

Chapter 8 - Lesson 1



Fecal, Blood, & Urine Examinations

Fecal Examination

Examining fecal samples for the presence of worm eggs and larvae and protozoa trophozoites and cysts is a common practice in most veterinary clinics. Veterinarians try to prevent continued parasitic diseases in animals, which decrease production; reduce growth rates; cause infertility, abortions, and deaths; and require costly treatment medications.

The veterinary assistant should know how to collect and examine fecal samples. However, the veterinarian will give the assistant specific instructions for when and what veterinary procedures need to be performed. Methods for testing fecal samples include direct smear, flotation, and gross examinations.

Collection

When collecting fecal samples, first make certain that the feces is from the animal in question. Secondly, secure a fresh sample that is free from rocks, soil, bedding, and other foreign materials. Place the fecal sample in a plastic vial, glass jar, waxed cup, or plastic bag. If the examination does not follow closely after collection, preserve the sample in a refrigerator.

Direct Smear Examination

The direct smear method involves mixing a very small amount of feces with a water or saline solution. Place the mixture on a slide, overlay it with a cover glass, and examine the entire smear under a low power microscope.



Observe the mixture for worm eggs and larvae and protozoa trophozoites and cysts. The use of a small amount of feces and the presence of fecal debris lower the reliability of this examination method.

Flotation Examination

Examination by the flotation method is more complex and requires more time, but is usually more accurate than the direct smear. The flotation method involves the use of a flotation solution that has a specific gravity, greater than 1.2, such as a salt or sugar solution. Add the flotation solution to the feces, mix thoroughly

then filter the feces through gauze. Fill a centrifuge tube with the filtrate and centrifuge for 3 minutes. Place a drop from the top of the mixture on a slide, overlay it with a cover slip, and examine it under the microscope. If a centrifuge is not available, fill a vial with the filtrate to make a positive meniscus. Place a cover slip on top of the vial. Allow a flotation time of 10 minutes. Place the cover slip on a slide and examine it under a microscope.

The flotation method uses the principle that most fecal particles fall to the bottom of the tube or vial. Parasite eggs and cysts rise to the top of the salt or sugar solution, which is the result of a weight difference between feces, parasite eggs, and cysts within the solution. In pure water, parasite eggs and cysts settle to the bottom rather than float; whereas in the salt or sugar solution, they float due to the higher density of the solution.

Gross Examination

The gross examination method involves visual observation of the fecal material. Consider these characteristics in gross examinations of feces: color and consistency of the feces and the presence of mucus, blood, undigested food, and parasites.

The assistant learns various laboratory skills and techniques under the direct supervision of the veterinarian. The veterinarian trains the assistant to develop the knowledge and skills necessary to prepare samples and slides and to read the results of fecal examinations.

Blood Examination

By examining blood samples, veterinarians can diagnose certain diseases. The veterinarian does not expect the veterinary assistant to diagnose blood conditions. However, the assistant should understand the principles of sample collection and preparation for various tests and examinations. The assistant should be able to determine the types of cells the veterinarian wants to see in the blood test.

Blood consists of microscopic cells called erythrocytes (red blood cells), leukocytes (white blood cells), and thrombocytes (platelets). Leukocytes have different functional cells called neutrophils, eosinophils, basophils, lymphocytes, and monocytes. Plasma (light



Drawing blood from the foreleg of a dog.



Drawing blood from the jugular vein of a horse.

yellow fluid) suspends these cells, carries nutrients throughout the body, and transports waste materials to the kidneys.

Blood Collection

In the veterinary practice, collect blood samples from a prominent vein with a syringe and needle, or use a bleeding needle and vacuum tube. Using very slight suction with the syringe, allow the blood to flow into

the syringe. Using slight suction will prevent the destruction of red blood cells.

Whole blood in dry containers will clot or coagulate; prevent this by mixing the blood with an anticoagulant. Common anticoagulants include the oxalates, citrate, heparin, and tetraacetic acid (EDTA).

For determining hemoglobin and blood sugar levels, counting blood cells, and preparing blood smears, collect blood in tubes containing an anticoagulant. Use blood for smears within 10 to 15 minutes and for other tests within 24 hours of collection. Until they are used, preserve blood samples in a refrigerator.

Blood Smears

When preparing blood smears, use a pipette to draw the blood from the vial. Then place a drop of blood from the pipette on a slide. Develop the proper knowledge and skills in preparing, spreading, and staining blood smears for microscopic examination under the direct supervision of the veterinarian. Differential white blood cell counts and platelet counts are made with fixed-stained smears. Wet-stained smears are examined for micro-filariae in dog heartworm tests.

Hemoglobin Tests

Accomplish hemoglobin determination with a colorimeter, using a direct or indirect method. The colorimeter is a fast and accurate instrument that compares color intensity to accepted standards. The direct method simply compares a color standard with the color of the whole blood. The indirect method uses hydrochloric acid to compare the blood-acid mixture with a color standard.

Blood Cell Counts

Erythrocyte (RBC) counts and leukocyte (WBC) counts require specific skills and techniques. These cell counts are useful to the veterinarian in disease diagnosis or diagnosis confirmation. The hematocrit determination includes the sedimentation rate and the packed cell volume (PCV) of the blood. The number of erythrocytes per volume of blood affects the sedimentation rate. The PCV depends on the size and number of erythrocytes per volume of blood.



Preparing slide for blood smear.

Other Blood Tests

Other tests include the determination of antibody and enzyme levels in blood for diagnosis of infectious diseases and abnormal organ functions. Concentration tests, such as the modified Knott's technique, are used for detection of dog heartworm microfilariae.

The importance of proper collection and preparation of samples and the use of proper and accurate steps and techniques when conducting blood examinations cannot be over-emphasized. A veterinarian or trained technician must perform many of the examinations involved in this process. The veterinary assistant should learn the required information, skills, and techniques of any phase as directed by the veterinarian.

Urine Examination

Veterinary assistants routinely perform several urine tests that are helpful to the veterinarian in making or confirming a diagnosis. Urinalysis procedures include

collection methods and physical, chemical, and microscopic examinations.

Collection

Urine samples are collected for examination purposes using various methods. Regardless of the method, use a clean, dry container that is free from foreign material to collect the urine. Cattle very often will urinate during examinations, so have a suitable container ready. Continuous stroking of the skin just below the vulva of cows will usually induce urination. If necessary, pass a catheter into the bladder of the cow.

Since bulls and steers cannot be catheterized, longer observation may be needed to obtain a sample. A collecting urinal may be strapped on male swine, cattle, sheep, or goats to obtain a sample. Catheters can be used on both male and female horses. In male horses, manual pressure on the bladder via the rectum will sometimes induce urination. Close observation will enable collection from dogs and cats, but catheterization can be used successfully. Other collection methods from dogs and cats include applying pressure on the bladder and using a collection cage (with floor drain).

Physical Examination

The physical examination of urine includes quantity, specific gravity, color, odor, and consistency. The quantity measurement refers to the amount urinated in a 24-hour period.

This can be accurately determined with a collection cage or a receptacle attached to the animal. The specific gravity of urine is measured with either a refractometer or a urinometer (hydrometer) by filling a urinometer cylinder with the urine. Small and large urinometers and cylinders are available.

A change from the normal urine color (light yellow to dark amber) to a red, brownish red, or black color is important for diagnosis of certain diseases. The urine odor can also aid in diagnosing diseases. Mild, strong, sour, and sweet urine odors are associated with certain diseases. Normal horse urine is cloudy to opaque. Urine from other animals is usually clear when collected. The consistency is noted by degrees: clear, cloudy, flocculant, and opaque.



Urinometer.



Microscopic examination.

Chemical Examination

Chemical examination of urine includes tests for pH (acidity or alkalinity), albumin, sugar, bile, acetone, calcium, bilirubin, and urobilinogen. Simple test kits are available for urinalysis. The assistant will learn and conduct all tests and procedures under the direct supervision of a veterinarian.

To determine the acidity of urine, the veterinarian will use a paper test strip. The test strip is dipped into the urine sample. The urine will react with the paper and turn the paper a certain color depending on its acidity level. The strip is then compared to the color standards on the bottle.

Microscopic Examination

Perform microscopic examination of urinary sediment after centrifugation of a urine sample. Classify the sediments in the urine as organized and unorganized. Organized sediments include epithelial cells, blood cells, mucous threads, and microorganisms, such as bacteria, yeasts, and fungi. Unorganized sediments include fat globules and precipitated crystals. Classify the crystals as those present in alkaline urine and those in acidic urine. Fat globules may be present in urine of either pH range.

Carry out all urine collection and examination procedures carefully, and have a veterinarian interpret all test results.

Reference

Bassett, J. M., & McCurnin, D. M. (2010). *McCurnin's clinical textbook for veterinary technicians* (7th ed.). St. Louis, MO: Saunders Elsevier.

Questions

Fill-in-the-Blanks

- _____ are microscopic cells in the blood, also called red blood cells.
- _____ are microscopic cells in the blood, also called white blood cells.
- If too much suction is created when drawing blood from an animal, the _____ blood cells may be destroyed.
- Prevent whole blood from coagulating by mixing it with a/an _____.
- Use blood for smears within _____ minutes after sample collection.
- Perform blood cell counts and hemoglobin tests within _____ hours of sample collection.
- The hematocrit determination includes the sedimentation rate and the _____ (PCV) of the blood.
- The PCV depends on the size and number of _____ per volume of blood.

Activities

- Conduct gross examinations of the feces of a cow, horse, sheep, and dog. Record your observations.
- Under the supervision of a veterinarian, perform a direct smear exam of dog feces and a flotation exam of cow feces.
- Record the steps of each method followed.
- Identify advantages and disadvantages of the direct smear and flotation methods of fecal examinations.
- Ask the veterinarian to show the evidence of parasites in the dog and cow feces, and make a drawing of the findings observed under the microscope.
- Conduct gross urine examinations of a horse and dog. Record your observations. (Page 176)
- Under the supervision of a veterinarian, perform a pH test on urine. Record the steps and result of the test.
- Under the supervision of a veterinarian, perform a specific gravity test on urine. Record the steps and result of the test.
- Under the supervision of a veterinarian, observe urine sediment under a microscope. Ask the veterinarian to indicate presence of cells, crystals, and globules. Make a drawing of the findings observed.
- Under the supervision of a veterinarian, perform a paper strip test on urine. Record negative or positive results for sugar, acetone, and bilirubin.
- Set a tube of blood with an anticoagulant in a vertical position. After one hour, observe the red blood cells at the bottom of the tube, the middle layer of white blood cells (buffy coat), and the plasma in the upper portion of the tube. Record your observations by drawing and labeling the portions of blood in the tube.
- Set a tube of blood in the refrigerator and store another at room temperature. After 24 hours, describe the colors of the two blood samples. Did

refrigeration preserve the blood? Did room temperature allow the blood to deteriorate?

13. Set a tube of blood with an anticoagulant and a tube of blood without an anticoagulant in the refrigerator. After 24 hours, compare two tubes of blood. Did the anticoagulant prevent the blood from coagulating? Describe the appearance of the coagulated blood.

14. After inverting a tube of blood several times, draw the blood from the tube with strong suction using a syringe and needle. Return the blood from the syringe to the tube with strong force through the needle. Set the tube in a vertical position. After one hour, describe the color of the plasma. Does the color indicate destroyed red blood cells? What caused their destruction?

Gross Examination of Feces				
	Cow	Horse	Sheep	Dog
Debris				
Mucus				
Blood				
Color				
Consistency				

Gross Urine Examinations		
	Horse	Dog
Color		
Odor		
Consistency		