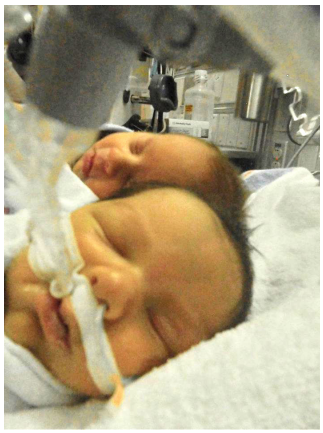
ROUTINE LAB STUDIES

Routine Clinic Lab Studies

With all lab studies, a Tacrolimus level will be obtained. These drug levels are routinely assessed to ensure the correct amount of anti-rejection medicine is present in the blood stream. Here are the general guidelines for all blood draws:



- The Tacrolimus level is assessed at its lowest concentration (just before the next dose of medicine). This is called a "trough level." This means the Tacrolimus level should be drawn as close as possible to the regularly scheduled Tacrolimus dose. Please do not exceed one hour before or one hour after the dose is due. For example if you gave your child his/her Tacrolimus at 8 p.m. your child's labs should be drawn between 7 and 8 a.m. the next day.
- DO NOT give your child Tacrolimus before the blood draw. Once the blood has been drawn, then give your child his/her medicine.
- For all lab studies that will be drawn on a clinic appointment day, the lab orders will already be at the drawing station. Many times, the transplant team may have the lab results available for you before leaving clinic that day. However, the Tacrolimus level will not be ready for review until later.
- For all routine local lab studies, the transplant nurse practioner will provide you a lab requisition or lab slip for you to take to the local lab. The lab slip will be good for six to 12 months and will be updated with each clinic visit. The transplant nurse practitioner will also inform you about the needed frequency of the routine lab studies. It is important to mark the date needed for the lab studies on your calendar for review.
- The local lab will draw and fax the results to the transplant center for review. Some local lab centers are not able to process the Tacrolimus level. In that case, the transplant nurse practitioner will provide you some mailing boxes to have ONLY one tube of blood to be sent to the University of Michigan for processing. There will be no cost to you for mailing the blood specimen to the hospital. You MUST make sure that the tube of blood has your child's full name, date of blood draw, date of birth and UM Hospital ID number. Without the proper identification, the blood specimen will not be processed.
- Once your child has had the local lab studies drawn, please notify the transplant office. Some lab centers will need to be called for the results.

	Measures:	Increase Could Mean:	Decrease Could Mean:
Hematocrit (HCT)	The percentage of oxygen-carrying red blood cells (RBCs) in the blood	• Thickened blood and unwanted clotting • Dehydration	• Anemia – weakness, dizziness, even breathing and heart difficulties
Hemoglobin (Hgb)	The pigment found in red blood cells that carries oxygen from the lungs	• Dehydration • Heart or blood disorders	• Muscle weakness • Sleepiness • Problems with the heartbeat • Could be caused by some anti-rejection drugs and antibiotics
Platelets (Plts) (also called thrombocytes)	Platelets in the blood that help stop bleeding by clumping and forming a clot around an injury	• The blood is too thick and prone to clotting	• Easy bruising and bleeding • A sign of kidney or liver disease • Internal bleeding • Anemia • Could be caused by some anti-rejection drugs and antibiotics
Glucose	How well the body is regulating the use of glucose (a sugar) following a meal	• Development of diabetes (signs of diabetes – excessive thirst, excessive urination, fatigue and weight loss)	• A problem with the pancreas: fainting, sweating, nervousness, fast pulse and headache • Liver disease • A thyroid problem
Potassium (K)	Potassium levels in the blood; reflects potassium in the tissues that is required to change carbohydrates into energy, build protein and help the heart, muscles and nerves function	• Kidney is not working well • Some anti-rejection drugs may be the cause	• Use of diuretics can cause potassium to be excreted (released) by the kidneys • Heart problems • Muscle cramps
Sodium (Na)	The balance between electrolytes and water in the body Also indicates nerve and muscle disorders, as well as kidney and adrenal gland problems	• Excessive sodium in the diet • Not enough water in the body • Kidney function problems	• Chronic kidney disease • Inadequate sodium intake
Creatinine (Cr)	Creatinine, a protein waste substance produced by muscles and released into the blood stream for removal by the kidney. Measuring creatinine in the blood helps show how the kidney is working	• Dehydration • Kidney disease • A possible side effect of some anti-rejection medicines • Obstruction within the urinary system	N/A

	Measures:	Increase Could Mean:	Decrease Could Mean:
Cholesterol (Chol)	Cholesterol, a fat-like material carried in the blood that makes hormones and builds cell walls	• Narrowing or blockage of blood vessels • You've eaten fatty food within 12 hours of the test • A side effect of some anti-rejection medicines	N/A
Triglycerides	Triglycerides, a fat that, along with cholesterol, helps determine the risk of coronary artery disease	• Poorly controlled diabetes • High blood pressure • Increased risk of coronary artery disease (if cholesterol levels are also high)	• Malnutrition • Overactive thyroid
Uric Acid	Elimination of uric acid, a waste product of energy production found in the urine and blood	• Gout, liver disease, or ulcerative colitis	N/A
White Blood Count (WBC)	The number of leukocytes (white blood cells) in your blood. White blood cells fight off infection. They also are involved in kidney rejection.	• Infection • Inflammation • Tissue destruction • Stress can elevate the levels, as can some anti-rejection drugs	• Too few infection-fighting cells to protect the body • Taking medicines like antibiotics, diuretics, or some anti-rejection drugs
BUN	Blood urea nitrogen (BUN), a waste product of protein breakdown that is removed from the blood by the kidneys. A very important test of kidney function	• Kidney is not functioning properly • Diet is too high in protein • Dehydration • May be caused by anti-rejection medicines	• Liver disease • Too much water in your body
Bicarbonate (HCO_3)	Acid/base balance of blood as controlled by the kidney	• A lung disorder • Result of prolonged vomiting • Taking too many antacids	• A sign of diabetes • Kidney failure
Calcium	Calcium—needed for blood clotting, building bones, and also muscle, heart, and nerve function	• Too much calcium intake from overuse of antacids • Bone disorders • Too much vitamin D • Problems with thyroid or parathyroid glands	• Inflammation of pancreas • Kidney failure • Too little vitamin D • Too much water in the body

	Measures:	Increase Could Mean:	Decrease Could Mean:
Phosphorus (PO4)	Phosphorous levels in the blood—valuable in creating energy	• Kidney failure • Too much phosphorous in the diet	• Bone disorders • Too little vitamin D • A complication of diabetes • Excessive use of some antacids
Protein in Urine (Proteinuria)	Normally, protein is not present in urine. If it is, the quantity of protein may be measured over a 24-hour period	• A kidney disorder • A complication of diabetes	N/A
Urinalysis	White blood cells, red blood cells, bacteria and protein levels in the urine	• Kidney disease • Urinary tract infection • Poorly controlled diabetes	N/A
Albumin	A protein produced by the liver and released into the blood stream	• Recovering from a serious illness	• Ascites (excess fluid in the abdomen) • Kidney disease • Hepatitis • Cirrhosis • Body is not absorbing nutrients from food • Malnutrition
Alkaline Phosphatase	An enzyme produced in the liver, bone and placenta that is released into the blood stream	• Inflammation in the bile ducts inside the liver	N/A
ALT (Alanine Transaminase)	An enzyme produced in the liver that is released into the blood when liver cells are injured	• Liver cell injury • Hepatitis • Noncancerous tumor • Use of medicines or drugs that are toxic to the liver • Rejection episode • Excessive use of alcohol • Severe infection	N/A
AST (Aspartate Transaminase)	An enzyme released into the blood when the liver is injured	• Liver cell injury • Hepatitis • Use of medications that are toxic to the liver • A rejection episode • Excessive use of alcohol • Severe infection	N/A

	Measures:	Increase Could Mean:	Decrease Could Mean:
Bilirubin	A component of bile, a digestive enzyme produced by the liver	• Liver cell injury • Hepatitis • A change in the bile duct structure • A rejection episode • Use of medications toxic to the liver • A narrowing of the common bile duct • Gallstones	N/A
INR	The ability of the liver to make prothrombin, a protein that is important for blood clotting	• Liver damage • A person is taking anti-clotting medicine	N/A
LDH (Lactic Acid Dehydrogenase)	LDH, an enzyme found in many body tissues including the heart, liver and kidney; most often measured to evaluate tissue damage	• Stroke or heart attack • Low blood pressure • Liver diseases such as hepatitis • Disease of the pancreas	N/A