Blood Tests

What is the routine? What do they tell us?

Blood Tests

- This is the cause of some of the greatest anxiety among patients and their parents
- The anxiety is related to physical pain and emotional stress
- Having a strategy for dealing with blood tests is a good thing

Who?

- Every transplant recipient must have blood work on a regular basis for the rest of their life

Why?

- Blood tests help the team to monitor the health of the heart, kidneys and immune system of the transplant recipient

Why?

Blood tests can catch problems early

- Keep immunosuppression levels within range
- Tell us how well medications are working
- Warn us of infection

Where to go first 3 months?

Lab tests done at a large hospital often have results the same day

- Do at or before clinic early after discharge from hospital

Where to go later?

- Community lab OK but may not have infant expertise, would get result the next day
- if urgent result needed might ask you to come to the hospital lab
- Rural labs often will not get result to the clinic for 3 or more days

How can I help my child with this?

- *Prepare the Child* — Calmly explain how the sample will be collected and why, giving the child time to adjust to the idea before anyone touches his or her body.

http://www.labtestsonline.org/understanding/testtips/kidtips.html

What can I do to make it better?

- *Help the Child Put It in Perspective* —For example, explain that this will be over as fast as you climb stairs at home or before we can sing the Barney song, or this will be over in the time it take Sidney Crosby to get a goal.

- *Stay with Your Child* — Parents are strongly encouraged to stay and help their child during a blood draw. The parent can be face to face with the child, while the child is laying down, providing physical comfort, distraction, and assistance.

Participation?

- Some children want to watch; others would rather look away.
- If the child does not want to watch, have an alternate focus in mind, such as looking at an interesting book you have brought along (an *I Spy* or pop-up, for example) or singing a favorite song or hymn.
  - You can ask, "Do you want to see how the nurse does this, or do you want to look at this book with me while she works?“

Reward your Child

- *Plan a Reward* — Telling your child you will have a treat of some kind afterward is often helpful.

- Food can be a reward but it shouldn't always be the reward. How about a trip to the zoo or the playground on the way home.

Encourage Rehearsing

- the child can rehearse sitting still and you can review by saying "show me how you stay still, now show me how you wiggle, now show me how you stay still again."
- Rehearsing can help the child feel composed and in control of his or her body; the child may even be proud to demonstrate his or her ability.
- Rehearse what will happen with a doll or toy

Routine Blood Tests

- Drug level; CBC & Diff.; Electrolytes; Creatinine, BUN; Glucose; Magnesium; Calcium are tested every time you go to the lab.
  - twice a week for the first month post-transplant
  - once a week for the second and third months post-transplant
  - Twice a month until month 12
  - Year 2 and 3 blood work shall be monitored monthly
  - Blood work thereafter is monitored every 3 months

Drug Levels

Drug levels measure **Tacrolimus, Cyclosporine, and Sirolimus** (Rapamycin) in the blood.

- These blood levels must be checked regularly to avoid levels that are too high or too low.
- High levels could lead to toxicity or over-immunosuppression and high infection rates, and low levels may lead to rejection.
- **NOTE:** The normal range will differ for each person, depending on the combination of anti-rejection medications and the length of time since the transplant.

CBC & Diff

- A complete blood count (CBC) is a series of tests used to evaluate the composition and concentration of blood cells. It consists of the following tests: red blood cell (RBC) count, **white blood cell (WBC) count**, and platelet count; measurement of **hemoglobin** and mean red cell volume; classification of white blood cells (WBC differential); and calculation of hematocrit and red blood cell percentages.

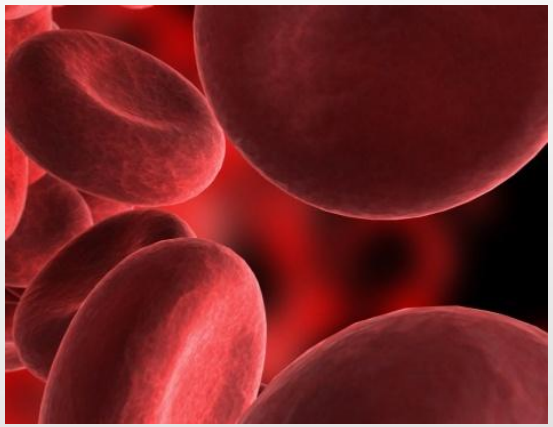
http://www.answers.com/topic/full-blood-count

White Blood Cells (WBC)

- May also be called the white cell count
- **WBC** tells the doctor if the patient's white blood cells have increased (a sign of infection) or decreased (indicating a lower defence against infection).
- Differential is a breakdown of white cells into types, such as **neutrophils**, leukocytes etc.
- Low white cells can be caused by immunosuppression

Hemaglobin

- **HGB** measures the hemoglobin, which is the amount of red blood cells in the blood.
- Red blood cells carry oxygen to all parts of the body.
- When a patient's Hgb is low, he may feel tired or have little energy.
- Can be caused by immunosuppression, illness, poor iron status



Electrolytes

Electrolyes are an important part of fluid balance in the body

- **K** measures potassium, which is needed for normal heart and muscle function.
- **Na** measures sodium, which helps maintain the balance of salt and water in the body.
- **Cl** stands for chloride, which mirrors the flow of sodium in the body to maintain neutral electrical charge of cells
- **CO_2** or bicarbonate is responsible for keeping the acid-base balance of the body (pH balance)

Glucose

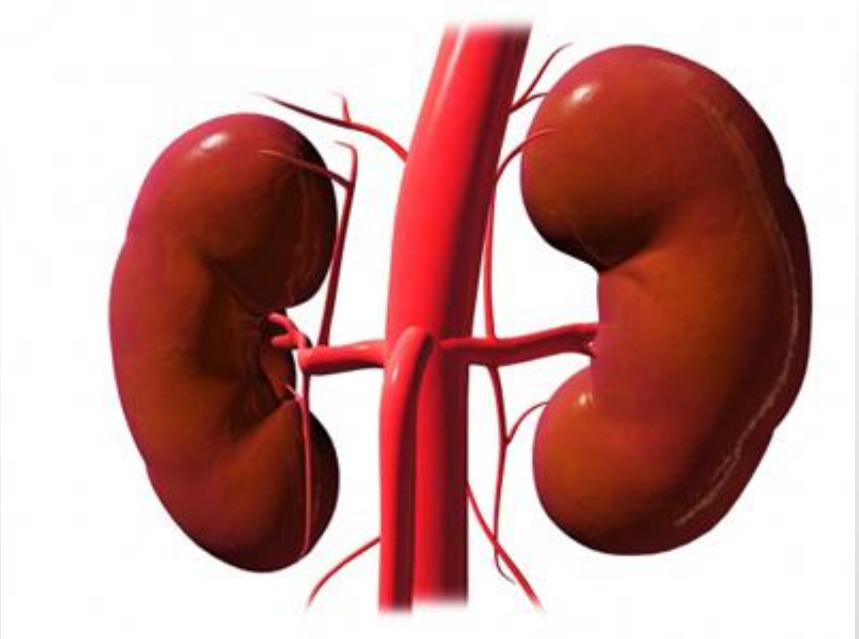
- **Glu** measures glucose, levels of sugar in the blood; some medications may produce a diabetes-like condition in which blood-sugar levels are too high.

Other dissolved minerals

- **Ca** measures calcium, which is necessary for strong bones and teeth, blood clotting, and heart and nerve function.
- **Mg** measures magnesium, which is necessary for normal function of muscles and for blood clotting.
  - Very sensitive to tacrolimus

Creatinine and BUN

- Creatinine and BUN (urea) tell how well the kidneys work by measuring levels of creatinine and blood urea nitrogen (BUN), waste products normally removed from the blood by the kidneys.



Special Blood Tests

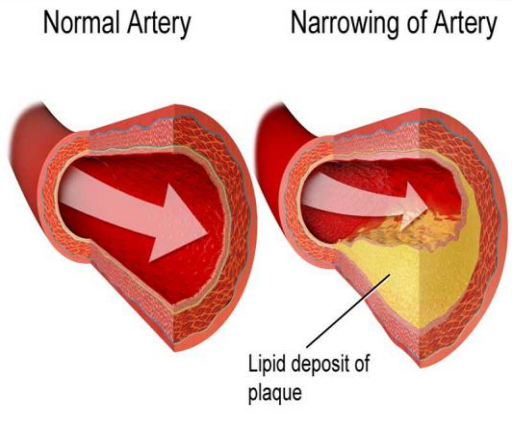
- Those who receive a mismatched organ need to have antibodies against other blood types measured
- Isohemagglutinins (anti-A, anti-B): Daily for 7 days; then weekly for 3 weeks; then every 2 weeks for 2 months; then monthly for 4 months, then every 3 months and at the time of non-routine biopsies.

Occasional Blood Tests

- Fasting Lipids are tested annually, these look at your good and bad cholesterol
- PTH, Vitamin D 25(OH), PTH, Phospate, Albumin, HgBA1C, HLA antibody screen (LAS) annually

Starting a cholesterol med

- Blood levels of Creatine kinase rise when muscle or heart cells are injured.
- **Statins** can cause damage to muscles and CK will rise so this is monitored with the start of a statin
- Statins = Lipitor, pravachol, other medications that reduce cholesterol.



http://www.labtestsonline.org/understanding/analytes/ck/test.html

Starting a water pill

- Lasix, and spironolactone are medications to help your kidneys eliminate more water.
- After you start on these medications you usually have to have you electrolytes tested to make sure your fluid and electrolyte balance is OK.

CMV and EBV

- Most young children have not been exposed to these viruses before transplant
- CMV can cause inflammation of the GI tract (gastritis, esophagitis) or lungs (pnuemonitis), ulcerated surfaces
- EBV can cause mono or flu-like illness but also can cause lymphoma.
- Important to monitor to ensure infection does not occur early post transplant

Looking for Viral Infection

- Only some recipients require testing for CMV and EBV, they are complex regimens
- You will be given special requisitions if you need this testing

CMV D+/R- OR CMV D+/R+ OR D-/R+ with ATG induction
Valganciclovir po once daily Prophylaxis to start day 10 of transplant and continue to 14 weeks posttransplant; after completion of prophylaxis monitor PCR weekly x 12 weeks.
CMV PCR at 6 months and then annually
Monitoring Dates:

CMV D+/R+ OR CMV D-/R+ and NO ATG induction:
Pre-emptive therapy protocol. Monitor weekly PCR week 2 to 12 post transplant, CMV PCR at 6 months and then annually.
Monitoring Dates:

EBV D-R+, D+R+ and NO ATG
PCR monitoring Q monthly x 3 months, Dates:
Q 3 months until 1 year, Dates:
Annually thereafter

EBV D+R- OR D-R+, D+R+ and ATG induction, no prophylaxis recommended
PCR monitoring Q2 weeks for 2 months, Dates:
Q4 weeks until 3 months post tx, Dates:
Q2 months until 9 months post tx, Monitoring Dates:
Annually thereafter beginning 12 months post.

CAUTION!

- A single test usually means nothing
- Must examine a trend before making decisions for treatment
- You may be asked to repeat blood work within a week if unexpected result
  - Lab error
  - Metabolic blip

Resources

Questions?

Questions can be directed to your local Cardiology Clinic Nurse Coordinator:

Vancouver, BC:	(604) 875-2120
Edmonton, AB:	(780) 407-3592
Calgary, AB:	(403) 955-7858
Saskatoon, SK:	(306) 844-1235
Winnipeg, MB:	(204) 787-2410