



Blood gases analysis

Blood gases are a measurement of how much oxygen and carbon dioxide are in your blood. They also determine the acidity (pH) of your blood. Blood gas measurements are used to evaluate a person's lung function and acid/base balance. Blood gases are used to detect an acid-base imbalance, such as can occur with kidney failure, heart failure, uncontrolled diabetes, severe infections, and drug overdose.

They are typically ordered if someone is having worsening symptoms of a respiratory problem, such as difficulty breathing or shortness of breath, and a condition such as asthma or chronic obstructive pulmonary disease (COPD) .

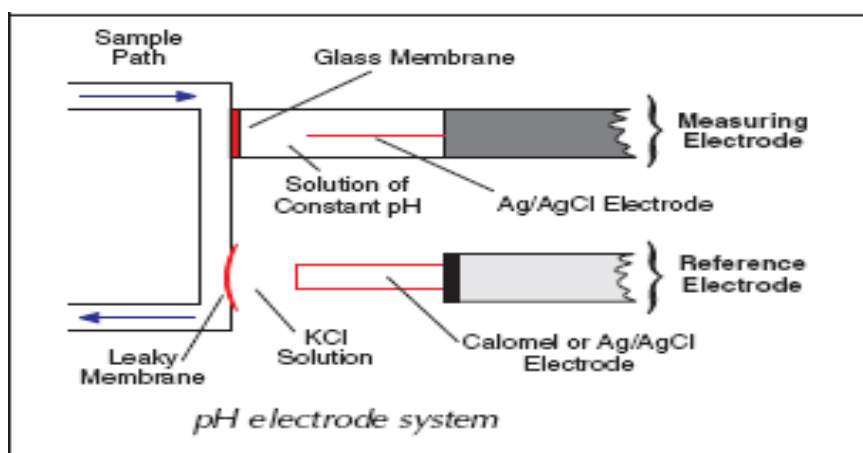
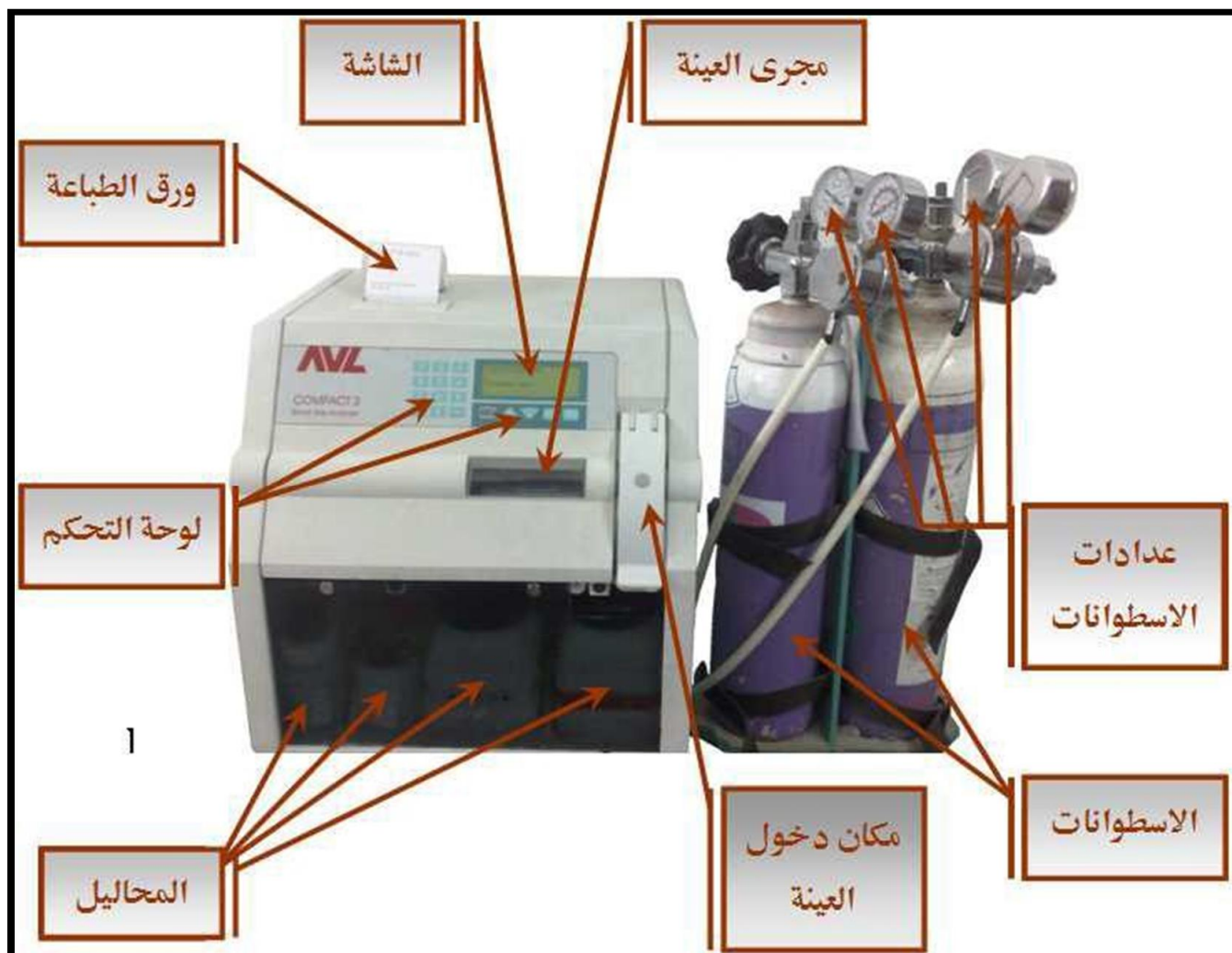
How the Test is Performed?

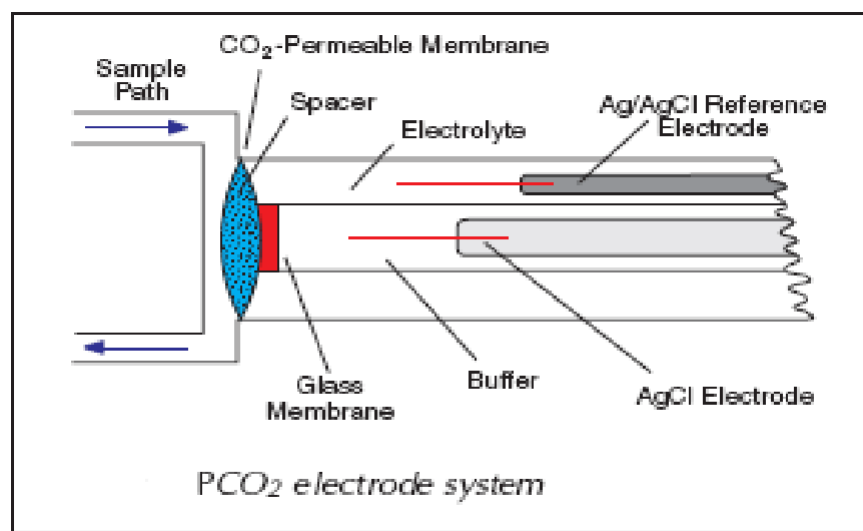
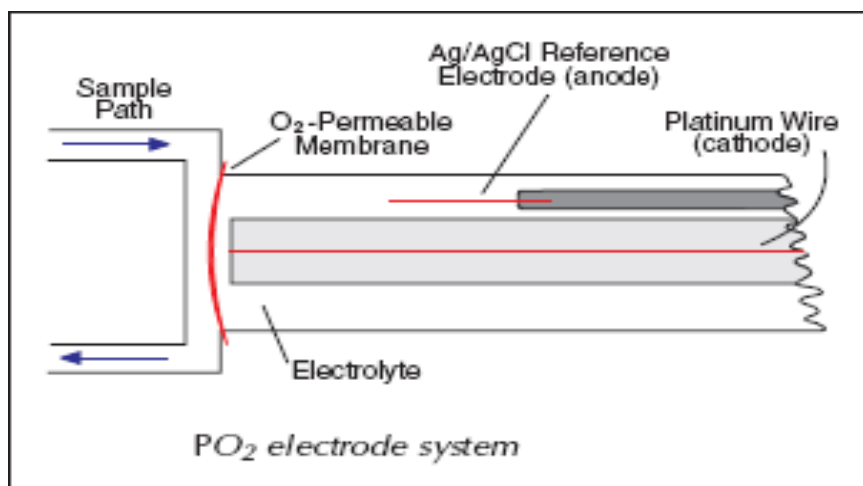
Usually, blood is taken from an artery. In some cases, blood from a vein may be used. Blood may be collected from one of the following arteries:

- wrist the in artery Radial
- Femoral artery in the groin
- Brachial artery in the arm

Normal Results

- Partial pressure of oxygen (PaO₂): 75 - 100 mmHg
- Partial pressure of carbon dioxide (PaCO₂): 38 - 42 mmHg
- Arterial blood pH: 7.38 - 7.42
- Oxygen saturation (SaO₂): 94 - 100%
- Bicarbonate - (HCO₃): 22 - 28 mEq/L
- Note: mEq/L = milliequivalents per liter; mmHg = millimeters of mercury if abnormal, may indicate a condition that is causing acidosis or alkalosis.





What does it do?	<p>It measures pH and blood gas ie; concentration of hydrogen ions (pH), partial pressure of carbon dioxide (pCO₂) and partial pressure of oxygen (pO₂), in whole blood. It may also measure electrolytes and metabolites.</p> <p>eg. Electrolytes: cK⁺ (potassium ion concentration), cNa⁺, cCa²⁺, cCl⁻</p> <p>Metabolites: cGlu (glucose), cLac (lactate), ctBil (total bilirubin)</p>
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Physiology	<p>The pH value of blood, serum or plasma is an indicator of the balance between the blood, renal (kidney), and lung (respiratory) systems, and is one of the most tightly controlled parameters in the body.</p> <p>The pCO₂ value of arterial blood is used to assess how well the body eliminates carbon dioxide, a by-product of metabolism. The pO₂ value of arterial blood is a measure of how well the body is able to absorb oxygen in the lungs. Electrolytes and metabolites give further information about body chemistry.</p>
How it works	<p>Blood is collected from the patient and introduced into the analyser. The analyser aspirates the blood into a measuring chamber which has Ion Selective Electrodes (IE electrodes that are sensitive only to the measurement of interest).</p> <p>The pH electrode compares a potential developed at the electrode tip with a reference potential, the resulting voltage is proportional to the concentration of hydrogen ions, [H⁺].</p> <p>The pCO₂ electrode is a pH electrode with a Teflon or silicone rubber CO₂ semi permeable membrane covering the tip. CO₂ combines with H₂O in the space between the membrane and the electrode tip to produce free hydrogen ions in proportion to the partial pressure of CO₂. The voltmeter, although actually measuring [H⁺], is calibrated in pCO₂.</p> <p>For pO₂, oxygen permeates a polypropylene membrane and reacts chemically with a phosphate buffer. The O₂ combines with water</p>
	<p>in the buffer, producing current in proportion to the number of oxygen molecules. The current is measured and expressed as partial pressure of oxygen.</p> <p>After measurement the blood is automatically expelled into a waste container and the sample path is cleaned, ready for the next sample. Results may be printed, displayed and sent to the Laboratory Information System.</p>
Units of measurement	<p>Millimeters of mercury (mmHg), kilo Pascal's, (kPa)</p>
Typical values	<p>PH of blood is normally maintained within the very narrow range 7.38 to 7.44. Typical values for pCO₂ in adult male arterial blood are 34 to 35 mmHg. Typical values of pO₂ in a resting male arterial blood sample are 80 to 90 mmHg.</p>
Pictures of equipment	

