Laboratory testing is required for the diagnosis of many diseases, and early detection of disease plays an important role in veterinary preventative care. Many laboratory tests are performed by veterinary technicians.

One of the most important jobs a veterinary technician performs is venipuncture (drawing blood) for running laboratory tests. It is important to be familiar with different laboratory tubes and what samples should be collected in each tube.

Hematology is the study of the blood elements (red blood cells, white blood cells, and platelets). This PowerPage discusses the different blood tubes and important points to know.

### Blood Chemistry

- **Whole blood** - consists of blood cells, suspected in a fluid component (plasma)
  - Blood cell constituents are leukocytes (white blood cells), erythrocytes (red blood cells), and thrombocytes (platelets).
- **Plasma** - the fluid part of the whole blood. Plasma is about 90% water and 10% proteins, carbs, vitamins, hormones, fats, salts, enzymes, and wastes.
- **Serum** is plasma that has had fibrinogen removed.

### Purple/Lavender-Top Tube

Contains EDTA as the anticoagulant. It prevents coagulation by binding to calcium ions (calcium is required for clotting).

- Cell constituents are stable for up to 24 hours in a purple-top tube.
- This is the tube used for running a complete blood count (CBC), hematocrit/packed cell volume, reticulocyte count (immature erythrocytes), or any counts of the aforementioned blood cells.
- Purple tops are also used for collecting fluid that may clot from body cavities in which cell counts need to be performed. This may include cerebrospinal fluid, peritoneal or pleural effusions, and synovial fluid.
- These samples are not centrifuged because there is no clot to be separated.
Laboratory Testing

Plain Red-Top Tube
Glass tubes have no additive; plastic tubes have clot activators.
- Red-Top Tubes are used in immunology and in some serologic tests.
- These can also be used as a sterile tube for collecting samples for culture such as urine.

Speckled Red-Top Tube (Tiger Top)
- **Serum separator tubes** - contain a clot activator and gel for serum separation
- Used for **chemistry panels** and are used to check any laboratory value seen on these panels and other **tests requiring a serum sample**. These tubes are used for the majority of blood tests (BUN, creatinine, ALT, ALP, triglycerides, cholesterol, electrolytes, etc.).

Light Blue-Top Tube
- Contains **sodium citrate**, an anticoagulant that binds calcium in the blood.
- For accuracy, these tubes must be completely filled to recommended level.
  - The appropriate ratio is 9 parts blood to 1 part citrate.
- Used to check for coagulation disorders: **Prothrombin time (PT)**, **Partial Thromboplastin Time (PTT)**, **Fibrin Degradation Products (FDP)**, **D-dimer**, **von Willebrand Factor**, and other factor and fibrinolysis assays.

Green-Top Tube
- **Plasma separator tubes (PST)** - contain **heparin**
- Heparin activates antithrombins, which block coagulation.
- Produces a whole blood/plasma sample and is used for collecting a plasma sample.

Gray-Top Tube
- These tubes contain **sodium fluoride**, which is best known as a **glucose preservative**, and some contain potassium oxalate.
- Used if an accurate glucose measurement is needed and sample processing will be delayed.
  - A blood glucose tested from serum in a red- or tiger-top tube in a delayed sample will be falsely low due to ongoing glucose metabolism by red blood cells in the tube.
References