

**EVEROLIMUS- everolimus tablet**  
**Hikma Pharmaceuticals USA Inc.**

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**HIGHLIGHTS OF PRESCRIBING INFORMATION**

These highlights do not include all the information needed to use EVEROLIMUS TABLETS safely and effectively. See full prescribing information for EVEROLIMUS TABLETS.

EVEROLIMUS tablets, for oral use  
Initial U.S. Approval: 2010

**WARNING: MALIGNANCIES and SERIOUS INFECTIONS; KIDNEY GRAFT THROMBOSIS; NEPHROTOXICITY; and MORTALITY IN HEART TRANSPLANTATION**

*See full prescribing information for complete boxed warning.*

- Only physicians experienced in immunosuppressive therapy and management of transplant patients should use everolimus. (5.1)
- Increased susceptibility to infection and the possible development of malignancies may result from immunosuppression. (5.2, 5.3)
- Increased incidence of kidney graft thrombosis. (5.4)
- Reduced doses of cyclosporine are required for use in combination with everolimus in order to reduce nephrotoxicity. (2.4, 2.5, 5.6, 12.7, 12.8)
- Increased mortality in a heart transplant clinical trial. Use in heart transplantation is not recommended. (5.7)

----- **INDICATIONS AND USAGE** -----

Everolimus is an mTOR inhibitor immunosuppressant indicated for the prophylaxis of organ rejection in adult patients:

- Kidney Transplant: at low-moderate immunologic risk. Use in combination with basiliximab, cyclosporine (reduced doses) and corticosteroids. (1.1)
- Liver Transplant: Administer no earlier than 30 days posttransplant. Use in combination with tacrolimus (reduced doses) and corticosteroids. (1.2, 5.5)

Limitations of Use:

Safety and efficacy have not been established in the following:

- Kidney transplant patients at high immunologic risk. (1.3)
- Recipients of transplanted organs other than kidney or liver. (1.3, 5.7)
- Pediatric patients (less than 18 years). (1.3)

----- **DOSAGE AND ADMINISTRATION** -----

- Kidney Transplantation: starting oral dose of 0.75 mg twice daily as soon as possible after transplantation. (2.1)
- Liver Transplantation: starting oral dose of 1 mg twice daily starting 30 days after transplantation. (2.2)
- Monitor Everolimus Concentrations: Adjust maintenance dose to achieve trough concentrations within the 3 to 8 ng/mL target range using LC/MS/MS assay method. (2.1, 2.2, 2.3)
- Administer consistently with or without food at the same time as cyclosporine or tacrolimus. (2.6, 12.3)
- Mild Hepatic Impairment: Reduce initial daily dose by one-third. (2.7)
- Moderate or Severe Hepatic Impairment: Reduce initial daily dose by one-half. (2.7, 12.6)

----- **DOSAGE FORMS AND STRENGTHS** -----

Everolimus Tablets are available as 0.25 mg, 0.5 mg, 0.75 mg, and 1 mg tablets. (3)

----- **CONTRAINDICATIONS** -----

- Hypersensitivity to everolimus, sirolimus, or to components of the drug product. (4)

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## WARNINGS AND PRECAUTIONS

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- Angioedema [increased risk with concomitant angiotensin converting enzyme (ACE inhibitors)]: Monitor for symptoms and treat promptly. (5.8)
- Delayed wound healing/fluid accumulation: Monitor symptoms; treat promptly to minimize complications. (5.9)
- Interstitial lung disease (ILD)/Non-infectious pneumonitis: Monitor for symptoms or radiologic changes; manage by dose reduction or discontinuation until symptoms resolve; consider use of corticosteroids. (5.10)
- Hyperlipidemia (elevations of serum cholesterol and triglycerides): Monitor and consider anti-lipid therapy. (5.11)
- Proteinuria (increased risk with higher trough concentrations): Monitor urine protein. (5.12)
- Polyoma virus infections (activation of latent viral infections; BK virus associated nephropathy): Consider reducing immunosuppression. (5.13)
- TMA/TTP/HUS (concomitant use with cyclosporine may increase risk): Monitor for hematologic changes or symptoms. (5.15)
- New onset diabetes after transplantation: Monitor serum glucose (5.16).
- Male infertility: Azoospermia or oligospermia may occur. (5.18, 13.1)
- Immunizations: Avoid live vaccines. (5.19)
- Embryo-fetal toxicity: Advise females of reproductive potential of the potential risk to a fetus and to use effective contraception during treatment with everolimus and for 8 weeks after final dose (5.17, 8.1, 8.3)

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## ADVERSE REACTIONS

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Most common adverse reactions were as follows:

Kidney Transplantation (incidence greater than or equal to 20%): peripheral edema, constipation, hypertension, nausea, anemia, urinary tract infection (UTI), and hyperlipidemia. (6.1)

Liver Transplantation (incidence greater than 10%): diarrhea, headache, peripheral edema, hypertension, nausea, pyrexia, abdominal pain, leukopenia, and hypercholesterolemia. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Hikma Pharmaceuticals USA Inc. at 1-800-962-8364 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

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## DRUG INTERACTIONS

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Strong-moderate CYP3A4 inhibitors (e.g., cyclosporine, ketoconazole, erythromycin, verapamil) and CYP3A4 inducers (e.g., rifampin) may affect everolimus concentrations. (7.1) Consider everolimus dose adjustment. (5.14)

Therapeutic drug monitoring and dose reduction for everolimus should be considered when everolimus is coadministered with cannabidiol. (5.22, 7.13)

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## USE IN SPECIFIC POPULATIONS

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- Pregnancy: Based on animal data, may cause maternal and fetal harm. (8.1)
- Lactation: Breastfeeding not recommended. (8.2)
- Females and Males of Reproductive Potential: May impair fertility. (8.1, 8.3, 13.1)

**See 17 for PATIENT COUNSELING INFORMATION and Medication Guide.**

**Revised: 9/2024**

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## **FULL PRESCRIBING INFORMATION**

**WARNING: MALIGNANCIES and SERIOUS INFECTIONS; KIDNEY GRAFT THROMBOSIS; NEPHROTOXICITY; and MORTALITY IN HEART TRANSPLANTATION**

**Malignancies and Serious Infections**

- Only physicians experienced in immunosuppressive therapy and management of transplant patients should prescribe everolimus. Patients receiving the drug should be managed in facilities equipped and staffed with adequate laboratory and supportive medical resources. The physician responsible for maintenance therapy should have complete information requisite for the follow-up of the patient [*see Warnings and Precautions (5.1)*].
- Increased susceptibility to infection and the possible development of malignancies, such as lymphoma and skin cancer, may result from immunosuppression [*see Warnings and Precautions (5.2, 5.3)*].

**Kidney Graft Thrombosis**

- An increased risk of kidney arterial and venous thrombosis, resulting in graft loss, was reported, mostly within the first 30 days posttransplantation [*see Warnings and Precautions (5.4)*].

**Nephrotoxicity**

- Increased nephrotoxicity can occur with use of standard doses of cyclosporine in combination with everolimus. Therefore, reduced doses of cyclosporine should be used in combination with everolimus in order to reduce renal dysfunction. It is important to monitor the cyclosporine and everolimus whole blood trough concentrations [*see Dosage and Administration (2.4,2.5), Warnings and Precautions (5.6), Clinical Pharmacology (12.7,12.8)*].

**Mortality in Heart Transplantation**

- Increased mortality, often associated with serious infections, within the first three months posttransplantation was observed in a clinical trial of *de novo* heart transplant patients receiving immunosuppressive regimens with or without induction therapy. Use in heart transplantation is not recommended [*see Warnings and Precautions (5.7)*].

## **1 INDICATIONS AND USAGE**

### **1.1 Prophylaxis of Organ Rejection in Kidney Transplantation**

Everolimus is indicated for the prophylaxis of organ rejection in adult patients at low to moderate immunologic risk receiving a kidney transplant [*see Clinical Studies (14.1)*]. Everolimus is to be administered in combination with basiliximab induction and

concurrently with reduced doses of cyclosporine and with corticosteroids. Therapeutic drug monitoring (TDM) of everolimus and cyclosporine is recommended for all patients receiving these products [see *Dosage and Administration* (2.2, 2.3)].

## **1.2 Prophylaxis of Organ Rejection in Liver Transplantation**

Everolimus is indicated for the prophylaxis of allograft rejection in adult patients receiving a liver transplant. Everolimus is to be administered no earlier than 30 days posttransplant concurrently in combination with reduced doses of tacrolimus and with corticosteroids [see *Warnings and Precautions* (5.5), *Clinical Studies* (14.2)]. TDM of everolimus and tacrolimus is recommended for all patients receiving these products [see *Dosage and Administration* (2.3, 2.5)].

## **1.3 Limitations of Use**

The safety and efficacy of everolimus has not been established in the following populations:

- Kidney transplant patients at high immunologic risk.
- Recipients of transplanted organs other than kidney and liver [see *Warnings and Precautions* (5.7)].
- Pediatric patients (less than 18 years).

## **2 DOSAGE AND ADMINISTRATION**

Patients receiving everolimus may require dose adjustments based on everolimus blood concentrations achieved, tolerability, individual response, change in concomitant medications and the clinical situation. Optimally, dose adjustments of everolimus should be based on trough concentrations obtained 4 or 5 days after a previous dosing change. Dose adjustment is required if the trough concentration is below 3 ng/mL. The total daily dose of everolimus should be doubled using the available tablet strengths (0.25 mg, 0.5 mg, 0.75 mg, or 1 mg). Dose adjustment is also required if the trough concentration is greater than 8 ng/mL on 2 consecutive measures; the dose of everolimus should be decreased by 0.25 mg twice daily [see *Dosage and Administration* (2.3), *Clinical Pharmacology* (12.3)].

### **2.1 Dosage in Adult Kidney Transplant Patients**

An initial everolimus dose of 0.75 mg orally twice daily (1.5 mg per day) is recommended for adult kidney transplant patients in combination with reduced-dose cyclosporine, administered as soon as possible after transplantation [see *Dosage and Administration* (2.3, 2.4), *Clinical Studies* (14.1)].

Oral prednisone should be initiated once oral medication is tolerated. Steroid doses may be further tapered on an individualized basis depending on the clinical status of patient and function of graft.

### **2.2 Dosage in Adult Liver Transplant Patients**

Start everolimus at least 30 days posttransplant. An initial dose of 1 mg orally twice daily (2 mg per day) is recommended for adult liver transplant patients in combination with reduced-dose tacrolimus [see *Dosage and Administration* (2.3, 2.5), *Clinical Studies*

(14.2)].

Steroid doses may be further tapered on an individualized basis depending on the clinical status of patient and function of graft.

### **2.3 Therapeutic Drug Monitoring (TDM) - Everolimus**

Routine everolimus whole blood therapeutic drug concentration monitoring is recommended for all patients. The recommended everolimus therapeutic range is 3 to 8 ng/mL [see *Clinical Pharmacology (12.7)*]. Careful attention should be made to clinical signs and symptoms, tissue biopsies, and laboratory parameters. It is important to monitor everolimus blood concentrations, in patients with hepatic impairment, during concomitant administration of CYP3A4 inducers or inhibitors or cannabidiol, when switching cyclosporine formulations and/or when cyclosporine dosing is reduced according to recommended target concentrations [see *Drug Interactions (7)*, *Clinical Pharmacology (12.7, 12.8)*].

There is an interaction of cyclosporine on everolimus, and consequently, everolimus concentrations may decrease if cyclosporine exposure is reduced. There is little to no pharmacokinetic interaction of tacrolimus on everolimus, and thus, everolimus concentrations do not decrease if the tacrolimus exposure is reduced [see *Drug Interactions (7.2)*].

The everolimus recommended therapeutic range of 3 to 8 ng/mL is based on an LC/MS/MS assay method. Currently in clinical practice, everolimus whole blood trough concentrations may be measured by chromatographic or immunoassay methodologies. Because the measured everolimus whole blood trough concentrations depend on the assay used, individual patient sample concentration values from different assays may not be interchangeable. Consideration of assay results must be made with knowledge of the specific assay used. Therefore, communication should be maintained with the laboratory performing the assay.

### **2.4 Therapeutic Drug Monitoring (TDM) - Cyclosporine in Kidney Transplant Patients**

Both cyclosporine doses and the target range for whole blood trough concentrations should be reduced, when given in a regimen with everolimus, in order to minimize the risk of nephrotoxicity [see *Warnings and Precautions (5.6)*, *Drug Interactions (7.2)*, *Clinical Pharmacology (12.8)*].

The recommended cyclosporine therapeutic ranges when administered with everolimus are 100 to 200 ng/mL through Month 1 posttransplant, 75 to 150 ng/mL at Months 2 and 3 posttransplant, 50 to 100 ng/mL at Month 4 posttransplant, and 25 to 50 ng/mL from Month 6 through Month 12 posttransplant. The median trough concentrations observed in the clinical trial ranged between 161 to 185 ng/mL through Month 1 posttransplant and between 111 to 140 ng/mL at Months 2 and 3 posttransplant. The median trough concentration was 99 ng/mL at Month 4 posttransplant and ranged between 46 to 75 ng/mL from Months 6 through Month 12 posttransplant [see *Clinical Pharmacology (12.8)*, *Clinical Studies (14.1)*].

Cyclosporine, USP Modified is to be administered as oral capsules twice daily unless cyclosporine oral solution or intravenous administration of cyclosporine cannot be avoided. Cyclosporine, USP Modified should be initiated as soon as possible, and no later

than 48 hours after reperfusion of the graft and dose adjusted to target concentrations from Day 5 onwards.

If impairment of renal function is progressive, the treatment regimen should be adjusted. In renal transplant patients, the cyclosporine dose should be based on cyclosporine whole blood trough concentrations [see *Clinical Pharmacology (12.8)*].

In renal transplantation, there are limited data regarding dosing everolimus with reduced cyclosporine trough concentrations of 25 to 50 ng/mL after 12 months. Everolimus has not been evaluated in clinical trials with other formulations of cyclosporine. Prior to dose reduction of cyclosporine, it should be ascertained that steady-state everolimus whole blood trough concentration is at least 3 ng/mL. There is an interaction of cyclosporine on everolimus, and consequently, everolimus concentrations may decrease if cyclosporine exposure is reduced [see *Drug Interactions (7.2)*].

## **2.5 Therapeutic Drug Monitoring (TDM) - Tacrolimus in Liver Transplant Patients**

Both tacrolimus doses and the target range for whole blood trough concentrations should be reduced, when given in a regimen with everolimus, in order to minimize the potential risk of nephrotoxicity [see *Warnings and Precautions (5.6)*, *Clinical Pharmacology (12.9)*].

The recommended tacrolimus therapeutic range when administered with everolimus are whole blood trough ( $C_{0h}$ ) concentrations of 3 to 5 ng/mL by three weeks after the first dose of everolimus (approximately Month 2) and through Month 12 posttransplant.

The median tacrolimus trough concentrations observed in the clinical trial ranged between 8.6 to 9.5 ng/mL at Weeks 2 and 4 posttransplant (prior to initiation of everolimus). The median tacrolimus trough concentrations ranged between 7 to 8.1 ng/mL at Weeks 5 and 6 posttransplant, between 5.2 to 5.6 ng/mL at Months 2 and 3 posttransplant, and between 4.3 to 4.9 ng/mL between Months 4 and 12 posttransplant [see *Clinical Pharmacology (12.9)*, *Clinical Studies (14.2)*].

Tacrolimus is to be administered as oral capsules twice daily unless intravenous administration of tacrolimus cannot be avoided.

In liver transplant patients, the tacrolimus dose should be based on tacrolimus whole blood trough concentrations [see *Clinical Pharmacology (12.9)*].

In liver transplantation, there are limited data regarding dosing everolimus with reduced tacrolimus trough concentrations of 3 to 5 ng/mL after 12 months. Prior to dose reduction of tacrolimus, it should be ascertained that the steady-state everolimus whole blood trough concentration is at least 3 ng/mL. Unlike the interaction between cyclosporine and everolimus, tacrolimus does not affect everolimus trough concentrations, and consequently, everolimus concentrations do not decrease if the tacrolimus exposure is reduced.

## **2.6 Administration**

Everolimus tablets should be swallowed whole with a glass of water and not crushed before use.

Administer everolimus consistently approximately 12 hours apart with or without food to minimize variability in absorption and at the same time as cyclosporine or tacrolimus [see



*Clinical Pharmacology (12.3)].*

## 2.7 Hepatic Impairment

Whole blood trough concentrations of everolimus should be closely monitored in patients with impaired hepatic function. For patients with mild hepatic impairment (Child-Pugh Class A), the initial daily dose should be reduced by approximately one-third of the normally recommended daily dose. For patients with moderate or severe hepatic impairment (Child-Pugh Class B or C), the initial daily dose should be reduced to approximately one-half of the normally recommended daily dose. Further dose adjustment and/or dose titration should be made if a patient's whole blood trough concentration of everolimus, as measured by an LC/MS/MS assay, is not within the target trough concentration range of 3 to 8 ng/mL [see *Clinical Pharmacology (12.6)*].

## 3 DOSAGE FORMS AND STRENGTHS

Everolimus Tablets are available for oral administration as 0.25 mg, 0.5 mg, 0.75 mg, and 1 mg tablets.

**Table 1. Description of Everolimus Tablets**

Dosage Strength	0.25 mg	0.5 mg	0.75 mg	1 mg
Appearance	White to off white, round standard convex tablets.			White to off white, flat faced beveled edge tablet.
Imprint	Plain on one side, "54" over "414" debossed on the other side.	Plain on one side, "54" over "761" debossed on the other side.	Plain on one side, "54" over "044" debossed on the other side.	Plain on one side, "54" over "206" debossed on the other side.

## 4 CONTRAINDICATIONS

### 4.1 Hypersensitivity Reactions

Everolimus is contraindicated in patients with known hypersensitivity to everolimus, sirolimus, or to components of the drug product.

## 5 WARNINGS AND PRECAUTIONS

### 5.1 Management of Immunosuppression

Only physicians experienced in management of systemic immunosuppressant therapy in transplantation should prescribe everolimus. Patients receiving the drug should be managed in facilities equipped and staffed with adequate laboratory and supportive medical resources. The physician responsible for the maintenance therapy should have complete information requisite for the follow-up of the patient. In limited data with the complete elimination of calcineurin inhibition (CNI), there was an increased risk of acute

rejection.

## **5.2 Lymphomas and Other Malignancies**

Patients receiving immunosuppressants, including everolimus, are at increased risk of developing lymphomas and other malignancies, particularly of the skin. The risk appears to be related to the intensity and duration of immunosuppression rather than to the use of any specific agent.

As usual for patients with increased risk for skin cancer, exposure to sunlight and ultraviolet light should be limited by wearing protective clothing and using a sunscreen with a high protection factor.

## **5.3 Serious Infections**

Patients receiving immunosuppressants, including everolimus, are at increased risk of developing bacterial, viral, fungal, and protozoal infections, including opportunistic infections [see *Warnings and Precautions (5.13)*, *Adverse Reactions (6.1, 6.2)*]. These infections may lead to serious, including fatal, outcomes. Because of the danger of over-immunosuppression, which can cause increased susceptibility to infection, combination immunosuppressant therapy should be used with caution.

Antimicrobial prophylaxis for *Pneumocystis jirovecii (carinii)* pneumonia and prophylaxis for cytomegalovirus (CMV) is recommended in transplant recipients.

## **5.4 Kidney Graft Thrombosis**

An increased risk of kidney arterial and venous thrombosis, resulting in graft loss, has been reported, usually within the first 30 days posttransplantation [see *Boxed Warning*].

## **5.5 Hepatic Artery Thrombosis**

Mammalian target of rapamycin (mTOR) inhibitors are associated with an increase in hepatic artery thrombosis (HAT). Reported cases mostly have occurred within the first 30 days posttransplant and most also lead to graft loss or death. Therefore, everolimus should not be administered earlier than 30 days after liver transplant.

## **5.6 Everolimus and Calcineurin Inhibitor-Induced Nephrotoxicity**

In kidney transplant recipients, everolimus with standard dose cyclosporine increases the risk of nephrotoxicity resulting in a lower glomerular filtration rate. Reduced doses of cyclosporine are required for use in combination with everolimus in order to reduce renal dysfunction [see *Boxed Warning*, *Indications and Usage (1.1)*, *Clinical Pharmacology (12.8)*].

In liver transplant recipients, everolimus has not been studied with standard dose tacrolimus. Reduced doses of tacrolimus should be used in combination with everolimus in order to minimize the potential risk of nephrotoxicity [see *Indications and Usage (1.2)*, *Clinical Pharmacology (12.9)*].

Renal function should be monitored during the administration of everolimus. Consider switching to other immunosuppressive therapies if renal function does not improve after dose adjustments or if the dysfunction is thought to be drug related. Caution should be exercised when using other drugs which are known to impair renal function.

## 5.7 Heart Transplantation

In a clinical trial of *de novo* heart transplant patients, everolimus in an immunosuppressive regimen, with or without induction therapy, resulted in an increased mortality often associated with serious infections within the first three months posttransplantation compared to the control regimen. Use of everolimus in heart transplantation is not recommended.

## 5.8 Angioedema

Everolimus has been associated with the development of angioedema. The concomitant use of everolimus with other drugs known to cause angioedema, such as angiotensin converting enzyme (ACE) inhibitors may increase the risk of developing angioedema.

## 5.9 Wound Healing and Fluid Accumulation

Everolimus increases the risk of delayed wound healing and increases the occurrence of wound-related complications like wound dehiscence, wound infection, incisional hernia, lymphocele and seroma. These wound-related complications may require more surgical intervention. Generalized fluid accumulation, including peripheral edema (e.g., lymphoedema) and other types of localized fluid collection, such as pericardial and pleural effusions and ascites have also been reported.

## 5.10 Interstitial Lung Disease (ILD)/Non-Infectious Pneumonitis

A diagnosis of interstitial lung disease (ILD) should be considered in patients presenting with symptoms consistent with infectious pneumonia but not responding to antibiotic therapy and in whom infectious, neoplastic and other non-drug causes have been ruled out through appropriate investigations. Cases of ILD, implying lung intraparenchymal inflammation (pneumonitis) and/or fibrosis of non-infectious etiology, some reported with pulmonary hypertension [including pulmonary arterial hypertension (PAH)] as a secondary event, have occurred in patients receiving rapamycins and their derivatives, including everolimus. Most cases generally resolve on drug interruption with or without glucocorticoid therapy. However, fatal cases have also occurred.

## 5.11 Hyperlipidemia

Increased serum cholesterol and triglycerides, requiring the need for anti-lipid therapy, have been reported to occur following initiation of everolimus and the risk of hyperlipidemia is increased with higher everolimus whole blood trough concentrations [see *Adverse Reactions (6.2)*]. Use of anti-lipid therapy may not normalize lipid levels in patients receiving everolimus.

Any patient who is administered everolimus should be monitored for hyperlipidemia. If detected, interventions, such as diet, exercise, and lipid-lowering agents should be initiated as outlined by the National Cholesterol Education Program guidelines. The risk/benefit should be considered in patients with established hyperlipidemia before initiating an immunosuppressive regimen containing everolimus. Similarly, the risk/benefit of continued everolimus therapy should be reevaluated in patients with severe refractory hyperlipidemia. Everolimus has not been studied in patients with baseline cholesterol levels greater than 350 mg/dL.

Due to an interaction with cyclosporine, clinical trials of everolimus and cyclosporine in

kidney transplant patients strongly discouraged patients from receiving the HMG-CoA reductase inhibitors simvastatin and lovastatin. During everolimus therapy with cyclosporine, patients administered an HMG-CoA reductase inhibitor and/or fibrate should be monitored for the possible development of rhabdomyolysis and other adverse effects, as described in the respective labeling for these agents [see *Drug Interactions (7.7)*].

### **5.12 Proteinuria**

The use of everolimus in transplant patients has been associated with increased proteinuria. The risk of proteinuria increased with higher everolimus whole blood trough concentrations. Patients receiving everolimus should be monitored for proteinuria [see *Adverse Reactions (6.2)*].

### **5.13 Polyoma Virus Infections**

Patients receiving immunosuppressants, including everolimus, are at increased risk for opportunistic infections, including polyoma virus infections. Polyoma virus infections in transplant patients may have serious, and sometimes fatal, outcomes. These include polyoma virus-associated nephropathy (PVAN), mostly due to BK virus infection, and JC virus associated progressive multiple leukoencephalopathy (PML). PVAN has been observed in patients receiving immunosuppressants, including everolimus. PVAN is associated with serious outcomes; including deteriorating renal function and kidney graft loss [see *Adverse Reactions (6.2)*]. Patient monitoring may help detect patients at risk for PVAN. Reductions in immunosuppression should be considered for patients who develop evidence of PVAN or PML. Physicians should also consider the risk that reduced immunosuppression represents to the functioning allograft.

### **5.14 Interaction with Strong Inhibitors and Inducers of CYP3A4**

Coadministration of everolimus with strong CYP3A4 inhibitors (e.g., ketoconazole, itraconazole, voriconazole, clarithromycin, telithromycin, ritonavir, boceprevir, telaprevir) or strong CYP3A4 inducers (e.g., rifampin, rifabutin) is not recommended without close monitoring of everolimus whole blood trough concentrations [see *Drug Interactions (7)*].

### **5.15 Thrombotic Microangiopathy/Thrombotic Thrombocytopenic Purpura/Hemolytic Uremic Syndrome**

The concomitant use of everolimus with cyclosporine may increase the risk of thrombotic microangiopathy (TMA)/thrombotic thrombocytopenic purpura (TTP)/hemolytic uremic syndrome (HUS). Monitor hematologic parameters [see *Adverse Reactions (6.2)*].

### **5.16 New Onset Diabetes After Transplant**

Everolimus has been shown to increase the risk of new onset diabetes mellitus after transplant. Blood glucose concentrations should be monitored closely in patients using everolimus.

### **5.17 Embryo-Fetal Toxicity**

Based on animal studies and the mechanism of action [see *Clinical Pharmacology (12.1)*], everolimus may cause fetal harm when administered to a pregnant woman. In animal

studies, everolimus caused embryo-fetal toxicity when administered during the period of organogenesis at maternal exposures that were equal to or less than human exposures at the recommended lowest starting dose. Advise pregnant women of the potential risk to a fetus. Advise female patients of reproductive potential to avoid becoming pregnant and to use effective contraception while using everolimus and for 8 weeks after ending treatment [see *Use in Specific Populations (8.1, 8.3)*].

### **5.18 Male Infertility**

Azoospermia or oligospermia may be observed [see *Adverse Reactions (6.2), Nonclinical Toxicology (13.1)*]. Everolimus is an anti-proliferative drug and affects rapidly dividing cells like the germ cells.

### **5.19 Immunizations**

The use of live vaccines should be avoided during treatment with everolimus; examples include (not limited to) the following: intranasal influenza, measles, mumps, rubella, oral polio, BCG, yellow fever, varicella, and TY21a typhoid vaccines.

### **5.20 Interaction with Grapefruit Juice**

Grapefruit and grapefruit juice inhibit cytochrome P450 3A4 and P-gp activity and should therefore be avoided with concomitant use of everolimus and cyclosporine or tacrolimus.

### **5.21 Patients with Hereditary Disorders/Other**

Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take everolimus as this may result in diarrhea and malabsorption.

### **5.22 Cannabidiol Drug Interactions**

When cannabidiol and everolimus tablets are coadministered, closely monitor for an increase in everolimus blood levels and for adverse reactions suggestive of everolimus toxicity. A dose reduction of everolimus should be considered as needed when everolimus tablets are coadministered with cannabidiol [see *Dosage and Administration (2.3), Drug Interactions (7.13)*].

## **6 ADVERSE REACTIONS**

### **6.1 Serious and Otherwise Important Adverse Reactions**

The following adverse reactions are discussed in greater detail in other sections of the label.

- Hypersensitivity Reactions [see *Contraindications (4.1)*]
- Lymphomas and Other Malignancies [see *Boxed Warning, Warnings and Precautions (5.2)*]
- Serious Infections [see *Warnings and Precautions (5.3)*]
- Kidney Graft Thrombosis [see *Warnings and Precautions (5.4)*]
- Hepatic Artery Thrombosis [see *Warnings and Precautions (5.5)*]

- Everolimus and Calcineurin Inhibitor-Induced Nephrotoxicity [see *Warnings and Precautions* (5.6)]
- Heart Transplantation [see *Warnings and Precautions* (5.7)]
- Angioedema [see *Warnings and Precautions* (5.8)]
- Wound Healing and Fluid Accumulation [see *Warnings and Precautions* (5.9)]
- Interstitial Lung Disease/Non-Infectious Pneumonitis [see *Warnings and Precautions* (5.10)]
- Hyperlipidemia [see *Warnings and Precautions* (5.11)]
- Proteinuria [see *Warnings and Precautions* (5.12)]
- Polyoma Virus Infections [see *Warnings and Precautions* (5.13)]
- Thrombotic Microangiopathy/Thrombotic Thrombocytopenic Purpura/Hemolytic Uremic Syndrome (TMA/TTP/HUS) [see *Warnings and Precautions* (5.15)]
- New Onset Diabetes After Transplant [see *Warnings and Precautions* (5.16)]
- Male Infertility [see *Warnings and Precautions* (5.18)]

## 6.2 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, the adverse reaction rates observed cannot be directly compared to rates in other trials and may not reflect the rates observed in clinical practice.

### *Kidney Transplantation*

The data described below reflect exposure to everolimus in an open-label, randomized trial of *de novo* kidney transplant patients of concentration-controlled everolimus at an initial everolimus starting dose of 1.5 mg per day [target trough concentrations 3 to 8 ng/mL with reduced exposure cyclosporine (N=274) compared to mycophenolic acid (N=273) with standard exposure cyclosporine]. All patients received basiliximab induction therapy and corticosteroids. The population was between 18 and 70 years, more than 43% were 50 years of age or older (mean age was 46 years in the everolimus group, 47 years control group); a majority of recipients were male (64% in the everolimus group, 69% control group); and a majority of patients were Caucasian (70% in the everolimus group, 69% control group). Demographic characteristics were comparable between treatment groups. The most frequent diseases leading to transplantation were balanced between groups and included hypertension/nephrosclerosis, glomerulonephritis/glomerular disease and diabetes mellitus. Significantly more patients discontinued everolimus 1.5 mg per day treatment (83/277, 30%) than discontinued the control regimen (60/277, 22%). Of those patients who prematurely discontinued treatment, most discontinuations were due to adverse reactions: 18% in the everolimus group compared to 9% in the control group (p-value = 0.004). This difference was more prominent between treatment groups among female patients. In those patients discontinuing study medication, adverse reactions were collected up to 7 days after study medication discontinuation and serious adverse reactions up to 30 days after study medication discontinuation.

Discontinuation of everolimus at a higher dose (3 mg per day) was 95/279, 34%, including 20% due to adverse reactions, and this regimen is not recommended (see below).

The overall incidences of serious adverse reactions were 57% (159/278) in the everolimus group and 52% (141/273) in the mycophenolic acid group. Infections and infestations reported as serious adverse reactions had the highest incidence in both

groups [20% (54/274) in the everolimus group and 25% (69/273) in the control group]. The difference was mainly due to the higher incidence of viral infections in the mycophenolic acid group, mainly CMV and BK virus infections. Injury, poisoning and procedural complications reported as serious adverse reactions had the second highest incidence in both groups [14% (39/274) in the everolimus group and 12% (32/273) in the control group] followed by renal and urinary disorders [10% (28/274) in the everolimus group and 13% (36/273) in the control group] and vascular disorders [10% (26/274) in the everolimus group and 7% (20/273) in the control group].

A total of 13 patients died during the first 12 months of study; 7 (3%) in the everolimus group and 6 (2%) in the control group. The most common causes of death across the study groups were related to cardiac conditions and infections.

There were 12 (4%) graft losses in the everolimus group and 8 (3%) in the control group over the 12-month study period. Of the graft losses, 4 were due to renal artery and two due to renal vein thrombosis in the everolimus group (2%) compared to two renal artery thromboses in the control group (1%) [*see Boxed Warning, Warnings and Precautions (5.4)*].

The most common (greater than or equal to 20%) adverse reactions observed in the everolimus group were: peripheral edema, constipation, hypertension, nausea, anemia, urinary tract infection, and hyperlipidemia.

### Infections

The overall incidence of bacterial, fungal and viral infections reported as adverse reactions was higher in the control group (68%) compared to the everolimus group (64%) and was primarily due to an increased number of viral infections (21% in the control group and 10% in the everolimus group). The incidence of CMV infections reported as adverse reactions was 8% in the control group compared to 1% in the everolimus group; and 3% of the serious CMV infections in the control group versus 0% in the everolimus group were considered serious [*see Warnings and Precautions (5.3)*].

### BK Virus

BK virus infections were lower in incidence in the everolimus group (2 patients, 1%) compared to the control group (11 patients, 4%). One of the two BK virus infections in the everolimus group, and two of the 11 BK virus infections in the control group were also reported as serious adverse reactions. BK virus infections did not result in graft loss in any of the groups in the clinical trial.

### Wound Healing and Fluid Collections

Wound healing-related reactions were identified through a retrospective search and request for additional data. The overall incidence of wound-related reactions, including lymphocele, seroma, hematoma, dehiscence, incisional hernia, and infections was 35% in the everolimus group compared to 26% in the control group. More patients required intraoperative repair debridement or drainage of incisional wound complications and more required drainage of lymphoceles and seromas in the everolimus group compared to control.

Adverse reactions due to major fluid collections such as edema and other types of fluid collections was 45% in the everolimus group and 40% in the control group [*see Warnings and Precautions (5.9)*].

## Neoplasms

Adverse reactions due to malignant and benign neoplasms were reported in 3% of patients in the everolimus group and 6% in the control group. The most frequently reported neoplasms in the control group were basal cell carcinoma, squamous cell carcinoma, skin papilloma and seborrheic keratosis. One patient in the everolimus group who underwent a melanoma excision prior to transplantation died due to metastatic melanoma [see *Boxed Warning, Warnings and Precautions (5.2)*].

## New Onset Diabetes Mellitus (NODM)

NODM reported based on adverse reactions and random serum glucose values, was 9% in the everolimus group compared to 7% in the control group.

## Endocrine Effects in Males

In the everolimus group, serum testosterone levels significantly decreased while the FSH levels significantly increased without significant changes being observed in the control group. In both the everolimus and the control groups mean testosterone and FSH levels remained within the normal range with the mean FSH level in the everolimus group being at the upper limit of the normal range (11.1 U/L). More patients were reported with erectile dysfunction in the everolimus treatment group compared to the control group (5% compared to 2%, respectively).

Table 2 compares the incidence of treatment-emergent adverse reactions reported with an incidence of greater than or equal to 10% for patients receiving everolimus with reduced dose cyclosporine or mycophenolic acid with standard dose cyclosporine. Within each MedDRA system organ class, the adverse reactions are presented in order of decreasing frequency.

**Table 2. Incidence Rates of Frequent (Greater Than or Equal to 10% in any Treatment Group) Adverse Reactions (Safety Population\*)**

<b>Adverse Reactions</b>	<b>Everolimus 1.5 mg with reduced exposure cyclosporine N=274 n (%)</b>	<b>Mycophenolic acid 1.44 g with standard exposure cyclosporine N=273 n (%)</b>
<b>Any adverse reactions*</b>	271 (99)	270 (99)
<b>Blood lymphatic system disorders</b>	93 (34)	111 (41)
Anemia	70 (26)	68 (25)
Leukopenia	8 (3)	33 (12)
<b>Gastrointestinal disorders</b>	196 (72)	207 (76)
Constipation	105 (38)	117 (43)
Nausea	79 (29)	85 (31)



Diarrhea	51 (19)	54 (20)
Vomiting	40 (15)	60 (22)
Abdominal pain	36 (13)	42 (15)
Dyspepsia	12 (4)	31 (11)
Abdominal pain upper	9 (3)	30 (11)
<b>General disorders and administration site conditions</b>	181 (66)	160 (59)
Edema peripheral	123 (45)	108 (40)
Pyrexia	51 (19)	40 (15)
Fatigue	25 (9)	28 (10)
<b>Infections and infestations</b>	169 (62)	185 (68)
Urinary tract infection	60 (22)	63 (23)
Upper respiratory tract infection	44 (16)	49 (18)
<b>Injury, poisoning and procedural complications</b>	163 (60)	163 (60)
Incision-site pain	45 (16)	47 (17)
Procedural pain	40 (15)	37 (14)
<b>Investigations</b>	137 (50)	133 (49)
Blood creatinine increased	48 (18)	59 (22)
<b>Metabolism and nutrition disorders</b>	222 (81)	199 (73)
Hyperlipidemia	57 (21)	43 (16)
Hyperkalemia	49 (18)	48 (18)
Hypercholesterolemia	47 (17)	34 (13)
Dyslipidemia	41 (15)	24 (9)
Hypomagnesemia	37 (14)	40 (15)

Hypophosphatemia	35 (13)	35 (13)
Hyperglycemia	34 (12)	38 (14)
Hypokalemia	32 (12)	32 (12)
<b>Musculoskeletal and connective tissue disorders</b>	112 (41)	105 (39)
Pain in extremity	32 (12)	29 (11)
Back pain	30 (11)	28 (10)
<b>Nervous system disorders</b>	92 (34)	109 (40)
Headache	49 (18)	40 (15)
Tremor	23 (8)	38 (14)
<b>Psychiatric disorders</b>	90 (33)	72 (26)
Insomnia	47 (17)	43 (16)
<b>Renal and urinary disorders</b>	112 (41)	124 (45)
Hematuria	33 (12)	33 (12)
Dysuria	29 (11)	28 (10)
<b>Respiratory, thoracic and mediastinal disorders</b>	86 (31)	93 (34)
Cough	20 (7)	30 (11)
<b>Vascular disorders</b>	122 (45)	124 (45)
Hypertension	81 (30)	82 (30)

\*The safety analysis population defined as all randomized kidney transplant patients who received at least one dose of treatment and had at least one post-baseline safety assessment.

Adverse reaction that occurred with at least a 5% higher frequency in the everolimus 1.5 mg group compared to the control group were: peripheral edema (45% compared to 40%), hyperlipidemia (21% compared to 16%), dyslipidemia (15% compared to 9%), and stomatitis/mouth ulceration (8% compared to 3%).

A third treatment group of everolimus 3 mg per day (1.5 mg twice daily; target trough concentrations 6 to 12 ng/mL) with reduced exposure cyclosporine was included in the study described above. Although as effective as the lower dose everolimus group, the overall safety was worse and consequently higher doses of everolimus cannot be

recommended. Out of 279 patients, 95 (34%) discontinued the study medication with 57 (20%) doing so because of adverse reactions. The most frequent adverse reactions leading to discontinuation of everolimus when used at this higher dose were injury, poisoning and procedural complications (everolimus 1.5 mg: 5%, everolimus 3 mg: 7%, and control: 2%), infections (2%, 6%, and 3%, respectively), renal and urinary disorders (4%, 7%, and 4%, respectively), and gastrointestinal disorders (1%, 3%, and 2%).

The combination of fixed-dose everolimus and standard doses of cyclosporine in previous kidney clinical trials resulted in frequent elevations of serum creatinine with higher mean and median serum creatinine values observed than in the current study with reduced exposure cyclosporine. These results indicate that everolimus increases the cyclosporine-induced nephrotoxicity, and, therefore, should only be used in a concentration-controlled regimen with reduced exposure cyclosporine [see *Boxed Warning, Indications and Usage (1.1), Warnings and Precautions (5.6)*].

### *Liver Transplantation*

The data described below reflect exposure to everolimus starting 30 days after transplantation in an open-label, randomized trial of liver transplant patients. Seven hundred and nineteen (719) patients who fulfilled the inclusion/exclusion criteria [see *Clinical Studies (14.2)*] were randomized into one of the three treatment groups of the study. During the first 30 days prior to randomization, patients received tacrolimus and corticosteroids, with or without mycophenolate mofetil (about 70% to 80% received MMF). No induction antibody was administered. At randomization, MMF was discontinued and patients were randomized to everolimus initial dose of 1 mg twice per day (2 mg daily) and adjusted to protocol specified target trough concentrations of 3 to 8 ng/mL with reduced exposure tacrolimus [protocol specified target troughs 3 to 5 ng/mL] (N=245) [see *Clinical Pharmacology (12.7, 12.9)*] or to a control group of standard exposure tacrolimus [protocol-specified target troughs 8 to 12 ng/mL up to Month 4 posttransplant, then 6 to 10 ng/mL Month 4 through Month 12 posttransplant] (N=241). A third randomized group was discontinued prematurely [see *Clinical Studies (14.2)*] and is not described in this section.

The population was between 18 and 70 years, more than 50% were 50 years of age (mean age was 54 years in the everolimus group, 55 years in the tacrolimus control group); 74% were male in both everolimus and control groups, respectively, and a majority were Caucasian (86% everolimus group, 80% control group). Demographic characteristics were comparable between treatment groups. The most frequent diseases leading to transplantation were balanced between groups. The most frequent causes of end-stage liver disease (ESLD) were alcoholic cirrhosis, hepatitis C, and hepatocellular carcinoma and were balanced between groups.

Twenty-seven percent (27%) discontinued study drug in the everolimus group compared with 22% for the tacrolimus control group during the first 12 months of study. The most common reason for discontinuation of study medication was due to adverse reactions (19% and 11%, respectively), including proteinuria, recurrent hepatitis C, and pancytopenia in the everolimus group. At 24 months, the rate of discontinuation of study medication in liver transplant patients was greater for the everolimus group (42%) compared to tacrolimus control group (33%).

The overall incidences of serious adverse reactions were 50% (122/245) in the everolimus group and 43% (104/241) in the control group at 12 months and similar at 24 months (56% and 54%, respectively). Infections and infestations were reported as

serious adverse reactions with the highest incidence followed by gastrointestinal disorders and hepatobiliary disorders.

During the first 12 months of study, 13 deaths were reported in the everolimus group (one patient never took everolimus). In the same 12-month period, 7 deaths were reported in the tacrolimus control group. Deaths occurred in both groups for a variety of reasons and were mostly associated with liver-related issues, infections and sepsis. In the following 12 months of study, four additional deaths were reported in each treatment group.

The most common adverse reactions (reported for greater or equal to 10% patients in any group) in the everolimus group were: diarrhea, headache, peripheral edema, hypertension, nausea, pyrexia, abdominal pain, and leukopenia (see *Table 3*).

### Infections

The overall incidence of infections reported as adverse reactions was 50% for everolimus and 44% in the control group and similar at 24 months (56% and 52%, respectively). The types of infections were reported as follows: bacterial 16% vs 12%, viral 17% vs 13%; and fungal infections 2% vs 5% for everolimus and control, respectively [see *Warnings and Precautions (5.3)*].

### Wound Healing and Fluid Collections

Wound healing complications were reported as adverse reactions for 11% of patients in the everolimus group compared to 8% of patients in the control group up to 24 months. Pleural effusions were reported in 5% in both groups, and ascites in 4% of patients in the everolimus group and 3% in the control arm.

### Neoplasms

Malignant and benign neoplasms were reported as adverse reactions in 4% of patients in the everolimus group and 7% in the control group at 12 months. In the everolimus group, 3 malignant tumors were reported compared to 9 cases in the control group. For the everolimus group this included lymphoma, lymphoproliferative disorder and a hepatocellular carcinoma, and for the control group included Kaposi's sarcoma (2), metastatic colorectal cancer, glioblastoma, malignant hepatic neoplasm, pancreatic neuroendocrine tumor, hemophagocytic histiocytosis, and squamous cell carcinomas. At 24 months, the rates of malignancies were similar (10% and 11%, respectively) [see *Boxed Warning, Warnings and Precautions (5.2)*].

### Lipid Abnormalities

Hyperlipidemia adverse reactions (including the preferred terms: hyperlipidemia, hypercholesterolemia, blood cholesterol increased, blood triglycerides increased, hypertriglyceridemia lipids increased, total cholesterol/HDL ratio increased, and dyslipidemia) were reported for 24% everolimus patients, and 10% control patients at 12 months. Results were similar at 24 months (28% and 12%, respectively).

### New Onset of Diabetes After Transplant (NODAT)

Of the patients without diabetes mellitus at randomization, NODAT was reported in 32% in the everolimus group compared to 29% in the control group at 12 months and similar at 24 months.

Table 3 compares the incidence of treatment-emergent adverse reactions reported with

an incidence of greater than or equal to 10% for patients receiving everolimus with reduced exposure tacrolimus or standard dose tacrolimus from randomization to 24 months. Within each MedDRA system organ class, the adverse reactions are presented in order of decreasing frequency.

**Table 3. Incidence Rates of Most Frequent (Greater Than or Equal to 10% in Any Treatment Group) Adverse Reactions at 12 Months and 24 Months After Liver Transplantation (Safety Population\*)**

Adverse Reactions	12 months		24 months	
	Everolimus with reduced exposure tacrolimus N=245 n (%)	Tacrolimus standard exposure N=241 n (%)	Everolimus with reduced exposure tacrolimus N=245 n (%)	Tacrolimus standard exposure N=242 n (%)
<b>Any adverse reaction/infection</b>	232 (95)	229 (95)	236 (96)	237 (98)
<b>Blood &amp; lymphatic system disorders</b>	66 (27)	47 (20)	79 (32)	58 (24)
Leukopenia	29 (12)	12 (5)	31 (13)	12 (5)
<b>Gastrointestinal disorders</b>	136 (56)	121 (50)	148 (60)	138 (57)
Diarrhea	47 (19)	50 (21)	59 (24)	61 (25)
Nausea	33 (14)	28 (12)	36 (15)	33 (14)
Abdominal pain	32 (13)	22 (9)	37 (15)	31(13)
<b>General disorders and administration-site conditions</b>	94 (38)	85 (35)	113 (46)	98 (41)
Peripheral edema	43 (18)	26 (11)	49 (20)	31 (13)
Pyrexia	32 (13)	25 (10)	43 (18)	28 (12)
Fatigue	22 (9)	26 (11)	27 (11)	28 (12)
<b>Infections and infestations</b>	123 (50)	105 (44)	135 (56)	125 (52)
Hepatitis C**	28 (11)	19 (8)	33 (14)	24 (10)

<b>Investigations</b>	81 (33)	78 (32)	92 (38)	98 (41)
Liver function test abnormal	16 (7)	24 (10)	19 (8)	25 (10)
<b>Metabolism and nutrition disorders</b>	111 (45)	92 (38)	134 (55)	106 (44)
Hypercholesterolemia	23 (9)	6 (3)	27 (11)	9 (4)
<b>Nervous system disorders</b>	89 (36)	85 (35)	99 (40)	101 (42)
Headache	47 (19)	46 (19)	53 (22)	54 (22)
Tremor	23 (9)	29 (12)	25 (10)	37 (15)
Insomnia	14 (6)	19 (8)	17 (7)	24 (10)
<b>Renal and urinary disorder</b>	49 (20)	53 (22)	67 (27)	73 (30)
Renal failure	13 (5)	17 (7)	24 (10)	37 (15)
<b>Vascular disorders</b>	56 (23)	57 (24)	72 (29)	68 (28)
Hypertension	42 (17)	38 (16)	52 (21)	44 (18)

\*The safety analysis population is defined as all randomized liver transplant patients who received at least one dose of treatment and had at least one post-baseline safety assessment. Primary system organ classes are presented alphabetically.

\*\*No *de novo* hepatitis C cases were reported.

### Less Common Adverse Reactions

Less common adverse reactions, occurring overall in greater than or equal to 1% to less than 10% of either kidney or liver transplant patients treated with everolimus include:

*Blood and Lymphatic System Disorders:* anemia, leukocytosis, lymphadenopathy, neutropenia, pancytopenia, thrombocythemia, thrombocytopenia

*Cardiac and Vascular Disorders:* angina pectoris, atrial fibrillation, cardiac failure congestive, palpitations, tachycardia, hypertension, including hypertensive crisis, hypotension, deep-vein thrombosis

*Endocrine Disorders:* Cushingoid, hyperparathyroidism, hypothyroidism

*Eye Disorders:* cataract, conjunctivitis, vision blurred

*Gastrointestinal Disorders:* abdominal distention, abdominal hernia, ascites, constipation, dyspepsia, dysphagia, epigastric discomfort, flatulence, gastritis, gastroesophageal reflux disease, gingival hypertrophy, hematemesis, hemorrhoids, ileus, mouth ulceration,

peritonitis, stomatitis

*General Disorders and Administrative Site Conditions:* chest discomfort, chest pain, chills, fatigue, incisional hernia, inguinal hernia, malaise, edema, including generalized edema, pain

*Hepatobiliary Disorders:* hepatic enzyme increased, bile duct stenosis, bilirubin increased, cholangitis, cholestasis, hepatitis (non-infectious)

*Infections and Infestations:* BK virus infection [see *Warnings and Precautions (5.13)*], bacteremia, bronchitis, candidiasis, cellulitis, CMV, folliculitis, gastroenteritis, herpes infections, influenza, lower respiratory tract, nasopharyngitis, onychomycosis, oral candidiasis, oral herpes, osteomyelitis, pneumonia, pyelonephritis, sepsis, sinusitis, tinea pedis, upper respiratory tract infection, urethritis, urinary tract infection, wound infection [see *Boxed Warning, Warnings and Precautions (5.3)*].

*Injury Poisoning and Procedural Complications:* incision site complications, including infections, perinephric collection, seroma, wound dehiscence, incisional hernia, perinephric hematoma, localized intra-abdominal fluid collection, impaired healing, lymphocele, lymphorrhea

*Investigations:* blood alkaline phosphatase increased, blood creatinine increased, blood glucose increased, hemoglobin decreased, white blood cell count decreased, transaminases increased

*Metabolism and Nutrition Disorders:* blood urea increased, acidosis, anorexia, dehydration, diabetes mellitus [see *Warnings and Precautions (5.16)*], decreased appetite, fluid retention, gout, hypercalcemia, hypertriglyceridemia, hyperuricemia, hypocalcemia, hypokalemia, hypoglycemia, hypomagnesemia, hyponatremia, iron deficiency, new onset diabetes mellitus, vitamin B12 deficiency

*Musculoskeletal and Connective Tissues Disorders:* arthralgia, joint swelling, muscle spasms, muscular weakness, musculoskeletal pain, myalgia, osteoarthritis, osteonecrosis, osteopenia, osteoporosis, spondylitis

*Nervous System Disorders:* dizziness, hemiparesis, hypoesthesia, lethargy, migraine, neuralgia, paresthesia, somnolence, syncope, tremor

*Psychiatric Disorders:* agitation, anxiety, depression, hallucination

*Renal and Urinary Disorders:* bladder spasm, hydronephrosis, micturation urgency, nephritis interstitial, nocturia, pollakiuria, polyuria, proteinuria [see *Warnings and Precautions (5.12)*], pyuria, renal artery thrombosis [see *Boxed Warning, Warnings and Precautions (5.4)*], acute renal failure, renal impairment [see *Warnings and Precautions (5.6)*], renal tubular necrosis, urinary retention

*Reproductive System and Breast Disorders:* amenorrhea, benign prostatic hyperplasia, erectile dysfunction, ovarian cyst, scrotal edema

*Respiratory, Thoracic, Mediastinal Disorders:* atelectasis, bronchitis, dyspnea, cough, epistaxis, lower respiratory tract infection, nasal congestion, oropharyngeal pain, pleural effusions, pulmonary edema, rhinorrhea, sinus congestion, wheezing

*Skin and Subcutaneous Tissue Disorders:* acne, alopecia, dermatitis acneiform, ecchymosis, hirsutism, hyperhidrosis, hypertrichosis, night sweats, pruritus, rash

*Vascular Disorders:* venous thromboembolism (including deep vein thrombosis), phlebitis,

pulmonary embolism

Less common, serious adverse reactions occurring overall in less than 1% of either kidney or liver transplant patients treated with everolimus include:

- Angioedema [see *Warnings and Precautions (5.8)*]
- Interstitial Lung Disease/Non-Infectious Pneumonitis [see *Warnings and Precautions (5.10)*, *Adverse Reactions (6.1)*]
- Pericardial Effusions [see *Warnings and Precautions (5.9)*]
- Pancreatitis
- Thrombotic Microangiopathy (TMA), Thrombotic Thrombocytopenic Purpura (TTP), and Hemolytic Uremic Syndrome (HUS) [see *Warnings and Precautions (5.15)*]

### **6.3 Postmarketing Experience**

Adverse reactions identified from the postmarketing use of the combination regimen of everolimus and cyclosporine that are not specific to any one transplant indication include angioedema [see *Warnings and Precautions (5.8)*], erythroderma, leukocytoclastic vasculitis, pancreatitis, pulmonary alveolar proteinosis, and pulmonary embolism. There have also been reports of male infertility with mTOR inhibitors, including everolimus [see *Warnings and Precautions (5.18)*].

## **7 DRUG INTERACTIONS**

### **7.1 Interactions with Strong Inhibitors or Inducers of CYP3A4 and P-glycoprotein**

Everolimus is mainly metabolized by CYP3A4 in the liver and to some extent in the intestinal wall and is a substrate for the multidrug efflux pump, P-glycoprotein (P-gp). Therefore, absorption and subsequent elimination of systemically absorbed everolimus may be influenced by medicinal products that affect CYP3A4 and/or P-gp. Concurrent treatment with strong inhibitors (e.g., ketoconazole, itraconazole, voriconazole, clarithromycin, telithromycin, ritonavir, boceprevir, telaprevir) and inducers (e.g., rifampin, rifabutin) of CYP3A4 is not recommended. Inhibitors of P-gp (e.g., digoxin, cyclosporine) may decrease the efflux of everolimus from intestinal cells and increase everolimus blood concentrations. *In vitro*, everolimus was a competitive inhibitor of CYP3A4 and of CYP2D6, potentially increasing the concentrations of medicinal products eliminated by these enzymes. Thus, caution should be exercised when coadministering everolimus with CYP3A4 and CYP2D6 substrates with a narrow therapeutic index [see *Dosage and Administration (2.3)*].

All *in vivo* interaction studies were conducted without concomitant cyclosporine. Pharmacokinetic interactions between everolimus and concomitantly administered drugs are discussed below. Drug interaction studies have not been conducted with drugs other than those described below.

### **7.2 Cyclosporine (CYP3A4/P-gp Inhibitor and CYP3A4 Substrate)**

The steady-state  $C_{max}$  and area under the curve (AUC) estimates of everolimus were significantly increased by coadministration of single dose cyclosporine [see *Clinical Pharmacology (12.5)*]. Dose adjustment of everolimus might be needed if the cyclosporine dose is altered [see *Dosage and Administration (2.3)*]. Everolimus had a



clinically minor influence on cyclosporine pharmacokinetics in transplant patients receiving cyclosporine (Neoral).

### **7.3 Ketoconazole and Other Strong CYP3A4 Inhibitors**

Multiple-dose ketoconazole administration to healthy volunteers significantly increased single dose estimates of everolimus  $C_{max}$ , AUC, and half-life. It is recommended that strong inhibitors of CYP3A4 (e.g., ketoconazole, itraconazole, voriconazole, clarithromycin, telithromycin, ritonavir, boceprevir, telaprevir) should not be coadministered with everolimus [see *Warnings and Precautions (5.14)*, *Clinical Pharmacology (12.5)*].

### **7.4 Erythromycin (Moderate CYP3A4 Inhibitor)**

Multiple-dose erythromycin administration to healthy volunteers significantly increased single dose estimates of everolimus  $C_{max}$ , AUC, and half-life. If erythromycin is coadministered, everolimus blood concentrations should be monitored and a dose adjustment made as necessary [see *Clinical Pharmacology (12.5)*].

### **7.5 Verapamil (CYP3A4 and P-gp Substrate)**

Multiple-dose verapamil administration to healthy volunteers significantly increased single dose estimates of everolimus  $C_{max}$  and AUC. Everolimus half-life was not changed. If verapamil is coadministered, everolimus blood concentrations should be monitored and a dose adjustment made as necessary [see *Clinical Pharmacology (12.5)*].

### **7.6 Atorvastatin (CYP3A4 Substrate) and Pravastatin (P-gp Substrate)**

Single-dose administration of everolimus with either atorvastatin or pravastatin to healthy subjects did not influence the pharmacokinetics of atorvastatin, pravastatin and everolimus, as well as total HMG-CoA reductase bioreactivity in plasma to a clinically relevant extent. However, these results cannot be extrapolated to other HMG-CoA reductase inhibitors. Patients should be monitored for the development of rhabdomyolysis and other adverse reactions as described in the respective labeling for these products.

### **7.7 Simvastatin and Lovastatin**

Due to an interaction with cyclosporine, clinical studies of everolimus with cyclosporine conducted in kidney transplant patients strongly discouraged patients with receiving HMG-CoA reductase inhibitors such as simvastatin and lovastatin [see *Warnings and Precautions (5.11)*].

### **7.8 Rifampin (Strong CYP3A4/P-gp Inducers)**

Pretreatment of healthy subjects with multiple-dose rifampin followed by a single dose of everolimus increased everolimus clearance and decreased the everolimus  $C_{max}$  and AUC estimates. Combination with rifampin is not recommended [see *Warnings and Precautions (5.14)*, *Clinical Pharmacology (12.5)*].

### **7.9 Midazolam (CYP3A4/5 Substrate)**

Single-dose administration of midazolam to healthy volunteers following administration of

multiple-dose everolimus indicated that everolimus is a weak inhibitor of CYP3A4/5. Dose adjustment of midazolam or other CYP3A4/5 substrates is not necessary when everolimus is coadministered with midazolam or other CYP3A4/5 substrates [see *Clinical Pharmacology (12.5)*].

### **7.10 Other Possible Interactions**

Moderate inhibitors of CYP3A4 and P-gp may increase everolimus blood concentrations (e.g., fluconazole; macrolide antibiotics; nicardipine, diltiazem; nelfinavir, indinavir, amprenavir). Inducers of CYP3A4 may increase the metabolism of everolimus and decrease everolimus blood concentrations (e.g., St. John's Wort [*Hypericum perforatum*]; anticonvulsants: carbamazepine, phenobarbital, phenytoin; efavirenz, nevirapine).

### **7.11 Octreotide**

Coadministration of everolimus and depot octreotide increased octreotide  $C_{min}$  by approximately 50%.

### **7.12 Tacrolimus**

There is little to no pharmacokinetic interaction of tacrolimus on everolimus, and consequently, dose adjustment of everolimus is not necessary when everolimus is coadministered with tacrolimus.

### **7.13 Cannabidiol**

The blood levels of everolimus may increase upon concomitant use with cannabidiol. When cannabidiol and everolimus are coadministered, closely monitor for an increase in everolimus blood levels and for adverse reactions suggestive of everolimus toxicity. A dose reduction of everolimus should be considered as needed when everolimus is coadministered with cannabidiol [see *Dosage and Administration (2.3)*, *Warnings and Precautions (5.22)*].

## **8 USE IN SPECIFIC POPULATIONS**

### **8.1 Pregnancy**

#### *Risk Summary*

Based on animal studies and the mechanism of action [see *Clinical Pharmacology (12.1)*], everolimus can cause fetal harm when administered to a pregnant woman. There are limited case reports of everolimus use in pregnant women; however, these reports are insufficient to inform a drug-associated risk of adverse developmental outcomes. Reproductive studies in animals have demonstrated that everolimus was maternally toxic in rabbits and caused embryo-fetal toxicities in rats and rabbits, at exposures near or below those achieved in human transplant patients. Advise pregnant women of the potential risk to a fetus.

The background risk of major birth defects and miscarriage for the indicated population is unknown; however, in the U.S. general population, the estimated background risk of major birth defects is 2% to 4% and of miscarriage is 15% to 20% of clinically

recognized pregnancies.

## *Data*

### Animal Data

Everolimus crossed the placenta and was toxic to the conceptus.

Everolimus administered daily to pregnant rats by oral gavage at 0.1 mg/kg (approximately one tenth the exposure in humans administered the lowest starting dose of 0.75 mg twice daily), from before mating through organogenesis, resulted in increased preimplantation loss and embryonic resorptions. These effects occurred in the absence of maternal toxicities.

Everolimus administered daily by oral gavage to pregnant rabbits during organogenesis resulted in abortions, maternal toxicity and lethality, and increased fetal resorptions. At these doses, exposure to everolimus (AUC) was approximately one-tenth-, one-half-, and one- and one-half-fold the exposures in humans administered the starting clinical dose, respectively.

In a pre- and post-natal development study in rats, animals were dosed from implantation through lactation. At a dose of 0.1 mg/kg (0.6 mg/m<sup>2</sup>), there were no adverse effects on delivery and lactation or signs of maternal toxicity; however, there were reductions in body weight (up to 9% reduction) and in survival of offspring (~5%). There were no drug-related effects on the developmental parameters (morphological development, motor activity, learning, or fertility assessment) in the offspring.

## **8.2 Lactation**

### *Risk Summary*

There is no data regarding the presence of everolimus in human milk, the effects on breastfed infants, or the effects on milk production. Everolimus and/or its metabolites are readily transferred into milk of lactating rats at a concentration 3.5 times higher than in maternal rat serum. In pre-post-natal and juvenile studies in rats, exposure to everolimus during the postnatal period caused developmental toxicity [see *Use in Specific Populations (8.1), Nonclinical Toxicology (13.2)*]. Advise lactating women not to breastfeed because of the potential for serious adverse reactions in infants exposed to everolimus.

## **8.3 Females and Males of Reproductive Potential**

### *Contraception*

Females should not be pregnant or become pregnant while receiving everolimus. Advise females of reproductive potential that animal studies have been performed showing everolimus to be harmful to the mother and developing fetus [see *Use in Specific Populations (8.1)*]. Females of reproductive potential are recommended to use highly effective contraception methods while receiving everolimus and up to 8 weeks after treatment has been stopped.

### *Infertility*

#### Females

Amenorrhea occurred in female patients taking everolimus [see *Adverse Reactions*

(6.2)]. Everolimus may cause preimplantation loss in females based on animal data [see *Nonclinical Toxicology*(13.1)].

Female fertility may be compromised by treatment with everolimus.

### Males

Everolimus treatment may impair fertility in males based on human [see *Warnings and Precautions* (5.18), *Adverse Reactions* (6.2, 6.3)] and animal findings [see *Nonclinical Toxicology*(13.1)].

## **8.4 Pediatric Use**

The safe and effective use of everolimus in kidney or liver transplant patients younger than 18 years of age has not been established.

## **8.5 Geriatric Use**

There is limited clinical experience on the use of everolimus in patients of age 65 years or older. There is no evidence to suggest that elderly patients will require a different dosage recommendation from younger adult patients [see *Clinical Pharmacology* (12.5)].

## **8.6 Hepatic Impairment**

Everolimus whole blood trough concentrations should be closely monitored in patients with impaired hepatic function. For patients with mild hepatic impairment (Child-Pugh Class A), the dose should be reduced by approximately one-third of the normally recommended daily dose. For patients with moderate or severe hepatic impairment (Child-Pugh Class B or C), the initial daily dose should be reduced to approximately half of the normally recommended daily dose. Further dose adjustment and/or dose titration should be made if a patient's whole blood trough concentration of everolimus, as measured by an LC/MS/MS assay, is not within the target trough concentration range of 3 to 8 ng/mL [see *Clinical Pharmacology* (12.6)].

## **8.7 Renal Impairment**

No dose adjustment is needed in patients with renal impairment [see *Clinical Pharmacology* (12.6)].

## **10 OVERDOSAGE**

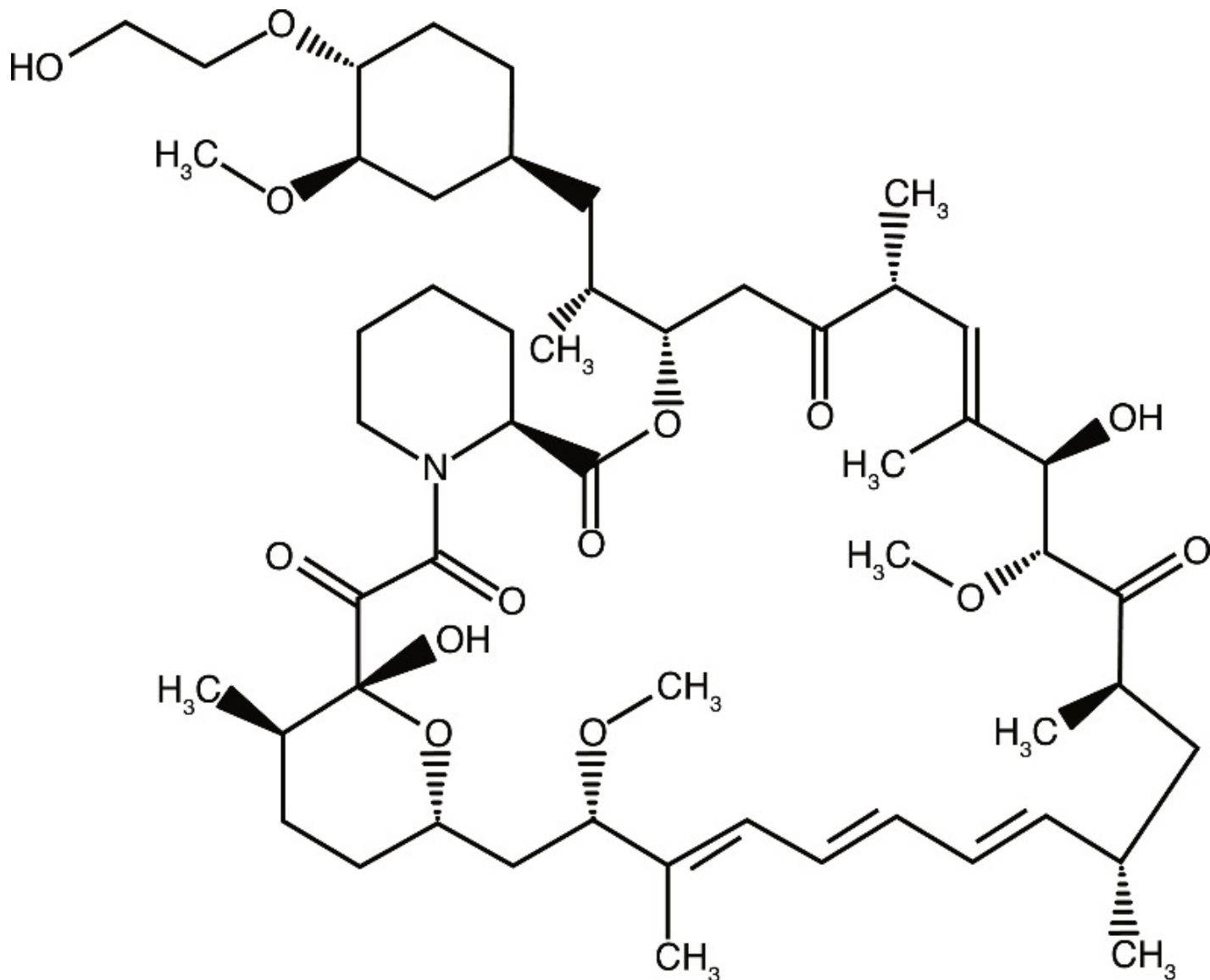
Reported experience with overdose in humans is very limited. There is a single case of an accidental ingestion of 1.5 mg everolimus in a 2-year-old child where no adverse reactions were observed. Single doses up to 25 mg have been administered to transplant patients with acceptable acute tolerability. Single doses up to 70 mg (without cyclosporine) have been given with acceptable acute tolerability. General supportive measures should be followed in all cases of overdose. Everolimus is not considered dialyzable to any relevant degree (less than 10% of everolimus removed within 6 hours of hemodialysis). In animal studies, everolimus showed a low acute toxic potential. No lethality or severe toxicity was observed after single oral doses of 2,000 mg/kg (limit test) in either mice or rats.

## 11 DESCRIPTION

Everolimus Tablets are a macrolide immunosuppressant.

The chemical name of everolimus is (1R, 9S, 12S, 15R, 16E, 18R, 19R, 21R, 23S, 24E, 26E, 28E, 30S, 32S, 35R)-1, 18-dihydroxy-12 -{(1R)-2-[(1S,3R,4R)4-(2-hydroxyethoxy)-3-methoxycyclohexyl]-1-methylethyl}-19,30-dimethoxy-15, 17, 21, 23, 29, 35-hexamethyl-11, 36-dioxa-4-aza-tricyclo[30.3.1.0<sup>4,9</sup>] hexatriaconta-16,24,26,28-tetraene-2, 3,10,14,20-pentaone.

The molecular formula is C<sub>53</sub>H<sub>83</sub>NO<sub>14</sub> and the molecular weight is 958.22 g/mol. The structural formula is:



Everolimus Tablets are available for oral administration containing either 0.25 mg, 0.5 mg, 0.75 mg, and 1 mg of everolimus, USP. Each tablet contains the following inactive ingredients: anhydrous lactose, butylated hydroxytoluene, crospovidone, hypromellose and magnesium stearate.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Everolimus inhibits antigenic and interleukin (IL-2 and IL-15) stimulated activation and proliferation of T and B lymphocytes.

In cells, everolimus binds to a cytoplasmic protein, the FK506 Binding Protein-12 (FKBP-12), to form an immunosuppressive complex (everolimus: FKBP-12) that binds to and inhibits the mammalian target of rapamycin (mTOR), a key regulatory kinase. In the presence of everolimus phosphorylation of p70 S6 ribosomal protein kinase (p70S6K), a substrate of mTOR, is inhibited. Consequently, phosphorylation of the ribosomal S6 protein and subsequent protein synthesis and cell proliferation are inhibited. The everolimus: FKBP-12 complex has no effect on calcineurin activity.

In rats and nonhuman primate models, everolimus effectively reduces kidney allograft rejection resulting in prolonged graft survival.

### 12.3 Pharmacokinetics

Everolimus pharmacokinetics have been characterized after oral administration of single and multiple doses to adult kidney transplant patients, hepatically-impaired patients, and healthy subjects.

#### *Absorption*

After oral dosing, peak everolimus concentrations occur 1 to 2 hours post dose. Over the dose range of 0.5 mg to 2 mg twice daily, everolimus  $C_{max}$  and AUC are dose proportional in transplant patients at steady-state.

#### *Food Effect*

In 24 healthy subjects, a high-fat breakfast (44.5 g fat) reduced everolimus  $C_{max}$  by 60%, delayed  $T_{max}$  by a median 1.3 hours, and reduced AUC by 16% compared with a fasting administration. To minimize variability, everolimus should be taken consistently with or without food [see *Dosage and Administration (2.6)*].

#### *Distribution*

The blood-to-plasma ratio of everolimus is concentration dependent ranging from 17% to 73% over the range of 5 ng/mL to 5,000 ng/mL. Plasma protein binding is approximately 74% in healthy subjects and in patients with moderate hepatic impairment. The apparent distribution volume associated with the terminal phase ( $V_z/F$ ) from a single-dose pharmacokinetic study in maintenance kidney transplant patients is 342 to 107 L (range: 128 to 589 L).

#### *Elimination*

#### Metabolism

Everolimus is a substrate of CYP3A4 and P-gp. Following oral administration, everolimus is the main circulating component in human blood. Six main metabolites of everolimus have been detected in human blood, including 3 monohydroxylated metabolites, 2 hydrolytic ring-opened products, and a phosphatidylcholine conjugate of everolimus. These metabolites were also identified in animal species used in toxicity studies and showed approximately 100 times less activity than everolimus itself.

## Excretion

After a single dose of radiolabeled everolimus was given to transplant patients receiving cyclosporine, the majority (80%) of radioactivity was recovered from the feces and only a minor amount (5%) was excreted in urine. Parent drug was not detected in urine and feces.

## Pharmacokinetics in Kidney Transplant Patients

Steady-state is reached by Day 4 with an accumulation in blood concentrations of 2- to 3-fold compared with the exposure after the first dose. Table 4 below provides a summary of the steady-state pharmacokinetic parameters.

**Table 4. Steady-State Pharmacokinetic Parameters (mean +/- SD) Following the Administration of 0.75 mg Twice Daily**

<b>C<sub>max</sub></b>	<b>T<sub>max</sub></b>	<b>AUC</b>	<b>CL/F<sup>1</sup></b>	<b>V<sub>c</sub>/F<sup>1</sup></b>	<b>Half-life (T<sub>1/2</sub>)</b>
11.1 ± 4.6 ng/mL	1 to 2 h	75 + 31 ng●hr/mL	8.8 L/h	110 L	30 ± 11 h

<sup>1</sup>Population pharmacokinetic analysis.

The half-life estimates from 12 maintenance renal transplant patients who received single doses of everolimus capsules at 0.75 mg or 2.5 mg with their maintenance cyclosporine regimen indicate that the pharmacokinetics of everolimus are linear over the clinically-relevant dose range. Results indicate the half-life of everolimus in maintenance renal transplant patients receiving single doses of 0.75 mg or

2.5 mg everolimus during steady-state cyclosporine treatment was 30 ± 11 hours (range: 19 to 53 hours).

## 12.5 Drug-Drug Interactions

Everolimus is known to be a substrate for both cytochrome CYP3A4 and P-gp. The pharmacokinetic interaction between everolimus and concomitantly administered drugs is discussed below. Drug interaction studies have not been conducted with drugs other than those described below [see *Warnings and Precautions (5.14), Drug Interactions (7)*].

### *Cyclosporine (CYP3A4/P-gp Inhibitor and CYP3A4 Substrate)*

Everolimus should be taken concomitantly with cyclosporine in kidney transplant patients. Everolimus concentrations may decrease when doses of cyclosporine are reduced, unless the everolimus dose is increased [see *Dosage and Administration (2.1), Drug Interactions (7.2)*].

In a single-dose study in healthy subjects, cyclosporine (Neoral) administered at a dose of 175 mg increased everolimus AUC by 168% (range: 46% to 365%) and C<sub>max</sub> by 82% (range: 25% to 158%) when administered with 2 mg everolimus compared with administration of everolimus alone [see *Drug Interactions (7.2)*].

### *Ketoconazole and Other Strong CYP3A4 Inhibitors*

Multiple-dose administration of 200 mg ketoconazole twice daily for 5 days to 12 healthy

volunteers significantly increased everolimus  $C_{max}$ , AUC, and half-life by 3.9-fold, 15-fold, and 89%, respectively, when coadministered with 2 mg everolimus. It is recommended that strong inhibitors of CYP3A4 (e.g., ketoconazole, itraconazole, voriconazole, clarithromycin, telithromycin, ritonavir, boceprevir, telaprevir) should not be coadministered with everolimus [see *Warnings and Precautions (5.14)*, *Drug Interactions (7.3)*].

#### *Erythromycin (Moderate CYP3A4 Inhibitor)*

Multiple-dose administration of 500 mg erythromycin 3 times daily for 5 days to 16 healthy volunteers significantly increased everolimus  $C_{max}$ , AUC, and half-life by 2-fold, 4.4-fold, and 39%, respectively, when coadministered with 2 mg everolimus. If erythromycin is coadministered, everolimus blood concentrations should be monitored and a dose adjustment made as necessary [see *Drug Interactions (7.4)*].

#### *Verapamil (CYP3A4 Inhibitor and P-gp Substrate)*

Multiple-dose administration of 80 mg verapamil 3 times daily for 5 days to 16 healthy volunteers significantly increased everolimus  $C_{max}$  and AUC by 2.3-fold and 3.5-fold, respectively, when coadministered with 2 mg everolimus. Everolimus half-life was not changed. If verapamil is coadministered, everolimus blood concentrations should be monitored and a dose adjustment made as necessary [see *Drug Interactions (7.5)*].

#### *Atorvastatin (CYP3A4 Substrate) and Pravastatin (P-gp Substrate)*

Following administration of a single dose of 2 mg everolimus to 12 healthy subjects, the concomitant administration of a single oral dose administration of atorvastatin 20 mg or pravastatin 20 mg only slightly decreased everolimus  $C_{max}$  and AUC by 9% and 10%, respectively. There was no apparent change in the mean  $T_{1/2}$  or median  $T_{max}$ . In the same study, the concomitant everolimus dose slightly increased the mean  $C_{max}$  of atorvastatin by 11% and slightly decreased the AUC by 7%. The concomitant everolimus dose decreased the mean  $C_{max}$  and AUC of pravastatin by 10% and 5%, respectively. No dosage adjustments are needed for concomitant administration of everolimus and atorvastatin and pravastatin [see *Drug Interactions (7.6)*].

#### *Midazolam (CYP3A4/5 Substrate)*

In 25 healthy male subjects, coadministration of a single dose of midazolam 4 mg oral solution with steady-state everolimus (10 mg daily dose for 5 days) resulted in a 25% increase in midazolam  $C_{max}$  and a 30% increase in midazolam AUC; whereas the terminal half-life of midazolam and the metabolic AUC-ratio (1-hydroxymidazolam/midazolam) were not affected [see *Drug Interactions (7.9)*].

#### *Rifampin (Strong CYP3A4 and P-gp Inducer)*

Pretreatment of 12 healthy subjects with multiple-dose rifampin (600 mg once-daily for 8 days) followed by a single dose of 4 mg everolimus increased everolimus clearance nearly 3-fold, and decreased  $C_{max}$  by 58% and AUC by 63%. Combination with rifampin is not recommended [see *Drug Interactions (7.8)*].

## **12.6 Specific Populations**

### *Hepatic Impairment*

Relative to the AUC of everolimus in subjects with normal hepatic function, the average AUC in 6 patients with mild hepatic impairment (Child-Pugh Class A) was 1.6-fold higher



following administration of a 10 mg single dose. In 2 independently studied groups of 8 and 9 patients with moderate hepatic impairment (Child-Pugh Class B) the average AUC was 2.1-fold and 3.3-fold higher following administration of a 2 mg or a 10 mg single dose, respectively; and in 6 patients with severe hepatic impairment (Child-Pugh Class C) the average AUC was 3.6-fold higher following administration of a

10 mg single dose. For patients with mild hepatic impairment (Child-Pugh Class A), the dose should be reduced by approximately one-third of the normally recommended daily dose. For patients with moderate or severe hepatic impairment (Child-Pugh Class B or C), the initial daily dose should be reduced to approximately one-half of the normally recommended daily dose. Further dose adjustment and/or dose titration should be made if a patient's whole blood trough concentration of everolimus, as measured by an LC/MS/MS assay, is not within the target trough concentration range of 3 to 8 ng/mL [see *Dosage and Administration (2.7)*].

### *Renal Impairment*

No pharmacokinetic studies in patients with renal impairment were conducted. Posttransplant renal function (creatinine clearance range: 11 to 107 mL/min) did not affect the pharmacokinetics of everolimus; therefore, no dosage adjustments are needed in patients with renal impairment.

### *Geriatrics*

A limited reduction in everolimus oral CL/F of 0.33% per year was estimated in adults (age range studied was 16 to 70 years). There is no evidence to suggest that elderly patients will require a different dosage recommendation from younger adult patients.

### *Race*

Based on analysis of population pharmacokinetics, oral clearance (CL/F) is, on average, 20% higher in black transplant patients.

## **12.7 Everolimus Whole Blood Concentrations Observed in Kidney and in Liver Transplant Patients**

### *Everolimus in Kidney Transplantation*

Based on exposure-efficacy and exposure-safety analyses of clinical trials and using an LC/MS/MS assay method, kidney transplant patients achieving everolimus whole blood trough concentrations greater than or equal to 3 ng/mL have been found to have a lower incidence of treated biopsy-proven acute rejection compared with patients whose trough concentrations were below 3 ng/mL. Patients who attained everolimus trough concentrations within the range of 6 to 12 ng/mL had similar efficacy and more adverse reactions than patients who attained lower trough concentrations between 3 to 8 ng/mL [see *Dosage and Administration (2.3)*].

In the kidney clinical trial [see *Clinical Studies (14.1)*], everolimus whole blood trough concentrations were measured at Days 3, 7, and 14 and Months 1, 2, 3, 4, 6, 7, 9, and 12. The proportion of patients receiving 0.75 mg twice daily everolimus treatment regimen who had everolimus whole blood trough concentrations within the protocol specified target range of 3 to 8 ng/mL at Days 3, 7, and 14 were 55%, 71% and 69%, respectively. Approximately 80% of patients had everolimus whole blood trough concentrations within the 3 to 8 ng/mL target range by Month 1 and remained stable within range through Month 12 posttransplant. The median everolimus trough

concentration for the 0.75 mg twice daily treatment group was between 3 and 8 ng/mL throughout the study duration.

### *Everolimus in Liver Transplantation*

In the liver clinical trial [see *Clinical Studies (14.2)*], everolimus dosing was initiated after 30 days following transplantation. Whole blood trough everolimus concentrations were measured within 5 days after first dose, followed by weekly intervals for 3 to 4 weeks, and then monthly thereafter. Approximately 49%, 37%, and 18% of patients, respectively, were below 3 ng/mL at 1, 2, and 4 weeks after initiation of everolimus dosing. The majority of patients (approximately 70% to 80%) had everolimus trough blood concentrations within the target range of 3 to 8 ng/mL from Month 2 through Month 24 posttransplant.

## **12.8 Cyclosporine Concentrations Observed in Kidney Transplant Patients**

In the kidney transplant clinical trial [see *Clinical Studies (14.1)*], the target cyclosporine whole blood trough concentration for the everolimus treatment arm of 0.75 mg twice daily were 100 to 200 ng/mL through Month 1 posttransplant, 75 to 150 ng/mL at Months 2 and 3 posttransplant, 50 to 100 ng/mL at Month 4 posttransplant, and 25 to 50 ng/mL from Month 6 through Month 12 posttransplant. Table 5 below provides a summary of the observed cyclosporine whole blood trough concentrations during the study.

**Table 5. Cyclosporine Trough Concentrations Over 12 Months Posttransplant - Kidney Study Median Values (ng/mL) with 10<sup>th</sup> and 90<sup>th</sup> Percentiles**

<b>Treatment Group</b>	<b>Visit</b>	<b>N</b>	<b>Target (ng/mL)</b>	<b>Median</b>	<b>10<sup>th</sup> Percentile</b>	<b>90<sup>th</sup> Percentile</b>
Everolimus 0.75 mg twice daily	Day 3	242	100 to 200	172	46	388
	Day 7	265	100 to 200	185	75	337
	Day 14	243	100 to 200	182	97	309
	Month 1	245	100 to 200	161	85	274
	Month 2	232	75 to 150	140	84	213
	Month 3	220	75 to 150	111	68	187
	Month 4	208	50 to 100	99	56	156
	Month 6	200	25 to 50	75	43	142
	Month 7	199	25 to 50	59	36	117
	Month 9	194	25 to 50	49	28	91
	Month 12	186	25 to 50	46	25	100

## **12.9 Tacrolimus Concentrations in Liver Transplant**

In the liver transplant clinical trial [see *Clinical Studies (14.2)*], the target tacrolimus whole blood trough concentrations were greater than or equal to 8 ng/mL in the first 30 days posttransplant. The protocol required that patients had a tacrolimus trough concentration of at least 8 ng/mL in the week prior to initiation of everolimus. Everolimus was initiated after 30 days posttransplant. At that time, the target tacrolimus trough concentrations were reduced to 3 to 5 ng/mL. Table 6 below provides a summary of the tacrolimus whole blood trough concentrations observed during the study through

Month 24 posttransplant.

**Table 6. Tacrolimus Trough Concentrations Over 24 Months Posttransplant - Liver Study Median Values (ng/mL) with 10<sup>th</sup> and 90<sup>th</sup> Percentiles**

<b>Treatment Group</b>	<b>Visit</b>	<b>N</b>	<b>Target (ng/mL)</b>	<b>Median</b>	<b>10<sup>th</sup> Percentile</b>	<b>90<sup>th</sup> Percentile</b>
Pre-dose group Everolimus 1 mg twice daily (initiated at Month 1)	Week 4	234	3 to 5	9.5	5.8	14.6
	Week 5	219	3 to 5	8.1	4.5	13.8
	Week 6	233	3 to 5	7.0	4.1	12.0
	Month 2	219	3 to 5	5.6	3.4	10.3
	Month 3	218	3 to 5	5.2	3.1	9.7
	Month 4	196	3 to 5	4.9	2.9	7.7
	Month 5	195	3 to 5	4.8	2.7	7.3
	Month 6	200	3 to 5	4.6	3.0	7.5
	Month 9	186	3 to 5	4.4	2.9	8.0
	Month 12	175	3 to 5	4.3	2.6	7.3
	Month 24	109	3 to 5	3.8	2.3	5.5

## **13 NONCLINICAL TOXICOLOGY**

### **13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility**

Everolimus was not carcinogenic in mice or rats when administered daily by oral gavage for 2 years at doses up to 0.9 mg/kg, the highest dose tested. In these studies, AUCs in mice were higher (at least 20 times) than those in humans receiving 0.75 mg twice daily, and AUCs in rats were in the same range as those in humans receiving 0.75 mg twice daily.

Everolimus was not mutagenic in the bacterial reverse mutation, the mouse lymphoma thymidine kinase assay, or the chromosome aberration assay using V79 Chinese hamster cells, or *in vivo* following two daily doses of 500 mg/kg in the mouse micronucleus assay.

In a 13-week male fertility oral gavage study in rats, testicular morphology was affected at 0.5 mg/kg and above, and sperm motility, sperm head count and plasma testosterone concentrations were diminished at 5 mg/kg which caused a decrease in male fertility. There was evidence of reversibility of these findings in animals examined after 13 weeks post-dosing. The 0.5 mg/kg dose in male rats resulted in AUCs in the range of clinical exposures, and the 5 mg/kg dose resulted in AUCs approximately 5 times the AUCs in humans receiving 0.75 mg twice daily.

Oral doses of everolimus in female rats greater or equal to 0.1 mg/kg (approximately 0.13-fold the estimated AUC<sub>0-24h</sub> in patients receiving the starting dose 0.75 mg twice daily) resulted in increased incidence of pre-implantation loss.

### **13.2 Animal Toxicology and/or Pharmacology**

In an oral neonatal and juvenile development study in rats, oral administration of everolimus from postnatal Day 7 to 70 produced dose-related delayed attainment of

developmental landmarks, including delayed eye-opening, delayed reproductive development in males and females, and increased latency time during the learning and memory phases were observed at doses as low as 0.15 mg/kg/day. Exposures in the rat at these doses were equal to or less than those obtained in adult human transplant patients.

## 14 CLINICAL STUDIES

### 14.1 Prevention of Organ Rejection After Kidney Transplantation

A 24-month, multi-national, open-label, randomized (1:1:1) trial was conducted comparing two concentration-controlled everolimus regimens of 1.5 mg per day starting dose (targeting 3 to 8 ng/mL using an LC/MS/MS assay method and 3 mg per day starting dose (targeting 6 to 12 ng/mL using an LC/MS/MS assay method) with reduced exposure cyclosporine and corticosteroids, to 1.44 g per day of mycophenolic acid with standard exposure cyclosporine and corticosteroids. The mean cyclosporine starting dose was 5.2, 5 and 5.7 mg/kg body weight/day in the everolimus 1.5 mg, 3 mg and in mycophenolic acid groups, respectively. The cyclosporine dose in the everolimus group was then adjusted to the blood trough concentration ranges indicated in Table 5, whereas in the mycophenolic acid group the target ranges were 200 to 300 ng/mL starting Day 5: 200 to 300 ng/mL, and 100 to 250 ng/mL from Month 2 to Month 12.

All patients received basiliximab induction therapy. The study population consisted of 18- to 70-year-old male and female low-to-moderate risk renal transplant recipients undergoing their first transplant. Low to moderate immunologic risk was defined in the study as an ABO blood type compatible first organ or tissue transplant recipient with anti-human leukocyte antigen (HLA) Class I panel reactive antibody (PRA) less than 20% by a complement dependent cytotoxicity-based assay, or less than 50% by a flow cytometry or ELISA-based assay, and with a negative T-cell cross match. Eight hundred thirty-three (833) patients were randomized after transplantation; 277 randomized to the everolimus 1.5 mg per day group, 279 to the everolimus 3 mg per day group and 277 to the mycophenolic acid 1.44 g per day group. The study was conducted at 79 renal transplant centers across Europe, South Africa, North and South America, and Asia-Pacific. There were no major baseline differences between treatment groups with regard to recipient or donor disease characteristics. The majority of transplant recipients in all groups (70% to 76%) had three or more HLA mismatches; mean percentage of panel reactive antibodies ranged from 1% to 2%. The rate of premature treatment discontinuation at 12 months was 30% and 22% in the everolimus 1.5 mg and control groups, respectively, ( $p=0.03$ , Fisher's exact test) and was more prominent between groups among female patients. Results at 12 months indicated that everolimus 1.5 mg per day is comparable to control with respect to efficacy failure, defined as treated biopsy-proven acute rejection\*, graft loss, death, or loss to follow-up. The percentage of patients experiencing this endpoint and each individual variable in the everolimus and control groups is shown in Table 7.

**Table 7. Efficacy Failure by Treatment Group (ITT Population) at 12 Months After Kidney Transplantation**

	<b>Everolimus 1.5 mg per day with</b>	<b>Mycophenolic acid 1.44 g per day with</b>
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	<b>reduced exposure CsA N=277 n (%)</b>	<b>standard exposure CsA N=277 n (%)</b>
<b>Efficacy Endpoints<sup>1</sup></b>		
Efficacy failure endpoint <sup>2</sup>	70 (25.3)	67 (24.2)
Treated biopsy proven acute rejection	45 (16.2)	47 (17.0)
Death	7 (2.5)	6 (2.2)
Graft loss	12 (4.3)	9 (3.2)
Loss to follow-up	12 (4.3)	9 (3.2)
Graft loss or death or loss to follow-up <sup>3</sup>	32 (11.6)	26 (9.4)
Graft loss or death	18 (6.5)	15 (5.4)
Loss to follow-up <sup>3</sup>	14 (5.1)	11 (4.0)

Abbreviation: CsA, cyclosporine.

\*Treated biopsy-proven acute rejection (tBPAR) was defined as a histologically confirmed acute rejection with a biopsy graded as IA, IB, IIA, IIB, or III according to 1997 Banff criteria that were treated with anti-rejection medication.

<sup>1</sup>The difference in rates (everolimus - mycophenolic acid) with 95% confidence interval (CI) for primary efficacy failure endpoint is 1.1% (-6.1%, 8.3%); and for the graft loss, death or loss to follow-up endpoint is 2.2% (-2.9%, 7.3%).

<sup>2</sup>Includes treated BPAR, graft loss, death or loss to follow-up by Month 12 where loss to follow-up represents patient who did not experience treated BPAR, graft loss or death and whose last contact date is prior to 12-month visit.

<sup>3</sup>Loss to follow-up (for Graft Loss, Death, or Loss to Follow-up) represents patient who did not experience death or graft loss and whose last contact date is prior to 12-month visit.

The estimated mean glomerular filtration rate [using the Modification of Diet in Renal Disease (MDRD) equation] for everolimus 1.5 mg (target trough concentrations 3 to 8 ng/mL) and mycophenolic acid groups were comparable at Month 12 in the intent-to-treat (ITT) population (Table 8).

**Table 8. Estimated Glomerular Filtration Rates (mL/min/1.73 m<sup>2</sup>) by MDRD at 12 Months After Kidney Transplantation\***

	<b>Everolimus 1.5 mg per</b>	<b>Mycophenolic acid</b>
--	------------------------------	--------------------------

<b>Month 12 GFR (MDRD)</b>	<b>day with reduced exposure CsA N=276</b>	<b>1.44 g per day with standard exposure CsA N=277</b>
<b>Mean (SD)</b>	54.6 (21.7)	52.3 (26.5)
<b>Median (range)</b>	55.0 (0 to 140.9)	50.1 (0.0 to 366.4)

Abbreviations: CsA, cyclosporine; MDRD, modification of diet in renal disease; SD, standard deviation.

\*Analysis based on using a subject's last observation carried forward for missing data at 12 months due to death or lost to follow-up data, a value of zero is used for subjects who experienced a graft loss.

Two earlier studies compared fixed doses of everolimus 1.5 mg per day and 3 mg per day, without TDM, combined with standard exposure cyclosporine and corticosteroids to mycophenolate mofetil 2 g per day and corticosteroids. Antilymphocyte antibody induction was prohibited in both studies. Both were multicenter, double-blind (for first 12 months), randomized trials (1:1:1) of 588 and 583 *de novo* renal transplant patients, respectively. The 12-month analysis of GFR showed increased rates of renal impairment in both the everolimus groups compared to the mycophenolate mofetil group in both studies. Therefore, reduced exposure cyclosporine should be used in combination with everolimus in order to avoid renal dysfunction and everolimus trough concentrations should be adjusted using TDM to maintain trough concentrations between 3 to 8 ng/mL [see *Boxed Warning, Dosage and Administration (2.4), Warnings and Precautions (5.6)*].

## **14.2 Prevention of Organ Rejection After Liver Transplantation**

A 24-month, multinational, open-label, randomized (1:1:1) trial was conducted in liver transplant patients starting 30 days posttransplant. During the first 30 days, after transplant and prior to randomization, patients received tacrolimus and corticosteroids, with or without mycophenolate mofetil. No induction antibody was administered. Approximately 70% to 80% of patients received at least one dose of mycophenolate mofetil at a median total daily dose of 1.5 g during the first 30 days. For eligibility, patients had to have a tacrolimus trough concentration of at least 8 ng/mL in the week prior to randomization.

At randomization, mycophenolate mofetil was discontinued and patients were randomized to one of two everolimus treatment groups [initial dose of 1 mg twice per day (2 mg daily) and adjusted to target trough concentrations using an LC/MS/MS assay of 3 to 8 ng/mL] either with reduced exposure of tacrolimus (target trough whole blood concentrations of 3 to 5 ng/mL) or tacrolimus elimination. In the tacrolimus elimination group, at Month 4 posttransplant, once the everolimus trough concentrations were within the target range of 6 to 10 ng/mL, reduced exposure tacrolimus was eliminated. The everolimus with tacrolimus elimination group was discontinued early due to higher incidence of acute rejection. In the control group, patients received standard exposure tacrolimus (target trough whole blood concentrations of 8 to 12 ng/mL tapered to 6 to 10 ng/mL by Month 4 posttransplant). All patients received corticosteroids during the trial.

The study population consisted of 18- to 70-year-old male and female liver transplant

recipients undergoing their first transplant, mean age was approximately 54 years, more than 70% of patients were male, and the majority of patients were Caucasian, with approximately 89% of patients per treatment group completing the study. Key stratification parameters of HCV status (31% to 32% HCV positive across groups) and renal function (mean baseline eGFR range 79 to 83 mL/min/1.73 m<sup>2</sup>) were also balanced between groups.

A total of 1,147 patients were enrolled into the run-in period of this trial. At 30 days posttransplant, a total 719 patients, who were eligible according to study inclusion/exclusion criteria, were randomized into 1 of 3 treatment groups: everolimus with reduced exposure tacrolimus; N=245, everolimus with tacrolimus elimination (tacrolimus elimination group); N=231, or standard dose/exposure tacrolimus (tacrolimus control); N=243. The study was conducted at 89 liver transplant centers across Europe, including the United Kingdom and Ireland, North and South America, and Australia.

Key inclusion criteria were recipients 18 to 70 years of age, eGFR greater or equal to 30 mL/min/1.73 m<sup>2</sup>, tacrolimus trough level of greater or equal to 8 ng/mL in the week prior to randomization, and the ability to take oral medication.

Key exclusion criteria were recipients of multiple solid organ transplants, history of malignancy (except hepatocellular carcinoma within Milan criteria), human immunodeficiency virus, and any surgical or medical condition which significantly alter the absorption, distribution, metabolism and excretion of study drug.

There were no major baseline differences between treatment groups with regard to recipient or donor disease characteristics. Mean MELD scores at time of transplantation, cold ischemia times (CIT), and ABO matching were similar across groups. Overall, the treatment groups were comparable with respect to the key determinants of liver transplantation.

The tacrolimus elimination group was stopped prematurely due to a higher incidence of acute rejection and adverse reactions leading to treatment discontinuation reported during the elimination phase of tacrolimus. Therefore, a treatment regimen of everolimus with tacrolimus elimination is not recommended.

Results up to 24 months are presented indicating that everolimus with reduced exposure tacrolimus is comparable to standard exposure tacrolimus with respect to efficacy failure, defined as treated biopsy-proven acute rejection, graft loss, death, or loss to follow-up throughout 12 to 24 months of treatment. The percentage of patients experiencing this endpoint and each individual variable in the everolimus and control group for each time interval is shown in Table 9.

**Table 9. Efficacy Failure by Treatment Group (ITT Population) at 12 and 24 Months After Liver Transplantation**

	<b>Everolimus with reduced exposure tacrolimus N=245 n (%)</b>	<b>Tacrolimus standard exposure N=243 n (%)</b>
<b>Efficacy endpoints<sup>1</sup> at 12 months</b>		
Composite efficacy failure endpoint <sup>1, 2</sup>	22 (9.0)	33 (13.6)

Treated biopsy proven acute rejection*	7 (2.9)	17 (7.0)
Death	13 (5.3)	7 (2.9)
Graft loss	6 (2.4)	3 (1.2)
Loss to follow-up <sup>2</sup>	4 (1.6)	9 (3.7)
Graft loss or death or loss to follow-up	18 (7.3)	18 (7.4)
Graft loss or death	14 (5.7)	8 (3.3)
Loss to follow-up	4 (1.6)	10 (4.1)
<b>Efficacy endpoints at 24 months</b>		
Composite efficacy failure endpoint <sup>2</sup>	45 (18.4)	53 (21.8)
Treated biopsy proven acute rejection	11 (4.5)	18 (7.4)
Death	17 (6.9)	11 (4.5)
Graft loss	9 (3.7)	7 (2.9)
Loss to follow-up <sup>2</sup>	18 (7.3)	23 (9.5)
Graft loss or death or loss to follow-up <sup>3</sup>	38 (15.5)	39 (16.0)
Graft loss or death	20 (8.2)	15 (6.2)
Loss to follow-up <sup>3</sup>	18 (7.3)	24 (9.9)

\*Treated biopsy-proven acute rejection (tBPAR) was defined as histologically confirmed acute rejection with a rejection activity index (RAI) greater than or equal to RAI score 3 that received anti-rejection treatment.

<sup>1</sup>The difference in rates (everolimus – control) at 12 months with 97.5% CI for efficacy failure endpoint based on normal approximation with Yates continuity correction is -4.6% (-11.4%, 2.2%); and for the graft loss, death or loss to follow-up endpoint is -0.1% (-5.4%, 5.3%).

<sup>2</sup>Loss to follow-up (for treated BPAR, graft loss, death or loss to follow-up) represents patients who did not experience treated BPAR, graft loss or death and whose last contact date is prior to 12- or 24-month visit.

<sup>3</sup>Loss to follow-up (for graft loss, death, or loss to follow-up) represents patients who did not experience death or graft loss and whose last contact date is prior to 12- or 24-month visit.

At Month 12, the estimated mean glomerular filtration rate (eGFR) using the MDRD equation for the everolimus group was 80.9 mL/min/1.73 m<sup>2</sup> and the tacrolimus control

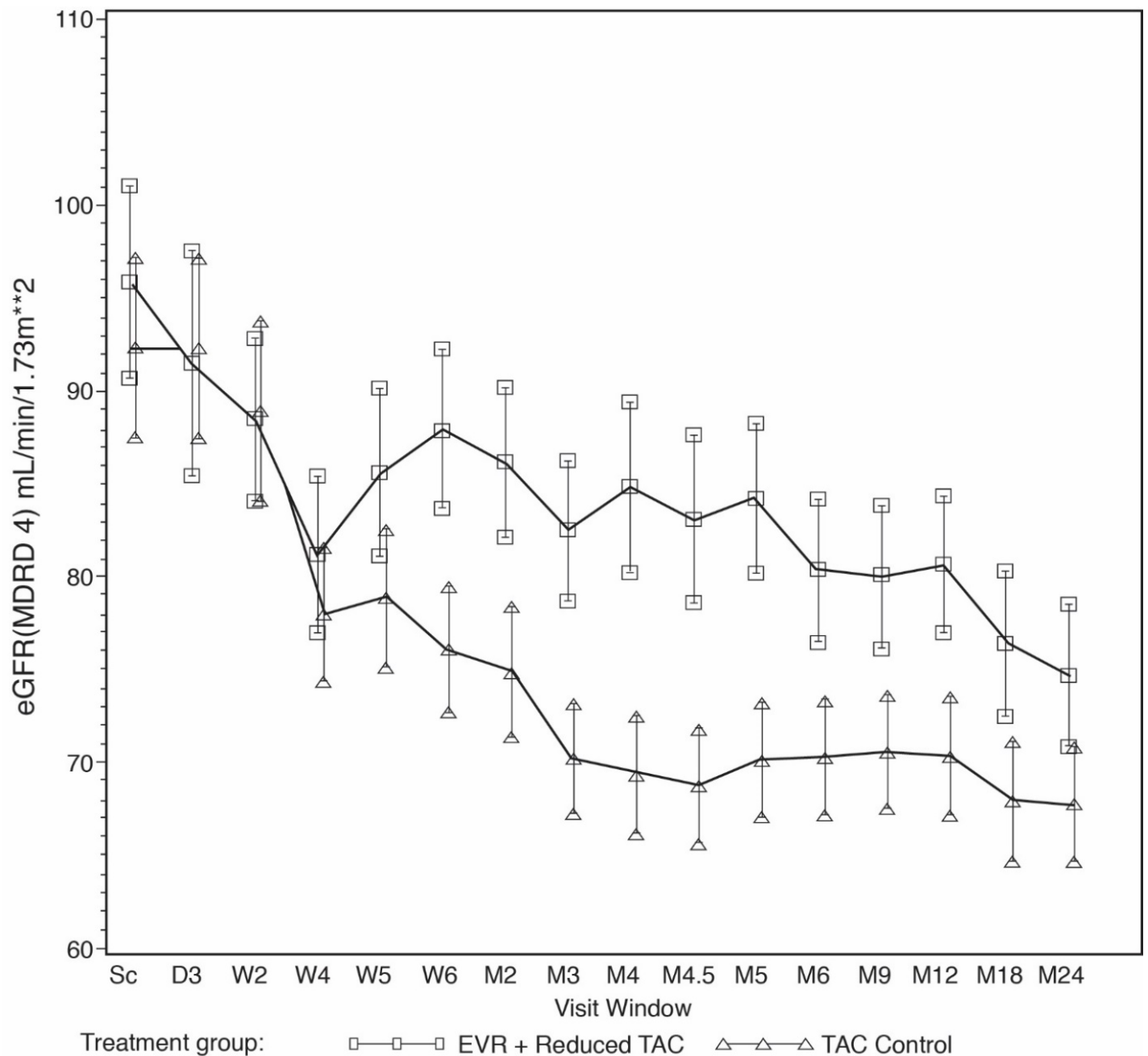


was 70.3 mL/min/1.73 m<sup>2</sup> in the ITT population. At Month 24, the eGFR using the MDRD equation for the everolimus group was 74.7 mL/min/1.73 m<sup>2</sup> and for the tacrolimus control the eGFR was 67.8 mL/min/1.73 m<sup>2</sup> (Table 10).

**Table 10. Estimated Glomerular Filtration Rates (mL/min/1.73 m<sup>2</sup>) by MDRD at 12 and 24 Months After Liver Transplantation**

<b>eGFR (MDRD)</b>	<b>Everolimus with reduced exposure tacrolimus</b>	<b>Tacrolimus standard exposure</b>
<b>Month 12</b>	N=215	N=209
<b>Mean (SD)</b>	80.9 (27.3)	70.3 (23.1)
<b>Median (range)</b>	78.3 (28.4 to 153.1)	66.4 (27.9 to 155.8)
<b>Month 24</b>	N=184	N=186
<b>Mean (SD)</b>	74.7 (26.1)	67.8 (21.0)
<b>Median (range)</b>	72.9 (20.3 to 151.6)	65.2 (27.0 to 148.9)

Abbreviations: eGFR, Estimated Glomerular Filtration Rates; MDRD, Modification Of Diet In Renal Disease; SD, standard deviation.



\* Everolimus dosing was initiated 30 days after transplantation

**Figure 1: Mean and 95% CI of eGFR (MDRD 4) [mL/min/1.73 m<sup>2</sup>] by Visit Window and Treatment After Liver Transplantation (ITT population-- 24-Month Analysis)\***

## 16 HOW SUPPLIED/STORAGE AND HANDLING

### Everolimus Tablets

**0.25 mg tablets are supplied as white to off white, round standard convex tablets, plain on one side and "54" over "414" debossed on the other side.**

NDC 0054-0470-21: Bottles of 60 Tablets

**0.5 mg tablets are supplied as white to off white, round standard convex tablets, plain on one side and "54" over "761" debossed on the other side.**

NDC 0054-0471-21: Bottles of 60 Tablets

**0.75 mg tablets are supplied as white to off white, round standard convex tablets, plain on one side and “54” over “044” debossed on the other side.**

NDC 0054-0472-21: Bottles of 60 Tablets

**1 mg are supplied as white to off white, round, flat faced beveled edge tablets, plain on one side and “54” over “206” debossed on the other side.**

NDC 0054-0604-21: Bottles of 60 Tablets

### Storage

Store at 20°C to 25°C (68°F to 77°F); excursions permitted between 15°C and 30°C (59°F and 86°F) [See USP Controlled Room Temperature].

Protect from light and moisture.

## **17 PATIENT COUNSELING INFORMATION**

Advise the patient to read the FDA-approved patient labeling (Medication Guide).

### *Administration*

Inform patients that everolimus should be taken orally twice a day approximately 12 hours apart consistently either with or without food.

Inform patients to avoid grapefruit and grapefruit juice, which increase blood drug concentrations of everolimus [see *Warnings and Precautions (5.20)*].

Advise patients that everolimus should be used concurrently with reduced doses of cyclosporine and that any change in doses of these medications should be made under physician supervision. A change in the cyclosporine dose may also require a change in the dosage of everolimus.

Inform patients of the necessity of repeated laboratory tests according to physician recommendations while they are taking everolimus.

### *Development of Lymphomas and Other Malignancies*

Inform patients they are at risk of developing lymphomas and other malignancies, particularly of the skin, due to immunosuppression. Advise patients to limit exposure to sunlight and ultraviolet (UV) light by wearing protective clothing and using a sunscreen with a high protection factor [see *Warnings and Precautions (5.2)*].

### *Increased Risk of Infection*

Inform patients they are at increased risk of developing a variety of infections, including opportunistic infections, due to immunosuppression. Advise patients to contact their physician if they develop any symptoms of infection [see *Warnings and Precautions (5.3, 5.13)*].

### *Kidney Graft Thrombosis*

Inform patients that everolimus has been associated with an increased risk of kidney arterial and venous thrombosis, resulting in graft loss, usually within the first 30 days posttransplantation [see *Warnings and Precautions (5.4)*].

### *Everolimus and Calcineurin Inhibitor-Induced Nephrotoxicity*

Advise patients of the risks of impaired kidney function with the combination of everolimus and cyclosporine as well as the need for routine blood concentration monitoring for both drugs. Advise patients of the importance of serum creatinine monitoring [see *Warnings and Precautions (5.6)*].

#### *Angioedema*

Inform patients of the risk of angioedema and that concomitant use of ACE inhibitors may increase this risk. Advise patients to seek prompt medical attention if symptoms occur [see *Warnings and Precautions (5.8)*].

#### *Wound Healing Complications and Fluid Accumulation*

Inform patients that the use of everolimus has been associated with impaired or delayed wound healing, fluid accumulation and the need for careful observation of their incision site [see *Warnings and Precautions (5.9)*].

#### *Interstitial Lung Disease (ILD)/Non-Infectious Pneumonitis*

Inform patients that the use of everolimus may increase the risk of non-infectious pneumonitis. Advise patients to seek medical attention if they develop clinical symptoms consistent with pneumonia [see *Warnings and Precautions (5.10)*].

#### *Hyperlipidemia*

Inform patients that the use of everolimus has been associated with increased serum cholesterol and triglycerides that may require treatment and the need for monitoring of blood lipid concentrations [see *Warnings and Precautions (5.11)*].

#### *Proteinuria*

Inform patients that the use of everolimus has been associated with an increased risk of proteinuria [see *Warnings and Precautions (5.12)*].

#### *Pregnancy and Lactation*

Advise women of childbearing age to avoid becoming pregnant throughout treatment and for 8 weeks after everolimus therapy has stopped. Everolimus can cause fetal harm if taken during pregnancy. Advise a pregnant woman of the potential risk to a fetus. Also advise not to breastfeed while taking everolimus [see *Use in Specific Populations (8.1, 8.2)*].

#### *Male and Female Fertility*

Inform male and female patients that everolimus may impair fertility [see *Warnings and Precautions (5.18), Use in Specific Populations (8.1, 8.3), Nonclinical Toxicology (13.1)*].

#### *Medications That Interfere with Everolimus*

Some medications can increase or decrease blood concentrations of everolimus. Advise patients to inform their physician if they are taking any of the following: antifungals, antibiotics, antivirals, anti-epileptic medicines including carbamazepine, phenytoin and barbiturates, herbal/dietary supplements (St. John's Wort), cannabidiol, and/or rifampin [see *Warnings and Precautions (5.14, 5.22)*].

#### *New Onset Diabetes*

Inform patients that the use of everolimus may increase the risk of diabetes mellitus and to contact their physician if they develop symptoms [see *Warnings and Precautions*

(5.16)].

### *Immunizations*

Inform patients that vaccinations may be less effective while they are being treated with everolimus. Advise patients that live vaccines should be avoided [see *Warnings and Precautions* (5.19)].

### *Patient with Hereditary Disorders*

Advise patients to inform their physicians that if they have hereditary disorders of galactose intolerance (Lapp-lactase deficiency or glucose-galactose malabsorption) not to take everolimus [see *Warnings and Precautions* (5.21)].

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**Hikma Pharmaceuticals USA Inc.**

Berkeley Heights, NJ 07922

**C50001129/04**

**Revised September 2024**

## **MEDICATION GUIDE**

### **Everolimus Tablets (e" ver oh' li mus)**

**Rx only**

**What is the most important information I should know about everolimus?**

**Everolimus can cause serious side effects, including:**

- **Increased risk of getting certain cancers.** People who take everolimus have a higher chance of getting lymphoma and other cancers, especially skin cancer. Talk to your doctor about your risk for cancer.
- **Increased risk of serious infections.** Everolimus weakens the body's immune system and affects your ability to fight infections. Serious infections can happen with everolimus that may lead to death. People taking everolimus have a higher chance of getting infections caused by viruses, bacteria, and fungi (yeast).
  - o Call your doctor if you have symptoms of infection, including fever or chills.
- **Blood clot in the blood vessels of your transplanted kidney.** If this happens, it usually occurs within the first 30 days after your kidney transplant. Tell your doctor right away if you:
  - o have pain in your groin, lower back, side or stomach (abdomen)
  - o make less urine or you do not pass any urine
  - o have blood in your urine or dark colored urine (tea-colored)
  - o have fever, nausea, or vomiting
- **Serious problems with your transplanted kidney (nephrotoxicity).** You will need to start with a lower dose of cyclosporine when you take it with everolimus. Your doctor should do regular blood tests to check your levels of both everolimus

and cyclosporine.

- **Increased risk of death that can be related to infection, in people who have had a heart transplant.** You should not take everolimus without talking to your doctor if you have had a heart transplant.

**See the section “What are the possible side effects of everolimus?” for information about other serious side effects.**

### **What is everolimus?**

Everolimus is a prescription medicine used to prevent transplant rejection (antirejection medicine) in people who have received a kidney transplant or liver transplant. Transplant rejection happens when the body’s immune system perceives the new transplanted kidney or liver as “foreign” and attacks it.

Everolimus is used with other medicines called cyclosporine, corticosteroids and certain other transplant medicines to prevent rejection of your transplanted kidney. Everolimus is used with other medicines called tacrolimus and corticosteroids to prevent rejection of your transplanted liver.

It is not known if everolimus is safe and effective in transplanted organs other than the kidney and liver.

It is not known if everolimus is safe and effective in children under 18 years of age.

### **Do not take everolimus if you are allergic to:**

- everolimus or any of the ingredients in everolimus tablets. See the end of this Medication Guide for a complete list of ingredients in everolimus tablets.
- sirolimus (Rapamune®)

### **Before taking everolimus, tell your doctor about all of your medical conditions, including if you:**

- have liver problems
- have skin cancer or it runs in your family
- have high cholesterol or triglycerides (fat in your blood)
- have Lapp lactase deficiency or glucose-galactose malabsorption. You should not take everolimus if you have this disorder.
- are pregnant or could become pregnant. Everolimus may harm your unborn baby. If you are able to become pregnant, you should use effective birth control during treatment and for 8 weeks after your last dose of everolimus. Talk to your doctor about birth control methods that may be right for you during this time. If you become pregnant or think you are pregnant, tell your healthcare provider right away. You should not become pregnant during treatment with everolimus.
- are breastfeeding or plan to breastfeed. It is not known if everolimus passes into your breast milk.

**Tell your doctor about all the medicines you take,** including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Especially tell your doctor if you take:

- antifungal medicine

- antibiotic medicine
- heart medicine
- high blood pressure medicine
- a medicine to lower cholesterol or triglycerides
- cyclosporine (Sandimmune<sup>®</sup>, Gengraf<sup>®</sup>, Neoral<sup>®</sup>)
- tuberculosis (TB) medicine
- HIV medicine
- St. John's Wort
- seizure (anticonvulsant) medicine
- cannabidiol (Epidiolex<sup>®</sup>)

## How should I take everolimus?

- Take everolimus exactly as your doctor tells you to.
- **Do not** stop taking everolimus or change your dose unless your doctor tells you to.
- Take everolimus at the same time as your dose of cyclosporine or tacrolimus medicine.
- **Do not** stop taking or change your dose of cyclosporine or tacrolimus medicine unless your doctor tells you to.
- If your doctor changes your dose of cyclosporine or tacrolimus, your dose of everolimus may change.
- Take everolimus 2 times a day about 12 hours apart.
- Swallow everolimus tablets whole with a glass of water. Do not crush or chew everolimus tablets.
- Take everolimus tablets with or without food. If you take everolimus tablets **with food**, always take everolimus tablets with food. If you take everolimus tablets without food, always take everolimus tablets without food.
- Your doctor will do regular blood tests to check your kidney or liver function while you take everolimus. It is important that you get these tests done when your doctor tells you to. Blood tests will monitor how your kidneys or liver are working and make sure you are getting the right dose of everolimus and other transplant medications you may be on (cyclosporine or tacrolimus).
- If you take too much everolimus, call your doctor or go to the nearest hospital emergency room right away.

## What should I avoid while taking everolimus?

- Avoid receiving any live vaccines while taking everolimus. Some vaccines may not work as well while you are taking everolimus.
- Do not eat grapefruit or drink grapefruit juice while you are taking everolimus. Grapefruit may increase your blood level of everolimus.
- Limit the amount of time you spend in the sunlight. Avoid using tanning beds or sunlamps. People who take everolimus have a higher risk of getting skin cancer. See the section **“What is the most important information I should know about everolimus?”** Wear protective clothing when you are in the sun and use a sunscreen with a high protection factor (SPF 30 and above). This is especially important if you have fair skin or if you have a family history of skin cancer.
- Avoid becoming pregnant. See the section **“What should I tell my doctor before taking everolimus?”**

## What are possible side effects of everolimus?

### Everolimus may cause serious side effects, including:

- See “**What is the most important information I should know about everolimus?**”
- **swelling under your skin especially around your mouth, eyes and in your throat (angioedema).** Your chance of having swelling under your skin is higher if you take everolimus along with certain other medicines. Tell your doctor right away or go to the nearest emergency room if you have any of these symptoms of angioedema:
  - o sudden swelling of your face, mouth, throat, tongue or hands
  - o hives or welts
  - o itchy or painful swollen skin
  - o trouble breathing
- **delayed wound healing.** Everolimus can cause your incision to heal slowly or not heal well. Call your doctor right away if you have any of the following symptoms:
  - o your incision is red, warm or painful
  - o blood, fluid, or pus in your incision
  - o your incision opens up
  - o swelling of your incision
- **lung or breathing problems.** Tell your doctor right away if you have new or worsening cough, shortness of breath, difficulty breathing or wheezing. In some patients, lung or breathing problems have been severe and can even lead to death. Your doctor may need to stop everolimus or lower your dose.
- **increased cholesterol and triglycerides (fat in your blood).** If your cholesterol and triglyceride levels are high, your doctor may want to lower them with diet, exercise and certain medicines.
- **protein in your urine (proteinuria).**
- **change in kidney function.** Everolimus may cause kidney problems when taken along with a standard dose of cyclosporine medicine instead of a lower dose.

### Your doctor should do blood and urine tests to monitor your cholesterol, triglycerides and kidney function.

- **viral infections.** Certain viruses can live in your body and cause active infections when your immune system is weak. Viral infections that can happen with everolimus include BK virus-associated nephropathy. BK virus can affect how your kidney works and cause your transplanted kidney to fail.
- **blood clotting problems.** Talk to your doctor if this is a concern for you.
- **diabetes.** Tell your doctor if you have frequent urination, increased thirst or hunger.
- **infertility, male.** Everolimus can affect fertility in males and may affect your ability to father a child. Talk with your doctor if this is a concern for you.
- **infertility, female.** Everolimus can affect fertility in females and may affect your ability to become pregnant. Talk to your doctor if this is a concern for you.

### The most common side effects of everolimus in people who have had a kidney or liver transplant include:

These common side effects have been reported in both kidney and liver transplant patients:



- nausea
- swelling of the lower legs, ankles and feet
- high blood pressure

**The most common side effects of everolimus in people who have had a kidney transplant include:**

- constipation
- low red blood cell count (anemia)
- urinary tract infection
- increased fat in the blood (cholesterol and triglycerides)

**The most common side effects of everolimus in people who have had a liver transplant include:**

- diarrhea
- headache
- fever
- abdominal pain
- low white blood cells

These are not all of the possible side effects of everolimus.

Call your doctor for medical advice about side effects. You may report side effects to the FDA at 1-800-FDA-1088.

**How should I store Everolimus Tablets?**

- Store Everolimus Tablets between 68°F to 77°F (20°C to 25°C).
- Keep Everolimus Tablets out of the light.
- Keep Everolimus Tablets dry.

**Keep Everolimus Tablets and all medicines out of the reach of children.**

**General information about the safe and effective use of everolimus.**

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use everolimus for a condition for which it was not prescribed. Do not give everolimus to other people, even if they have the same symptoms that you have. It may harm them.

You can ask your doctor or pharmacist for information about everolimus that is written for healthcare professionals.

**What are the ingredients in Everolimus Tablets?**

**Active ingredient:** everolimus, USP.

**Inactive ingredients:** anhydrous lactose, butylated hydroxytoluene, crospovidone, hypromellose and magnesium stearate.

Any other trademarks in this document are the property of their respective owners.

Rapamune® is a registered trademark of Pfizer Inc.

Gengraf® is a registered trademark of Abbott Laboratories.

For more information, call 1-800-962-8364 or visit [www.hikma.com](http://www.hikma.com).

This Medication Guide has been approved by the U.S. Food and Drug Administration.

Distributed by:

**Hikma Pharmaceuticals USA Inc.**

Berkeley Heights, NJ 07922

**C50001129/04**

**Revised September 2024**

### Package/Label Display Panel

Everolimus Tablets, 0.25 mg

NDC 0054-0470-21 60 Tablets

Rx only

Each tablet contains  
0.25 mg everolimus, USP.

**USUAL DOSAGE:**  
See Package Insert for Complete  
Prescribing Information.

Store at 20° to 25°C (68° to 77°F).  
[See USP Controlled  
Room Temperature.]

**Protect from light and moisture.**

**Call your doctor for medical  
advice about side effects.  
You may report side effects to  
FDA at 1-800-FDA-1088.**

Keep this and all drugs out of the  
reach of children.

NDC 0054-0470-21 60 Tablets

**Everolimus  
Tablets**

**0.25 mg**

PHARMACIST: DISPENSE WITH ATTACHED  
MEDICATION GUIDE

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**Rx only  
hikma.**

0054-0470-21

c5000550/03

### Package/Label Display Panel

Everolimus Tablets, 0.5 mg

NDC 0054-0471-21 60 Tablets

Rx only

Each tablet contains 0.5 mg everolimus, USP.

**USUAL DOSAGE:**  
See Package Insert for Complete Prescribing Information.

Store at 20° to 25°C (68° to 77°F).  
[See USP Controlled Room Temperature.]

**Protect from light and moisture.**

**Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.**

Keep this and all drugs out of the reach of children.

NDC 0054-0471-21 60 Tablets

**Everolimus**  
Tablets

**0.5 mg**

PHARMACIST: DISPENSE WITH ATTACHED MEDICATION GUIDE

Distributed by: **Hikma Pharmaceuticals USA Inc.**  
Berkeley Heights, NJ 07922

**Rx only**  
**hikma.**

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c50000549/03

### Package/Label Display Panel

Everolimus Tablets, 0.75 mg

NDC 0054-0472-21 60 Tablets

Rx only

Each tablet contains 0.75 mg everolimus, USP.

**USUAL DOSAGE:**  
See Package Insert for Complete Prescribing Information.

Store at 20° to 25°C (68° to 77°F).  
[See USP Controlled Room Temperature.]

**Protect from light and moisture.**

**Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.**

Keep this and all drugs out of the reach of children.

NDC 0054-0472-21 60 Tablets

**Everolimus**  
Tablets

**0.75 mg**

PHARMACIST: DISPENSE WITH ATTACHED MEDICATION GUIDE

Distributed by: **Hikma Pharmaceuticals USA Inc.**  
Berkeley Heights, NJ 07922

**Rx only**  
**hikma.**

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c50000551/03

### PACKAGE/LABEL PRINCIPAL DISPLAY PANEL

Everolimus Tablets, 1 mg

NDC 0054-0604-21 60 Tablets

Rx only

Each tablet contains  
1 mg everolimus, USP.

**USUAL DOSAGE:**

See Package Insert for Complete  
Prescribing Information.

Store at 20° to 25°C (68° to 77°F).  
[See USP Controlled  
Room Temperature.]

**Protect from light and moisture.**

**Call your doctor for medical  
advice about side effects.**

**You may report side effects to  
FDA at 1-800-FDA-1088.**

Keep this and all drugs out of the  
reach of children.

NDC 0054-0604-21

60 Tablets

**Everolimus**  
Tablets

**1 mg**

**PHARMACIST: DISPENSE WITH ATTACHED  
MEDICATION GUIDE**

Distributed by: **Hikma**  
**Pharmaceuticals USA Inc.**  
Berkeley Heights, NJ 07922

**R<sub>x</sub> only**  
**hikma.**



c50000782/02

**EVEROLIMUS**

everolimus tablet

**Product Information**

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:0054-0604
<b>Route of Administration</b>	ORAL		

**Active Ingredient/Active Moiety**

Ingredient Name	Basis of Strength	Strength
<b>EVEROLIMUS</b> (UNII: 9HW64Q8G6G) (EVEROLIMUS - UNII:9HW64Q8G6G)	EVEROLIMUS	1 mg

**Inactive Ingredients**

Ingredient Name	Strength
<b>ANHYDROUS LACTOSE</b> (UNII: 3SY5LH9PMK)	
<b>BUTYLATED HYDROXYTOLUENE</b> (UNII: 1P9D0Z171K)	
<b>CROSPVIDONE (120 .MU.M)</b> (UNII: 68401960MK)	
<b>HYPROMELLOSE 2910 (5 MPA.S)</b> (UNII: R75537T0T4)	
<b>MAGNESIUM STEARATE</b> (UNII: 70097M6I30)	

**Product Characteristics**

<b>Color</b>	WHITE	<b>Score</b>	no score
<b>Shape</b>	ROUND	<b>Size</b>	8mm
<b>Flavor</b>		<b>Imprint Code</b>	54;206
<b>Contains</b>			

**Packaging**

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0054-0604-	60 in 1 BOTTLE; Type 0: Not a Combination	11/18/2021	

21	Product	11/10/2021	
<b>Marketing Information</b>			
Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA206133	11/18/2021	

## EVEROLIMUS

everolimus tablet

<b>Product Information</b>			
Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:0054-0472
Route of Administration	ORAL		

<b>Active Ingredient/Active Moiety</b>		
Ingredient Name	Basis of Strength	Strength
EVEROLIMUS (UNII: 9HW64Q8G6G) (EVEROLIMUS - UNII:9HW64Q8G6G)	EVEROLIMUS	0.75 mg

<b>Inactive Ingredients</b>	
Ingredient Name	Strength
ANHYDROUS LACTOSE (UNII: 3SY5LH9PMK)	
BUTYLATED HYDROXYTOLUENE (UNII: 1P9D0Z171K)	
CROSPVIDONE (120 .MU.M) (UNII: 68401960MK)	
HYPROMELLOSE 2910 (5 MPA.S) (UNII: R75537T0T4)	
MAGNESIUM STEARATE (UNII: 70097M6I30)	

<b>Product Characteristics</b>			
Color	WHITE	Score	no score
Shape	ROUND	Size	8mm
Flavor		Imprint Code	54;044
Contains			

<b>Packaging</b>				
#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0054-0472-21	60 in 1 BOTTLE; Type 0: Not a Combination Product	03/10/2020	

## Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA206133	03/10/2020	

## EVEROLIMUS

everolimus tablet

### Product Information

Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:0054-0471
Route of Administration	ORAL		

### Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
EVEROLIMUS (UNII: 9HW64Q8G6G) (EVEROLIMUS - UNII:9HW64Q8G6G)	EVEROLIMUS	0.5 mg

### Inactive Ingredients

Ingredient Name	Strength
ANHYDROUS LACTOSE (UNII: 3SY5LH9PMK)	
BUTYLATED HYDROXYTOLUENE (UNII: 1P9D0Z171K)	
CROSPVIDONE (120 .MU.M) (UNII: 68401960MK)	
HYPROMELLOSE 2910 (5 MPA.S) (UNII: R75537T0T4)	
MAGNESIUM STEARATE (UNII: 70097M6I30)	

### Product Characteristics

Color	WHITE	Score	no score
Shape	ROUND	Size	7mm
Flavor		Imprint Code	54;761
Contains			

### Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0054-0471-21	60 in 1 BOTTLE; Type 0: Not a Combination Product	03/10/2020	

### Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA206133	03/10/2020	

# EVEROLIMUS

everolimus tablet

## Product Information

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:0054-0470
<b>Route of Administration</b>	ORAL		

## Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
EVEROLIMUS (UNII: 9HW64Q8G6G) (EVEROLIMUS - UNII:9HW64Q8G6G)	EVEROLIMUS	0.25 mg

## Inactive Ingredients

Ingredient Name	Strength
ANHYDROUS LACTOSE (UNII: 3SY5LH9PMK)	
BUTYLATED HYDROXYTOLUENE (UNII: 1P9D0Z171K)	
CROSPVIDONE (120 .MU.M) (UNII: 68401960MK)	
HYPROMELLOSE 2910 (5 MPA.S) (UNII: R75537T0T4)	
MAGNESIUM STEARATE (UNII: 70097M6I30)	

## Product Characteristics

<b>Color</b>	WHITE	<b>Score</b>	no score
<b>Shape</b>	ROUND	<b>Size</b>	5mm
<b>Flavor</b>		<b>Imprint Code</b>	54;414
<b>Contains</b>			

## Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0054-0470-21	60 in 1 BOTTLE; Type 0: Not a Combination Product	03/10/2020	

## Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA206133	03/10/2020	

**Labeler** - Hikma Pharmaceuticals USA Inc. (080189610)

## Establishment

Name	Address	ID/FEI	Business Operations
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West-Ward Columbus Inc. 058839929 MANUFACTURE(0054-0470, 0054-0471, 0054-0472, 0054-0604)

Revised: 9/2024

Hikma Pharmaceuticals USA Inc.