Electrolyte Homeostasis Part 4 Cheat Sheet

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Blood pH levels

Dependent on H+ concentration
Normal pH: 7.35-7.45
Alkalosis: 7.45-7.8
Acidosis: 7-7.35
Anything >7.8 or <7 is deadly

Buffers

Buffering is the primary regulator of acid-base balance.	
Buffers act chemically to change strong acids into weaker ones, or bind them to neutralise them	
Different buffer systems assume dominant roles in different parts of the body:	
Extracellular Fluid (ECF)	*Major buffer*: Bicarbonate buffer system
	Minor buffers: Intracellular problems, Phosphate buffer system
Blood	*Major buffers*: Bicarb buffer system, Hemoglobin
	Minor buffers: Plasma proteins, Phosphate buffer system
Intracellular fluid (ICF)	*Major buffers*: Proteins, Phosphate
	Minor buffers: None
Urine	*Major buffers*: Ammonia, Phosphate
	Minor buffers: None

Renal

Secretes free hydrogen ions into renal tubules
Excretes weak acid
Excretes HCO3 (if there is metabolic acidosis)

Reading arterial blood gases (ABG)

Respiratory Acidosis	
Respiratory Alkalosis	
Metabolic Acidosis	
Metabolic Alkalosis	Increased pH, normal PaCO2, increased HCO3
	Normal ABG figures
pH	7.35-7.45
PO2	80-100
PCO2	35-45
HCO3	22-28

Acid-base homeostasis

How is it maintained?	
Buffers	Bicarbonate (HCO3) - reacts rapidly, less than an second. Chemically change strong aicds to weaker acids or bind to neutralise effect
Resipratory system	Reacts rapidly - seconds to minutes
Renal system	Reacts slowly - hours

Respiration

CO2 formed and excreted in lungs

Lungs excrete CO2 + H2O as by-products of cellular metabolism

CO2 is regarded as an acid

Homeostasis cycle of CO2 in the body:

During exercise or other activity, cell metabolism increases and produces more CO2, then:

More CO2 dissolves in blood, forming carbonic acid which lowers blood pH slightly, then:

Receptors in the brain sense the drop in pH and send nerve signals to increase breathing rate, then:

Increased breathing rate quickly removes more CO2 from blood. Blood pH rises slightly, returning to normal - cycle starts again

Continuous mixing of body fluids/gases