

Respiratory Acidosis



Accumulation of carbon dioxide in the body lowers pH. This condition is called *respiratory acidosis*.

In this exercise, we make the guy inhale some carbon dioxide and this leads to respiratory acidosis.

The Respiratory Acidosis Protocol

Click Restart to reestablish initial conditions and record the control data.

Go to . Slide the inhaled CO₂ concentration up to 5% and click the gas tanks switch on. Advance the solution and record pertinent data.

Note the falling pH as CO₂ accumulates. Note also that inhaled CO₂ stimulates ventilation.

Use and to track CO₂ and pH. Use to track ventilation.

Venous pCO₂ (mmHg)

Venous [H⁺] (nEq/L)



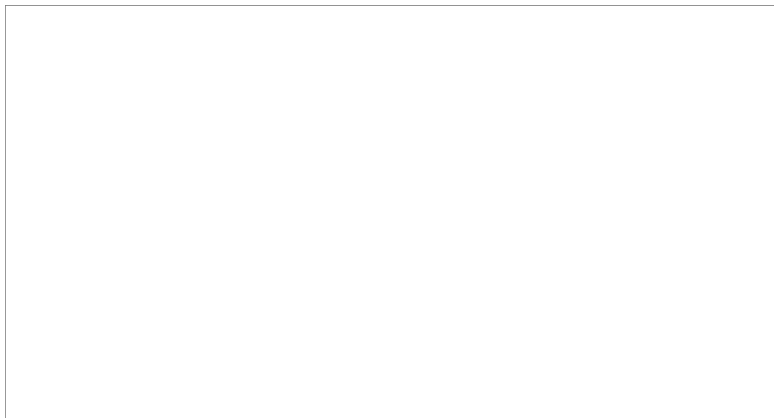
Venous [HCO₃⁻] (mEq/L)

Venous pH

Venous pO₂ (mmHg)

Time	0 Min	30 Min	60 Min
Venous pCO ₂			
Venous [H ⁺]			
Venous [HCO ₃ ⁻]			
Venous pH			
Venous pO ₂			

Plot venous pH as a function of venous pCO₂ on the coordinates below.



You can use hyperventilation to create lower than normal blood carbon dioxide levels. Go to and slide the basic respiratory drive in the respiratory center up to a higher value.

CO2 And Ventilation

CO2 stimulates ventilation by way of changes in pH in the brain's respiratory center.

Normally, arterial pCO₂ does not change a lot and the stimulatory effect of CO₂ on ventilation remains hidden. In this exercise, we'll observe the effect of arterial pCO₂ on ventilation, using CO₂ inhalation as a stimulus.

Click Restart to reestablish initial conditions and record the control data.

Go to . Slide the inhaled CO₂ concentration up to 2% and click the gas tanks switch on. Advance the solution for 30 minutes and record pertinent data.

Repeat protocol at CO₂ concentrations of 4%, 6% and 8%

Arterial pCO₂ (mmHg) and pH

Total Ventilation (L/Min)

Inhaled CO ₂ (%)	0	2	4	6	8
Arterial pCO ₂					
Arterial pH					
Ventilation					

Plot total ventilation as a function arterial pCO₂ on the coordinates below.

