

## MODIGRAF® 1 mg, granules for oral suspension

(tacrolimus)

### Read all of this leaflet carefully before you start taking this medicine because it contains important information for you.

- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor or pharmacist.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. See section 4.

This product is called Modigraf 1 mg, granules for oral suspension, but will be referred to as Modigraf throughout the leaflet.

#### What is in this leaflet

1. What Modigraf is and what it is used for
2. What you need to know before you take Modigraf
3. How to take Modigraf
4. Possible side effects
5. How to store Modigraf
6. Contents of the pack and other information

### 1. What Modigraf is and what it is used for

Modigraf contains the active substance tacrolimus. It is an immunosuppressant. Following your organ transplant (e.g., liver, kidney, heart), your body’s immune system will try to reject the new organ. Modigraf is used to control your body’s immune response enabling your body to accept the transplanted organ.

You may also be given Modigraf for an ongoing rejection of your transplanted liver, kidney, heart or other organ or if any previous treatment you were taking was unable to control this immune response after your transplantation.

Modigraf is used in adults and children.

### 2. What you need to know before you take Modigraf

#### Do not take Modigraf

- If you are allergic to tacrolimus or any of the other ingredients of this medicine (listed in section 6).
- If you are allergic to sirolimus (another substance used to prevent rejection of your transplanted organ) or to any macrolide antibiotic (e.g., erythromycin, clarithromycin, josamycin).

#### Warnings and precautions

Talk to your doctor or pharmacist before taking Modigraf

- if you have or have had liver problems.
- if you have diarrhoea for more than one day.
- if you feel strong abdominal pain accompanied or not with other symptoms, such as chills, fever, nausea or vomiting.
- if you have an alteration of the electrical activity of your heart called “QT prolongation”.
- if you have or have had damage to the smallest blood vessels, known as thrombotic microangiopathy/thrombotic thrombocytopenic purpura/haemolytic uraemic syndrome. Tell your doctor if you develop fever, bruising under the skin (which may appear as red dots), unexplained tiredness, confusion, yellowing of the skin or eyes, reduced urine output, vision loss and seizures (see section 4). When tacrolimus is taken together with sirolimus or everolimus, the risk of developing these symptoms may increase.

Please avoid taking any herbal remedies, e.g., St. John’s wort (*Hypericum perforatum*) or any other herbal products as this may affect the effectiveness and the dose of Modigraf that you need to receive. If in doubt please consult your doctor prior to taking any herbal products or remedies.

Your doctor may need to adjust your dose of Modigraf.

You should keep in regular contact with your doctor. From time to time, your doctor may need to do blood, urine, heart, eye tests, to set the right dose of Modigraf.

You should limit your exposure to the sun and UV (ultraviolet) light whilst taking Modigraf. This is because immunosuppressants like Modigraf could increase the risk of skin cancer. In case of sun exposure, wear appropriate protective clothing and use a sunscreen with a high sun protection factor.

Precaution for handling:

Direct contact with any part of your body like your skin or eyes, or breathing in of injection solutions, powder or granules contained in tacrolimus products should be avoided during preparation. If such contact occurs, wash the skin and eyes.

#### Other medicines and Modigraf

Tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines.

It is not recommended that Modigraf is taken with ciclosporin (another medicine used for the prevention of transplant organ rejection).

**If you need to attend a doctor other than your transplant specialist, tell the doctor that you are taking tacrolimus. Your doctor may need to consult your transplant specialist if you should use another medicine that could increase or decrease your tacrolimus blood level.**

Modigraf blood levels can be affected by other medicines you take, and blood levels of other medicines can be affected by taking Modigraf, which may require interruption, an increase or a decrease in Modigraf dose.

Some patients have experienced increases in tacrolimus blood levels while taking other medicines. This could lead to serious side effects, such as kidney problems, nervous system problems, and heart rhythm disturbances (see section 4).

An effect on the Modigraf blood levels may occur very soon after starting the use of another medicine, therefore frequent continued monitoring of your Modigraf blood level may be needed within the first few days of starting another medicine and frequently while treatment with the other medicine continues. Some other medicines may cause tacrolimus blood levels to decrease, which could increase the risk of rejecting the transplanted organ. In particular, you should tell your doctor if you are taking or have recently taken medicines like:

- antifungal medicines and antibiotics, particularly so-called macrolide antibiotics, used to treat infections e.g., ketoconazole, fluconazole, itraconazole, posaconazole, voriconazole, clotrimazole, isavuconazole, miconazole, caspofungin, telithromycin, erythromycin, clarithromycin, josamycin, azithromycin, rifampicin, rifabutin, isoniazid and flucloxacillin
- letermovir, used to prevent illness caused by CMV (human cytomegalovirus)
- HIV protease inhibitors (e.g., ritonavir, nelfinavir, saquinavir), the booster medicine cobicistat, and combination tablets, or HIV non-nucleoside reverse transcriptase inhibitors (efavirenz, etravirine, nevirapine) used to treat HIV infection
- HCV protease inhibitors (e.g., telaprevir, boceprevir, the combination ombitasvir/paritaprevir/ritonavir with or without dasabuvir, elbasvir/grazoprevir, and glecaprevir/pibrentasvir), used to treat hepatitis C infection
- nilotinib and imatinib, idelalisib, ceritinib, crizotinib, apalutamide, enzalutamide, or mitotane (used to treat certain cancers)
- mycophenolic acid, used to suppress the immune system to prevent transplant rejection
- medicines for stomach ulcer and acid reflux (e.g., omeprazole, lansoprazole or cimetidine)
- antiemetics, used to treat nausea and vomiting (e.g., metoclopramide)
- cisapride or the antacid magnesium-aluminium-hydroxide, used to treat heartburn
- the contraceptive pill, hormone treatments with ethinylestradiol, or hormone treatments with danazol
- medicines used to treat high blood pressure or heart problems (e.g., nifedipine, nicardipine, diltiazem and verapamil)
- anti-arrhythmic medicines (amiodarone) used to control arrhythmia (uneven beating of the heart)
- medicines known as “statins” used to treat elevated cholesterol and triglycerides
- carbamazepine, phenytoin or phenobarbital, used to treat epilepsy
- metamizole, used to treat pain and fever
- the corticosteroids prednisolone and methylprednisolone, belonging to the class of corticosteroids used to treat inflammations or suppress the immune system (e.g., in transplant rejection)
- nefazodone, used to treat depression
- herbal preparations containing St. John’s wort (*Hypericum perforatum*) or extracts of Schisandra sphenanthera cannabidiol (uses amongst others include treatment of seizures).

Tell your doctor if you are receiving treatment for hepatitis C. The drug treatment for hepatitis C may change your liver function and may affect blood levels of tacrolimus. Tacrolimus blood levels may fall or may increase depending on the medicines prescribed for hepatitis C. Your doctor may need to closely monitor tacrolimus blood levels and make necessary adjustments of Modigraf dose after you start treatment for hepatitis C.

Tell your doctor if you are taking or need to take ibuprofen (used to treat fever, inflammation and pain), antibiotics (cotrimoxazole, vancomycin, or aminoglycoside antibiotics such as gentamicin), amphotericin B (used to treat fungal infections) or antivirals (used to treat viral infections e.g., acyclovir, ganciclovir, cidofovir, foscarnet). These may worsen kidney or nervous system problems when taken together with Modigraf.

Tell your doctor if you are taking sirolimus or everolimus. When tacrolimus is taken together with sirolimus or everolimus, the risk of developing thrombotic microangiopathy, thrombotic thrombocytopenic purpura, and haemolytic uraemic syndrome may increase (see section 4).

Your doctor also needs to know if you are taking potassium supplements or certain diuretics used for heart failure, hypertension and kidney disease, (e.g., amiloride, triamterene, or spironolactone), or the antibiotics trimethoprim or cotrimoxazole that may increase levels of potassium in your blood, non-steroidal anti-inflammatory drugs (NSAIDs, e.g., ibuprofen) used for fever, inflammation and pain, anticoagulants (blood thinners), or oral medicines for diabetes, while you take Modigraf.

If you need to have any vaccinations, please tell your doctor before.

#### Modigraf with food and drink

You should generally take Modigraf on an empty stomach or at least 1 hour before or 2 to 3 hours after a meal. Grapefruit and grapefruit juice should be avoided while taking Modigraf, since it can affect its levels in the blood.

#### Pregnancy and breast-feeding

If you take Modigraf during pregnancy, it may pass into your baby through the placenta. It could potentially influence the health of the baby or adversely influence the course of the pregnancy. If you are pregnant or breast-feeding, think you may be pregnant or are planning to have a baby, ask your doctor for advice before taking this medicine.

One study assessed pregnancy outcomes in women treated with tacrolimus and those treated with other immunosuppressants. While there was insufficient evidence in this study to draw conclusions, higher rates of miscarriage were reported among liver and kidney transplant patients treated with tacrolimus, as well as higher rates among kidney transplant patients of persistent hypertension associated with protein loss in the urine that develops during pregnancy or the postpartum period (a condition called pre-eclampsia). No increased risk of major birth defects associated with Modigraf use was found. Modigraf passes into breast milk. Therefore, you should not breast-feed whilst using Modigraf.

#### Driving and using machines

Do not drive or use any tools or machines if you feel dizzy or sleepy, or have problems seeing clearly after taking Modigraf. These effects are more frequent if you also drink alcohol.

#### Modigraf contains lactose and sodium

Modigraf contains lactose (milk sugar). If you have been told by your doctor that you have an intolerance to some sugars, contact your doctor before taking this medicine. This medicine contains less than 1 mmol sodium (23 mg) per sachet, that is to say essentially ‘sodium-free’.

### 3. How to take Modigraf

Always take this medicine exactly as your doctor has told you. Check with your doctor or pharmacist if you are not sure. Modigraf should be prescribed by doctors trained to treat transplant patients and experienced in the use of medicines that control the body’s immune system (immunosuppressants).

Make sure that you receive the same tacrolimus medicine every time you collect your prescription, unless your transplant specialist has agreed to change to a different tacrolimus medicine.

This medicine should be taken twice a day. If the physical appearance has changed from the normal white granules, or if dose instructions have changed, speak to your doctor or pharmacist as soon as possible to make sure that you have the right medicine.

The starting dose to prevent the rejection of your transplanted organ will be determined by your doctor calculated according to your body weight. Initial doses just after transplantation will generally be in the range of 0.075 - 0.30 mg per kg body weight per day depending on the transplanted organ. When treating rejection, these same doses may be used.

Your dose depends on your general condition and on which other immunosuppressive medicines you are taking.

#### Children and adolescents

Children and adolescents will receive doses of Modigraf calculated in the same way as adults. In general children need higher doses per kg of body weight to achieve the same effective levels in the blood as adults.

Following the initiation of your treatment with Modigraf, frequent blood tests will be taken by your doctor to define the correct dose and to adjust the dose from time to time. Your doctor will usually reduce your Modigraf dose once your condition has stabilised. Your doctor will tell you exactly how many sachets to take.

You will need to take Modigraf every day as long as you need immunosuppression to prevent rejection of your transplanted organ. You should keep in regular contact with your doctor.

Modigraf is taken orally twice daily, usually in the morning and evening. Take Modigraf on an empty stomach or 2 to 3 hours after a meal. Wait at least 1 hour until the next meal.

#### How to prepare the Modigraf sachets for use?

Your doctor will advise you on the number of sachets that you need to open and the volume of water that is required to make a suspension. For accurate measuring the volume of water you can use a syringe or graduated cylinder.

Pour the prescribed volume of water (at room temperature) into a glass or cup, up to a maximum of 50 ml. Place the cup with water on a stable surface. Do not use cups or spoons that are made of PVC (polyvinylchloride) to take Modigraf because the active substance in Modigraf may stick to PVC. Carefully open the prescribed number of sachets, e.g., with a pair of scissors at the point indicated with an arrow. Hold the opened sachet between thumb and index finger above the cup with the open side of the sachet facing downwards. Gently tap on the closed end of the sachet and pour the contents of each sachet into the glass or cup containing the water. Do not use any utensils or liquids to empty the sachet. If you follow these instructions, you will get the right amount of granules from the sachet. It is normal that some granules stay behind; the sachet was designed that way. Stir, or swirl gently until the granules have been suspended completely. The suspension can be drawn up with a syringe or swallowed directly by the patient. The liquid has a sweet taste. Rinse the glass or cup once with the same amount of water and drink this, too. The liquid should be drunk immediately after preparation.

#### If you take more Modigraf than you should

If you have accidentally taken too much Modigraf, contact your doctor or nearest hospital emergency department immediately.

#### If you forget to take Modigraf

Do not take a double dose to make up for forgotten individual doses. If you have forgotten to take your Modigraf, wait until it is time for the next dose, and then continue as before.

#### If you stop taking Modigraf

Stopping your treatment with Modigraf may increase the risk of rejection of your transplanted organ. Do not stop your treatment unless your doctor tells you to do so.

If you have any further questions on the use of this medicine, ask your doctor or pharmacist.

#### 4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Modigraf reduces your body's defense mechanism (immune system), which will not be as good at fighting infections. Therefore, you may be more prone to infections while you are taking Modigraf.

Some infections could be serious or fatal and may include infections caused by bacteria, viruses, fungi, parasites, or other infections.

Tell your doctor immediately if you get signs of an infection including:

- Fever, cough, sore throat, feeling weak or generally unwell
- Memory loss, trouble thinking, difficulty walking or loss of vision - these may be due to a very rare, serious brain infection, which can be fatal (Progressive Multifocal Leukoencephalopathy or PML)

Severe effects may occur, including allergic and anaphylactic reactions (a very serious type of allergic reaction with fainting and difficulty breathing, which needs immediate medical attention). Benign and malignant tumours have been reported following Modigraf treatment.

**Tell your doctor immediately if you have or suspect you may have any of the following serious side effects:**

Serious common side effects (may affect up to 1 in 10 people):

- Gastrointestinal perforation: strong abdominal pain accompanied or not with other symptoms, such as chills, fever, nausea or vomiting.
- Insufficient function of your transplanted organ.
- Blurred vision.

Serious uncommon side effects (may affect up to 1 in 100 people):

- Thrombotic microangiopathy (damage to the smallest blood vessels) including haemolytic uraemic syndrome, a condition with the following symptoms: low or no urine output (acute renal failure), extreme tiredness, yellowing of the skin or eyes (jaundice) and abnormal bruising or bleeding and signs of infection.

Serious rare side effects (may affect up to 1 in 1,000 people):

- Thrombotic Thrombocytopenic Purpura: a condition involving damage to the smallest blood vessels and characterised by fever and bruising under the skin that may appear as red pinpoint dots, with or without unexplained extreme tiredness, confusion, yellowing of the skin or eyes (jaundice), with symptoms of acute renal failure (low or no urine output), vision loss and seizures.
- Toxic epidermal necrolysis: erosion and blistering of skin or mucous membranes, red swollen skin that can detach in large parts of the body.
- Blindness.

Serious very rare side effects (may affect up to 1 in 10,000 people):

- Stevens-Johnson syndrome: unexplained widespread skin pain, facial swelling, serious illness with blistering of skin, mouth, eyes and genitals, hives, tongue swelling, red or purple skin rash that spreads, skin shedding.
- Torsades de pointes: change in the heart frequency that can be accompanied or not of symptoms, such as chest pain (angina), faint, vertigo or nausea, palpitations (feeling the heartbeat) and difficulty breathing.

Serious side effects - frequency not known

(frequency cannot be estimated from the available data):

- Opportunistic infections (bacterial, fungal, viral and protozoal): prolonged diarrhoea, fever and sore throat.
- Benign and malignant tumours have been reported following treatment as a result of immunosuppression, including malignant skin cancers and a rare type of cancer that may include skin lesions known as Kaposi's sarcoma. Symptoms include skin changes such as new or changing discoloration, lesions or lumps.
- Cases of pure red cell aplasia (a very severe reduction in red blood cell counts), haemolytic anaemia (decreased number of red blood cells due to abnormal breakdown accompanied with tiredness) and febrile neutropenia (a decrease in the type of white blood cells which fight infection, accompanied by fever) have been reported. It is not known exactly how often these side effects occur. You may have no symptoms or depending on the severity of the condition, you may feel: fatigue, apathy, abnormal paleness of the skin (pallor), shortness of breath, dizziness, headache, chest pain and coldness in hands and feet.
- Cases of agranulocytosis (a severely lowered number of white blood cells accompanied with ulcers in the mouth, fever and infection(s)). You may have no symptoms or you may feel sudden fever, rigors and sore throat.
- Allergic and anaphylactic reactions with the following symptoms: a sudden itchy rash (hives), swelling of hands, feet, ankle, face, lips, mouth or throat (which may cause difficulty in swallowing or breathing) and you may feel you are going to faint.

- Posterior Reversible Encephalopathy Syndrome (PRES): headache, confusion, mood changes, fits, and disturbances of your vision. These could be signs of a disorder known as posterior reversible encephalopathy syndrome, which has been reported in some patients treated with tacrolimus.
- Optic neuropathy (abnormality of the optic nerve): problems with your vision such as blurred vision, changes in colour vision, difficulty in seeing detail or restriction of your field of vision.

The side effects listed below may also occur after receiving Modigraf and could be serious:

Very common side effects (may affect more than 1 in 10 people):

- Increased blood sugar, diabetes mellitus, increased potassium in the blood
- Difficulty in sleeping
- Trembling, headache
- Increased blood pressure
- Liver function tests abnormal
- Diarrhoea, nausea
- Kidney problems

Common side effects (may affect up to 1 in 10 people):

- Reduction in blood cell counts (platelets, red or white blood cells), increase in white blood cell counts, changes in red blood cell counts (seen in blood tests)
- Reduced magnesium, phosphate, potassium, calcium or sodium in the blood, fluid overload, increased uric acid or lipids in the blood, decreased appetite, increased acidity of the blood, other changes in the blood salts (seen in blood tests)
- Anxiety symptoms, confusion and disorientation, depression, mood changes, nightmare, hallucination, mental disorders
- Fits, disturbances in consciousness, tingling and numbness (sometimes painful) in the hands and feet, dizziness, impaired writing ability, nervous system disorders
- Increased sensitivity to light, eye disorders
- Ringing sound in your ears
- Reduced blood flow in the heart vessels, faster heartbeat
- Bleeding, partial or complete blocking of blood vessels, reduced blood pressure
- Shortness in breath, changes in the lung tissue, collection of liquid around the lung, inflammation of the throat, cough, flu-like symptoms
- Inflammations or ulcers causing abdominal pain or diarrhoea, bleeding in the stomach, inflammations or ulcers in the mouth, collection of fluid in the belly, vomiting, abdominal pains, indigestion, constipation, flatulence, bloating, loose stools, stomach problems
- Bile duct disorders, yellowing of the skin due to liver problems, liver tissue damage and inflammation of the liver
- Itching, rash, hair loss, acne, increased sweating
- Pain in joints, limbs, back and feet, muscle spasms
- Insufficient function of the kidneys, reduced production of urine, impaired or painful urination
- General weakness, fever, collection of fluid in your body, pain and discomfort, increase of the enzyme alkaline phosphatase in your blood, weight gain, feeling of temperature disturbed

Uncommon side effects (may affect up to 1 in 100 people):

- Changes in blood clotting, reduction in the number of all types of blood cells (seen in blood tests)
- Dehydration
- Reduced protein or sugar in the blood, increased phosphate in the blood
- Coma, bleeding in the brain, stroke, paralysis, brain disorder, speech and language abnormalities, memory problems
- Opacity of the eye lens
- Impaired hearing
- Irregular heartbeat, stop of heartbeat, reduced performance of your heart, disorder of the heart muscle, enlargement of the heart muscle, stronger heartbeat, abnormal ECG, heart rate and pulse abnormal
- Blood clot in a vein of a limb, shock
- Difficulties in breathing, respiratory tract disorders, asthma
- Obstruction of the gut, increased blood level of the enzyme amylase, reflux of stomach content in your throat, delayed emptying of the stomach
- Inflammation of the skin, burning sensation in the sunlight
- Joint disorders
- Inability to urinate, painful menstruation and abnormal menstrual bleeding
- Multiple organ failure, flu-like illness, increased sensitivity to heat and cold, feeling of pressure on your chest, jittery or abnormal feeling, increase of the enzyme lactate dehydrogenase in your blood, weight loss

Rare side effects (may affect up to 1 in 1,000 people):

- Small bleedings in your skin due to blood clots
- Increased muscle stiffness
- Deafness
- Collection of fluid around the heart
- Acute breathlessness
- Cyst formation in your pancreas
- Problems with blood flow in the liver
- Increased hairiness
- Thirst, fall, feeling of tightness in your chest, decreased mobility, ulcer

Very rare side effects (may affect up to 1 in 10,000 people):

- Muscular weakness
- Abnormal heart scan
- Liver failure
- Painful urination with blood in the urine
- Increase of fat tissue

**Children and adolescents**

Children and adolescents may experience the same side effects as adults.

**Reporting of side effects**

If you get any side effects, talk to your doctor or pharmacist.

This includes any possible side effects not listed in this leaflet.

You can also report side effects directly via the Yellow Card Scheme at: [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store. By reporting side effects you can help provide more information on the safety of this medicine.

#### 5. How to store Modigraf

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the carton and sachet after EXP. The expiry date refers to the last day of that month.

This medicine does not require any special temperature storage conditions.

After preparation, the suspension should be taken immediately.

Do not throw away any medicines via wastewater or household waste. Ask your pharmacist how to throw away medicines you no longer use. These measures will help protect the environment.

If the medicine becomes discolored or shows any other signs of deterioration, you should seek the advice of your pharmacist who will tell you what to do.

#### 6. Contents of the pack and other information

**What Modigraf contains**

- The active substance is tacrolimus. Each sachet of Modigraf 1 mg granules contains 1 mg of tacrolimus (as monohydrate).
- The other ingredients are: lactose monohydrate, hypromellose (E464) and croscarmellose sodium (E468).

**What Modigraf looks like and contents of the pack**

Modigraf granules for oral suspension are white granules supplied in sachets.

Packs containing 50 sachets are available.

**Manufacturer**

Astellas Ireland Co. Ltd.

Killorglin

County Kerry

Ireland

**Procured from within the EU and repackaged for the PL Holder:**

Abacus Medicine Ltd., Abbey House, 282 Farnborough Road, Farnborough, GU14 7NA, United Kingdom

Modigraf 1 mg, granules for oral suspension

PL 45763/0516

**POM**

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For any information about this medicine, please contact the Product Licence Holder: Abacus Medicine Ltd.

tel: +44(0)2036301244

email: [MedInfo@abacusmedicine.co.uk](mailto:MedInfo@abacusmedicine.co.uk)

or

[drugsafetyuk@abacusmedicine.co.uk](mailto:drugsafetyuk@abacusmedicine.co.uk)

**This leaflet was last revised on: 11.04.2025.**

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