Respiratory Acidosis

1. Accumulation of carbon dioxide in the body lowers pH. This condition is called *respiratory acidosis*.
2. In this exercise, we make the patient 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 tank switch to 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)

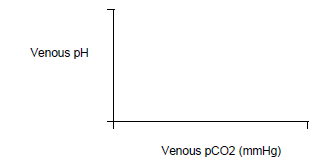
Venous [H+] (nEq/L)

Venous [HCO3-] (mEq/L)

Venous pH

Venous pO2 (mmHg)

|  |  |  |  |
| --- | --- | --- | --- |
| Time | 0 Min | 30 Min | 60 Min |
| Venous pCO2 |  |  |  |
| Venous [H+] |  |  |  |
| Venous [HCO3-] |  |  |  |
| Venous pH |  |  |  |
| Venous pO2 |  |  |  |

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 to 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 CO2 (%) | 0 | 2 | 4 | 6 | 8 |
| Arterial pCO2 |  |  |  |  |  |
| Arterial pH |  |  |  |  |  |
| Ventilation |  |  |  |  |  |

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