

Respiratory Acidosis

- Ventilatory type
 - Occurs when ventilation fails to remove all of the CO₂ produced by normal metabolism
 - Alveolar PCO₂ increases -> arterial PCO₂ increases
 - Reduced ventilation due to lack of drive to breathe
 - Eg drugs, central/respiratory center disease
 - Reduced ventilation due to inability to breathe
 - Respiratory muscle weakness, pulmonary parenchymal disease, obstructive airway disease
- Tissue type
 - Appropriately low arterial CO₂ with high venous CO₂
 - Due to increased CO₂ production or decreased flow of blood to an organ (so that a low CO₂ can be maintained)
 - Venous PCO₂ reflects PCO₂ in capillaries and therefore tissue PCO₂

Respiratory Alkalosis

TABLE 8-5 CAUSES OF RESPIRATORY ALKALOSIS

CONDITION	CAUSES
Hypoxia	Intrinsic pulmonary disease, high altitude, congestive heart failure, congenital heart disease (cyanotic)
Pulmonary receptor stimulation	Pneumonia, pulmonary embolism, asthma, pulmonary fibrosis, pulmonary edema
Drugs	Salicylates, alkaloids, catecholamines, theophylline, progesterone
Central nervous system disorders	Subarachnoid hemorrhage, primary hyperventilation syndrome
Miscellaneous	Psychogenic hyperventilation, liver cirrhosis, fever, gram-negative sepsis, pregnancy

- Salicylate intoxication
 - Uncouples oxidative phosphorylation and direct effects of salicylate anions on cells
 - Central stimulation of respiration
 - Therapy: dialysis, alkali therapy (with caution), acetazolamide (with caution, unknown mechanism: increases pH in lumen of proximal tubule though may increase the toxic effects of salicylates via competitive albumin binding)

QUESTION

1. Name the two types of respiratory acidosis, and give an example of each.

ANSWER

- 1. Ventilatory type
 - Occurs when ventilation fails to remove all of the CO₂ produced by normal metabolism
 - Reduced ventilation due to lack of drive to breathe
 - Eg drugs, central/respiratory center disease
 - Reduced ventilation due to inability to breathe
 - Respiratory muscle weakness, pulmonary parenchymal disease, obstructive airway disease
- 2, Tissue type
 - Due to increased CO₂ production or decreased flow of blood to an organ
 - Eg: seizures, severe exercise, decreased forward flow of blood