

**Medicines
for
Keeping Your Transplanted Organ Healthy**



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Medicines for Keeping Your Transplanted Organ Healthy

Disclaimer: Every effort has been made to provide the most updated information. Patients are encouraged to consult their transplant center for more information.

Some Facts about Transplant Medicines

Fact #1: You must take your transplant medicine to keep your new organ healthy.

Fact #2: These medicines are very strong. They have side effects and need careful monitoring. Some of your medicines require regular blood testing. You may need to take other medicines to treat the side effects caused by your transplant medicines.

Your transplant team will work very hard to keep you and your new organ healthy. They will keep a close eye on your new organ and the medicines you take to keep your new organ healthy. They may change your medicines, change the doses of your medicines, add new medicine, or take some away. They will always try to keep everything in balance. It is very important for you to stay in touch with your transplant team. Talk to them and ask them questions. They need you to work with them as they try to find the right medicines at the right doses for you.

You will take 3 kinds of medicines:

1. Medicine to keep your body from attacking or “rejecting” your new organ.
2. Medicine that protects you from infection.
3. Medicine to prevent or control side effects.

1. Transplant immunosuppressant medicines

Your body’s defense system — called the immune system — fights off things like bacteria and viruses. This keeps you from getting sick. Unfortunately, your immune system may also think that your new organ is a foreign invader and attack it. We call this “rejection.”

Your transplant team will prescribe medicines that block your immune system to keep it from attacking or hurting your new organ and causing rejection. They are called immunosuppressants (im-u-no-su-pres-ants) or anti-rejection drugs.

Transplant immunosuppressant medicines work better when used in combination. Most patients will be on 2 or 3 immunosuppressant medicines to keep their new organ healthy. Over time, you may need less medicine. Your transplant team will work with you to find the best medicines to keep you and your transplanted organ healthy.

Many transplant medicines are now available in generic forms. Generic medicines are usually ok to use, but you should always tell your transplant team about any changes in your medicines. Ask your pharmacist about any change in the shape, size or color of your medicines.

2. Medicines for infections

It will be easier for you to get infections after your transplant due to the immunosuppressant medications (anti-rejection drugs) you need to suppress your immune system and keep your new organ healthy. Your immune system will not be able to fight infections as easily. To help

keep you from getting sick, your transplant team will prescribe medications to help your immune system fight infections from bacteria, viruses, and fungi.

3. Medicines for side effects

The immunosuppressant medicines you will take have side effects, just like most other drugs. Your transplant team can prescribe medications to help prevent and/or treat these side effects. For example, if your stomach bothers you, your transplant team may prescribe a medicine to help with upset stomach or stomach acid. If the immunosuppressants cause high blood pressure, your transplant team will prescribe a medication to lower your blood pressure.

Take Your Medicines Correctly

It is important that you take all your transplant medicines the right way. The transplant team will tell you how they want you to take them. Be sure you know and understand what they tell you. This is not always easy and it is possible to get confused.

There are a few things you can do to make sure you are taking your medicine the right way.

1. Bring all your medicines with you to all of your doctor visits.
2. Show your transplant team how and when you take your medicines. After you tell them what you are doing, they can tell you if you need to make some changes.
3. Keep a list of all medications you are taking and bring this list with you to all doctor visits. Keep this list up to date.
4. Make sure that both you and your caregivers know the name and dose of each medication you take and why you are taking it.

Note: You are an important part of the transplant team. The rest of the team cannot do this without you. Be sure to tell them everything about your medicines so they can understand what you are doing and what you may *not* be doing.

Here are some important things to do when taking transplant medicines:

1. Never stop taking your medicine without calling your transplant doctor first.
2. Tell your transplant team if you experience side effects from your medications.
3. Always have enough medicine on hand. Get your prescriptions filled before you run out. You *must* have the right amount of medicine every day to prevent rejection and infection.
4. If you cannot pay for your medicine, tell your transplant team right away. Transplant medicines can be expensive. Your transplant team can help you, but only if you tell them you are having a problem!

Be sure to call your transplant team if:

1. You miss a dose of medicine
2. Another doctor gives you a prescription for a new medicine
3. You want to take any over the counter medicine, including herbal medications

Side effects

You will need to take immunosuppressant medications for as long as you have your transplant. If you stop taking these medications, you could lose your transplant.

These medicines are strong and have side effects that can be different for each person. Your transplant team will try to make sure you are on the best medicines to prevent rejection with the fewest side effects.

Transplant immunosuppressants can make it harder for your body to fight off infections. They can also make you more likely to get some types of cancer. It is important to remember that infections can be prevented or treated, and that most transplant patients do not get cancer. Your transplant team will work with you to try and make sure these and any other side effects are taken care of quickly.

Pregnancy Considerations

Pregnancy after transplant is safe for some women. If you want to have a baby you should tell your transplant team and develop a plan with your transplant doctor. If you accidentally become pregnant, you need to let your transplant team know right away. Pregnant transplant patients need to be watched very closely by their transplant and pregnancy doctors. Pregnancy in a transplant patient is considered a high-risk pregnancy. There are risks to the mother and to the unborn baby. Some of the medications you are taking may harm the unborn baby while you are pregnant. Please see the pregnancy section listed under each medication's section for more specific information.

If you are a woman and able to get pregnant, please talk about birth control with your transplant doctor. Many women who could not get pregnant before transplant are able to get pregnant after transplant.

Transplant Immunosuppressant Medications

Tacrolimus (Prograf®)

Tacrolimus and Prograf® are the same medicine. Prograf® is the brand name for tacrolimus (ta-KROE-li-mus). Tacrolimus is sometimes called "tacro" for short.

You will need to have blood tests to check the level of tacrolimus in your blood. Your transplant doctor needs to make sure the level is not too high or too low. **When you go for a blood test, do not take your morning tacrolimus dose before the test. After your blood has been drawn, you should take your medication.** The level that is drawn from your blood immediately before your dose is called a trough level.

Generic tacrolimus

There are multiple generic versions of tacrolimus; therefore, it is important to know which one you are taking. The label on the medicine bottle will indicate the generic manufacturer you are taking. Examples of generic manufacturers include Sandoz, Dr. Reddy's, Mylan, Accord, Strides, and Panacea Biotec. Some transplant teams may want to know every time you switch from one generic manufacturer to another. Ask your transplant team if this is important for you to keep track of. **DO NOT** stop taking your tacrolimus without instruction from your transplant team.

Extended release tacrolimus (Astagraf XL®, Envarsus XR®)

Two extended release tacrolimus products are available, and they are called Astagraf XL® and Envarsus XR®. These extended release products are only taken once a day. **DO NOT SWITCH** between extended release and immediate release products without instructions from your transplant team. **DO NOT SWITCH** between Astagraf XL® and Envarsus XR® without instructions from your transplant team. **DO NOT TAKE BOTH** extended release or an immediate release product with an extended release product together. The body processes all three products differently and this may cause unwanted effects. If you are using an extended release tacrolimus product, make sure you clearly tell this to all of your healthcare providers. If you are taking Envarsus XR®, be sure to follow the directions for storage exactly as provided as this product is very sensitive to moisture.

How does tacrolimus work?

Tacrolimus is a common immunosuppressant that is in the class of drugs known as calcineurin inhibitors. Tacrolimus can help keep your body from rejecting your new organ by suppressing your immune system. Tacrolimus works the same way as another medicine called cyclosporine. It is almost always given along with other transplant immunosuppressants like mycophenolate mofetil (or mycophenolic acid) and prednisone.

How do I take tacrolimus?

Tacrolimus capsules are available in three strengths: 0.5mg, 1mg, and 5mg. Tacrolimus capsules can also be specially made into a liquid suspension by the pharmacy.

You will usually take this drug two times a day, **12 hours apart** (either before or after you eat). Rarely, it will be prescribed once daily or three times per day. It depends on how quickly your body uses the drug and what you are eating when you take it (children may need to take the drug three times a day).

You must take tacrolimus at the same time each day, at the same time before or after you eat. Consistency is very important! This drug and your food work together. If you take your pill 1 hour before you eat, then you must *always* take it 1 hour before you eat. If you take it 1 hour after you eat, then you must *always* take it 1 hour after you eat. You must take it with the same kind of food every time. Do not change how you take it from day to day, because this will change the levels of tacrolimus in your blood.

DO NOT take tacrolimus and cyclosporine at the same time.

How should I store tacrolimus?

Store the capsules at room temperature away from direct sunlight or heat. Avoid storing this medication in areas of moisture, such as the bathroom, and in areas with heat, such as above the kitchen stove. Moisture and heat can damage your medication.

Always make sure you have enough of this medicine on hand so that you never run out.

What are the side effects?

Side effects related to high tacrolimus levels in blood:

1. Decreased kidney function
2. Tremors and shakiness
3. Headache
4. Trouble sleeping
5. High potassium
6. Low magnesium

Side effects unrelated to tacrolimus levels:

7. High blood pressure
8. High blood sugar
9. Tingling in hands and feet
10. Low white and red blood cells
11. Hair loss or hair thinning

Do other medications interact with tacrolimus?

Yes, please see the section at the end "Combining medicines: What you need to know". This section provides important information on medications to avoid. Always ask your transplant team before starting a new medication.

Do foods interact with tacrolimus?

Yes, avoid grapefruit and any drinks that contain grapefruit juice (Fresca, Sunny Delight). Grapefruit can increase your levels of tacrolimus to a potentially toxic level.

Avoid excessive intake of high potassium foods (bananas, oranges, orange juice, potatoes, spinach, etc.).

Pregnancy Information

The FDA has rated tacrolimus with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby.

If you are able to become pregnant, please discuss effective birth control methods while on tacrolimus with your transplant doctors.

Cyclosporine

Neoral[®], Sandimmune[®], and Gengraf[®] are brand names for cyclosporine (SYE-kloe-spor-een). Cyclosporine is sometimes called “cyclo” for short.

You will need to have blood tests to check the level of cyclosporine in your blood. Your transplant doctor needs to make sure the level is not too high or too low. **When you go for a blood test, do not take your morning cyclosporine dose before the test. After your blood has been drawn, you should take your medication.** The level that is drawn from your blood immediately before your dose is called a trough level.

Your doctor may also draw another level called a peak level. This level is taken approximately two hours after you take your cyclosporine dose, and is the highest level of the medication in your body.

Make sure you know whether your doctor is drawing a peak or a trough level.

There are two different formulations of cyclosporine:

1. Cyclosporine-nonmodified, or cyclosporine-regular (Sandimmune[®])
2. Cyclosporine-modified, or cyclosporine-microemulsion (Neoral[®] and Gengraf[®])

DO NOT SWITCH between formulations without instructions from your transplant team.

Generic cyclosporine

There are multiple generic versions of cyclosporine; therefore, it is important to know which one you are taking. The label on the medicine bottle will indicate the generic manufacturer you are taking. Examples of generic manufacturers include Apotex, Teva, Sandoz, and Watson. Some transplant teams may want to know every time you switch from one generic manufacturer to another. Ask your transplant team if this is important for you to keep track of. **DO NOT** stop taking your cyclosporine without instruction from your transplant team.

How does cyclosporine work?

Cyclosporine is an immunosuppressant that is in the class of drugs known as calcineurin inhibitors. Cyclosporine can help keep your body from rejecting your new organ by suppressing your immune system. Cyclosporine works the same way as another medicine called tacrolimus. It is almost always given along with other transplant immunosuppressants like mycophenolate mofetil (or mycophenolic acid) and prednisone.

How do I take cyclosporine?

Cyclosporine capsules come in three strengths: 25mg, 50mg and 100mg. Cyclosporine is also available in liquid form as a 50mL bottle. Each mL (or milliliter) of the liquid contains 100mg of cyclosporine.

You will usually take this drug two times a day, **12 hours apart** (either before or after you eat). Rarely, it will be prescribed once daily or three times per day. It depends on how quickly your body uses the drug and what you are eating when you take it (children may need to take the drug three times a day).

Take cyclosporine at the same time each day. This drug and your food work together. If you take your pill 1 hour before you eat, then you must *always* take it 1 hour before you eat. If you take it 1 hour after you eat, then you must *always* take it 1 hour after you eat. You must take it with the same kind of food every time. Do not change how you take it from day to day, as this will affect the levels of cyclosporine in your blood.

DO NOT take tacrolimus and cyclosporine at the same time.

Cyclosporine capsule instructions

The capsules should be swallowed whole and not opened, crushed, or chewed.

Cyclosporine liquid instructions

Cyclosporine-nonmodified liquid may be taken directly by mouth or mixed with room temperature milk, chocolate milk, or orange juice. **Cyclosporine-modified liquid** may be taken directly by mouth or mixed with room temperature orange juice or apple juice. When you choose to mix cyclosporine liquid with other juices or milk as described, you must mix it in a glass container and use a metal spoon. **Never mix your cyclosporine with grapefruit juice.** It may cause a dangerous increase in the blood level of the drug. **Never mix your cyclosporine in a plastic or Styrofoam glass.** The drug will stick to the cup and you will not receive the intended dose. Make sure to stir well and drink at once. After drinking the mixture, add another 4 ounces (1/2 cup or 120mL) of your mixing liquid, stir it, and drink it again to be sure you take the entire dose.

How should I store cyclosporine?

Store the capsules and liquid at room temperature away from direct sunlight or heat. Avoid storing this medication in areas of moisture, such as the bathroom, and in areas with heat, such as above the kitchen stove. Moisture and heat can damage your medication.

Each capsule comes in a foil package. Leave each capsule in this package until you are ready to take it. You may notice a slight odor when you open the foil package. This is normal and does not mean the capsule has gone bad.

DO NOT keep the liquid form in the refrigerator. An opened bottle of cyclosporine liquid may be used for up to two months.

Always make sure you have enough of this medicine on hand so you never run out.

What are the side effects?

Side effects related to high cyclosporine levels in blood:

1. Decreased kidney function
2. Tremors
3. Headache
4. Trouble sleeping
5. High potassium
6. Low magnesium

Side effects unrelated to cyclosporine levels:

7. High blood pressure
8. Excessive hair growth on face, arms, and legs
9. Swollen and bleeding gums
10. Acne
11. High blood sugar
12. Tingling in hands and feet
13. Low white and red blood cells

Do other medications interact with cyclosporine?

Yes, please see the section at the end "Combining medicines: What you need to know". This section provides important information on medications to avoid. Always ask your transplant team before starting a new medication.

Do foods interact with cyclosporine?

Yes, avoid grapefruit and any drinks that contain grapefruit juice (Fresca, Sunny Delight). Grapefruit can increase your levels of cyclosporine to a potentially toxic level.

Avoid excessive intake of high potassium foods (bananas, oranges, orange juice, potatoes, spinach, etc.).

Pregnancy Information

The FDA has rated cyclosporine with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby.

If you are able to become pregnant, please discuss effective birth control methods while on cyclosporine with your transplant doctors.

Mycophenolate mofetil (CellCept®)

Mycophenolate mofetil and CellCept® are the same medicine. CellCept® is the brand name for mycophenolate (mye-koe-FEN-oh-late) mofetil. Mycophenolate mofetil is sometimes called "MMF" for short.

Generic mycophenolate mofetil

There are multiple generic versions of mycophenolate mofetil and they are OK to use as prescribed by your transplant doctor.

How does mycophenolate mofetil work?

Mycophenolate mofetil is a common immunosuppressant that is in the class of drugs known as anti-proliferatives. Mycophenolate mofetil can help keep your body from rejecting your new organ by suppressing your immune system. It is commonly used along with tacrolimus or cyclosporine, and with or without prednisone.

How do I take mycophenolate mofetil?

Mycophenolate mofetil is available as a 250 mg capsule, a 500 mg tablet, and a 200 mg/ml oral suspension. Mycophenolate mofetil is also available intravenously (IV). The capsules and tablets should be swallowed whole and should not be opened, crushed, or chewed.

This medication should be taken at the same time each day. It is most commonly prescribed to be taken twice a day, 12 hours apart. Your transplant doctor might spread out the doses to three or four times a day if you have trouble with nausea or diarrhea. You can take this medication with or without food, but make sure you take it the same way every day, because the food can change how much of the medication is absorbed and used by your body.

DO NOT take antacids containing calcium, magnesium or aluminum hydroxide (i.e., Maalox®, Mylanta®, Gaviscon®, Tums®, etc.) at the same time you take mycophenolate mofetil.

How should I store mycophenolate mofetil?

Store your capsules, tablets, and liquid forms of mycophenolate mofetil at room temperature, away from direct sunlight or heat. Avoid storing this medication in areas of moisture, such as the bathroom, and in areas with heat, such as above the kitchen stove. Moisture and heat can damage your medication.

Always make sure you have enough of this medicine on hand so you never run out.

What are the side effects?

Stomach problems

1. This medicine can cause diarrhea, nausea, vomiting, and/or heartburn. These are the most common side effects. These side effects may get better by separating out the doses to three or four times a day. **DO NOT** make any medication changes without talking to your transplant doctor first. Contact your transplant team if your diarrhea, nausea, or vomiting becomes bothersome.

Low white blood cell counts

2. This medicine can cause low white blood cell counts, and low white blood cell counts can increase your risk of getting an infection. If your white blood count becomes too low, your transplant doctor may lower your dose of mycophenolate mofetil.

Other side effects

3. Some other side effects include high blood pressure, low platelet counts, rash, and headache.

What should I do if I miss a dose?

The transplant team does not routinely draw your blood for levels of this medication, which is different from some of your other medications, like tacrolimus or cyclosporine. If you miss a dose, you can take it as soon as you remember, as long as it is not too close to the next scheduled dose. Then, return to your regular schedule. **DO NOT** double the next dose.

Do other medications interact with mycophenolate mofetil?

Cholestyramine, antacids containing calcium, magnesium, or aluminum hydroxide (i.e., Maalox[®], Mylanta[®], Gaviscon[®], Tums[®] etc.), and binders such as sevelamer and sucralfate can prevent you from absorbing mycophenolate mofetil as well as you should. For this reason, take these other medications 1 hour before, or 2 hours after, your mycophenolate mofetil dose.

DO NOT take mycophenolate mofetil with mycophenolic acid (Myfortic[®]) or azathioprine (Imuran[®]) since these are all similar transplant medications.

Do foods interact with mycophenolate mofetil?

There are no foods or drinks that significantly interact with this drug.

Pregnancy Information

The FDA has rated mycophenolate mofetil with a pregnancy D rating. This means that there is evidence it may cause harm to the unborn baby.

There is a warning from the FDA about mycophenolate mofetil being linked to an increased risk of birth defects and pregnancy loss in the first trimester when pregnant women have taken this medicine.

If you become pregnant, let your transplant doctor know immediately. Mycophenolate mofetil will have to be changed to a different medication. If you want to start a family, please let your transplant doctor know. They will discuss different medications you could use and when, depending on your health, would be a good time to make that change.

For girls or women who have entered puberty, still have a uterus, and have not yet entered menopause:

1. A pregnancy test may be done right before starting mycophenolate mofetil and repeated 8-10 days after the transplant. It may also be done at follow-up clinic appointments, too.
2. If you are sexually active, you **must** use an acceptable form of birth control the entire time you are on mycophenolate mofetil and for 6 weeks after stopping the medication.

3. You can choose from the following acceptable birth control options:

OPTION 1: Methods that can be used alone

Intrauterine devices (IUDs)
 Tubal sterilization (having your tubes tied)
 Vasectomy of partner

OPTION 2: One hormone method AND one barrier method

Hormone Method (choose one)
Estrogen and Progesterone Oral contraceptive pill Transdermal patch Vaginal ring
Progesterone only Injection Implant

PLUS

Barrier Method (choose one)
Diaphragm with spermicide Cervical cap with spermicide Contraceptive sponge Male condom Female condom

OPTION 3: TWO barrier methods

First Barrier Method (choose one)
Diaphragm with spermicide Cervical cap with spermicide Contraceptive sponge

PLUS

Second Barrier Method (choose one)
Male condom Female condom

The Mycophenolate Risk Evaluation and Mitigation Strategy (REMS) program is a program to teach women about the risks of taking this medication during pregnancy. Information and education will be provided to you after your transplantation if you are capable of getting pregnant.

Mycophenolic acid (Myfortic®)

Mycophenolic acid and Myfortic® are the same medicine. Myfortic® is the brand name for mycophenolic (mye-koe-FEN-oh-lick) acid. You may also hear it called mycophenolate sodium. Mycophenolic acid is similar to mycophenolate mofetil; however, mycophenolic acid is enteric coated to possibly reduce some of the stomach upset that patients may have with mycophenolate mofetil.

Generic mycophenolic acid

There are multiple generic versions of mycophenolic acid and they are OK to use as prescribed by your transplant doctor.

How does mycophenolic acid work?

Mycophenolic acid is a common immunosuppressant that is in the class of drugs known as anti-proliferatives. Mycophenolic acid can help keep your body from rejecting your new organ by suppressing your immune system. It is commonly used along with tacrolimus or cyclosporine, and with or without prednisone.

How do I take mycophenolic acid?

These tablets come in two strengths: 180 mg and 360 mg tablets. The tablets should be swallowed whole and should not be crushed, or chewed.

This medication should be taken at the same time each day. It is most commonly prescribed to be taken twice a day, 12 hours apart. Your transplant doctor might spread out the doses to three or four times a day if you have trouble with nausea or diarrhea. You can take this medication with or without food, but make sure you take it the same way every day, because the food can change how much of the medication is absorbed and used by your body.

DO NOT take antacids containing calcium, magnesium or aluminum hydroxide (i.e., Maalox®, Mylanta®, Gaviscon®, Tums®, etc) at the same time you take mycophenolate mofetil.

How should I store mycophenolic acid?

Store at room temperature, away from direct sunlight or heat, and away from children. Avoid storing this medication in areas of moisture, such as the bathroom, and in areas with heat, such as above the kitchen stove. Moisture and heat can damage your medication.

Always make sure you have enough of this medicine on hand so you never run out.

What are the side effects?

The side effects of mycophenolic acid are the same as those listed for mycophenolate mofetil.

What should I do if I miss a dose?

The transplant team does not routinely draw your blood for levels of this medication, which is different from some of your other medications, like tacrolimus or cyclosporine. If you miss a dose, you can take it as soon as you remember, as long as it is not too close to the next scheduled dose. Then, return to your regular schedule. **DO NOT** double the next dose.

Do other medications interact with mycophenolic acid?

See information above for mycophenolate mofetil

Do foods interact with mycophenolate mofetil?

There are no foods or drinks that significantly interact with this drug.

Pregnancy Information

See important birth control requirements for mycophenolate mofetil. The same information applies to mycophenolic acid.

Azathioprine (Imuran®)

Azathioprine and Imuran® are the same medicine. Imuran® is the brand name for azathioprine (ay-za-THYE-oh-prin).

How does azathioprine work?

Azathioprine is in the class of drugs known as anti-proliferatives. It helps keep your body from rejecting your new organ by suppressing your immune system.

How do I take azathioprine?

Azathioprine is a tablet you take by mouth once a day, at the same time every day. It can be taken on an empty stomach or with food to decrease the chance of an upset stomach. Azathioprine tablets come in three strengths: 50 mg, 75 mg, and 100 mg. Azathioprine tablets can also be specially made into a liquid suspension by the pharmacy.

What are the side effects?

Most people notice very few side effects from taking azathioprine, but some include:

Low Blood Cell Counts

1. This medicine can cause low white blood cell counts, and low white blood cell counts can increase your risk of getting an infection. If your white blood cell count becomes too low, your transplant doctor may reduce your dose.
2. Azathioprine can also cause a drop in the number of platelets in your blood. You need platelets to help clot your blood.
3. The number of red cells in your blood may also drop, causing anemia.

Stomach problems

4. Though uncommon, some people have nausea, vomiting, and/or diarrhea.
5. This medicine can potentially cause liver damage, but this is rare. You will have liver blood tests to check for this side effect.

Other side effects that are rare

6. Fever, rash, thinning hair, loss of appetite, joint or muscle pain, or pancreas problems can also occur on this medicine.

What should I do if I miss a dose?

If you miss a dose, you can take it as soon as you remember, as long as it is not too close to the next scheduled dose. Then, return to your regular schedule. **DO NOT** double the next dose.

Do other medications interact with azathioprine?

The gout medicines allopurinol (Zyloprim®) and febuxostat (Uloric®) significantly increase your blood levels of azathioprine. This can greatly increase your risk of severe side effects with your blood and bone marrow and will require a decrease in your azathioprine dose. The combined use of febuxostat or Uloric® and azathioprine is prohibited. If another doctor decides to start you on either of these medications, immediately notify your transplant team.

ACE inhibitors (like lisinopril) in combination with azathioprine may lower your blood cell counts and should be closely monitored.

Do not take azathioprine with the transplant medicines mycophenolate mofetil or mycophenolic acid.

Pregnancy Information

The FDA has rated azathioprine with a pregnancy D rating. This means that there is evidence that azathioprine may cause harm to an unborn baby. Azathioprine should only be given if the benefit of the medication outweighs the potential risk such as in life threatening situations or if there is no other medication.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby.

If you are able to become pregnant, please discuss effective birth control methods while on azathioprine with your transplant doctors.

Other

Your doctor may test your level of the enzyme TPMT. Individuals with less active or no TPMT have higher blood levels of azathioprine and increased risk of low blood cell counts. This may require lowering your azathioprine dose or stopping the medicine.

Steroids

There are many different types of steroids. The steroids used in transplant patients are not the same as those used by some athletes. Steroids used in transplant suppress the immune system. Here are the names of some steroids used by transplant patients:

Prednisone (Deltasone[®])
Methylprednisolone (Solu-medrol[®], Medrol[®])
Prednisolone (Orapred[®], Pediapred[®], Prelone[®])

How do steroids work?

Steroids decrease the risk of your body rejecting your new organ by suppressing your immune system.

How do I take steroids?

Your transplant team will likely give you high doses of steroids through your vein (by IV) and by mouth during and right after your transplant operation. If your body tries to reject the organ, you may be given a large dose of steroids through an IV for a few days. After these large doses, you may have to start taking daily steroids if you were not already. Your daily dose may also go up for a period of time for continued treatment for rejection. After that, you will start to take smaller doses.

When you are home, you might take steroids once a day, twice a day, or once every other day. Some people are able to stop taking steroids. Never stop taking steroids unless instructed to do so by your transplant doctor.

Prednisone is available in many different strength tablets. Liquid preparations of prednisone and prednisolone are also available.

Be careful about looking at the strengths of your medications. Your transplant doctor might give you a small dose, such as a 5 mg tablet, to allow you to gradually decrease your dose over time (known as "tapering" the dose). Prednisone also comes in larger strengths, such as 10 mg and 20 mg tablets. Sometimes your doctor might have you take half of a tablet as your dose (for example: half of a 10 mg tablet = 5 mg dose).

What if I miss a dose?

If you miss a dose, you can take it as soon as you remember, as long as it is not too close to the next scheduled dose. Then, return to your regular schedule. **DO NOT** double the next dose.

What are the side effects of steroids?

Steroids can have many side effects. They are usually more noticeable if you have to take a high dose for a long time. Your transplant doctor can help you if you experience side effects.

Changes in the way you look

1. Your face might get more round. You may get more fat deposits around your waist and the back of your neck.
2. Some people get stretch marks; others get bruises.
3. Teenagers and young adults often get acne on the face, back, and chest.

4. You might become very sensitive to the sun.
5. Most of these changes do not last and will begin to go away when your steroid dose is reduced.

Stomach problems

6. Steroids can cause mild heartburn and ulcers.
7. Take your steroid medicine with food to make it easier on your stomach. Your transplant team can also give you other medicines for your stomach.

Fluid retention and high blood pressure

8. Steroids can cause your body to retain salt and water. This can raise your blood pressure and cause you to need blood pressure medicine.
9. Try to avoid eating salty foods and those that contain a lot of sodium. This can help keep your blood pressure down.

Hunger and weight gain

10. Steroids can make you feel hungry. Try to eat low-fat foods and limit the amount of sweets you eat. Ask the dietitian on your transplant team to help you with an eating plan.

High blood sugar levels

11. Your blood sugar may go up if you are on a high dose of steroids. You may need to take drugs to lower your blood sugar. Some people need insulin shots. If you have taken insulin before, or have a family history of diabetes, you might need to take insulin.

Problems with bones and muscles

12. Steroids can cause your muscles to get weak, especially the muscles in your thighs and shoulders.
13. Some people get muscle cramps and pains in their joints, mostly in their hips and knees. These problems should go away when your steroid dose becomes smaller.
14. Steroids can take calcium out of your bones, which can lead to weak bones (osteoporosis). Sometimes these drugs can damage hip or knee bones, and surgery may be needed. You can decrease this by taking calcium and vitamin D. Talk to your doctor about how to prevent bone loss.
15. Your doctor may need you to have a test to check your bone density every 1 to 2 years while you are on steroids.

Changes in mood or behavior

16. Steroids can cause mood changes. You may have trouble sleeping or have nightmares. You might feel depressed.
17. Steroids can make people, especially children, feel nervous or hyperactive. This happens more often with high doses. It usually goes away when the dose is lower.
18. There are many medicines that can relieve these symptoms, so be sure to tell your doctor if you are having any of these side effects.

Eye problems

19. Some people get eye diseases like cataracts or glaucoma (high pressure in the eye that can lead to vision loss). Regular eye exams are an important part of your treatment. Talk to your doctor about regular eye checkups.

Do other medications interact with prednisone?

If you are taking steroids and your doctor suggests you take blood thinners like aspirin, make sure you inform your transplant team so that they may prescribe the right kind of medicine to prevent ulcers.

Pregnancy Information

The FDA has rated prednisone and methylprednisolone with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby.

If you are able to become pregnant, please discuss effective birth control methods while on steroids with your transplant doctors.

Sirolimus (Rapamune®)

Sirolimus and Rapamune® are the same medicine. Rapamune® is the brand name for sirolimus (sir-OH-li-mus). Sirolimus is sometimes called “rapa” for short.

How does sirolimus work?

Sirolimus helps prevent your body from rejecting your new organ by suppressing your immune system. It is almost always used along with other immunosuppressants like mycophenolate mofetil or prednisone. Sometimes sirolimus can replace tacrolimus or cyclosporine, or can be given together with cyclosporine or tacrolimus.

How do I take sirolimus?

Sirolimus is available as a tablet (0.5 mg, 1 mg and 2 mg) and an oral solution (1 mg/mL). A generic product is available for the tablets.

For the oral solution, the prescribed dose of sirolimus should be measured using the amber syringe provided with the bottle. If you are instructed to carry the medication with you, place a cap securely on the syringe. The medication in the syringe can be kept at room temperature or refrigerated for 24 hours. The medicine can be mixed in a plastic or glass container with at least 2 ounces (1/4 cup or 60 mL) of water or orange juice. **Never mix it with grapefruit juice, apple juice, or other liquids.** Stir vigorously for one minute and drink immediately. After drinking the mixture, add another 4 ounces (1/2 cup or 120 mL) of water or orange juice, stir it, and drink it again to be sure you take the entire dose. The syringe and cap should be used once and discarded.

Take your medicine the following way. This is very important!

Sirolimus is taken once a day, though children may sometimes need to take it two times per day. Take it at the same time each day. This drug and your food work together. If you take your pill 1 hour before you eat, then you must *always* take it 1 hour before you eat. If you take it 1 hour after you eat, then you must *always* take it 1 hour after you eat. You must take it with the same kind of food every time. Do not change how you take it from day to day.

Do not take sirolimus and everolimus at the same time.

Note: You will have blood tests to check the amount of sirolimus in your blood. Your transplant doctor needs to make sure the amount of this drug in your blood is not too high or too low. **When you go for a blood test, do not take your morning sirolimus dose before the test. After your blood has been drawn, you should take your medication.** The level that is drawn from your blood immediately before your dose is called a trough level.

How should I store sirolimus?

Sirolimus tablets should be stored at room temperature in a cabinet or some place that is dark. The tablets should be kept in the container (bottle or blister packaging) that you received it in and keep it protected from light.

Sirolimus oral solution should be kept in a dark container and refrigerated at 2°C to 8°C (36°F to 46°F). Do not store in the freezer. Once you open the bottle, you need to use the medication within 1 month. If you need to, you can store the bottle at room temperature, but only for a maximum of **15 days**. After sirolimus is drawn into the dosing syringe, the medication is good

for **24 hours**. A new dosing syringe should be used each time. After you mix sirolimus liquid in orange juice or water, the mixture should be used immediately.

Sirolimus oral solution provided in bottles may develop a slight haze when refrigerated. If such a haze occurs, allow the product to stand at room temperature and shake gently until the haze disappears. The presence of this haze does not affect the quality of the product.

What are the side effects?

Swelling (edema)

1. Fluid may collect in your hands and feet. This can also occur in other tissues in your body, including the sac around your heart and/or lungs. Please contact your doctor if you have trouble breathing.

Poor wound healing

2. Sirolimus may cause wounds to heal more slowly. Please make sure your transplant team knows if you develop any wounds that do not heal or if you are scheduled for surgery while taking sirolimus.

Low blood cell counts/increased risk of infection

3. Sirolimus may lower your white blood cells, platelets, and red blood cells. White blood cells are important for fighting infection, platelets help your blood clot, and red blood cells carry oxygen in your blood. Your transplant doctor will check your blood cell counts to monitor for this side effect. Please contact your doctor immediately if you develop signs of infection, such as a fever or sore throat.

High lipid counts

4. Lipids are cholesterol and triglycerides. Sirolimus may cause your lipids to increase. This can lead to hardening of the arteries. These levels need to be monitored. If your lipids increase, you may need to take another medicine to lower your lipid levels.

Effects on kidney infection

5. You may develop increased protein in your urine. Your doctor will want to monitor your kidney function and check for protein in your urine.

Mouth and stomach ulcers

6. Sirolimus may irritate your mouth and stomach. You may have diarrhea or develop small ulcers in your mouth or on your tongue. Please consult your doctor if these side effects become bothersome.

Skin rash or acne

7. Sirolimus may cause a rash or acne on your face or body.

Low blood potassium levels

8. Sirolimus may decrease the potassium level in your body. You may need to take medicine that will bring your potassium level back up. You may also have to eat foods high in potassium.

Lung disease/breathing problem

9. If you have a new or worsening cough, shortness of breath, or difficulty breathing, contact your transplant doctor. There have been cases of patients developing a serious lung problem that can lead to death. This side effect is extremely rare.

Blood clotting problems

10. In liver transplant patients, there is a concern that sirolimus may increase the risk of developing blood clots in the vessel that brings blood to the liver. This vessel is called the hepatic artery. Some studies have shown an increase in blood clots in the hepatic artery in patients who received sirolimus in combination with prednisone or cyclosporine or tacrolimus. If blood clots form in the hepatic artery, you might need another liver transplant. Sirolimus is typically not used shortly after liver transplant due to this concern.
11. Sirolimus may be used to replace or lower the doses of other immunosuppressant medicines such as cyclosporine or tacrolimus. This might occur because of the side effects from cyclosporine or tacrolimus. If you are prescribed sirolimus, it is usually started at least 30-90 days after the transplant to allow transplant incisions to heal and to decrease the risk of blood clots. When sirolimus is started, your dose of cyclosporine or tacrolimus may be decreased or stopped.
12. Please discuss the risk and benefits of sirolimus use with the transplant team.

Do other medications interact with sirolimus?

Yes, please see the section at the end "Combining medicines: What you need to know", this section provides important information on medications to avoid.

Pregnancy Information

The FDA has rated sirolimus with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby. Most patients are put on cyclosporine or tacrolimus because there is more experience with the safety of these medications in pregnancy.

If you are able to become pregnant, please discuss effective birth control methods while on sirolimus with your transplant doctors.

Everolimus (Zortress®)

Everolimus and Zortress® are the same medicine. Zortress® is the brand name for everolimus (ev-er-OH-li-mus) when used for organ transplantation. Afinitor® is the brand name when used for cancer. If your everolimus dose is high, you may be prescribed Afinitor® tablets because they are available in larger sizes.

How does everolimus work?

Everolimus works like sirolimus. It helps prevent your body from rejecting your new organ by suppressing your immune system.

How do I take everolimus?

Everolimus is available in 0.25 mg, 0.5 mg, and 0.75 mg tablets.

Take your medicine the following way. This is very important!

Take everolimus at the same time each day. Everolimus is taken twice a day, approximately 12 hours apart. This drug can be taken with or without food. If you decide to take your pill 1 hour before you eat, then you must *always* take it 1 hour before you eat. If you take it 1 hour after you eat, then you must *always* take it 1 hour after you eat. You must take it with the same kind of food every time. Do not change how you take it from day to day. The tablets should be swallowed whole and not crushed or chewed.

Do not take sirolimus and everolimus at the same time.

Note: You will have blood tests to check the amount of everolimus in your blood. Your doctor needs to make sure the amount of this drug in your blood is not too high or too low. **When you go for a blood test, do not take your morning everolimus dose before the test. After your blood has been drawn, you should take your medication.** The level that is drawn from your blood immediately before your dose is called a trough level.

How should I store everolimus?

Everolimus should be stored at room temperature away from light or moisture. Keep the medication stored in the blister pack until you are ready to take it.

What are the side effects of everolimus?

See side effects for sirolimus.

Blood clotting problems

1. An increased risk of kidney clots, which may result in the loss of the kidney transplant, may occur within the first 30 days after the transplant. Everolimus is typically not used shortly after transplant due to this concern.

Do other medications interact with everolimus?

Yes, please see the section at the end "Combining medicines: What you need to know", this section provides important information on medications to avoid.

Pregnancy Information

The FDA has rated everolimus with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby. Most patients are put on cyclosporine or tacrolimus because there is more experience with the safety of these medications in pregnancy.

If you are able to become pregnant, please discuss effective birth control methods while on everolimus with your transplant doctors.

Belatacept (Nulojix®)

Belatacept and Nulojix® are the same medicine. Nulojix® is the brand name for belatacept (bela-TA-sept). Belatacept is sometimes called "bela" for short.

Belatacept is **only** approved for kidney transplant recipients. Belatacept can be used in place of tacrolimus or cyclosporine immediately after transplant. Some people may be switched after transplant from tacrolimus, cyclosporine, sirolimus, or combinations of these medications to belatacept.

How does belatacept work?

Belatacept can help keep your body from rejecting your new kidney by suppressing your immune system,

How do I take belatacept?

You will receive belatacept as an intravenous (IV) infusion in your arm vein. Each IV infusion takes about 30 minutes.

After the first dose, you will be placed on a regular schedule as directed by your transplant doctor. Typically, it is dosed more often in the first month and then every 4 weeks after the first month. There is a 3-day window before and after the scheduled date to allow for flexibility. The dose is based on your weight.

You should receive this medication regularly to get the most benefit from it. It is important that you keep up with your appointments for belatacept treatment and monitoring. It may be helpful to mark your calendar to keep track of when your next dose is due.

Note: Read the Medication Guide provided by the infusion staff before you start using belatacept and each time you get an infusion.

What are the side effects?

Increased risk of Post-Transplant Lymphoproliferative Disorder (PTLD)

1. PTLD is a condition where your white blood cells grow out of control after transplant. It can eventually become a type of cancer. Patients treated with belatacept have a higher risk of getting PTLD, especially the type that affects the brain.
2. The risk of PTLD is higher if you have not been exposed to a certain virus called Epstein-Barr virus, or EBV. Before starting treatment with belatacept, your transplant doctor should test to check if you have had an exposure to EBV. You can only receive belatacept if you have been exposed to this virus in the past.
3. Contact your transplant doctor right away if you notice any of the following symptoms while taking belatacept: fever, night sweats, swollen glands, unexplained weight loss, or unusual tiredness.

Increased risk of brain infections

4. Belatacept increases the risk of a rare and possibly deadly brain infection called progressive multifocal leukoencephalopathy (PML).
5. Contact your transplant doctor right away if you notice new or worsening symptoms such as: clumsiness, difficulty speaking, problems with balance, sudden change in

your thinking (such as confusion, difficulty concentrating, and memory loss), vision changes, or weakness of the arms and legs.

Other side effects

6. You may get a headache, nausea, or diarrhea while receiving belatacept. If any of these symptoms continue or worsen, contact your transplant doctor right away.

Pregnancy Information

The FDA has rated belatacept with a pregnancy C rating. This means that it is not known if it will harm an unborn baby. These medications should only be given if the benefit of the medication outweighs the potential risk.

If you are planning to become pregnant or are pregnant, please discuss this with your transplant doctor. This will help make sure you are on the safest medications for both you and your baby.

If you are able to become pregnant, please discuss effective birth control methods while on belatacept with your transplant doctors.

Medicines for Infections

Trimethoprim-sulfamethoxazole

Bactrim[®], Cotrim[®], Sulfatrim[®] and Septra[®] are brand names for trimethoprim-sulfamethoxazole (trye-METH-oh-prim sul-fa-meth-ox-a-zole) or co-trimoxazole. They are all the same medicine. This drug is an antibiotic that fights bacterial infections.

How does trimethoprim-sulfamethoxazole work?

This medicine is used to prevent and treat a special type of pneumonia caused by *Pneumocystis jiroveci*, or PJP. This drug can also be used to treat other infections and can help prevent urinary tract infections after a kidney transplant.

How do I take trimethoprim-sulfamethoxazole?

Trimethoprim-sulfamethoxazole is available as a tablet or liquid formulation. It can also be injected into a vein (by IV). The tablets come in two strengths: single-strength (SS) tablets and double-strength (DS) tablets. It can be taken once a day or three times per week.

This medicine has sulfa in it. If you have an allergy to sulfa, tell your transplant doctors. They will give you a different medicine. Do not take this medicine if you are pregnant.

This medication can increase the levels of other drugs you may be taking. Make sure your transplant doctors know that you are taking this medication and other medications such as Coumadin[®] or warfarin (blood thinner) and digoxin (heart medication). Always inform your transplant team of any new medications that are prescribed to you.

What are the side effects?

Most people do not have side effects from this drug, but it is possible you may experience the following:

1. Nausea, vomiting, diarrhea, or stomach cramps
2. Loss of appetite
3. Skin rash and itchy skin
4. Low numbers of white blood cells and other blood changes
5. Your skin may become sensitive to sunlight. Use sunscreen when you are outdoors, and take your medicine with a glass of water
6. High potassium levels. You may need to avoid foods high in potassium. Ask your dietician for help with what foods to eat. You can also go to www.kidney.org for a list of foods

Valganciclovir (Valcyte®)

Valganciclovir and Valcyte® are the same medication. Valcyte® is the brand name for valganciclovir (val-gan-SYE-kloh-veer).

How does valganciclovir work?

This medicine fights viral infections like CMV, herpes, chicken pox, shingles, and cold sores. It works the same way as ganciclovir, and is available as a 450 mg tablet or a 50 mg/ml liquid.

Precautions

This medicine may reduce your platelet count; platelets are the blood cells that are necessary for clotting. This medication can also reduce the white blood cells and red blood cells. Your transplant team will be monitoring your blood counts to make sure you are not having side effects.

This medication will need to be adjusted if you develop kidney problems.

The benefits of taking valganciclovir if you are pregnant or breastfeeding must be weighed against the possible harm to you, your unborn baby, or your infant. Valganciclovir can cause birth defects in animals and may affect the ability to have children. Since it may cause birth defects, both women and men who may get pregnant or may get someone pregnant should use effective birth control during therapy with valganciclovir and for 90 days following the use of valganciclovir. If you suspect you are pregnant, contact your transplant team immediately.

How do I take valganciclovir?

Doses may be once a day, twice a day, or a few times per week. Your transplant doctor will advise what dose is best for you. You should take it with food for better absorption into your blood stream.

Do not take valganciclovir and ganciclovir at the same time.

How long will I take valganciclovir?

Most patients will take valganciclovir for at least 3 months. Ask your transplant team about the exact stop date of this medication. Do not stop this medication until you are told to do so by your transplant doctor, as this will increase your risk for serious viral infections.

What are the side effects?

Valganciclovir can lower your white blood cell, red blood cell, and platelet counts; it can also cause dizziness, nausea, and diarrhea.

Ganciclovir (Cytovene®)

Ganciclovir and Cytovene® are the same medication. Cytovene® is the brand name for ganciclovir (gan-ci-clo-vir).

How does ganciclovir work?

Ganciclovir fights viral infections like cytomegalovirus (CMV), herpes, chicken pox, shingles, and cold sores. If you develop a viral infection after your transplant you may have to receive ganciclovir, the intravenous (IV) formulation of Valcyte®.

How do I take ganciclovir?

Ganciclovir is only available in the IV form that is injected into your arm vein. The first few doses are usually given in the hospital.

Your transplant team will decide the right dosage and length of time you should take this medicine.

Take plenty of fluids when you are on this medication.

Precautions

This medicine may reduce your platelet count; platelets are the blood cells that are necessary for clotting. This medication can also reduce the white blood cells and red blood cells. Your transplant team will be monitoring your blood counts to make sure you are not having side effects.

This medication requires a lower dose if you develop kidney problems.

The benefits of taking ganciclovir if you are pregnant or breastfeeding must be weighed against the possible harm to you, your unborn baby, or your infant. Ganciclovir can cause birth defects in animals and may affect the ability to have children. Since it may cause birth defects, both women and men who may get pregnant or may get someone pregnant should use effective birth control during therapy with ganciclovir and for 90 days following the use of ganciclovir. If you suspect you are pregnant, contact your transplant team immediately.

What are the side effects?

Most people do not have many side effects from this medicine, but you may experience nausea, vomiting, or diarrhea.

Valacyclovir (Valtrex®)

Valacyclovir and Valtrex® are the same medication. Valtrex® is the brand name for valacyclovir (val-a-SYE-kloe-veer).

How does valacyclovir work?

Valacyclovir is a drug that fights viral infections. You may take it for the first few months to one year after your transplant. It helps to prevent certain kinds of viral infections such as herpes, chicken pox, shingles, and cold sores.

How do I take valacyclovir?

Valacyclovir comes as a tablet in several strengths. It may be taken with or without food. Take plenty of fluids when you are on this medication.

DO NOT take valacyclovir and acyclovir at the same time.

Precautions

This medication may cause confusion, agitation or hallucinations when used in elderly patients or patients with kidney dysfunction. Your transplant team will be monitoring your kidney function to make sure you are receiving a safe dose. It is also important to maintain adequate fluid intake while taking valacyclovir to prevent a decrease in your kidney function.

This medication has not been studied well in pregnant women. The benefits of taking valacyclovir if you are pregnant or breastfeeding must be weighed against the possible harm to you, your unborn baby, or your infant. Call your transplant team immediately if you think you are pregnant.

What are the side effects?

This drug has few side effects, but you may feel tired, get headaches, or feel nauseated.

Acyclovir (Zovirax®)

Acyclovir and Zovirax® are the same medication. Zovirax® is the brand name for acyclovir (a-SYE-klo--veer).

How does acyclovir work?

Acyclovir fights viral infections. You may take acyclovir for the first few months after your transplant. It helps prevent certain kinds of viral infections such as herpes, chicken pox, shingles, and cold sores. Be sure to tell your transplant doctor if you have been around anyone with chicken pox.

How do I take acyclovir?

Acyclovir comes as a tablet or liquid formulation in several strengths. This medication can also be injected into a vein (by IV). Shake well before using the liquid suspension. It may be taken with or without food. Take plenty of fluids when you are on this medication.

DO NOT take valacyclovir and acyclovir at the same time.

Precautions

Acyclovir will not prevent you from spreading herpes to others. It is best not to have sex if either partner has any symptoms of genital herpes. Condoms may help prevent the spread of genital herpes, but vaginal jellies and diaphragms will not.

Your transplant team will be monitoring your kidney function to make sure you are receiving a safe dose. It is important to maintain adequate hydration while taking acyclovir by mouth or IV to prevent a decrease in your kidney function.

The benefits of taking acyclovir if you are pregnant or breastfeeding must be weighed against the possible danger to you, your unborn baby, or your infant. Call your transplant team immediately if you think you are pregnant.

What are the side effects?

This drug has few side effects, but you may feel tired, get headaches, or feel nauseated.

Nystatin and Clotrimazole (Mycostatin® and Mycelex®)

Nystatin and Mycostatin® are the same medication. Mycostatin® is the brand name for nystatin (nye-STA-tin). Clotrimazole and Mycelex® are the same medication. Mycelex® is brand name for clotrimazole (kloe-TRIM-a-zole).

How do nystatin and clotrimazole work?

Nystatin and clotrimazole are used to prevent and treat yeast infections in your mouth. This yeast infection is called thrush. Thrush looks like a white coating on your tongue and sides of your mouth.

How do I take nystatin and clotrimazole?

When you take nystatin, you swish and hold the medicine in your mouth for several minutes, or as long as possible, then swallow it. You should not eat or drink anything for 30 minutes after doing this. Nystatin is used four times a day.

Clotrimazole comes as a lozenge. When you take clotrimazole, you suck on the lozenge until it dissolves, making sure to coat your mouth as best as you can. Clotrimazole is used three to four times a day. Like all of your other medications, this medication should not be stopped without discussing with your transplant team first, since it will affect some of your immunosuppressant drug levels.

What are the side effects?

You are unlikely to experience many side effects from these medicines, but you may have some nausea, vomiting, diarrhea, or stomach cramps.

Fluconazole (Diflucan®)

Fluconazole and Diflucan® are the same medication. Diflucan® is the brand name for fluconazole (flu-KO-na-zole).

How does fluconazole work?

Fluconazole fights fungal infections like Candida infection.

How do I take fluconazole?

Fluconazole comes as a tablet (50 mg, 100 mg, 150 mg, and 200 mg) or a liquid (10 mg/mL and 40 mg/mL). It may also be given intravenously (IV) and infused through a vein. It can interact with your immunosuppressive medicines. Your transplant doctor may change the dose of your medicines when you are on fluconazole and when you stop fluconazole.

What are the side effects?

The most common side effects include nausea, vomiting, diarrhea, headache, and rash. Changes in your liver blood tests may also occur.

Itraconazole (Sporanox®)

Itraconazole and Sporanox® are the same medication. Sporanox® is the brand name for itraconazole (i-tra-KO-na-zole).

How does itraconazole work?

Itraconazole fights fungal infections like Aspergillus infection.

How do I take itraconazole?

Itraconazole is available as a capsule or a liquid formulation. It may also be given intravenously (IV) into an arm vein. It interacts with your immunosuppressive medicines and can change the drug levels that are detected in your blood. Your doctor may change the dose of your medicines when you are on itraconazole and again when you stop itraconazole. Itraconazole should always be taken with food.

What are the side effects?

The most common side effects are nausea and stomach upset, but you may also experience headaches and high blood pressure.

Voriconazole (Vfend®)

Voriconazole and Vfend® are the same medication. Vfend® is the brand name for voriconazole (vor-i-KON-a-zole).

How does voriconazole work?

Voriconazole fights fungal infections like Aspergillus infection.

How do I take voriconazole?

Voriconazole is available as a tablet or a liquid solution. It can also be given intravenously (IV) through an arm vein. It interacts with your immunosuppressive medicines and can change the drug levels that are detected in your blood. Your transplant team may change the dose of your medicines when you are on voriconazole and again when you stop voriconazole.

What are the side effects?

The most common side effects are visual disturbances (like changes in color vision) and hallucinations. Nausea and stomach upset, a headache, swelling of your legs, or a skin rash may also occur. Changes in your liver blood tests may also occur.

Medicines that help with side effects

Medicine for Ulcers

Sucralfate (Carafate[®])
Famotidine (Pepcid[®])
Cimetidine (Tagamet[®])
Ranitidine (Zantac[®])
Nizatidine (Axid[®])
Omeprazole (Prilosec[®])
Lansoprazole (Prevacid[®])
Esomeprazole (Nexium[®])
Pantoprazole (Protonix[®])

How do these medicines work?

Some transplant medicines, like steroids, are hard on your stomach. You may need to take medicine to prevent stomach ulcers. The medicines listed above are the ulcer prevention medicines used by most people. Many of them are available over the counter.

How do I take these medicines?

Follow the directions on the label, and ask your transplant doctor if you have any questions.

Note: If you are taking CellCept[®], you should not take Carafate[®] at the same time of day because it prevents CellCept[®] from working. Your doctor should give you a different medicine. If your doctor tells you to take an antacid or Carafate, take it 1 hour before or 2 hours after you take CellCept[®] or Myfortic[®]

What are the side effects?

Most people have very few side effects from these medicines.

Diuretics (Water Pills):

Furosemide (Lasix[®])
Bumetanide (Bumex[®])
Metolazone (Zaroxolyn[®])
Spironolactone (Aldactone[®])

Furosemide (Lasix[®]) is the diuretic most often used.

How do diuretics work?

Diuretics are called water pills because they help the kidneys make more urine. They help reduce fluid that has built up, swelling and blood pressure, as well as lower high blood potassium levels.

How do I take diuretics?

Follow the directions on the label, and ask your transplant doctor if you have any questions.

When you take water pills, it is important to watch your weight and blood pressure. It is important that your body does not lose too much water.

What are the side effects?

When you first start taking diuretics, you will probably notice that you are passing more urine than before. If you feel dizzy when you stand up, get up more slowly. You can also develop low or high potassium.

Vitamins and Minerals:

How do vitamins and minerals work?

Most people get all the vitamins they need from the food they eat, but when you have a transplant, it puts stress on your body. Your transplant doctor may tell you to take more vitamins or minerals, like Vitamin D and calcium.

How do I take vitamins and minerals?

Follow the directions on the label and ask your transplant doctor if you have any questions.

There is no need for you to take additional vitamins than what your doctor recommends, but if you want to take them, tell your transplant team. Some herbal medicines may interact with your transplant drugs. Do not take herbal medicines unless you ask your transplant doctor first.

What are the side effects?

Side effects from vitamins and minerals are rare, if you take the right dose.

Blood Pressure Medicines:

How do blood pressure medicines work?

Some transplant medicines cause your blood pressure to rise. This can happen even if your new organ is healthy. If you were taking blood pressure medicine before your transplant, you may need to keep taking it.

How do I take blood pressure medicines?

Follow the directions on the label and ask your transplant doctor if you have any questions.

Note: There are many kinds of blood pressure medicines. Two of them may have side effects that decrease your kidney function. These medicines are:

1. Angiotensin converting enzyme (ACE) inhibitors
2. Angiotensin receptor blockers (ARBs)

Other medications that are commonly used to treat blood pressure following transplantation include calcium channel blockers (amlodipine, felodipine, diltiazem, etc.), beta-blockers (carvedilol, labetalol, metoprolol, etc.), and clonidine. Your transplant doctor will prescribe the blood pressure medicine that is felt to be best for you. Some blood pressure medicines may affect the blood levels of your transplant medicines. Make sure you contact your transplant

team before starting any new blood pressure medicines that may be prescribed by other doctors.

What are the side effects?

The side effects you get from blood pressure medicine depend on which medicine you take.

Some common side effects of blood pressure medicine are:

1. Getting dizzy when you stand up
2. Being tired
3. Change in your heart beat
4. Swelling in your feet or hands
5. Problems having sex

Combining medicines: What you need to know

Over the Counter (OTC) Medications

Tell your transplant doctor or pharmacist about any medicine or over the counter drugs you are taking. These include pain medications, vitamins, herbal medicines, and cough and cold products. Your transplant team needs to know if you are taking any of these to avoid any problems with how your medicines work together. **A very important point to remember: do not start taking any new prescription or OTC medications after your transplant without talking to your transplant team first.** Transplant medicines are very strong, and they do not always mix well with other medicines. Below is some information you need to know about mixing medicines.

Herbal Medications:

If you took herbal medications and/or dietary supplements before transplant, it is important for you review these medications with your transplant coordinator and pharmacist after transplant. Many herbal products can interact with the immune system and the immunosuppression medications that you are taking. The transplant team discourages their use.

Nonprescription Pain Medications:

All OTC non-steroidal anti-inflammatory medicines (NSAIDs) should be avoided in transplant patients due to the risk of these medicines causing kidney injury and worsening high blood pressure. High doses of aspirin may cause kidney problems and should be avoided. Aspirin (81mg or 325mg once a day) for prevention of heart disease appears to be safe, but it is still recommended that your creatinine, a marker of your kidney function, is closely followed. Acetaminophen (Tylenol®) is the preferred OTC pain medication for transplant patients. For liver transplant patients, 2000 mg per day is the highest recommended dose.

Cough and Cold Products:

Some cough and cold products contain ingredients that transplant patients should try to avoid. If you have high blood pressure, avoid cold products that contain pseudoephedrine. An alternative decongestant/antihistamine that is appropriate is called chlorpheniramine. Guaifenesin and dextromethorphan are generally safe products to use after transplant.

Laxatives:

Magnesium and aluminum containing laxatives should always be separated by at least 4 hours from CellCept® dosing. Senna and docusate sodium are the laxatives of choice after surgery.

Antidiarrheals:

Diarrhea may be a sign of a serious infection that may require a doctor visit; diarrhea may also affect your drug levels. Prior to taking any OTC antidiarrheals, contact your transplant team. Loperamide is the OTC antidiarrheal medicine of choice. Bismuth subsalicylate (Pepto Bismal®) should be avoided since it contains salicylates. Polycarbophil (Metamucil®) may bind to CellCept® or Myfortic® and affect their absorption into your blood.

Drugs that raise the cyclosporine/tacrolimus/sirolimus/everolimus level in your blood

Warning this list is not all inclusive, check with your transplant team before taking any new medication

If you are taking cyclosporine (Sandimmune[®], Neoral[®], Gengraf[®]), tacrolimus (Prograf[®], Astagraf XL[®], Envarsus XR[®]), sirolimus (Rapamune[®]), or everolimus (Zortress[®]), the following medicines can raise the levels of those drugs in your blood:

Antibacterial medications:

1. Erythromycin and clarithromycin (Biaxin[®])

Antifungal medications:

2. Ketoconazole (Nizoral[®])
3. Itraconazole (Sporanox[®])
4. Fluconazole (Diflucan[®])
5. Voriconazole (Vfend[®])
6. Posaconazole (Noxafil[®])
7. Clotrimazole (Mycelex[®])

Hepatitis C medications:

8. Telaprevir (Incivek[™])
9. Boceprevir (Victrelis[™])
10. Ombitasvir, paritaprevir, ritonavir, and dasabuvir (Viekira Pak[™])

HIV medications:

11. elvitegravir, cobicistat, emtricitabine, tenofovir disoproxil fumarate (Stribild[®])

Protease inhibitors, like:

12. Indinavir (Crixivan[®])
13. Saquinavir (Fortovase[®], Invirase[®])
14. Ritonavir (Norvir[®])
15. Nelfinavir (Viracept[®])
16. Fosamprenavir (Lexiva[®])
17. Lopinavir/ritonavir (Kaletra[®])
18. Atazanavir (Reyataz)
19. Darunavir (Prezista)

Blood pressure medicines:

20. Verapamil (Calan[®], Isoptin[®])
21. Diltiazem (Cardizem[®])

Other medicines:

22. Ethisterone derivative (danazol) used for gynecologic conditions
23. Amiodarone (Cordarone[®]) used for heart rhythm problems
24. Theophylline (Theo-Dur[®])

Foods:

25. Grapefruit, grapefruit juice and Fresca®

Drugs that lower the cyclosporine/tacrolimus/sirolimus/everolimus level in your blood

Warning this list is not all inclusive, check with your transplant team before taking any new medication

A low cyclosporine, tacrolimus, sirolimus, and/or everolimus level may lead to rejection and damage to your transplanted organ.

Medicines for seizures

1. Phenytoin (Dilantin®)
2. Phenobarbital (Luminal™)
3. Carbamazepine (Tegretol®)

Infection drugs

4. Rifampin (Rifadin®)
5. Rifabutin (Mycobutin®)
6. Isoniazid (Calpas-INH™)
7. Griseofulvin (Grifulvin®)
8. Nafcillin

HIV medications

9. Efavirenz (Sustiva®)

Other medicines:

10. Acetaminophen/Butalbital/Caffeine (Fioricet®)
11. St. John's Wort
12. Echinacea

Taking cyclosporine/tacrolimus/sirolimus/everolimus with the drugs below can be dangerous for you. You should consult with your transplant team even if another doctor prescribes them for you, since careful monitoring is needed.

Cholesterol drugs:

1. Simvastatin (Zocor®) – not recommended with cyclosporine

Infection drugs

2. Gentamicin (Garamycin®)
3. Tobramycin (Nebcin®)
4. Amphotericin B (Fungizone®)

Pain medicines (some are over-the-counter)

5. Ibuprofen (Motrin®, Advil®, Nuprin®)
6. Indomethacin (Indocin®)
7. Naproxen (Naprosyn®, Aleve®)

8. Piroxicam (Feldene[®])
9. Phenylbutazone (Butazone[™])
10. Ketorolac (Toradol[®])
11. Ketoprofen (Orudis[®])

Researching new medicines

Doctors are studying new medicines all the time. Some of these drugs may help you keep your new organ healthy. Other new medicines could have fewer side effects or cause fewer infections.

Tell your doctor if you would like to be part of a clinical trial. All new medicines must be tested before they can be given to people who need transplants. These tests are called clinical trials or studies.

Your doctor will see if there is a clinical trial that can be helpful to you. Your transplant team will discuss with you the pros and cons of taking part in a clinical trial. They will explain, in detail, all the facts about the clinical trial so that you will be able to make what we call an informed decision.

You do not have to join a clinical trial. It is your right to join or not join. Your choice will not change the quality of care you will receive after the transplant.