

Blood Biochemistry Analysis

Equipment: **Nova Biomedical Stat Profile M7** (manufactured by Nova Biomedical, Waltham, MA)
<http://www.clinlabexpo.com/exhib/hall/nova2.html>

Supplies:

- 150 or 200 µl capacity ammonium heparinized capillary tubes (Drummond Microcaps, Drummond Scientific Company, Broomall, PA)
- 0.5 ml microtubes
- crushed ice

General Information:

The Stat Profile M7 Analyzer is intended for the quantitative determination of sodium, potassium, chloride, ionized calcium, creatinine, glucose, lactate, and Urea or BUN in serum, plasma, and whole blood and pH, PCO₂, PO₂, oxygen saturation, hematocrit and hemoglobin in whole blood. From these directly measured results, the following calculated results are reported;

- Base Excess of the Blood (BE-B)
- Base Excess of Extracellular Fluid (BE-ECF)
- Bicarbonate level (HCO₃⁻)
- Standard Bicarbonate Concentration (SBC)
- Total Carbon Dioxide (TCO₂)
- Oxygen Content (O₂CT)
- Hemoglobin (Hb) – (If Hb is not selected as a measured test)
- Osmolality (Osm)
- Arterial Alveolar Oxygen Tension Ratio (a/A)
- P50
- Normalized Calcium (nCa)
- Alveolar Oxygen (A)
- Arterial Alveolar Oxygen Tension Gradient (AaDO₂)
- PO₂/FI (Arterial samples only)
- Anion Gap
- O₂ Sat (If SO₂% is not selected as a measured test)
- BUN/Creatinine Ratio

The following is a list of acceptable samples:

- Whole blood, plasma, or serum collected anaerobically from an arterial, venous or capillary site
- Whole blood, plasma, or serum collected aerobically (Na⁺, K⁺, Cl⁻, iCa, Creatinine, Glucose, Lactate, and Urea)
- Whole blood (Hematocrit and Hemoglobin)
- Urine cannot be analyzed in this instrument

Ammonium and lithium heparin are the recommended anticoagulants for use with the Stat Profile M7 Analyzer. Sodium heparin can be used but may affect the quantification of sodium in the sample. EDTA, citrate, oxalate, or sodium fluoride are **not** recommended for use.

In the mouse physiology screening laboratory we collect mouse saphenous vein blood aerobically for the measurement of Na⁺ (mmol/L), K⁺ (mmol/L), Cl⁻ (mmol/L), iCa (mmol/L), creatinine (µmol/L), glucose (mmol/L), lactate (mmol/L) and Urea (mmol/L). At the current time, blood gas measurements are not part

of our blood biochemistry screen because anaerobic blood collection is difficult and we currently collect only venous blood. Blood biochemistry analyses are available on a fee-for-service basis. Individuals are encouraged to do their own mouse blood collection (refer to the Saphenous Vein Blood Collection Protocol) and to simply provide the blood samples for any desired screening.

Procedure: (please refer to the Saphenous Vein Blood Collection Protocol for details on how to collect blood from the mouse)

Blood collected aerobically for biochemical analysis in the Stat M7 Profile Analyzer is collected in 150 or 200 µl ammonium heparinized capillary tubes (Drummond Microcaps, Drummond Scientific Company, Broomall, PA). The analyzer requires a minimum volume of 120 µl for a successful measurement. Therefore, we collect between 130-150 µl of whole blood. To avoid stress due to excessive blood loss, mice must weigh ≥ 15 grams in survival experiments and ~ 2 weeks should elapse between repeated blood sampling. The collected blood is dispensed into a 0.5 ml microtube. The tube is capped and the contents of the tube gently mixed by flicking the side of the tube. Samples should be analyzed within 15 minutes for blood gases (note: samples must be collected anaerobically for accurate blood gas measurements) and within 30 minutes for electrolytes, glucose and lactate (plasma samples may be analyzed for Creatinine and Urea hours after collection as long as samples are kept on ice). Samples are stored on crushed ice until they are analyzed.

Reported Results:

For each blood sample analyzed, a blood biochemistry report is generated.

Acknowledgements:

The CMHD requests that the users of our screening service acknowledge the technical assistance of our facility in any presentations or publications that report results generated by our services. A suitable acknowledgement for publications is as follows: "The authors would like to acknowledge the Samuel Lunenfeld Research Institute's CMHD Mouse Physiology Facility for their technical screening services (www.cmhd.ca)."

Additionally, please send reprints or information on such publications or presentations when they are submitted or available. Such acknowledgements will help promote the use of our service and assist us in obtaining continued financial support to help defray service fees.