**MODULE 5: LABORATORY AND PHARMACY**

**Lesson 1: Stool and Urine**

1) What is the difference between fecal cytology and a direct fecal exam?

[Note to Trainer: Demonstrate these techniques to the trainees.]

**Answer: Cytology is an air dried smear stained with Diff-Quik stain or Gram stain. It is examined under oil (100X magnification) for identification of bacteria such as Clostridium. A direct fecal exam is a wet mount where a small amount of feces is mixed with a little saline and examined under a cover slip to look for parasites such as Giardia, coccidia, or other protozoa, at 40X magnification.**

2) How many different tests can be performed on stool?

*Sample Response: Fecal float, fecal centrifugation, cytology, Giardia, direct smear, occult blood test, or fecal culture*

3) How do the team members know what test to order when a fecal sample is submitted?

[Note to Trainer: Does your practice have a standard protocol for what tests to run when a pet has diarrhea? Do the team members need to ask a doctor?]

**Answer:**

4) Do we ask clients to prepay for stool tests? Which ones?

**Answer:**

5) How do specific tests results get relayed to the doctor?

**Answer:**

6) How and when will an owner be notified with their pet’s test result(s)?

**Answer:**

7) Can a stool sample be analyzed after freezing?

**Answer: Freezing can damage cells. Roundworm and hookworm eggs are sturdy and are likely to survive the freeze-thaw process, but coccidia, Giardia, or urine sediment may not.**

8) Does the team member who analyzes the specimen need to note if the sample was frozen or if the stool was very hard or soft?

[Note to Trainer: How is this done?]

**Answer: Yes**

9) Does our practice send fecal samples to an external laboratory for Giardia testing or is a Giardia SNAP test performed in-house?

[Note to Trainer: What is a SNAP test?]

**Answer:**

10) How many different tests can be performed on urine?

[Note to Trainer: Explain what each of these is and demonstrate where possible.]

*Sample Response: Several tests are available alone or in combination. Some examples include a full urinalysis, specific gravity, urine protein, a “dipstick,” or urine culture and sensitivity.*

11) How do team members know which test(s) to order?

**Answer:**

12) What does a complete urinalysis include?

**Answer: S.G., dipstick, and spindown, also called a sediment, are included.**

13) What tests can be performed using a urine dipstick?

**Answer: Depending on the stick, glucose, ketones, bilirubin, protein, hemoglobin, or myoglobin (indicative of blood or muscle breakdown), pH, and white blood cells can be performed.**

14) What is **urine specific gravity**?

**Answer: The specific gravity measures how watery the urine is.**

15) What does it mean when we say “the urine was concentrated”?

**Answer: The urine was not watery, suggesting that the kidneys are functioning properly.**

16) How much does a specific gravity test cost?

**Answer:**

17) How much does a complete urinalysis cost?

**Answer:**

## 18) When is a complete urinalysis recommended?

## *Sample Response: We recommend a complete urinalysis with pets with a history of* ***PU/PD****/accidents/urine leakage/straining to urinate/ frequent urination, increased* ***BUN****/creatinine, current renal or bladder disease, suspicion of glomerulonephritis,* ***urolithiasis****, renal dysplasia or other* ***genetic*** *urinary tract problems, annually in senior pets, or as part of the annual wellness exam.*

19) What is a UPC?

**Answer:**

20) If a urinalysis is abnormal what other tests might we wish to run?

[Note to Trainer: If the urine dipstick shows excessive protein, should the technicians save the rest of the sample for a urine protein:creatinine ratio? If it shows an infection would you want a gram stain or a culture?]

*Sample Response: Team members will need to check with the veterinarian to ensure the proper test(s) are ordered or performed, BEFORE the sample is discarded.*

21) How does a client collect a urine sample from a dog?

[Note to Trainer: Trainees should be able to explain this and the next answer as if talking to a client. Do you give out urine specimen cups for clients to use? Do you advise them to wear gloves to reduce the risk of acquiring Leptospirosis?]

**Answer:**

22) How does a client collect a urine sample from cat?

**Answer:**

23) What product can be used to collect urine samples from litter boxes?

**Answer: An empty litter box or one with Nosorb™ (or similar products) can be used. The litter pan must be cleaned and dried before collecting the sample.**

24) What is a **cystocentesis**?

**Answer: Collecting a urine sample directly from the bladder using a syringe and needle.**

25) How much does a cystocentesis cost?

**Answer:**

26) What are the advantages of collecting a urine sample by cystocentesis?

**Answer: Urine collected via cystocentesis is sterile and can be cultured to identify any bacteria in the bladder. It may be used to differentiate an infection of the prepuce or vagina from one affecting the bladder or kidneys. It is (usually) quick and easy to collect a urine sample from a pet using this technique. Cystocentesis can be performed using an ultrasound machine to help identify the bladder.**

27) When would we obtain urine via a urinary catheter?

*Sample Response: To collect a sterile urine sample from a male dog or after catheterizing a blocked (plugged) cat or dog.*

28) Do we ask clients to prepay for urine tests? Which ones?

**Answer:**

29) How long will a urine specimen keep?

**Answer: Urine will keep for approximately 24 hours for a basic urinalysis (fresher is always better and more accurate). It will keep for several days for a UPC or a UCC.**

30) Can a urine sample be frozen or have snow mixed in it?

**Answer:**

31) Can a urine sample have cat litter dust in it?

**Answer: Dust or dirt makes the sediment very difficult to read.**

32) What information should be collected from the client when they drop off a urine sample?

*Sample Response: Ask the owner how old the sample is, how it was collected (e.g., off the floor, free catch), and whether it was refrigerated.*

33) Under what circumstances should a urine sample be analyzed right away and when is it acceptable to place the sample on the counter or in the fridge for later?

**Answer:**

34) How long does it take to perform a complete urinalysis?

[Note to Trainer: Do you have owners wait while the test is run?]

**Answer:**

35) When and how will a client be notified of the test results for a routine urinalysis? Who will contact them?

**Answer:**

36) Who evaluates the urine sediment (“spin downs”) in your hospital?

**Answer:**

37) How is the doctor given urinalysis results?

**Answer:**

38) For how long should a stool or urine specimen be saved?

*Sample Response: Always check with the doctor that no further tests are required before disposing of a sample.*

**MODULE 5: LABORATORY AND PHARMACY**

**Lesson 2: Laboratory Procedures**

[Note to Trainer: This section can be taught in the lab area to demonstrate the equipment and techniques.]

1) What is an SST tube and what is it used for?

**Answer: SST stands for “serum separator tube.” This is a glass tube with a gel-like substance in the bottom of the tube. When a blood sample is placed in the tube and centrifuged, the heavy cells sink to the bottom, the gel floats in the middle, and the serum floats on the top. This tube makes it easy to remove the serum from the blood sample without disturbing the clot of red and white blood cells in the bottom. The serum can then be used for various tests (e.g., serum biochemistry).**

2) What is an EDTA tube?

**Answer: EDTA is a substance that keeps blood from clotting. Blood samples collected in these tubes can be used to measure different blood cells (e.g., a complete blood count). Blood in an EDTA tube is called “whole blood.”**

3) What is a heparin tube and when do we use one?

*Sample Response: Heparin is a different anticoagulant. These tubes are usually used under specific circumstances, e.g. suspicion that a cat may have Mycoplasma felidae (Hemobartonella), which shows up better without EDTA. Heparin tubes are commonly used to collect bird blood samples, some chemistry machines can use heparinized samples, and there are a few specific blood tests that require heparin instead of EDTA.*

4) Which color tops do these tubes have?

**Answer: Green**

5) What is a RTT tube?

**Answer: An RTT is red top tube—a plain tube with no gel or anticoagulant in it. RTTs are used to test for drugs or substances that can be absorbed into the gel if the blood was put in a SST tube (e.g., phenobarbital, digoxin).**

6) Why is it important to hold a pet off-food before collecting blood for some blood tests?

**Answer: Fat (lipids) in the blood can interfere with some tests. Blood lipids levels are higher after meals. A blood with lots of lipids is called lipemic.**

7) What does it mean when a sample is **hemolyzed**?

**Answer: Red blood cells have been damaged during the course of drawing blood and putting it into the blood collection tube. The serum will look pink or red instead of clear. This can happen when the needle used to draw the blood is too small, the animal struggled and the draw was difficult, or the sample was squirted into the vial too quickly. Hemolysis affects the accuracy of some serum tests, so careful sample handling is important.**

8) What does it mean if it is **icteric**?

**Answer: The serum is yellow in color, indicating liver disease, intravascular hemolysis, or decreased elimination of bilirubin. (Hemolysis outside the body makes the serum look red. If the hemolysis occurred inside the body, by the time the blood is drawn the serum will look yellow, not red.) This is caused by the pigment bilirubin, the same substance that causes jaundice, which is a yellow appearance of the skin and mucous membranes.**

8) What types of biological samples need to be refrigerated?

**Answer: Some parts of the blood (especially whole blood cells) degrade quickly at room temperature, but others, do not. In general, blood, urine, and stool samples are kept in the refrigerator, but they are not usually shipped with ice or dry ice. Dried slides and formalin-fixed tissue are not refrigerated.**

9) What external laboratories does our practice use?

**Answer:**

10) How often does the lab pick-up samples and at what time(s) of the day?

**Answer:**

11) Does the external lab collect samples on weekends?

**Answer:**

12) Where do the samples go if our clinic is closing and the external lab has not picked up our samples yet?

**Answer:**

13) If you know we have a sick pet in the back having blood collected that will need to be sent out, do you ask the lab courier to wait?

**Answer:**

14) Where are the forms that accompany the biological samples and how are these filled out correctly?

[Note to Trainer: Demonstrate this to trainees.]

**Answer:**

15) What tests are performed in-house?

**Answer:**

16) What tests results are logged in a lab log?

**Answer:**

17) Who tells the doctor the results are ready? Who calls the client?

**Answer:**

18) What is **histopathology**?

[Note to Trainer: What lab do you send histopathology samples to? Are they mailed or does the lab pick them up? How long does it take to get results back?]

**Answer:**

19) What is **formalin**?

**Answer: Formalin is the solution used to preserve tissue samples. It is toxic and requires careful handling.**

20) What is a **culture**? Is it the same as a culture and **sensitivity** (C/S)?

**Answer: A sample of pus or other liquid or tissue material is collected from a patient and smeared onto a special agar (gel-like material). If bacteria are present, they may grow in colonies on the agar. A culture will usually grow some bacterial colonies if a bacterial infection is present. The sensitivity part of the test exposes the bacteria that has been grown to different antibiotics and tells you which ones would be the most effective for treating the particular bacteria growing in the culture. Hopefully, these are the same ones that are causing illness in the pet, and we will have chosen the best drug for the job. Not all bacteria grow well in culture and some may grow very slowly.**

21) Where is the urine transport media?

**Answer:**

22) Where are the culturettes?

**Answer:**

23) What is the name of the substance (agar) used for ringworm cultures?

**Answer: DTM or dermatophyte (fungal) test media. Alternatively, some clinics use “Derm Duet” plates.**

24) Does our practice have these products?

**Answer:**

25) Where are the agar plates or the DTM containers kept while waiting to see if the cultures will grow? How often are the cultures examined?

**Answer:**

26) How are the results of a culture or culture and sensitivity relayed to the doctor?

**Answer:**

27) Who informs the client of the results of laboratory tests?

[Note to Trainer: Do the doctors call the clients every time or only if the test result is abnormal?]

**Answer:**

28) When is it acceptable to give a client the lab test result if the doctor is busy?

**Answer:**

 29) What is **adrenal** testing? What diseases can this test identify?

**Answer:**

30) What tests are recommended for an **epileptic** pet being treated with phenobarbital?

*Sample Response: The phenobarbital levels are measured to ensure the pet is not being administered too much or too little. The liver function of these animals is also commonly evaluated at the same time (phenobarbital can be toxic to the liver).*

31) How often are these tests performed?

**Answer:**

32) What other medications require periodic monitoring?

[Note to Trainer: Do you have a master list or system that indicates what testing is required for different medications?]

*Sample Response: Diethylstilbesterol (DES) can cause bone marrow suppression, so we would monitor a CBC. Phenylpropanolamine can cause hypertension, so blood pressure monitoring is indicated. Enalapril can cause renal problems; furosemide can cause low potassium levels; thyroid supplements and methimazole require monitoring the patient’s thyroid hormone levels. Potassium bromide, digoxin, and cyclosporin blood levels can all be monitored, to name only a few.*

33) How does our practice inform and/or remind owners when their pet should be rechecked?

**Answer:**

34) How does the person reminding the owner know what the recheck appointment is for and what biological sample or procedure will be performed?

[Note to Trainer: Does your practice use a master drug list or problem list in the medical record? Are instructions included on the patient’s medication label? Does your practice provide drug information sheets to owners that explain what testing that is needed and how often?]

**Answer:**

35) Do we fill small amounts of the medication if necessary until the pet can come in for needed testing prior to dispensing a full refill? How much of a refill is acceptable—five days, a week, longer?

**Answer:**

**MODULE 5: LABORATORY AND PHARMACY**

**Lesson 3: Pharmacy (Part One)**

[Note to Trainer: You may wish to teach this module in the pharmacy.]

## 1) What are some of the antibiotic products our practice stocks? Which antibiotic is the doctor likely to use for what problem?

[Note to Trainer: Do you use labels such as, “Shake Well” or, “Keep Refrigerated?” Which medications should be administered with food? Why is it important to emphasize to clients that they need to give the entire prescription and not stop early?]

**Answer:**

2) A pet is on an antibiotic to treat diarrhea. Are there any special instructions?

**Answer:**

3) Does the patient need to be scheduled to come in for a recheck?

**Answer:**

## 4) Where are the medications for vomiting or diarrhea?

**Answer:**

5) Where are the medications for heart disease?

**Answer:**

6) Where are the thyroid medications?

**Answer:**

## 7) List five drugs that are usually dispensed for the remainder of a pet’s lifetime?

**Answer:**

## 8) What would each of these five drugs be prescribed for?

**Answer:**

9) Where are eye ointments kept?

[Note to Trainer: Explain what they are used for and indicated if there are any special instructions.]

**Answer:**

10) How are eye ointments or drops administered?

**Answer:**

11) Who teaches the client how to administer these medications?

**Answer:**

12) Should a team member make a follow-up call in a day or two to make sure they are able to administer the medications properly?

**Answer:**

13) How is a small tube of eye ointment labeled?

**Answer:**

14) Do all prescriptions, even repeat prescriptions, require a label?

**Answer:**

15) Name three common **topical** medications.

**Answer:**

16) Is there a dispensing fee for topical medications?

**Answer:**

17) What medications are **NSAIDS**?

**Answer: Nonsteroidal antiinflammatory drugs (e.g., aspirin, meloxicam, carprofen, etc.)**

18) Where are the pain medications kept? Are controlled drugs kept in a different place?

**Answer:**

19) What **steroid** medications does our practice stock and recommend?

**Answer:**

20) Does our practice stock Oxyglobin™? Where is this product stored?

**Answer:**

21) What is **oxytocin**?

**Answer:**

22) Where is oxytocin stored?

**Answer:**

23) What is **proparacaine**?

**Answer:**

24) Where is proparacaine stored?

**Answer:**

25) Where is the **epinephrine** stored?

**Answer:**

## 26) List five drugs that should be administered with food.

**Answer:**

## 26) List five drugs that should be administered on an empty stomach.

**Answer:**

27) What medications are most cats likely to eat crushed and hidden in their food?

*Sample Response: Prednisolone, methimazole, clindamycin, amoxicillin, fluoroquinolones, Reconcile, and glucosamine are all fairly palatable.*

28) What medications are most cats NOT likely to eat crushed and hidden in their food?

*Sample Response: Metronidazole and amitriptyline are bitter and antihistamines are not usually accepted well in food.*

29) Are there medications that need to be administered whole (i.e., without crushing) to be effective?

**Answer:**

30) How can tablets be administered in liquid form?

**Answer:**

31) A client calls and says they are having trouble giving their cat pills. What are some pointers or alternatives?

 [Note to Trainer: Does your practice sell pet pillers or Pill Pockets®? Do you mix certain medications in VAL syrup or non-dairy creamer or use FlavoRx™?]

**Answer:**

32) What medications can be ordered as ear gels?

[Note to Trainer: Almost any drug can be formulated as an ear gel, but not all drugs can be absorbed **systemically** if administered **topically**.]

**Answer:**

33) Where are bulk pill vials stored?

**Answer:**

34) How are liquid medications prepared?

**Answer:**

35) Where are the emergency medications kept?

**Answer:**

36) Are medications ever prescribed without the use of a child resistant container? If so, would this be noted in the patient’s medical record?

**Answer:**

**MODULE 5: LABORATORY AND PHARMACY**

**Lesson 4: Pharmacy (Part Two)**

1) What is a **script**?

**Answer: A written prescription**

2) When does a doctor write a script?

[Note to Trainer: Where are the prescription pads? Which team member phones in or faxes over a prescription? How are prescriptions refilled?]

**Answer:**

3) What is our hospital’s policy for owners who ask for a written prescription for a medication our hospital does or does not stock? Is the client charged for the script?

**Answer:**

4) Are there some drugs that can’t be called in and need a written prescription?

**Answer:**

5) Does our practice use a formulating pharmacy? What products are typically ordered from a formulating pharmacy?

*Sample Response: A formulating pharmacy is one that produces drugs in a different dose or formulation (e.g., liquid, capsule, chewable, topical) than one that is commercially available.*

6) What does it mean when a drug is “compounded”?

**Answer: This is much the same as formulating. It means the medication has been specially prepared for a particular patient in a different form or strength than the original drug.**

7) What is a **controlled substance**?

**Answer:** **Drugs that can be misused or abused such as anesthetics and pain medications**

8) Where are the controlled substances?

[Note to Trainer: Explain your controlled substances log and procedures. Who has keys to the cabinet and what is the protocol for dispensing these drugs?]

**Answer:**

9) Why is it so important that every drug is written into the log?

**Answer:**

10) What is the DEA? What is a DEA number?

**Answer: The Drug Enforcement Agency regulates controlled substances. A DEA number and license enables a veterinarian to prescribe controlled substances.**

11) How is this different from the FDA?

**Answer: The Food and Drug Administration is the government agency that oversees drug trials and food and drug manufacturing. The FDA approves drugs for sale once the pharmaceutical company’s testing is complete and the drug has been proven safe and effective.**

# 12) What is a **formulary**?

**Answer: It’s like a dictionary for medications, listing each drug alphabetically with a summary of the drug’s properties, uses, warnings and side effects.**

13) How are prescription products different from over-the-counter products and nutritional supplements/**nutraceuticals**?

**Answer: They are FDA approved, which means the manufacturer has had to provide data on both safety and efficacy. There is no FDA or any other agency oversight of nutraceuticals.**

14) What does “off-label use” mean?

[Note to Trainer: Veterinary practices are required by law to inform pet owners if prescribing a drug for an off label use.]

**Answer: Off-label means that a drug is administered to a species, at a dosage, or for a purpose that it has not been tested or labeled for (FDA-approved). For example, some drugs administered to cats and dogs are human drugs that have not been tested or approved for use in animals.**

15) What information is explained to a client when a medication is dispensed or prescribed?

[Note to Trainer: Does your hospital use information sheets? Which team member gives the client information regarding possible side effects and proper use (e.g., give with food or on an empty stomach)?]

**Answer:**

16) What information is required on a drug label?

*Sample Response: Owner’s name, patient’s name, date, medication name and strength, dosing instructions, quantity or volume dispensed, practice’s name, address, and phone number (with area code), name of veterinarian dispensing medication, and drug expiration date.*

17) When are most of the drugs and supplies delivered?

**Answer:**

18) How are the drugs and supplies delivered?

**Answer:**

19) Which team member orders drugs and supplies and when?

**Answer:**

20) Which team member unpacks the drugs and supplies and puts them away?

**Answer:**

21) Where do the packing slips go?

**Answer:**

22) Which team member enters the drugs and supplies invoices in the computer?

**Answer:**

23) How are special orders processed?

**Answer:**

24) Where do team members make a note to reorder a drug or supply before the hospital runs out?

**Answer:**

**Module 5 Suggested Reading**

American Animal Hospital Association. 2010. *Controlled Substance Logs*. Lakewood, CO: AAHA Press.

American Animal Hospital Association. 2007. *Laboratory Standards.* *AAHA Standards*. Lakewood, CO: AAHA.

American Animal Hospital Association. 2007. *Pharmacy Standards.* *AAHA Standards*. Lakewood, CO: AAHA.

College of Veterinary Medicine at Cornell University Urine Sediment Atlas. http://diaglab.vet.cornell.edu/clinpath/modules/ua-sed/ua-intro.htm

U.S. Department of Justice Drug Enforcement Administration Practitioner’s Manual: An Informational Outline of the Controlled Substance Act. http://www.deadiversion.usdoj.gov/pubs/manuals/pract/index.html