Common Laboratory Questions

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How do I get ready?

1. Not every test requires a fasting state but, for consistency sakes, if you started out in a fasting state, you should continue.

2. Keep the collections at the approximate same time. A lot of values change throughout the day. A normal person could have as much as a 1 gram (10 gram Canadian) drop in hemoglobin from morning to night.

Is there really an issue with needle size?

- Yes

- The smaller the needle (the higher the gauge number), the more likely there will be an increase in hemolysis.

Since I don't like getting needles, how about a fingerstick?

- The specimen from the vein is blood. The specimen from the finger is a mixture of blood, interstitial fluids, and tissue. The two will never agree.

- Ex: if the venous blood glucose is 80mg/dL, a fingerstick glucose could be 60 – 100mg/dL

How hydrated is enough?

- There are no acceptable standards for fluid intake. It is simply too individualized based on the functionality of different

- organs (heart, kidneys, skin, etc.),
- fluid sources (water, fruits, vegetables, etc.)
- fluid loss (temperature, humidity, work)
- age/gender

Up until what point can I exercise?

Remember that exercise can influence fluid levels

Granulocytes are found in two "pools" in the peripheral blood:

1. the circulating pool – the one we measure

2. the marginating pool – which can fall off into the circulating pool thus "falsely" increasing both the total WBC and the absolute granulocyte count

I get SOOOOO nervous

- Excess stress – emotional or physical
- Fever
- Recent trauma (a fall or bruising)
- causes marginating cells to fall into the circulating pool.

- Before you are called in an during the procedure, close your eyes and pay attention to slow deep breathing

Weather conditions

- This is NOT just because I come from the northeast

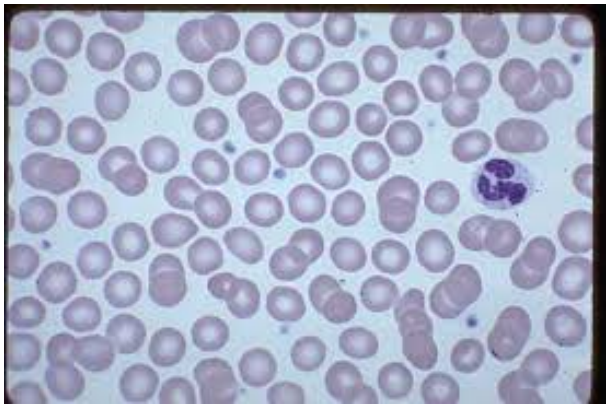
But

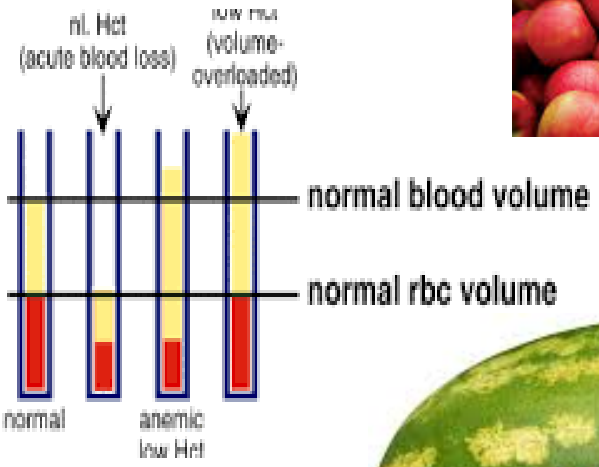
If you are cold, your veins will be constricted – so wash your hands in warm/hot water. As they warm up, so too with the veins in the arm

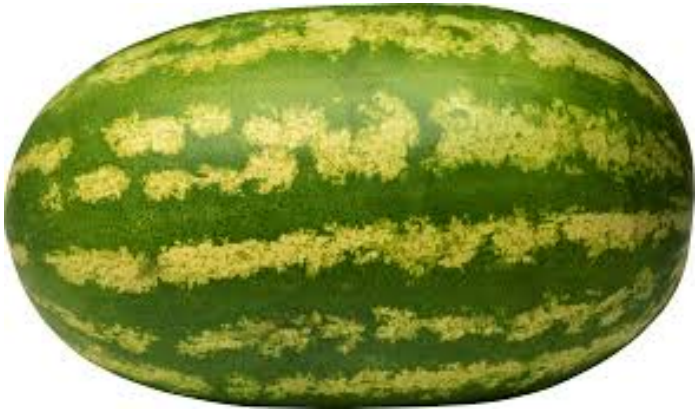
The tourniquet is too tight

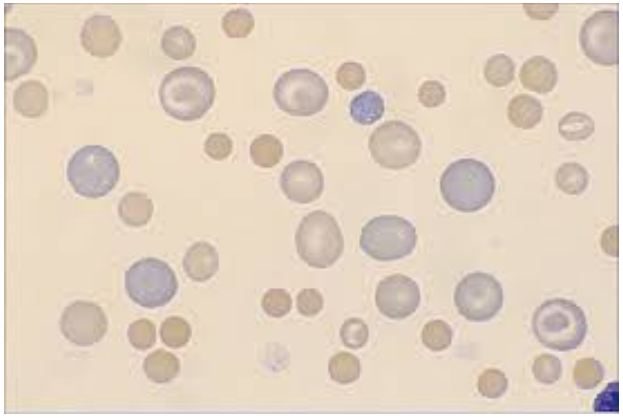
- The job of the tourniquet is to allow arterial blood to get into the hand but to prevent venous blood from leaving.
- Blood then collects in the veins causing them to swell (to be found). The longer this takes, the more false changes can occur.
- Ask that the tourniquet be placed over your sleeve or a piece of paper toweling to lessen pinching/hair pulling.

Hematocrit and the RDW









When is the difference between two values too "off"?

- Hematocrit - If the value changes by more than 3% (or 30% Canadian)
- Hemoglobin – If the value changes by more than 1.0 (remember the issue of the time of day)
- RBC – no one really cares
  - The hemoglobin and hematocrit are so much better.

When is the difference between two values too "off"?

- MCV – while 3 or more are of interest (a trend), MCVs don't get interesting until they are clearly out of range

- RDW – VERY sensitive to stress in marrow
  earliest sign of iron deficiency state
  only increases are of clinical significance

When is the difference between two values too "off"?

- WBC – technically if the change is greater/less than $1.0 \times 10^3/\mu L$ or $1.0 \times 10^9/L$
- But remember we need to evaluate current status – exercise, stress, mild infections, etc. so this range can increase if all of the cell types look functional and in appropriate ratios

When is the difference between two values too "off"?

- Differential
  - Two kinds – manual and automated
    - Manual
      - Traditional form – count 100 cells and report as percentage
      - Since 100 is a must, an increase in one cell line mandates a decrease in another.
    - Automated
      - Performed by multichannel instrument
      - Counts every cell in a specific volume so you get an absolute number of each cell line
  - Why is this important?

When is the difference between two values too "off"?

- Differentials

White cell count 4.0 – 11.00	Percentage granulocytes 50 – 70	Percentage lymphocytes 20 - 40	Absolute Granulocytes 2,000-7,700	Absolute lymphocytes 0.8 – 4.4
10,000	75	25	7,500	2,500
15,000	75	25	11,250	3,750
2,000	75	25	1,500	500
				*all acceptable

- So watch the absolute values!

What about platelet counts

Not the world's most consistent test result

Automated

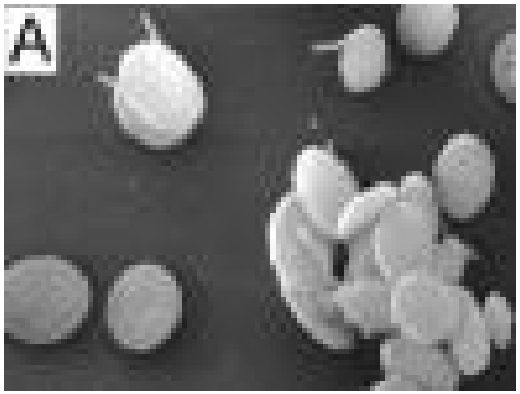
Range of reproducibility is plus or minus 10,000 so if you historically have a platelet count of 300, then there is no significant change if the value is between 290 and 310.

- Manual

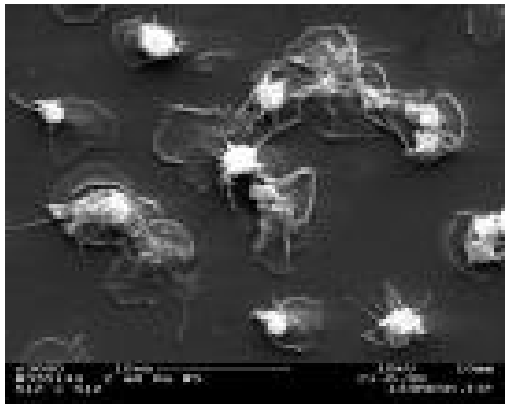
Range is plus or minus 25,000

What do platelets look like?

- Inactive



Active



- As the platelets squeeze together, they release potassium.
- When they clump, they can be counted as 1

JAK2

Every cell has 2 copies of every gene
But
Only 1 works at any given time.

Genes can

- make a protein
- regulate the rate of some action
- suppress another gene
- become active/inactive as it ages

JAK2

Normal or wild type JAK2 – responds to Interleukin 3 and the stimulating factors that causes progenitor cells to red cells, granulocytes and/or platelets

JAK2 (V617F) cells do not need to respond to outside agents and grow independently.

JAK exon 12 mutations

Exon 12 mutation let cells be independent of erythropoietin but these cells appear to still in under the control of other compounds for granulocyte and platelet production.

CALR

Normal or wild type CALR – responds to Interleukin 3 to stimulate platelet numbers

CALR – mutated protein is always on stimulating platelet growth in spite of IL-3 levels.