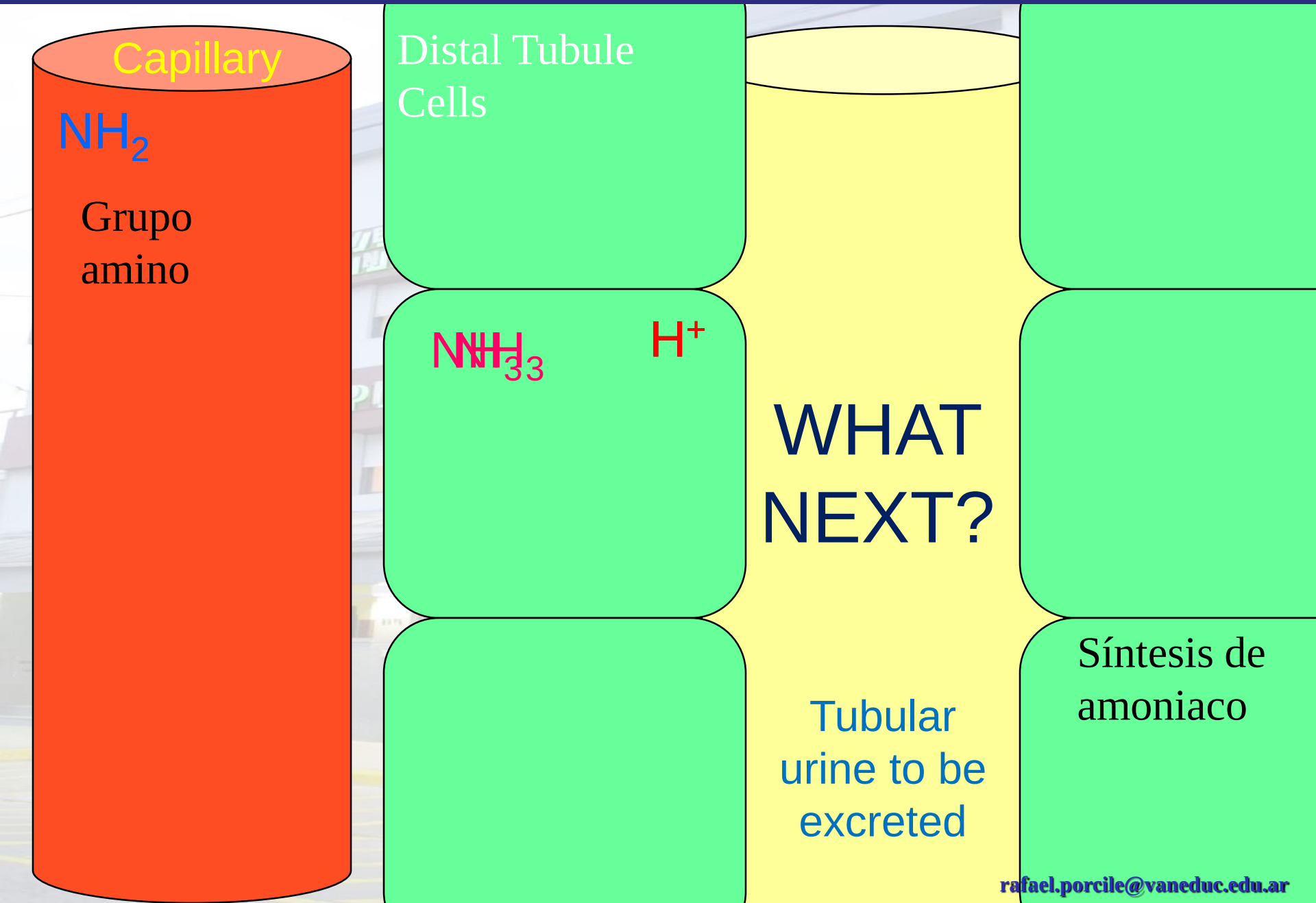

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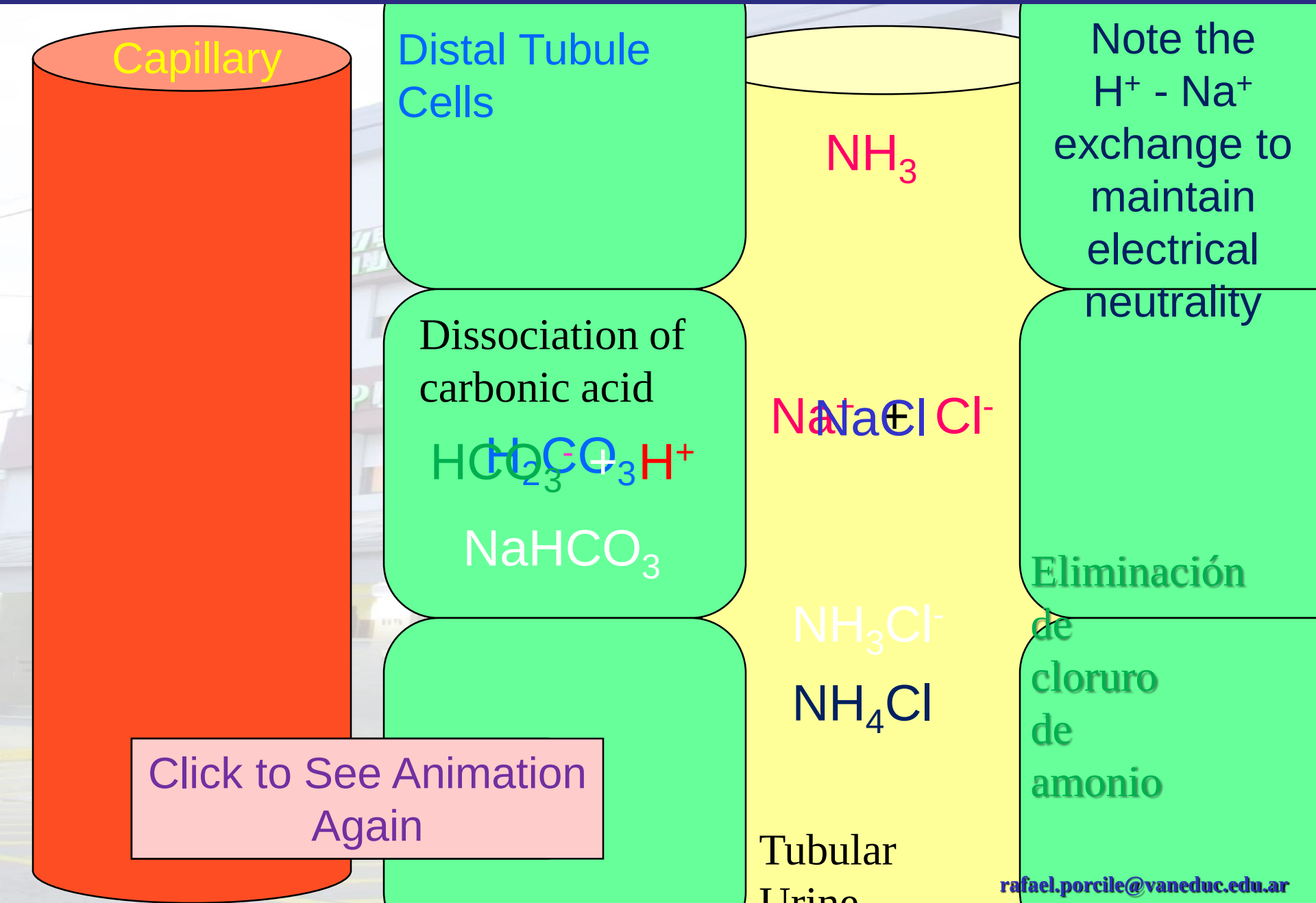

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DIURÉTICOS TIAZÍDICOS

De acción corta: clorotiazida, hidroclorotiazida

De acción intermedia: indapamida

De accion prolongada: clortalidona (adm cada 2 o 3 días)

- Potencia diurética: moderada.”de bajo techo”: facilita la
excreción de un 5-10% del sodio filtrado (frente a una cifra
normal de 1%)

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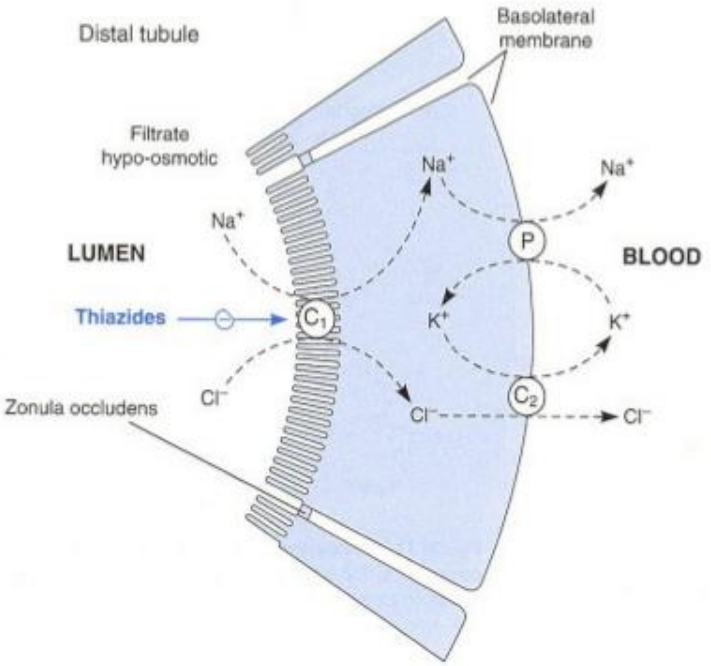
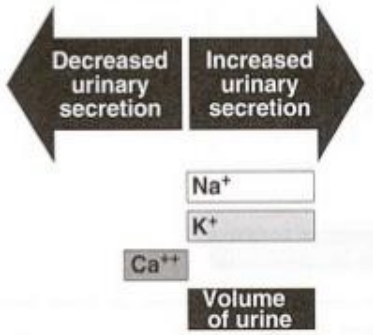
Tiazidas: *Hidroclorotiazida,clortalidona*

- Inhiben al cotransportador Na^+/Cl^- del túbulo c. distal
  - ↓ reabsorción de Na^+
  - ↑ excreción de Na^+ y Cl^-
  - Pérdida de K^+
- Excreción de orina hiperosmolar
- ↓ volumen sanguíneo





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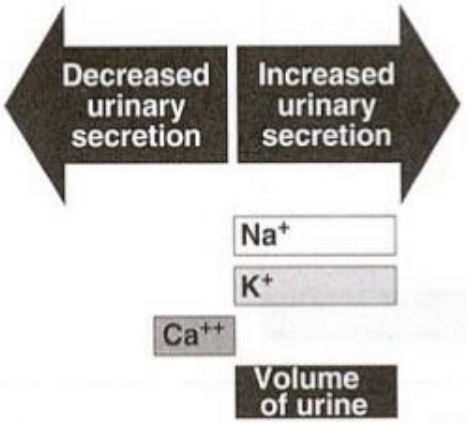
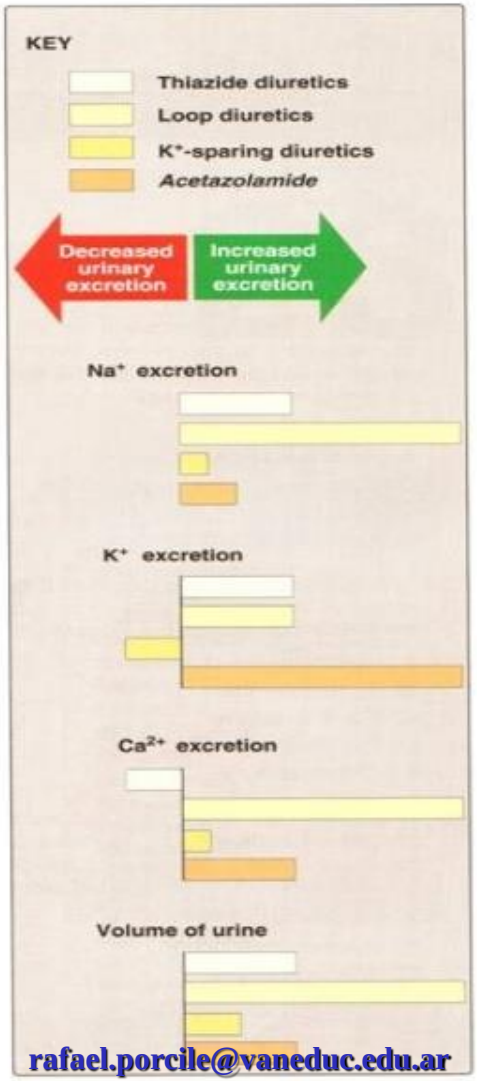
Tiazidas: Usos

1. Hipertensión.
2. Enfermedad cardiaca congestiva.
3. Síndrome nefrótico con edema.

Efecto de las tiazidas en la composición urinaria





Excreción de orina hiperosmolar

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5 minutos …

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El tubo colector

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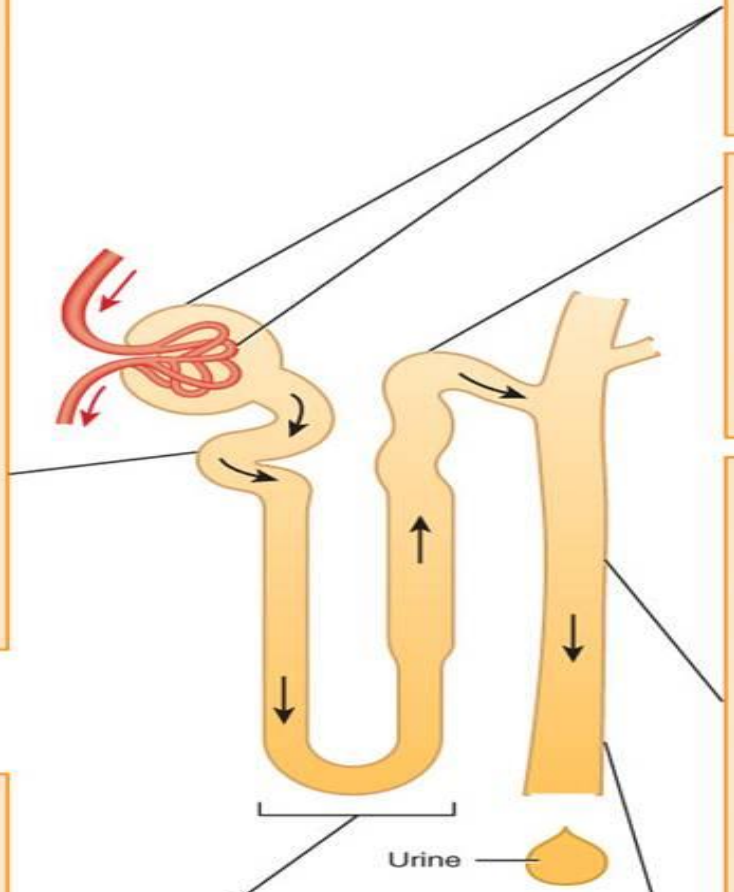

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Tubular fluid leaving the collecting duct is dilute when ADH level is low and concentrated when ADH level is high.

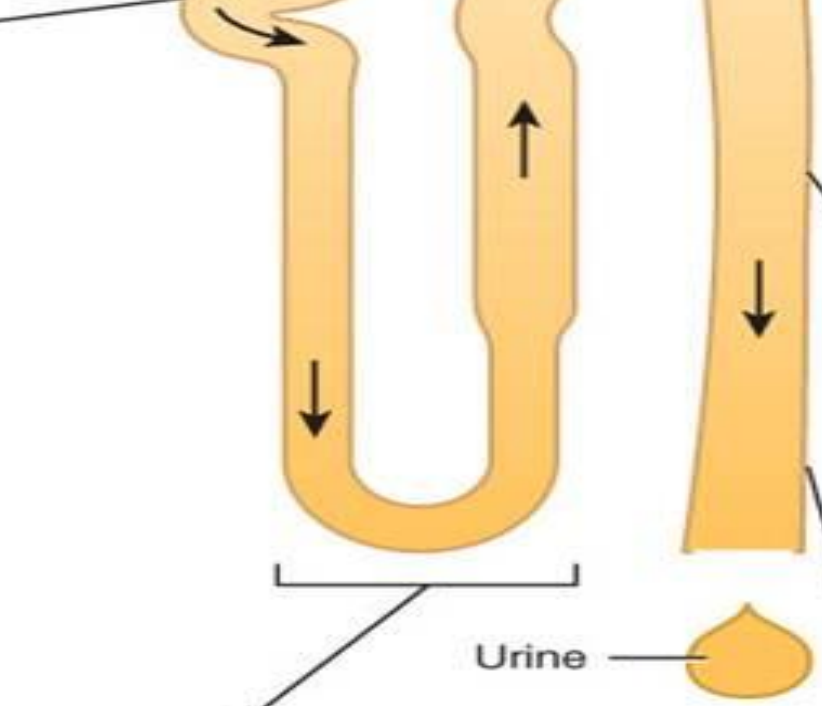
INTERCALATED CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

HCO_3^- (new)	varible amount, depends on H^+ secretion (antiporters)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

H^+	variable amounts to maintain acid-base homeostasis (H^+ pumps)



PRINCIPAL CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

Water	5–9% (insertion of water channels stimulated by ADH)
Na^+	1–4% (sodium-potassium pumps)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

K^+	variable amount to adjust for dietary intake (leakage channels)

Tubular fluid leaving the collecting duct is dilute when ADH level is low and concentrated when ADH level is high.

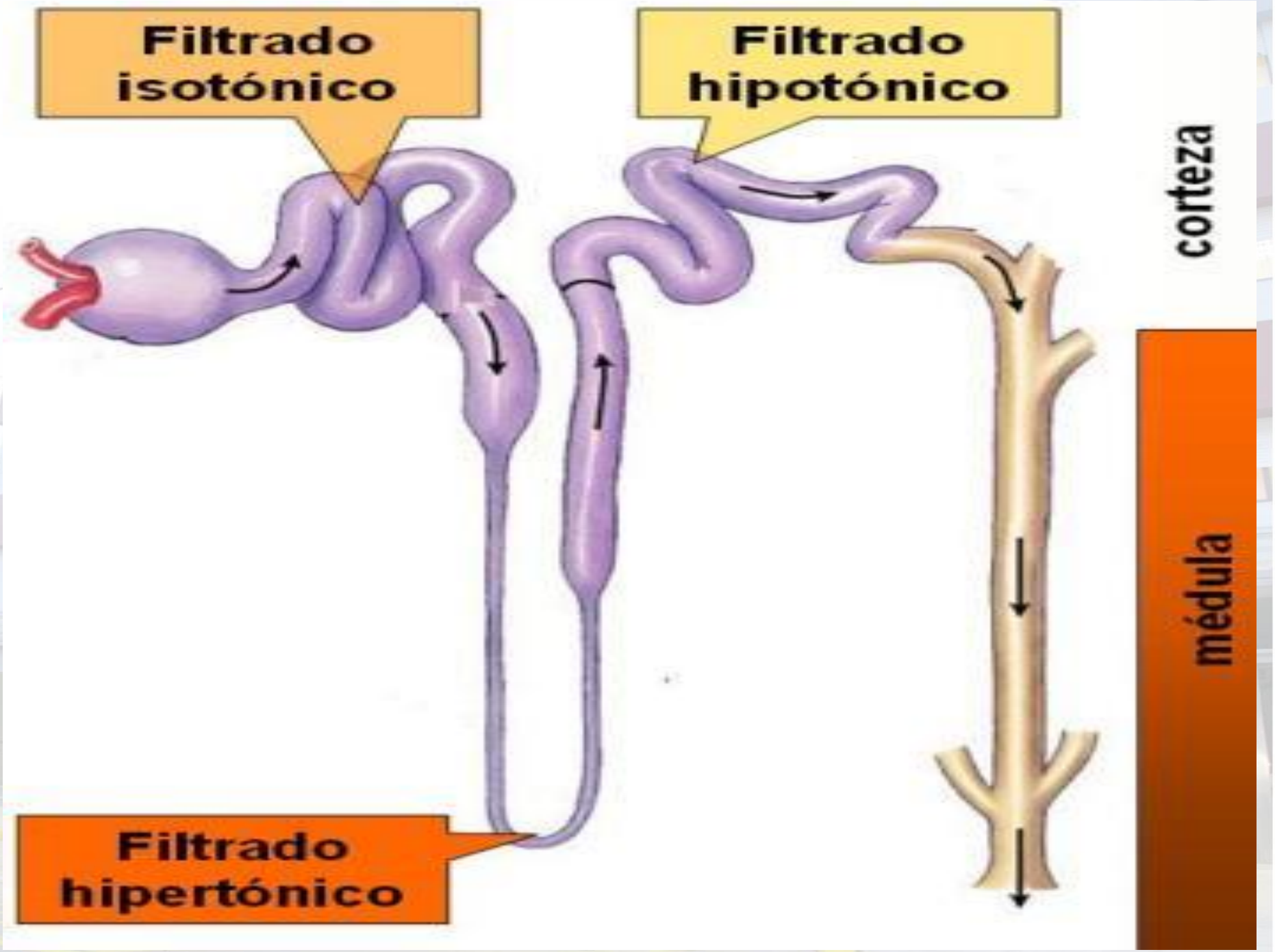
INTERCALATED CELLS IN LATE DISTAL TUBULE AND COLLECTING DUCT

Reabsorption (into blood) of:

HCO_3^- (new)	varible amount, depends on H^+ secretion (antiporters)
Urea	variable (recycling to loop of Henle)

Secretion (into urine) of:

H^+	variable amounts to maintain acid-base homeostasis (H^+ pumps)



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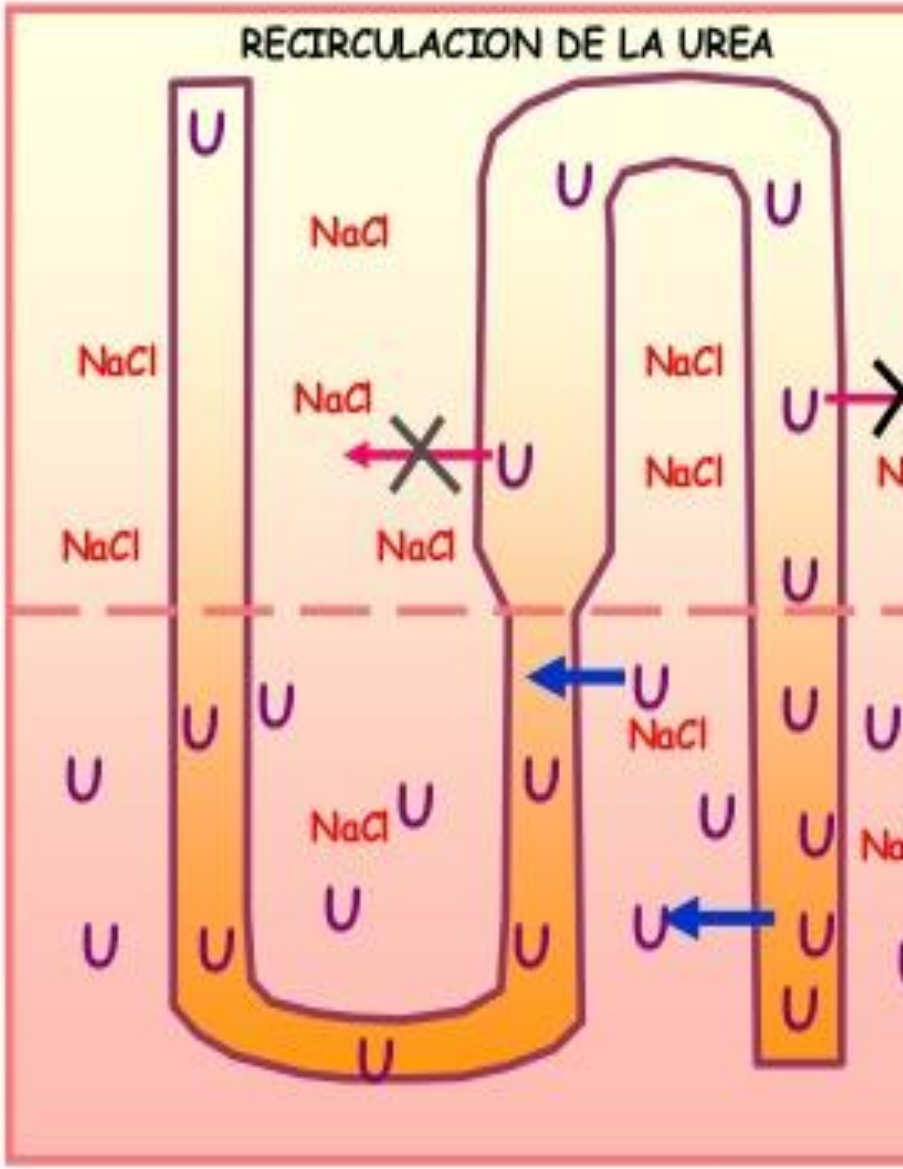
- T.P reabsorbe 40-60% la Urea
- Aumento de [Urea] en Seg. Descendente por salida de agua
- Segmento ascendente: [Urea] aumenta por reingresodelgado del asa, debido al reingreso de urea (secreción de urea)
- [Urea] aumenta en el T.Colector con la salida de agua dirigida por la ADH
- En la médula renal interna, la urea difunde al intersticio siguiendo su gradiente de concentración hacia los vasos rectos y otra parte reingresa al asa de Henle.



El reciclaje de urea en la médula interna contribuye en un 50 % a la osmolaridad del intersticio en esta zona, el resto se debe al NaCl.

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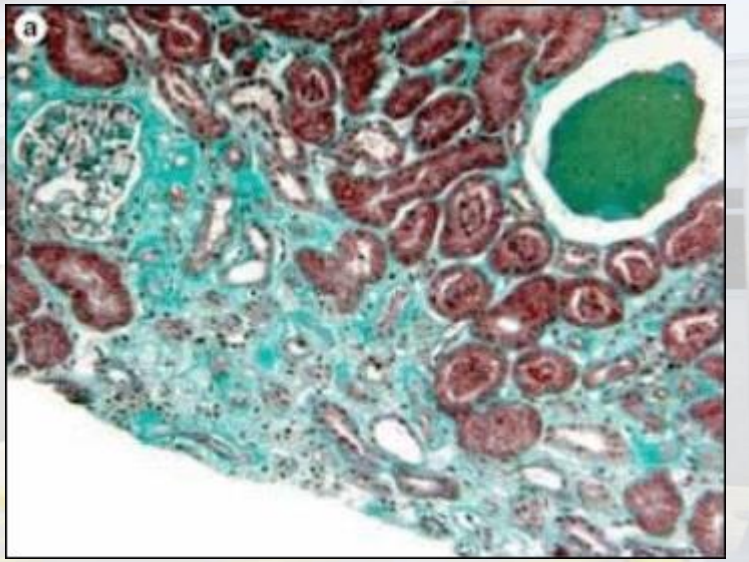
ES UN EFECTOR NEFROENDOCRINO



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Hormonas que regulan la Reabsorción Tubular

HORMONA	SITIO DE ACCIÓN	EFECTOS
Aldosterona	Túbulo distal Túbulo colector	↑ reabsorción NaCl, ↑ reabsorción de H_2O ↑ secreción de K^+
Angiotensina II	Túbulo proximal Porción gruesa ascendente del asa de Henle Túbulo distal Túbulo colector	↑ NaCl ↑ reabsorción de H_2O ↑ secreción de H^+
Hormona Antidiurética	Última porción del Túbulo distal Túbulo y conducto colector	↑ Reabsorción de H_2O
Péptido Natriurético atrial	Túbulo distal Túbulo y conducto colector	↓ reabsorción de NaCl
Hormona Paratiroidea	Túbulo proximal Porción gruesa ascendente del asa de Henle Túbulo distal	↓ reabsorción de PO_4^- ↑ reabsorción de Ca^{2+}

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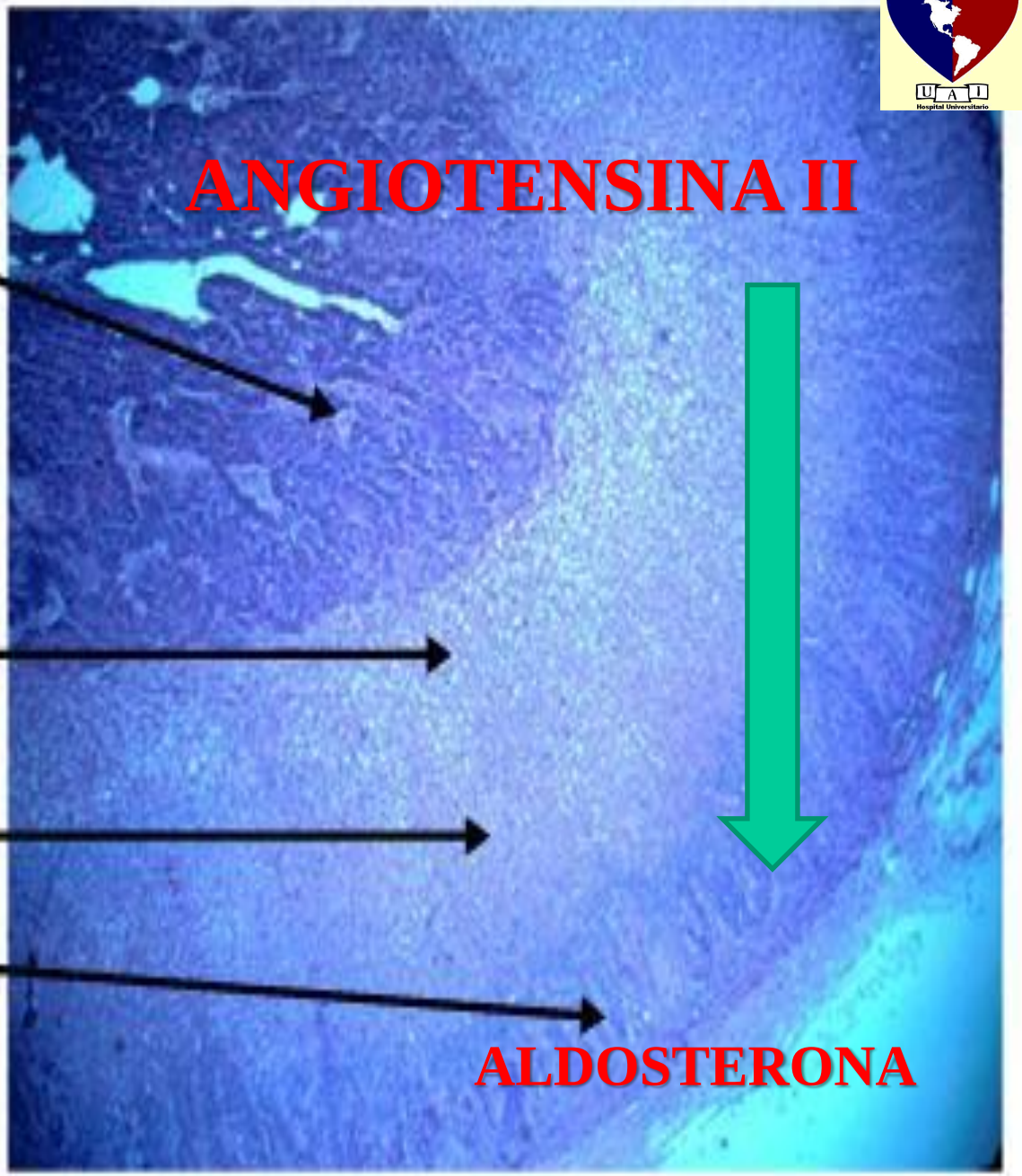
Médula adrenal -
. Noradrenalina
. Adrenalina

Corteza adrenal -
Zona reticular:
. *Esteroides sexuales*
Zona fasciculada:
. *Glucocorticoides*
Zona glomerulosa:
. *Mineralocorticoides*



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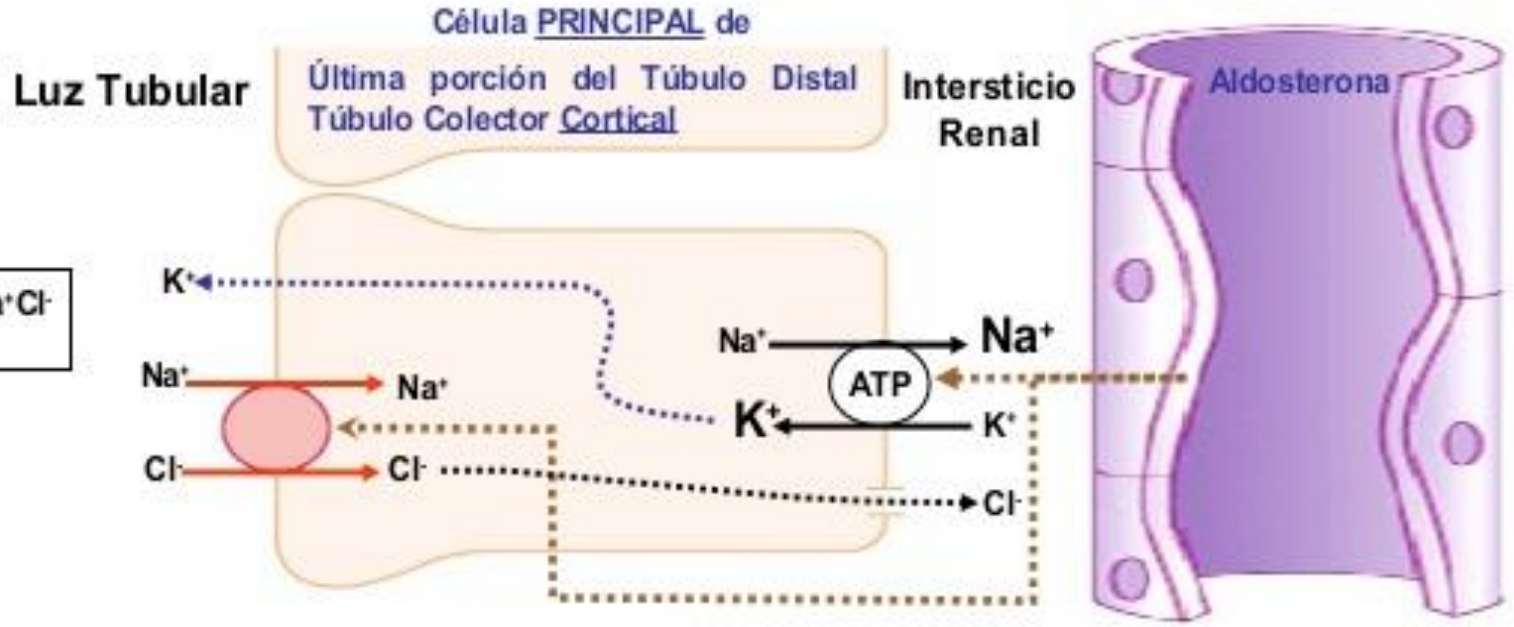
Acción de la Aldosterona



Si falta ALDOSTERONA → Enfermedad de Addison: Intensa pérdida de Na^+; Retención excesiva de K^+ plasmático

El exceso de ALDOSTERONA → Síndrome de Conn (Tumor de Suprarrenales): Retención de Na^+; Agotamiento de K^+ plasmático

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ALDOSTERONA

- Retencion Na^+
- Retencion H_2O

→ **Edema**

- Excrecion K^+
- Excrecion Mg^{2+}

→ **Arritmias**

- Deposito de colageno

→ **Fibrosis**

- miocardica
- vascular

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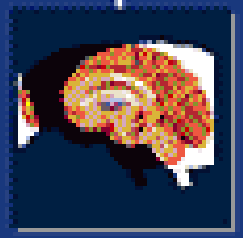
Cardiovascular Effects of Aldosterone

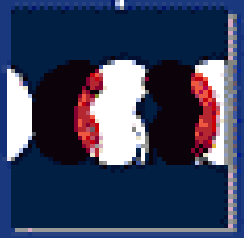
Aldosterone + Na^+

Oxidative Stress

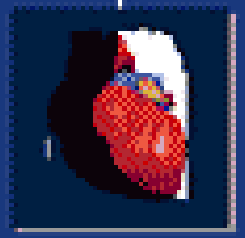
Blood vessels



Brain



Kidneys
(and other epithelial tissues)



Heart

Blood vessels	Brain	Kidneys (and other epithelial tissues)	Heart
Endothelial dysfunction Vascular inflammation Vascular remodeling Perivascular fibrosis	Vascular damage Baroreceptor dysfunction	Vascular inflammation Renal fibrosis	Ventricular hypertrophy Myocardial fibrosis Ventricular remodeling Sympathomimetic activation
Hypertension Atherosclerosis Ischemia Infarction	Hypertension Stroke	Hypertension Renal failure Heart failure	Heart failure Sudden death, MI

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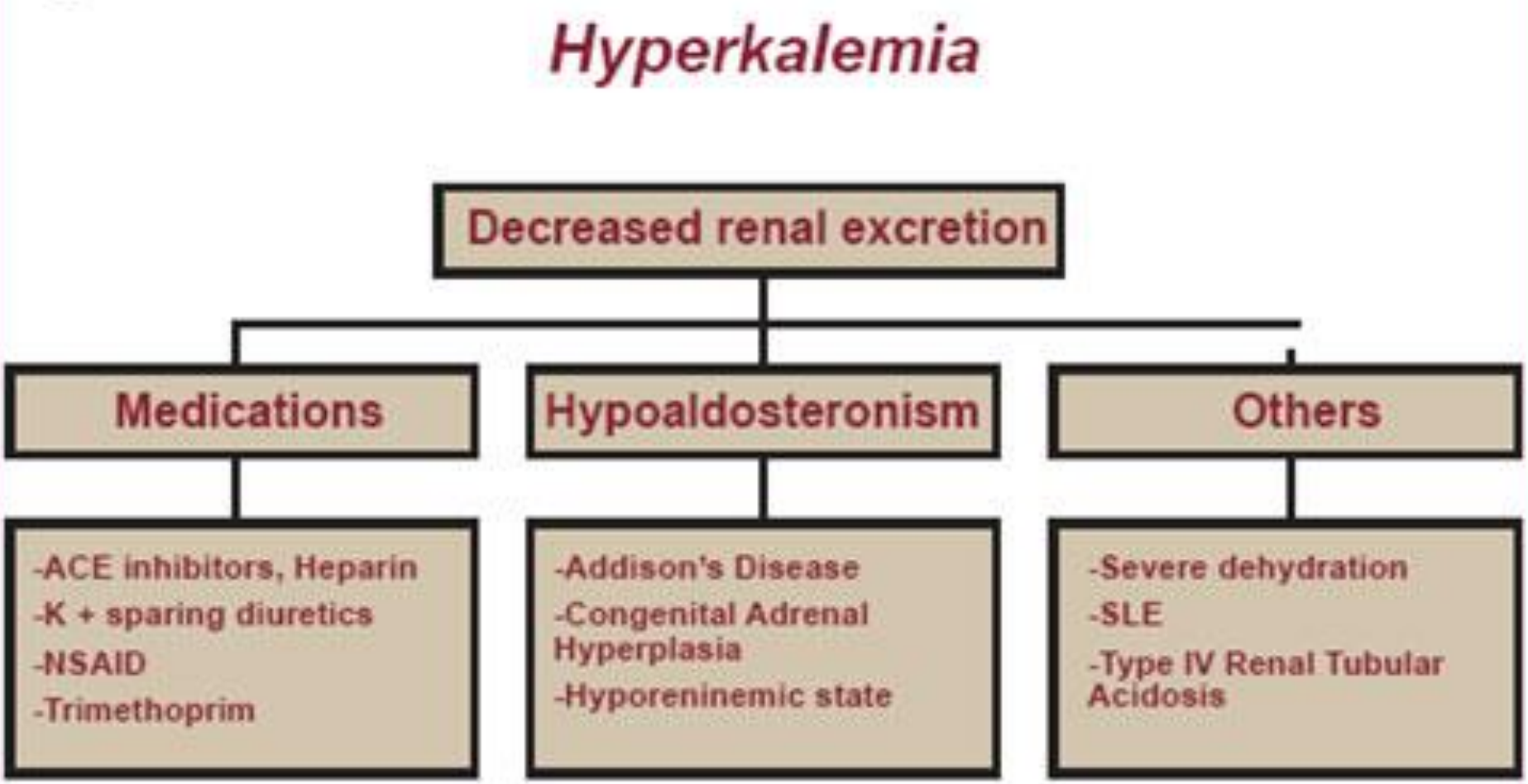
Figure 3.



-ACE inhibitors decrease aldosterone. NSAID's decrease prostaglandin production that leads to decreased arteriolar flow. It also suppresses renin and aldosterone secretion. Trimethoprim reduces the cellular electrical gradient.[2]

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HORMONA ANTIDIURETICA

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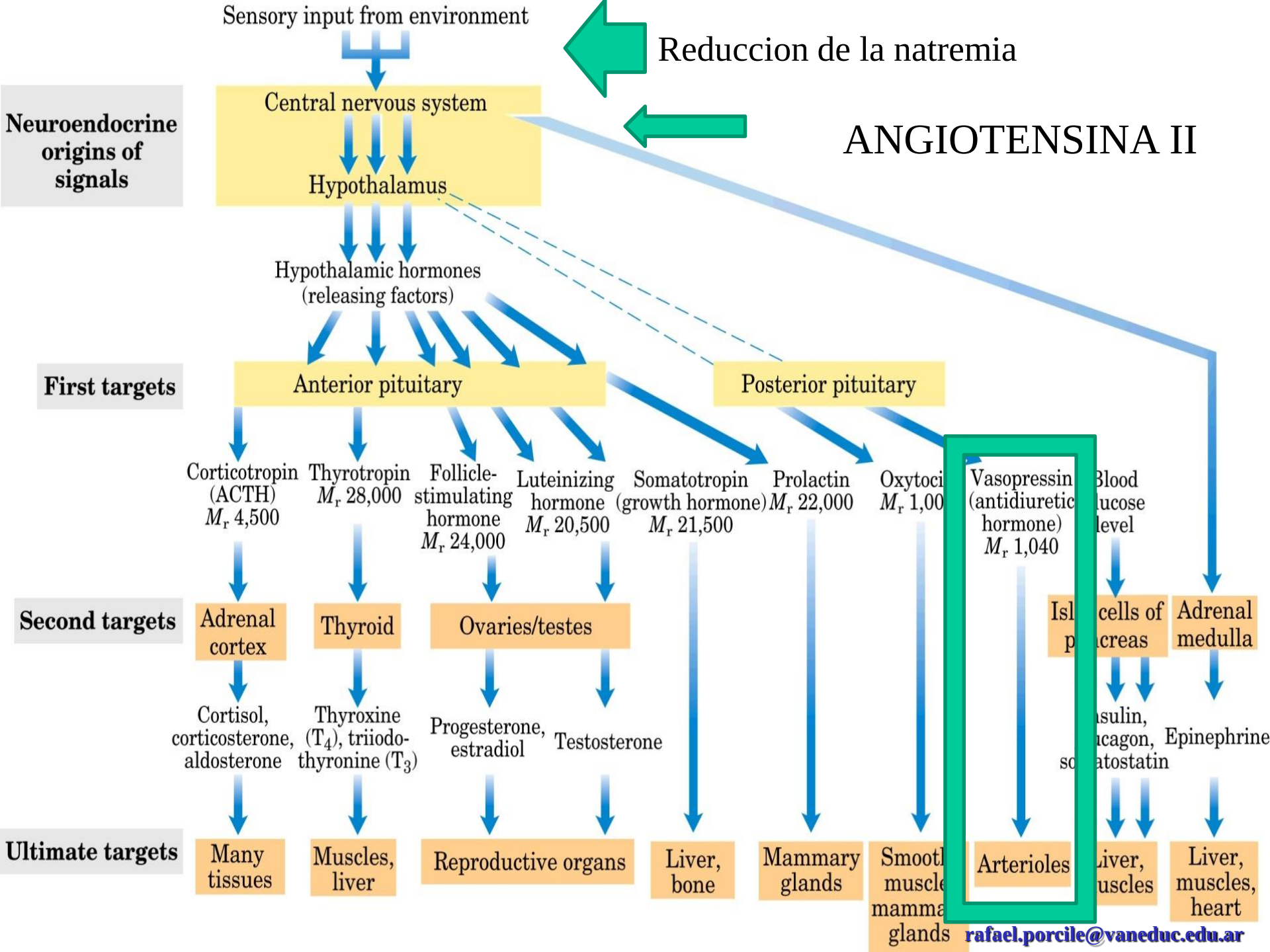

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1. Acción de la ADH

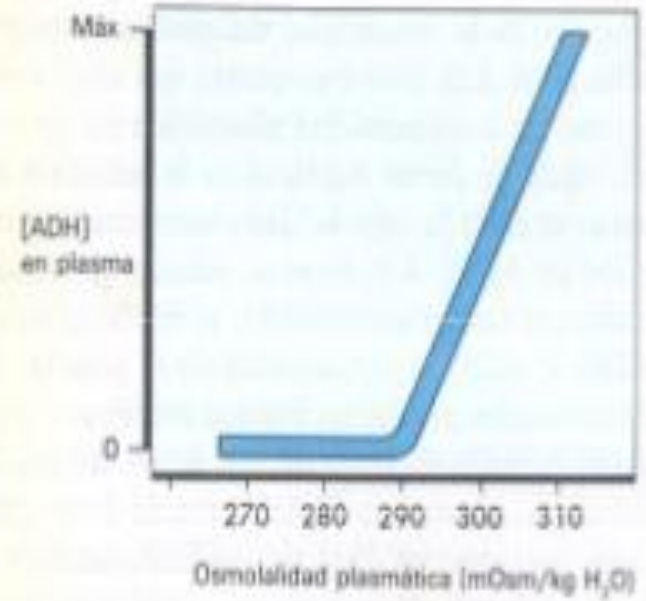
↑ Osmolaridad (1%) → osmoreceptores hipotalámicos

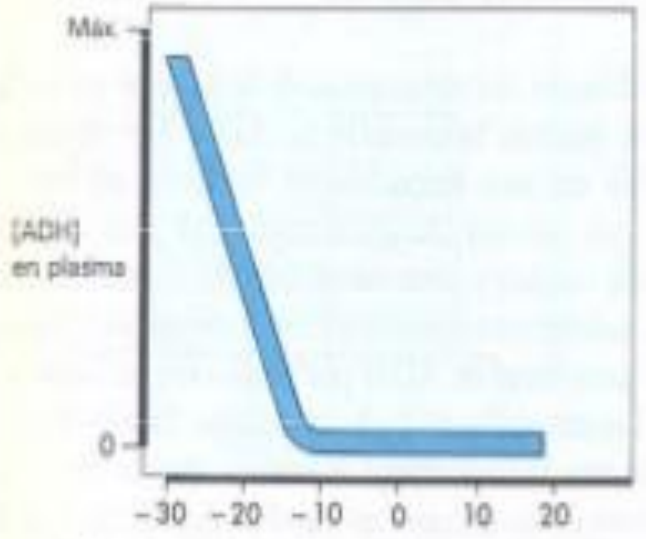
↓ presión (5-10%) → ↓ P ⇒ aurícula izq.

↓ volumen (5-10%) → ↑ P ⇒ cayado aort y s carotídeo

\+ ↙ SED

\+ ↘ ADH





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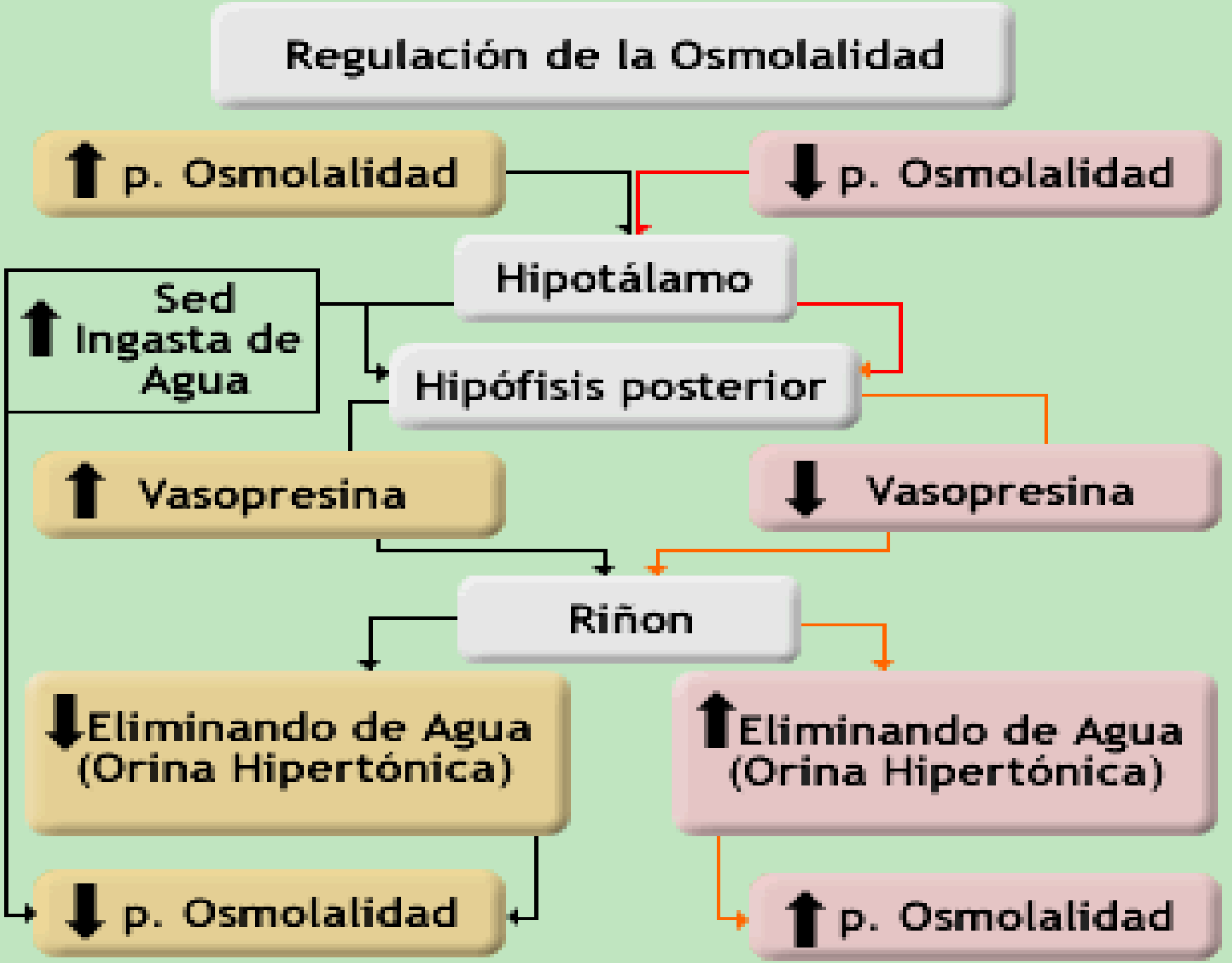

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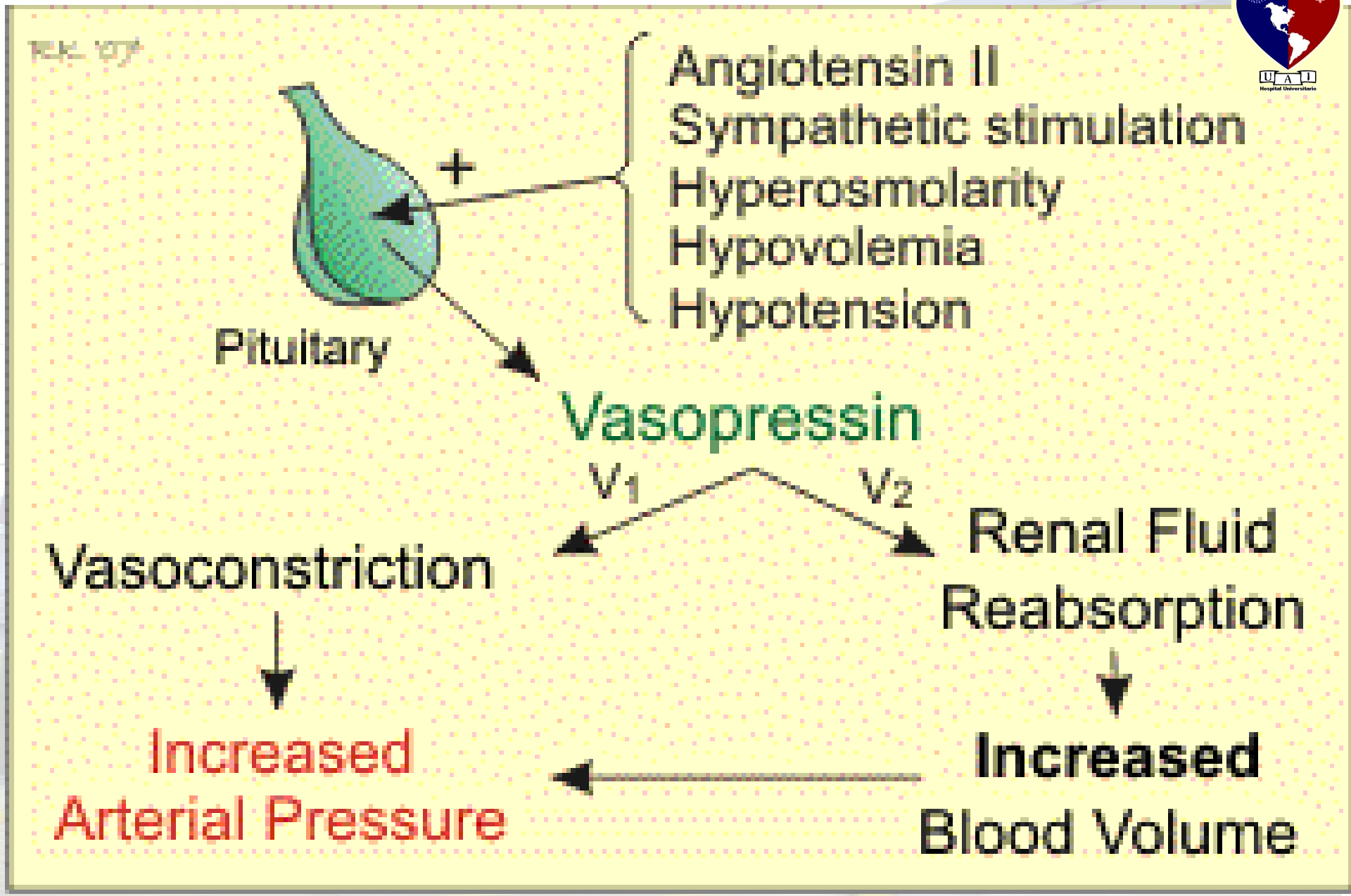

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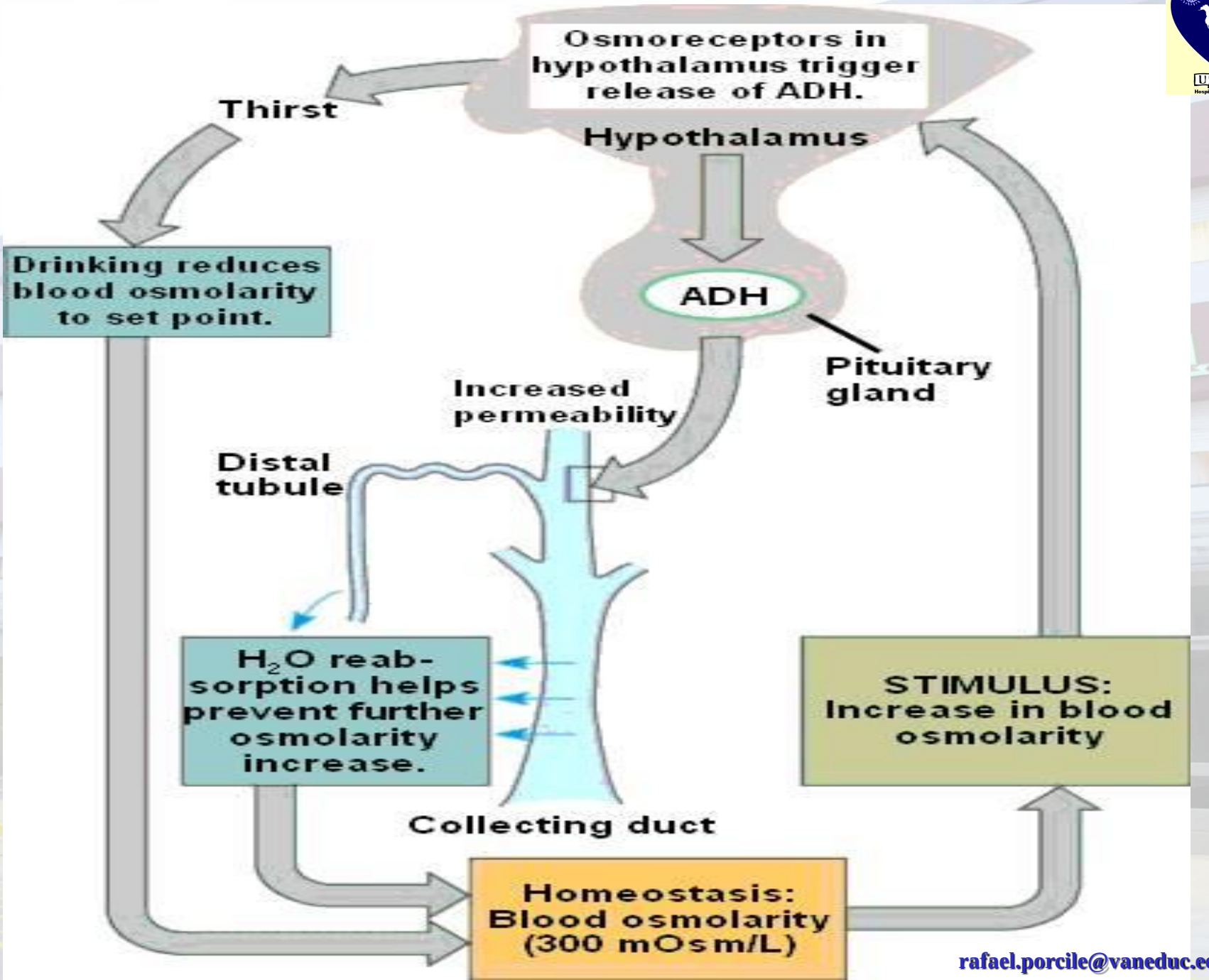

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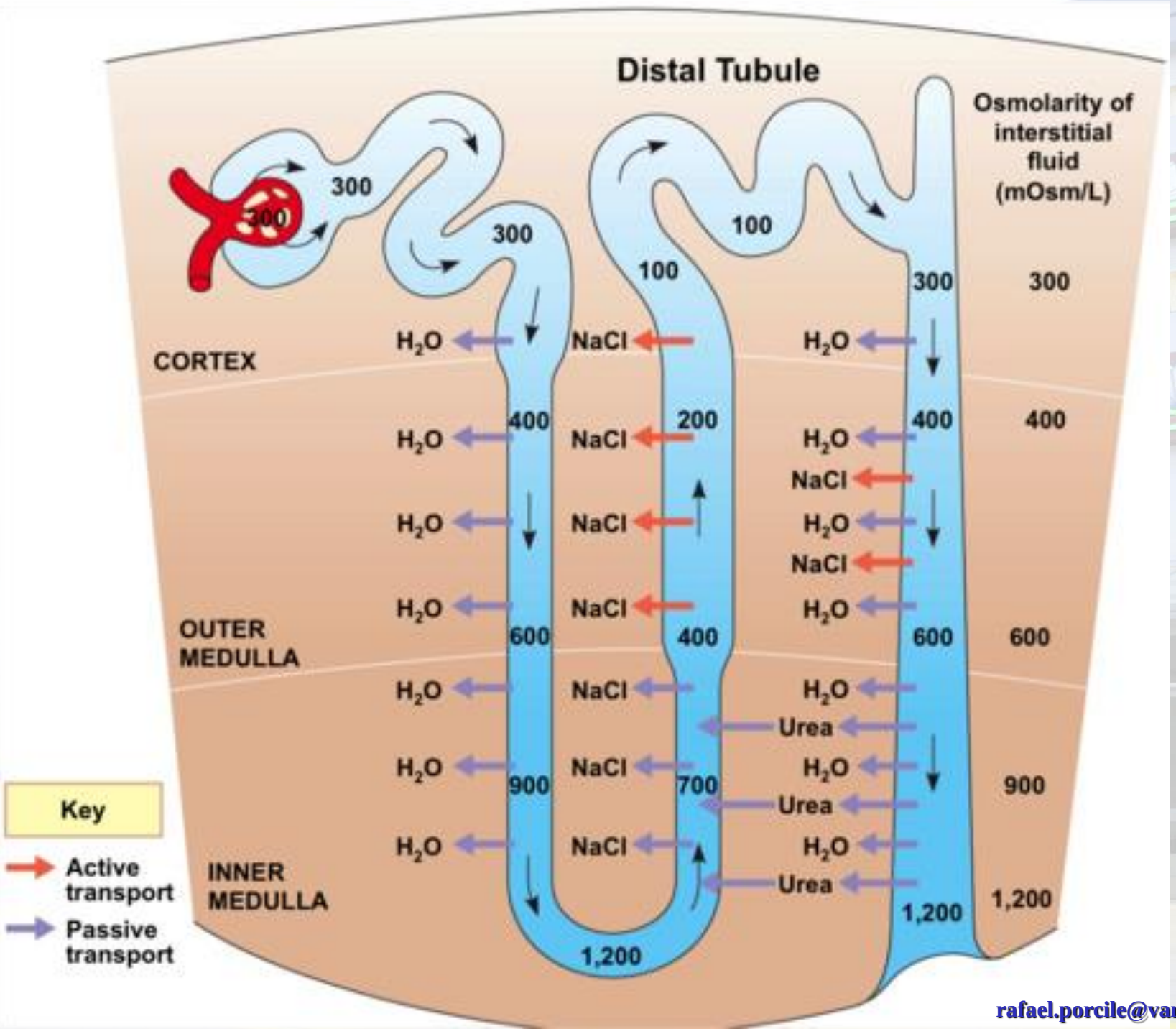

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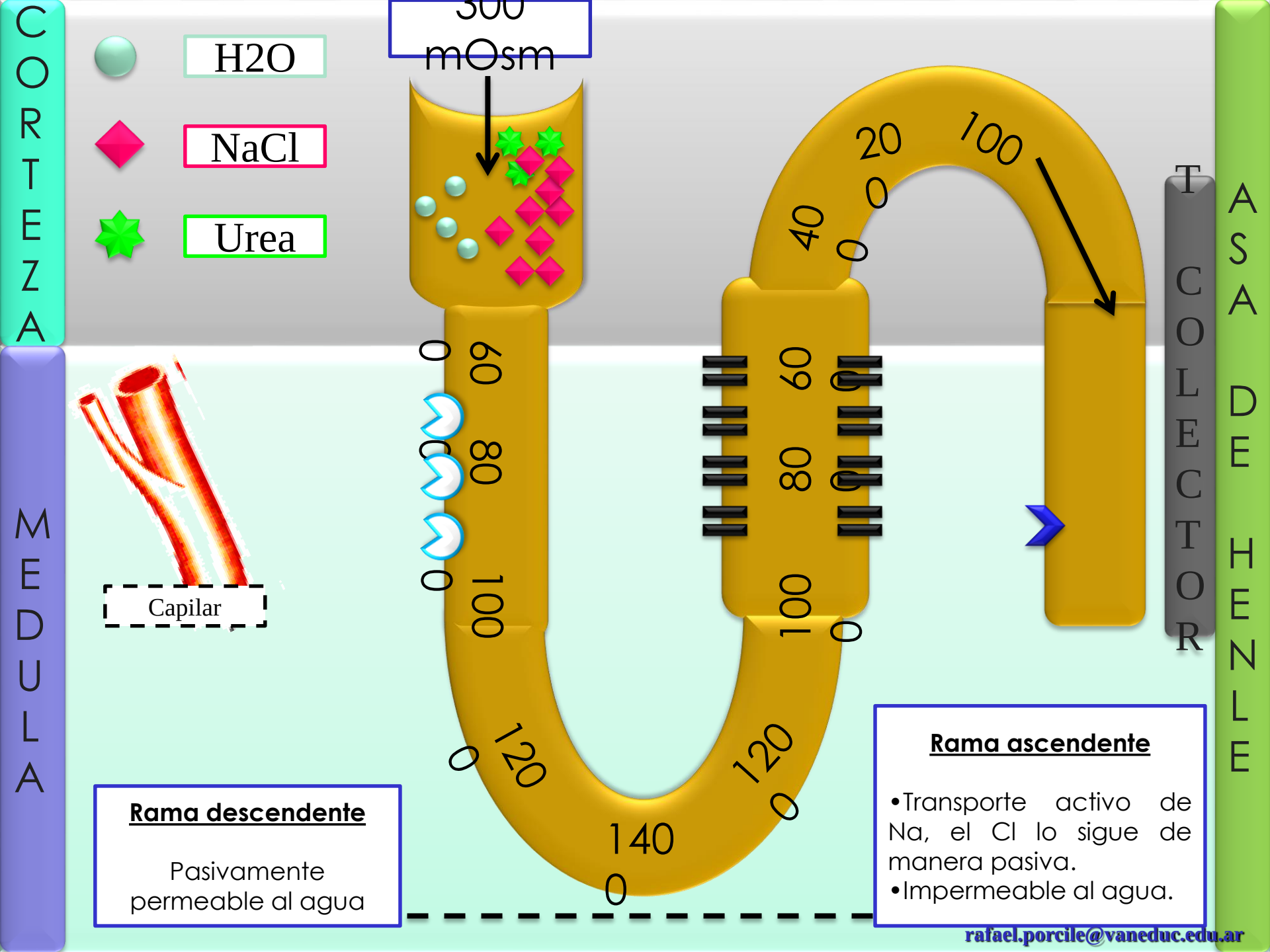

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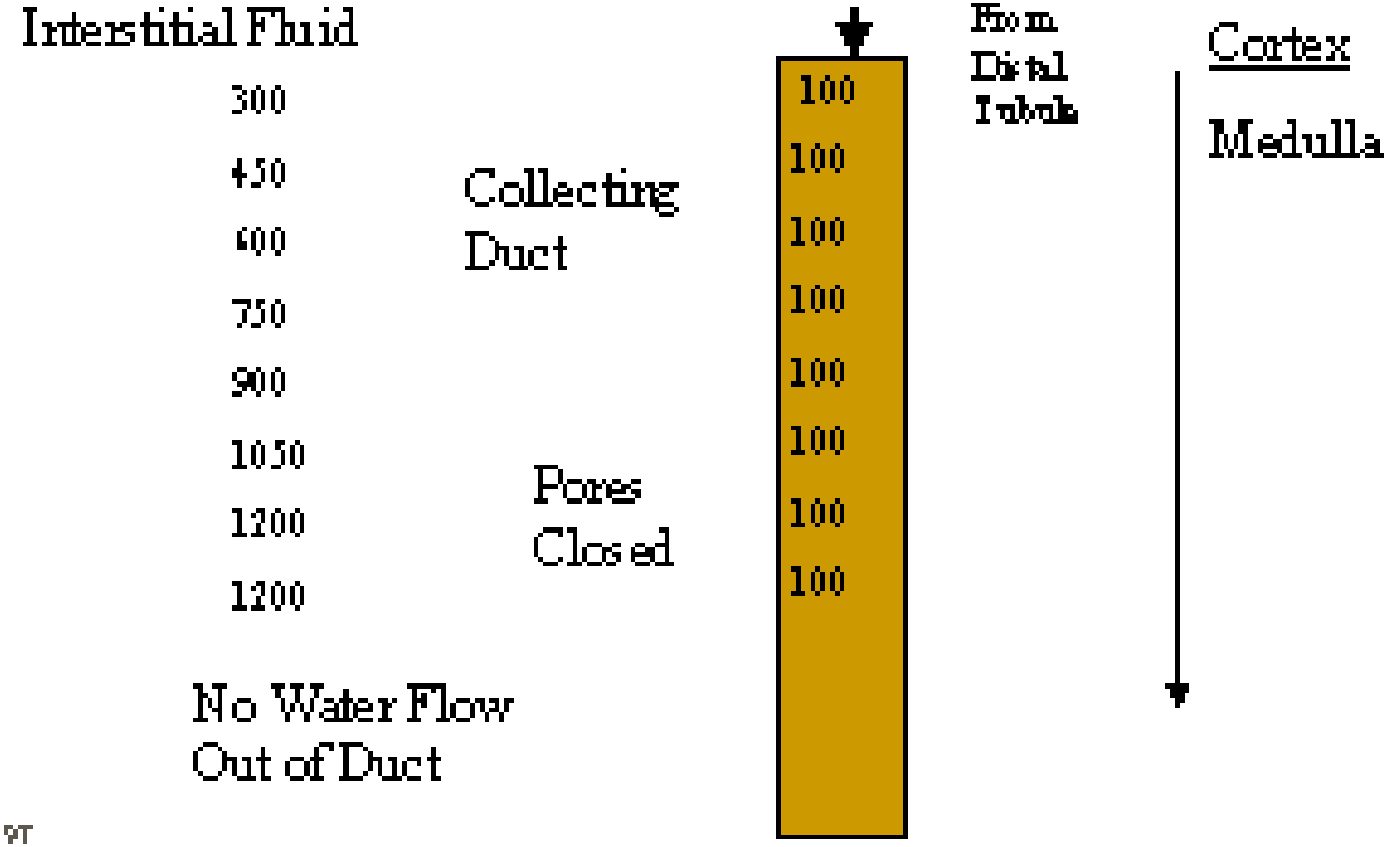
WHEN VASOPRESSIN (ANTI DIURETIC HORMONE [ADH]) IS ABSENT A DILUTE URINE IS PRODUCE



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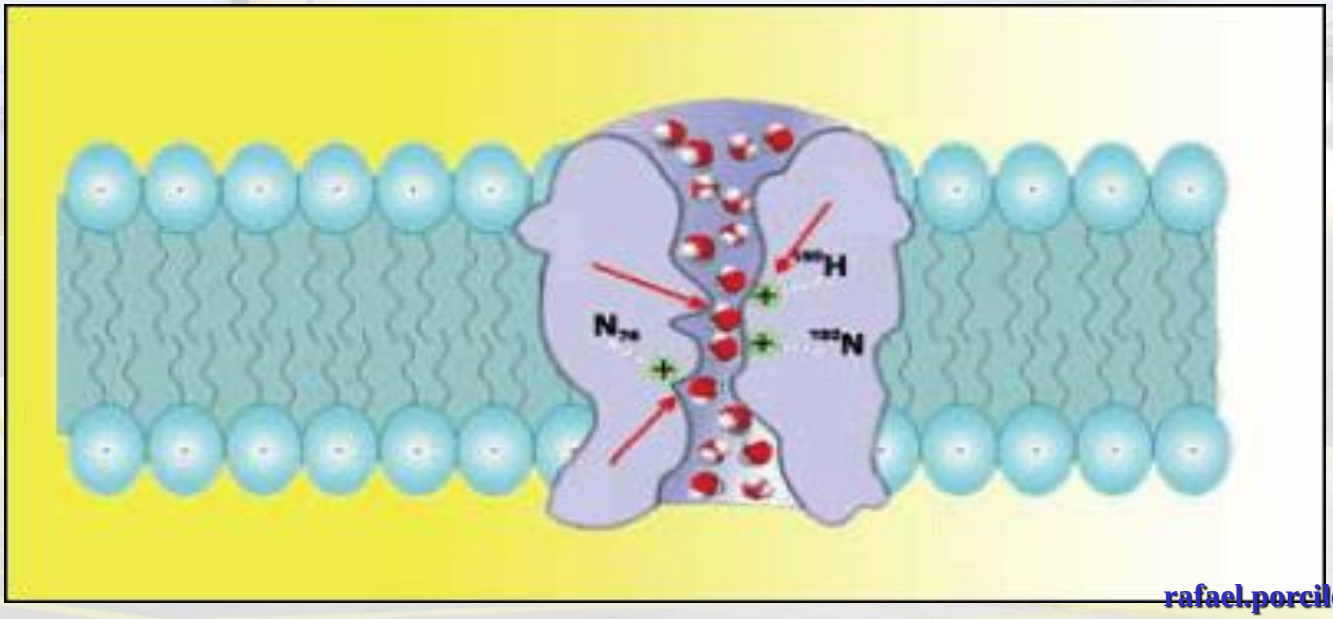
La **acuaporina** es una proteína transmembrana, encargada de transportar el agua a través de los compartimientos celulares. Dejan una estrecha abertura en su interior por la que pueden pasar moléculas de agua.

Estas proteínas transmembrana son especializadas, no permiten que los aniones y la mayoría de los cationes grandes puedan atravesarla. Además hay un par de aminoácidos catiónicos que actúan como "puerta", impidiendo el paso de cationes pequeños como el ion H3O+.



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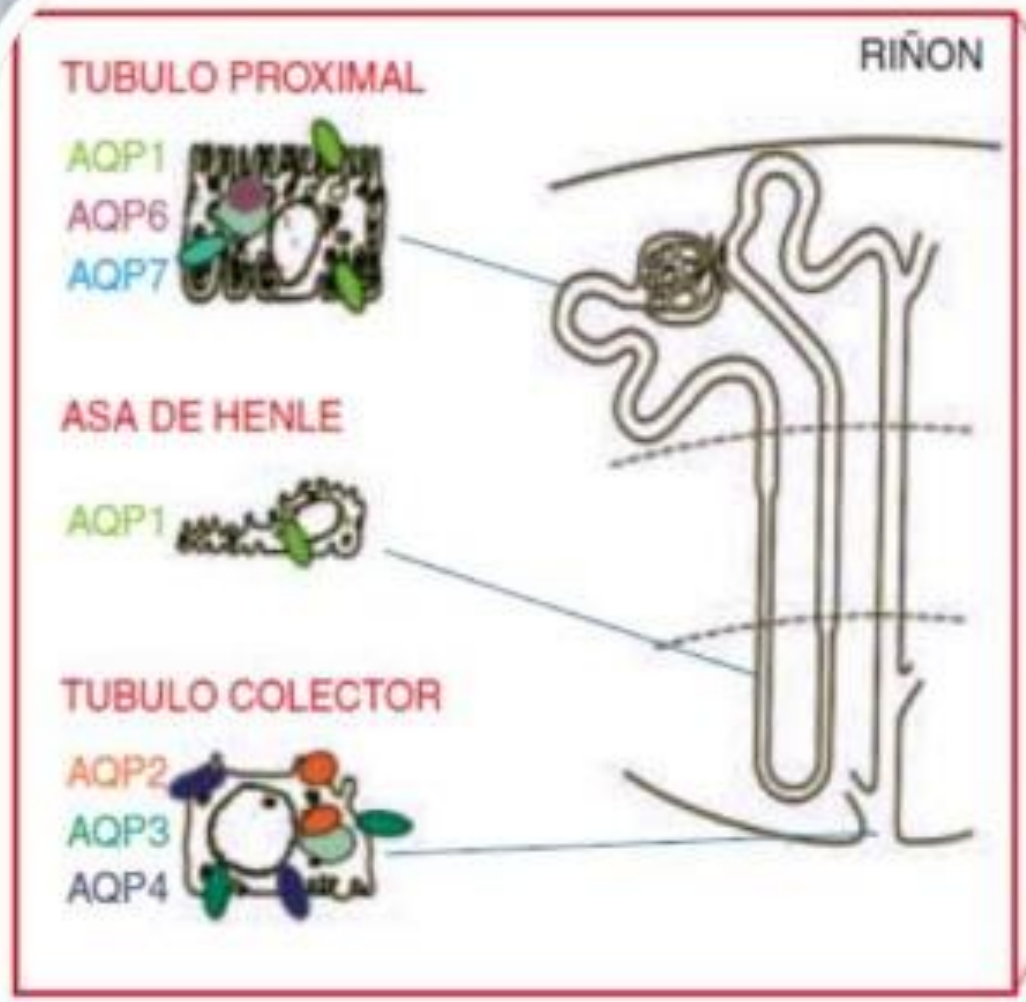
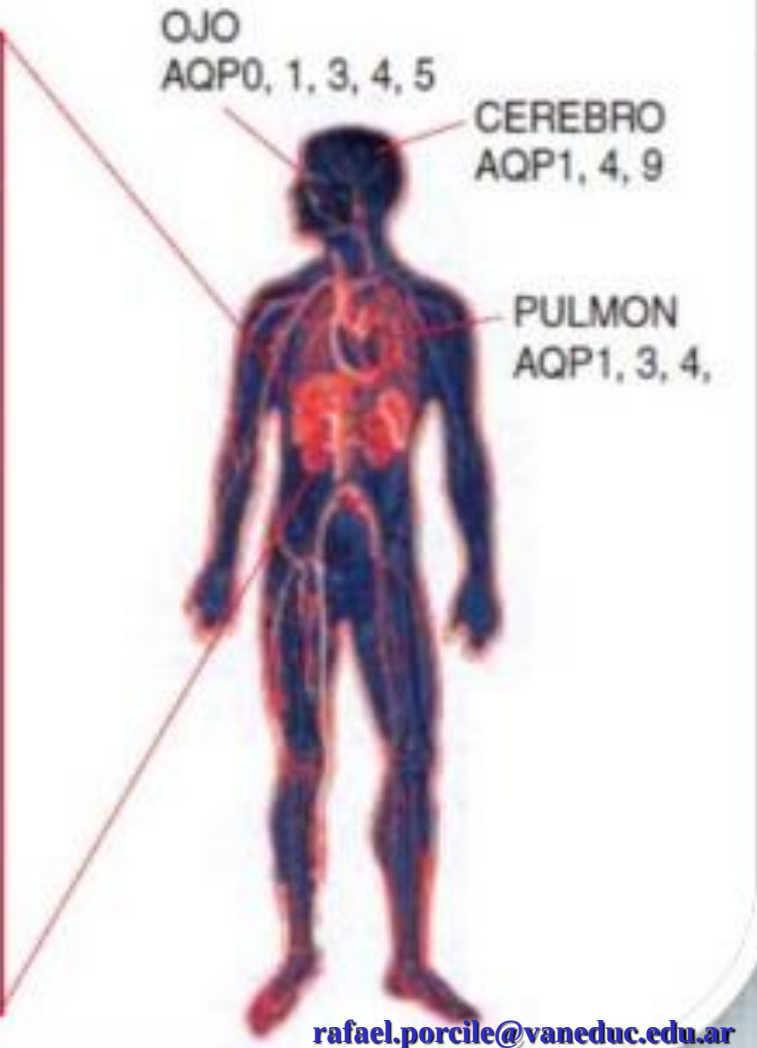
ACUAPORINAS





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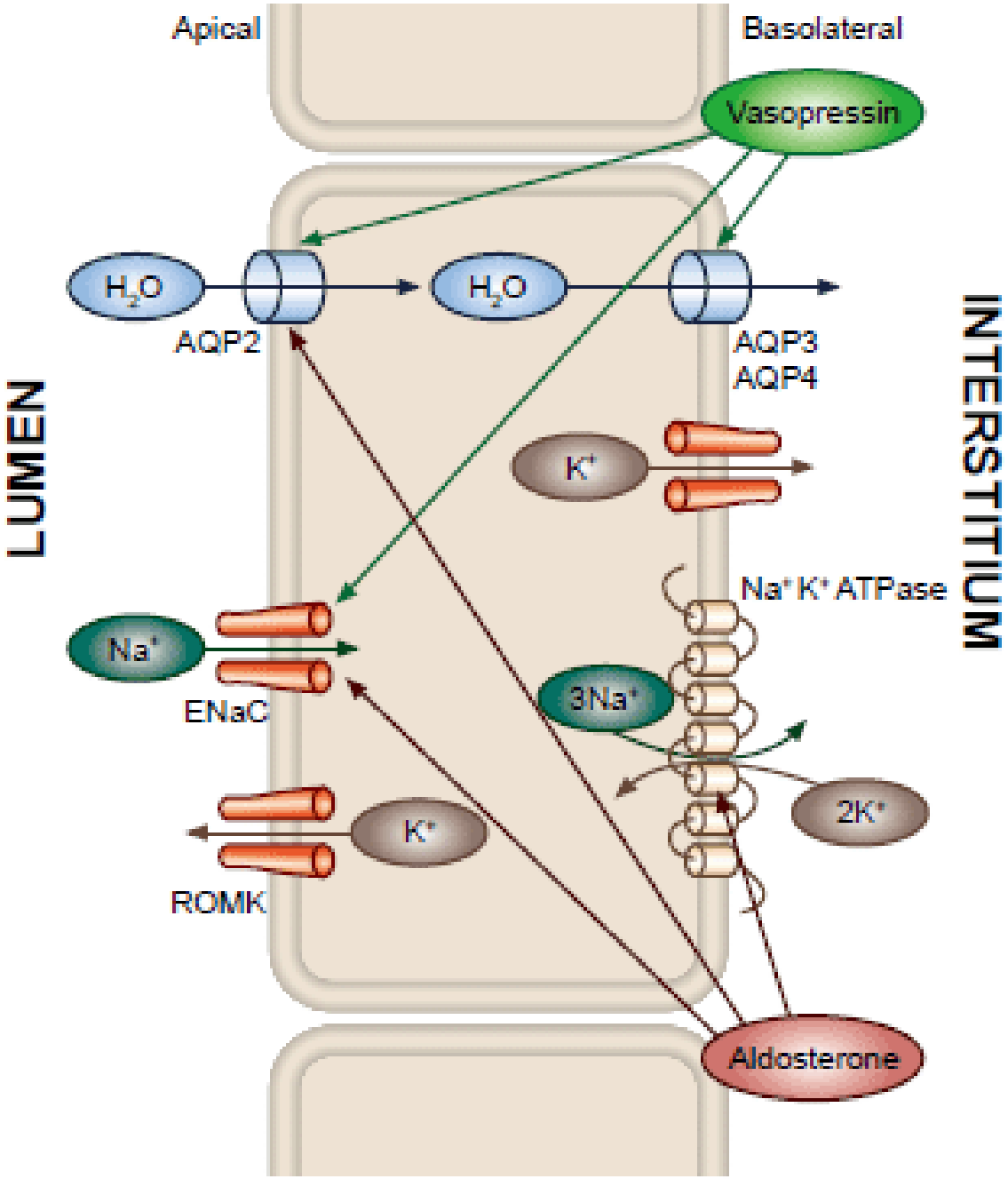
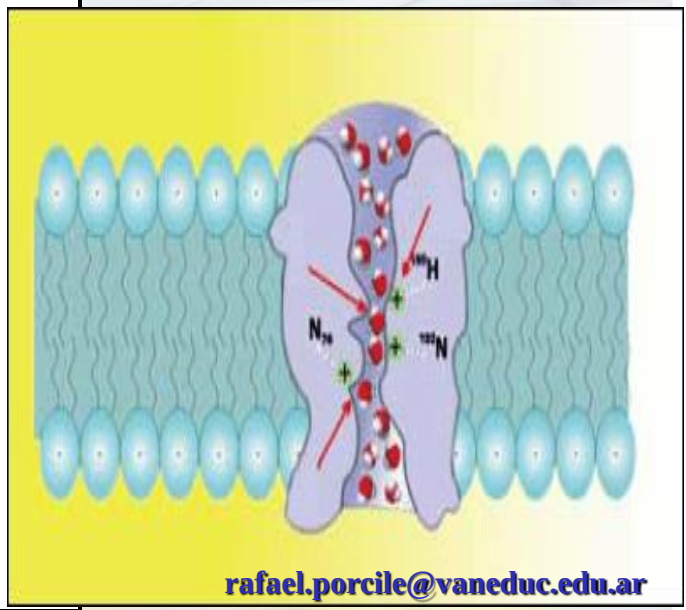
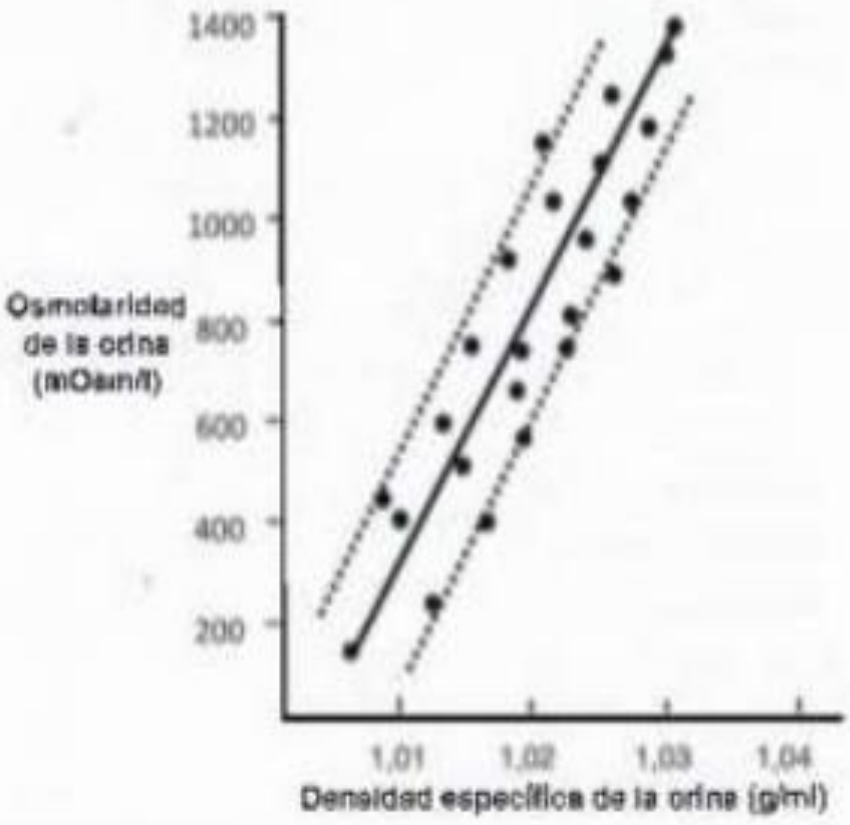


ACUO PORINAS



DENSIDAD ESPECÍFICA DE LA ORINA

Mas concentrada la orina, mayor densidad específica.



Densidad especifica de la orina se expresa en g/ml

SERES HUMANOS:
1,002 Y 1,028 g/ml

Aumento de 0,001 por cada 35-40mOsmol/l

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FÁRMACOS ANTIDIURÉTICOS

VASOPRESINA hormona antidiurética (HAD) y análogos :DESMOPRESINA

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DESMOPRESINA

- Análogo estructural de la hormona natural argininavasopresina

.

-La desmopresina induce la secreción de factor VIII y de factor de Von Willebrand. Al mismo tiempo produce una liberación del activador del plasminógeno (t-PA).

La desmopresina está relacionada con la disminución o normalización del tiempo de hemorragia en pacientes con tiempo de hemorragia prolongado:caso de uremia, cirrosis hepática, insuficiencia trombocitaria congénita

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Se emplea en medicina para el tratamiento de la diabetes insípida, la hemofilia y la enuresis nocturna. Su acción se diferencia de la hormona antidiuretica natural o vasopresina, en que no actúa sobre los receptores V1, responsables de la acción vasoconstrictora de la vasopresina, por tanto su efecto vasoconstrictor es prácticamente despreciable

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La desmopresina tiene la propiedad de elevar entre 2 y 5 veces el nivel de factor de coagulación VIII en sangre, muy probablemente por favorecer su liberación desde los lugares que el organismo utiliza para almacenar esta sustancia. Por ello se utiliza tanto en el tratamiento de la hemofilia A, como en la enfermedad de von Willebrand

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Capacidad máxima de orina: 1.200 mOsm/L

En los océanos :
Concentración de NaCl es de 3-5%, osmolaridad de: 1.000-1.200 mOsm/L

¿Por qué beber agua de mar produce deshidratación?

Porque el riñon también necesita excretar

Urea: (600mOsm/L)
NaCl: (600mOsm/L)

= 1.200mOsm = 1L de orina

Perdida de 1L de liquido por cada Litro de agua de mar bebida

INGERIR AGUA DE MAR:

Urea: (600mOsm/L)
NaCl: (1.200mOsm/L)

= 1.800mOsm = 1.5 L de orina

BEBER CON IMPUNIDAD EL AGUA DE MAR QUE DESEARA

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Gracias por su atención

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