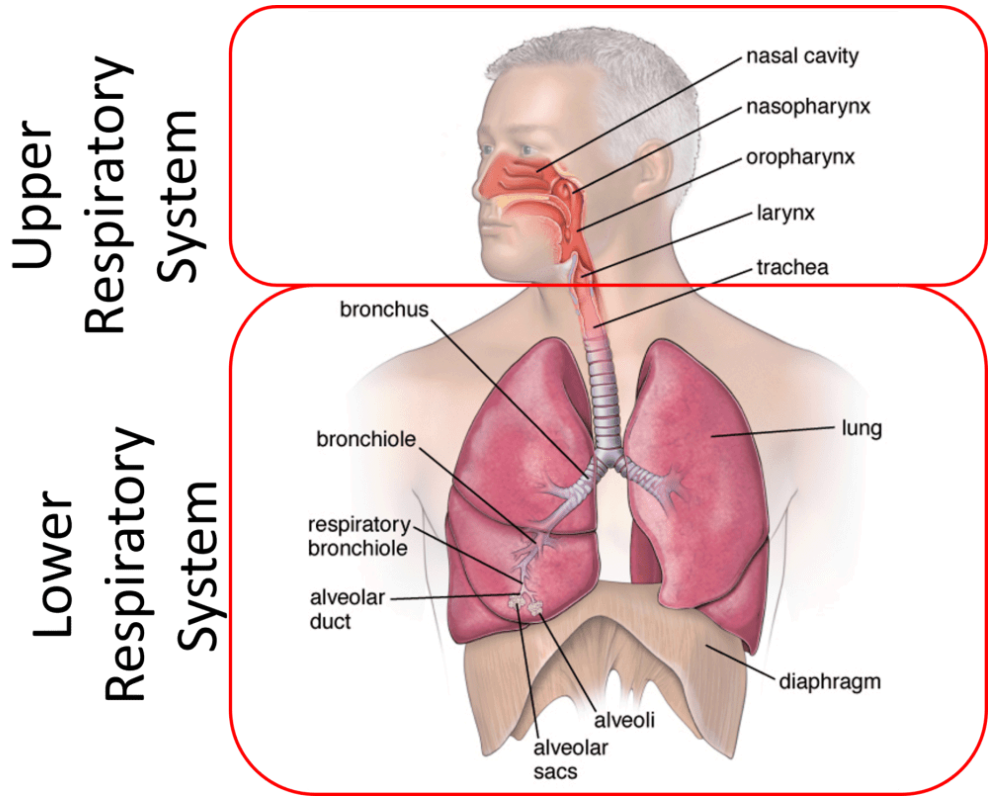
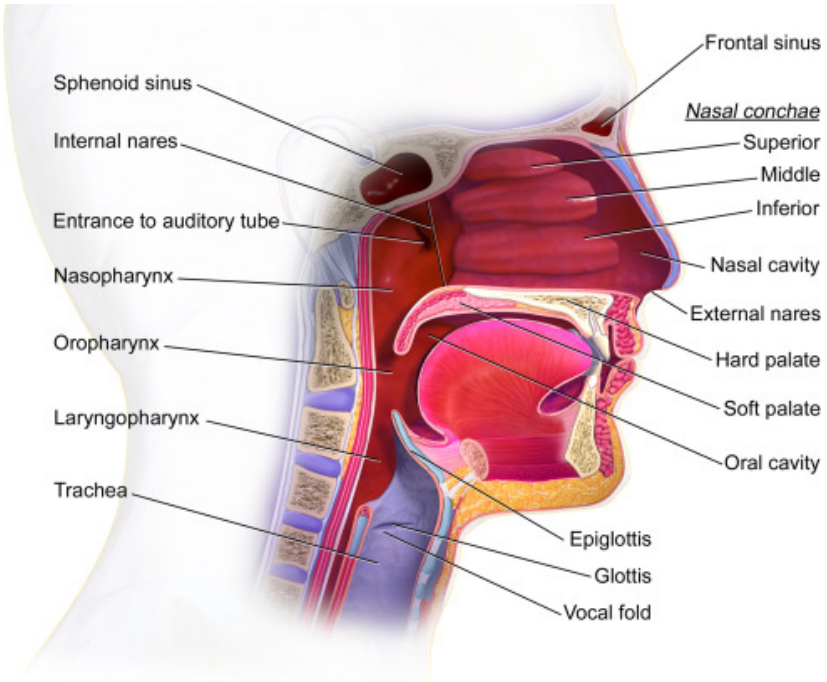
Anatomy Unit 5 Notes

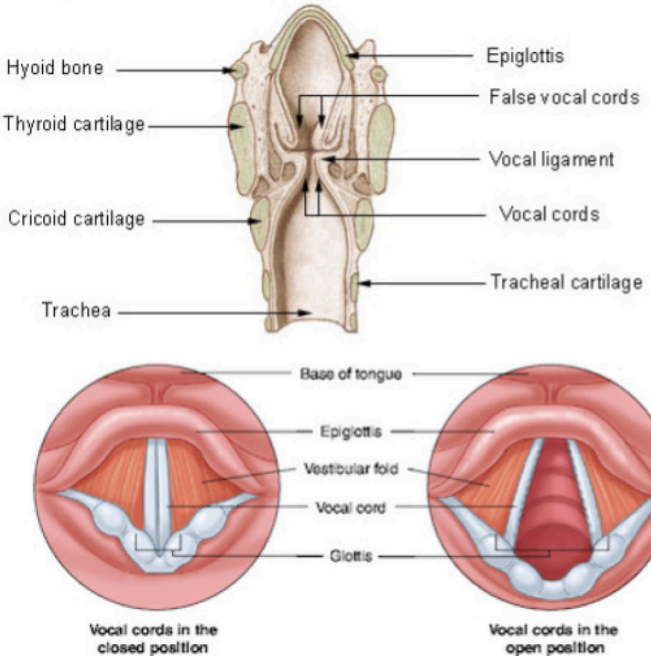
Roles of the respiratory system

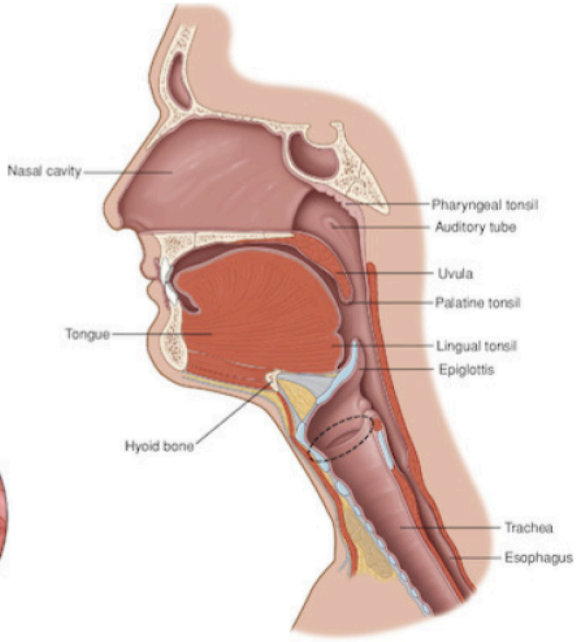
1. Works with circulatory system to provide body with oxygen and remove carbon dioxide
2. Influences speech and sound production
3. Makes smell possible
4. Maintains homeostasis through regulating acid-base balance

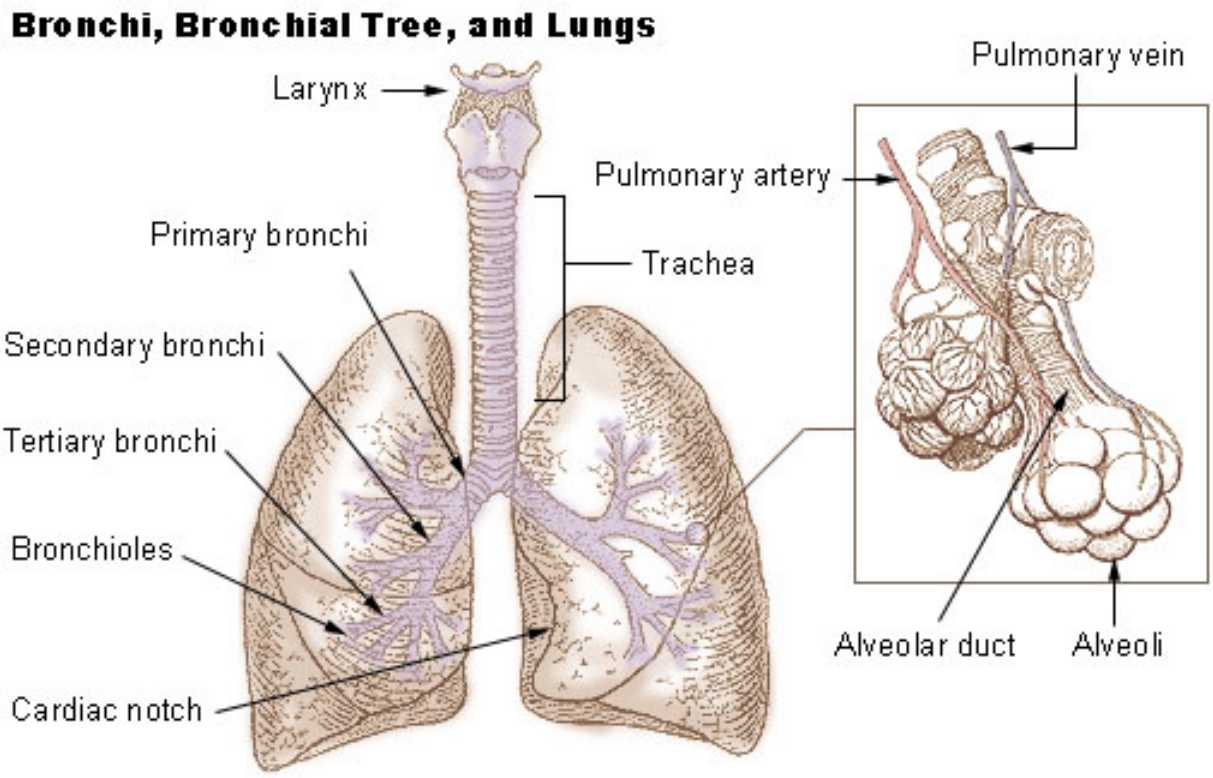


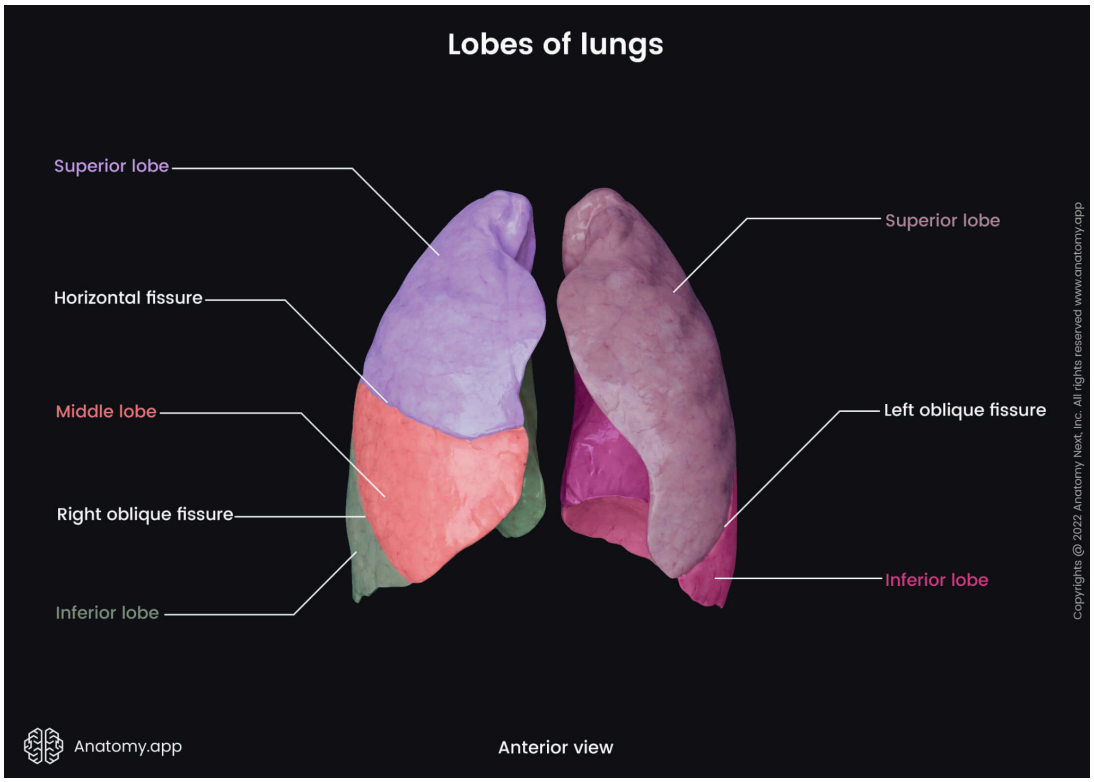

Frontal sinus
Sphenoid sinus
Nasal conchae
Internal nares
Superior
Middle
Entrance to auditory tube
Inferior
Nasopharynx
Nasal cavity
External nares
Oropharynx
Hard palate
Soft palate
Laryngopharynx
Oral cavity
Trachea
Epiglottis
Glottis
Vocal fold

Larynx


Hyoid bone
Epiglottis
False vocal cords
Thyroid cartilage
Vocal ligament
Cricoid cartilage
Vocal cords
Tracheal cartilage
Trachea
Base of tongue
Epiglottis
Vestibular fold
Vocal cord
Glottis
Vocal cords in the closed position
Vocal cords in the open position


Nasal cavity
Pharyngeal tonsil
Auditory tube
Uvula
Palatine tonsil
Tongue
Lingual tonsil
Epiglottis
Hyoid bone
Trachea
Esophagus


Bronchi, Bronchial Tree, and Lungs
Larynx
Primary bronchi
Secondary bronchi
Tertiary bronchi
Bronchioles
Cardiac notch
Trachea
Pulmonary artery
Pulmonary vein
Alveolar duct
Alveoli


Lobes of lungs
Superior lobe
Horizontal fissure
Middle lobe
Right oblique fissure
Inferior lobe
Superior lobe
Left oblique fissure
Inferior lobe
Anatomy.app
Anterior view
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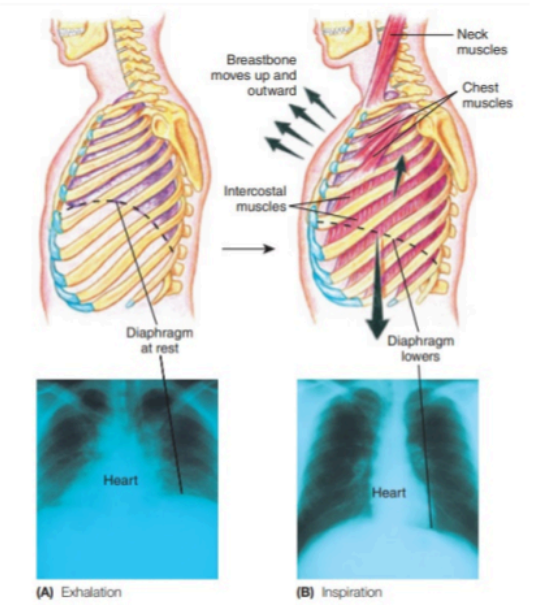
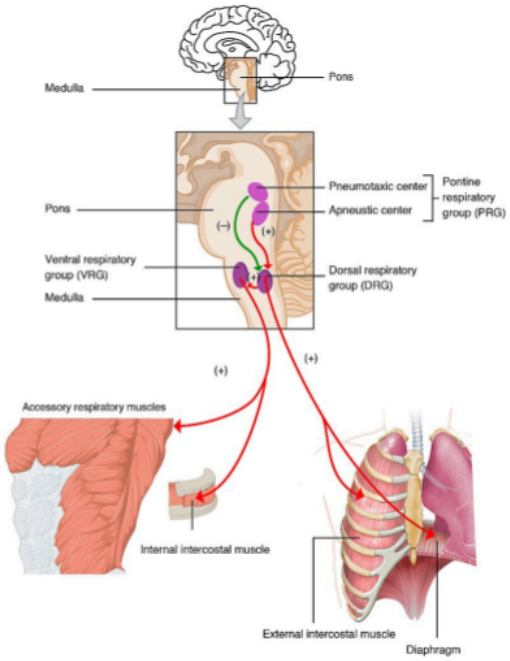


FIGURE 21-8 (A) Expiration and (B) inspiration.



Factors that affect breathing

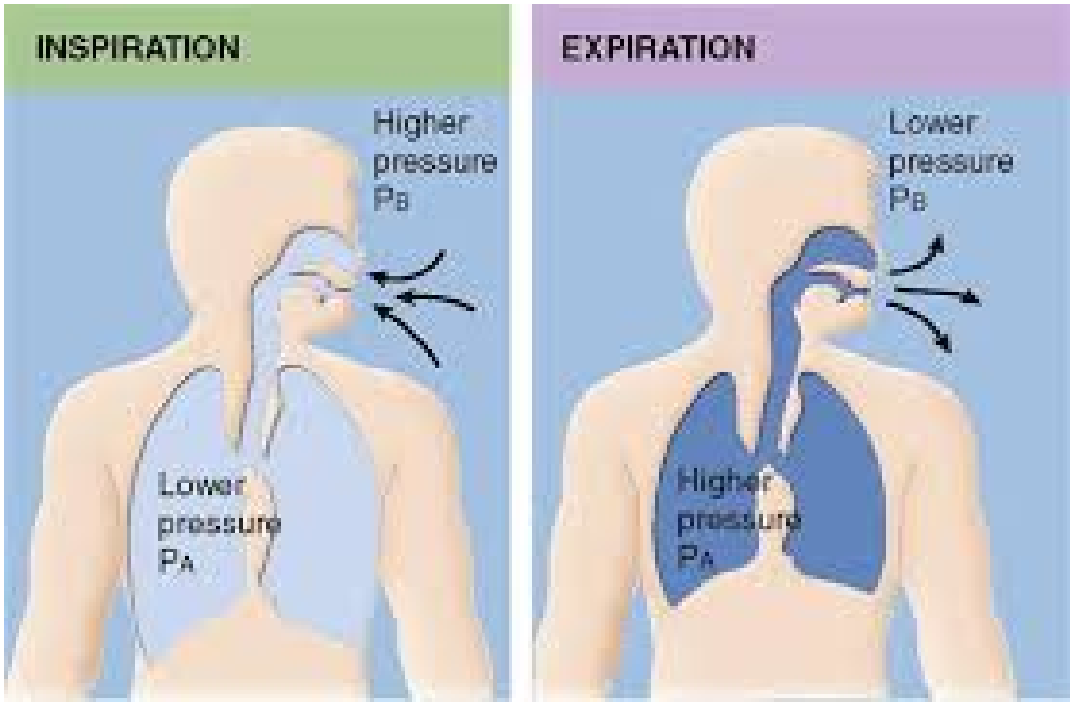
Oxygen (if too low, increase rate and depth of breathing)

pH (falling pH means too much carbon dioxide, so increases rate and depth of breathing)

Stretch (when lungs have inhaled enough)

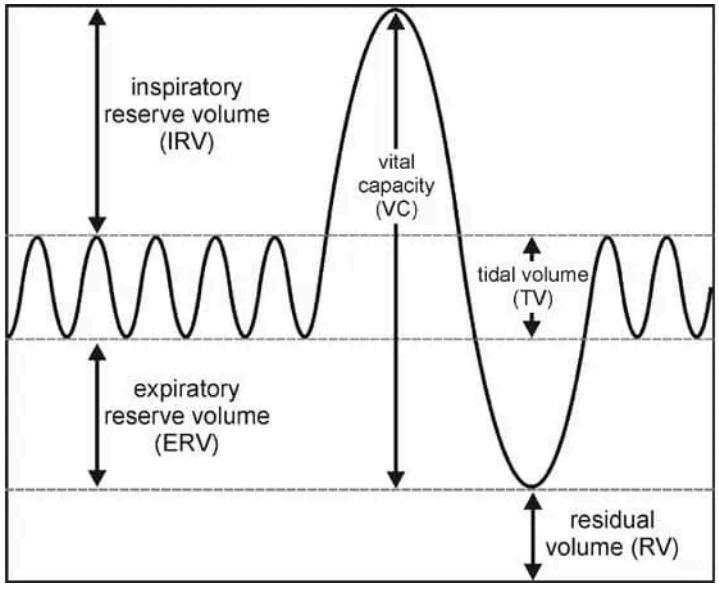
Pain/Emotion

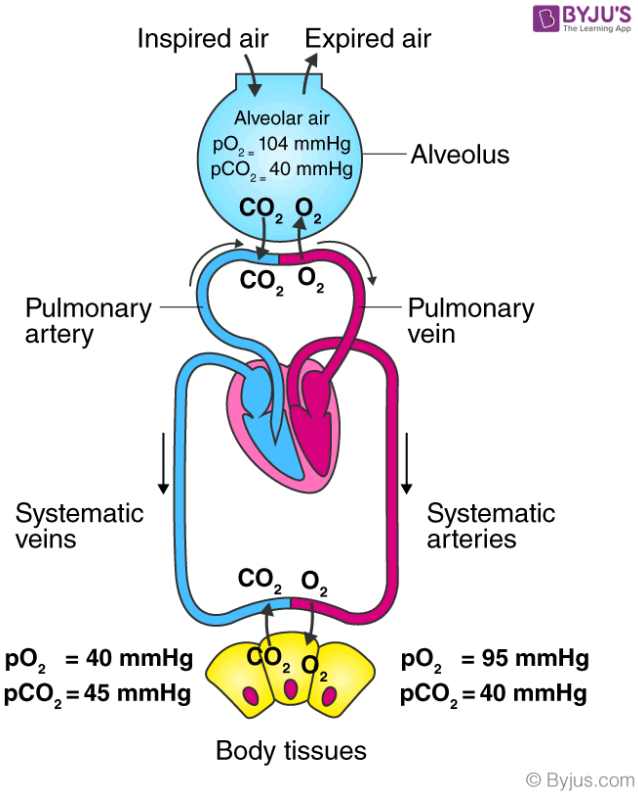
Irritants (cough/sneeze)



Factors affecting airflow

1. Diameter of bronchioles
2. Pulmonary compliance (elasticity of lung tissue)
3. Alveolar surface tension (having enough surfactant to keep the alveoli from collapsing)




BYJU'S
The Learning App
Inspired air
Expired air
Alveolar air
pO_2 = 104 mmHg
pCO_2 = 40 mmHg
Alveolus
CO_2 O_2
CO_2 O_2
Pulmonary artery
Pulmonary vein
Systematic veins
Systematic arteries
CO_2 O_2
pO_2 = 40 mmHg
pCO_2 = 45 mmHg
CO_2 O_2
pO_2 = 95 mmHg
pCO_2 = 40 mmHg
Body tissues
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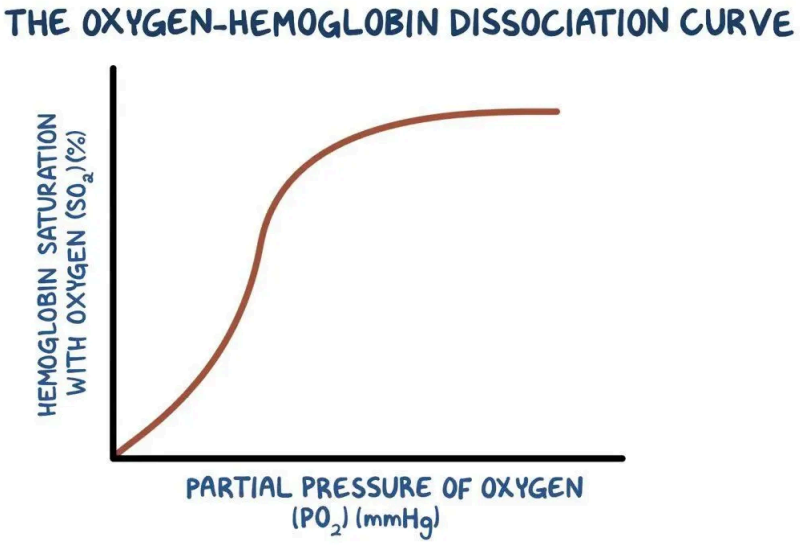
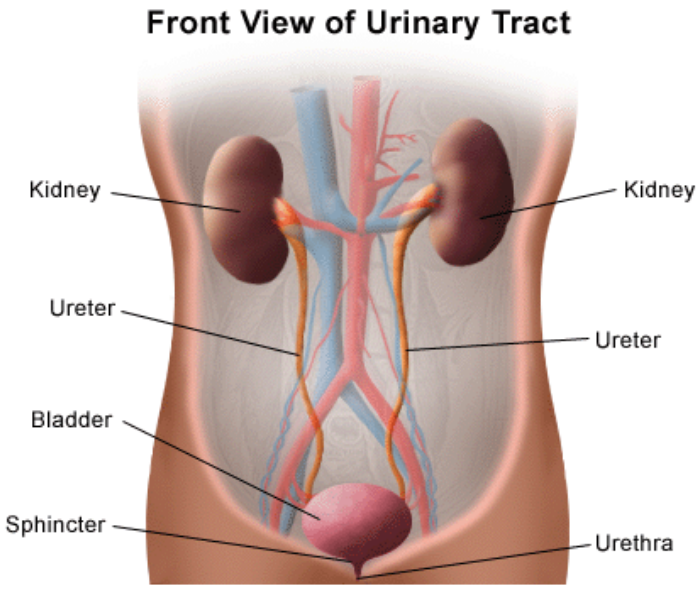
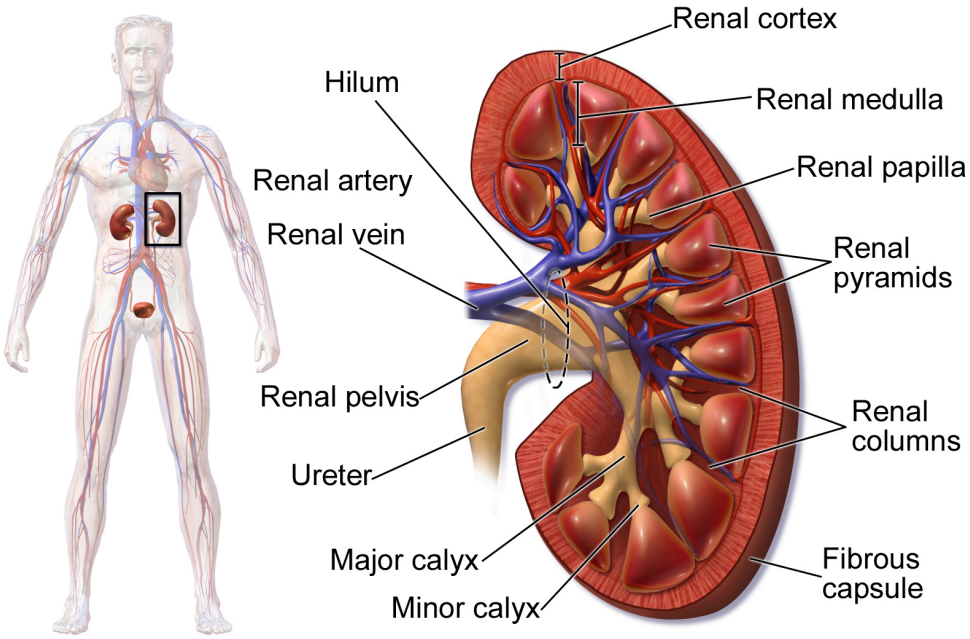
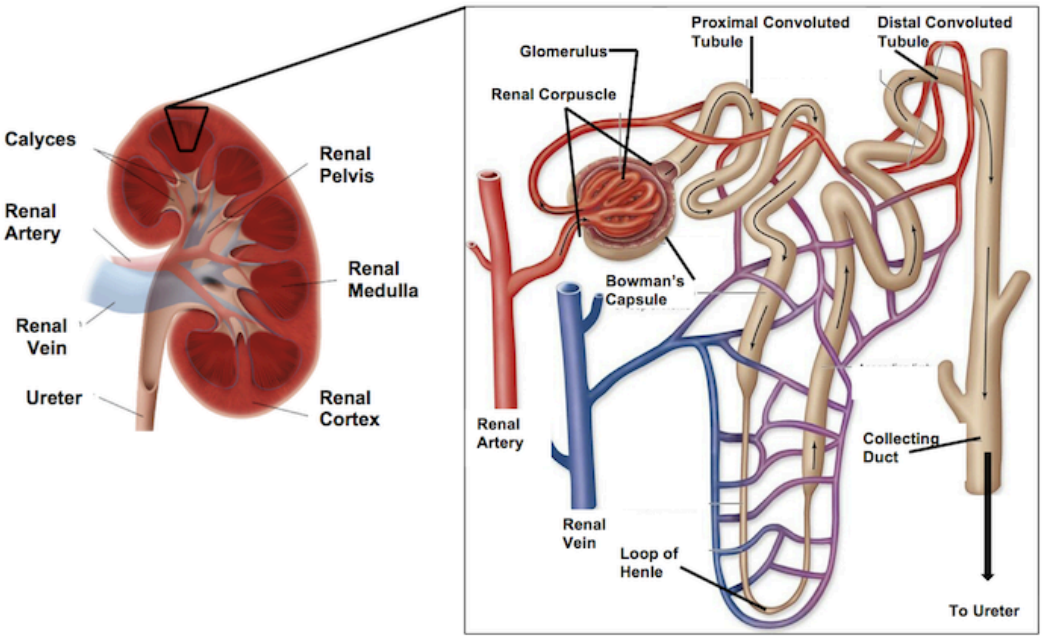

THE OXYGEN-HEMOGLOBIN DISSOCIATION CURVE
HEMOGLOBIN SATURATION WITH OXYGEN (SO_2) (%)
PARTIAL PRESSURE OF OXYGEN (PO_2) (mmHg)

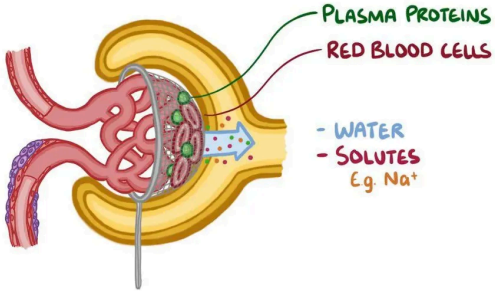


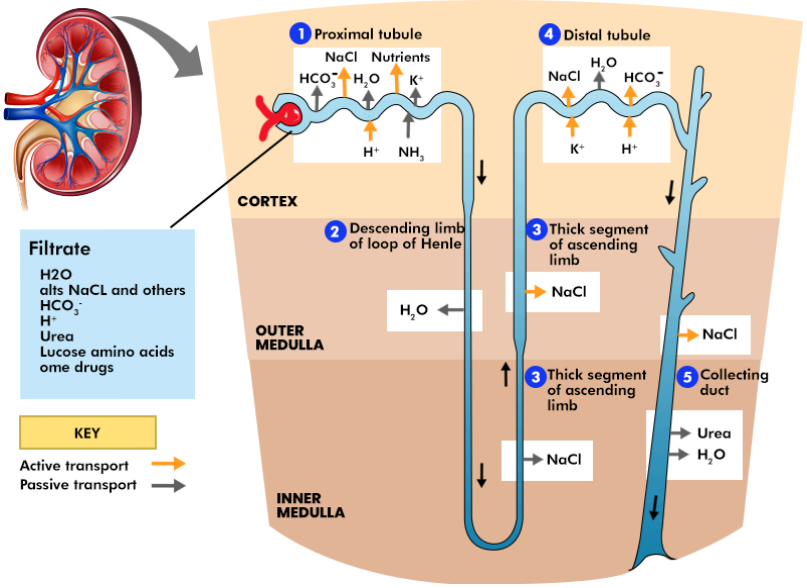


Kidney Anatomy



GLOMERULAR FILTRATION BARRIER - 3 LAYERS

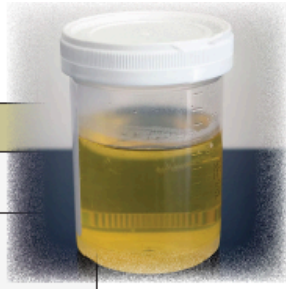




Hormone	Site of Action
Aldosterone	Collecting tubule and duct
Angiotensin II	Proximal tubule, thick ascending loop of Henle/distal tubule, collecting tubule
Antidiuretic hormone	Distal tubule/collecting tubule and duct
Atrial natriuretic peptide	Distal tubule/collecting tubule and duct
Parathyroid hormone	Proximal tubule, thick ascending loop of Henle/distal tubule

Composition of Normal Urine

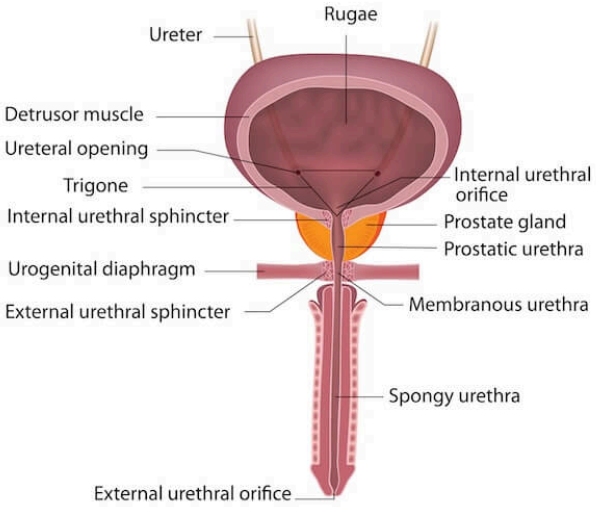
Constituents	Amount present
Water	95%
Urea	9.3 to 23.3 gram/liter
Chloride	1.87 to 8.4 gram/liter
Sodium	1.17 to 4.39 gram/liter
Potassium	0.750 to 2.61 gram/liter
Creatinine	0.670 to 2.15 gram/liter
Sulfur	0.163 to 1.80 gram/liter



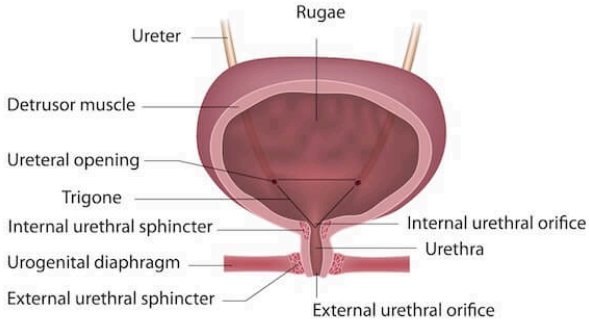
Urine Physical & Chemical Characteristics	
Volume	1-2 liters per day
Color	Variable shades of yellow, reflecting concentration, but diseases and conditions can cause urine to be red, brown, orange, etc.
Character (sometimes called cloudiness)	Fresh urine is typically clear, but it can be cloudy, due to contamination or urinary diseases/conditions
Odor	Mild ammonia-like odor, but other odors can be apparent with various diseases/conditions
pH	Variable, 4.5-8.0; average, 5.0-6.5

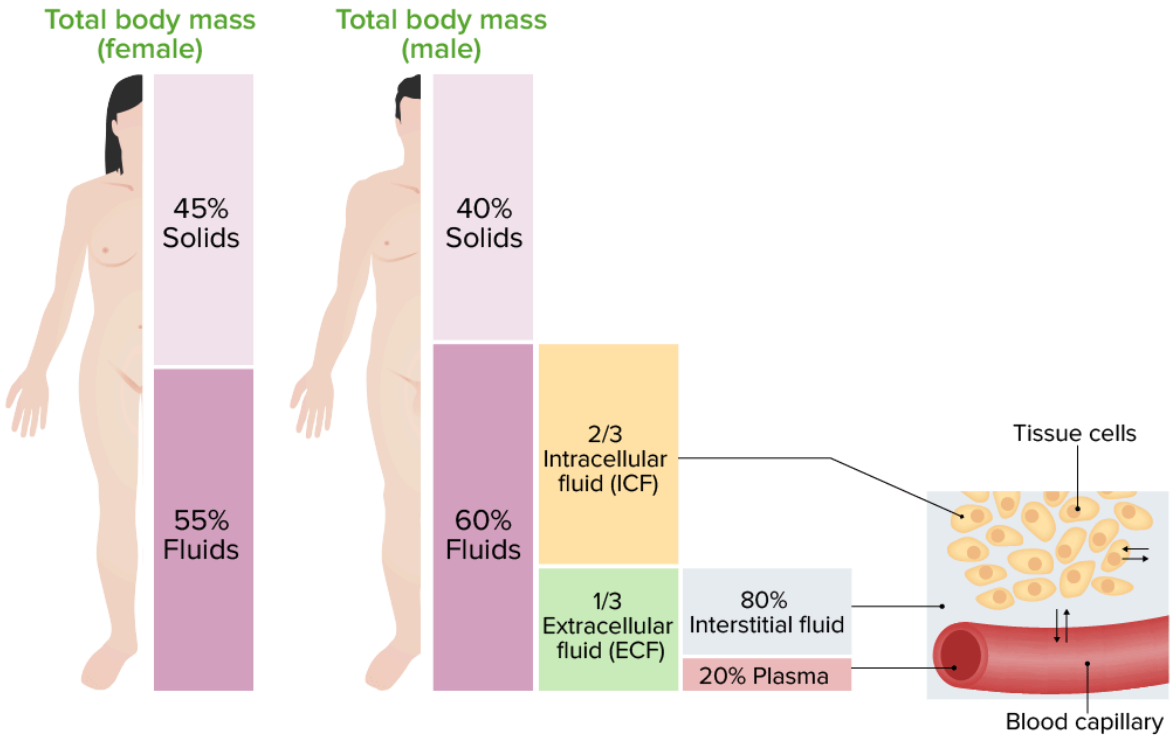
Urinary Bladder and Urethra

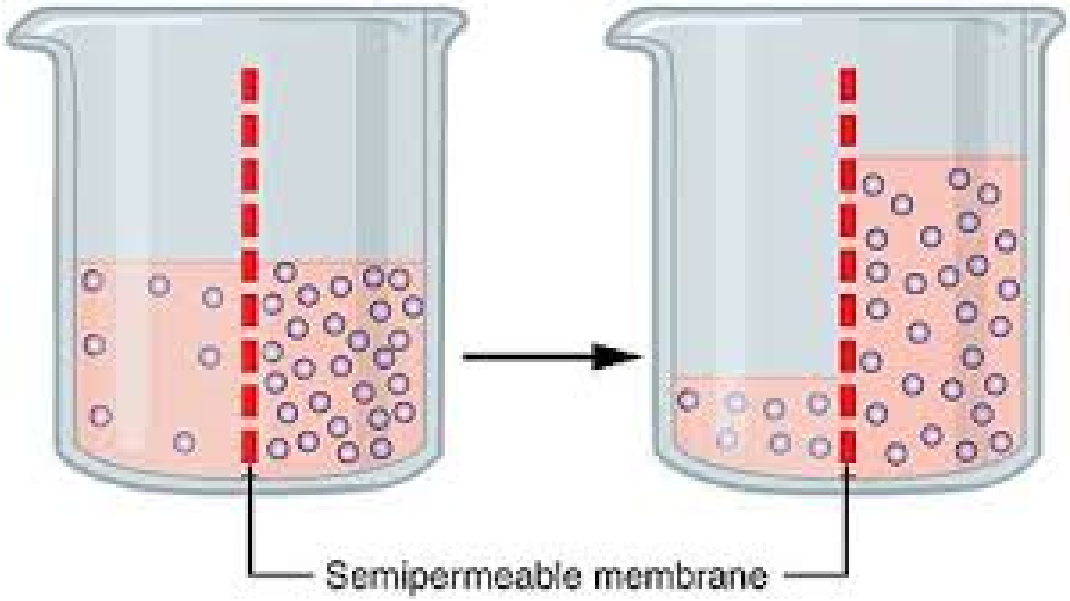
Male

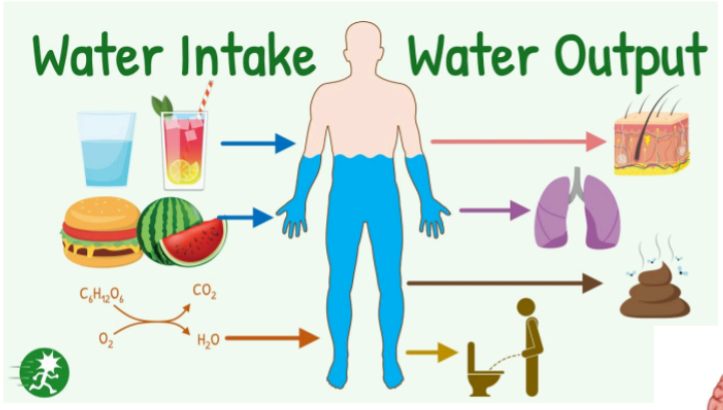


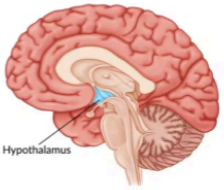
Female



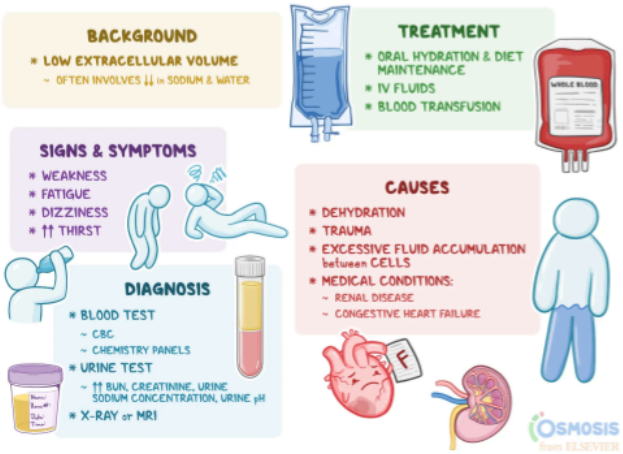

Total body mass (female)
45% Solids
55% Fluids
Total body mass (male)
40% Solids
60% Fluids
2/3 Intracellular fluid (ICF)
1/3 Extracellular fluid (ECF)
80% Interstitial fluid
20% Plasma
Tissue cells
Blood capillary


Semipermeable membrane

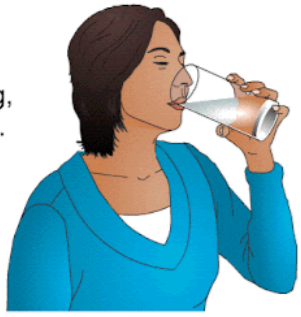


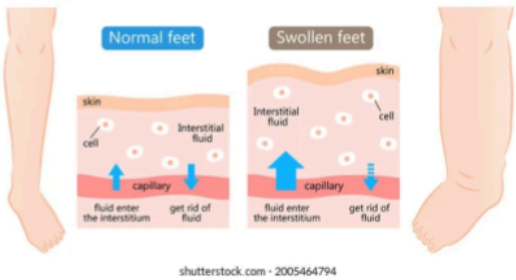


Hypovolemia



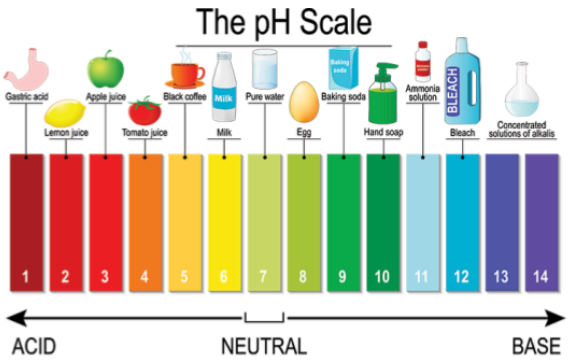
Water intoxication, also known as water poisoning, can lead to hyponatremia. This is a condition that happens when the level of sodium in your blood is abnormally low.

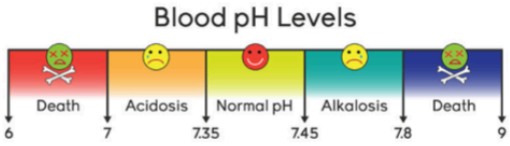




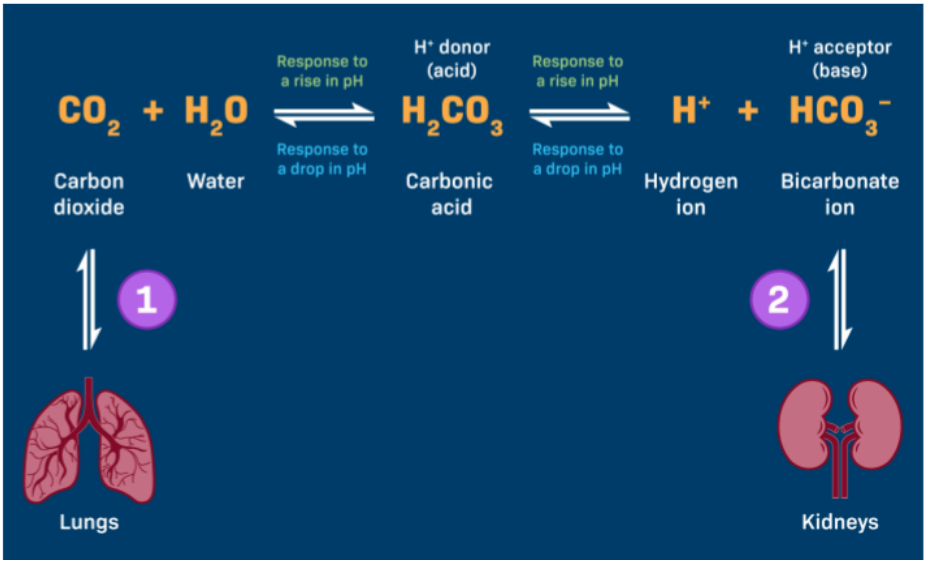
Different Types of Electrolyte Imbalances

Electrolytes	Too low	Too high
Bicarbonates	Acidosis	Alkalosis
Calcium	Hypocalcemia	Hypercalcemia
Chloride	Hypochloremia	Hyperchloremia
Magnesium	Hypomagnesemia	Hypermagnesemia
Phosphate	Hypophosphatemia	Hyperphosphatemia
Potassium	Hypokalemia	Hyperkalemia
Sodium	Hyponatremia	Hypernatremia

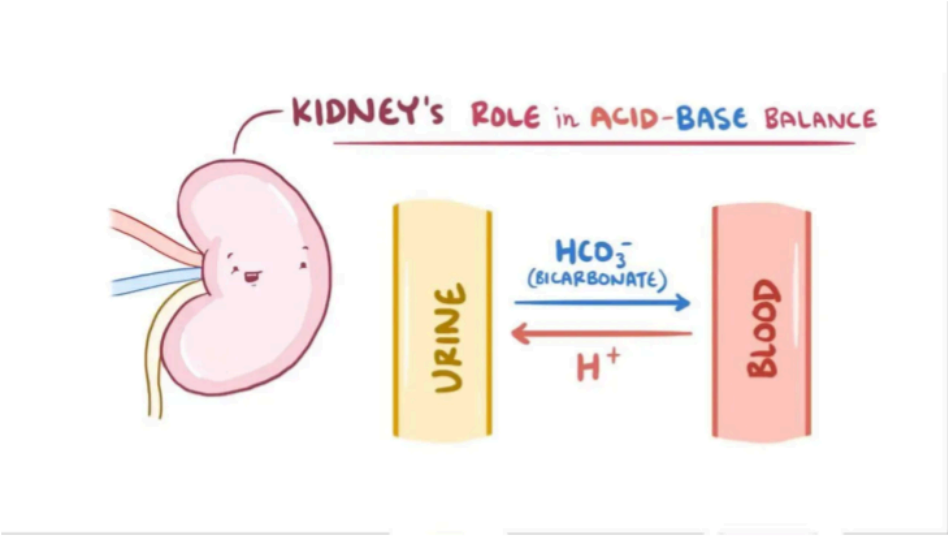


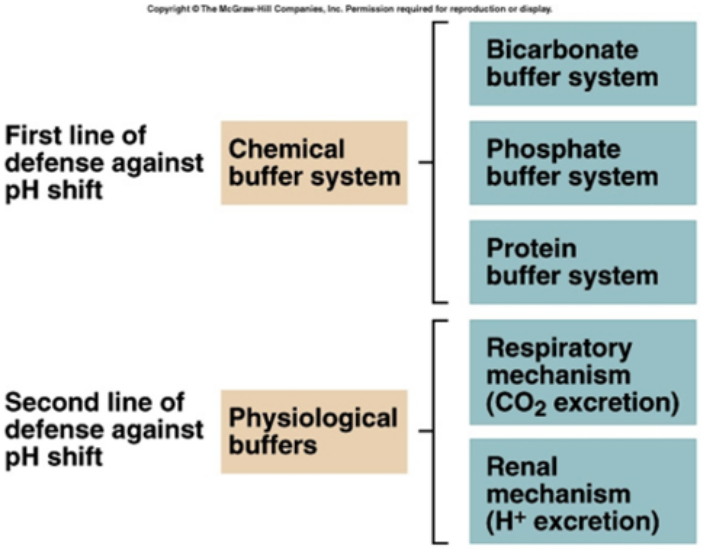


Chemical buffers: use a chemical to bind to H^+ and remove it from solution when levels rise to high and release H^+ when levels fall



Physiological buffers: use the respiratory and urinary systems to alter the output of acids, bases, or CO_2.





Alkalosis & Acidosis: Causes

Metabolic

ACIDOSIS

NORMAL ANION GAP

- Diarrhea
- RTA
- Renal failure

INCREASED ANION GAP

- Methanol
- Uremia
- DKA
- Paraldehyde
- Iron
- Lactate
- Ethylene glycol
- Salicylates

ALKALOSIS

- Vomiting (↓H^+)

- Loop & Thiazide diuretics (↑HCO^{3-})
- Hyperaldosteronism
- ↓ (H^+)

Respiratory

ACIDOSIS

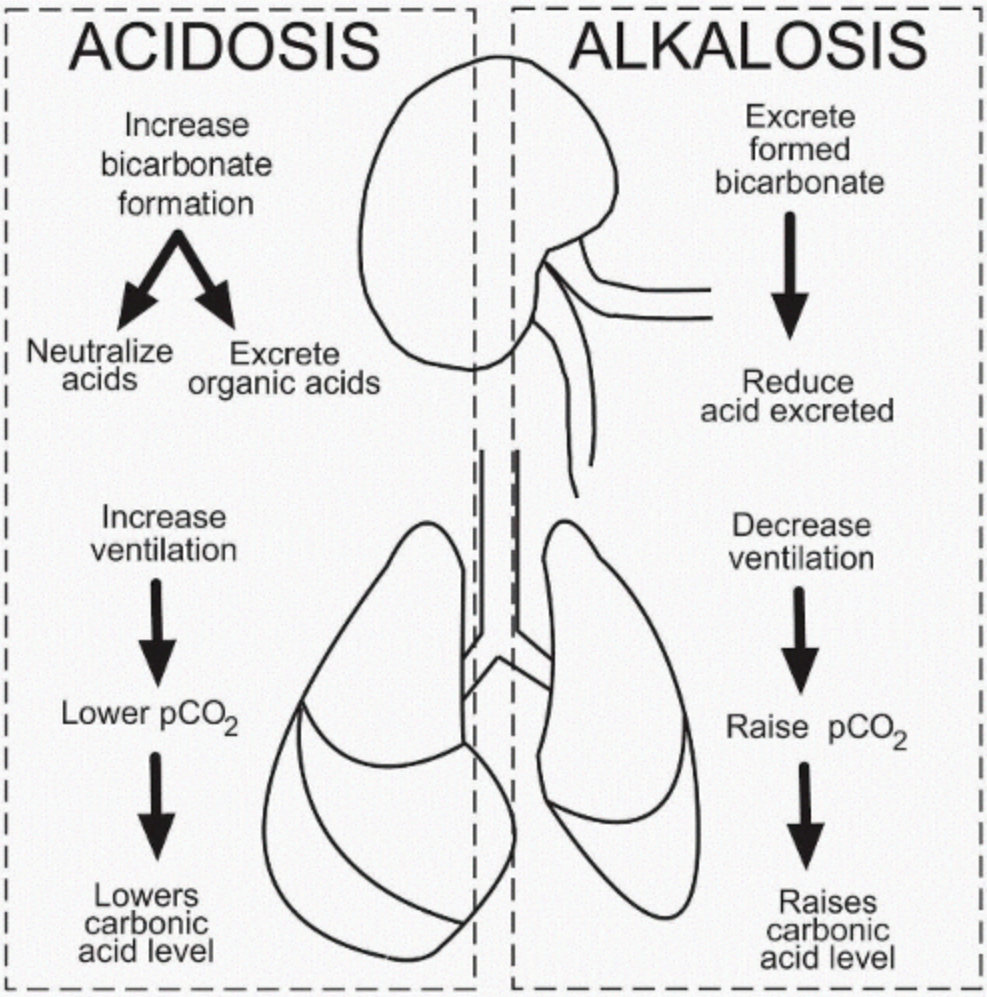
HYPOVENTILATION

- Medullary resp. center inhib..
- Neuromuscular defects
- Gas exchange defects

ALKALOSIS

HYPERVENTILATION

- Medullary resp. center stimulation
- Hypoxemia
- Distress


ACIDOSIS
ALKALOSIS
Increase bicarbonate formation
Neutralize acids
Excrete organic acids
Excrete formed bicarbonate
Reduce acid excreted
Increase ventilation
Lower pCO_2
Lowers carbonic acid level
Decrease ventilation
Raise pCO_2
Raises carbonic acid level