

High WBC with Increased Ratio of Eosinophils....what the ?...

Understanding Veterinary Staff

*Cheryl Purnell LVT
North Carolina Zoological Park*

Cheryl Purnell AAS, BS, LVT

- 1973 – Started as a play leader at the Belle Isle Zoo in Detroit summers while attending WMU where I received a BS in Behavioral Psychology and Social Work
- 1977 – Hired by the Detroit Zoological Park – one of the first female keepers! Keeper for 5 years – mixed bears, hippos's, hoof stock line and ending in the position of hospital keeper
- 1980 – Received an AAS in Animal Health Technology
- 1982 – Hired as the zoo's sole veterinary technician
- 1993 – Hired as the senior vet tech/veterinary hospital manager at the North Carolina Zoological Park...still ticking

Before we get started.....

Every zoo has its own policies and procedures. Some of the following information is just that...information..do not use it if it counters policies and procedures at your facility...the information is meant to help participants understand only!

Veterinarians and Technicians

- Veterinarians have completed between 7 and 10 years of education and training – they are doctors...they can do anything!
- Licensed, Certified or Registered Veterinary Technicians – have completed 2 years to 4 years of education, taken and passed a licensing/certification exam – have the knowledge and skill to perform all tasks *except...legally technicians cannot* perform surgery, prescribe drugs or diagnose disease

So:

asking a technician about lab results,
to diagnose a condition or to perform
surgery will get you no where,
because legally, we cannot...I
promise, we are not being difficult!

Workshop Goals

- Familiarize participants with lab tests performed that assist vets with diagnosing health conditions
- How husbandry staff can collect and preserve samples in order to provide good diagnostic quality
- Provide a list of more commonly used medical terms and/or abbreviations and their definitions to assist with understanding and communicating
- Familiarize participants with anesthetic protocols and common monitoring equipment
- Provide an opportunity for open discussion about common challenges and concerns when working with veterinary staff

Blood Draw

- The very first and simplest step in determining health status for normal or abnormal animals is a blood sample for a CBC and chemistry panel.
- Animal husbandry staff do perform this skill in some zoo's via training.
- For those who have not had the opportunity yet, the following is a simple step by step

Locating the Site for the Blood Draw



- In a mammal the three most likely sites are the jugular, cephalic or femoral veins

Palpation of the Site to Identify the Vein



- The fingers are slid lightly over the skin feeling for a soft tubular structure under the skin

Disinfection of the Site with Alcohol



- In addition to disinfection, the alcohol mats down fur and aids in visualizing the vein.

Needle Placement



- The needle is aimed at a 45 degree angle toward the middle of the vein and with a quick slight push forward, enters the vein
- If the needle is placed properly an immediate flash of blood will appear in the hub of the needle once gentle pressure is applied.

Blood from Syringe to Tubes



- Ideally blood is drawn directly into tubes via the vacutainer system
- If drawn into a syringe, place needle into the rubber stopper of the tube and allow vacuum to pull the sample in – – red top tube first then the purple or green top tube.

Put Pressure on the Site



- Closes the puncture hole and allows spot to clot.

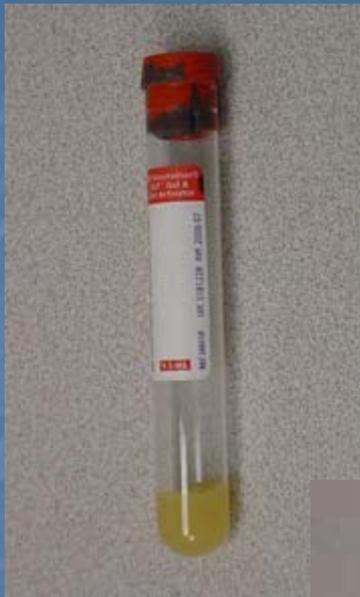
There are a few techniques to aid you in acquiring diagnostic quality blood samples.

- Blood tube draw order
- Needle know-how to avoid hemolysis of the sample
- Storage after the sample is taken

Blood Tube Draw Order



Most common – red, green and purple top top



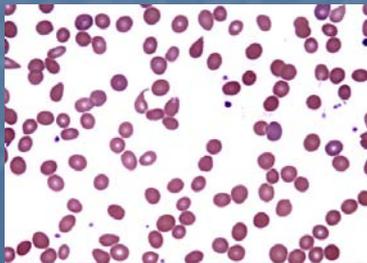
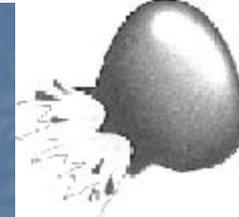
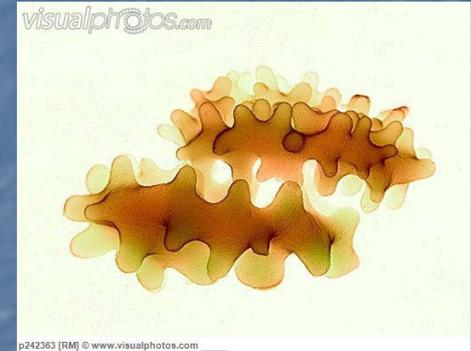
- The red top tube is the only tube that does not contain an chemical additive which is why this tube clots
- The red top should be filled before the purple or green top tube to avoid the chemicals in the latter tubes entering the red tube

Needle Know How

To avoid hemolysis (rupture of the red cells) the following techniques should be employed:



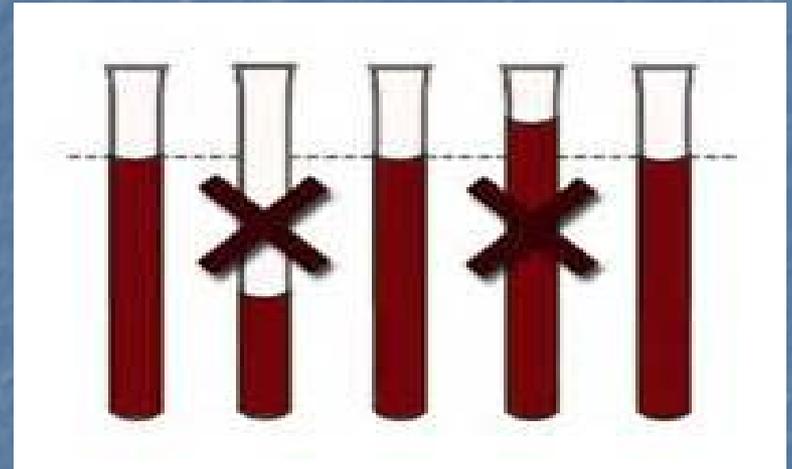
- Avoid vigorous mixing – gently invert tubes with additives 6 – 10 times. Red cells are delicate and do not handle stress well.



Desirable
observation

Undesirable
observation

- Fill tube fully – tubes with anticoagulant (purple or green top) should be filled as listed in the previous slide because the vacuum fills the tube to the required amount. If less than the required amount is added to the sample or too much, the sample loses its diagnostic quality or cells may rupture.





- Proper placement of the needle – prior to pulling back on the plunger be as centrally located in the vein as possible – if the needle bevel is against the wall of the vein a dramatic increase in force is present and can rupture cells. If you place the needle properly you will see blood in the hub of the needle which tells you are located properly in the vein. If blood is not readily entering the syringe centralize your needle in the vein.

- Prewarm the skin when possible – warm skin and tissue increases blood flow to the area by 7 fold making the blood draw much easier. Very small animals such as lizards can be placed under a warming lamp prior to blood draw.



- Let alcohol dry – if the skin surface is still wet from the disinfection with alcohol it will hemolyze the cells



- Excessive pulling pressure – when drawing a sample into a syringe use gentle pulling pressure. A hard pull on the plunger creates too much pressure which ruptures the cells. Note the abundance of air in the syringe

Blood sample storage

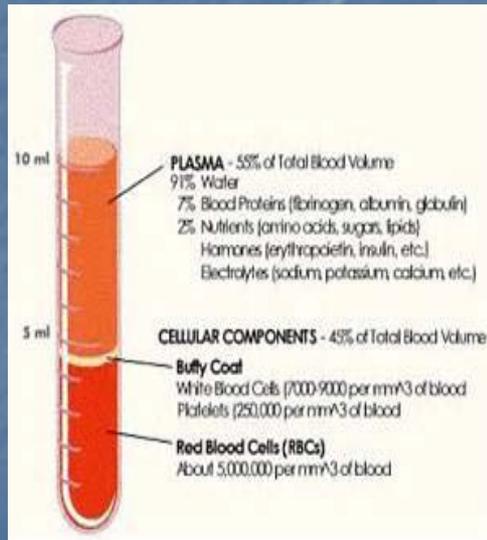
- Ideally, blood samples should be analyzed within 1 to 2 hours after collection. Over time the diagnostic quality deteriorates providing less precise results.
- To preserve diagnostic quality of samples that will not be run within the 2 hour timeframe, refrigerate the sample.
- If the lab is unable to analyze the sample the red top tube is spun down to separate the cells from the serum and the serum is frozen – the purple top tube is refrigerated

Blood is drawn from a vein into any variety of blood tubes . The type of tubes used are determined by what specific testing is needed in order to diagnose disease. Typically, for a routine screen, a red and purple or green top tube are utilized which provide the vets with a Complete Blood Count or CBC and chemistries

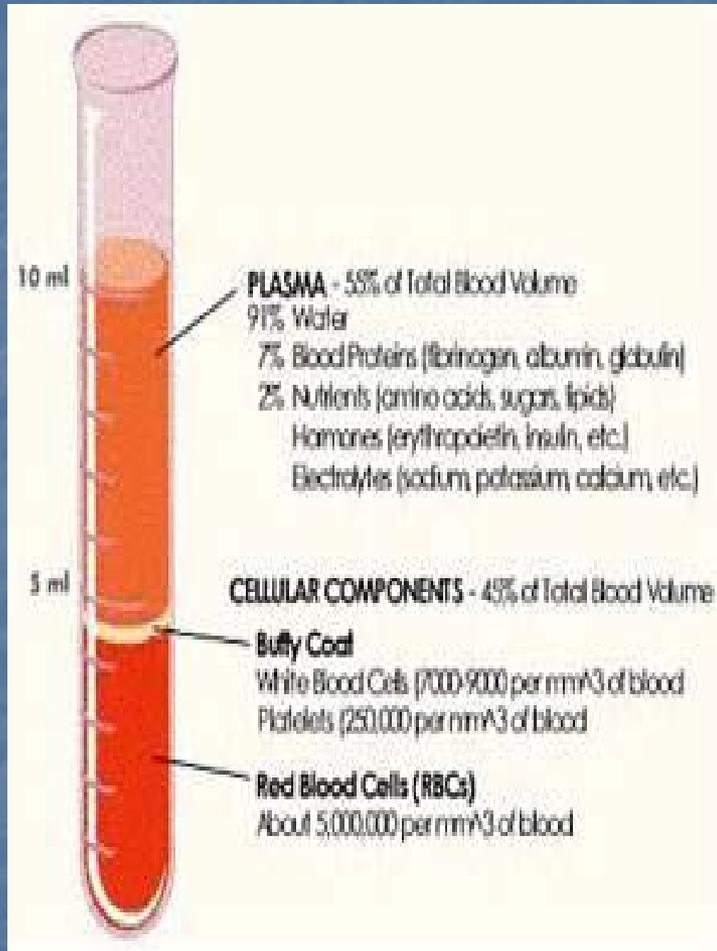




The red top tube provides serum and has no additive to keep it from clotting. After setting for at least 10 minutes – some species require up to an hour – the tube is spun at high speeds to separate the serum from the cells



After spinning the blood is separated into 3 layers:
Serum or plasma on top
White cells center
Red cells bottom



The top portion, serum or plasma, is used for chemistries.



- The purple and green top tube contain an anticoagulant that keeps the blood from clotting.
- In general, the purple top tube is used for mammal blood collection and the green top is used with birds, reptiles, fish and amphibians
- Often referred to as whole blood. This sample is used for a complete blood count

Complete Blood Count (CBC)

- Provides information about the kinds and numbers of cells in the blood
- Especially, red blood cells, white blood cells and platelets
- Results assist in diagnosing conditions such as anemia, infection, allergies and other disorders

Main Components of the complete Blood Count (CBC)

- White cell count
- Red cell count
- Differential cell count
- Hematocrit
- Hemoglobin
- Platelets

White cell count

Red cell count
Differential cell count
Hematocrit
Hemoglobin
Platelets

- White cells protect the body from infection
- The cells attack bacteria, virus and other organisms invading the body
- It is the largest cell type in the blood
- The white cell count increases when infection occurs

White Blood Cell Types

Each plays a different role in protecting the body – too many or too few of any one cell type helps narrow down what a condition may be

- Neutrophil
- Lymphocyte
- Monocyte
- Eosinophil
- Basophil

White cell count

Red cell count

Differential cell count

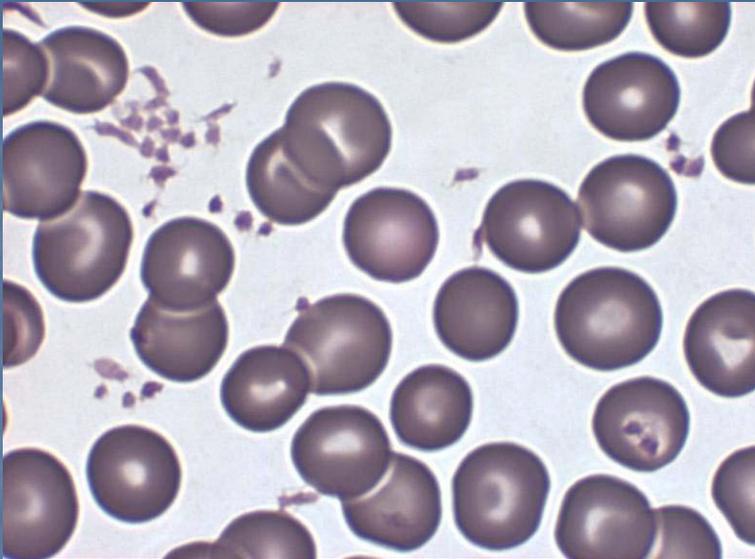
Hematocrit

Hemoglobin

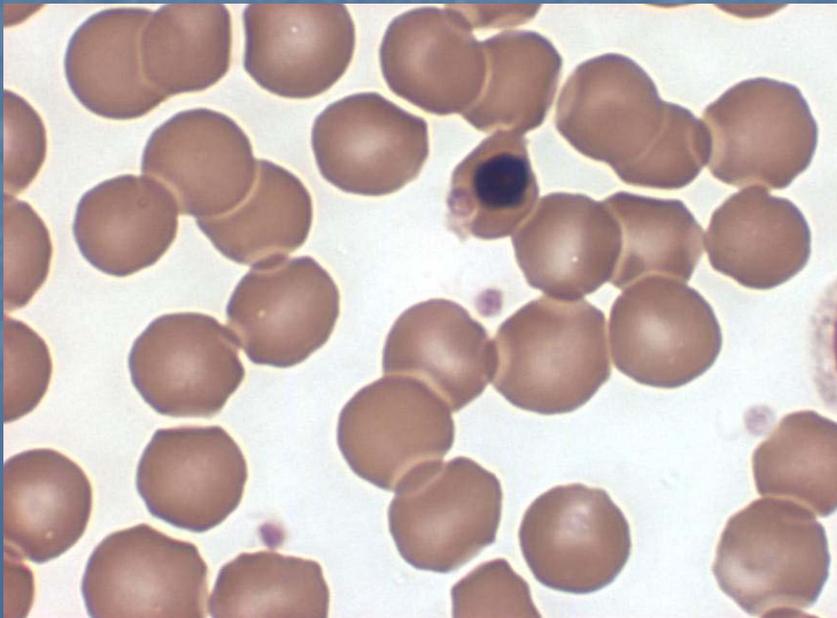
Platelets

- Most numerous cell in the blood under normal conditions
- Carries oxygen and nutrients to tissues throughout the body
- Come in various sizes and shapes depending on the species

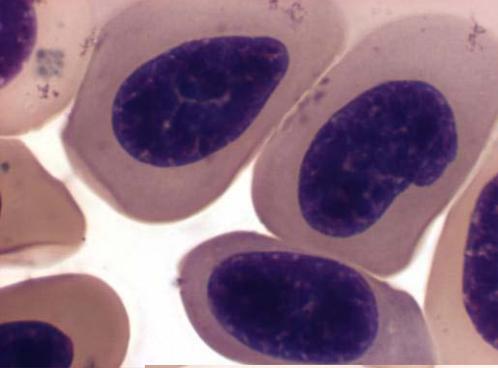
Mammal Red Cells



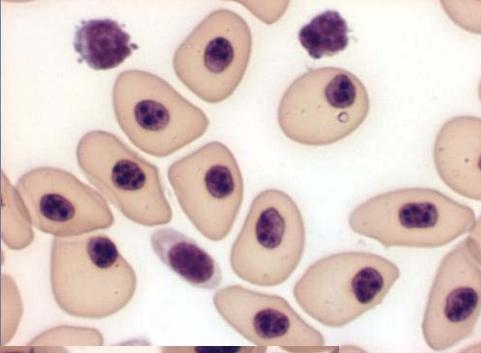
- Mammal red cells are round and do not contain a nucleus when circulating in the veins and arteries.
- Of all the animals, mammals have the smallest red blood cells.
- It is the most numerous cell in the circulatory system



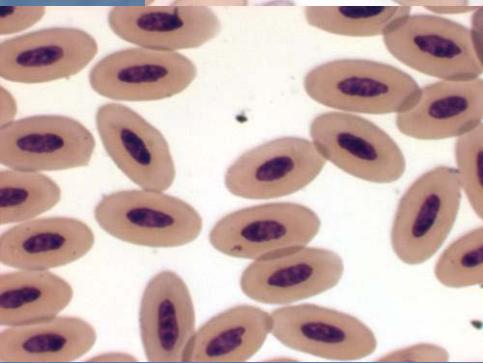
Bird, Reptile, Amphibian and Fish Red Cells



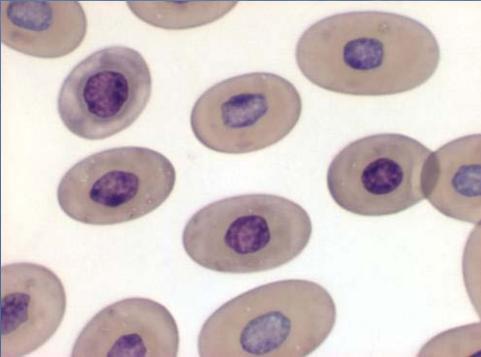
Hellbender



Fish



Bird



Reptile

- These species of animals have nucleated red blood cells
- Amphibians have the largest, next fish, then reptiles and birds

White cell count
Red cell count

Differential cell count

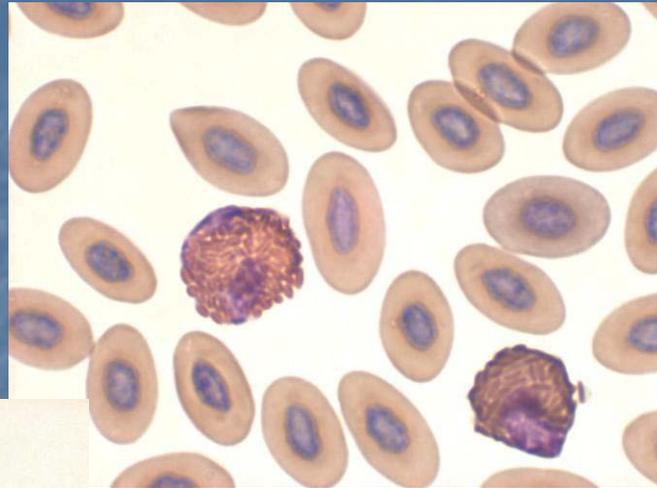
Hematocrit
Hemoglobin
Platelets

Neutrophil

- In mammals is the most numerous white cell type
- Comparative cells are present in lesser number in birds , reptiles (heterophils), amphibians and fish (granulocytes)
- Can increase in number when infection is present



← Mammal neutrophil



Bird heterophil



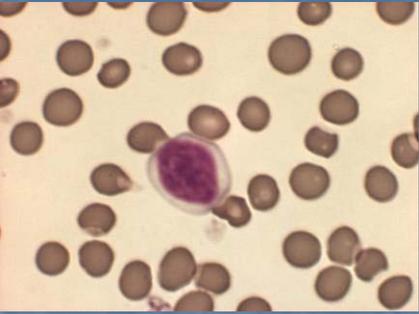
Snake Heterophil



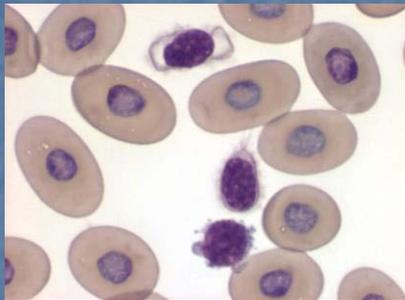
Amphibian fine granular



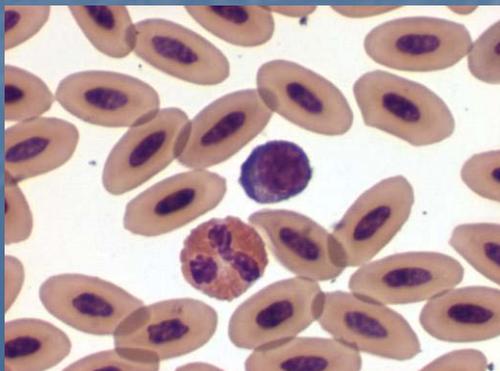
Lymphocyte



Mammal



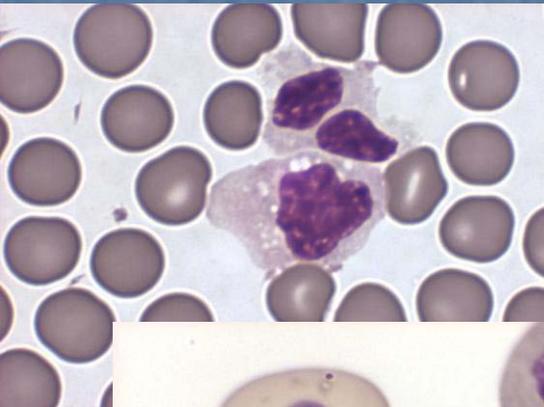
Reptile



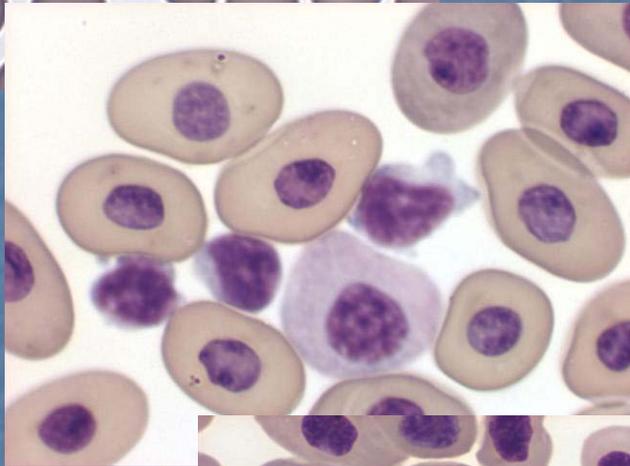
Bird

- Second most numerous cell in most mammals and birds; most numerous cell in most reptiles, amphibians and fish
- Provide a defense against invading organisms and tumor growth

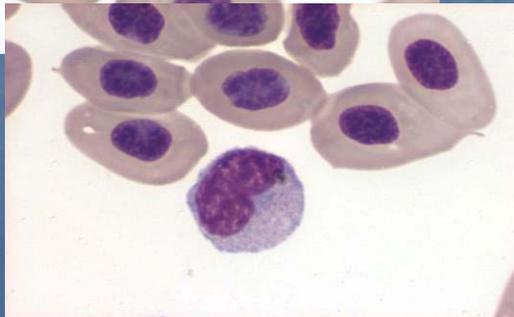
Monocytes



Elephant



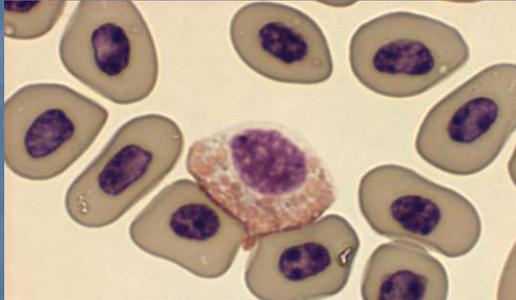
Reptile



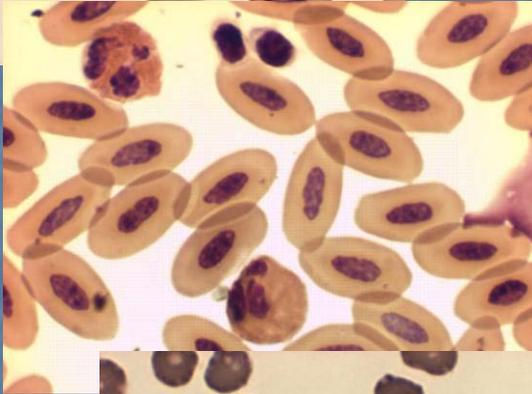
Amphibian

- Third most numerous white blood cell in most species of mammals, reptiles, birds, amphibians and fish...except elephants where a bilobed form can be the most numerous cell normally
- Main function is to engulf foreign microorganisms

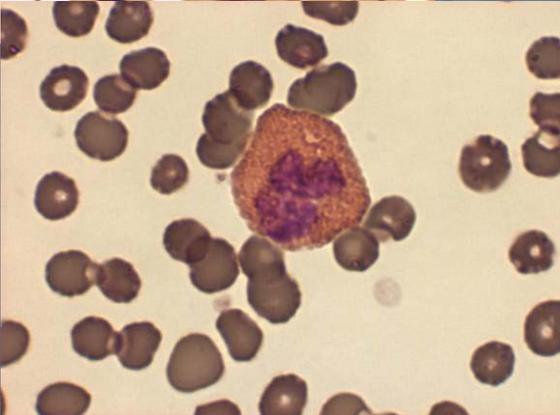
Eosinophil



Amphibian



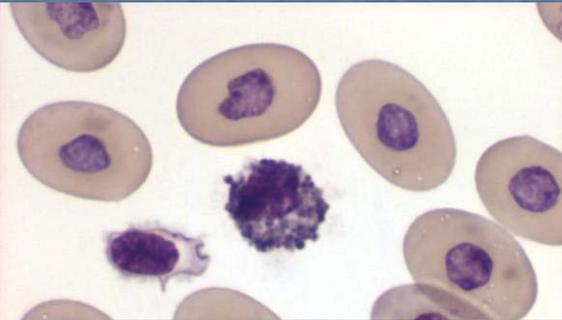
Bird



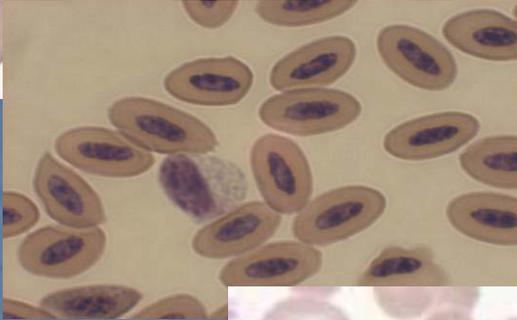
Mammal

- Generally very few of these cells in the circulatory system – increase in number with parasitism and allergic reactions

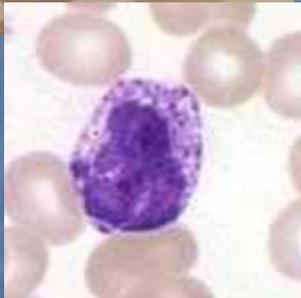
Basophil



Fish



Reptile



Mammal

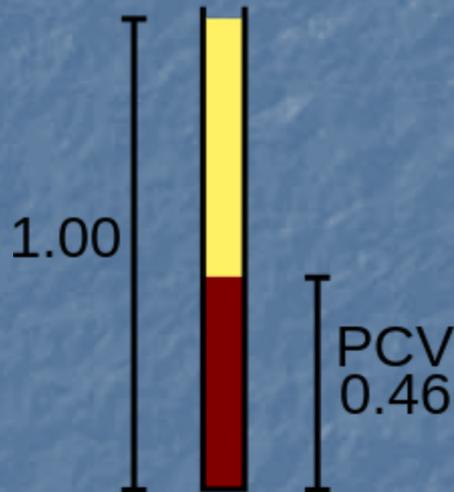
- Almost non existent in most species of mammals, birds, reptiles and fish – although...some species such as turtles and frogs may have very high numbers in healthy animals
- Most difficult cell to sometimes identify due to poor staining qualities with some stains
- Function is not thoroughly known but does play a part in inflammatory response and histamine release.

White cell count
Red cell count
Differential cell count

Hematocrit

Hemoglobin
Platelets

Hematocrit (Hct) or Packed Cell Volume (PCV)



- Is the volume percentage of red cells in the circulating blood
- Sample is placed in a thin tube, spun at high rpm's to separate the sample into its three components: liquid, white blood cells and red blood cells
- The dividing line between the cells and liquid is lined up against a percentage grid and read out as a percentage
- Is an indicator of anemia, dehydration and other conditions

White cell count
Red cell count
Differential cell count
Hematocrit

Hemoglobin

Platelets

Hemoglobin (Hgb or Hb)

- Iron-containing oxygen transport in the red cells.
- Hemoglobin carries oxygen from the respiratory tract to the tissues and organs where it then picks up carbon dioxide, returns to the lungs, and disposes of it.
-

White cell count
Red cell count
Differential cell count
Hematocrit
Hemoglobin

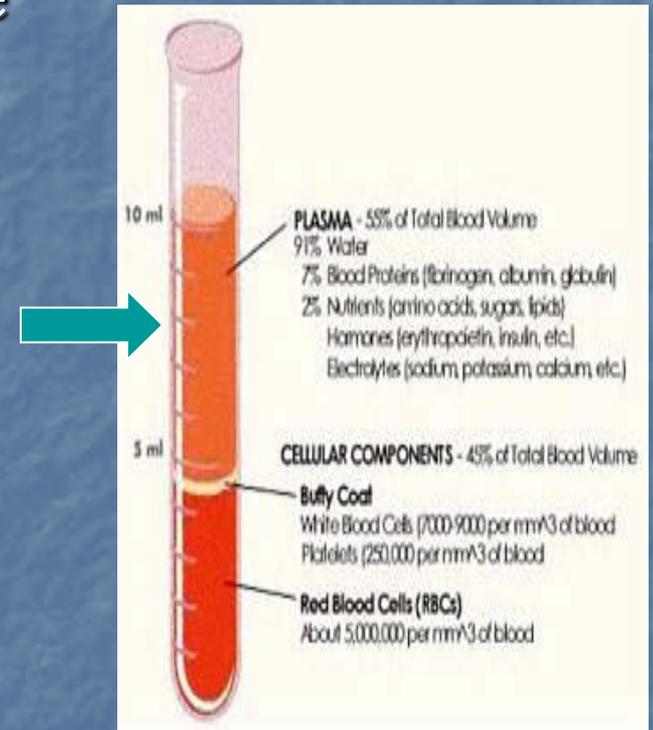
Platelets

Platelets (Plt)

- Circulate in the blood and are responsible for clotting.
- Too low number causes excessive bleeding; too high causes clots to form in vessels causing such conditions as stroke, heart attack, embolism etc.
- Also contain growth factors which aid in the repair and regeneration of tissue.

Serum Chemistries

- The serum chemistry profile is one of the most important initial tests that is commonly performed. These measurements aid in assessing the function of various organs and body systems.
- Sometimes a specific diagnosis may be made on the basis of a blood chemistry profile alone. More often than not, however, the profile provides information on a variety of body organs and systems, giving the veterinarian an indication of where a problem might be located.



Serum Chemistry Profile

.10 ml can provide all the below information

- Glucose – blood sugar
- BUN (blood urea nitrogen) – kidney function
- Calcium – mineral important to muscle and heart function
- TP – total protein – blood protein indicator of hydration, infection, some cancers kidney/liver function etc
- Cholesterol –
- CPK – enzyme – indicator of damage, disease or inflammation of the muscle
- Alk Phos – enzyme of the liver

- ALT – enzyme of the liver
- AST – enzyme of the liver and muscle
- Chloride – electrolyte – hydration
- Potassium – electrolyte – hydration, kidney bladder function
- Sodium – electrolyte – kidney and hydration status
- Uric – kidney liver function birds and reptiles

POOP



(Stool) Fecal Specimens



- Fecal samples are collected routinely for analysis to detect parasites.
- A series of other tests may also be conducted to diagnose conditions in the digestive tract
- Conditions include virus, bacteria, poor nutrient absorption or cancer.

Fecal Collection

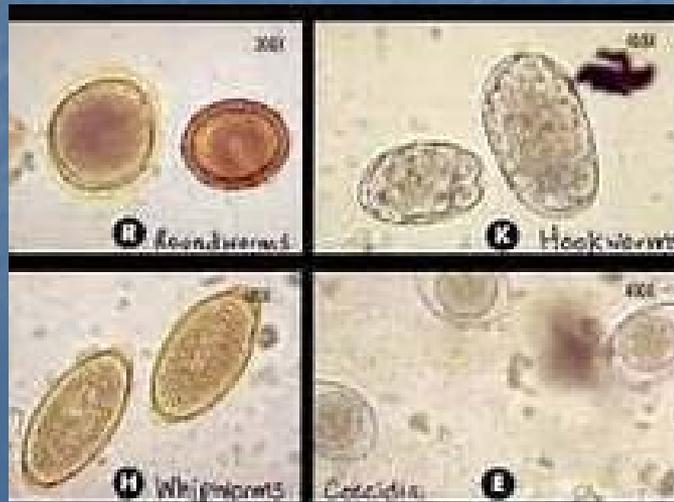
- Collecting fecals for analysis should be the freshest available in the enclosure
- If there are several to numerous animals about a teaspoon should be taken from several different eliminations.
- If normal and abnormal samples are present collect from each. Testing both assures the cause of abnormal stool is addressed.
- Place the samples in a refrigerator if unable to get them to the lab within an hour
- Warm samples that are not cooled allow parasite ova to sporulate making identification of the defining ova very difficult.
- Warm samples also allow degradation of other diagnostic qualities that may be present.

Fecal analysis

- Analysis includes microscopic examination, chemical and microbiologic testing.

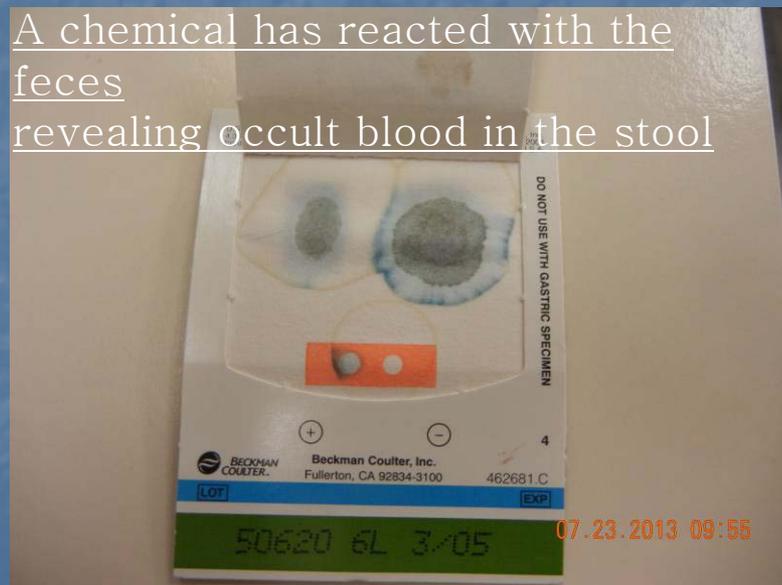
- The sample is checked for color, consistency, shape, odor and the presence of mucus.

- Microscopic examination looks for hidden characteristics such as blood, fat, white blood cells and parasites.
- Most zoo's are able to perform fecal analysis in house. The most routine:
 1. A fecal floatation – feces is placed in a sugar solution and if parasite ova are present they will float to the top and adhere to a cover slip
 2. A direct smear may also be performed where moving protozoa and amoeba will be observed
 3. Stained smear – looking for cells, fungus, yeast etc.



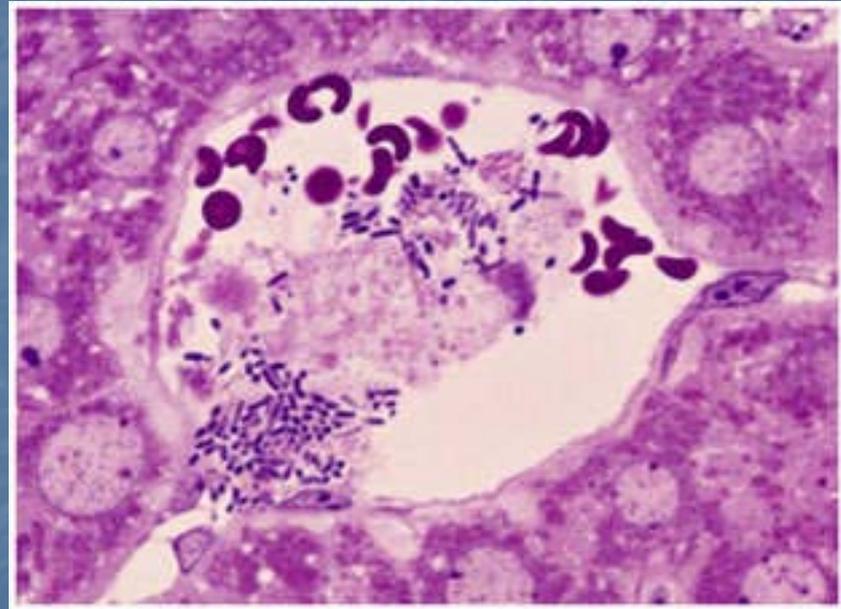
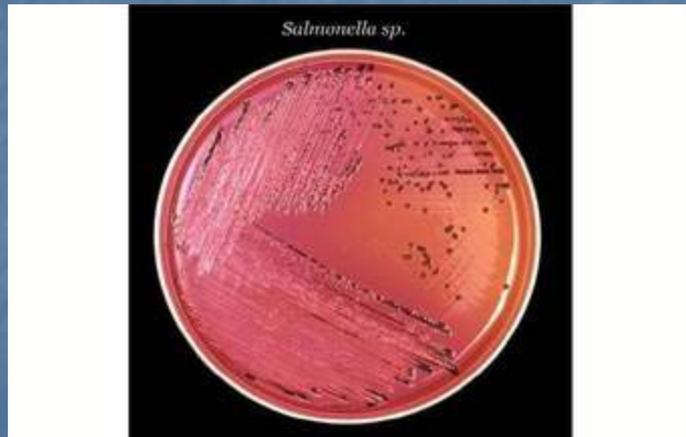
Parasite ova

- Chemical tests look for sugars, proteins, or other chemicals which may be present.
- A simple chemical test that can be run on site in most zoo's is the occult blood test which detects blood in the stool not seen upon visual exam



- Microbiologic tests detect abnormal bacteria or increased numbers
- Findings such as salmonella and shigella are derived from culturing the feces

Culture plate



Microscopic view

Urinalysis

- The collection of urine provides veterinary staff with information pertaining to normal or abnormal functioning of the kidney, liver, urinary tract and bladder. Analysis can also indicate metabolic disorders.
- Ideally, clean samples collected:
 1. Cystocentesis – a needle attached to a syringe is placed through the abdominal wall, or
 2. by expressing urine (placing pressure on the abdomen which pushes on the bladder and forces urine out through the urogenital tract or

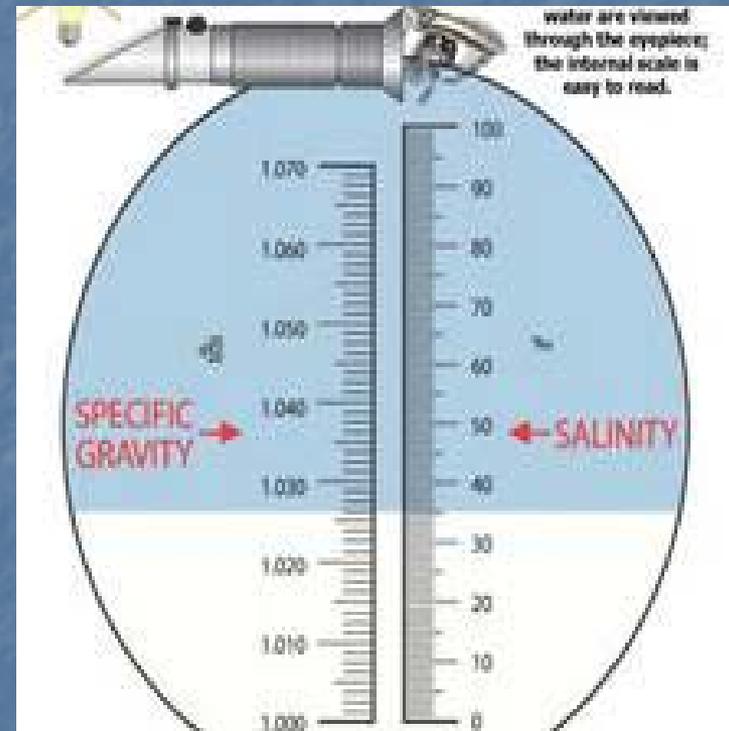
1. a midstream catch (collecting urine as it leaves the body into a receptacle and before it hits the floor) are preferred.
- Samples off the floor are acceptable but are contaminated and results are not accurate due to mixing with chemicals, dirt etc. The importance of training comes into play here!

Lab analysis of the urine

- Once in the lab the sample is analyzed visually for:
 1. Color and turbidity (clear or cloudy)
 2. Clear urine is normal
 3. Cloudy urine indicates increased amounts of inclusions such as cells, crystals etc



- Specific gravity – the number of solids in the urine
- As the number rises it indicates an increase in the number of cells, crystals etc



Urine Dip Stick

- pH – meat eaters are acidic; herbivores are alkaline. pH can indicate blockage, inflammation, fever and anorexia
- Blood – when blood is positive microscopic examination is necessary to evaluate the result
- Ketones – looking for a by product of lipid breakdown which can indicate of diabetes, high fever, starvation
- Glucose – not present in normal urine can indicate diabetes and sometimes liver disease
- Protein – not normally present and can indicate any number of diseases
- Bilirubin – liver damage, blockage of the bile duct
- White blood cells – increased numbers indicate infection

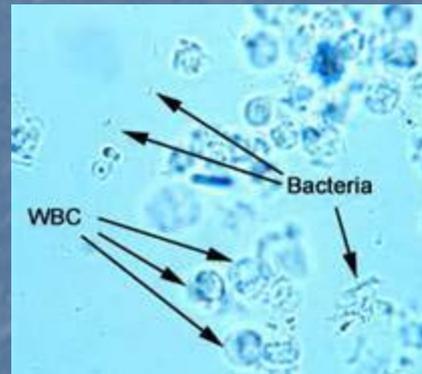


Microscopic examination

- The urine is spun down so the solids drop to the bottom. The top portion is poured off and the remaining sediment is stained to bring out the characteristics of the sediment.



Epithelial cells shed from
The lining of urinary tract organs



Bacteria and white cells

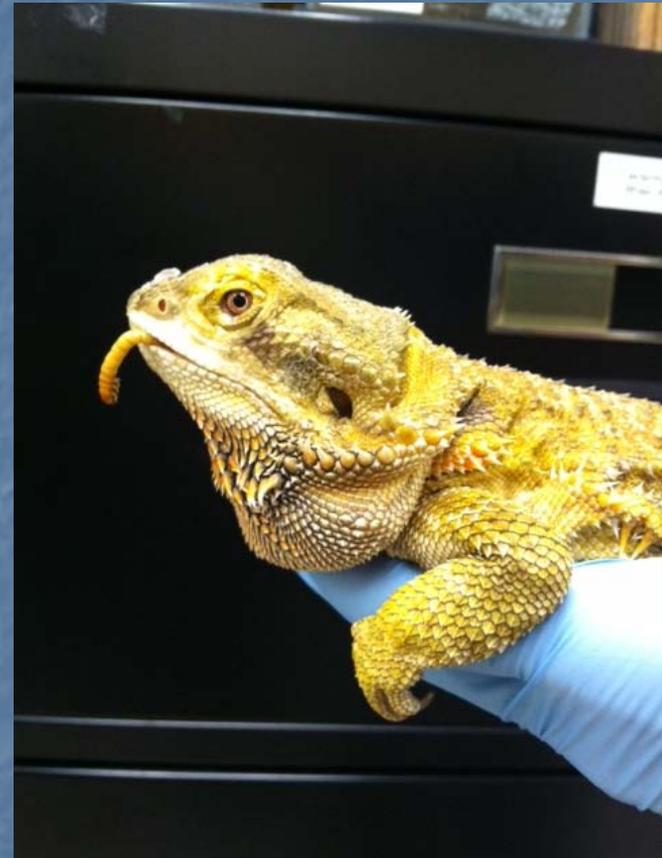


Cellular cast from a
tubule
in the Urinary tract

Medicating Animals

- One of the most challenging tasks for animal husbandry staff!
- Assist veterinary staff by sharing the knowledge you have about the animals likes and dislikes. For example: the bird loves wax worms so an injectable or suspension can be placed in the worm increasing the likelihood the med will be taken. Or, a cat species under your care can find and spit out any pill you give....let vet staff know...perhaps there is a liquid form that would work better.

- Dewormers – medication is given and repeated in two weeks. The second dose is given to eliminate the ova produced from the original worm.
- Medicating prior to feeding in a favorite food item increases the chance an animal will consume the meds as the animal is hungry



Anesthesia

Behavioral training minimizes the need for sedation/anesthesia which is the safest means of providing preventative and acute medical care for zoo animals!!!!

Veterinary staff's involvement with behavioral training can be an asset to the husbandry trainer as vet staff can provide information about what areas of the body need to be accessed, with what, for how long etc.



Fasting Before Anesthesia

- The purpose of fasting prior to anesthesia is to empty the stomach of food and water.
- Fasting decreases the likelihood of aspirating food and/or water into the lungs causing aspiration pneumonia
- Veterinary staff generally place an endotracheal tube to prevent aspiration, particularly if the animal was not fasted prior to anesthesia.

Fasting Times

- Mammals – 12 hours food; 2 hours water
- Birds – 4 hours food; 1 hour water
- Some procedures/surgeries and/or species of animals such as hoof stock, require up to 72 hours of fasting

What is anesthesia?

A state of unconsciousness induced in animal with three components

1. Amnesia – loss of memory
2. Analgesia – pain relief
3. Immobilization – ability to move

Choice of drugs

- The drugs used for an anesthetic event are determined by what is needed to accomplish the medical procedure. Some drugs only provide for one of the three components, others two and yet others all three. Often several drugs are used at once to accomplish a procedure where pain relief, no memory of the procedure and complete immobilization are needed.

Anesthetic Agents

- Inhalants
- Injectables
- Oral
- Local

Inhalant Anesthetics

- In general, inhalant anesthetics are safest for the animal because the gas is eliminated from the body by exhaling .
- Decreased chance of drug induced toxicity
- Anesthesia of choice when medically treating a severely debilitated animal because the drug is not eliminated via organs that may not be functioning normally

Precautions of inhalant anesthetics

- Animal must be monitored closely for what stage of anesthesia it is at – and the gas adjusted constantly so as not to depress cardiac and respiratory function
- Inhalants are volatile liquids – must be used and stored accordingly.
- Are potential hazards to personnel. The most common hazard effects pregnant staff. Always notify veterinary staff if you even suspect you may be pregnant. The NC Zoo policy states pregnant staff are not to participate in immobilizations involving gas anesthesia and must leave the area during x-rays.

Injectable Anesthetics

- Often used in combinations of one or more
- Mixing injectables can significantly reduce the amount of each drug used
- Injectables, in general, are metabolized by the liver and kidney
- Less expensive equipment is required with injectable anesthesia however some drugs used in zoo medicine are very expensive such as carfentanil, M-99 etc

Oral Anesthetics

- Generally, medications given orally are preanesthetics such as valium, fetanil, etc
- The function of premedication's is to calm the animal prior to delivering the immobilizing drug.
- Also helps lower the dose of immobilizing drugs

Local Anesthetics.

- The generic names often end in “caine” such as lidocaine, novicaine etc.
- The effects begin about 15 minutes after administering and can last 45 min to hours.
- Local anesthetics, depending on location of the injection, can numb the skin, tissue, or an entire region of the body.
- With trained animals this option can be used more often

Stages of Anesthesia

- Stage 1: Induction – excitement and struggling are common
- Stage 2: Delirium, involuntary excitement –self injury, loss of consciousness begins
- Stage 3: General Anesthesia – 3 planes
 - Plane 1: Light – most reflexes still present
 - Plane 2: Medium – Most surgeries are at this level – muscles relaxed and most reflexes such as eye blink and pinches to the toes are absent
 - Plane 3: Deep – all levels of muscle are relaxed and ability to maintain respiration is endangered. Corneas may not respond to light
 - Plane 4: Too Deep – muscles are paralyzed including those used to breath

Stages of Anesthesia

- Stage 4: Irreversible anesthesia – respiratory arrest followed by circulatory collapse. Death.

Monitoring Anesthesia

- Anesthesia is monitored using sensory techniques and equipment
- Sensory monitoring incorporates visual and touch
- Equipment – technology devised to measure physiological functions

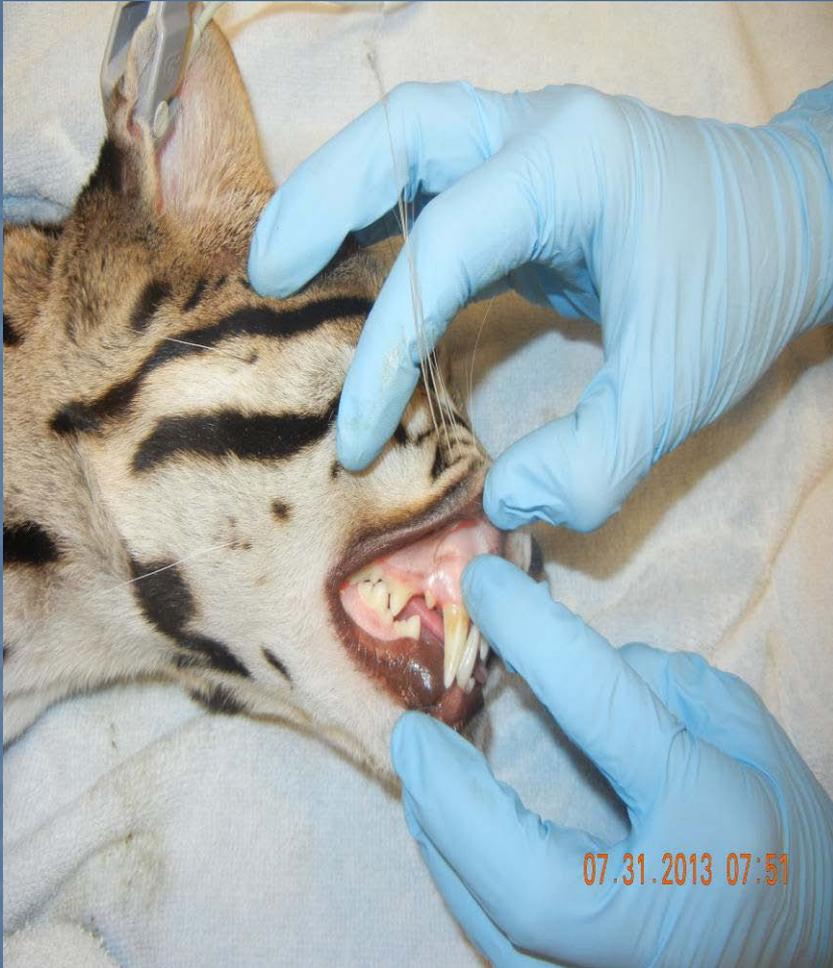
Sensory Monitoring



- Reflexes
 - Palpebral – touching eyelids to cause blinking – if the animal blinks it is too light
 - Toe/paw pinch reflexes – causes pain – animal will pull away
 - Corneal reflex – touching the cornea causes a blink – if the animal does not blink it is too deep

■ Muscle tone

- Increases as the depth of anesthesia decreases
- Test muscle tone by attempting to open the mouth – too light if there is resistance
- Movement – animal moves limbs etc if too light



- Cardiopulmonary function and body temp
 - Perfusion time – pressure on the gum line turns the tissue white – pressure removed the tissue will turn pink quickly if the heart beat is strong and oxygen is reaching the tissues.

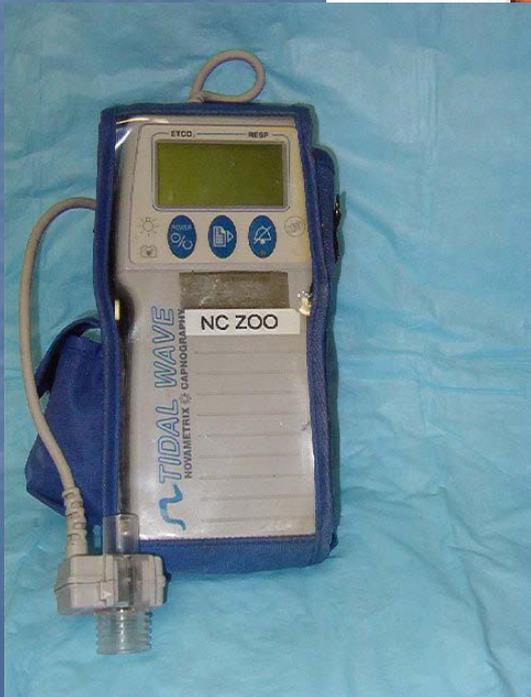
- Animal is too deep if respirations and heart rate decrease from the norm.
- Elevations in heart rate indicate animal may be feeling pain and is anesthetized too lightly
- Animals body temperature decreases with deeper anesthesia and increase as the animal lightens

Anesthesia Monitoring Equipment



Pulse oximeter –
measures the
percentage of oxygen
circulating through the
blood to tissues and
organs

Monitoring Equipment



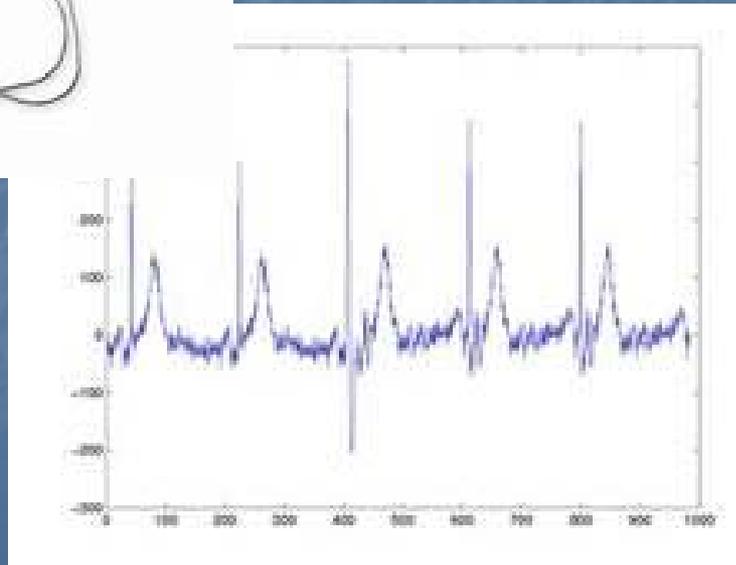
- Capnograph – provides information about the bodies ability to transport oxygen to organs and tissues and to remove carbon dioxide

Monitoring Equipment



- Blood Pressure Cuff – pressure exerted on the vessels as a result of the pumping of the heart. If too low or too high adjustments to medications, anesthesia levels etc. can be adjusted as well as further diagnostics to determine the cause.

Monitoring Equipment



- EKG— evaluates and graphs electrical activity of the heart

Monitoring Equipment



- Blood Gas Analyzer–

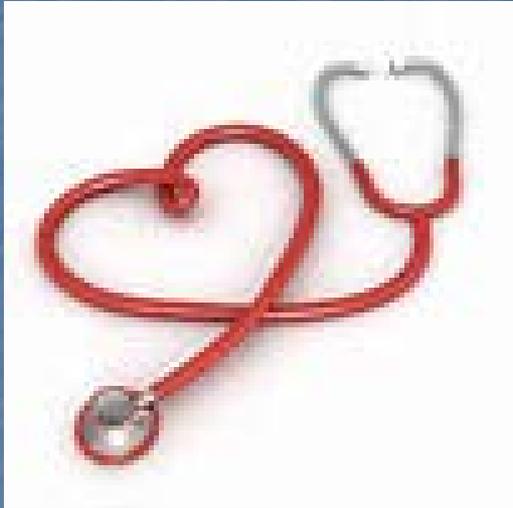
a small sample of blood is drawn from an artery and placed in the device. The analyzer measures the exchange of gases between circulating blood and tissues. Imbalances of the gases can be treated with drugs to return gases to normal values.

Monitoring Equipment



- Multi-functional Monitors
Several different models of monitors which incorporate all or some of the previous monitors mentioned

Antique Monitoring Devices – before the days of technology !!!!!!!



- Stethoscope – enables evaluation of the number and quality of heartbeats



- Thermometer – measures body temperature

Animal Handling for Necropsy

- Each institution has its own protocol for the handling of a deceased animal carcass
- The main objective is to cool the specimen as quickly as possible in order to preserve the tissues
- Heat degrades the tissues quickly

Small Animal Carcass Handling

- Birds, reptiles, amphibians and fish should be wrapped in moist newspaper, paper towel or the like and immediately placed in the refrigerator
- It is beneficial for cooling purposes, to water down a bird carcass to break the feather/skin tension – allowing the bird to cool faster – feathers are a big insulator. Dawn dish detergent is an added aid breaking the feather/skin tension further.
- Avoid placing animals in plastic bags initially as a sealed plastic bag retains the body heat and degrades the tissues – cooling will occur much quicker when the animal carcass is moist and refrigerated.



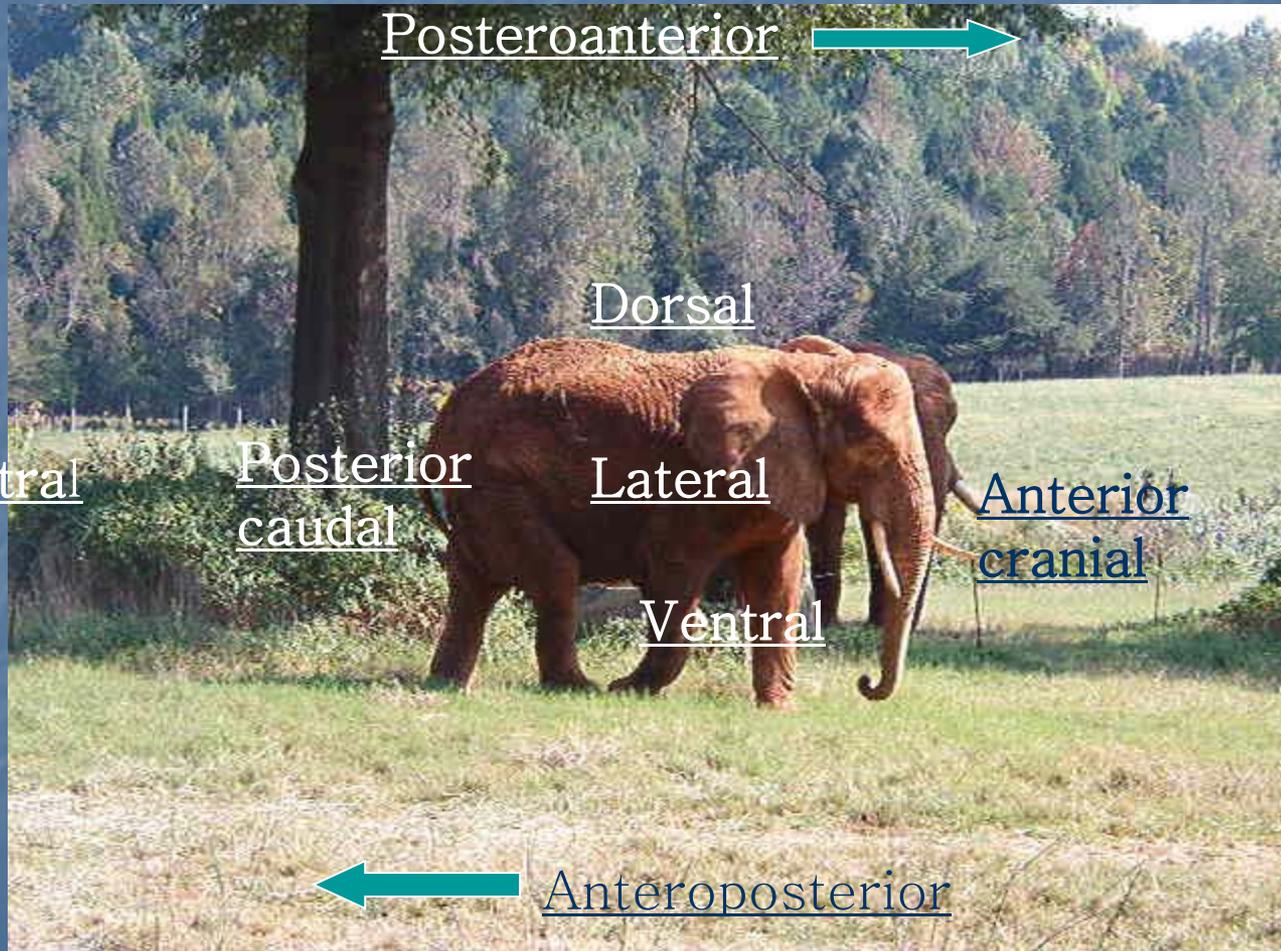
Moderate and Large Size Carcass

- Again, avoid placing animals in plastic bags.
- Place the animal in a cooler or refrigerator designated for deceased animals
- Very large animals which cannot be refrigerated can be moistened and cooled using a hose and should be necropsied as soon as possible in order to retain diagnostic quality of the internal organs and tissues
- As with birds, heavily furred or haired animals can be washed down with Dawn dish soap to break down the hair/fur /skin barrier to allow faster cooling.



- The following slides provide a reference for animal positioning and skeletal bone names.
- Helpful when discussing cases or writing up reports.
- There are also two documents provided at the end of this presentation.
 - Common Medical Terms
 - Common Pharmaceutical and Medical Abbreviations

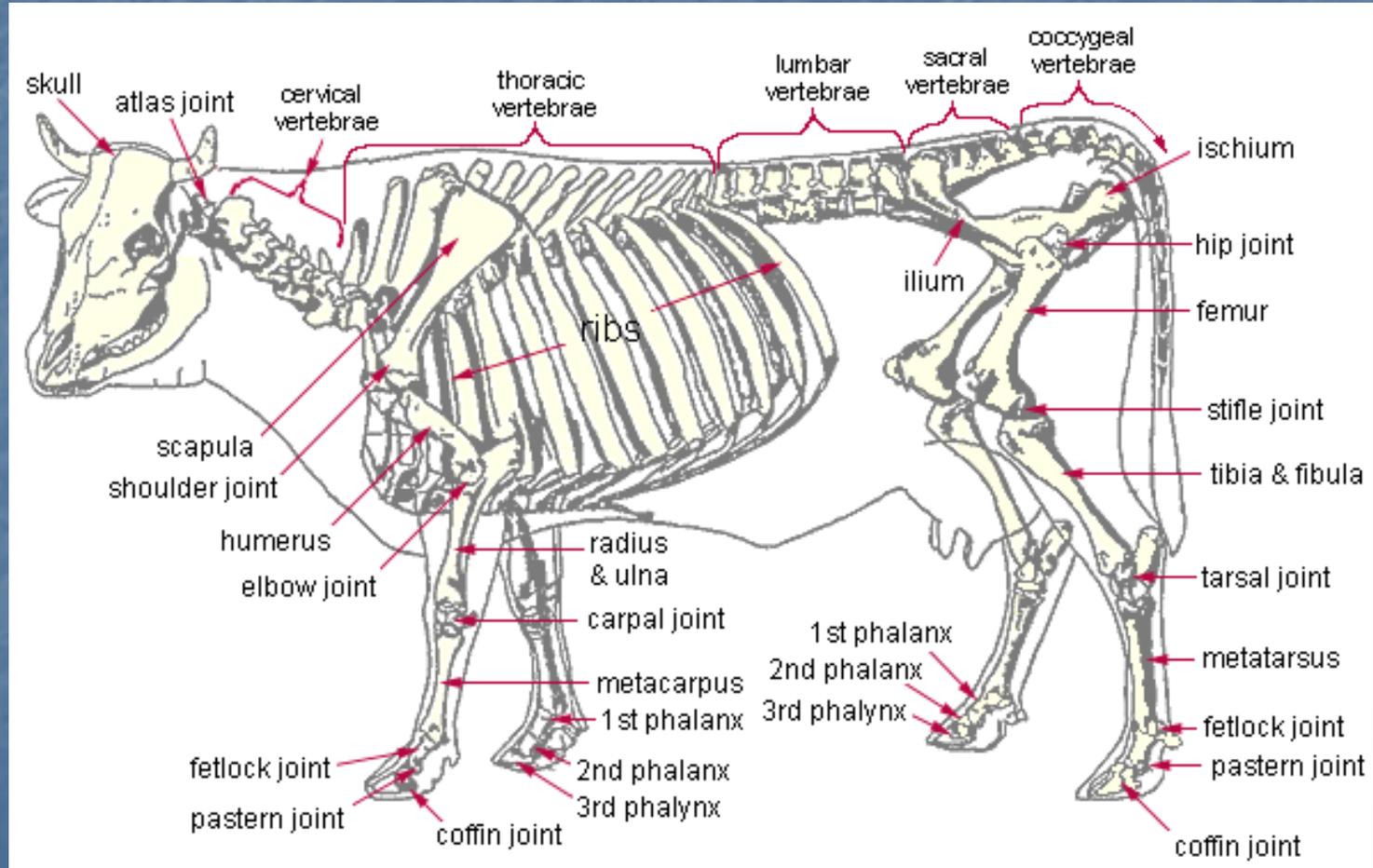
Positioning



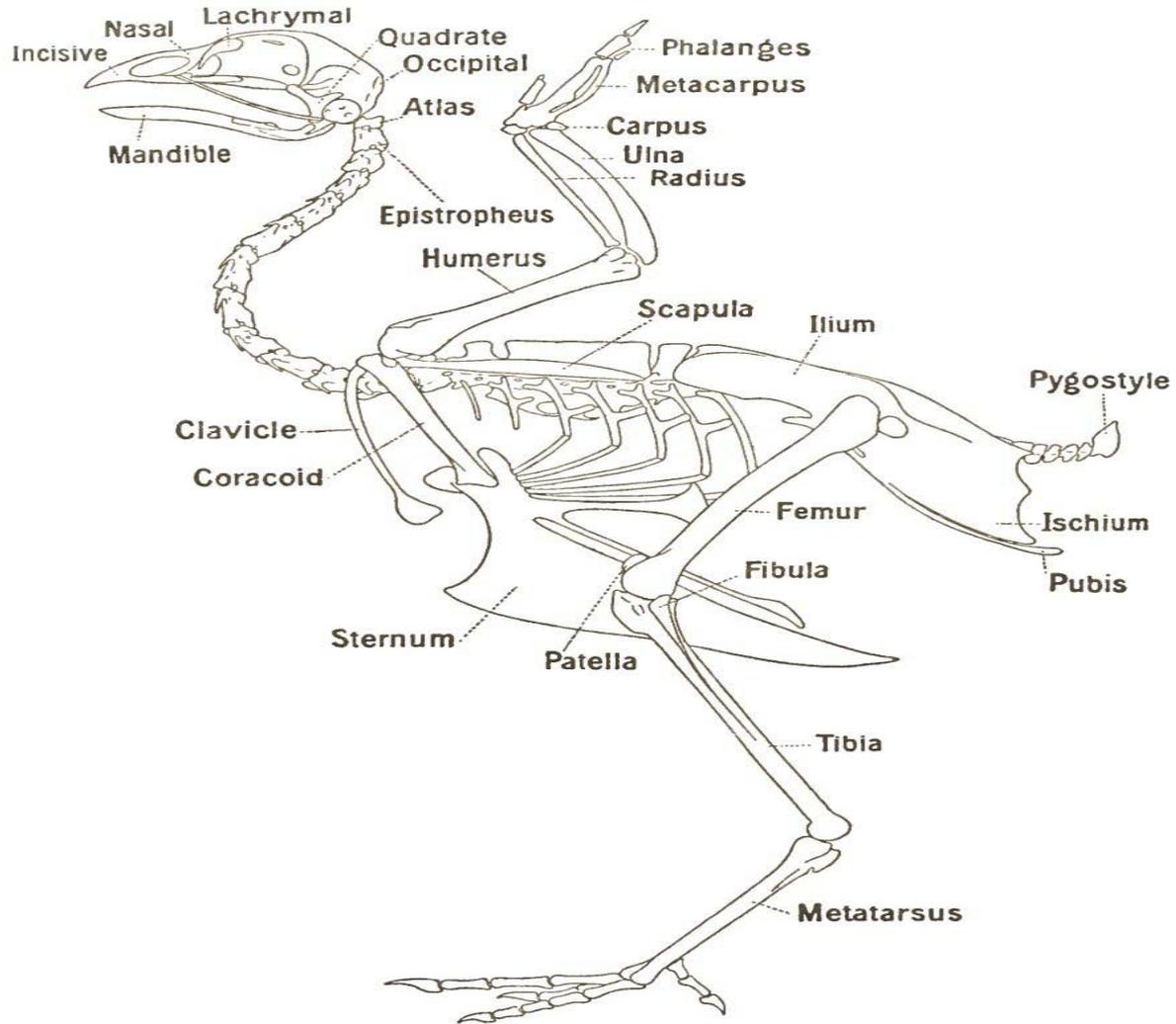
Animal Skeletal Bone Names

- The following labeled bones may assist with descriptions on daily reports or in conversation with veterinary staff
- Equid, bovid, canine and an avian skeleton are represented
- Other species of animals will be very similar

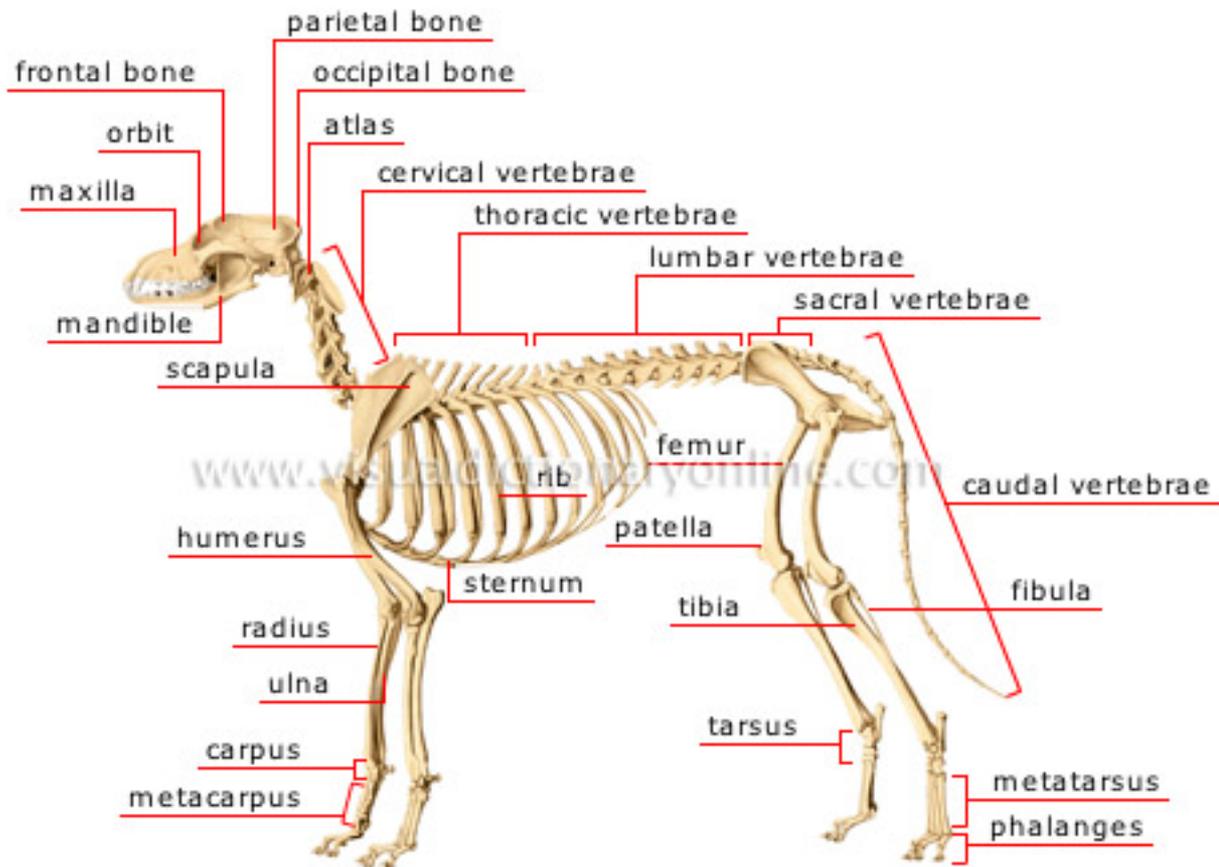
Bovine



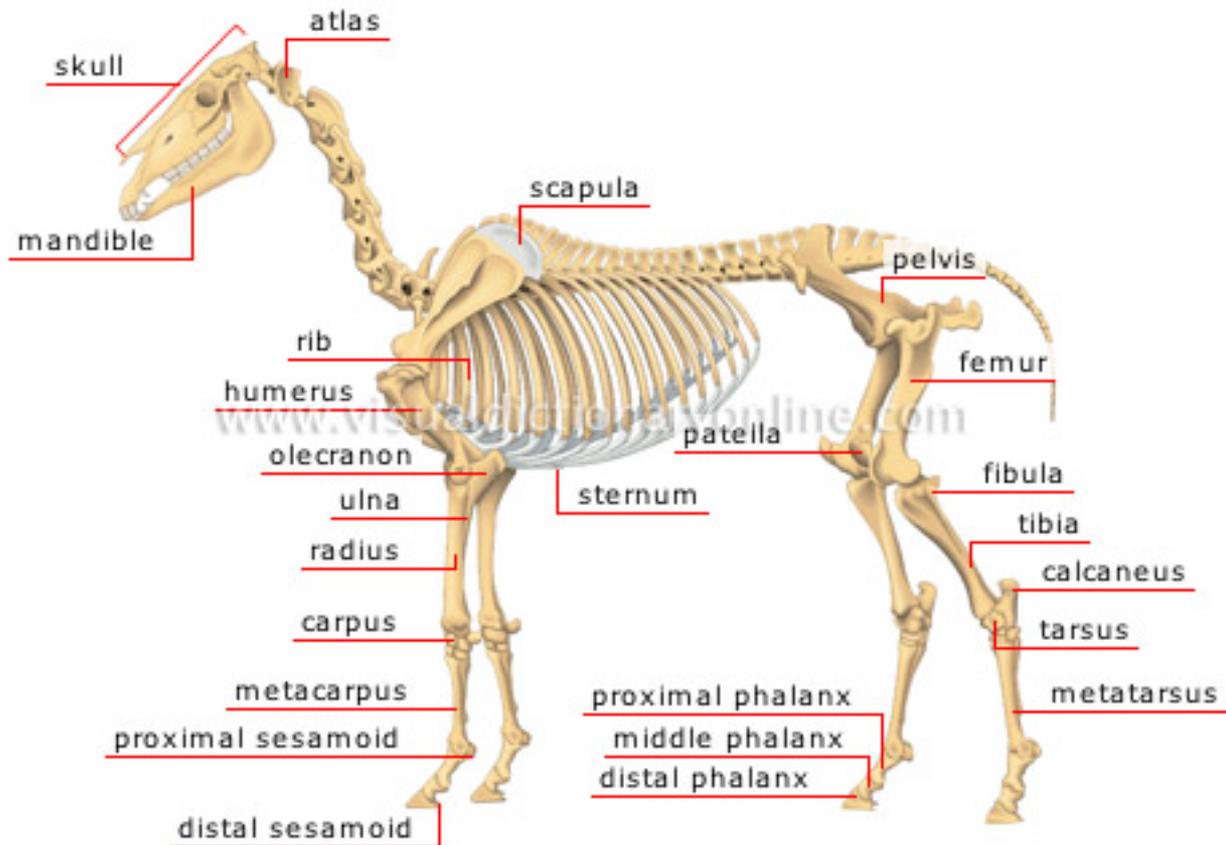
Bird



Dog



Equid



Contact information:

Cheryl Purnell

Senior Vet Tech/Hospital Manager

North Carolina Zoological Park

4401 Zoo Parkway

Asheboro, NC 27205

cheryl.purnell@nczoo.org

Common Medical Terms

Abdominocentesis - The insertion of a needle into the abdominal cavity to remove fluids.

Abscess - A localized accumulation of pus; usually associated with infection.

Active immunity - Immunity produced when an animal's own immune system reacts to a stimulus e.g., a virus or bacteria, and produces antibodies and cells which will protect it from the disease caused by the bacteria or virus. Compare with 'passive immunity.'

Acute - Having a sudden and generally severe onset. See also Chronic.

Adrenaline - A hormone produced by the adrenal glands that elevates heart and respiration rates; also called 'epinephrine.'

Aerobic bacteria - Bacteria that require oxygen to survive and grow.

Agglutination - Clumping together.

Albumin - A protein in the blood responsible for the maintenance of osmotic (water) pressure in the blood; also binds (attaches) to large molecules in the blood and serves to transport them; produced by the liver; also called 'serum albumin.'

Alimentary - Pertaining to food or the digestive tract.

Alopecia - A loss of hair or baldness.

Alveoli - The tiny microscopic areas of the lung where the actual exchange of oxygen and carbon dioxide into and out of the blood occurs. Also called alveolus and alveolar sacs.

Anaerobic bacteria - Bacteria which only live in an environment in which there is no or little oxygen, e.g., Clostridium tetani which causes tetanus.

Analgesia - Pain relief.

Anaphylaxis - Anaphylaxis is a rare, life-threatening, immediate allergic reaction to something ingested or injected. If untreated, it results in shock, respiratory and cardiac failure, and death. See article: Anaphylaxis in Dogs and Cats. May also be referred to as anaphylactic shock or anaphylactoid reaction.

Anemia - A condition in which the number of red blood cells present in the blood is lower than normal.

Anesthesia - Loss of sensation or feeling; induced artificially with drugs to permit painful procedures such as surgery.

Anorexia - Loss of appetite.

Anterior - Positioned in front of another body part, or towards the head of the animal. Opposite of posterior.

Anthelmintic - Medication which kills certain types of intestinal worms; dewormer.

Antibiotics - Usually refers to drugs administered to kill or inhibit the growth of bacteria; not effective against viral infections.

Antibody - Small disease-fighting proteins produced by certain types of cells called 'B cells.' The proteins are made in response to 'foreign' particles such as bacteria or viruses. These antibodies bind with certain proteins (antigens) on foreign particles like bacteria, to help inactivate them. See also Antigen.

Antiemetic - An agent that decreases or stops vomiting.

Antifungal - Drugs administered to kill or inhibit the growth of fungi (plural of fungus).

Antigen - A molecular structure on surfaces of such particles as bacteria and viruses. This structure is recognized by the body as 'foreign' and stimulates the body to produce special proteins called antibodies to inactivate this foreign invader. See also Antibody.

Antiprotozoal - An agent that kills protozoa, which are one-celled organisms such as Giardia.

Antipruritic - Relieves itching.

Antipyretic - A substance used to relieve fever.

Antiseptic - A substance which inhibits the growth of bacteria, but does not kill them.

Antispasmodic - An agent that relieves or decreases spasms in muscle. The muscle could include 'smooth muscle' which is the type of muscle in intestines that causes them to contract and move food through the digestive system.

Aquaculture - The (usually commercial) captive raising of fish, corals, and other aquatic life for aquariums, food, and scientific purposes.

Aqueous humor - The fluid found within the eyeball which provides nourishment to the interior eye structures and keeps the eyeball inflated.

Arrhythmia - A variation from normal heart rhythm.

Arteries - Thick walled vessels that carry blood away from the heart to the lungs and body tissues; the pulmonary arteries carry deoxygenated blood to the lungs, but all other arteries carry oxygenated blood.

Arthritis - Inflammation and swelling in the joints; has multiple causes including lameness.

Articular - Pertaining to a joint.

Ascarid - Roundworm.

Ascites - Fluid accumulation in the abdomen.

Aspirate - Withdraw fluid or cells through the use of suction - usually the suction produced by pulling back on the plunger of a syringe attached to a needle which is inserted into the area to be sampled. Also the breathing in of a fluid or foreign substances.

Asymptomatic - A term used to describe a condition in which no symptoms are present.

Ataxia - A lack of muscle coordination, usually causing an abnormal or staggered gait.

Atrophy - An abnormal decrease in size of an organ or tissue.

Auscultate - To listen for sounds produced within the body, usually with the aid of a stethoscope.

Azotemia - The presence of increased nitrogenous (containing nitrogen) waste products in the blood as a result of kidney malfunction.

Bacteriocidal - A description of an agent that kills bacteria.

Bacteriostatic - A description of an agent that stops the growth (reproduction) of bacteria, but does NOT kill them.

Bacterium - Microscopic organisms that lack nuclei and other organelles; pathogenic species cause disease, while nonpathogenic species are harmless.

Benign - A mild illness or non-malignant form of a tumor. Benign tumors usually have well defined edges and tend to grow slowly.

Bilateral - On both sides.

Bile - A liquid produced by the liver, stored in the gall bladder, and dispensed into the small intestine as needed; aids in the digestion and absorption of fats.

Bilirubin - An orange-yellow pigment in bile that is a product of red blood cell breakdown; it is normally excreted with the urine or feces, and a buildup in the body can cause jaundice.

Biopsy - The surgical removal of a small amount of abnormal tissue, usually of tumors, for diagnosis.

Bladder - A sac that receives and holds a liquid until it is excreted, e.g., urinary bladder, gall bladder; in fish, the swim bladder holds air.

Blepharospasm - Spasm of the eyelids often resulting in complete closure of the lids due to eye pain, such as seen with a scratch on the cornea.

Bloat - Filling of the stomach with air.

Blood gases - Gases, such as oxygen or carbon dioxide, that are in the blood.

Blood glucose - A graph of blood glucose levels over time. At the time of insulin injection, and at regular intervals throughout the day, the level of glucose in the blood is determined through laboratory testing.

Bone marrow - A soft tissue composed of blood vessels and connective tissues found at the center of bones; the primary function is blood cell production.

Bone marrow suppression - A condition in which the cells of the bone marrow which produce red blood cells, white blood cells, and platelets are inhibited. This may result from the use of certain drugs, such as anti-cancer agents.

Bradycardia - An abnormal slowing of the heart rate.

Bronchi - The plural of bronchus, the large air passages of the lungs.

Bronchiole - The small airways in the lung that come off of the larger bronchus; bronchioles are 1 mm or less in diameter.

Bronchodilator - Medication which opens up the main air passages to the lungs.

Bronchoscopy - The internal inspection of the trachea and bronchi using a bronchoscope.

BUN - Short for 'blood urea nitrogen,' a blood test that estimates kidney function.

Cachexia - Extreme weight loss.

Calcified - The hardening of tissue through the influx of calcium, usually as a result of chronic inflammation.

Calculus (Plural calculi) - Abnormal stone-like structure(s) usually composed of mineral salts, e.g., a bladder calculus is the same thing as a bladder stone.

Candida - A certain genus of yeast which can cause disease in humans and animals; an infection with Candida is called candidiasis.

Carcinogen - A substance which causes cancer.

Carcinoma - A malignant cancer that arises from the epithelial tissues of the body such as the skin, intestinal tract, and bladder.

Cardiac - Related to the heart.

Cardiomyopathy - Diseases of the heart muscle; does not include diseases of the valves of the heart or congenital defects.

Cardiopulmonary - Relating to the heart and lungs.

Cardiovascular - Related to the heart and blood vessels.

Carpus - The wrist (front leg) of dogs and cats.

Cataract - A cloudiness of the lens of the eye, reducing vision and giving the eye a pearly appearance.

Caudal - A directional term used to refer to an area more toward the cauda, or tail region; opposite of cranial.

Chelation - Binding of a substance to a metal, thus helping the body to remove it.

Chemotherapy - Treatment of a disease with chemical agents (drugs); the term is most commonly used to describe the treatment of cancer with medication.

Choana (Plural choanae) - An opening between the nasal cavity and oropharynx (mouth) in birds and reptiles.

Chondroitin - Decreases the activity of enzymes which break down cartilage in a joint.

Chronic - Of a long duration: a chronic illness persists for weeks, months, or even for the life of animal. See also acute.

Class I, II, III, IV medications (Controlled Drugs) - Drugs are classified by the Drug Enforcement Administration of the Department of Justice depending upon such criteria as the potential for human abuse.

Cloaca - A common tube-like structure through which feces, urine, and reproductive fluids/eggs pass in birds, turtles, and other lower vertebrates.

Clotting factors - Protein components in the blood which help it to clot. Clotting is a complex mechanism. In addition to platelets, clot formation is the result of a long chain of chemical reactions carried out by individual molecules called 'clotting factors.' Each factor is numbered such that factor I leads to a reaction with factor II forming a new substance. This then reacts with factor III and so on to factor XII.

CNS - Central nervous system. Includes the brain, spinal cord, and the nerves leading from them.

Coagulation - The process of clotting.

Coccidia - A one-celled parasite in the category of protozoa. In dogs and cats, coccidia are generally parasites of the intestinal tract.

Colitis - An infection or inflammation of the colon.

Colostrum - The antibody-rich first milk produced immediately before and after giving birth.

Coma - Being in a state of unconsciousness.

Complete blood count - A count of the total number of cells in a given amount of blood, including the red and white blood cells; often referred to as a 'CBC,' it is one of the most common tests done to check for abnormalities of the blood.

Computerized tomography scan (CT scan) - A radiological imaging procedure that uses x-ray pictures to produce "slices" through a patient's body; also called a computerized axial tomography (CAT).

Congenital - A characteristic of an animal that is present at birth. It may be inherited or induced by events that occur during pregnancy.

Conjunctiva - A thin membrane which lines the inside of the eyelids and covers part of the eyeball.

Conjunctivitis - An inflammation of the lining of the eyelids; may cause pain, redness, itching, and a discharge.

Contrast agents - A substance given orally or injected into a patient that makes the affected tissue easier to identify on an x-ray.

Contusion - An injury to underlying tissues without breaking the skin; a bruise.

Coprophagia - Eating dung or fecal matter; normal behavior in some animals, such as rabbits.

Cornea - The clear part of the front of the eye which allows light in.

Cranial - A directional term used to refer to the area near the cranium, or head region; opposite of caudal.

Crepitus - the grating sound or sensation caused by the rubbing together of dry surfaces of bone or joint

Crop - An organ between the esophagus and stomach of many domestic birds, which serves as a temporary food storage organ.

Crust - Area of dried fluid or cells on the skin. The fluid may have been blood, serum, pus, or medication.

Culture - The process in which a sample of fluid or tissue is taken from an animal and placed in special media which allows the bacteria, virus, etc., to grow (reproduce) in the laboratory.

Cutaneous - Relating to the skin.

Cyanosis - Bluish or grayish color to the skin and gums which occurs when the animal has insufficient oxygen.

Cyst - An abnormal sac-like structure that is lined with cells which produce a liquid or thick material.

Cystitis - Inflammation of the urinary bladder.

Cytology - The study of cells; often refers to the microscopic examination of a sample taken from the skin or lesion to look for the cause of a condition.

Cytoplasm - Substances which make up the inside of a cell and surround the nucleus of the cell which contains the genetic material.

DEA - Drug Enforcement Administration. The federal agency which regulates the manufacture, dispensing, storage, and shipment of controlled substances including medications with human abuse potential.

Decontaminate - Remove injurious material.

Defecation - The elimination of feces from the rectum.

Dehydration - A condition in which the body loses more water than it takes in.

Dermal - Relating to the skin.

Dermatitis - An inflammation of the skin.

Dermatophyte - Fungus that causes ringworm; include Trichophyton, Microsporum, and Epidermophyton.

Dextrose - A commonly used name for glucose (sugar) solutions given intravenously to treat fluid or nutrient loss.

Diuretic - Agent which increases the secretion of urine, ridding the body of excess fluid.

DNA - Deoxyribonucleic acid, the chemical compound that occurs in cells and is the basic structure for genes.

Duration of immunity - Length of time an animal is protected from a disease. Vaccines for some diseases provide long durations of immunity (years), while vaccines for some other diseases only provide immunity that lasts for 6 months.

Dysecdysis - Abnormal shedding of the skin in reptiles.

Dysphagia - Difficulty swallowing.

Dysplasia - An abnormal tissue development, common in the bones of the canine

. **Dyspnea** - Shortness of breath.

Dystocia - Difficult birth.

Dystrophic - Disorder caused by incorrect nutrition.

Dysuria - Difficult or painful urination.

Ecdysis - Shedding of the external layers of the skin in reptiles.

ECG / EKG - A printout of an analysis of the electrical activity in the heart.

Echocardiogram - The image produced by performing an ultrasound examination of the heart.

Ectoparasite - A parasite that lives on the outside surface or skin of another animal. Ectoparasites include fleas, ticks, lice, and mange mites.

Ectopic - Non-malignant tissue growing in an unusual location (e.g., an ectopic pregnancy is conception of a normal embryo outside the normal location, which is the uterus).

Edema - A condition in which the tissues of the body contain too much body fluid. The fluid accumulation may cause swelling in the affected area.

Electrocardiogram - A printout of an analysis of the electrical activity in the heart.

Electrocautery - An instrument with a very hot tip, heated by electricity, is applied to a tissue. Electrocautery may be used to make an incision, remove a mass, or to stop bleeding.

Electrolyte - Chemically, an element when dissolved in water, will cause the solution to transmit electricity. In medicine, certain elements in the blood which are critically important to life, including sodium, potassium, chloride, calcium, and phosphorous.

Emaciation - The severe loss of body weight; body weight is generally less than 50% of that in a normal animal.

Emesis - Vomiting.

Encephalitis - Inflammation of the brain; often caused by a virus.

Encephalopathy - Any degenerative disease of the brain. Causes include liver disease resulting in the buildup of toxic by-products of metabolism, heavy metal (e.g., lead) poisoning, and loss of blood supply.

Endocrine - Pertaining to the secretion of hormones. The endocrine system consists of various glands which produce hormones.

Endoscope - A long flexible instrument which can be passed into the body to view various structures through the use of fiber optics.

Enteritis - An inflammation of the intestines.

Envenomation - The act of injecting a poisonous material (venom).

Enzyme - Enzymes are special proteins produced by cells which cause chemical changes in other substances, but which are not themselves changed in the process.

Eosinophil - A type of white blood cell that commonly increases in numbers as a response to parasites and allergies.

Eosinophilia - A condition in which there are more than the usual number of eosinophils

in the circulating blood.

Epidermis - The top layer of the skin.

Epistaxis - Bleeding from the nose.

Erythema - Redness of the skin caused by blood clogging in small blood vessels.

Erythrocyte - Red blood cell; contains hemoglobin, which carries oxygen to the tissues.

Esophageal reflux - A condition in which stomach contents move backward into the esophagus, i.e., heartburn.

Esophagus - The muscular tube for the passage of food from the mouth to the stomach.

Estrus - The time when a female animal is fertile and receptive to the male. Also known as a heat period.

Exophthalmos - The abnormal outward protrusion (bulging) of the eye.

False negative test result - The result of a diagnostic test is negative; but the animal actually does have the condition tested for.

False positive test result - The result of a diagnostic test is positive; but the animal actually does not have the condition tested for.

Fine needle aspirate - Suction is applied to a hollow needle which has been inserted into tissue and a core of the tissue is withdrawn to culture and/or examine microscopically.

Follicle - The group of cells in the skin in which a hair or feather develops.

Foreign body - Any abnormal substance within the body. Examples include wood splinters, ingested cloth or balls, glass in the feet, etc.

Fungicide - A drug that kills fungi.

Gastric lavage - To flush out the stomach.

Gastritis - Inflammation of the stomach.

Gastrointestinal - Also known as GI. Pertaining to the stomach and intestines. The term 'digestive system' includes the mouth, gastrointestinal tract, anus, pancreas, and liver.

Gestation - Pregnancy.

Gingival - Relating to the gums.

Gingivitis - Inflammation of the gums.

Glaucoma - Increased pressure within the eye caused by an accumulation of fluids; can lead to blindness if left untreated.

Glucosamine - One of the building blocks the body uses to make new cartilage.

Glucosuria - Glucose in the urine. (Also called glycosuria.)

Glycogen - A storage form of glucose in the body.

Gram negative - A classification of bacteria based upon their lack of retention of a certain stain in the laboratory. The staining quality is based on the structure of the cell wall surrounding the bacteria. This structure of the cell wall influences which antibiotics will kill the bacteria. This laboratory staining method was developed by Hans Gram in 1884.

Gram positive - A classification of bacteria based upon their uptake of a certain stain in the laboratory. The staining quality is based on the structure of the cell wall surrounding the bacteria. This structure of the cell wall influences which antibiotics will kill the bacteria. This laboratory staining method was developed by Hans Gram in 1884.

Granuloma - The formation of a nodule as a result of inflammation.

Heartworm - A species of parasitic worm (*Dirofilaria immitis*) that lives and reproduces in the chambers of the heart of an animal. Microscopic, immature worms (microfilariae) circulate in the blood and are taken in by mosquitoes that bite the animal. Microfilariae mature in the mouthparts of the mosquito and infect another susceptible animal bitten by the same mosquito.

Heinz body - A condition in which the red blood cells are destroyed and this results in anemia. The specific type of anemia is called 'Heinz body anemia' because the red cells develop an abnormality called a 'Heinz body' which can be seen under the microscope. This anemia can occur as a reaction to certain medications and also in cats who eat onions.

Hemangiosarcoma - A malignant tumor of the blood vessels, usually occurring in the skin, liver, spleen, right atrium of the heart, and muscle; also called angiosarcoma.

Hematocrit - PCV (Packed Cell Volume), hematocrit: A laboratory test to monitor relative number of red blood cells present in the blood. A blood sample is placed in a tiny glass tube and spun in a centrifuge. The cells are heavier than the plasma and are compacted at one end of the tube. After the tube is spun, it is examined and the packed

cell volume is determined as the percentage of the red cellular portion relative to the total amount of blood in the tube (i.e. remainder being the plasma).

Hematology - The study of blood, its physiology and pathology.

Hematoma - A mass of blood within the tissues. Generally, the result of trauma to the blood vessels or abnormal blood clotting.

Hematuria - A condition of blood in the urine.

Hemoglobin - A protein inside of red blood cells, responsible for the binding and transport of oxygen to the body tissues (Hb).

Hemolytic - Causing the red blood cells to break open.

Hemorrhage - To bleed excessively; may be the result of injury or blood clotting abnormalities.

Hepatic - Pertaining to the liver.

Hepatitis - An inflammation or infection of the liver.

Hernia - The protrusion of an organ through an abnormal opening.

Hyper - A prefix meaning abnormally high or excessive.

Hypercalcemia - An increased level of calcium in the blood.

Hyperesthesia - Abnormal sensitivity to touch, pain, or other sensory stimuli.

Hyperglycemia - Higher than normal blood glucose level.

Hyperkalemia - Increased level of potassium in the blood.

Hyperphosphatemia - Elevated blood phosphate levels.

Hyperpigmentation - An increased dark color in the skin caused by the pigment 'melanin.'

Hyperplasia - An increase of the number of cells within an organ.

Hyperplastic - Abnormal increase in the amount of tissue, e.g., a hyperplastic ear would have increased numbers of cells in the ear canal, sometimes to the point of closing off the ear canal. In prostatic hyperplasia, the prostate enlarges due to an increased number of normal, not cancerous, cells.

Hyperreactive - Producing an exaggerated, or greater than normal response to a stimulus.

Hypersensitive - A type of allergic condition in which the body overreacts to a certain agent such as a bee sting or medication.

Hypertension - Blood pressure above normal.

Hyperthermia - An increase in body temperature above normal.

Hypertrophy - An increase in the size of a tissue or organ due to the enlargement of existing cells.

Hyperventilate - An increase in the rate and/or depth of respiration such that the body loses too much carbon dioxide.

Hypo - A prefix meaning abnormally low or deficient.

Hypoglycemia - Lower than normal blood glucose level.

Hypokalemia - Lower than normal level of potassium in the blood.

Hypoplasia - Inadequate or defective development of tissue.

Hypotension - Blood pressure below normal.

Hypothermia - A decrease in body temperature below normal.

Hypothyroidism - A condition, more common in dogs, in which the thyroid gland does not produce enough thyroid hormone.

Hypoxia - Low oxygen level in blood and tissues.

Icterus - Commonly referred to as jaundice. A yellowing of the tissues, usually as a result of abnormal liver function.

Idiopathic - Of unknown cause.

Ileus - A condition in which there is an absence of muscular contractions of the intestine which normally move the food through the system; can result in an intestinal obstruction.

Immune system - The body's defense system which recognizes infectious agents and other 'foreign' compounds (such as pollen), and works to destroy them.

Immunity - A condition in which the animal's immune system has been primed and is

able to protect the body from a disease-causing agent such as a certain virus or bacteria. An animal could have immunity to one agent, such as parvovirus, but not have immunity to another agent, such as rabies.

Immunization - The process of rendering an animal protected (immune) against a certain disease. Vaccination is a way to produce immunization. However, just because an animal has been vaccinated (received a vaccine) does not necessarily mean the animal is immune. If the body did not correctly react to the vaccine or if the vaccine was defective, immunity would not occur. No vaccine produces immunity in 100% of the population to which it was given. 'Vaccination' is not the same as 'immunization.'

Immunodeficiency - Reduced function of the immune system of an animal, making it more susceptible to infectious disease. Can be an inherited defect or caused by drugs, radiation, or viruses.

Incontinence - The inability to control the excretion of wastes; generally used to describe the inability to control urination.

Inflammation - A condition in which tissue reacts to injury and undergoes changes during the healing process. As an example, a toe with a sliver of wood in it would be inflamed and show the signs of inflammation which include redness, increased temperature, pain, swelling, and a loss of or disordered function. The toe is swollen, red, hot, painful, and the animal is reluctant to walk on that toe.

Intermediate Host - In the life cycle of some parasites, the immature form of the parasite must pass through a different type of host (animal, insect, snail, etc.), called the intermediate host, before it can re-enter and infect the type of animal it came from. An example would be heartworms. The adult worm lives in the dog or cat. The immature form, laid by the adult heartworm, is taken up by the mosquito. The immature form develops within the mosquito, and is then reintroduced into another dog or cat where it develops into the mature adult and the cycle repeats itself. The intermediate host for heartworms, then, is the mosquito.

Intracellular - An action taking place within a cell.

Intracranial - Originating within the cranial (brain) cavity.

Intramuscular - Into the muscle (IM).

Intranasal - Into the nose.

Intravenous - Into the bloodstream via a vein. (IV)

Intussusception - A condition in which one part of the intestine 'telescopes' into another.

Jaundice - The condition in which there is a buildup of waste products in the body called

bilirubin. Bilirubin is yellow in color, therefore, an animal with jaundice will have yellow gums, skin (often seen on the inside flap of the ear), and a yellowish cast to the 'whites' of the eyes. It can occur if a large number of red blood cells are destroyed, the liver is not functioning normally, or the bile ducts are blocked.

Jugular - Referring to the neck; specifically, the large jugular veins that return blood from the head and neck to the heart.

Keratitis - Inflammation of the cornea of the eye; may be caused by infection, trauma, or an allergic reaction.

Ketoacidosis - A life-threatening condition in which ketones, which result from the breakdown of fat for energy, accumulate in the bloodstream and the pH of the blood decreases.

Laceration

Lactating - Producing milk.

Larva - The worm-like offspring of an insect (plural larvae).

Larynx - The larynx is a muscular tube in the neck that allows air to pass from the throat to the trachea (windpipe). The larynx contains the vocal cords, which allow people and animals to make sounds. The larynx has cartilage that opens to allow air into the trachea.

Latent - A dormant stage of disease; the patient is infected with an organism, but is not yet ill.

Lesion

Leukopenia - A condition in which the numbers of white blood cells in the blood are lower than normal.

Lipase - Digestive enzyme, produced by the pancreas, which breaks down fat.

Lymph nodes - Part of the immune system of an animal. Small masses of tissue that contain white blood cells called lymphocytes. Blood from the nearby area is filtered through the lymph node allowing foreign or infectious material to be recognized and destroyed if possible.

Lymphocytes - The class of cells in the body which are responsible for mounting an immune response. Two main types are B cells and T cells.

Macrophage - A type of phagocyte (cell in the body which 'eats' damaged cells and foreign substances such as virus and bacteria).

Malabsorption syndrome - Maldigestion syndrome: A condition involving the intestine in which food may not be properly digested or the nutrients not absorbed.

Malignant - A process that does harm to nearby tissues. Usually synonymous with cancer, a tumor that grows quickly and spreads into other tissues.

Masticate - Chew.

Mastitis - An infection or inflammation of the mammary glands.

Maternal antibody - Antibody in a newborn animal which the newborn acquired through the placenta or colostrum (the first milk).

Melena - Darkening of the stool due to the presence of digested blood, which indicates bleeding is occurring in the stomach and/or beginning of the small intestine. The feces generally look black and tarry.

Metabolic acidosis - A condition in which the pH of the blood is too acidic because of the production of certain types of acids.

Metabolize - To have molecules transformed within the body tissue through chemical processes.

Metacarpus - The front limb between the carpus and the phalanges (toes).

Metastasis - Spread of a tumor from its original location to a remote one, by tumor cells that are carried in the blood.

Metatarsus - The part of the rear limb between the tarsus and the phalanges (toes).

Microfilaria - The larval form of some parasitic worms, for example heartworms. These worms do not lay eggs, they produce microfilariae (plural of microfilaria) instead.

Microfilaricide - Compound which kills microfilaria, the immature forms of heartworms which circulate in the blood.

Microorganism - A single-celled life form that is invisible to the naked eye and that may cause disease in man or animals.

Mineralization - The process in which minerals are laid down within tissue in an abnormal pattern causing a hardening of the tissue.

mL - Short for milliliter. A liquid measure, the same volume as a cc. 28 mL = 1 liquid oz.

MotilityMovement - intestinal motility is the muscular contractions of the intestines which move the food from the stomach to the anus.

Mucosa - Specialized membrane which covers various passages and cavities exposed to the air such as the mouth, nose, inner portion of the eyelids, vagina. Examination of the mucous membranes can provide important information: if they are dry, the animal is likely dehydrated; pale, and the animal may be anemic or in shock; yellow, and the animal is said to jaundiced due to accumulation of waste products which should be eliminated by the liver. Mucous membranes.

Musculoskeletal - Pertaining to the muscles and skeleton.

Mycosis - Disease caused by a fungus such as blastomycosis, histoplasmosis, and ringworm.

Miosis

Mydriasis - Small pupil size.

Myelogram - Radiograph (x-ray) of the spinal cord taken after a contrasting dye has been injected into the space around the spinal cord.

Myocardium - The middle layer of heart muscle.

Nebulize - Convert into a fine spray form.

Necropsy - Postmortem examination.

Necrosis - The death and breakdown of cells.

Nematodes - A common name for any roundworm of the phylum Nematoda.

Neoplasia - Abnormal growth and accumulation of cells. Neoplasias may be benign or malignant.

Nephrotoxic - Destructive to kidney cells.

Neuropathy - Abnormal functioning of nerves.

Nodule - Solid bump or lump in the skin that is over 1/3 inch in diameter.

Non-steroidal anti-inflammatory - NSAIDS: Agents which reduce inflammation, but are not in the class of drugs known as steroids. Examples include aspirin, Rimadyl, and phenylbutazone.

Nonpathogenic - Not causing disease. Some bacteria, such as those that normally live in an animal's intestines, are nonpathogenic.

Nonseptic - A condition not caused by an infection. For example, septic arthritis is caused by an infection with bacteria, yeast, or other agent; a case of nonseptic arthritis may be caused by injury or cancer.

Nucleated erythrocytes - Immature form of red blood cells.

Nystagmus - Constant involuntary movement of the eye, often from side to side.

Occult - Indicating a disease or condition that is clinically not apparent.

Ocular - Relating to the eye.

Opioid - Narcotic drug which has an activity similar to that of opium.

Osteomyelitis - An inflammation and infection of the bone.

Otic - Pertaining to the ear.

Ototoxic - Destructive to the structures of the ear.

Oxytocin - A hormone that stimulates milk flow in lactating mammals (females nursing their young), and contractions of the muscles of the reproductive tract in many species.

Packed cell volume (PCV), hematocrit - A laboratory test to monitor the relative number of red blood cells present in the blood. A blood sample is placed in a tiny glass tube and spun in a centrifuge. The cells are heavier than the plasma and are compacted at one end of the tube. After the tube is spun, it is examined and the packed cell volume is determined as the percentage of the red cellular portion relative to the total amount of blood in the tube (i.e., remainder being the plasma). The normal for dogs is 40-59 and cats is 29-50.

Pancreatitis - Inflammation of the pancreas, a severe and sometimes life threatening disease often associated with eating fatty foods. Symptoms include vomiting and a painful abdomen.

Papule - Solid bump on the skin, less than 1/3 inch in diameter.

Paralysis - Loss of motor function (movement) in a certain part of the body. Paralysis may be flaccid, in which muscles are weak and have little or no tone; or spastic, in which the muscles are tight.

Parasiticide - Medication formulated to kill parasites.

Parasympathetic - The portion of the nervous system which stimulates the pancreas to

produce digestive enzymes and stimulates many of the smooth muscles in the body including those of the stomach and intestine. It also tends to slow the heart rate.

Parenterally - A term used to describe the administration of a drug by means other than by mouth.

Paresis - Slight or incomplete paralysis.

Passive immunity - Immunity produced by providing an animal with antibodies or immunologic cells from another source, such as colostrum. Compare with 'active immunity.'

Pathogenic - Causing disease.

PCV - Packed cell volume. PCV, hematocrit: A laboratory test to monitor the relative number of red blood cells present in the blood. A blood sample is placed in a tiny glass tube and spun in a centrifuge. The cells are heavier than the plasma and are compacted at one end of the tube. After the tube is spun, it is examined and the packed cell volume is determined as the percentage of the red cellular portion relative to the total amount of blood in the tube (i.e., remainder being the plasma). The normal for dogs is 40-59 and cats is 29-50.

Perineal - The area between the anus and the genital organs.

Peritoneal dialysis - A process used to remove waste products from the body. Electrolyte fluids are administered into the abdomen, waste products of the body enter the fluids, and then the fluids are removed.

Peritoneum - The membrane lining the wall of the abdominal cavity.

Peritonitis - Inflammation of the lining of the abdomen.

Petechia - A small red or purple spot on the body, caused by a minor hemorrhage (broken capillary blood vessels). Forceful coughing or vomiting can cause facial petechiae, especially around the eyes. Newborns often have facial petechiae from the tight squeeze through the cervix. Thus petechiae are fairly common and in general of no concern.

Heavy lifting may lead to petechiae that resemble thin red lines on the shoulders.

Petechiae are also often found in cases of manual or ligature strangulation.

Petechiae are a sign of thrombocytopenia (low platelet counts), other disorders of coagulation. If they appear during illness, especially illness with fever, they may be a sign of septicemia (blood-borne bacterial infection), especially of Meningococcus (a causative agent of meningitis). The presence of petechiae in a sick child is therefore an important warning sign.

Phagocyte - Cell in the body which 'eats' damaged cells and foreign substances such as

virus and bacteria. A macrophage is a type of phagocyte.

Phalanges - Toes.

Pheromone - Chemical secreted by an animal and sensed by another animal of the same species, and often causing behavior change in that animal.

Photosensitivity - A condition in which the skin reacts abnormally to light, especially ultraviolet light or sunlight. It is usually caused by the interaction of light with certain chemicals in the skin such as antibiotics, other medications, hormones, or toxins.

Phytochemical - Substances in plants which affect a body system and may promote health and decrease the risk of a disease such as cancer.

Platelets - Cellular components found in the blood which help clots to form. In the body, microscopically small vessels often break in the normal course of events. Platelets and a protein called fibrinogen 'plug' the break in the vessel and prevent blood from leaking out.

Polydipsia - Excessive thirst resulting in excessive drinking.

Polyp - A small growth from mucous membranes such as those lining the nasal cavity and intestinal tract.

Polyphagia - Excessive ingestion of food.

Polyuria - Excessive urination.

Posterior - Positioned in back of another body part, or towards the rear half of the animal. Opposite of anterior.

Prolapsed rectum - Because of irritation or injury, the inner part of the rectum is pushed out so that it is visible as a pink mass protruding from the anal opening.

Protozoans - Single-celled animals invisible to the naked eye. Most are free living and a few are parasites in animals or man.

Pruritus - Itching.

Pulmonary - Relating to the lungs.

Purulent – containing or secreting pus

Pus – a liquid inflammation product made up of white blood cells and fluid.

Pustule - Small elevated area on the skin filled with pus.

Pyoderma - An infection of the skin; usually the result of a bacterial invasion.

Pyometra - An infection of the uterus.

Recumbency - Lying down.

Renal - Pertaining to the kidneys.

Renal insufficiency - The decreased ability of the kidneys to rid the body of wastes.

Resistance - A term used to describe bacteria which have mutated or changed so they are not affected by an antibiotic that previously killed them or slowed their growth. As more bacteria become resistant to various antibiotics, there are fewer antibiotics which will have an effect on them, thus newer and stronger antibiotics will need to be developed. Inappropriate use of antibiotics (using them too often, for too short a duration or in insufficient dose) may promote the development of resistance.

Resorption - In pregnancy, a condition in which the fetus dies, and instead of being aborted, the fetal tissue dissolves within the uterus and is absorbed by the mother. The mother will show no outward signs of a fetal resorption.

Respiratory - Relating to breathing or the lungs.

Respiratory depression - Decrease in the rate or depth of respiration.

Retina - The rear interior surface of the eyeball is called the retina. The retina contains nerve cells referred to as rods and cones. The rods are sensitive to light and the cones to color. The retina receives the light and color and converts them into nerve impulses which go to the brain.

Ringworm - A type of fungal infection of the skin.

Septic - A condition caused by an infection e.g., with bacteria or fungi, or toxins they produce.

Septicemia - A disease affecting many organ systems due to toxins in the blood which are released by bacteria or other microorganisms. Signs include fever, pinpoint bruises on mucous membranes, and lesions in the joints, heart valves, eyes, or other organs.

Serology - Laboratory testing for antibody-antigen reactions and antibody levels.

Serous - Thin and watery.

Serum - The fluid portion of the blood after it has clotted and the cells have been removed.

Shock - a temporary state of massive physiological reaction to bodily trauma usually characterized by loss of blood pressure and depression of vital processes

Skin cytology - Examination, with a microscope, of a skin scraping or material from swabbing the skin. The material may be stained and checked for the presence of yeast, bacteria, tumor cells, etc.

Skin scraping - Scraping some material from the surface of the skin and looking at it under a microscope, e.g., to check for skin mites.

Sphincter - A ring-like band of muscle that constricts a passage or closes an opening, e.g., the anal sphincter constricts to close the anus and relaxes when the animal is passing stool. The urethral sphincter closes the urinary bladder.

Squamate - Scaly-bodied reptile including lizards and snakes.

Stasis - In the gastrointestinal tract, a condition in which the food does not move through normally, but remains in one section, e.g., food does not pass from the stomach into the intestine.

Stenosis - The narrowing of an organ of passage such as a blood vessel or intestine.

Stress-induced hyperglycemia - A condition in which the blood glucose level becomes abnormally high when the animal is stressed.

Stricture - The narrowing of an organ of passage such as a blood vessel or intestine.

Subcutaneous - Under the skin; often called 'sub Q.'

Subluxation - A partial dislocation of a joint in which the bones become out of alignment, but the joint itself is still intact.

Synovial - Pertaining to a joint made up of bone ends covered with cartilage, ligaments, a cavity filled with synovial fluid (joint fluid) and an outside fibrous capsule, e.g., hip joint, elbow joint.

Systemic - Throughout the body.

T cell - Also called 'T lymphocytes.' The type of lymphocyte which is responsible for cell-mediated immunity. T cells may directly kill a cell or produce chemicals called lymphokines that activate macrophages which will kill the cell. Compare with 'B cell.'

Tachycardia - An abnormally high heart rate.

Tachypnea - Rapid breathing.

Tarsus - The ankle (rear leg) of dogs and cats; also called the hock.

Thrombocytopenia - A lower than normal number of platelets in the blood. Platelets, which are actually fragments of specific types of cells, are necessary for blood to clot. Signs of thrombocytopenia include bruising and bleeding from the nose, into the gastrointestinal tract, etc.

Titer - A measurement of the amount of antibodies in the blood. The test to measure antibodies is usually performed by making a number of dilutions of the blood and then measuring at what dilution there is sufficient antibody to react in the test. For example, a titer of 1:8 (one to eight) means the blood can be diluted to one part blood and seven parts saline and still produce a positive reaction in the test. The higher the titer (1:16 is higher than 1:8), the more antibody is present. (NOTE: The word 'titer' may also be used when discussing the amount of antigen present, e.g., a high titer vaccine has a large number of virus particles.)

Topical - To be used on the skin.

Torsion - The twisting of an organ.

Toxemia - A condition in which toxins move into the bloodstream.

Tracheobronchitis - Inflammation of the trachea and bronchi.

Transient - Temporary.

Transport host - An animal or insect which carries an immature parasite from one mammalian host to another.

Tumor - Abnormal growth or swelling; term often used to designate cancer.

Ulcer - A lesion in which the tissue surface is eroded away.

Ultrasound - Ultrasound/ultrasonography: A technique used to get the image of a deep structure within the body by directing ultrasound waves at it and recording the reflections (echoes) from it.

Umbilicus - The area of the body where the umbilical cord is attached; the belly button.

Unilateral - on one side

Urate - A chemical compound which contains uric acid and is made by the body, and can form crystals and stones in the urinary bladder. Uric acid is a waste product from the

breakdown of certain proteins.

Urea - Wasteproduct of protein metabolism that is removed from the body by the kidneys.

Urinary incontinence - A phrase used to describe the inability to control urination.

Uveitis - Inflammation of the eye.

Vaccination - The act of giving a vaccine. See also 'immunization,' since the two words have different meanings and are often confused.

Vaccine failure - A term often used to describe a condition in which an animal who was vaccinated against a disease still gets the disease. In truth, there is usually nothing wrong with the vaccine, but for some reason, the animal's immune system did not adequately react to it.

Vasculitis - Inflammation of blood vessels.

Vasoconstriction - A decrease in the diameter of blood vessels.

Vasodilator - Agent which dilates, or increases the diameter of blood vessels.

Vena cava - Either of two large veins carrying blood to the right atrium of the heart. The cranial vena cava brings blood from the head region, front legs, and upper chest to the heart; the caudal (or posterior) vena cava carries blood from the areas of the abdomen and hind legs to the heart.

Vent - The outside opening of the cloaca, which is a common passageway for feces, urine, and reproduction.

Ventricle - The chambers of the heart that pump the blood to the body or lungs.

Vestibular system - Portions of the inner ear, nerves, and brain which help the body maintain balance.

Villi - Microscopic projections which cover the intestine, greatly increasing the surface area and therefore, increasing the ability to absorb nutrients. Singular: Villus.

Virus - The smallest form of life, invisible with an ordinary microscope. An infectious unit that enters and uses cells of plants or animals for replication. Some viruses cause disease in animals or plants.

Viscosity - Thickness of a fluid, e.g., molasses is more viscous than water.

Vital signs - The signs of life which are pulse, respiration, and temperature.

Volvulus - Twisting of the stomach or intestine, which often has the effect of cutting off the blood supply to it.

Vomeronasal organ - Sensory organ also called 'Jacobson's organ,' which detects pheromones.

White blood cells - Cells in the blood whose major role is to defend the body against invading organisms such as bacteria, viruses, and fungi. There are different types of leukocytes: lymphocytes are part of the immune system; monocytes, eosinophils, and neutrophils eat or engulf organisms; basophils contain histamine and are involved in inflammatory reactions.

Zoonotic - A disease which can be transmitted between animals and people.

Medical and Pharmaceutical Abbreviations

SID – once a day
QID – 4 times a day
ABN - abnormal
AdLib – as will
ADR – ain't doin' right
AP – anteriorposterior – from front to back
BAR – bright, alert, responsive
BID – twice a day
BP – blood pressure
CAU – towards the tail
CBC – complete blood count
CC– cubic centimeter
CRN – towards the head
Cx - culture
DV – dorsal ventral
Fx – fracture
HCT - hematocrit
HGB – hemoglobin
IM – intramuscle
IP – intraperitoneal
IV – intravenously
ml – milliliter
os – left eye
PA – opposite of above
PCV – packed cell volume
PRN – as needed
PO – orally
q 72h– every 72 hours (or what ever hours are printed)
qod – every other day (or eod)
SQ – subcutaneously
TID – three times a day
TO – topical
TPR – temperature, pulse, respiration
UFN – until further notice
URT – upper respiratory tract
UTI – urinary tract infection
VD – ventral dorsal
WNL – within normal limits

A few facility favorites:

WTF – what the _uck
PFM – pure _ucking magic
LIB - well, I'll be

