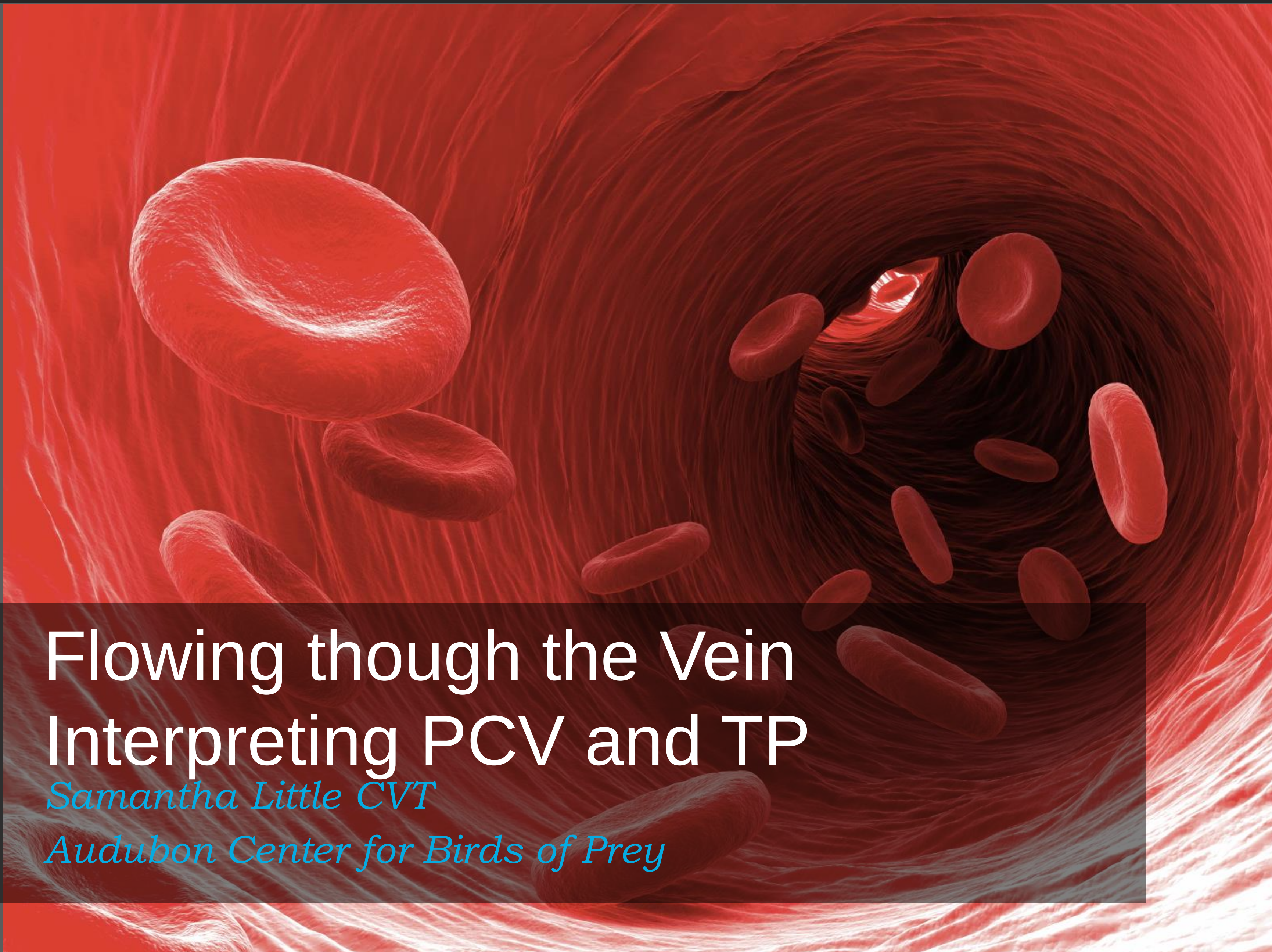
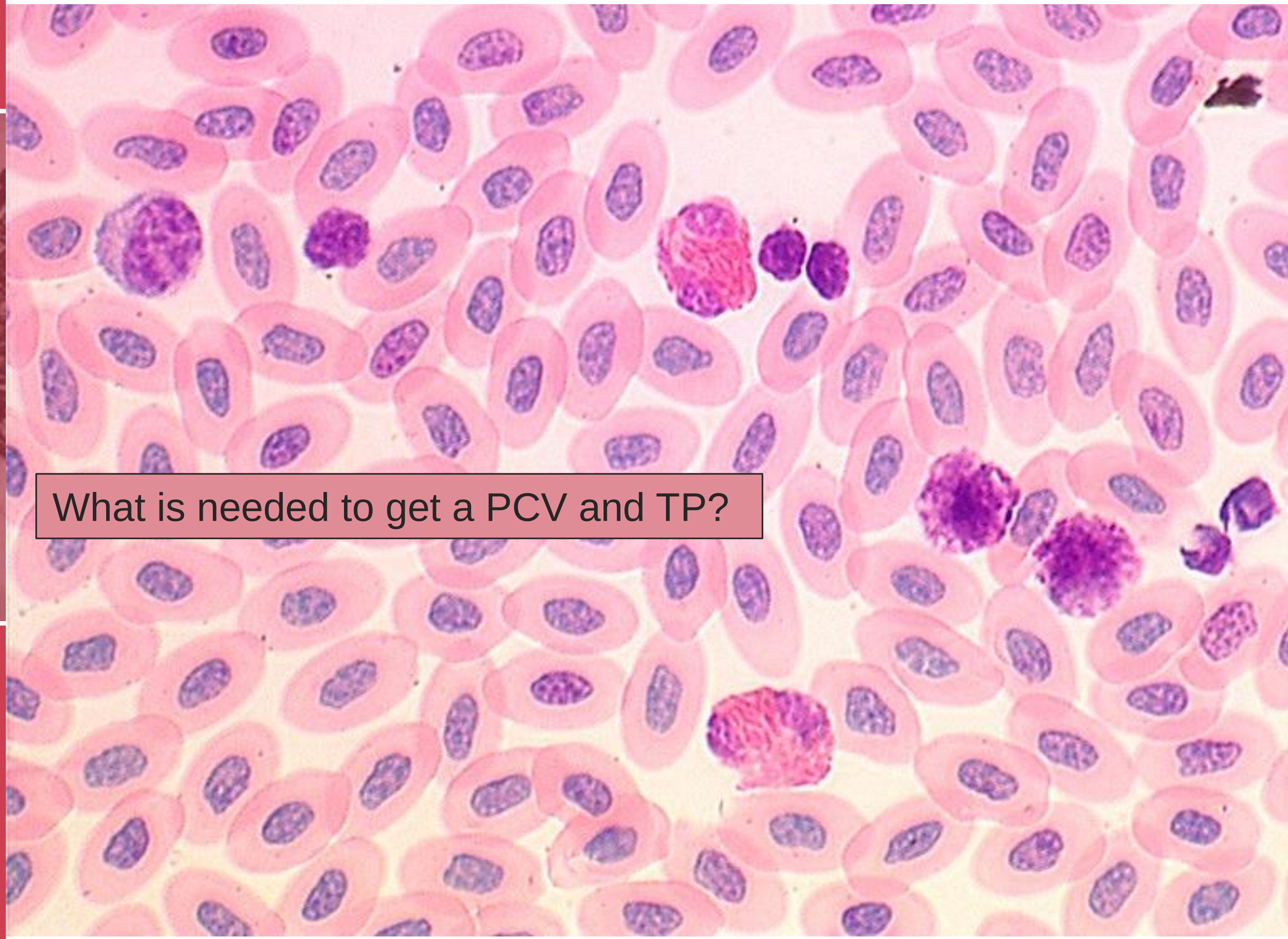


Flowing though the Vein Interpreting PCV and TP

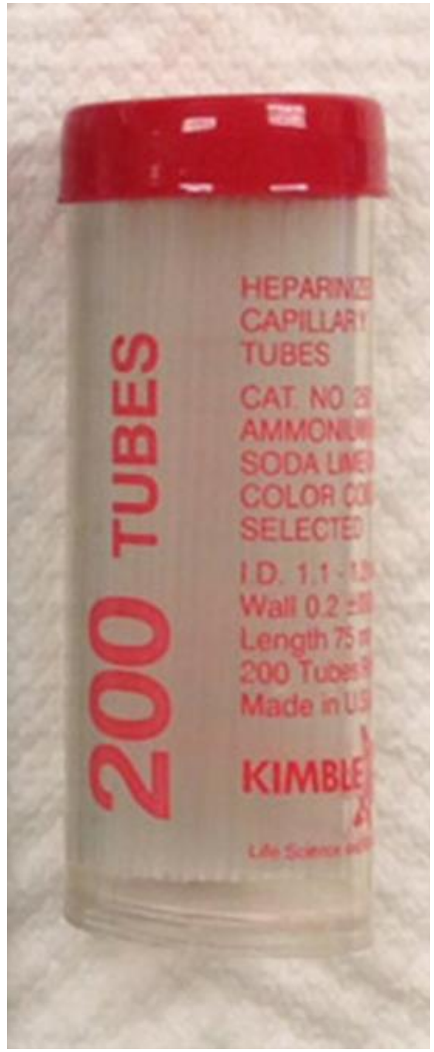
Samantha Little CVT

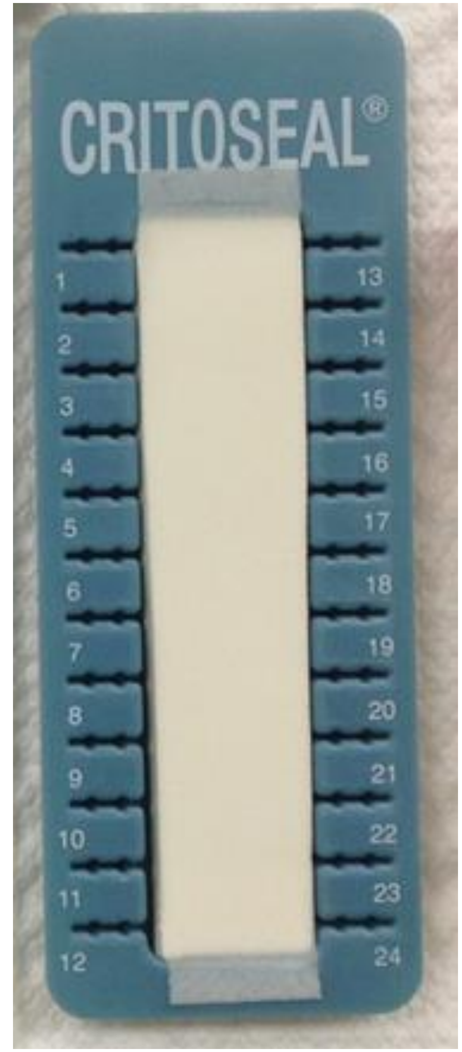
Audubon Center for Birds of Prey

- *Blood work can help give you an internal look at an animals overall health.*
- *The first steps in doing blood work is obtaining a Packed Cell Volume (PCV) % & Total protein (TP)*

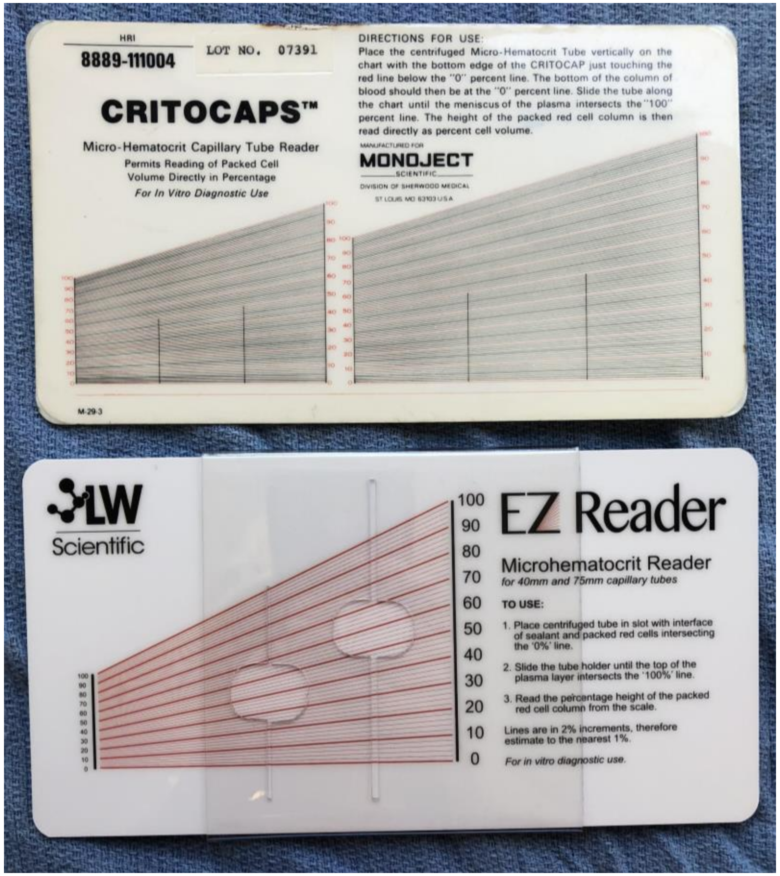


What is needed to get a PCV and TP?





Hematocrit tubes and critoseal putty



Refractometer and hematocrit reader


M24
Micro Hematocrit Centrifuge
LW
Scientific
BRAKE
TIMER
POWER

Do not open lid until rotor stops
OPEN
Time
speedx1000
start
stop
ZIP

Centrifuge

What if I don’t have a centrifuge?

What is PCV?

- *Packed Cell Volume (PCV) or Hematocrit is the volume of erythrocytes in a given volume of whole blood sample*

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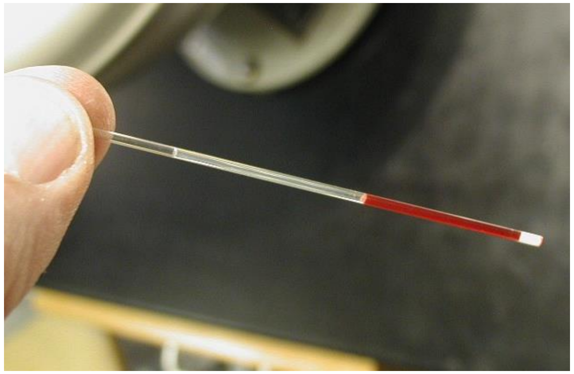
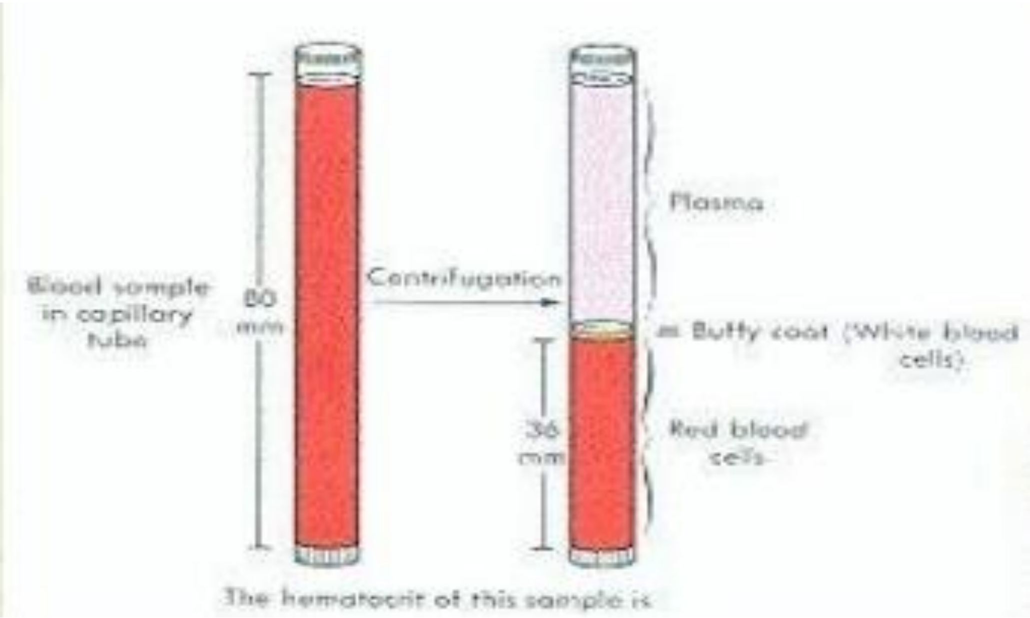
Filling your hematocrit tube

- Hematocrit tubes can be filed from a vile of blood or a syringe
  - Place hematocrit tube in vile or syringe hub and allow blood to fill tube about 2/3 full
    - If filling from syringe you may have to put pressure on plunger for blood to wick up into hematocrit tube
  - Once tube is full place finger on clean end to keep blood from dripping out and press blood end into seal clay.
  - Place in centrifuge with seal clay end pointing out and spin for 5 min (10,000 – 15,000rpms)



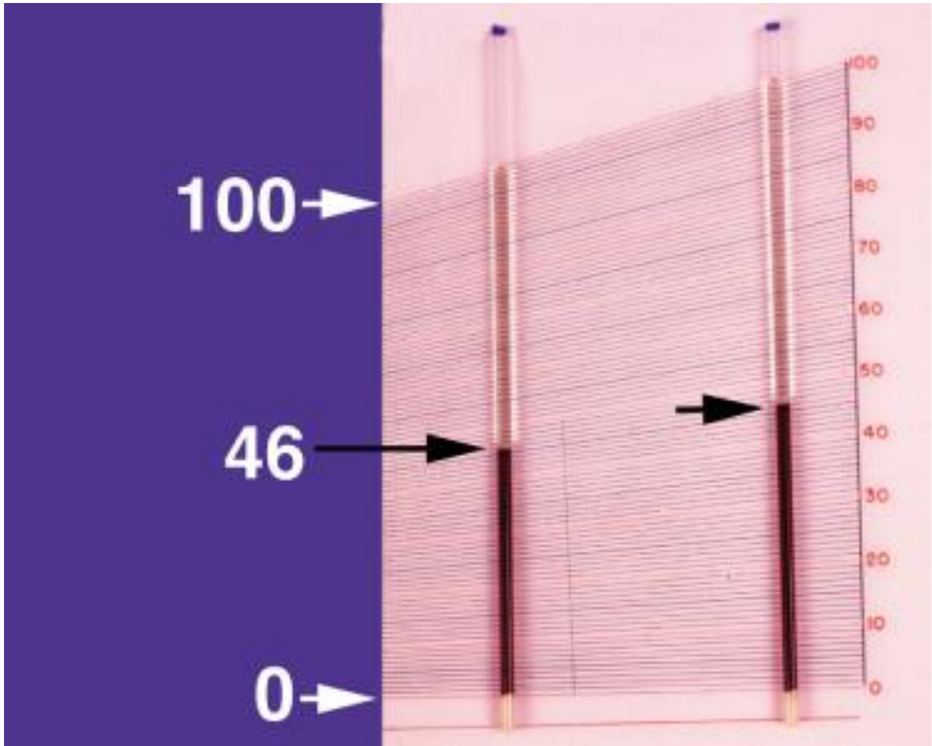
Obtaining PCV

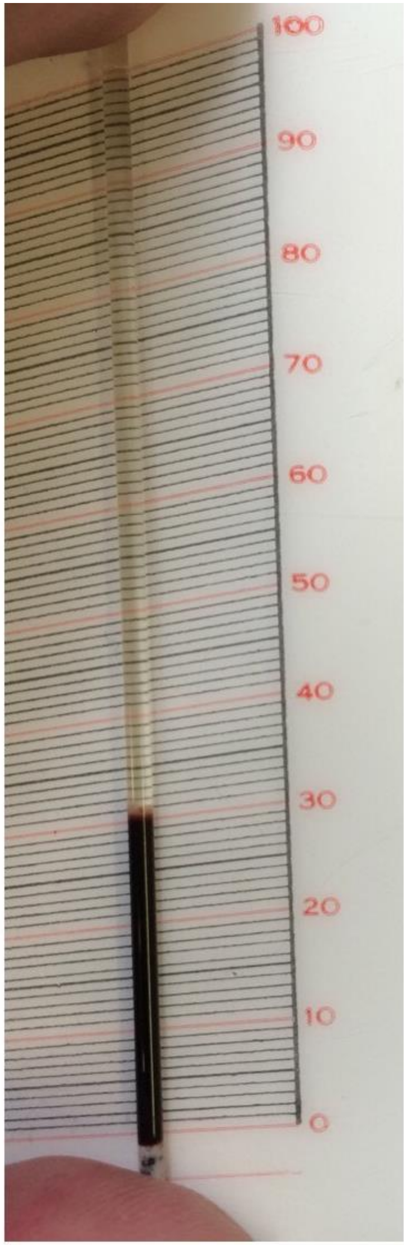
- Spinning the sample separates the blood in to 3 different parts the packed Red Blood Cells, Packed White Blood Cells (buffy coat), and Fluid (either plasma or serum depending on clotting factors)



Obtaining PCV

- Line up clay end of tube at the 0 mark of reader and top of fluid at 100 mark
- The top edge of the packed red blood cells is where you read the PCV%




100
90
80
70
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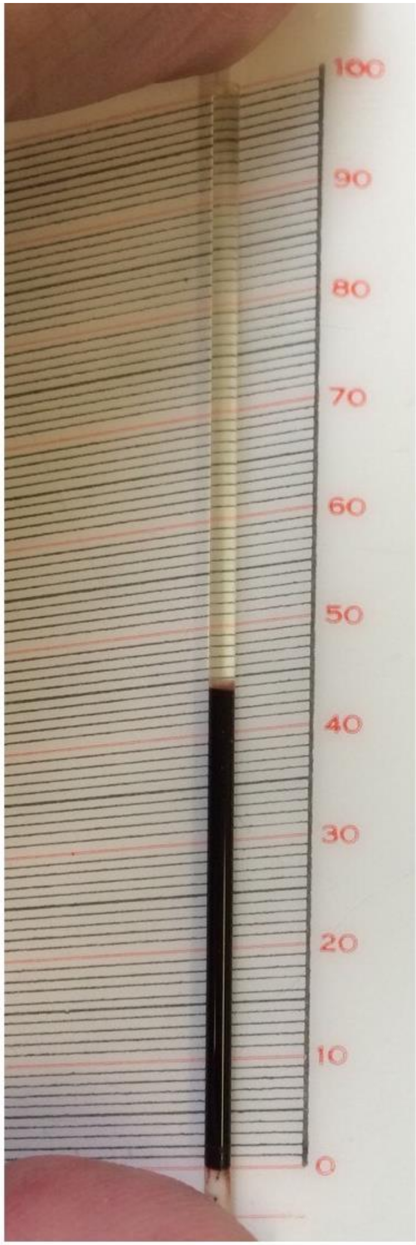
50
40
30
20
10
0


100
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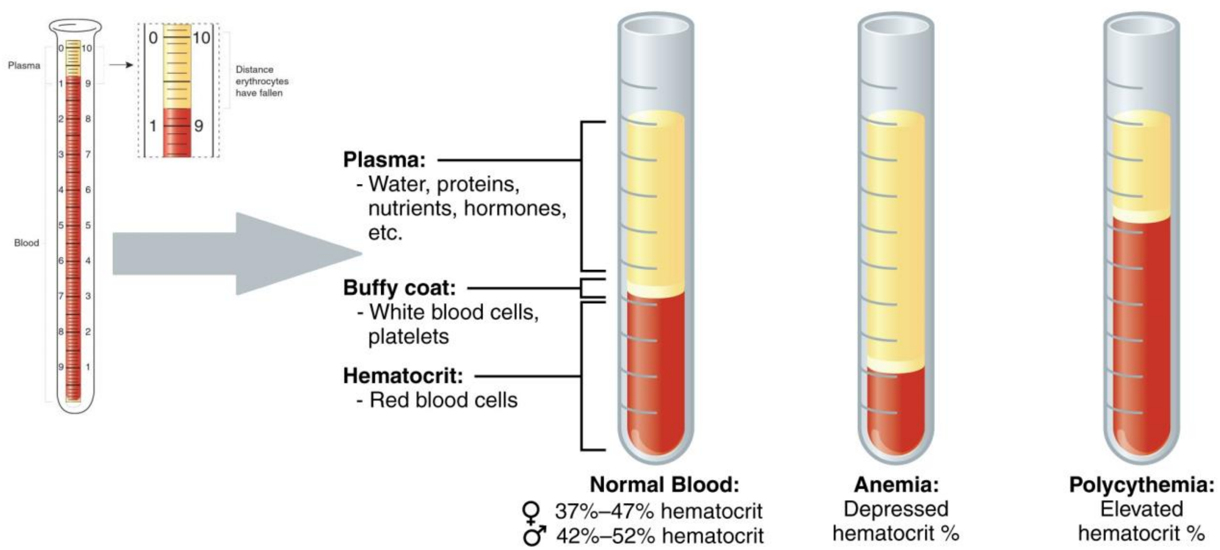
What is your PCV telling you?

- Increased number of Red Blood cells is Polycythemia
- Decreased number of Red Blood cells is Anemia



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What causes Polycythemia?

- Usually see relative polycythemia due to decreased plasma volume from dehydration
- Absolute polycythemia is associated with increased PCV and RBC mass

Polycythemia

↓ ↓

Relative (Dehydration) | Absolute (True)

Absolute (True) ↓ ↓

Primary (Polycythemia Vera; Erythropoietin Independent)

Secondary (erythropoietin dependent)

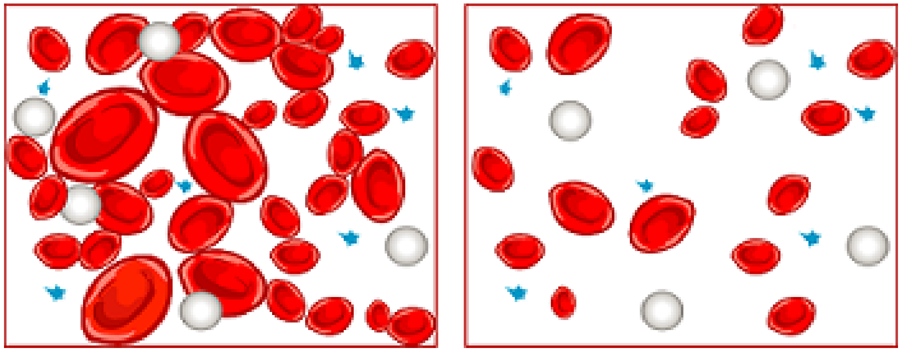
Secondary ↓ ↓

Physiologically appropriate (High altitude, congenital Right-to-left shunts, hypoxia)

physiologically inappropriate (renal disease, renal tumor)

What causes anemia?

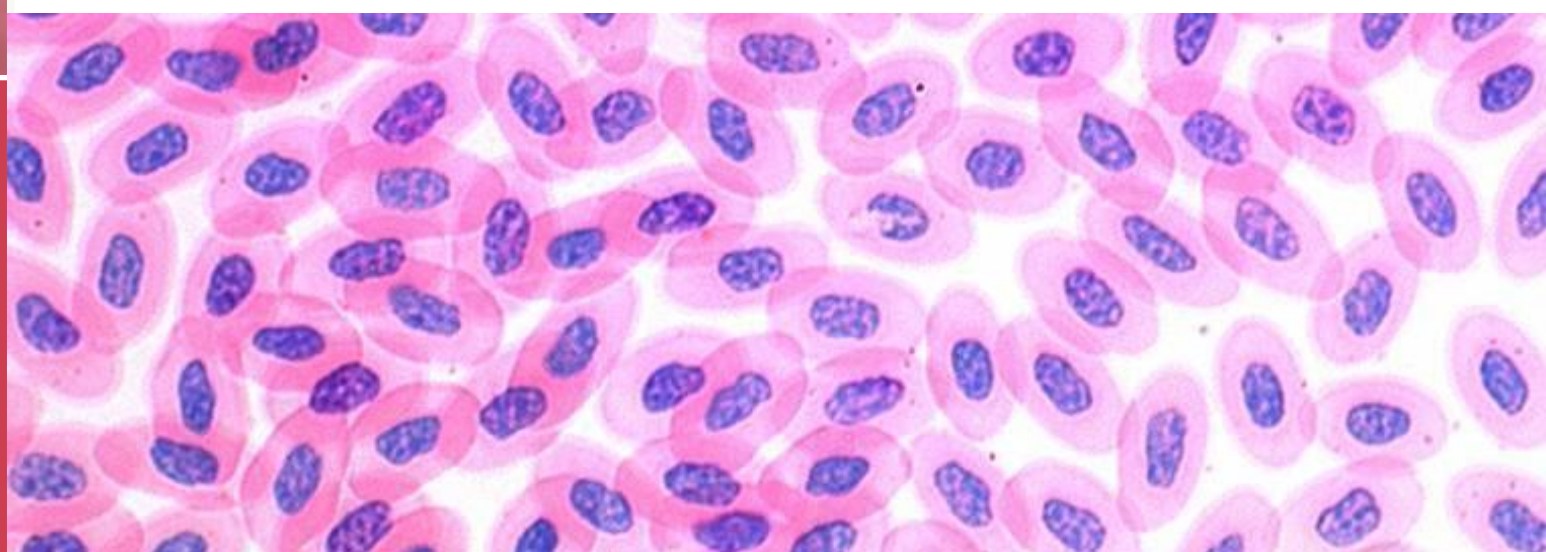
- Blood loss from severe injury that causes bleeding externally or internally
- Immune-mediated disease
- Bleeding into the gastrointestinal tract from disease, inflammation, & certain medications
- Infectious diseases
- Exposure to toxins such as lead or rat poison



Normal blood   Anemia

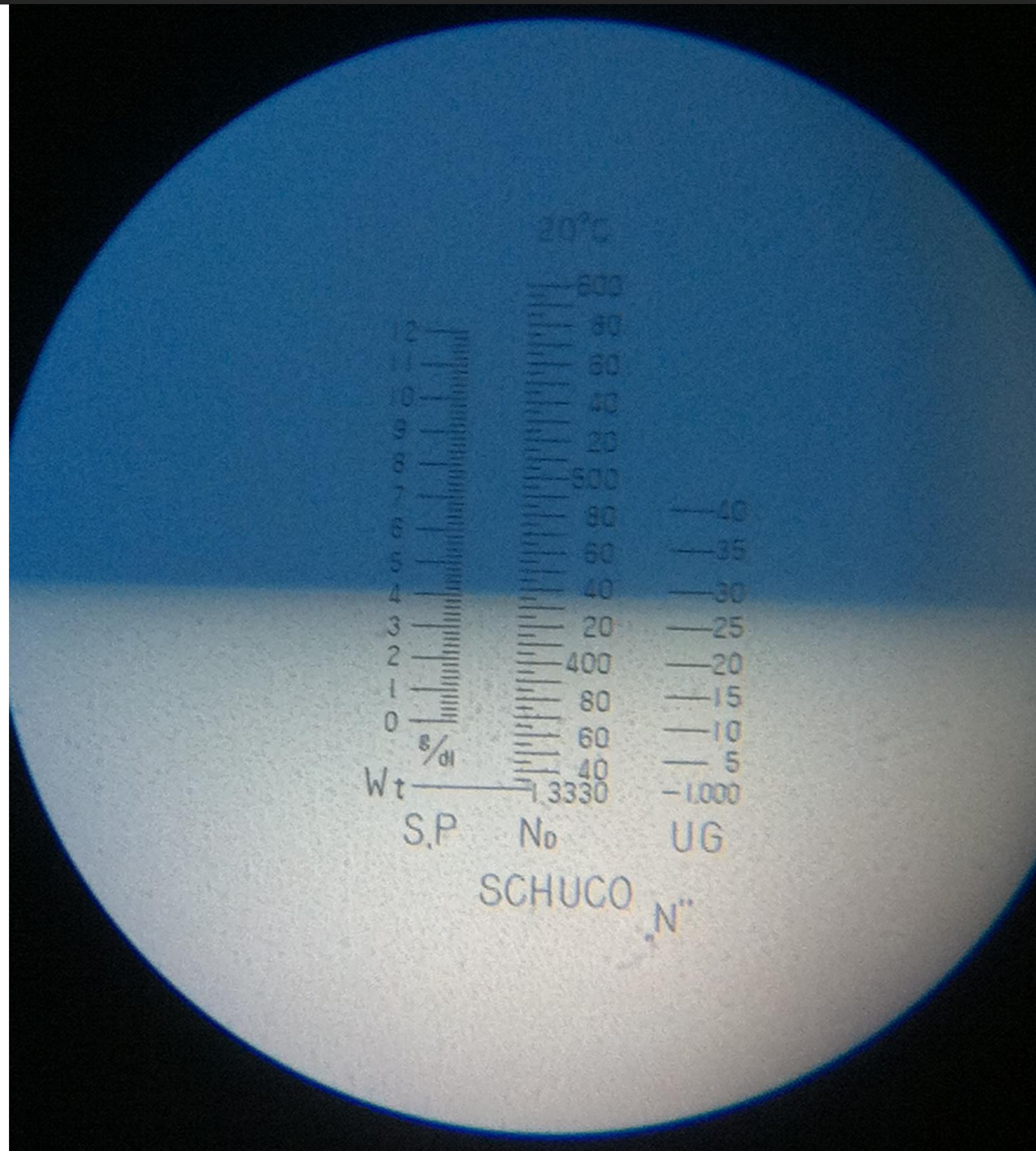
What is TP?

- *Total Protein (TP) is a measure of the total of proteins (albumin and globulin) found in the fluid portion of the blood.*
- *Albumin prevents fluid from leaking out of vessels and globulins are a port of the immune system.*



Obtaining TP

- Break hematocrit tube in fluid layer and blow or gently tap out fluid on to refractometer
- Close lid and look into eye piece
- Read the reader on the left hand side
  - usually labeled as SP (specific protein)


20°C
g/dl
Wt
1.3330
-1.000
S.P
No
UG
SCHUCO
"N"

What is TP telling you?

- Changes in total protein occur with various diseases and health status
  - Total protein that is high can signify dehydration
  - Total protein below 2.0g/dl usually signals animal in critical condition.
    - Animals with nutritional deficiency
    - Progressed disease
  - Animals with total protein below 1.0 rarely recover
- Over 5.0g/dl is likely due to dehydration
- An electrophoretic analysis is another test that can be run to determine fractions of each protein group.

What's normal

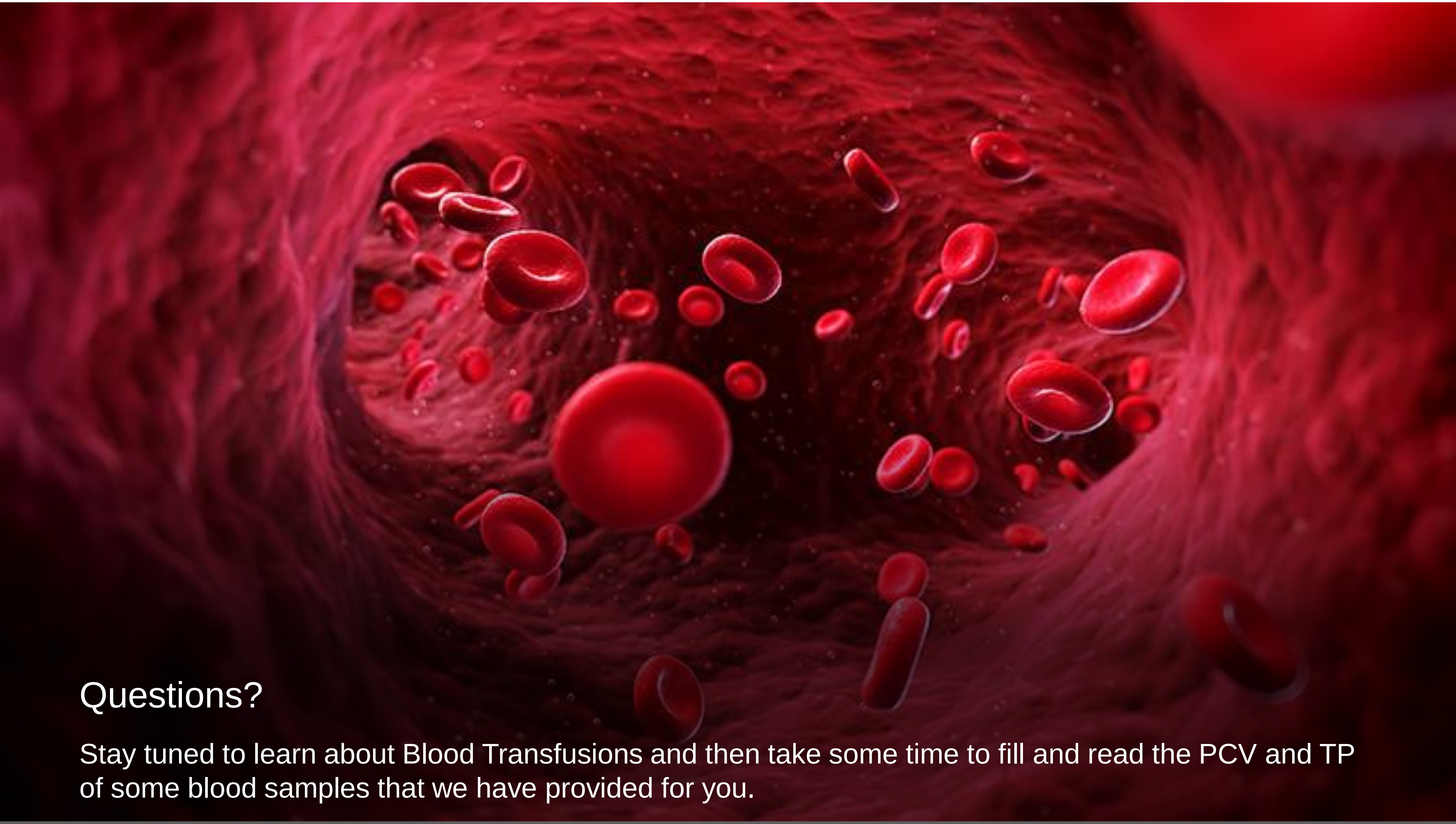
Raptors	Packed Cell Volume %	Total Solids g/dl
Hawks	38-47%	3-5g/dl
Eagles	37-48%	3-5g/dl
Owls	37-50%	3.5g/dl

Mammals	Packed Cell Volume %	Total Solids g/dl
Raccoon	37-55%	6.0-7.5
Opossum	37-55%	6.0-7.5
Fox	37-55%	6.0-7.5

Turtles & Tortoise	Packed Cell Volume %	Total Solids g/dl
Common box turtle	7-35%	
Gopher tortoise	15-30%	
Sliders	16-47%	

What to rule out based on results

Packed Cell Volume %	Total Solids g/dl	Rule out/ Interpretation
Increased	Increased	Dehydrated
Increased	Normal	Dehydration, protein loss
Increased	Decreased	Acute blood loss, severe dehydration with loss of protein
Normal	Increased	Anemia, dehydration
Normal	Normal	Normal
Normal	Decreased	Protein loss, decreased production (liver)
Decreased	Increased	Anemia, dehydration, chronic disease
Decreased	Normal	RBC destructive disease, reduced RBC production
Decreased	Decreased	Whole blood loss, aggressive fluid therapy



Questions?

Stay tuned to learn about Blood Transfusions and then take some time to fill and read the PCV and TP of some blood samples that we have provided for you.