| University of British Columbia<br>Centre for Dairy Education<br>and Research | Document Number | SOP-Cow-001 |
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# CATTLE BLOOD SAMPLING

## 1. PURPOSE

1.1. This Standard Operating Procedure (SOP) instructs farm staff and students on the humane methods of blood collection from cattle at the UBC Dairy Research and Education Centre.

## 2. SCOPE

2.1. This SOP will describe the method used for collection and identification of blood samples for clinical biochemical and hematological analyses, and research studies. This document will also provide a general overview of important points which impact the welfare of the animal to remember.

## 3. RESPONSIBILITY

3.1. The Operations Manager is responsible for reviewing and updating this procedure as required.

3.2. The Operations Manager is responsible for ensuring all staff are trained in this procedure.

3.1. Personnel performing cattle blood collection are responsible for reading, adhering to and understanding the procedure outlined in this SOP.

## 4. TRAINING

4.1. Training on how to safely move animals is needed prior to carrying out this SOP. Two in-house video modules are located in Rm 205 of the office/lab building. See SOP on Student Training.

## 5. SAFETY PRECAUTIONS

5.1. Personnel performing blood collection will follow routine health and safety procedures to protect against contamination or transfer of zoonotic diseases.

5.2. All personnel entering the cattle facilities will wear personal protective equipment. Coveralls and dedicated facility footwear is worn to enter the animal holding area. When working with blood, disposable gloves must also be worn.

5.3. Care will be taken when handling sharps; needles and syringes will be disposed of in appropriate sharps containers.

## 6. GENERAL

6.1. Check with the project leader to determine the appropriate blood collection tubes to use (plasma, serum) – as determined by the subsequent blood analysis to be done.

6.2. Label specimen containers with pertinent information; including date, animal ID, protocol # and investigator.

6.3. Verify the identity of each animal at the time of sampling and verify that corresponding, correctly labeled sample tubes are used for collection.

6.4. All procedures performed will be recorded in a Medical Record or on herd management software.

6.5. Two common sites for collecting blood samples are the jugular vein (in the neck) and the tail vein on the ventral surface (underneath) of the tail.

6.6. The vein must be clearly located and the puncture carried out assertively rather than hesitantly. Aim to pierce the skin and vessel in one movement by directing the needle tip bevel up so the angle is almost parallel to the vein. A vein will collapse if the sample is taken too quickly or the suction on the syringe or vacutainer is too strong.

6.7. After blood has been collected, gentle but firm continuous pressure for thirty seconds should stop the bleeding. The animal is monitored to ensure bleeding has stopped.

6.8. When a syringe and needle have been used to collect the blood sample, remove the needle from the syringe, before transferring blood into the vacutainer tube, to prevent hemolysis. To remove the needle safely, slide the needle into the cap lying on a level surface, and lift up. Grasp the capped needle (with a hemostat or similar tool), push down on the cap, and twist it off the syringe.

6.9. When using vacutainer tubes ensure the tube is filled to its intended capacity. A blood /anticoagulant ratio of 9:1 is optimum for citrated tubes.

6.10. Gently invert the tube 2 or 3 times to mix the anticoagulant and blood. Do not shake vigorously as this may cause hemolysis. DO NOT INVERT RED TUBES, these tubes are used for separation of serum.

## 7. MATERIALS AND EQUIPMENT

7.1.1. Syringes and/or Vacutainers -blood collection tubes

7.1.2. Vacutainer holders

7.1.3. 70% isopropyl alcohol

7.1.4. 4 x 4" gauze

7.1.5. Clean gloves

7.1.6. Eye protection (recommended)

7.1.7. 20 to 18 gauge 1-1.5" needles

7.1.8. Approved sharps container

7.1.9. IV catheters (if >3mls)

7.1.10. Winged infusion set

## PROCEDURE

7.2. Animal Preparation

7.2.1. Verify the identification of the cow or calf by number.

7.2.2. Move the cow into a pen equipped with a head locking gate. See Moving & Chasing Cattle SOP, and SOP on Handling Cattle for headlock procedure. If obtaining blood from a calf, have an experienced handler provide appropriate restraint.

7.3. Needle Preparation

7.3.1. Gather enough needles, syringes and vacutainers to obtain the required number of blood samples.

7.3.2. Prepare blood collection equipment by screwing the needle onto the syringe, or vacutainer holder. Loosen cap on needle. Ensure sterility is maintained.

7.3.3. If using a vacutainer, loosely place the vacutainer holder over the top of the vacutainer. Do not pierce the rubber seal of the vacutainer with the attached needle as you will lose the vacuum.

7.3.4. Catheters are preferred when taking a jugular neck sample >3mls, or if a non-coagulated sample is needed.

7.4. Jugular Vein Bleed

7.4.1. Gloves and eye protection are recommended. Again verify the identity of the cow or calf and that corresponding labels are correct.

7.4.2. Place 3 fingers of one hand into the jugular furrow at the base of the neck to enlarge and locate the vein.

7.4.3. Clean the collection site using alcohol and gauze until the gauze comes away clean.

7.4.4. While holding the three fingers of one hand in the jugular furrow, use the other hand to pierce the vein with the needle, winged infusion set or catheter into the jugular vein.

7.4.5. Once the sample has been obtained, withdraw the needle, infusion set or catheter and apply pressure (15-30 sec) over the puncture site until bleeding has stopped.

7.5. Tail Vein Bleed

7.5.1. Gloves and eye protection are recommended. Again verify the identity of the cow and that corresponding labels are correct.

7.5.2. Let the animal know you are behind her by gently talking and stroking her. Stand close to her to minimize injury from kicking.

7.5.3. Lift the cow's tail and clean the area where the needle will be inserted. The established location is between the vertebrae (close to the tail base) on the underside of the tail. Clean the area until the alcohol pad comes away clean. (Fig 1 & 2)

7.5.4. With a clean gloved hand and using the alcohol pad, palpate a space between the vertebrae. Move the alcohol pad away as you insert a 20 gauge 1 to 1 ½ inch needle connected to a vacutainer. (Fig 3)

7.5.5. Take the pre-loosened cap off the needle and insert the needle less than 1 cm deep. Push the vacutainer up to connect it to the needle. The vacutainer tube will fill with blood if it is in the right position. (Fig 4 & 5)

7.5.6. If no blood enters the tube, slowly retract the needle and alter the position slightly. DO NOT pull the needle out.

7.5.7. Once the sample has been obtained, disconnect the vacutainer, remove the needle (Fig 6) and apply pressure (15 to 30 sec) until the bleeding has stopped.

7.5.8. Record the date, the cow's identification number, and the # and type of vacutainers of blood collected. Place the samples in the refrigerator until they can be transferred to the lab for processing.

**Steps for obtaining a blood sample from the tail vein.**

Fig 1. Stand in close to the cow and lift her tail with one hand.

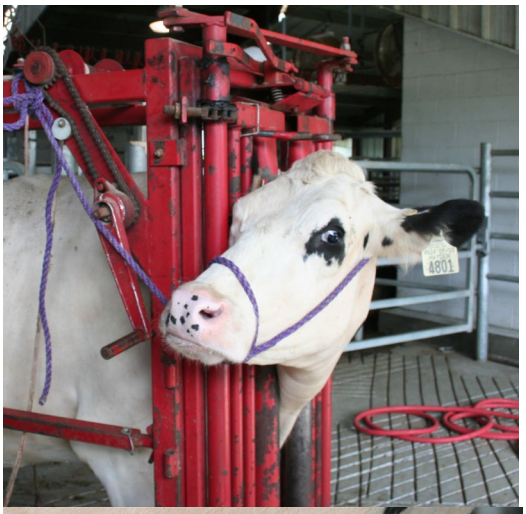
Fig 2. Clean injection area with an alcohol soaked gauze

Fig 3. Insert a sterile needle into the cleaned area.

Fig 4. Connect the needle/tube assembly to a vacutainer

Fig 5. Let vacutainer fill with blood.

Fig 6. Once the sample is obtained, disconnect the vacutainer from the needle and pull out needle from cow.



**Obtaining a blood sample from the jugular vein**

Figure 1. Pull head to the side, and secure lead with quick release knot

Figure 2. Occlude the jugular vein by applying pressure at the base of the jugular groove, clean the injection site and insert needle/vacutainer assembly.

Figure 3. Let the vacutainer fill with blood, then disconnect the vacutainer before removing the needle.

Images: Virginia Tech SOP Blood collection in cattle. See Ref #4.

## 8. REFERENCES


8.1. CCAC Guidelines on the Care and Use of Farm Animals in Research, Teaching and Testing. CCAC. 2009.

8.2. Code of Practice for the Care and Use of Dairy Cattle. National Farm Animal Care Council. 2009

8.3. Guidelines for the welfare of livestock from which blood is harvested for commercial and research purposes. New Zealand Government. Online document. Accessed Dec2019. https://www.mpi.govt.nz/dmsdocument/1475-guidelines-for-the-welfare-of-livestock-from-which-blood-is-harvested-for-commercial-and-research-purposes

8.4. Virginia Tech. University Veterinarian and Animal Resources. SOP Blood Collection in Cattle. Online document. Accessed Dec 17, 2019. https://ouv.vt.edu/content/dam/ouv_vt_edu/sops/large-animal/sop-bovine-blood-collection.pdf


## 9. SOPs

9.1. SOP-General-001 Student Training

9.2. SOP-Cow-006 Moving & Chasing Cattle

9.3. SOP-Cow-011 Giving Vaccinations

9.4. SOP-Cow-023 Handling Cattle

## 10. APPROVAL AND REVISION HISTORY

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