

## General Instructions

For mammalian species, Complete Blood Counts (CBCs) are performed on EDTA (purple/lavender top tube) whole blood samples. Heparin (green top tube) or citrate (light blue top tubes) are not valid on our hematology analyzer and are thus not acceptable for mammalian CBC submissions. EDTA whole blood is the preferred specimen for most non-mammalian species, though EDTA may cause hemolysis in some species.

- Heparin whole blood (green top tube) is the preferred specimen for the following species:
  - Avian: Ducks, Crows / Ravens / Jays (Corvidae), Rollers, Hornbills, Curassow
  - Reptile: Turtles, Tortoises, Skinks
- Citrate whole blood (light blue top tube) is the preferred specimen for Ostrich samples.
- For all non-mammalian CBCs submitted in heparin or citrate whole blood, we request several fresh blood smears made at time of blood draw to be submitted along with whole blood (2 slides minimum).

The following guidelines will provide the most accurate CBC:

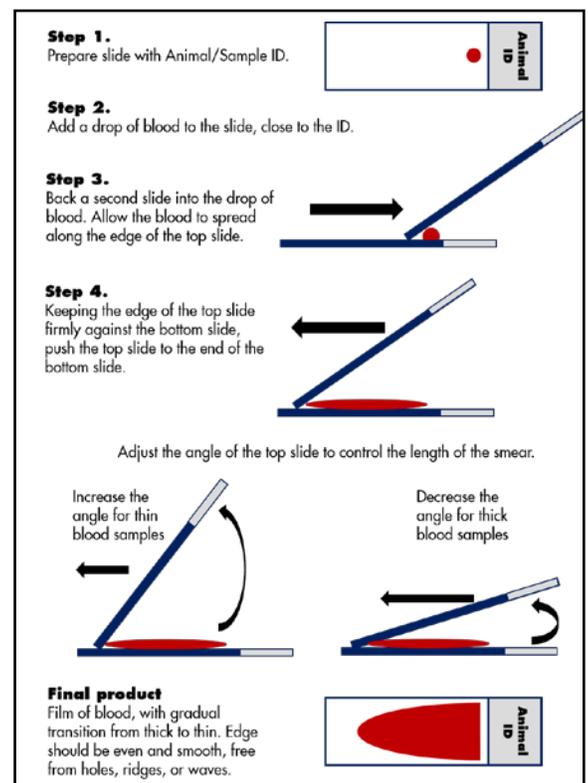
- Use the smallest size tube appropriate for your patient.
- Ensure that the blood is well mixed immediately after draw to prevent clotting. Mix by rolling tubes between palms or by gentle inversion. Do not shake!
- Label all tubes with patient ID and date of draw
- Make 2 fresh blood smears at time of sample collection if submission to our labs is greater than 8 hours. Blood smear instructions are below. Submit those smears along with whole blood.
- Store whole blood samples at refrigerator temperature until shipment (4°C).
- Ship for overnight delivery on ice packs. Do not allow blood samples to come into direct contact with the ice packs – wrap in a paper towel.

Non-mammalian CBCs can be challenging, due to low sample volume and propensity to lyse in EDTA. The UC Davis VMTH Clinical Diagnostic Laboratories strive to provide the most complete results possible given small sample size.

## Making a blood smear

Properly prepared blood smears made at time of blood collection will yield best results for any CBC. If whole blood samples cannot be delivered to the lab within ~8 hours of sample collection, we recommend preparing blood smears on site using the following directions.

1. Using pencil, label clean slide with Animal/Sample ID on the frosted edge. Pen will wash away when the slide is stained.
2. Place slide on a flat surface.
3. Place a single drop of blood about 1cm from the frosted end of the slide.
4. With the thumb and forefinger of the dominant hand, hold the frosted end of a second slide (top slide).
5. Place the non-frosted end of the top slide against the surface of the first slide (bottom slide) at an angle of 30-45 degrees.
  - a. Ensure that the non-frosted edge of the top slide is smooth and free from nicks or bumps. Defects in the slide will result in poor quality smears.



6. Draw the top slide back and allow it to contact the drop of blood. Allow the blood to spread along the edge of the top slide.
7. Holding the bottom slide in place with your non-dominant, gently-but-firmly push the top slide away from you at a moderate speed, allowing the blood to spread to a thin film on the bottom slide.
  - a. Common problem at this step is to push down on the top slide too firmly. If slides appear to have ridges, waves, or uneven blood distribution, try decreasing the firmness with which the top slide is held.
8. The film should not cover the entire surface of the bottom slide, but should form an elongated half-oval shape that stops ~1cm before the end of the slide.
  - a. A good quality smear will be even in appearance and free from ridges, waves, or holes. The edge of the smear (the “feathered edge”) should be smooth and even. Blood smears that appear rough or streaked result in uneven distribution of blood cells.
9. Allow the blood smear to quickly air dry.
10. Place dried slides in a slide storage container. Do not refrigerate. Avoid exposure to fixatives (formalin) or condensation, as these will damage the smear.
11. Send smears along with whole blood sample when submitting a CBC.

When making blood smears, the following are important:

- Size of the blood drop – If the drop is too large, the smear will be too long.
- Speed – the speed at which the top slide is moved is very important. Moving too fast: the smear will be too short and too thick. Moving too slow: the smear will be too long and will lack the feathered edge
- Angle of the top side – Angle determines the length of the smear. An angle of ~30-45° is optimal. Larger angles will cause the smear to be shorter; smaller angles will cause the smear to be longer.

### **Sample Storage and Shipping**

Store blood samples at 4C until shipment. Smears should be kept at room temperature and away from fixatives (formalin).

- Ensure all blood tubes are labelled with Animal/Sample ID and draw date.
- Obtain an insulated shipping box and fill with ice packs.
- Wrap blood tubes in a paper towel, then place in a sealable plastic bag.
- Nestle bag containing wrapped blood tubes in ice packs. Do not allow the blood tubes to touch the ice packs directly as this may cause lysis of the red blood cells.
- It is crucial to keep blood smears protected from moisture. Place smears in a plastic slide box, wrap with a paper towel, and place in a sealable plastic bag. Place slides at the very top of the ice packs, minimizing contact of slide box & ice packs. Ensure that slides do not rattle within the slide box; this may cause them to crack/break during transport.
- Close and secure box.
- Samples should be shipped via FedEx Priority Overnight, Monday – Thursday only.
  - The VMTH Clinical Diagnostic Laboratories do not receive packages on weekends or university holidays.

For additional information about sample submission, reduced rate shipping program, pricing, etc, please contact Central Laboratory Receiving or visit our website.

Central Lab Receiving: (530) 752-8684, UCDVetClinicalLabs@ucdavis.edu

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