

**RAMIPRIL- ramipril capsule**  
**Exelan Pharmaceuticals, Inc.**

-----  
**HIGHLIGHTS OF PRESCRIBING INFORMATION**

**These highlights do not include all the information needed to use RAMIPRIL CAPSULES safely and effectively. See full prescribing information for RAMIPRIL CAPSULES.**

**RAMIPRIL capsules, for oral use**

**Initial U.S. Approval: 1991**

**WARNING: FETAL TOXICITY**

*See full prescribing information for complete boxed warning*

- **When pregnancy is detected, discontinue ramipril capsules as soon as possible (5.6).**
- **Drugs that act directly on the renin-angiotensin system can cause injury and death to the developing fetus (5.6).**

-----  
**RECENT MAJOR CHANGES**

Warnings and Precautions, Hyperkalemia (5.8)

9/2015

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

Ramipril capsules, USP is an angiotensin converting enzyme (ACE) inhibitor indicated for the treatment of hypertension, to lower blood pressure. They may be used alone or in combination with thiazide diuretics (1.1).

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

Hypertension: Initial dose is 2.5 mg to 20 mg once daily. Adjust dosage according to blood pressure response after 2 to 4 weeks of treatment. The usual maintenance dose following titration is 2.5 mg to 20 mg daily as a single dose or equally divided doses (2.1).

Dosage adjustment: See respective sections pertaining to dosage adjustment in special situations (2.5).

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

Capsule: 1.25 mg, 2.5 mg, 5 mg, 10 mg (3)

-----  
**CONTRAINDICATIONS**

Angioedema related to previous treatment with an ACE inhibitor, or a history of hereditary or idiopathic angioedema. (4). Do not co-administer aliskiren with ramipril in patients with diabetes. (4)

-----  
**WARNINGS AND PRECAUTIONS**

Angioedema, increased risk in patients with a prior history (5.1)

Hypotension and hyperkalemia (5.5, 5.8)

Renal impairment: monitor renal function during therapy (5.3)

Avoid concomitant use of an ACE inhibitor and angiotensin blocker (5.7)

Rare cholestatic jaundice and hepatic failure (5.2)

Rare neutropenia and agranulocytosis (5.4)

-----  
**ADVERSE REACTIONS**

The most common adverse reactions in patients with hypertension included headache, dizziness, fatigue, and cough (6.1).

**To report SUSPECTED ADVERSE REACTIONS, contact Exelan Pharmaceuticals, Inc. at 1-855-295-7455 or [www.exelanpharma.com](http://www.exelanpharma.com) or the FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).**

-----  
**DRUG INTERACTIONS**

Diuretics: Possibility of excessive hypotension (7.1).

Lithium: Use with caution (7.3).

Gold: Nitritoid reactions have been reported (7.4).

NSAIDS use may lead to increased risk of renal impairment and loss of antihypertensive effect (7.5).

mTOR inhibitor use may increase angioedema risk (7.6).

-----  
**USE IN SPECIFIC POPULATIONS**

Pregnancy: Discontinue drug if pregnancy is detected (5.6, 8.1).

Nursing mothers: Ramipril use is not recommended in nursing mothers (8.3).

**See 17 for PATIENT COUNSELING INFORMATION.**

**Revised: 8/2016**

## **FULL PRESCRIBING INFORMATION: CONTENTS\***

### **WARNING: FETAL TOXICITY**

### **1 INDICATIONS AND USAGE**

1.1 Hypertension

### **2 DOSAGE AND ADMINISTRATION**

2.1 Hypertension

2.4 General Dosing Information

2.5 Dosage Adjustment

### **3 DOSAGE FORMS AND STRENGTHS**

### **4 CONTRAINDICATIONS**

### **5 WARNINGS AND PRECAUTIONS**

5.1 Anaphylactoid and Possibly Related Reactions

5.2 Hepatic Failure and Impaired Liver Function

5.3 Renal Impairment

5.4 Neutropenia and Agranulocytosis

5.5 Hypotension

5.6 Fetal Toxicity

5.7 Dual Blockade of the Renin-Angiotensin System

5.8 Hyperkalemia

5.9 Cough

### **6 ADVERSE REACTIONS**

6.1 Clinical Trials Experience

6.2 Post-marketing Experience

6.3 Clinical Laboratory Test Findings

### **7 DRUG INTERACTIONS**

7.1 Diuretics

7.2 Agents Increasing Serum Potassium

7.3 Other Agents Affecting RAS

7.4 Lithium

7.5 Gold

7.6 Non-Steroidal Anti-Inflammatory Agents including Selective Cyclooxygenase-2 Inhibitors (COX-2 Inhibitors)

7.7 mTOR Inhibitors

### **8 USE IN SPECIFIC POPULATIONS**

8.1 Pregnancy

8.3 Nursing Mothers

8.4 Pediatric Use

8.5 Geriatric Use

8.6 Renal Impairment

### **10 OVERDOSAGE**

### **11 DESCRIPTION**

### **12 CLINICAL PHARMACOLOGY**

12.1 Mechanism of Action

12.2 Pharmacodynamics

12.3 Pharmacokinetics

### **13 NONCLINICAL TOXICOLOGY**

13.1 Carcinogenesis, Mutagenesis, Impairment Of Fertility

### **14 CLINICAL STUDIES**

14.1 Hypertension

### **16 HOW SUPPLIED/STORAGE AND HANDLING**

### **17 PATIENT COUNSELING INFORMATION**

\* Sections or subsections omitted from the full prescribing information are not listed.

---

## FULL PRESCRIBING INFORMATION

### WARNING: FETAL TOXICITY

- When pregnancy is detected, discontinue ramipril capsules as soon as possible (5.6).
- Drugs that act directly on the renin-angiotensin system can cause injury and death to the developing fetus (5.6).

## 1 INDICATIONS AND USAGE

### 1.1 Hypertension

Ramipril Capsules, USP are indicated for the treatment of hypertension. They may be used alone or in combination with thiazide diuretics.

## 2 DOSAGE AND ADMINISTRATION

### 2.1 Hypertension

The recommended initial dose for patients not receiving a diuretic is 2.5 mg once a day. Adjust dose according to blood pressure response. The usual maintenance dosage range is 2.5 mg to 20 mg per day administered as a single dose or in two equally divided doses. In some patients treated once daily, the antihypertensive effect may diminish toward the end of the dosing interval. In such patients, consider an increase in dosage or twice daily administration. If blood pressure is not controlled with ramipril capsules alone, a diuretic can be added.

### 2.4 General Dosing Information

Generally, swallow ramipril capsules whole. The ramipril capsule can also be opened and the contents sprinkled on a small amount (about 4 oz.) of applesauce or mixed in 4 oz. (120 mL) of water or apple juice. To be sure that ramipril is not lost when such a mixture is used, consume the mixture in its entirety. The described mixtures can be pre-prepared and stored for up to 24 hours at room temperature or up to 48 hours under refrigeration. Concomitant administration of ramipril capsules with potassium supplements, potassium salt substitutes, or potassium-sparing diuretics can lead to increases of serum potassium [see *Warnings and Precautions* (5.8)].

### 2.5 Dosage Adjustment

#### *Renal Impairment*

Establish baseline renal function in patients initiating ramipril capsules. Usual regimens of therapy with ramipril capsules may be followed in patients with estimated creatinine clearance >40 mL/min. However, in patients with worse impairment, 25% of the usual dose of ramipril is expected to produce full therapeutic levels of ramiprilat [see *Use in Specific Populations* (8.6)].

#### *Hypertension*

For patients with hypertension and renal impairment, the recommended initial dose is 1.25 mg ramipril capsules once daily. Dosage may be titrated upward until blood pressure is controlled or to a maximum total daily dose of 5 mg.

#### *Volume Depletion or Renal Artery Stenosis*

Blood pressure decreases associated with any dose of ramipril capsules depend, in part, on the

presence or absence of volume depletion (e.g., past and current diuretic use) or the presence or absence of renal artery stenosis. If such circumstances are suspected to be present, initiate dosing at 1.25 mg once daily. Adjust dosage according to blood pressure response.

### 3 DOSAGE FORMS AND STRENGTHS

Ramipril capsules, USP are supplied as hard gelatin capsules containing 1.25 mg, 2.5 mg, 5 mg, and 10 mg of ramipril.

**Ramipril Capsules 1.25 mg** are hard gelatin capsules size “4”, yellow opaque body with yellow opaque cap imprinted with IG271 on cap and 1.25 mg on body in black ink, filled with white to off-white powder

**Ramipril Capsules 2.5 mg** are hard gelatin capsules size “4”, orange opaque body with orange opaque cap imprinted with IG272 on cap and 2.5 mg on body in black ink, filled with white to off-white powder

**Ramipril Capsules 5 mg** are hard gelatin capsules size “4”, red opaque body with red opaque cap imprinted with IG273 on cap and 5 mg on body in black ink, filled with white to off-white powder

**Ramipril Capsules 10 mg** are hard gelatin capsules size “4”, blue opaque body with blue opaque cap imprinted with IG274 on cap and 10 mg on body in black ink, filled with white to off-white powder

### 4 CONTRAINDICATIONS

Ramipril capsules are contraindicated in patients who are hypersensitive to this product or any other ACE inhibitor (e.g., a patient who has experienced angioedema during therapy with any other ACE inhibitor).

Do not co-administer ramipril capsules with aliskiren:

- in patients with diabetes

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Anaphylactoid and Possibly Related Reactions

Presumably because drugs that act directly on the renin-angiotensin-aldosterone system (e.g., ACE inhibitors) affect the metabolism of eicosanoids and polypeptides, including endogenous bradykinin, patients receiving these drugs (including ramipril capsules) may be subject to a variety of adverse reactions, some of them serious.

#### *Angioedema*

##### *Head and Neck Angioedema*

Patients with a history of angioedema unrelated to ACE inhibitor therapy may be at increased risk of angioedema while receiving an ACE inhibitor.

Angioedema of the face, extremities, lips, tongue, glottis, and larynx has been reported in patients treated with ACE inhibitors. Angioedema associated with laryngeal edema can be fatal. If laryngeal stridor or angioedema of the face, tongue, or glottis occurs, discontinue treatment with ramipril capsules and institute appropriate therapy immediately. Where there is involvement of the tongue, glottis, or larynx likely to cause airway obstruction, administer appropriate therapy (e.g., subcutaneous epinephrine solution 1:1000 [0.3 mL to 0.5 mL]) promptly [see *ADVERSE REACTIONS* (6)].

In considering the use of ramipril capsules, note that in controlled clinical trials ACE inhibitors cause a higher rate of angioedema in Black patients than in non-Black patients.

In a large U.S. post-marketing study, angioedema (defined as reports of angio, face, larynx, tongue, or throat edema) was reported in 3/1523 (0.20%) Black patients and in 8/8680 (0.09%) non-Black patients.

These rates were not different statistically.

Patients taking concomitant mTOR inhibitor (e.g. temsirolimus) therapy may be at increased risk for angioedema. [see *Drug Interactions (7.6)*]

### Intestinal Angioedema

Intestinal angioedema has been reported in patients treated with ACE inhibitors. These patients presented with abdominal pain (with or without nausea or vomiting); in some cases there was no prior history of facial angioedema and C-1 esterase levels were normal. The angioedema was diagnosed by procedures including abdominal CT scan or ultrasound, or at surgery, and symptoms resolved after stopping the ACE inhibitor. Include intestinal angioedema in the differential diagnosis of patients on ACE inhibitors presenting with abdominal pain.

### *Anaphylactoid Reactions During Desensitization*

Two patients undergoing desensitizing treatment with hymenoptera venom while receiving ACE inhibitors sustained life-threatening anaphylactoid reactions. In the same patients, these reactions were avoided when ACE inhibitors were temporarily withheld, but they reappeared upon inadvertent rechallenge.

### *Anaphylactoid Reactions During Membrane Exposure*

Anaphylactoid reactions have been reported in patients dialyzed with high-flux membranes and treated concomitantly with an ACE inhibitor. Anaphylactoid reactions have also been reported in patients undergoing low-density lipoprotein apheresis with dextran sulfate absorption.

## **5.2 Hepatic Failure and Impaired Liver Function**

Rarely, ACE inhibitors, including ramipril capsules, have been associated with a syndrome that starts with cholestatic jaundice and progresses to fulminant hepatic necrosis and sometimes death. The mechanism of this syndrome is not understood. Discontinue ramipril capsules if patient develops jaundice or marked elevations of hepatic enzymes.

As ramipril is primarily metabolized by hepatic esterases to its active moiety, ramiprilat, patients with impaired liver function could develop markedly elevated plasma levels of ramipril. No formal pharmacokinetic studies have been carried out in hypertensive patients with impaired liver function.

## **5.3 Renal Impairment**

As a consequence of inhibiting the renin-angiotensin-aldosterone system, changes in renal function may be anticipated in susceptible individuals. In patients with severe congestive heart failure whose renal function may depend on the activity of the renin-angiotensin-aldosterone system, treatment with ACE inhibitors, including ramipril capsules, may be associated with oliguria or progressive azotemia and rarely with acute renal failure or death.

In hypertensive patients with unilateral or bilateral renal artery stenosis, increases in blood urea nitrogen and serum creatinine may occur. Experience with another ACE inhibitor suggests that these increases would be reversible upon discontinuation of ramipril capsules and/or diuretic therapy. In such patients, monitor renal function during the first few weeks of therapy. Some hypertensive patients with no apparent pre-existing renal vascular disease have developed increases in blood urea nitrogen and serum creatinine, usually minor and transient, especially when ramipril capsules have been given concomitantly with a diuretic. This is more likely to occur in patients with pre-existing renal impairment. Dosage reduction of ramipril capsules and/or discontinuation of the diuretic may be required.

## **5.4 Neutropenia and Agranulocytosis**

In rare instances, treatment with ACE inhibitors may be associated with mild reductions in red blood cell count and hemoglobin content, blood cell or platelet counts. In isolated cases, agranulocytosis,

pancytopenia, and bone marrow depression may occur. Hematological reactions to ACE inhibitors are more likely to occur in patients with collagen-vascular disease (e.g., systemic lupus erythematosus, scleroderma) and renal impairment. Consider monitoring white blood cell counts in patients with collagen-vascular disease, especially if the disease is associated with impaired renal function.

## 5.5 Hypotension

### *General Considerations*

Ramipril capsules can cause symptomatic hypotension, after either the initial dose or a later dose when the dosage has been increased. Like other ACE inhibitors, ramipril capsules, have been only rarely associated with hypotension in uncomplicated hypertensive patients. Symptomatic hypotension is most likely to occur in patients who have been volume-and/or salt-depleted as a result of prolonged diuretic therapy, dietary salt restriction, dialysis, diarrhea, or vomiting. Correct volume-and salt-depletion before initiating therapy with ramipril capsules.

If excessive hypotension occurs, place the patient in a supine position and, if necessary, treat with intravenous infusion of physiological saline. Ramipril capsules treatment usually can be continued following restoration of blood pressure and volume.

### *Surgery and Anesthesia*

In patients undergoing surgery or during anesthesia with agents that produce hypotension, ramipril may block angiotensin II formation that would otherwise occur secondary to compensatory renin release. Hypotension that occurs as a result of this mechanism can be corrected by volume expansion.

## 5.6 Fetal Toxicity

### **Pregnancy Category D**

Use of drugs that act on the renin-angiotensin system during the second and third trimesters of pregnancy reduces fetal renal function and increases fetal and neonatal morbidity and death. Resulting oligohydramnios can be associated with fetal lung hypoplasia and skeletal deformations. Potential neonatal adverse effects include skull hypoplasia, anuria, hypotension, renal failure, and death. When pregnancy is detected, discontinue ramipril capsules as soon as possible [*see Use in Specific Populations (8.1)*].

## 5.7 Dual Blockade of the Renin-Angiotensin System

Dual blockade of the RAS with angiotensin receptor blockers, ACE inhibitors, or aliskiren is associated with increased risks of hypotension, hyperkalemia, and changes in renal function (including acute renal failure) compared to monotherapy. Most patients receiving the combination of two RAS inhibitors do not obtain any additional benefit compared to monotherapy. In general, avoid combined use of RAS inhibitors. Closely monitor blood pressure, renal function and electrolytes in patients on ramipril and other agents that affect the RAS.

### *Telmisartan*

The ONTARGET trial enrolled 25,620 patients >55 years old with atherosclerotic disease or diabetes with end-organ damage, randomized them to telmisartan only, ramipril only, or the combination, and followed them for a median of 56 months. Patients receiving the combination of telmisartan and ramipril did not obtain any benefit in the composite endpoint of cardiovascular death, MI, stroke and heart failure hospitalization compared to monotherapy, but experienced an increased incidence of clinically important renal dysfunction (death, doubling of serum creatinine, or dialysis) compared with groups receiving telmisartan alone or ramipril alone. Concomitant use of telmisartan and ramipril is not recommended.

### *Aliskiren*

Do not co-administer aliskiren with ramipril in patients with diabetes. Avoid concomitant use of aliskiren with ramipril in patients with renal impairment (GFR <60 mL/min/1.73 m<sup>2</sup>).

## 5.8 Hyperkalemia

In clinical trials with ramipril capsules, hyperkalemia (serum potassium >5.7 mEq/L) occurred in approximately 1% of hypertensive patients receiving ramipril capsules. In most cases, these were isolated values, which resolved despite continued therapy. None of these patients were discontinued from the trials because of hyperkalemia. Risk factors for the development of hyperkalemia include renal insufficiency, diabetes mellitus, and the concomitant use of other drugs that raise serum potassium levels. Monitor serum potassium in such patients [see *Drug Interactions* (7.2)].

## 5.9 Cough

Presumably caused by inhibition of the degradation of endogenous bradykinin, persistent nonproductive cough has been reported with all ACE inhibitors, always resolving after discontinuation of therapy. Consider the possibility of angiotensin converting enzyme inhibitor induced-cough in the differential diagnosis of cough.

# 6 ADVERSE REACTIONS

## 6.1 Clinical Trials Experience

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

### *Hypertension*

Ramipril has been evaluated for safety in over 4000 patients with hypertension; of these, 1230 patients were studied in U.S. controlled trials, and 1107 were studied in foreign controlled trials. Almost 700 of these patients were treated for at least one year. The overall incidence of reported adverse events was similar in ramipril and placebo patients. The most frequent clinical side effects (possibly or probably related to study drug) reported by patients receiving ramipril in placebo-controlled trials were: headache (5.4%), dizziness (2.2%), and fatigue or asthenia (2.0%), but only the last one was more common in ramipril patients than in patients given placebo. Generally the side effects were mild and transient, and there was no relation to total dosage within the range of 1.25 mg to 20 mg. Discontinuation of therapy because of a side effect was required in approximately 3% of U.S. patients treated with ramipril capsules. The most common reasons for discontinuation were: cough (1.0%), dizziness (0.5%), and impotence (0.4%). Of observed side effects considered possibly or probably related to study drug that occurred in U.S. placebo-controlled trials in more than 1% of patients treated with ramipril capsules, only asthenia (fatigue) was more common on ramipril than placebo (2% [n=13/651] vs. 1% [n=2/286], respectively).

In placebo-controlled trials, there was also an excess of upper respiratory infection and flu syndrome in the ramipril group, not attributed at that time to ramipril. As these studies were carried out before the relationship of cough to ACE inhibitors was recognized, some of these events may represent ramipril-induced cough. In a later 1-year study, increased cough was seen in almost 12% of ramipril capsules patients, with about 4% of patients requiring discontinuation of treatment.

### *Other Adverse Reactions*

Other adverse reactions reported in controlled clinical trials (in less than 1% of ramipril capsules patients), or rarer events seen in post-marketing experience, include the following (in some, a causal relationship to drug is uncertain):

*Body as a whole:* Anaphylactoid reactions [see *Warnings and Precautions* (5.1)].

*Cardiovascular:* Symptomatic hypotension (reported in 0.5% of patients in U.S. trials) [see *Warnings and Precautions* (5.5)], syncope, and palpitations.

*Hematologic:* Pancytopenia, hemolytic anemia, and thrombocytopenia. Decreases in hemoglobin or hematocrit (a low value and a decrease of 5 g/dL or 5%, respectively) were rare, occurring in 0.4% of patients receiving ramipril capsules alone and in 1.5% of patients receiving ramipril capsules plus a diuretic.

*Renal:* Acute renal failure. Some hypertensive patients with no apparent pre-existing renal disease have developed minor, usually transient, increases in blood urea nitrogen and serum creatinine when taking ramipril, particularly when ramipril was given concomitantly with a diuretic [see *Warnings and Precautions* (5.3)].

*Angioneurotic edema:* Angioneurotic edema has been reported in 0.3% of patients in U.S. clinical trials of ramipril [see *Warnings and Precautions* (5.1)].

*Gastrointestinal:* Hepatic failure, hepatitis, jaundice, pancreatitis, abdominal pain (sometimes with enzyme changes suggesting pancreatitis), anorexia, constipation, diarrhea, dry mouth, dyspepsia, dysphagia, gastroenteritis, increased salivation, and taste disturbance.

*Dermatologic:* Apparent hypersensitivity reactions (manifested by urticaria, pruritus, or rash, with or without fever), photosensitivity, purpura, onycholysis, pemphigus, pemphigoid, erythema multiforme, toxic epidermal necrolysis, and Stevens-Johnson syndrome.

*Neurologic and Psychiatric:* Anxiety, amnesia, convulsions, depression, hearing loss, insomnia, nervousness, neuralgia, neuropathy, paresthesia, somnolence, tinnitus, tremor, vertigo, and vision disturbances.

*Miscellaneous:* As with other ACE inhibitors, a symptom complex has been reported which may include a positive ANA, an elevated erythrocyte sedimentation rate, arthralgia/arthritis, myalgia, fever, vasculitis, eosinophilia, photosensitivity, rash and other dermatologic manifestations. Additionally, as with other ACE inhibitors, eosinophilic pneumonitis has been reported.

*Other:* Arthralgia, arthritis, dyspnea, edema, epistaxis, impotence, increased sweating, malaise, myalgia, and weight gain.

## 6.2 Post-marketing Experience

In addition to adverse reactions reported from clinical trials, there have been rare reports of hypoglycemia reported during ramipril therapy when given to patients concomitantly taking oral hypoglycemic agents or insulin. The causal relationship is unknown.

## 6.3 Clinical Laboratory Test Findings

**Creatinine and Blood Urea Nitrogen:** Increases in creatinine levels occurred in 1.2% of patients receiving ramipril alone, and in 1.5% of patients receiving ramipril and a diuretic. Increases in blood urea nitrogen levels occurred in 0.5% of patients receiving ramipril alone and in 3% of patients receiving ramipril with a diuretic. None of these increases required discontinuation of treatment. Increases in these laboratory values are more likely to occur in patients with renal insufficiency or those pretreated with a diuretic and, based on experience with other ACE inhibitors, would be expected to be especially likely in patients with renal artery stenosis [see *Warnings and Precautions* (5.3)]. As ramipril decreases aldosterone secretion, elevation of serum potassium can occur. Use potassium supplements and potassium sparing diuretics with caution, and monitor the patient's serum potassium frequently [see *Warnings and Precautions* (5.8)].

**Hemoglobin and Hematocrit:** Decreases in hemoglobin or hematocrit (a low value and a decrease of 5 g/dL or 5%, respectively) were rare, occurring in 0.4% of patients receiving ramipril alone and in 1.5% of patients receiving ramipril plus a diuretic. No US patients discontinued treatment because of decreases in hemoglobin or hematocrit.

**Other (causal relationships unknown):** Clinically important changes in standard laboratory tests were rarely associated with ramipril administration. Elevations of liver enzymes, serum bilirubin, uric acid,



and blood glucose have been reported, as have cases of hyponatremia and scattered incidents of leucopenia, eosinophilia, and proteinuria. In US trials, less than 0.2% of patients discontinued treatment for laboratory abnormalities; all of these were cases of proteinuria or abnormal liver-function tests.

## **7 DRUG INTERACTIONS**

### **7.1 Diuretics**

Patients on diuretics, especially those in whom diuretic therapy was recently instituted, may occasionally experience an excessive reduction of blood pressure after initiation of therapy with ramipril. The possibility of hypotensive effects with ramipril can be minimized by either decreasing or discontinuing the diuretic or increasing the salt intake prior to initiation of treatment with ramipril. If this is not possible, reduce the starting dose [*see DOSAGE AND ADMINISTRATION (2)*].

### **7.2 Agents Increasing Serum Potassium**

Coadministration of ramipril with other drugs that raise serum potassium levels may result in hyperkalemia. Monitor serum potassium in such patients.

### **7.3 Other Agents Affecting RAS**

In general, avoid combined use of RAS inhibitors. [*see Warnings and Precautions (5.7)*]. *Do not co-administer aliskiren with ramipril in patients with diabetes* [*see Contraindications (4)*].

### **7.4 Lithium**

Increased serum lithium levels and symptoms of lithium toxicity have been reported in patients receiving ACE inhibitors during therapy with lithium; therefore, frequent monitoring of serum lithium levels is recommended. If a diuretic is also used, the risk of lithium toxicity may be increased.

### **7.5 Gold**

Nitritoid reactions (symptoms include facial flushing, nausea, vomiting and hypotension) have been reported rarely in patients on therapy with injectable gold (sodium aurothiomalate) and concomitant ACE inhibitor therapy including ramipril.

### **7.6 Non-Steroidal Anti-Inflammatory Agents including Selective Cyclooxygenase-2 Inhibitors (COX-2 Inhibitors)**

In patients who are elderly, volume-depleted (including those on diuretic therapy), or with compromised renal function, co-administration of NSAIDs, including selective COX-2 inhibitors, with ACE inhibitors, including ramipril, may result in deterioration of renal function, including possible acute renal failure. These effects are usually reversible. Monitor renal function periodically in patients receiving ramipril and NSAID therapy.

The antihypertensive effect of ACE inhibitors, including ramipril, may be attenuated by NSAIDs.

### **7.7 mTOR Inhibitors**

Patients taking concomitant mTOR inhibitor (e.g. temsirolimus) therapy may be at increased risk for angioedema. [*see Warnings and Precautions (5.1)*]

## **8 USE IN SPECIFIC POPULATIONS**

### **8.1 Pregnancy**

Pregnancy Category D

third trimesters of pregnancy reduces fetal renal function and increases fetal and neonatal morbidity and

death. Resulting oligohydramnios can be associated with fetal lung hypoplasia and skeletal deformations. Potential neonatal adverse effects include skull hypoplasia, anuria, hypotension, renal failure, and death. When pregnancy is detected, discontinue ramipril as soon as possible. These adverse outcomes are usually associated with use of these drugs in the second and third trimester of pregnancy. Most epidemiologic studies examining fetal abnormalities after exposure to antihypertensive use in the first trimester have not distinguished drugs affecting the renin-angiotensin system from other antihypertensive agents. Appropriate management of maternal hypertension during pregnancy is important to optimize outcomes for both mother and fetus.

In the unusual case that there is no appropriate alternative to therapy with drugs affecting the renin-angiotensin system for a particular patient, apprise the mother of the potential risk to the fetus. Perform serial ultrasound examinations to assess the intra-amniotic environment. If oligohydramnios is observed, discontinue ramipril unless it is considered life-saving for the mother. Fetal testing may be appropriate, based on the week of pregnancy. Patients and physicians should be aware, however, that oligohydramnios may not appear until after the fetus has sustained irreversible injury. Closely observe infants with histories of in utero exposure to ramipril capsules for hypotension, oliguria, and hyperkalemia [see *Use in Specific Populations (8.4)*].

### **8.3 Nursing Mothers**

Ingestion of a single 10 mg oral dose of ramipril resulted in undetectable amounts of ramipril and its metabolites in breast milk. However, because multiple doses may produce low milk concentrations that are not predictable from a single dose, do not use ramipril capsules in nursing mothers.

### **8.4 Pediatric Use**

Neonates with a history of *in utero* exposure to ramipril capsules:

If oliguria or hypotension occurs, direct attention toward support of blood pressure and renal perfusion. Exchange transfusions or dialysis may be required as a means of reversing hypotension and/or substituting for disordered renal function. Ramipril, which crosses the placenta, can be removed from the neonatal circulation by these means, but limited experience has not shown that such removal is central to the treatment of these infants.

Safety and effectiveness in pediatric patients have not been established. Irreversible kidney damage has been observed in very young rats given a single dose of ramipril.

### **8.5 Geriatric Use**

Of the total number of patients who received ramipril in U.S. clinical studies of ramipril, 11.0% were  $\geq$  65 years of age while 0.2% were  $\geq$  75 years of age. No overall differences in effectiveness or safety were observed between these patients and younger patients, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but a greater sensitivity of some older individuals cannot be ruled out.

One pharmacokinetic study conducted in hospitalized elderly patients indicated that peak ramiprilat levels and area under the plasma concentration-time curve (AUC) for ramiprilat are higher in older patients.

### **8.6 Renal Impairment**

A single-dose pharmacokinetic study was conducted in hypertensive patients with varying degrees of renal impairment who received a single 10 mg dose of ramipril. Patients were stratified into four groups based on initial estimates of creatinine clearance: normal ( $>80$  mL/min), mild impairment (40 to 80 mL/min), moderate impairment (15 to 40 mL/min), and severe impairment ( $< 15$  mL/min). On average, the  $AUC_{0-24h}$  for ramiprilat was approximately 1.7 fold higher, 3.0 fold higher, and 3.2-fold higher in the groups with mild, moderate, and severe renal impairment, respectively, compared to the group with normal renal function. Overall, the results suggest that the starting dose of ramipril should be adjusted

downward in patients with moderate-to-severe renal impairment.

## 10 OVERDOSAGE

Single oral doses of ramipril in rats and mice of 10 g/kg to 11 g/kg resulted in significant lethality. In dogs, oral doses as high as 1 g/kg induced only mild gastrointestinal distress. Limited data on human overdosage are available. The most likely clinical manifestations would be symptoms attributable to hypotension.

Laboratory determinations of serum levels of ramipril and its metabolites are not widely available, and such determinations have, in any event, no established role in the management of ramipril overdose.

No data are available to suggest physiological maneuvers (e.g., maneuvers to change the pH of the urine) that might accelerate elimination of ramipril and its metabolites. Similarly, it is not known which, if any, of these substances can be effectively removed from the body by hemodialysis.

Angiotensin II could presumably serve as a specific antagonist-antidote in the setting of ramipril overdose, but angiotensin II is essentially unavailable outside of scattered research facilities. Because the hypotensive effect of ramipril is achieved through vasodilation and effective hypovolemia, it is reasonable to treat ramipril overdose by infusion of normal saline solution.

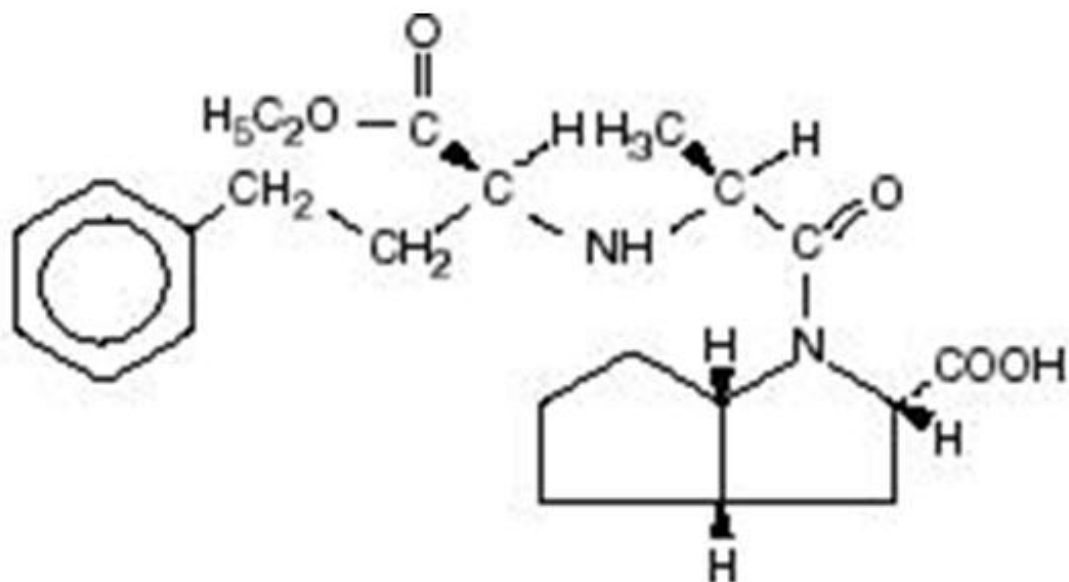
## 11 DESCRIPTION

Ramipril, USP is a 2-aza-bicyclo [3.3.0]-octane-3-carboxylic acid derivative. It is a white, crystalline substance soluble in polar organic solvents and buffered aqueous solutions. Ramipril melts between 105°C to 112°C.

The CAS Registry Number is 87333-19-5. Ramipril's chemical name is (2*S*,3*aS*,6*aS*)-1-[(*S*)-*N*-[(*S*)-1-carboxy-3-phenylpropyl]alanyl]octahydrocyclopenta[*b*]pyrrole-2-carboxylic acid, 1-ethyl ester.

The inactive ingredients present are pregelatinized starch NF, gelatin, and titanium dioxide. The 1.25 mg capsule shell contains D&C Yellow # 10 and FD&C Yellow # 6 the 2.5 mg capsule shell contains D&C Red # 28, D&C Yellow # 10 and FD&C Red #40, the 5 mg capsule shell contains D&C Red # 28, D&C Red # 33, D&C Yellow # 10 and FD&C Blue #1, and the 10 mg capsule shell contains D&C Red # 28, and FD&C Blue #1. Capsule shells are imprinted with ink containing Shellac and Black iron oxide.

The structural formula for ramipril is:



Its empirical formula is  $C_{23}H_{32}N_2O_5$  and its molecular weight is 416.5.

Ramiprilat, the diacid metabolite of ramipril, is a non-sulphydryl ACE inhibitor. Ramipril is converted to ramiprilat by hepatic cleavage of the ester group.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Ramipril and ramiprilat inhibit ACE in human subjects and animals. Angiotensin converting enzyme is a peptidyl dipeptidase that catalyzes the conversion of angiotensin I to the vasoconstrictor substance, angiotensin II. Angiotensin II also stimulates aldosterone secretion by the adrenal cortex. Inhibition of ACE results in decreased plasma angiotensin II, which leads to decreased vasopressor activity and to decreased aldosterone secretion. The latter decrease may result in a small increase of serum potassium. In hypertensive patients with normal renal function treated with ramipril alone for up to 56 weeks, approximately 4% of patients during the trial had an abnormally high serum potassium and an increase from baseline greater than 0.75 mEq/L, and none of the patients had an abnormally low potassium and a decrease from baseline greater than 0.75 mEq/L. In the same study, approximately 2% of patients treated with ramipril capsules and hydrochlorothiazide for up to 56 weeks had abnormally high potassium values and an increase from baseline of 0.75 mEq/L or greater; and approximately 2% had abnormally low values and decreases from baseline of 0.75 mEq/L or greater [see *Warnings and Precautions (5.8)*]. Removal of angiotensin II negative feedback on renin secretion leads to increased plasma renin activity.

The effect of ramipril on hypertension appears to result at least in part from inhibition of both tissue and circulating ACE activity, thereby reducing angiotensin II formation in tissue and plasma.

Angiotensin converting enzyme is identical to kininase, an enzyme that degrades bradykinin. Whether increased levels of bradykinin, a potent vasopressor peptide, play a role in the therapeutic effects of ramipril remains to be elucidated.

While the mechanism through which ramipril lowers blood pressure is believed to be primarily suppression of the renin-angiotensin-aldosterone system, ramipril has an antihypertensive effect even in patients with low-renin hypertension. Although ramipril was antihypertensive in all races studied, Black hypertensive patients (usually a low-renin hypertensive population) had a blood pressure lowering response to monotherapy, albeit a smaller average response, than non-Black patients.

## 12.2 Pharmacodynamics

Single doses of ramipril of 2.5 mg to 20 mg produce approximately 60% to 80% inhibition of ACE activity 4 hours after dosing with approximately 40% to 60% inhibition after 24 hours. Multiple oral doses of ramipril of 2.0 mg or more cause plasma ACE activity to fall by more than 90% 4 hours after dosing, with over 80% inhibition of ACE activity remaining 24 hours after dosing. The more prolonged effect of even small multiple doses presumably reflects saturation of ACE binding sites by ramiprilat and relatively slow release from those sites.

## 12.3 Pharmacokinetics

### *Absorption*

Following oral administration of ramipril, peak plasma concentrations ( $C_{max}$ ) of ramipril are reached within 1 hour. The extent of absorption is at least 50% to 60%, and is not significantly influenced by the presence of food in the gastrointestinal tract, although the rate of absorption is reduced.

In a trial in which subjects received ramipril capsules or the contents of identical capsules dissolved in water, dissolved in apple juice, or suspended in applesauce, serum ramiprilat levels were essentially unrelated to the use or non-use of the concomitant liquid or food.

### *Distribution*

Cleavage of the ester group (primarily in the liver) converts ramipril to its active diacid metabolite, ramiprilat. Peak plasma concentrations of ramiprilat are reached 2 to 4 hours after drug intake. The serum protein binding of ramipril is about 73% and that of ramiprilat about 56%; *in vitro*, these percentages are independent of concentration over the range of 0.01  $\mu\text{g/mL}$  to 10  $\mu\text{g/mL}$ .

### *Metabolism*

Ramipril is almost completely metabolized to ramiprilat, which has about 6 times the ACE inhibitory activity of ramipril, and to the diketopiperazine ester, the diketopiperazine acid, and the glucuronides of ramipril and ramiprilat, all of which are inactive.

Plasma concentrations of ramipril and ramiprilat increase with increased dose, but are not strictly dose-proportional. The 24-hour AUC for ramiprilat, however, is dose-proportional over the 2.5 mg to 20 mg dose range. The absolute bioavailabilities of ramipril and ramiprilat were 28% and 44%, respectively, when 5 mg of oral ramipril was compared with the same dose of ramipril given intravenously.

After once-daily dosing, steady-state plasma concentrations of ramiprilat are reached by the fourth dose. Steady-state concentrations of ramiprilat are somewhat higher than those seen after the first dose of ramipril, especially at low doses (2.5 mg), but the difference is clinically insignificant.

Plasma concentrations of ramiprilat decline in a triphasic manner (initial rapid decline, apparent elimination phase, terminal elimination phase). The initial rapid decline, which represents distribution of the drug into a large peripheral compartment and subsequent binding to both plasma and tissue ACE, has a half-life of 2 to 4 hours. Because of its potent binding to ACE and slow dissociation from the enzyme, ramiprilat shows two elimination phases. The apparent elimination phase corresponds to the clearance of free ramiprilat and has a half-life of 9 to 18 hours. The terminal elimination phase has a prolonged half-life (> 50 hours) and probably represents the binding/dissociation kinetics of the ramiprilat/ACE complex. It does not contribute to the accumulation of the drug. After multiple daily doses of ramipril 5 mg to 10 mg, the half-life of ramiprilat concentrations within the therapeutic range was 13 to 17 hours.

In patients with creatinine clearance < 40 mL/min/1.73 m<sup>2</sup>, peak levels of ramiprilat are approximately doubled, and trough levels may be as much as quintupled. In multiple-dose regimens, the total exposure to ramiprilat (AUC) in these patients is 3 to 4 times as large as it is in patients with normal renal function who receive similar doses.

In patients with impaired liver function, the metabolism of ramipril to ramiprilat appears to be slowed, possibly because of diminished activity of hepatic esterases, and plasma ramipril levels in these patients

are increased about 3 fold. Peak concentrations of ramiprilat in these patients, however, are not different from those seen in subjects with normal hepatic function, and the effect of a given dose on plasma ACE activity does not vary with hepatic function.

#### *Excretion*

After oral administration of ramipril, about 60% of the parent drug and its metabolites are eliminated in the urine, and about 40% is found in the feces. Drug recovered in the feces may represent both biliary excretion of metabolites and/or unabsorbed drug, however the proportion of a dose eliminated by the bile has not been determined. Less than 2% of the administered dose is recovered in urine as unchanged ramipril.

The urinary excretion of ramipril, ramiprilat, and their metabolites is reduced in patients with impaired renal function. Compared to normal subjects, patients with creatinine clearance  $< 40$  mL/min/1.73 m<sup>2</sup> had higher peak and trough ramiprilat levels and slightly longer times to peak concentrations.

## **13 NONCLINICAL TOXICOLOGY**

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

No evidence of a tumorigenic effect was found when ramipril was given by gavage to rats for up to 24 months at doses of up to 500 mg/kg/day or to mice for up to 18 months at doses of up to 1000 mg/kg/day. (For either species, these doses are about 200 times the maximum recommended human dose when compared on the basis of body surface area.) No mutagenic activity was detected in the Ames test in bacteria, the micronucleus test in mice, unscheduled DNA synthesis in a human cell line, or a forward gene-mutation assay in a Chinese hamster ovary cell line. Several metabolites and degradation products of ramipril were also negative in the Ames test. A study in rats with dosages as great as 500 mg/kg/day did not produce adverse effects on fertility.

No teratogenic effects of ramipril were seen in studies of pregnant rats, rabbits, and cynomolgus monkeys. On a body surface area basis, the doses used were up to approximately 400 times (in rats and monkeys) and 2 times (in rabbits) the recommended human dose.

## **14 CLINICAL STUDIES**

### **14.1 Hypertension**

Ramipril has been compared with other ACE inhibitors, beta-blockers, and thiazide diuretics as monotherapy for hypertension. It was approximately as effective as other ACE inhibitors and as atenolol.

Administration of ramipril to patients with mild to moderate hypertension results in a reduction of both supine and standing blood pressure to about the same extent with no compensatory tachycardia. Symptomatic postural hypotension is infrequent, although it can occur in patients who are salt-and/or volume-depleted [*see Warnings and Precautions (5.5)*]. Use of ramipril in combination with thiazide diuretics gives a blood pressure lowering effect greater than that seen with either agent alone.

In single-dose studies, doses of 5 mg to 20 mg of ramipril lowered blood pressure within 1 to 2 hours, with peak reductions achieved 3 to 6 hours after dosing. The antihypertensive effect of a single dose persisted for 24 hours. In longer term (4 to 12 weeks) controlled studies, once-daily doses of 2.5 mg to 10 mg were similar in their effect, lowering supine or standing systolic and diastolic blood pressures 24 hours after dosing by about 6/4 mmHg more than placebo. In comparisons of peak vs. trough effect, the trough effect represented about 50 to 60% of the peak response. In a titration study comparing divided (bid) vs. qd treatment, the divided regimen was superior, indicating that for some patients, the antihypertensive effect with once-daily dosing is not adequately maintained.

In most trials, the antihypertensive effect of ramipril increased during the first several weeks of

repeated measurements. The antihypertensive effect of ramipril has been shown to continue during long-term therapy for at least 2 years. Abrupt withdrawal of ramipril has not resulted in a rapid increase in blood pressure. Ramipril has been compared with other ACE inhibitors, beta-blockers, and thiazide diuretics. Ramipril was approximately as effective as other ACE inhibitors and as atenolol. In both Caucasians and Blacks, hydrochlorothiazide (25 or 50 mg) was significantly more effective than ramipril.

Ramipril was less effective in Blacks than in Caucasians. The effectiveness of ramipril was not influenced by age, sex, or weight.

In a baseline controlled study of 10 patients with mild essential hypertension, blood pressure reduction was accompanied by a 15% increase in renal blood flow. In healthy volunteers, glomerular filtration rate was unchanged.

## **16 HOW SUPPLIED/STORAGE AND HANDLING**

**Ramipril Capsules, USP 1.25 mg** are hard gelatin capsules size “4”, yellow opaque body with yellow opaque cap imprinted with IG271 on cap and 1.25 mg on body in black ink, filled with white to off-white powder and supplied in bottles of 100 (NDC 76282-271-01), 500 (76282-271-05) and 1000 (NDC 76282-271-10).

**Ramipril Capsules, USP 2.5 mg** are hard gelatin capsules size “4”, orange opaque body with orange opaque cap imprinted with IG272 on cap and 2.5 mg on body in black ink, filled with white to off-white powder and supplied in bottles of 100 (NDC 76282-272-01), 500 (NDC 76282-272-05) and 1000 (NDC 76282-272-10).

**Ramipril Capsules, USP 5 mg** capsules are hard gelatin capsules size “4”, red opaque body with red opaque cap imprinted with IG273 on cap and 5 mg on body in black ink, filled with white to off-white powder and supplied in bottles of 100 (NDC 76282-273-01), 500 (NDC 76282-273-05) and 1000 (NDC 76282-273-10).

**Ramipril Capsules, USP 10 mg** are hard gelatin capsules size “4”, blue opaque body with blue opaque cap imprinted with IG274 on cap and 10 mg on body in black ink, filled with white to off-white powder and supplied in bottles of 100 (NDC 76282-274-01), 500 (NDC 76282-274-05) and 1000 (NDC 76282-274-10).

Dispense in well-closed container with safety closure.

Store at controlled room temperature between 20° and 25°C (68°F to 77°F) [see USP Controlled Room Temperature].

## **17 PATIENT COUNSELING INFORMATION**

### **Angioedema**

Angioedema, including laryngeal edema, can occur with treatment with ACE inhibitors, especially following the first dose. Advise patients to immediately report any signs or symptoms suggesting angioedema (swelling of face, eyes, lips, or tongue, or difficulty in breathing) and to temporarily discontinue drug until they have consulted with the prescribing physician.

### **Neutropenia**

Advise patients to promptly report any indication of infection (e.g., sore throat, fever), which could be a sign of neutropenia.

### **Symptomatic Hypotension**

Inform patients that light-headedness can occur, especially during the first days of therapy, and it should be reported. Advise patients to discontinue ramipril capsules if syncope (fainting) occurs, and to follow

up with their health care providers.

Inform patients that inadequate fluid intake or excessive perspiration, diarrhea, or vomiting while taking ramipril capsules can lead to an excessive fall in blood pressure, with the same consequences of lightheadedness and possible syncope.

### **Pregnancy**

Tell female patients of childbearing age about the consequences of exposure to ramipril capsules during pregnancy. Discuss treatment options with women planning to become pregnant. Ask patients to report pregnancies to their physicians as soon as possible.

### **Hyperkalemia**

Advise patients not to use salt substitutes containing potassium without consulting their physician.

Manufactured for:  
Exelan Pharmaceuticals, Inc.  
Lawrenceville, GA 30046

Manufactured by  
InvaGen Pharmaceuticals, Inc.  
Hauppauge, NY, 11788

Rev: 08/16

## **PACKAGE LABEL.PRINCIPAL DISPLAY PANEL 1.25 mg**

**NDC 76282-271-01**

**RAMIPRIL**

**CAPSULES, USP**

**1.25 mg**

**EXELAN PHARMACEUTICALS, INC.**

Rx Only

100 Capsules

**NDC 76282-271-01**

**RAMIPRIL  
CAPSULES, USP**

**1.25 mg**

**EXELAN  
PHARMACEUTICALS, INC.**

Rx Only      100 Capsules

Each Ramipril capsule contains 1.25 mg of Ramipril, USP.

**Dosage and Administration:** Read package insert for prescribing information.

**WARNING:** Keep out of reach of children.

**Pharmacist:** Dispense in light-resistant, tight container with child-resistant closure.

**Store at controlled room temperature between 20° and 25°C (68° and 77°F) (See USP).**

Manufactured for:  
Exelan Pharmaceuticals, Inc.  
Lawrenceville, GA 30046

Manufactured by:  
InvaGen Pharmaceuticals, Inc.  
Hauppauge, NY 11788

Lot:  
Exp:

**NO VARNISH**

3 76282-271-01 9

Rev: 06/12



**PACKAGE LABEL.PRINCIPAL DISPLAY PANEL 2.5 mg**

**NDC 76282-272-01**

**RAMIPRIL**

**CAPSULES, USP**

**2.5 mg**

**EXELAN PHARMACEUTICALS, INC.**

Rx Only

100 Capsules

376282-272-01  
6

Rev: 06/12

NO VARNISH

Lot:  
Exp:

NDC 76282-272-01

**RAMIPRIL**  
**CAPSULES, USP**

**2.5 mg**

**EXELAN**  
PHARMACEUTICALS, INC.

Rx Only      100 Capsules

Each Ramipril capsule contains 2.5 mg of Ramipril, USP.  
**Dosage and Administration:** Read package insert for prescribing information.  
**WARNING:** Keep out of reach of children.  
**Pharmacist:** Dispense in light-resistant, tight container with child-resistant closure.  
**Store at controlled room temperature between 20° and 25°C (68° and 77° F) (See USP).**  
Manufactured for:  
Exelan Pharmaceuticals, Inc.  
Lawrenceville, GA 30046  
Manufactured by:  
InvaGen Pharmaceuticals, Inc.  
Hauppauge, NY 11788

**PACKAGE LABEL.PRINCIPAL DISPLAY PANEL 5 mg**

**NDC 76282-273-01**

**RAMIPRIL**

**CAPSULES, USP**

**5 mg**

**EXELAN PHARMACEUTICALS, INC.**

Rx Only

100 Capsules

3 N  
7 6 2 8 2 - 2 7 3 - 0 1 3  
Rev: 06/12

Exp: Lot:

NO VARNISH

NDC 76282-273-01

**RAMIPRIL  
CAPSULES, USP**

**5 mg**

EXELAN  
PHARMACEUTICALS, INC.

Rx Only 100 Capsules

Each Ramipril capsule contains 5 mg of Ramipril, USP.  
**Dosage and Administration:** Read package insert for prescribing information.  
**WARNING:** Keep out of reach of children.  
**Pharmacist:** Dispense in light-resistant, tight container with child-resistant closure.  
**Store at controlled room temperature between 20° and 25°C (68° and 77°F) (See USP).**  
 Manufactured for:  
 Exelan Pharmaceuticals, Inc.  
 Lawrenceville, GA 30046  
 Manufactured by:  
 InvaGen Pharmaceuticals, Inc.  
 Hauppauge, NY 11788

**PACKAGE LABEL, PRINCIPAL DISPLAY PANEL 10 mg**

**NDC 76282-274-01**

**RAMIPRIL  
CAPSULES, USP**

**10 mg**

**EXELAN PHARMACEUTICALS, INC.**

Rx Only

100 Capsules

3 N  
7 6 2 8 2 - 2 7 4 - 0 1 0  
Rev: 06/12

Exp: Lot:

NO VARNISH

NDC 76282-274-01

**RAMIPRIL  
CAPSULES, USP**

**10 mg**

EXELAN  
PHARMACEUTICALS, INC.

Rx Only 100 Capsules

Each Ramipril capsule contains 10 mg of Ramipril, USP.  
**Dosage and Administration:** Read package insert for prescribing information.  
**WARNING:** Keep out of reach of children.  
**Pharmacist:** Dispense in light-resistant, tight container with child-resistant closure.  
**Store at controlled room temperature between 20° and 25°C (68° and 77°F) (See USP).**  
 Manufactured for:  
 Exelan Pharmaceuticals, Inc.  
 Lawrenceville, GA 30046  
 Manufactured by:  
 InvaGen Pharmaceuticals, Inc.  
 Hauppauge, NY 11788

**RAMIPRIL**

ramipril capsule

**Product Information**

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:76282-271
<b>Route of Administration</b>	ORAL		

### Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
RAMIPRIL (UNII: L35JN3I7SJ) (RAMIPRILAT - UNII:6N5U4QFC3G)	RAMIPRIL	1.25 mg

### Inactive Ingredients

Ingredient Name	Strength
STARCH, CORN (UNII: O8232NY3SJ)	
GELATIN (UNII: 2G86QN327L)	
TITANIUM DIOXIDE (UNII: 15FIX9V2JP)	
D&C YELLOW NO. 10 (UNII: 35SW5USQ3G)	
FD&C YELLOW NO. 6 (UNII: H77VEI93A8)	
SHELLAC (UNII: 46N107B71O)	
FERROSO FERRIC OXIDE (UNII: XM0M87F357)	

### Product Characteristics

<b>Color</b>	YELLOW	<b>Score</b>	no score
<b>Shape</b>	CAPSULE	<b>Size</b>	4mm
<b>Flavor</b>		<b>Imprint Code</b>	IG271;1;25;mg
<b>Contains</b>			

### Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:76282-271-01	100 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
2	NDC:76282-271-05	500 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
3	NDC:76282-271-10	1000 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	

### Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA078745	06/27/2008	

## RAMIPRIL

ramipril capsule

### Product Information

<b>Product Type</b>	HUMAN PRESCRIPTION DRUG	<b>Item Code (Source)</b>	NDC:76282-272
<b>Route of Administration</b>	ORAL		

**Active Ingredient/Active Moiety**

Ingredient Name	Basis of Strength	Strength
RAMIPRIL (UNII: L35JN3I7SJ) (RAMIPRILAT - UNII:6N5U4QFC3G)	RAMIPRIL	2.5 mg

**Inactive Ingredients**

Ingredient Name	Strength
STARCH, CORN (UNII: O8232NY3SJ)	
GELATIN (UNII: 2G86QN327L)	
TITANIUM DIOXIDE (UNII: 15FIX9V2JP)	
D&C RED NO. 28 (UNII: 767IP0Y5NH)	
D&C YELLOW NO. 10 (UNII: 35SW5USQ3G)	
FD&C RED NO. 40 (UNII: WZB9127XOA)	
SHELLAC (UNII: 46N107B71O)	
FERROSO FERRIC OXIDE (UNII: XM0M87F357)	

**Product Characteristics**

Color	ORANGE	Score	no score
Shape	CAPSULE	Size	4mm
Flavor		Imprint Code	IG272;2;5;mg
Contains			

**Packaging**

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:76282-272-01	100 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
2	NDC:76282-272-05	500 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
3	NDC:76282-272-10	1000 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	

**Marketing Information**

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA078745	06/27/2008	

**RAMIPRIL**

ramipril capsule

**Product Information**

Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:76282-273
Route of Administration	ORAL		

**Active Ingredient/Active Moiety**

Ingredient Name	Basis of Strength	Strength
-----------------	-------------------	----------

RAMIPRIL (UNII: L35JN3I7SJ) (RAMIPRILAT - UNII:6N5U4QFC3G)	RAMIPRIL	5 mg
--	----------	------

### Inactive Ingredients

Ingredient Name	Strength
STARCH, CORN (UNII: O8232NY3SJ)	
GELATIN (UNII: 2G86QN327L)	
TITANIUM DIOXIDE (UNII: 15FIX9V2JP)	
D&C RED NO. 28 (UNII: 767IP0Y5NH)	
D&C RED NO. 33 (UNII: 9DBA0SBB0L)	
D&C YELLOW NO. 10 (UNII: 35SW5USQ3G)	
FD&C BLUE NO. 1 (UNII: HBR47K3TBD)	
SHELLAC (UNII: 46N107B71O)	
FERROSO FERRIC OXIDE (UNII: XM0M87F357)	

### Product Characteristics

Color	RED	Score	no score
Shape	CAPSULE	Size	4mm
Flavor		Imprint Code	IG273;5;mg
Contains			

### Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:76282-273-01	100 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
2	NDC:76282-273-05	500 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
3	NDC:76282-273-10	1000 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	

### Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA078745	06/27/2008	

## RAMIPRIL

ramipril capsule

### Product Information

Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:76282-274
Route of Administration	ORAL		

### Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
RAMIPRIL (UNII: L35JN3I7SJ) (RAMIPRILAT - UNII:6N5U4QFC3G)	RAMIPRIL	10 mg

## Inactive Ingredients

Ingredient Name	Strength
STARCH, CORN (UNII: O8232NY3SJ)	
GELATIN (UNII: 2G86QN327L)	
TITANIUM DIOXIDE (UNII: 15FIX9V2JP)	
D&C RED NO. 28 (UNII: 767IP0Y5NH)	
FD&C BLUE NO. 1 (UNII: HBR47K3TBD)	
SHELLAC (UNII: 46N107B71O)	
FERROSO FERRIC OXIDE (UNII: XM0M87F357)	

## Product Characteristics

Color	BLUE	Score	no score
Shape	CAPSULE	Size	4mm
Flavor		Imprint Code	IG274;10;mg
Contains			

## Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:76282-274-01	100 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
2	NDC:76282-274-05	500 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	
3	NDC:76282-274-10	1000 in 1 BOTTLE; Type 0: Not a Combination Product	06/27/2008	

## Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA078745	06/27/2008	

**Labeler** - Exelan Pharmaceuticals, Inc. (967795266)

**Registrant** - InvaGen Pharmaceuticals, Inc. (165104469)

## Establishment

Name	Address	ID/FEI	Business Operations
InvaGen Pharmaceuticals, Inc.		165104469	ANALYSIS(76282-271, 76282-272, 76282-273, 76282-274) , MANUFACTURE(76282-271, 76282-272, 76282-273, 76282-274)

## Establishment

Name	Address	ID/FEI	Business Operations
InvaGen Pharmaceuticals, Inc		080334903	pack(76282-271, 76282-272, 76282-273, 76282-274)