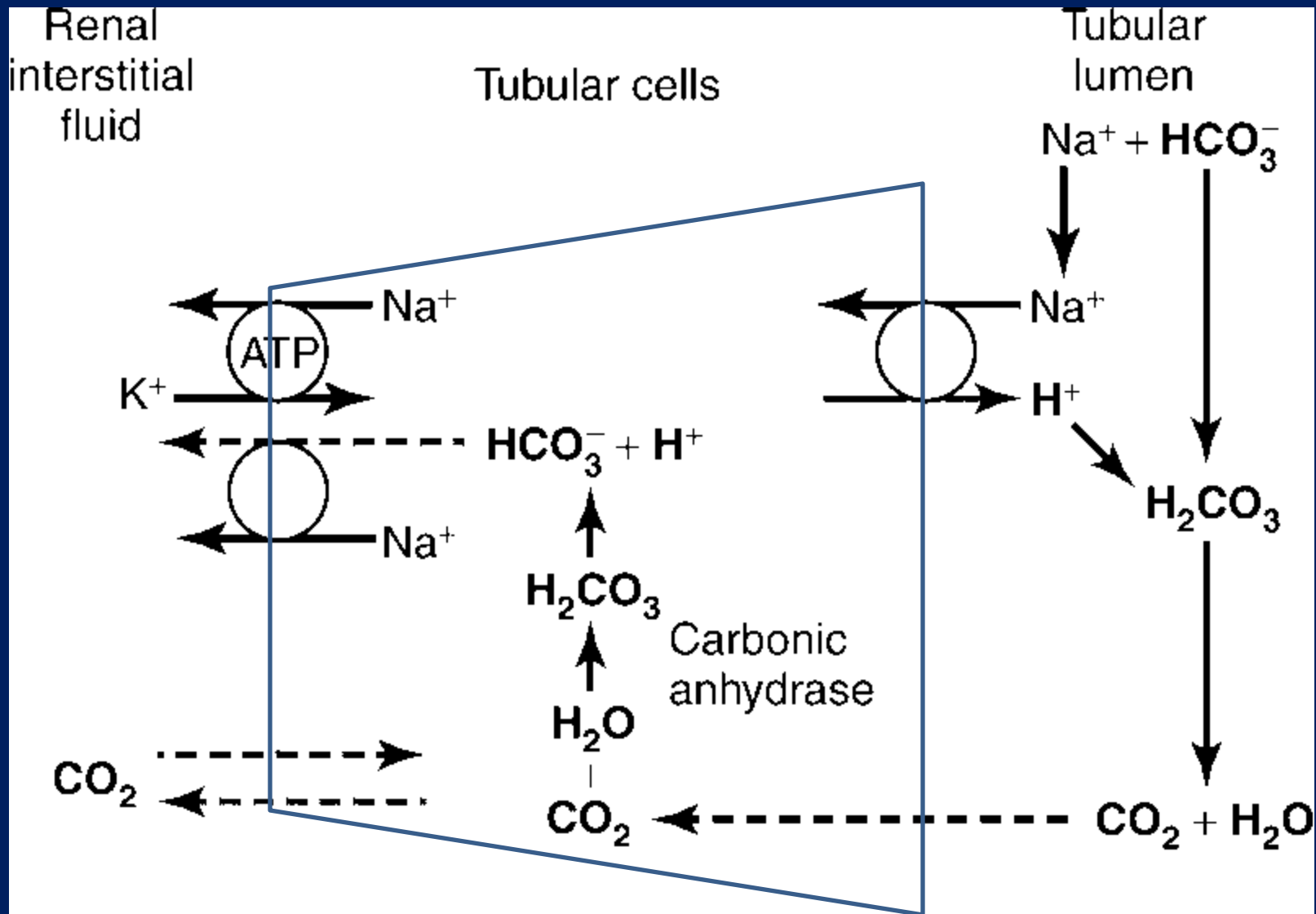


# Acid –Base Regulation

# Types of acids

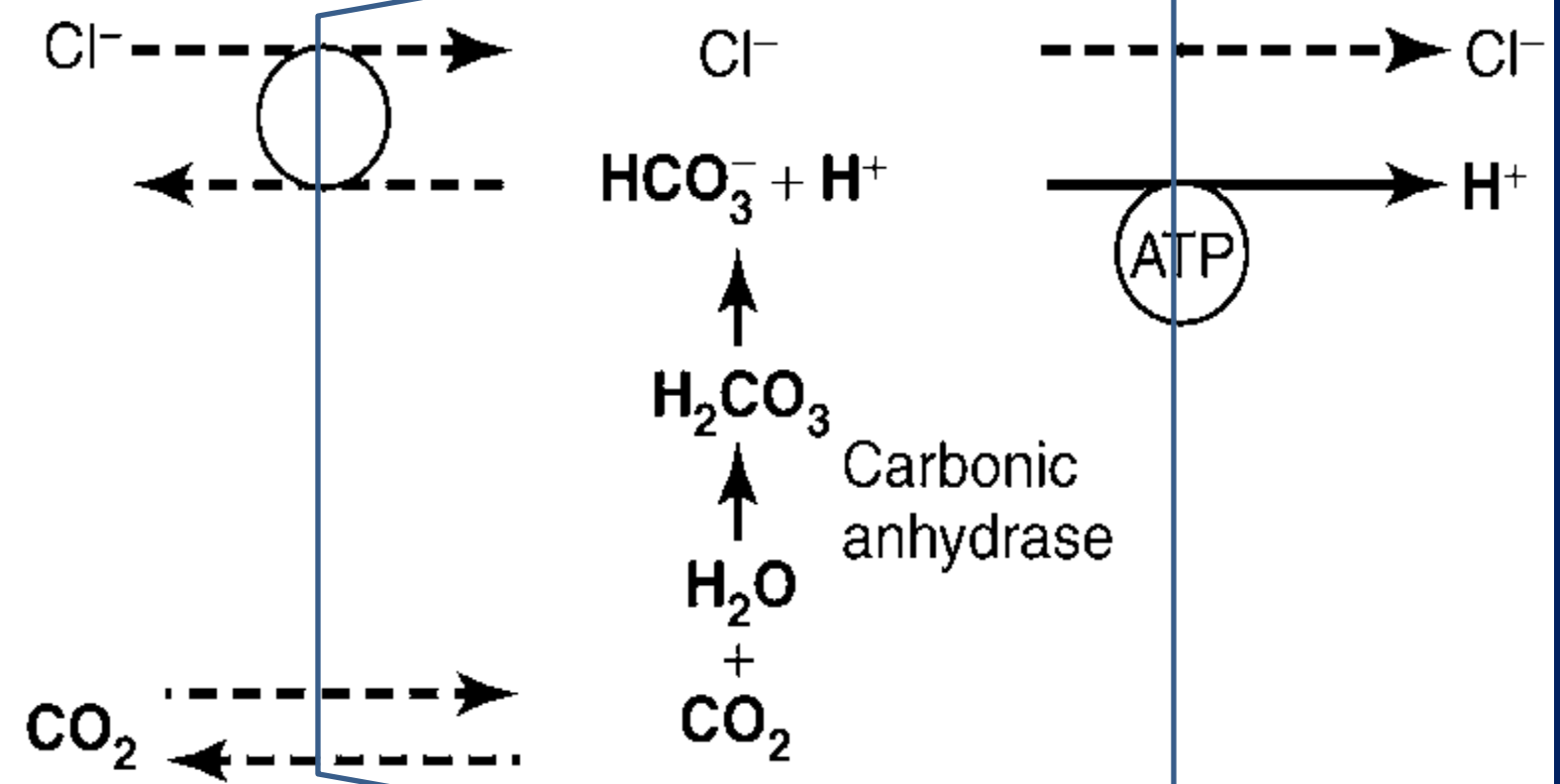
- Volatile acids: Carbon dioxide
- Fixed acids:  
Sulfuric acid and phosphoric acid
- Organic acids:  
Lactic acid, Aceto-acetic acid,  $\beta$ - Hydroxy  
Butyric acid

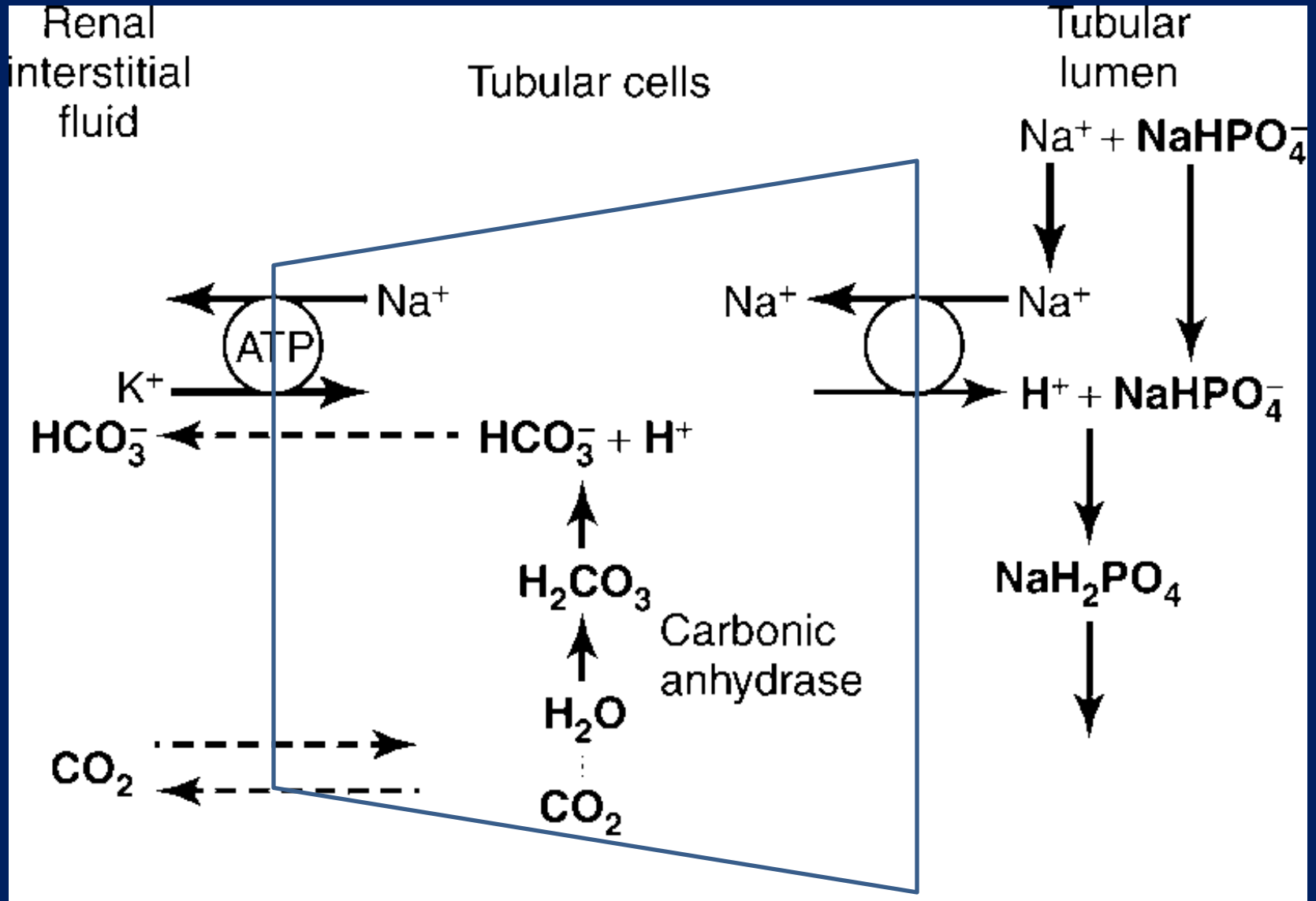


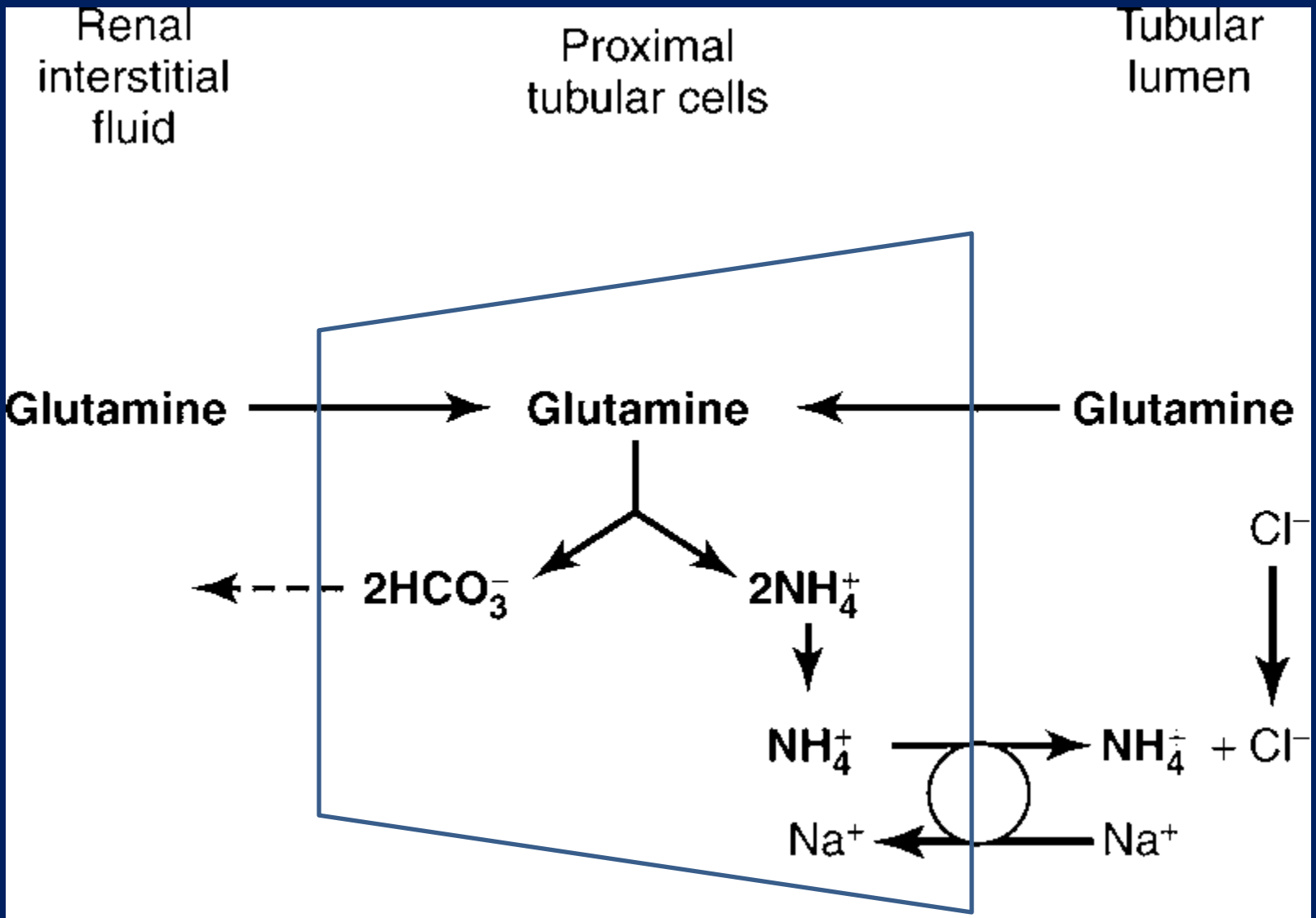
Renal  
interstitial  
fluid

Tubular cells

Tubular  
lumen



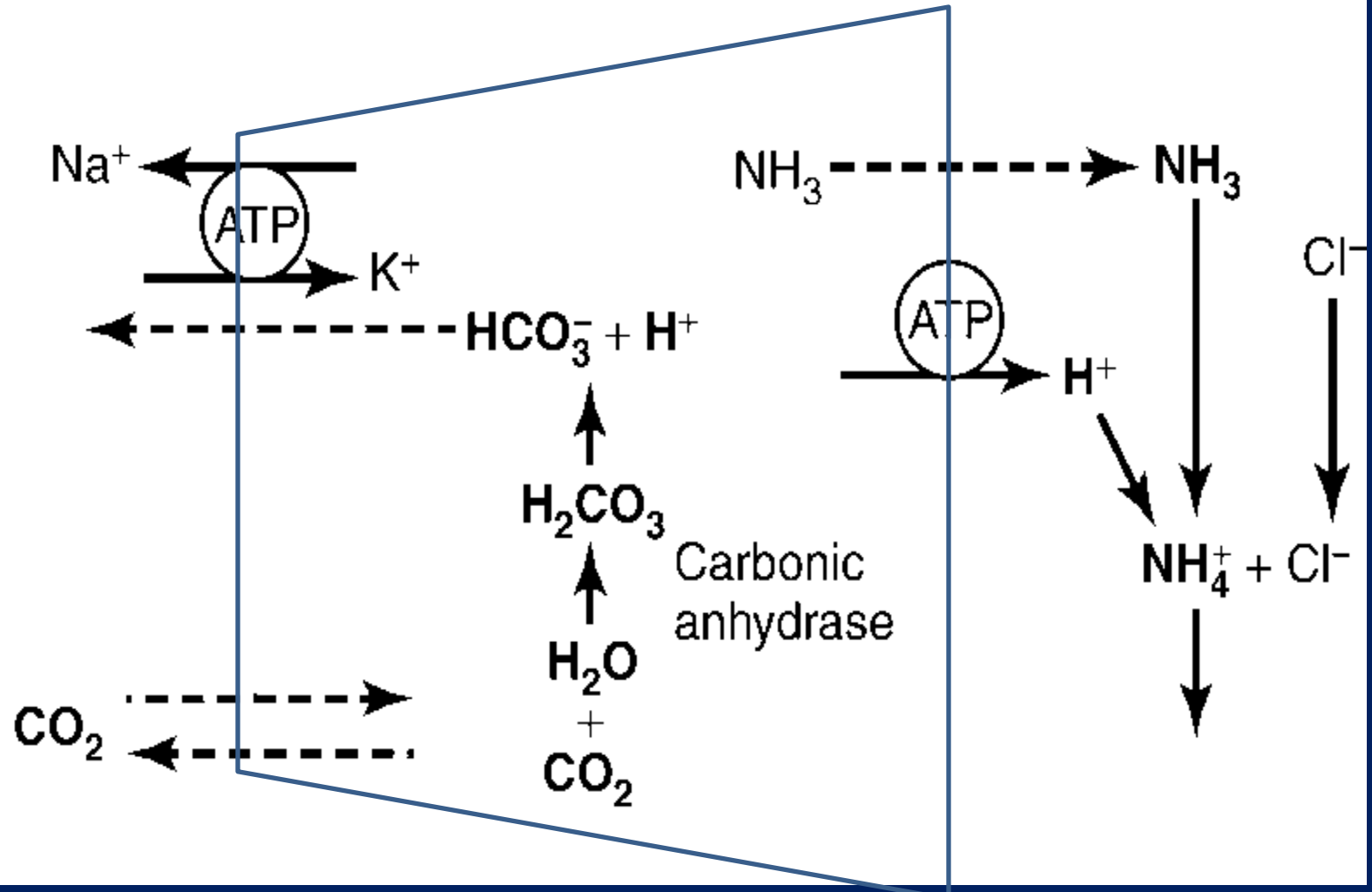




Renal interstitial fluid

Collecting tubular cells

Tubular lumen



# Factors increasing H<sup>+</sup> secretion

- ↑ PCO<sub>2</sub>
- ↑ H<sup>+</sup>; ↓ HCO<sub>3</sub><sup>-</sup>
- ↓ ECF volume
- ↑ Angiotensin II
- ↑ Aldosterone
- Hypokalemia



Arterial blood sample



pH?

<7.4

>7.4



Acidosis

Alkalosis

$\text{HCO}_3^-$   
<24 mEq/L ↓

↓  $\text{Pco}_2$   
>40 mm Hg

$\text{HCO}_3^-$   
>24 mEq/L ↓

↓  $\text{Pco}_2$   
<40 mm Hg

Metabolic

Respiratory

Metabolic

Respiratory



Respiratory  
compensation

Renal  
compensation

Respiratory  
compensation

Renal  
compensation

$\text{Pco}_2$   
<40 mm Hg

$\text{HCO}_3^-$   
>24 mEq/L

$\text{Pco}_2$   
>40 mm Hg

$\text{HCO}_3^-$   
<24 mEq/L

# Acidosis

## Respiratory- Acute

- Breath holding
- Acute respiratory tract obstruction
- Barbiturate poisoning
- Respiratory depression

## Chronic:

- COPD
- Persistent respiratory obstruction

## Metabolic- Acute

- Severe diarrhoea
- Cholera

## Chronic:

- Lactic acidosis
- Diabetic ketoacidosis

# Alkalosis

## Respiratory- Acute

- Voluntary hyperventilation
- High altitude

### Chronic:

- CNS disorders
- Psychological
- Persistent hyperventilation

## Metabolic- Acute

- Vomiting

### Chronic:

- Diuretics

# Anion Gap

## Increased Anion gap (Normochloremia)

- Diabetes Mellitus
- Lactic acidosis
- Chronic Renal Failure
- Aspirin
- Methanol poisoning
- Ethylenel glycol poisoning
- Starvation

## Normal Anion gap (Hyperchloremia)

- Diarrhoea
- Renal tubular acidosis
- Addison's disease
- Carbonic anhydrase inhibitors