



—BELMATT—
HEALTHCARE TRAINING

How to Interpret Your Lab Results

Parmy Deol

Presenting

- **CBC: Complete Blood Count**
- **Serum Chemistries**
- **Liver Function Tests**
- **Lipids/Glucose**
- **T cell subsets**
- **Viral load**



Elements of the CBC

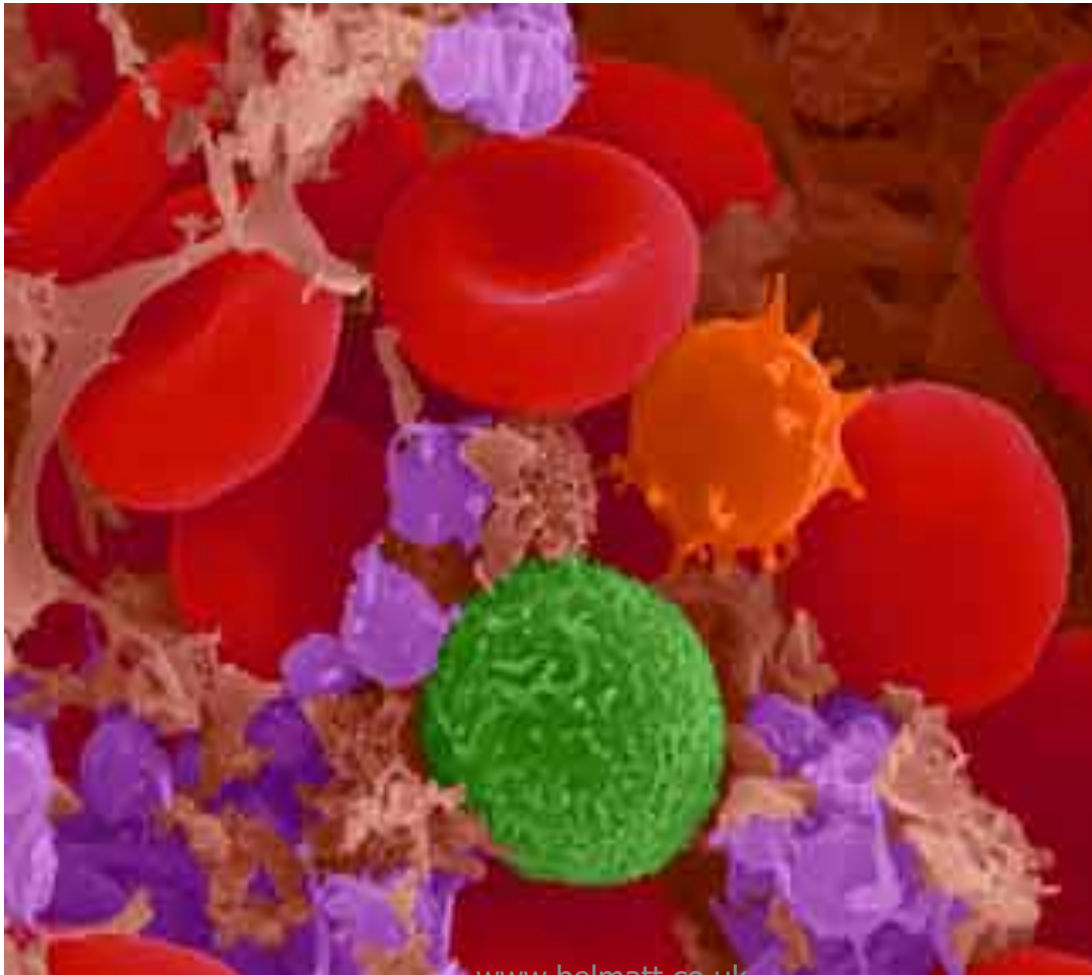
- **RBC' s: Red Blood Cells**
- **WBC' s: White Blood Cells**
- **Platelets**
- **Serum Plasma**

Stem Cells

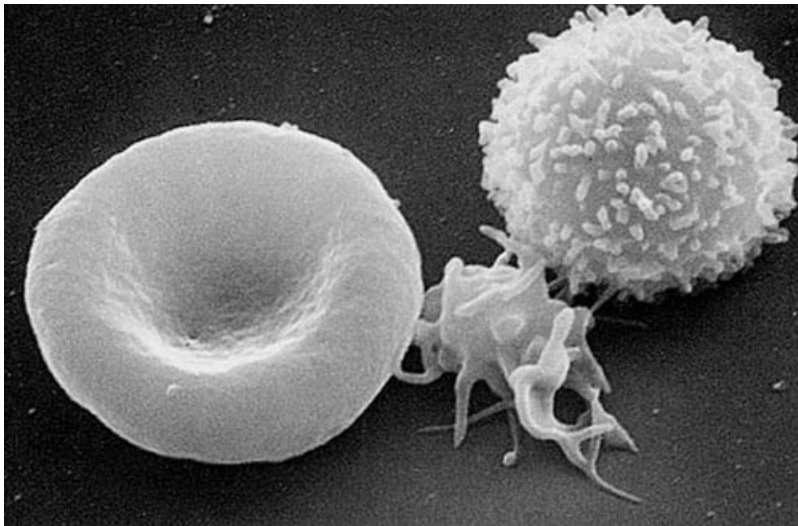


- **Stem cells are young cells**
- **All blood cells start as stem cells**
- **They get “drafted” as RBCs, WBCs or platelets depending on the body’s needs**

**Not all blood cells
are the same....**



Red Blood Cell Tests



- **Erythrocytes**
“cytes” = cells
- **Shaped like a bagel with hole covered**
- **Red Blood Cell count: total number of red blood cells**
- **Hemoglobin (HGB): protein in RBC's that actually carries O₂**

Red Blood Cell Tests

- **Hematocrit (HCT):** measures the % of blood volume taken up by RBC' s
- **Mean Corpuscular Volume (MCV):** average volume (size) of RBC' s
- **Mean Corpuscular Hemoglobin (MCH):**
amt/concentration of hgb in average cell
- **Platelets:** help stop bleeding by forming clots.
Low plt count: thrombocytopenia

White Blood Cells



- WBC' s are fighter cells
- Some make antibodies
- Some fight directly
- Divided into types by how they look and what they do

WBC Differential

(Different Types of WBC' s)

- **5 types of white blood cells**
 - **neutrophils or polymorphonuclear cells**
fight bacterial infections; low count=neutropenia
(HIV,some meds can cause neutropenia)
 - **lymphocytes: 2 types:**
 - T cells attack + Kill germs/regulate immune system**
need to know lymphocyte count to calculate T cells
 - B cells make antibodies**

More Types of WBC' s

- **Monocytes or Macrophages**
fight infections by eating germs; high count usually signifies infection
- **Eosinophils**
involved with allergies and reaction to parasites
- **Basophils**
Seem to be involved in long term allergic response; not well understood

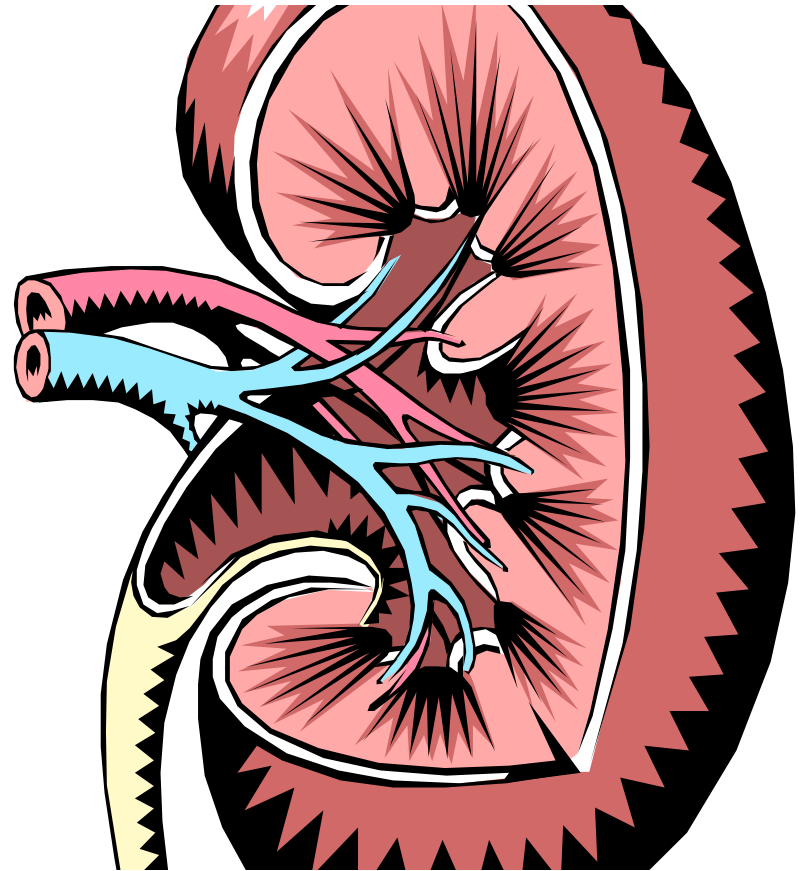
Blood Chemistry Tests



- **Electrolytes: related to fluid balance**
- **Sodium**
- **Potassium**
- **Chloride**
- **Bicarb**

Kidney Function Tests

- **Blood Urea Nitrogen (BUN)**
nitrogen in blood
waste that is normally
removed by kidneys
- **Creatinine**
waste product; most
direct sign of kidney
function



Liver Function Tests

- High enzymes can signal liver damage (meds, hepatitis, alcohol, drugs)
 - ALT (SGPT)
 - AST (SGOT)
 - Bilirubin yellow fluid produced when RBC' s break down (liver disease; indinavir and atazanavir can elevate bili)
 - Alkaline Phosphatase
 - LDH

Other Tests

- **Albumin:**

major protein in blood

**maintains balance in cells; carries
nutrients; can affect other lab tests**

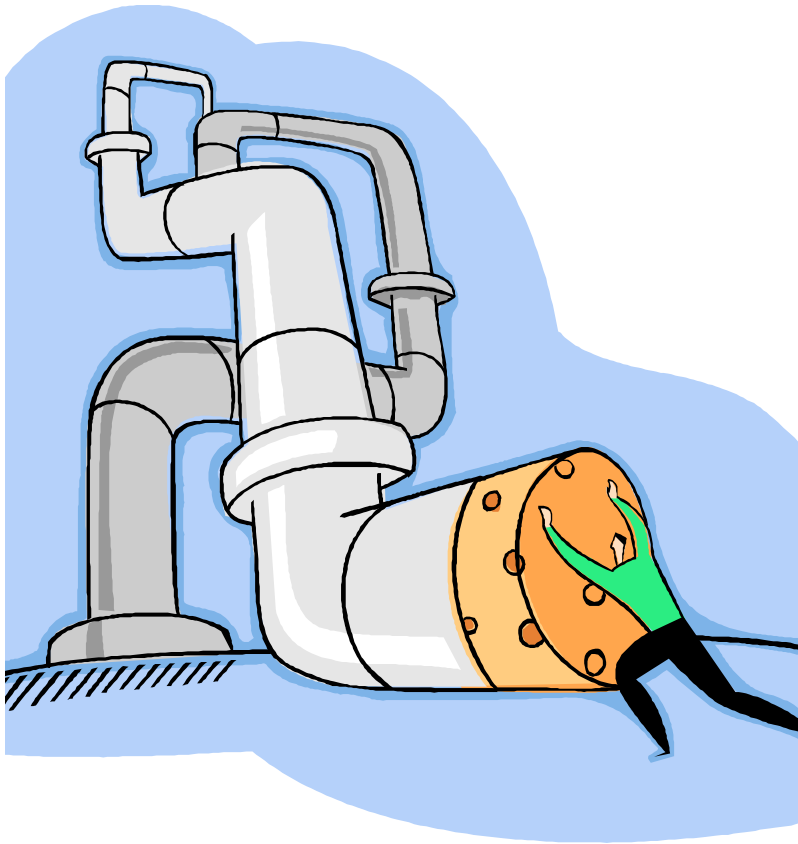
- **Erythrocyte Sedimentation Rate:**

**how quickly RBC's settle in a tube of blood;
high sed rate=inflammation**

Fat in Blood: Lipids

- **Fat is a source of energy**
- **Carries some vitamins**
- **Helps make hormones**
- **Helps make cell membranes**
- **Lubricates some body parts**
- **Fats are carried wrapped in lipoproteins**
- **Triglycerides most common, then cholesterol**

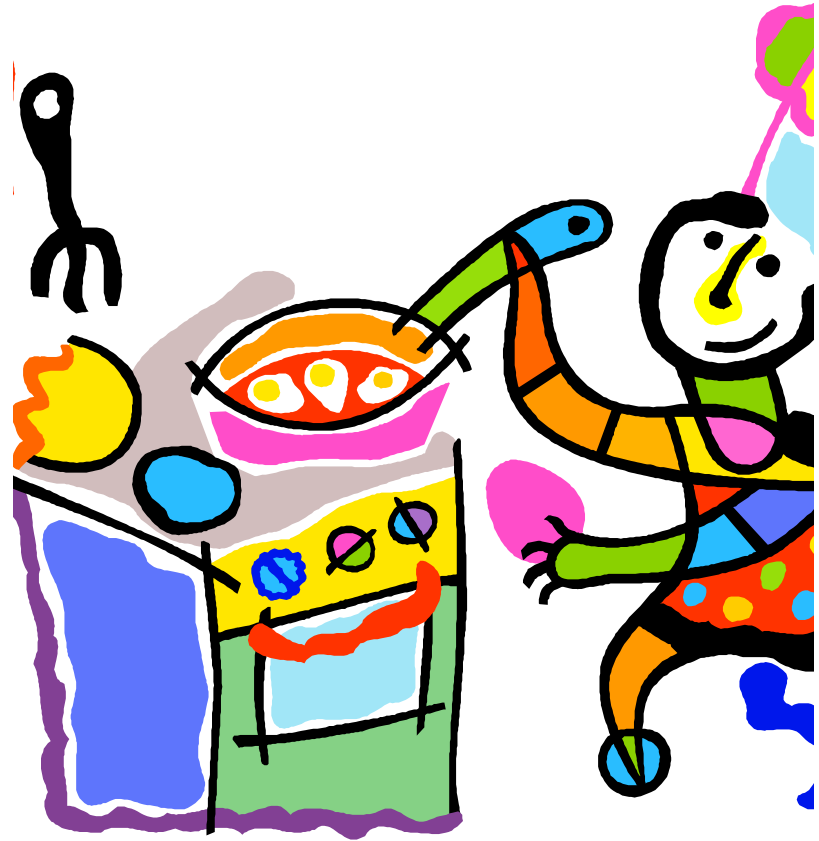
So what's the problem?



- Small lipoproteins (LDL or VLDL) carry fat from liver to rest of body
- Too much of these cause fat build-up on walls of arteries

Lipids

- Cholesterol
- HDL (good cholesterol)
- Ratio
- LDL (bad cholesterol)
- Triglycerides

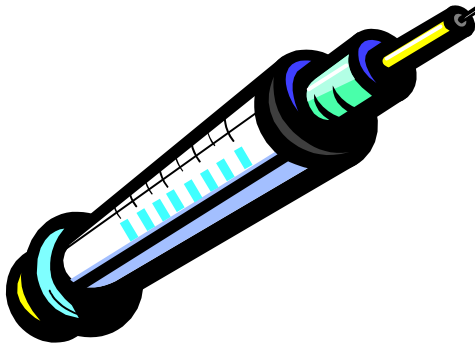


Blood Sugar

- **Glucose provides energy**
- **High blood sugar could signal diabetes**
- **Insulin is produced in pancreas and helps glucose move from blood to cells**
- **Some protease inhibitors can cause elevation of blood sugar by inhibiting insulin**

Types of glucose tests

- **Random Blood sugar**
(not fasting)
- **Fasting Blood sugar**
(nothing to eat or drink except H2O for 8 hrs)
- **Glucose Tolerance Test**
(Starts fasting, then given sweet drink and measured over time)
- **Hemoglobin A1c**
(Measures glucose control over 3 month)



T cell subsets: It's a war out there!

- **CD4**
(cells that HIV targets and
- **CD4%**
(% of total lymphocytes)
- **CD8**
(fight HIV)



Viral Load Tests

- **Different types of tests and results may be different**
- **PCR**
- **bDNA (branched DNA)**
- **Viral load testing measures only that which is in your blood**
- **Valuable for managing therapy: goal is undetectable**