



—BELMATT—  
HEALTHCARE TRAINING

# How to Interpret Your Lab Results

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# Presenting

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



# Elements of the CBC

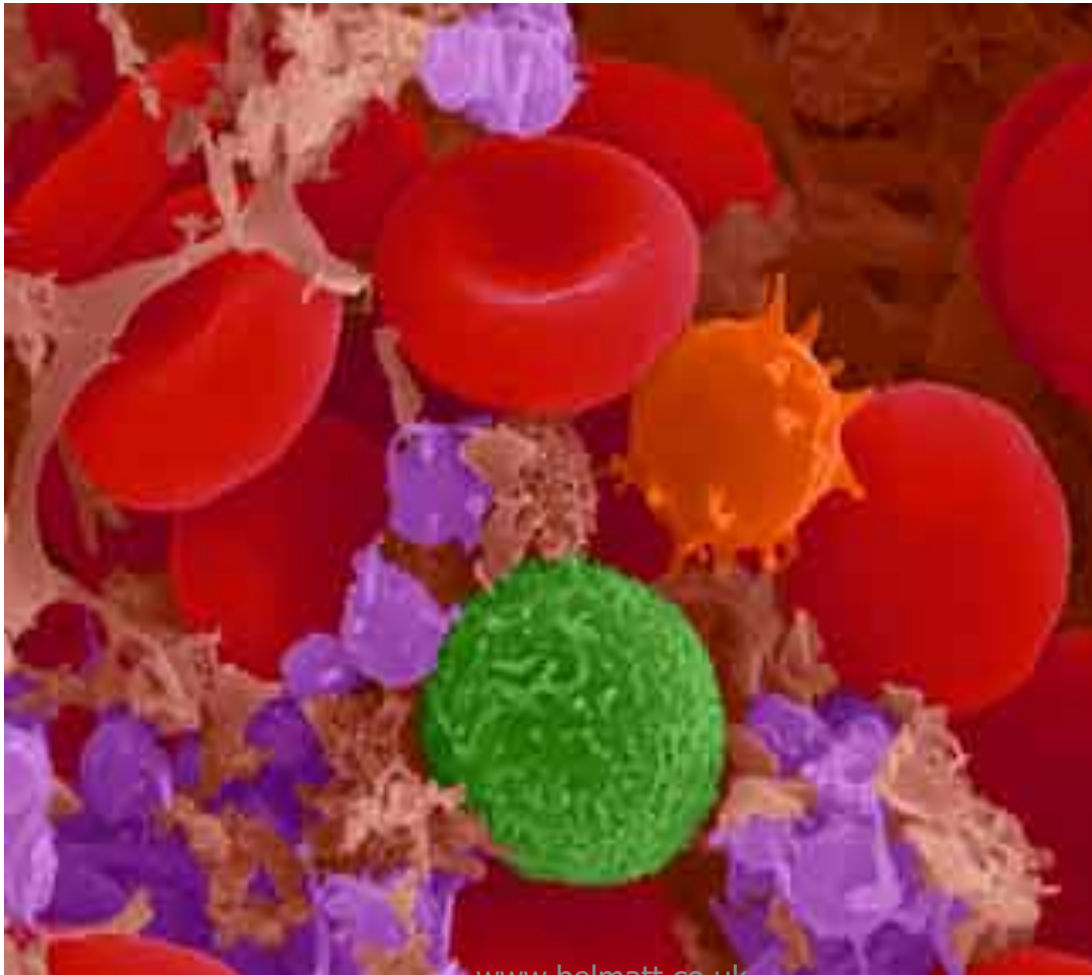
- **RBC' s: Red Blood Cells**
- **WBC' s: White Blood Cells**
- **Platelets**
- **Serum Plasma**

# Stem Cells

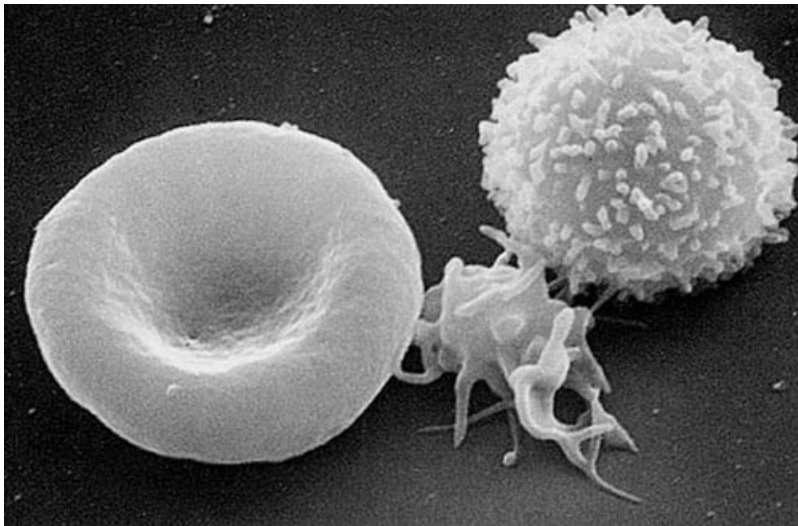


- **Stem cells are young cells**
- **All blood cells start as stem cells**
- **They get “drafted” as RBCs, WBCs or platelets depending on the body’s needs**

**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 O<sub>2</sub>**

# 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

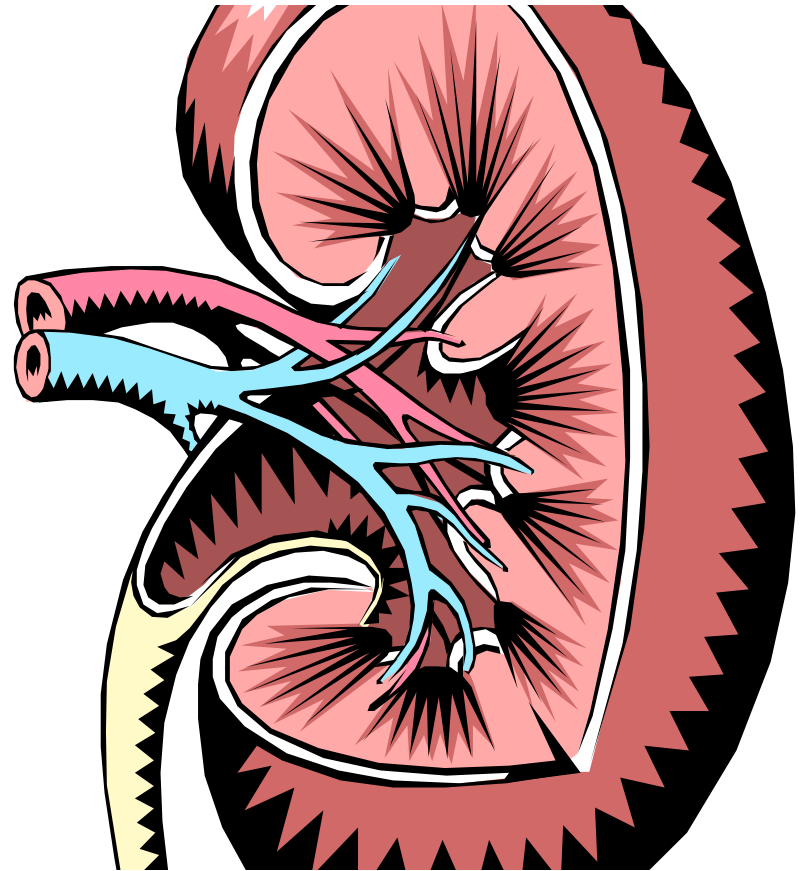
# Blood Chemistry Tests



- **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**

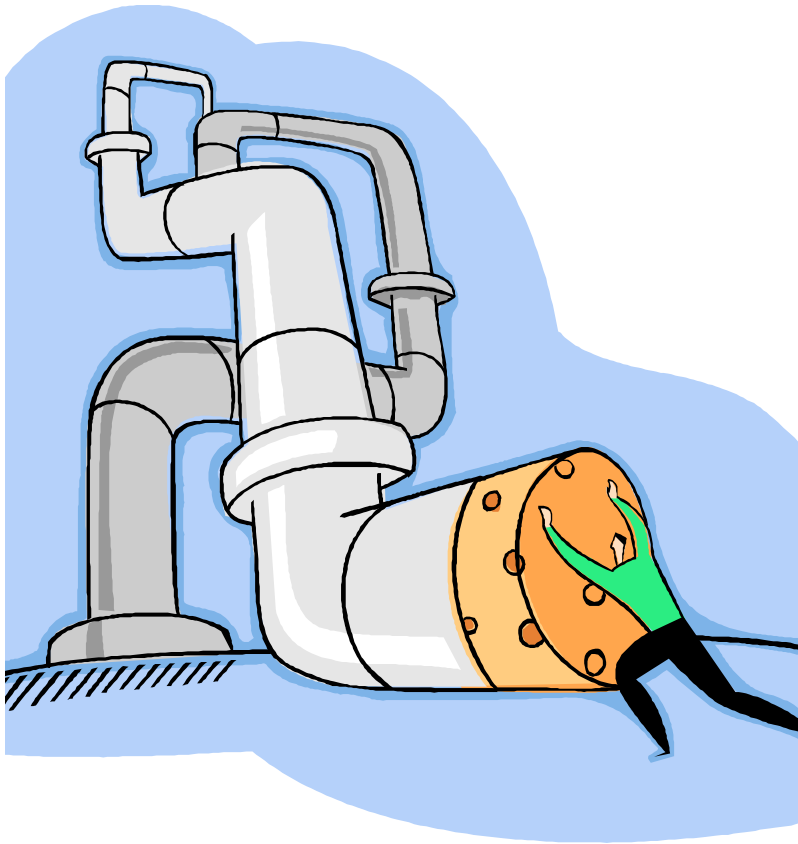
- **Erythrocyte Sedimentation Rate:**

**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?

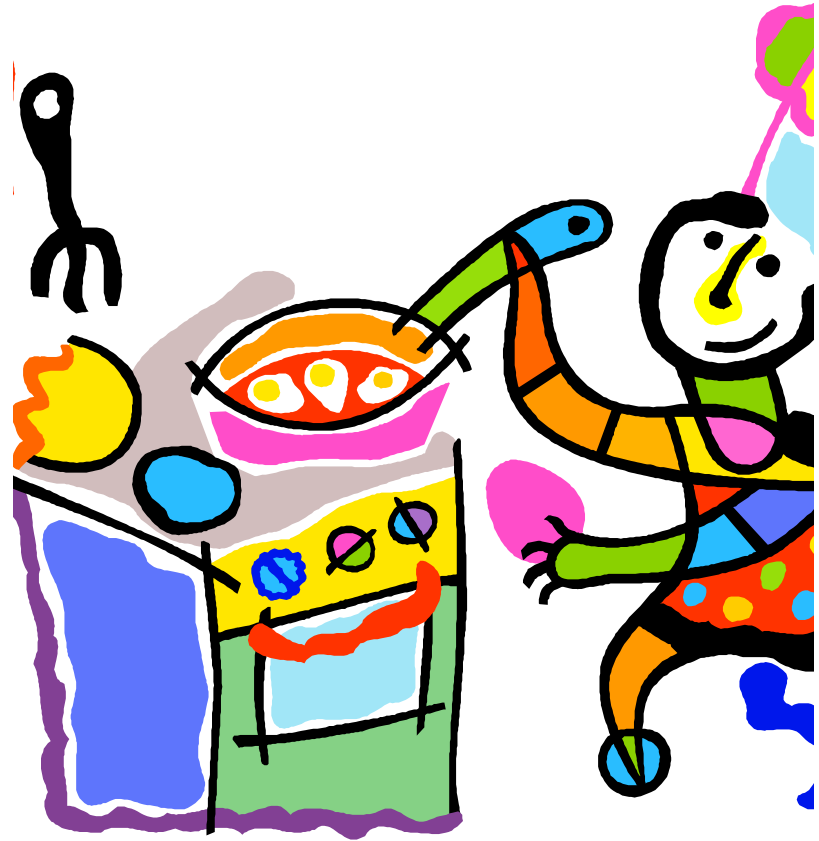


- Small lipoproteins (LDL or VLDL) carry fat from liver to rest of body
- Too much of these cause fat build-up on walls of arteries



# Lipids

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

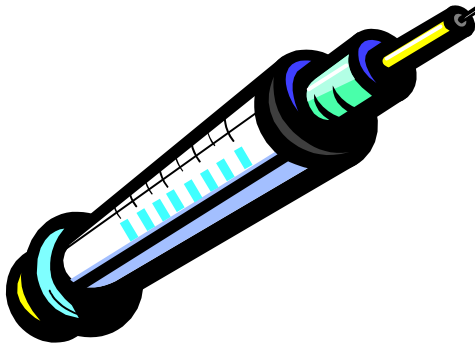


# Blood Sugar

- **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**