

A HEALTH GUIDE FOR PATIENTS AFTER TRANSPLANTATION

This information is intended to supplement the advice given to you by your transplant team. There may be side effects or instructions that are not listed on this pamphlet. If you feel you need more information, please contact your transplant physician or clinical pharmacist.

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TABLE OF CONTENTS

Pharmacies in BC.....	1
Medication Guide.....	2
General Medication Information	3
Anti-Rejection Medications	6
Medication Safety Precautions at Home	7
Tacrolimus [tak-row-lim-us].....	8
Mycophenolate [my-ko-fen-o-late]	10
Prednisone, Prednisolone, Methylprednisolone	12
Rejection	14
Infection and Anti-Infective Medications	16
General Information	17
Bacterial Infection.....	19
Fungal Infection	20
Sulfamethoxazole / Trimethoprim.....	21
Viral Infection.....	23
Valganciclovir	24
Valacyclovir	26
Over-the-Counter (OTC) Medications.....	27
Naturopathic, Herbal, Traditional or Homeopathic Products	29
Cancer Risk	31
Vaccinations for solid organ transplant recipients	33

PHARMACIES IN BC

That Dispense Medications for BC Transplant Patients

Pharmacy	Address (listed alphabetically by city)	Phone
Newgen Pharmachoice	100-1945 McCallum Road Abbotsford BC V2S 3N4	604-859-2351
Kipp-Mallery Pharmacy	273 Victoria Street Kamloops BC V2C 2A1	250-372-2531
Lakeside Clinical Pharmacy	112A - 2365 Gordon Avenue Kelowna BC V1W 3C2	250-860-3100
Wellness Pharmacy #2	#104-22314 Fraser Hwy Langley, BC V3A 8M6	604-530-5300
Central Drugs	Unit #16 2220 Bowen Road Nanaimo BC V9S 1H9	250-758-7711
City Centre Pharmacy	101-399 Main Street Penticton, BC, V2A 5B7	250-770-0047
London Drugs Pharmacy	#196 - 1600 15th Avenue Prince George BC V2L 3X3	250-561-1118
Somerset Medical Centre Pharmacy	#7 - 13791 72nd Avenue Surrey BC V3W 9Y9	604-590-5587
Shoppers Drug Mart # 271	#271 - 1305 Cedar Street Trail BC V1R 4C3	250-368-3343
Ambulatory Care Pharmacy BC Children's Hospital	4480 Oak Street Vancouver BC V6H 3V5	604-875-2205
Ambulatory Pharmacy St. Paul's Hospital	1081 Burrard Street Vancouver BC V6Z 1Y6	604-806-8151
Solid Organ Transplant Pharmacy Gordon & Leslie Diamond Centre Vancouver General Hospital	5 th Level, 2775 Laurel Street Vancouver BC V5Z 1M9	604-875-5692
Royal Jubilee Prescriptions Royal Jubilee Hospital	DT1200-1952 Bay Street Victoria BC V8R 1J8	250-370-8153

MEDICATION GUIDE

GENERAL MEDICATION INFORMATION

Before discharge from the hospital

Before discharge from the hospital, a transplant pharmacist will discuss your medication regimen and provide you with:

- a medication calendar
- a supply of your anti-rejection medications
- a prescription for the rest of your medications

Your transplant medications will be refilled at the transplant clinic or a designated BC Transplant partner pharmacy (See *List of Pharmacies in BC*).

Ordering Medications

Please monitor your home supply of anti-rejection medications and give the Transplant Pharmacy **one week** advance notice when re-ordering your anti-rejection medications for the first 1-2 months after transplant. Once your transplant is stable, always have at least 2 week supplies of medications at home in case of emergency and please notify the pharmacy **two to three weeks** in advance.

Patients who place phone orders will be given priority over those who walk in to order. (See *Contact Information* for Pharmacy hours and telephone number).

Medication cost

BC Transplant covers the cost of your immunosuppressant/anti-rejection medication for your transplant. The cost of some of your other medications is your responsibility.

Register with Fair Pharmacare to take advantage of government coverage. To apply visit: <https://www2.gov.bc.ca/gov/content/health/health-drug-coverage/pharmacare-for-bc-residents/who-we-cover/fair-pharmacare-plan> . To check if you have coverage call (604) 683-7151 (from Vancouver) or 1-800-663-7100 (toll-free anywhere else in B.C.)

For patients who receive a kidney transplant, your medication coverage with Provincial Renal Agency (PRA) will be terminated.

The following medications are covered by BC Transplant and may be refilled at the transplant clinic or a designated BC Transplant partner pharmacy (See *List of Pharmacies in BC*):

Type	Name
Immunosuppressant/ Anti-Rejection	Azathioprine
	Cyclosporine
	Mycophenolate
	Prednisone and Prednisolone
	Sirolimus
	Tacrolimus
Anti-Viral	Adefovir
	Entecavir
	Lamivudine
	Leflunomide
	Letermovir
	Tenofovir
	Valganciclovir
Erythrocyte (Red Blood Cells) Stimulating Agents	Epoetin alfa
	Darbepoetin
Granulocyte (White Blood Cells) Colony Stimulating Agents	Filgrastim (G-CSF)

All other medications must be purchased at any pharmacy of your choice. BC Transplant recommends that you consider having all your medications filled at the same pharmacy. You may request for your medications to be compliance packed (blister packed) free of charge. (NOTE: Not all medications can be blister packed - please consult a transplant pharmacist).

How to Take Your Medications

Take all and especially your anti-rejection medications at the **same time every day** to avoid missing doses and to keep consistent blood levels of the medication in your body.

Always check with your transplant pharmacist before starting or stopping any new prescription and non-prescription medications as well as supplements, such as naturopathic or homeopathic products, vitamins and supplements.

Missed Doses

If you miss a dose, take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses. If you **missed more than 1 day** of anti-rejection medications, contact your transplant team immediately for further instructions.

Storage

Store your medications in a cool, dry place away from sunlight. Do not store them in the bathroom or kitchen because moisture and heat may interfere with the effectiveness of some medications. Do not refrigerate your medications unless instructed to do so by your pharmacist. Keep medications in a safe place out of reach of children and pets.

Alcohol Intake

Depending on your medical history, you may be asked by your transplant team not to drink alcohol. If you have been advised that you may drink in moderation, keep in mind that Health Canada recommends no more than 7 drinks a week for women, with no more than 2 drinks on a single occasion and 9 drinks a week for men, with no more than 3 drinks on a single occasion (one shot, one beer, or 5 ounces of wine).

Pregnancy

Before planning a pregnancy, talk with your transplant physician. Use a safe method of birth control to avoid unplanned pregnancies.

For more information about medications please contact your transplant clinic.

ANTI-REJECTION MEDICATIONS

Anti-rejection medications lower your body's natural defence system (immune system) to prevent it from recognizing your transplant as a "foreign invader" and attacking it. The result of such an attack is **rejection**. By taking these medications, your immune system is lowered enough for you to safely keep your organ. It is essential that you take anti-rejection medications at the **same time every day** and **12 hours apart** to avoid missing doses and to keep consistent blood levels of the medication in your body. Put an alarm on their phone or other ways to remind yourself to never miss or be late for a dose. Make sure that you understand the directions. Never change your dose unless your transplant team tells you to do so.

Many prescription and non-prescription medications as well as naturopathic and homeopathic products (e.g. herbal medications) and vitamins don't mix safely with anti-rejection medications; please inform your healthcare providers (e.g. family doctor, dentist, community pharmacist) that you are taking anti-rejection medications so they can tailor your other therapies accordingly. Your healthcare providers should phone your Solid Organ Transplant clinic to check safety of starting any new therapy.

Avoid grapefruit or grapefruit juice, pomelo or Seville orange fruit/ juice while on this medication due to a serious interaction.

If you throw up within **30 minutes** of taking your anti-rejection medications or see any of your anti-rejections medications in the vomit, repeat the dose again. If you throw up more than one hour after taking your medication, do not repeat the dose, wait until your next dose.

MEDICATION SAFETY PRECAUTIONS AT HOME

This information is provided to advise you of safety precautions to be followed at home while taking any one of the following medications: ***tacrolimus, cyclosporine, mycophenolate, azathioprine, sirolimus, or valganciclovir.***

These medication(s) are beneficial for your treatment, but at the same can be harmful to healthy cells in the body of those who are not taking them. These precautions are recommended for the safety of others around you.

After taking your medication(s), they remain in your body for several days and are gradually removed in your urine and stool. However, small amounts may also be present in other bodily fluids such as blood, saliva, sweat, vomit, semen, vaginal fluids and breast milk. While the risk is very low, it is important to follow the following recommendations:

- Family and friends can be near you, but they should avoid direct contact with your bodily fluids.
- If you are sharing the same bathroom with other members of the family, it is advisable to double flush the toilet with the lid closed to avoid potential back splashing. Wash your hands with soap and water after using the toilet.
- Wear gloves when handling items or cleaning up anything that has become soiled with significant amount of bodily fluids, vomit or medication spills. Wash hands after removing and disposing of gloves.
- Clothing and bedding that is soiled with significant amount of bodily fluids should be handled with disposable gloves, placed in a separate laundry bag and washed in a separate load from other family member's laundry.
- Garbage that has come in contact with bodily fluids that cannot be flushed down the toilet should be placed into a separate bag before putting into the regular garbage bag.
- Anyone coming into contact with your medications should wash their hands before and after. This is done to avoid contaminating the medication, food, or other surfaces around the house.
- Dishes and cutlery do NOT have to be washed separately.
- Casual contact such as hugging, touching and kissing are safe.
- Sexual activities are considered safe. Because small amounts of medication may be present in semen and vaginal fluids and it is unclear the long term effect this might have on the partners, it is recommended that a condom or female condom be used to prevent bodily fluids from coming in contact with your partner, if you are not comfortable with this risk.
- Female patients of childbearing age must use a method of birth control. Female patients who are considering pregnancy must contact their transplant team prior to stopping birth control. Some antirejection medications can harmful to unborn infants and must be changed prior to pregnancy.
- Male patients can father children while taking immunosuppressive medications without any modification to their medication regimen.
- Ask your doctor or pharmacist for the most up to date information about breast-feeding.
- Unused and expired medications should be returned to the hospital or your pharmacy for disposal. Do not flush them down the toilet or discard in your garbage.




For more information about medications, please contact your transplant clinic.

TACROLIMUS [TAK-ROW-LIM-US]




In BC, there are four brands of tacrolimus available for transplant recipients. Tacrolimus is a medication used to lower your body's immune system to prevent your transplanted organ from being rejected.

- **It is very important to keep track of the brand of tacrolimus you're taking. Do not change brands of tacrolimus unless your transplant team has discussed the change with you. In case you need to go to the hospital, bring your home supply of medications with you.**





Prograf® - tacrolimus taken TWICE a day

Prograf 0.5 mg  (light yellow capsule)	Prograf 1 mg  (white capsule)	Prograf 5 mg  (pink capsule)
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Sandoz tacrolimus® – tacrolimus taken TWICE a day

Sandoz tacrolimus 0.5mg  (light yellow capsule)	Sandoz tacrolimus 1 mg  (white capsule)	Sandoz tacrolimus 5 mg  (pink capsule)
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Advagraf® – LONG ACTING tacrolimus taken ONCE a day

Advagraf 0.5 mg  (orange- light yellow capsule)	Advagraf 1 mg  (orange- white capsule)	Advagraf 3 mg  (orange- orange capsule)	Advagraf 5 mg  (orange- pink capsule)
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Envarsus PA® - LONG ACTING tacrolimus taken ONCE a day

Envarsus PA 0.75 mg  (white tablet)	Envarsus PA 1 mg  (white tablet)	Envarsus PA 4 mg  (white tablet)
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How should I take this medication?

It is important to take your medications at the same time each day in order to keep a steady amount (drug level) in your body.

	Prograf: take this medication EVERY 12 HOURS (for example 9 AM and 9 PM)	Your medication times: _____
	Sandoz tacrolimus: take this medication EVERY 12 HOURS (for example 9 AM and 9 PM)	Your medication times: _____
	Advagraf: take this medication ONCE a day (for example 9 AM)	Your medication time: _____
	Envarsus PA: take this medication ONCE a day (for example 9 AM)	Your medication time: _____

- Tacrolimus should be taken **with food** to decrease stomach upset, but may be taken on an empty stomach if preferred. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, then try to take it on an empty stomach.
- Avoid grapefruit or pomelo or Seville orange fruit/juice while on this medication due to a serious interaction.
- In case you need to go for a procedure or an operation that requires you to not eat anything before (fasting), you **must** still take your transplant medications with a sip of water at your regular time.

Remember: if you are asked to get tacrolimus level done, do NOT take your morning dose before your blood work. Try to schedule your bloodwork around the time that you are due to take your medication. Bring your dose to the clinic or lab so you can take it after the blood work is done.

Missed Dose or Vomited Dose:

If you miss a dose take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you missed more than 1 day of anti-rejection medications, contact your transplant team immediately for further instructions.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?





Side Effects	Management
Tremor, shakiness, headache, seizures	Presence of these side effects may be a sign of high tacrolimus levels. Report these symptoms to your doctor.
High blood pressure	Check your blood pressure regularly. You may need blood pressure medicines. Avoid foods high in salt or sodium.
High blood sugar	Blood sugar will be monitored and treatment may be required for high blood sugars. Report any numbness or tingling in your hands or feet, increased thirst, dry mouth, fruity odour on your breath, or increased urinary frequency to your doctor. If you are a diabetic, make sure you monitor your sugars regularly and take your diabetic medications as prescribed.
Heartburn, nausea, vomiting, diarrhea	Check with your doctor if any of these are bothersome or persistent.
Mood changes, depression, confusion, difficulty sleeping, abnormal dreams	Check with your doctor if any of these are bothersome or persistent.
Thinning or loss of hair	Report these symptoms to your doctor.
Your body's ability to handle illness or injury is weakened by tacrolimus	Report signs of infection (fever, chills, rapid heart rate, colds and flu) to your transplant team. Try to avoid close contact with people who have active infections. Practice frequent hand washing.
Decrease in kidney function	High tacrolimus levels may decrease your kidney function. Your tacrolimus levels will be closely monitored and the dose will be adjusted as needed. Notify your doctor if you notice any changes in your urine or the amount produced.
High potassium level	Your potassium levels will be monitored. Report any muscle weakness, numbness in your limbs or irregular heartbeats to your transplant team immediately.
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information, please see section on "Cancer Risk".

MYCOPHENOLATE [MY-KO-FEN-O-LATE]

- Mycophenolate Mofetil (MMF, Teva-Mycophenolate®, Apo-mycophenolate®, Sandoz-mycophenolate®, Cellcept) tablet and capsules
- Mycophenolate Sodium (Apo-mycophenolate sodium, Myfortic®) tablets
- Mycophenolate oral suspension (CellCept®)
 - **Be careful not to mix up mycophenolate mofetil and mycophenolate sodium.**
 - **Pay close attention to the instructions your pharmacist and nurse gives you about how many pills to take.**

What does the medication look like?

There are several brands for this medication and you may not see yours shown exactly below. Please check with your transplant pharmacists if you have any questions.

Mycophenolate mofetil 250 mg  Blue and orange capsule	Mycophenolate sodium 180 mg  Light green round tablet
Mycophenolate mofetil 500 mg  Purple tablet	Mycophenolate sodium 360 mg  Light pink oval tablet

What is this medication for?

Mycophenolate is a medication used to lower your body’s immune system to prevent your transplanted organ from being rejected. It makes your white blood cells weaker so they cannot damage the new organ.

How should I take this medication?

It is important to take your medications at the same time each day in order to keep a steady amount (drug level) in your body.

For mycophenolate mofetil : take this medication every 12 hours (for example 9 AM and 9 PM)	Your medication time: _____
For mycophenolate sodium : take this medication every 12 hours (for example 9 AM and 9 PM)	Your medication time: _____

- Mycophenolate should be taken **with food** to decrease stomach upset, but may be taken on an empty stomach if preferred. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, always take it on an empty stomach.

- Do not take calcium supplements or antacids (Diovol[®], Maalox[®], etc.) within 2 hours of mycophenolate as antacids may decrease the absorption of the medication by the body.
- You may take mycophenolate at the same time with stomach acid reducing medications (e.g. ranitidine (Zantac[®]), pantoprazole (Tecta[®]) etc.).
- In case you need to go for a procedure or an operation that requires you to not eat anything before (fasting), you **must** still take your transplant medications with a sip of water at your regular time.

Remember: *If you are pregnant or are planning to become pregnant, you must check with your doctor or transplant team as soon as possible.*

Missed Dose or Vomited Dose:

If you miss a dose, take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you missed more than 1 day of anti-rejection medications, contact your transplant team immediately for further instructions.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?





Side Effect	Management
<i>Heartburn, nausea, vomiting, and diarrhea</i>	Make sure you take mycophenolate with food. Diarrhea often starts after a few months of taking mycophenolate. Notify your doctor or transplant team if diarrhea persists or if it is very bothersome.
<i>Mycophenolate can lower the number of your white blood cells, red blood cells and platelets.</i> <i>You may be at an increased risk for infection and bleeding</i>	Regular blood work will be done to check your blood cell counts. Check with your doctor if you have any: <ul style="list-style-type: none"> • Signs or symptoms of infection (fever or chills, cough, sore throat or pain or difficulty passing urine) • Signs of bleeding (bruising, tarry stools, vomiting of blood or blood in the urine) • Signs of decreased red blood cells (weakness or tiredness, fainting spells, light-headedness) • Try to avoid close contact with people who have active infections (like cold/flu). Practice frequent hand washing.
<i>Cancer</i>	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information, please see section on “Cancer Risk”.

PREDNISONE, PREDNISOLONE, METHYLPREDNISOLONE

- Also known as steroids or corticosteroids
- This medication is available as tablet, oral liquid or as an intravenous injection.

What does the medication look like?

There are several brands for this medication and you may not see yours shown exactly below. Please check with your transplant pharmacists if you have any questions.

Prednisone 1 mg tablet	Prednisone oral suspension or Prednisolone oral solution	Methylprednisolone – IV
Prednisone 5 mg tablet 		
Prednisone 50 mg tablet 		

What is this medication for?

Prednisone, prednisolone and methylprednisolone are also referred to as corticosteroids or “steroids”. These “steroids” are different from the type used by some athletes. They are used for their anti-inflammatory and immunosuppressive effects. They lower your immune system and prevent rejection. They can also treat mild acute rejection when given in high doses.

How should I take this medication?

It is important to take your medications at the same time each day in order to keep a steady amount (drug level) in your body.

	Take this medication ONCE a day (for example 9 AM)	Your medication time: _____
	Taper instructions:	

- Prednisone and prednisolone should be taken **with food** to decrease stomach upset.
- If you take prednisone and prednisolone just once a day, take your dose in the morning with breakfast. This mimics your body’s natural rhythm of steroid production.
- You may be started on high doses of prednisone, prednisolone or methylprednisolone in cases of acute rejection. The dose will be decreased gradually to the smallest effective dose, and you may need to continue this dose ongoing.
- In case you need to go for a procedure or an operation that requires you to not eat anything before (fasting), you **must** still take your transplant medications with a sip of water at your regular time.

Missed Dose or Vomited Dose:

If you miss a dose take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you missed more than 1 day of anti-rejection medications, contact your transplant team immediately for further instructions.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?

Side Effect	Management
<i>Heartburn or nausea, stomach ulcers</i>	Take prednisone and prednisolone with food or milk. Your doctor may put you on a medication to protect your stomach (ranitidine (Zantac®) or pantoprazole (Tecta®)).
<i>Swelling or high blood pressure</i>	Avoid salty foods, elevate your feet when sitting, check your blood pressure regularly.
<i>High blood sugar</i>	Blood sugar will be monitored and treatment may be required for high blood sugars. Report any numbness or tingling in your hands or feet, increased thirst, dry mouth, fruity odour on your breath, or increased urinary frequency to your doctor. If you are a diabetic, make sure you monitor your sugars regularly and take your diabetic medications as prescribed.
<i>Increased appetite / weight gain</i>	Eat healthy, well-balanced meals, eat foods that are lower in fat and avoid high calorie snacks like chips, chocolate bars and sugared drinks. Ask the dietitian to help you with an eating plan.
<i>Bone loss (osteoporosis) can occur with long-term use</i>	Taking calcium, vitamin D can help prevent osteoporosis.
<i>Changes in behaviour including trouble sleeping, decreased mood, nightmares, nervousness</i>	Other medications can be used to help with these symptoms if they are very bothersome. Contact your doctor or transplant team if these become an issue
<i>Vision changes, cataracts, glaucoma</i>	It is important to have regular eye examinations.
<i>Changes in appearance (rounder face, more fat deposits around waist and the back of the neck, stretch marks, acne on face, back and chest)</i>	These symptoms usually appear if you take high doses for a prolonged period of time. These changes do not last long and will start to improve after your steroid dose is reduced.
<i>Slower wound healing</i>	Inform your transplant doctor if this becomes an issue.

REJECTION

What is rejection?

Your body's defense system – immune system – protects you from “foreign invaders” such as bacteria, viruses and fungi. When a new organ is introduced into your body, your immune system may recognize it as a “foreign invader”. This triggers an immune response as a result of your body's immune cells attacking the cells of your new organ. This attack is called rejection. Rejection damages your new organ especially if it is not detected early.

One of the most common causes of rejection is skipping your doses of anti-rejection medications, taking them differently from how they were prescribed or not taking them at the same time every day. This allows your immune system to become stronger and start rejecting your organ.

What are the signs of kidney transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. Inform your transplant team **immediately** if you have any of the following:

- Fever (greater than 100° F or 38°C), chills
- Tenderness/pain over the transplanted area
- Significant swelling of hands, eyelids or legs
- Significantly decreased or no urine output
- Weight gain (1-2kgs or 2-4lbs) in 24 hours
- **Significant:** flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness

What are the signs of pancreas transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. Inform your transplant team **immediately** if you have any of the following:

- Fever (greater than 100° F or 38°C), chills
- Rise in blood sugar
- Decreased energy level
- Tenderness/pain over the transplanted area
- **Significant:** flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness

What are the signs of liver transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. Inform your transplant team **immediately** if you have any of the following:

- Fever (greater than 100° F or 38°C), chills
- Abdominal pain or tenderness
- **Significant:** flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness

What are the signs of heart transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. These symptoms may feel somewhat like you felt before your transplant. Inform your transplant team **immediately** if you have any of the following:

- Decreased energy level
- Reduced ability to exercise
- Weight gain of one kilogram (2.2 pounds) per day, or more
- Shortness of breath at rest or with normal activities
- Fast or irregular heartbeat and low blood pressure
- Swelling of your ankles
- **Significant:** flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness

What are the signs of lung transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. Inform your transplant team **immediately** if you have any of the following:

- Fever (greater than 100° F or 38°C), chills
- Chest pain or tenderness
- Shortness of breath with light to moderate activity
- Dry cough
- Decreased energy level
- Decrease in home spirometry
- Decreased appetite and/or nausea
- **Significant:** flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness

**INFECTION
AND
ANTI-INFECTIVE MEDICATIONS**

GENERAL INFORMATION

Anti-rejection medications decrease the body's ability to fight infection.

What is infection?

An infection occurs when germs (micro-organisms) enter your body causing damage to your body's tissues.

There are THREE types of germs:

- **Bacteria** – cause bacterial infections
- **Virus** – cause viral infections
- **Fungus**– cause fungal infections

As a transplant recipient, you will require lifelong treatment with anti-rejection medications that lower your immune system and therefore decrease your body's natural ability to fight off invading micro-organisms.

What are the signs of infection?

Regardless of which type of germ has caused an infection, you may experience some common symptoms:

- decreased, painful or frequent urination
- new onset of aches or pain
- fever, chills
- flu-like symptoms, cough, shortness of breath
- nausea, vomiting, diarrhea
- decreased blood pressure, racing pulse
- changes in wound appearance: increased redness, foul odor, increased pain and drainage.

Report these symptoms to your transplant team **immediately**.

How to decrease your risk of infection?

Cuts and scrapes: The skin is a major defense against infection. If you have a cut or are injured, keep the area clean and dry. Watch for symptoms of a local infection (tenderness over the area, redness, pus, and pain). Notify your doctor if signs of infection are noted. Persistent sores, blisters, lumps, or growths in armpit, groin, or elsewhere should be examined by your family physician as soon as possible.

Hand washing: Wash your hands frequently using warm water and soap. Ask your healthcare team to demonstrate proper hand washing technique. Hand washing is recommended especially before eating and handling food, before caring for wounds, before and after handling a urinary catheter, after going to the bathroom, changing diapers, playing with pets. Encourage your visitors and family members to practice good hand washing techniques. Avoid putting your fingers or hands near your mouth, eyes or nose especially if you have not washed them.

Contacts: Avoid close contact with people who have obvious illness (cold, flu) especially in the first 6 months after transplantation. Avoid crowds during cold and flu season. Wear a medical mask indoor or crowded area. Do not share utensils, cups, glasses or items for personal hygiene, like toothbrush or razors.

Pets: Ensure your pets are healthy and have all the required vaccinations. Do not handle animal waste; avoid cleaning bird cages, fish or turtle tanks or changing cat litter.

Gardening: Wear gloves when working in the garden and in soil. Wash your hands frequently.

Swimming: Six months after transplantation and after your incision and wounds have healed, you may swim in chlorinated pools, large bodies of water (ocean, sea, large lake). Avoid public hot tubs if possible and take care not to swallow water during swimming.

Sexual activity: Practice safe sex, use condoms.

BACTERIAL INFECTION

What is a bacterial infection?

An infection that occurs when bacteria takes over and makes you sick. This type of infection commonly occurs in the urinary tract. You will notice burning and/or pain when urinating and the urge to urinate frequently (Note: the urge to urinate frequently is common within the first few weeks after transplantation, but does not mean you have an infection).

Bacterial infections can also occur at the site of your surgery before it has completely healed. You will notice increased pain, swelling and unusual discharge from the site.

How is it treated?

Medications called “antibiotics” can be used to treat bacterial infections. Please let your doctor know if you have any medication allergies or if you have ever had side-effects to antibiotics.

Remember, many medications do NOT mix well with your transplant medicines. Be sure to tell your doctor and pharmacist to check the safety of any new medicine before you take it, even antibiotics.

FUNGAL INFECTION

What is a fungal infection?

An infection caused by a fungus. There are many types of fungi; however, three most common ones are:

- Pneumocystis carinii (also known as Pneumocystis jirovecii)
- Candida
- Aspergillus

PCP (Pneumocystis carinii pneumonia) or PJP (Pneumocystis jirovecii pneumonia)

Use of anti-rejection medications increases the risk of this type of fungal lung infection. The risk is highest one month after transplantation and up to a year after transplantation.

To prevent this infection, you will be started on an anti-infective medication called sulfamethoxazole/trimethoprim (Septra®; Bactrim®, Sulfatrim®). If you have a history of allergy to this medication or a “sulfa” allergy, alternative medication will be prescribed.

Candida

Candida can affect different parts of your body; however, the most common type of infection is called **thrush**. Thrush is an infection of the mouth; it looks like a white coating over your tongue that can cause pain, dryness and difficulty swallowing. The treatment for thrush is an oral liquid anti-fungal called **nystatin**. If candida affects other parts of your body, you may be given an oral tablet called **fluconazole**.

Aspergillus

This type of fungus usually affects the respiratory or digestive tract. It is treated with intravenous or oral anti-fungal medications (e.g. voriconazole, amphotericin B).

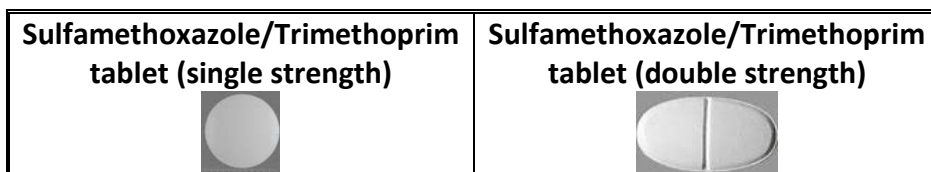
Remember, many medications do NOT mix well with your transplant medications. Be sure to tell your doctor and pharmacist to check the safety of any new medication before you take it, even anti-fungals.

SULFAMETHOXAZOLE / TRIMETHOPRIM

- Also known as Septra®, Sulfatrim®, Bactrim®, cotrimoxazole
- This medication is available as an oral tablet and a specially made liquid, if necessary.
- This medication is not covered by BC Transplant and may be purchased at any pharmacy of your choice.

What does the medication look like?

There are several brands for this medication and you may not see yours shown exactly below. Please check with your transplant pharmacists if you have any questions.



What is this medication for?

This is a combination antibiotic used to prevent or treat a type of lung infection called PCP or PJP which is caused by a fungus. This type of infection is more common in patients who have a weakened immune system (for example after an organ transplant).

How should I take this medication?

	Take this medication once a day (for example 9 AM)	Your medication times: _____
	If you take this medication three times a week	Your medications times and days of the week:

- This medication may be taken with or without food.
- It can be taken at any time of the day and may be taken at the same time as any of your other medications. It is best to take it at the same time every day, in order to keep a steady amount (drug level) in your body.
- Drink a full glass of water with this medication. This helps prevent kidney stone formation.

Alert: This medication belongs to the class of sulfa medications and it is very important to inform your doctor if you have an allergy to sulfa medications.

Missed Dose or Vomited Dose:

If you miss a dose, take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?

<i>Side Effect</i>	Management
<i>Nausea, vomiting, diarrhea</i>	Take medication with food to minimize this side effect. Check with your doctor if bothersome or persistent.
<i>Dizziness</i>	Check with your doctor if this is bothersome or persistent.
<i>Sun sensitivity</i>	Wear a hat, long sleeves and long pants or skirt outside on sunny days. Apply a sun block lotion with a SPF (sun protection factor) of at least 30
<i>Skin rash or itching</i>	Notify your doctor or transplant team as soon as possible

VIRAL INFECTION

What is a viral infection?

Use of anti-rejection medications lowers the body's natural ability to fight off viruses. In the first year after transplantation, the amount of anti-rejection medications you need is the highest to lower your immune system and you are at the highest risk of getting a new or re-activating (waking up) a virus you have been exposed to in the past. There are many types of viruses; however, the most common in transplant patients are:

- Cytomegalovirus (CMV)
- BK Virus (BKV) and JC Virus (JCV)
- Hepatitis B and C

Cytomegalovirus (CMV)

The risk of CMV infection is highest in the first months after getting your new transplant. Signs of CMV infection can vary depending on which organ system is affected. Some of the symptoms may include: fatigue, aching joints, high temperature, headaches, diarrhea, heartburn, shortness of breath.

BK Virus

Infection with this virus commonly occurs in early childhood. After the infection resolves, some virus lingers in the body. BK virus may become active particularly during the first 6 months after transplantation. Your transplant team will be monitoring for BK virus infection. Common site for infection for this virus is the kidney; if the infection goes untreated for a long period of time, it can cause damage to your transplanted kidney.

Hepatitis B and C

Every transplant recipient is screened for active hepatitis infection (a type of viral infection of the liver) or signs of previous exposure. If you have had Hepatitis B or C in the past, the transplant team will conduct very in-depth screening for the presence of hepatitis.

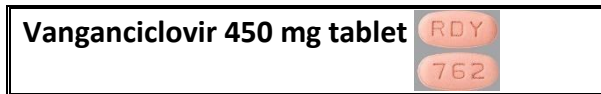
Remember, many medications do NOT mix well with your transplant medications. Be sure to tell your doctor and pharmacist to check the safety of any new medication before you take it, even anti-viral medications.

VALGANCICLOVIR

- Also known as Valcyte[®], Apo-vanganciclovir[®], Auro-valganciclovir
- This medication is available as an oral tablet and liquid.

What does the medication look like?

There are several brands for this medication and you may not see yours shown exactly below. Please check with your transplant pharmacists if you have any questions.



What is this medication for?

This is an anti-viral medication. In patients who have a weakened immune system (for example after an organ transplant), it is most commonly used to prevent or treat a viral infection called CMV (Cytomegalovirus).

How should I take this medication?

Take this medication once a day (for example 9 AM)	Your medication time: _____
Take this medication twice a day (for example 9 AM and 9 PM)	Your medication time: _____

- This medication should be taken with food to improve absorption.
- It can be taken at any time of the day and may be taken at the same time as your other medications. Take it at the same time of the day every day in order to keep a steady amount (drug level) in your body.

Missed Dose or Vomited Dose:

If you miss a dose take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?

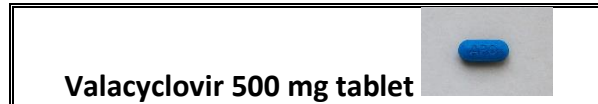
Side Effect	Management
<i>Nausea, vomiting, diarrhea</i>	Take with food. Contact your doctor if this is persistent or bothersome.
<i>Valganciclovir can lower the number of your white blood cells, red blood cells and platelets.</i> <i>You may be at increased risk for infection and bleeding.</i>	Regular bloodwork will be done to check your blood cell counts. Check with you doctor if you have any of the following: <ul style="list-style-type: none">• Signs and symptoms of infection such as fever or chills, cough, sore throat, pain or difficulty passing urine• Signs of bleeding such as bruising, black, tarry stools, vomiting of blood or blood in the urine• Signs of decreased red blood cells such as unusual weakness or tiredness, fainting spells, or light-headedness.

VALACYCLOVIR

- Also known as Valtrex®
- This medication comes as an oral tablet.
- This medication is not funded by BC Transplant and may be purchased at any pharmacy of your choice

What does this medication look like?

There are several brands for this medication and you may not see yours shown exactly below. Please check with your transplant pharmacists if you have any questions.



What is this medication for?

This is an antiviral medication. You may get valacyclovir for the first few months after your transplant to help prevent certain kinds of viral infections such as herpes, chicken pox, shingles, and cold sores.

How should I take this medication?

	Take this medication once a day (for example 9 AM)	Your medication time: _____
	Take this medication twice a day (for example 9 AM and 9 PM)	Your medication time: _____

- This medication can be taken with or without food.
- It can be taken at any time of the day and may be taken at the same time as any of your other medications. Take it at the same time every day in order to keep a steady amount (drug level) in your body.

Missed Dose or Vomited Dose:

If you miss a dose take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If you are more than half way to your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses.

If you vomit within 30 minutes of taking the dose or if you see some of the medication come up, then repeat the dose. Otherwise, just continue on with your next scheduled dosing time.

What are some possible side effects of this medication?

<i>Side Effect</i>	<i>Management</i>
Nausea, vomiting, diarrhea	Take with food or milk. May resolve, but inform your doctor if symptoms persist.
Headache	May resolve. Your doctor may suggest an over-the-counter painkiller.

OVER-THE-COUNTER (OTC) MEDICATIONS

This list is not complete. You may take brands other than the ones listed as long as the ingredients are safe (as per table). **Before you use any new medication, please contact your transplant clinic to ensure this medication is safe for you.**

Symptom	Examples of safe medications (active ingredient)	Not recommended
Allergies	Benadryl® (Diphenhydramine)	
	Chlortripolon® (Chlorpheniramine)	
	Claritin® (Loratidine)	
	Reactine® (Cetirizine)	
	Allegra® (Fexofenadine)	
	Aerius® (Desloratidine)	
Congestion	Otrivin® (Xylometazoline)	Avoid ORAL DECONGESTANTS (pseudoephedrine) if blood pressure is poorly controlled.
	Dristan® (Oxymetazoline)	
Cough	Benylin® DM (Dextromethorphan)	Avoid products with ORAL DECONGESTANTS (pseudoephedrine) if blood pressure is poorly controlled.
	Benylin® DM-D (Dextromethorphan-Pseudoephedrine)	
	Benylin® DM-DE (Dextromethorphan-pseudoephedrine-guaifenesin)	

Symptom	Examples of safe medications (active ingredient)	Not recommended
Diarrhea	Report ongoing symptoms to transplant clinic. Your doctor may need to rule out infection.	IMODIUM – Unless directed by your doctor or the transplant team
Nausea	Gravol® (Dimenhydrinate) Report ongoing symptoms to transplant clinic	
Pain or headaches	Tylenol® (Acetaminophen) Tylenol ES® (Acetaminophen Extra Strength)	Do not take pain relief medications known as NSAIDs (non-steroidal anti-inflammatory medications). This includes ibuprofen (Advil® and Motrin®); naproxen (Aleve® and Naprosyn®); and also ASA or Aspirin®. If you are taking an 81mg ‘baby’ Aspirin® once daily to prevent heart attack and stroke, this is okay if it is on the advice of a doctor.
Back pain	Robaxin® (Methocarbamol) Robaxacet® (Methocarbamol-acetaminophen)	

NATUROPATHIC, HERBAL, TRADITIONAL OR HOMEOPATHIC PRODUCTS

Very little research has been done on these products and the effect that they have on transplant medications. We recommend that you *do not take any* naturopathic, herbal, traditional or homeopathic products until you have discussed this with a transplant pharmacist.

The safety and side effects of these products may vary depending on how they mix with anti-rejection medications. Some of these products may stimulate your immune system which can make you more likely to reject your transplant. Some of the most common products and their safety are as follows:

Product	Safety	Additional Information
Echinacea (Echinacea purpurea)	This supplement is an immune booster and is NOT safe for transplant patients because it will act against your transplant medications.	
Garlic (Allium sativum)	Taking concentrated garlic supplement may cause bleeding and should NOT be used by transplant patients. The supplemental form of garlic contains a super-concentrated version of garlic.	It is safe to continue eating garlic with food.
Ginger	Ginger boosts your immune system, which is NOT safe for transplant patients because it will act against your transplant medications.	Drinking ginger or other herbal teas in moderation or using ginger in food as part of a recipe is safe. Do not take a concentrated source in a pill <i>or</i> liquid <i>form</i> .

Product	Safety	Additional Information
Ginkgo (Ginkgo biloba)	This supplement may cause increased bleeding and should NOT be used by transplant patients.	
Marijuana (THC/CBD)	<p>Marijuana can interact with your anti-rejection medications.</p> <p>Transplant patients who smoke marijuana could develop a serious lung infection caused by a fungus, called aspergillus.</p>	<p>More frequent drug levels are needed to ensure the desired amount of medication is in your body.</p> <p>Please discuss with your transplant team BEFORE your start using marijuana. More information is available on BC Transplant website: http://www.transplant.bc.ca/transplant-and-medications/general-medication</p>
Melatonin	This supplement is likely safe to take for short term. However, use the lowest possible dose and advise your transplant team before starting to take this supplement.	
Probiotics	Taking a supplement (pill or capsule) with probiotics is NOT safe for transplant patients. Because your immune system is lowered, you are more susceptible to infections and putting a potentially live bacteria into your body may cause an infection.	Eating foods with probiotics is safe. However, there are no standards in the food industry regarding probiotics and the food you eat may not actually contain the ingredients on the label.
St. John's Wort	Do NOT take this supplement. It interferes with your immunosuppressive medications TACROLIMUS and CYCLOSPORINE.	

CANCER RISK

Taking anti-rejection medications increases the risk of developing certain types of cancers. The most common types of cancer seen are:

- Lymphoma (a cancer of the blood cells) called Post Transplant Lymphoproliferative Disease or PTLT
- Cancer of the cervix for women
- Digestive tract cancer
- Skin cancers

PTLT most often occurs in the first few months after transplantation but may occur years after. PTLT is a serious complication and the treatment involves reduction or discontinuation of anti-rejection medications and chemotherapy or radiation in some cases.

Cancer of the cervix in female recipients can be detected through a Pap smear; therefore, the test is recommended at least once a year. This test helps detect abnormal cells so that they can be treated quickly. Early detection usually makes this type of cancer curable.

Digestive tract cancer is often difficult to detect just based on signs and symptoms. Report significant changes in bowel habits (e.g. alternating diarrhea and constipation, or the presence of blood in the stool) to your family doctor or transplant team. Early detection and treatment is important.

Transplant recipients may develop **other cancers** at similar rates to people who do not have a transplant. Women should have breast examinations done through their family doctor once a year and report any abnormalities immediately. Routine mammograms (a special type of x-ray to examine the breasts) are usually started once a woman reaches age 50, or earlier in some cases. Men should do monthly testicular checks for any abnormal lumps, and should report these immediately. Men over the age of 40 should also discuss the need for prostate checks, including the PSA (prostate specific antigen) blood test to screen for prostate cancer and a physical examination with their family doctor.

Skin Cancers

Skin cancers are very common among transplant recipients. It is easily treated if detected early. Your family doctor should screen you for skin cancers and can refer you to a dermatologist if necessary.

What you can do to minimize your risk of skin cancers:

- Use sunscreen with sun protection factor (SPF) 30 or higher (remember commonly missed areas such as lips, behind the ears, along hairline, backs of the hands and tops of the feet). Reapply sunscreen after swimming or sweating heavily.
- Use sunscreen even in the winter if you are outside for a prolonged period especially at higher elevations (e.g. skiing) and if it is sunny outside.
- Wear a hat, long sleeve shirts and pants when you are out in the sun. Remember though that regular clothing does not prevent UV rays from reaching your skin. Only specialized sun-protective (SPF) clothing reliably provides such protection.
- Avoid the sun especially in the summer between 11:00 a.m. and 3:00 p.m. Even on cool, cloudy or overcast days, 70-80% of the sun's ultraviolet (UV) rays still get through. Sitting in the shade or swimming underwater does not fully protect you.
- Examination of your skin and monthly checks for moles are a wise precaution. Look for any scaliness, changes in the color or shape of moles, or any persistent itching or oozing.
- Apply sunscreen 10 minutes before going outside and reapply every two hours. Refer to the following information to ensure that you receive the required protection.
 - Apply 1 teaspoon to face, head, and neck;
 - 2 teaspoons to front and back of torso;
 - 1 teaspoon for each of arms and forearms;
 - 2 teaspoons for each thighs, legs, and feet.

VACCINATIONS FOR SOLID ORGAN TRANSPLANT RECIPIENTS

Organ transplant recipients are at an increased risk of infections because of the anti-rejection medications that you need to protect your transplanted organ. These medications can weaken your immune system. It is important to keep up-to-date with your vaccinations to prevent certain types of infections. Vaccines can be given 3 to 6 months after transplantation. Inactivated vaccines are safe but live vaccines are NOT safe after your transplant.

Please discuss with your transplant team and ask for a brochure that outlines recommended vaccines after your transplant. The brochure is also available on the BC Transplant website: <http://www.transplant.bc.ca/transplant-and-medications/general-medication/vaccination-after-transplant>