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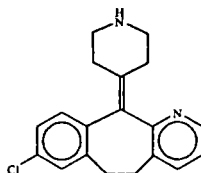
**APPLICATION NUMBER
21-165**

FINAL PRINTED LABELING

CLARINEX® (desloratadine) TABLETS

DESCRIPTION: CLARINEX (desloratadine) Tablets are light blue, round, film coated tablets containing 5 mg desloratadine, an antihistamine, to be administered orally. It also contains the following excipients: dibasic calcium phosphate dihydrate USP, microcrystalline cellulose NF, corn starch NF, talc USP, carnauba wax NF, white wax NF, coating material consisting of lactose monohydrate, hydroxypropyl methylcellulose, titanium dioxide, polyethylene glycol, and FD&C Blue # 2 Aluminum Lake.

Desloratadine is a white to off-white powder that is slightly soluble in water, but very soluble in ethanol and propylene glycol. It has an empirical formula: $C_{19}H_{19}ClN_2$ and a molecular weight of 310.8. The chemical name is 8-chloro-6,11-dihydro-11-(4-piperidinylidene)-5H-benzo[5,6]cyclohepta[1,2-b]pyridine and has the following structure:



CLINICAL PHARMACOLOGY: Mechanism of Action: Desloratadine is a long-acting tricyclic histamine antagonist with selective H_1 -receptor histamine antagonist activity. Receptor binding data indicates that at a concentration of 2-3 ng/mL (7 nanomolar), desloratadine shows significant interaction with the human histamine H_1 receptor. Desloratadine inhibited histamine release from human mast cells *in vitro*.

Results of a radiolabeled tissue distribution study in rats and a radioligand H_1 -receptor binding study in guinea pigs showed that desloratadine does not readily cross the blood brain barrier.

Pharmacokinetics: Absorption: Following oral administration of desloratadine 5 mg once daily for 10 days to normal healthy volunteers, the mean time to maximum plasma concentrations (T_{max}) occurred at approximately 3 hours post dose and mean steady state peak plasma concentrations (C_{max}) and area under the concentration-time curve (AUC) of 4 ng/mL and 56.9 ng·hr/mL were observed, respectively. Food had no effect on the bioavailability (C_{max} and AUC) of desloratadine.

Distribution: Desloratadine and 3-hydroxydesloratadine are approximately 82 to 87% and 85 to 89%, bound to plasma proteins, respectively. Protein binding of desloratadine and 3-hydroxydesloratadine was unaltered in subjects with impaired renal function.

Metabolism: Desloratadine (a major metabolite of loratadine) is extensively metabolized to 3-hydroxydesloratadine, an active metabolite, which is subsequently glucuronidated. The enzyme(s) responsible for the formation of 3-hydroxydesloratadine have not been identified. Data from clinical trials indicate that a subset of the general patient population has a decreased ability to form 3-hydroxydesloratadine, and are slow metabolizers of desloratadine. In pharmacokinetic studies ($n=1087$), approximately 7% of subjects were slow metabolizers of desloratadine (defined as a subject with an AUC ratio of 3-hydroxydesloratadine to desloratadine less than 0.1, or a subject with a desloratadine half-life exceeding 50 hours). The frequency of slow metabolizers is higher in blacks (approximately 20% of blacks were slow metabolizers in pharmacokinetic studies, $n=276$). The median exposure (AUC) to desloratadine in the slow metabolizers was approximately 6-fold greater than the subjects who are not slow metabolizers. Subjects who are slow metabolizers of desloratadine cannot be prospectively identified and will be exposed to higher levels of desloratadine following dosing with the recommended dose of desloratadine. Although not seen in these pharmacokinetic studies, patients who are slow metabolizers may be more susceptible to dose-related adverse events.

Elimination: The mean elimination half-life of desloratadine was 27 hours. C_{max} and AUC values increased in a dose proportional manner following single oral doses between 5 and 20 mg. The degree of accumulation after 14 days of dosing was consistent with the half-life and dosing frequency. A human mass balance study documented a recovery of approximately 87% of the ^{14}C -desloratadine dose, which was equally distributed in urine and feces as metabolic products. Analysis of plasma 3-hydroxydesloratadine showed similar T_{max} and half-life values compared to desloratadine.

Special Populations: Geriatric: In older subjects (≥ 65 years old; $n=17$) following multiple-dose administration of CLARINEX Tablets, the mean C_{max} and AUC values for desloratadine were 20% greater than in younger subjects (< 65 years old). The oral total body clearance (CL/F) when normalized for body weight was similar between the two age groups. The mean plasma elimination half-life of desloratadine was 33.7 hr in subjects ≥ 65 years old. The pharmacokinetics for 3-hydroxydesloratadine appeared unchanged in older versus younger subjects. These age-related differences are unlikely to be clinically relevant and no dosage adjustment is recommended in elderly subjects.

Renally Impaired: Desloratadine pharmacokinetics following a single dose of 7.5 mg were characterized in patients with mild ($n=7$; creatinine clearance 51-69 mL/min/1.73 m²), moderate ($n=6$; creatinine clearance 34-43 mL/min/1.73 m²), and severe ($n=6$; creatinine clearance 5-29 mL/min/1.73 m²) renal impairment or hemodialysis dependent ($n=6$) patients. In patients with mild and moderate renal impairment, median C_{max} and AUC values increased by

approximately 1.2 and 1.9-fold, respectively, relative to subjects with normal renal function. In patients with severe renal impairment or who were hemodialysis dependent, C_{max} and AUC values increased by approximately 1.7- and 2.5-fold, respectively. Minimal changes in 3-hydroxydesloratadine concentrations were observed. Desloratadine and 3-hydroxydesloratadine were poorly removed by hemodialysis. Plasma protein binding of desloratadine and 3-hydroxydesloratadine was unaltered by renal impairment. Dosage adjustment for patients with renal impairment is recommended (see **DOSAGE AND ADMINISTRATION** section).

Hepatically Impaired: Desloratadine pharmacokinetics were characterized following a single oral dose in patients with mild ($n=4$), moderate ($n=4$), and severe ($n=4$) hepatic impairment as defined by the Child-Pugh classification of hepatic function and 8 subjects with normal hepatic function. Patients with hepatic impairment, regardless of severity, had approximately a 2.4-fold increase in AUC as compared with normal subjects. The apparent oral clearance of desloratadine in patients with mild, moderate, and severe hepatic impairment was 37, 36, and 28% of that in normal subjects, respectively. An increase in the mean elimination half-life of desloratadine in patients with hepatic impairment was observed. For 3-hydroxydesloratadine, the mean C_{max} and AUC values for patients with hepatic impairment were not statistically significantly different from subjects with normal hepatic function. Dosage adjustment for patients with hepatic impairment is recommended (see **DOSAGE AND ADMINISTRATION** section).

Gender: Female subjects treated for 14 days with CLARINEX Tablets had 10% and 3% higher desloratadine C_{max} and AUC values, respectively, compared with male subjects. The 3-hydroxydesloratadine C_{max} and AUC values were also increased by 45% and 48%, respectively, in females compared with males. However, these apparent differences are not likely to be clinically relevant and therefore no dosage adjustment is recommended.

Race: Following 14 days of treatment with CLARINEX Tablets, the C_{max} and AUC values for desloratadine were 18 and 32% higher, respectively, in Blacks compared with Caucasians. For 3-hydroxydesloratadine there was a corresponding 10% reduction in C_{max} and AUC values in Blacks compared to Caucasians. These differences are not likely to be clinically relevant and therefore no dosage adjustment is recommended.

Drug Interactions: In two controlled clinical pharmacology studies in healthy male ($n=12$ in each study) and female ($n=12$ in each study) volunteers, desloratadine 7.5 mg once daily was coadministered with erythromycin 500 mg every 8 hours or ketoconazole 200 mg every 12 hours for 10 days. Although increased plasma concentrations (C_{max} and AUC 0-24 hrs) of desloratadine and 3-hydroxydesloratadine were observed (see Table 1), there were no clinically relevant changes in the safety profile of desloratadine, as assessed by electrocardiographic parameters (including the corrected QT interval), clinical laboratory tests, vital signs, and adverse events.

Table 1
Changes in Desloratadine and 3-Hydroxydesloratadine Pharmacokinetics
After 10 Days of Co-administration of Desloratadine 7.5 mg daily With Erythromycin
or Ketoconazole in Healthy Male and Female Volunteers.

	Desloratadine		3-Hydroxydesloratadine	
	C_{max}	AUC 0-24 hrs	C_{max}	AUC 0-24 hrs
Erythromycin (500 mg Q8h)	+24%	+14%	+43%	+40%
Ketoconazole (200 mg Q12h)	+45%	+39%	+43%	+72%

Pharmacodynamics: Effects on QT_c: Single dose administration of desloratadine did not alter the corrected QT interval (QT_c) in rats (up to 12 mg/kg, oral), or guinea pigs (25 mg/kg, intravenous). Repeated oral administration at doses up to 24 mg/kg for durations up to 3 months in monkeys did not alter the QT_c at an estimated desloratadine exposure (AUC) that was approximately 955 times the mean AUC in humans at the recommended daily oral dose. See **OVERDOSAGE** section for information on human QT_c experience.

Clinical Trials: The clinical efficacy and safety of CLARINEX Tablets were evaluated in over 2,300 patients 12 to 75 years of age with seasonal allergic rhinitis. A total of 1838 patients received 2.5-20 mg/day of CLARINEX in 4 double-blind, randomized, placebo-controlled clinical trials of 2- to 4- weeks duration conducted in the United States. The results of these studies demonstrated the efficacy and safety of CLARINEX 5 mg in the treatment of adult and adolescent patients with seasonal allergic rhinitis. In a dose ranging trial, CLARINEX 2.5-20 mg/day was studied. Doses of 5, 7.5, 10, and 20 mg/day were superior to placebo; and no additional benefit was seen at doses above 5.0 mg. In the same study, an increase in the incidence of somnolence was observed at doses of 10 mg/day and 20 mg/day (5.2% and 7.6%, respectively), compared to placebo (2.3%).

CLARINEX Tablets 5 mg once daily significantly reduced the Total Symptom Scores (the sum of individual scores of nasal and non-nasal symptoms) in patients with seasonal allergic rhinitis. See Table 2.

Table 2
TOTAL SYMPTOM SCORE (TSS)

Changes in a 2 Week Clinical Trial in Patients With Seasonal Allergic Rhinitis

Treatment Group (n)	Mean Baseline* (sem)	Change from Baseline** (sem)	Placebo Comparison (P-value)
5.0 mg (171)	14.2 (0.3)	-4.3 (0.3)	P=<0.01
Placebo (173)	13.7 (0.3)	-2.5 (0.3)	

* At baseline, a total nasal symptom score (sum of 4 individual symptoms) of least 6 and a total non-nasal symptom score (sum of 4 individual symptoms) of at least 5 (each symptom scored 0 to 3 where 0=no symptom and 3=severe symptoms) was required for trial eligibility. TSS ranges from 0=no symptoms to 24=maximal symptoms.

** Mean reduction in TSS averaged over the 2-week treatment period.

There were no significant differences in the effectiveness of CLARINEX Tablets 5 mg across subgroups of patients defined by gender, age, or race.

INDICATIONS AND USAGE: CLARINEX Tablets are indicated for the relief of the nasal and non-nasal symptoms of seasonal allergic rhinitis in patients 12 years of age and older.

CONTRAINDICATIONS: CLARINEX Tablets are contraindicated in patients who are hypersensitive to this medication or to any of its ingredients, or to loratadine.

PRECAUTIONS: Carcinogenesis, Mutagenesis, Impairment of Fertility: The carcinogenic potential of desloratadine was assessed using loratadine studies. In an 18-month study in mice and a 2-year study in rats, loratadine was administered in the diet at doses up to 40 mg/kg/day in mice (estimated desloratadine and desloratadine metabolite exposures were approximately 3 times the AUC in humans at the recommended daily oral dose) and 25 mg/kg/day in rats (estimated desloratadine and desloratadine metabolite exposures were approximately 30 times the AUC in humans at the recommended daily oral dose). Male mice given 40 mg/kg/day loratadine had a significantly higher incidence of hepatocellular tumors (combined adenomas and carcinomas) than concurrent controls. In rats, a significantly higher incidence of hepatocellular tumors (combined adenomas and carcinomas) was observed in males given 10 mg/kg/day and in males and females given 25 mg/kg/day. The estimated desloratadine and desloratadine metabolite exposures of rats given 10 mg/kg of loratadine were approximately 7 times the AUC in humans at the recommended daily oral dose. The clinical significance of these findings during long-term use of desloratadine is not known.

In genotoxicity studies with desloratadine, there was no evidence of genotoxic potential in a reverse mutation assay (*Salmonella/E. coli* mammalian microsome bacterial mutagenicity assay) or in two assays for chromosomal aberrations (human peripheral blood lymphocyte clastogenicity assay and mouse bone marrow micronucleus assay).

There was no effect on female fertility in rats at desloratadine doses up to 24 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 130 times the AUC in humans at the recommended daily oral dose). A male specific decrease in fertility, demonstrated by reduced female conception rates, decreased sperm numbers and motility, and histopathologic testicular changes, occurred at an oral desloratadine dose of 12 mg/kg in rats (estimated desloratadine exposures were approximately 45 times the AUC in humans at the recommended daily oral dose). Desloratadine had no effect on fertility in rats at an oral dose of 3 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 8 times the AUC in humans at the recommended daily oral dose).

Pregnancy Category C: Desloratadine was not teratogenic in rats at doses up to 48 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 210 times the AUC in humans at the recommended daily oral dose) or in rabbits at doses up to 60 mg/kg/day (estimated desloratadine exposure was approximately 230 times the AUC in humans at the recommended daily oral dose). In a separate study, an increase in pre-implantation loss and a decreased number of implantations and fetuses were noted in female rats at 24 mg/kg (estimated desloratadine and desloratadine metabolite exposures were approximately 120 times the AUC in humans at the recommended daily oral dose). Reduced body weight and slow righting reflex were reported in pups at doses of 9 mg/kg/day or greater (estimated desloratadine and desloratadine metabolite exposure was approximately 50 times or greater than the AUC in humans at the recommended daily oral dose). Desloratadine had no effect on pup development at an oral dose of 3 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 7 times the AUC in humans at the recommended daily oral dose). There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, desloratadine should be used during pregnancy only if clearly needed.

Nursing Mothers: Desloratadine passes into breast milk, therefore a decision should be made whether to discontinue nursing or to discontinue desloratadine, taking into account the importance of the drug to the mother.

Pediatric Use: The safety and effectiveness of CLARINEX Tablets in pediatric patients under 12 years of age have not been established.

Geriatric Use: Clinical studies of desloratadine did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy. (see **CLINICAL PHARMACOLOGY - Special Populations**).

Information for Patients: Patients should be instructed to use CLARINEX Tablets as directed. As there are no food effects on bioavailability, patients can be instructed that CLARINEX Tablets may be taken without regard to meals. Patients should be advised not to increase the dose or dosing frequency as studies have not demonstrated increased effectiveness at higher doses and somnolence may occur.

ADVERSE REACTIONS: In multiple-dose placebo-controlled trials, 1,838 patients received CLARINEX Tablets at doses of 2.5 mg to 20 mg daily, 659 patients received the recommended daily dose of 5 mg. In patients receiving 5 mg daily, the rate of adverse events was

similar between CLARINEX and placebo-treated patients. The percent of patients who withdrew prematurely due to adverse events was 2% in both the CLARINEX and the placebo groups. There were no serious adverse events in these trials in patients receiving desloratadine. All adverse events that were reported by greater than or equal to 2% of patients who received the recommended daily dose of CLARINEX Tablets (5.0 mg once-daily), and that were more common with CLARINEX than placebo, are listed in Table 3.

Table 3
Incidence of Adverse Events Reported by $\geq 2\%$ of Patients in Placebo-Controlled, Multiple-Dose Clinical Trials

Adverse Experience	CLARINEX Tablets 5.0 mg (n=659)	Placebo (n=661)
Pharyngitis	5%	2%
Dry Mouth	4%	2%
Somnolence	3%	2%
Fatigue	3%	2%
Influenza-Like Symptoms	2%	1%
Myalgia	2%	<1%
Nausea	2%	1%
Dizziness	2%	1%
Dry Throat	2%	1%

The frequency and magnitude of laboratory and electrocardiographic abnormalities were similar in CLARINEX and placebo-treated patients.

There were no differences in adverse events for subgroups of patients as defined by gender, age, or race.

The following spontaneous adverse events have been reported during the marketing of desloratadine: tachycardia, and rarely hypersensitivity reactions (such as rash, pruritus, urticaria, edema, dyspnea, and anaphylaxis), and elevated liver enzymes including bilirubin.

DRUG ABUSE AND DEPENDENCE: There is no information to indicate that abuse or dependency occurs with CLARINEX Tablets.

OVERDOSAGE: Information regarding acute overdosage is limited to experience from clinical trials conducted during the development of the CLARINEX product. In a dose ranging trial, at doses of 10 mg and 20 mg/day somnolence was reported.

Single daily doses of 45 mg were given to normal male and female volunteers for 10 days. All ECGs obtained in this study were manually read in a blinded fashion by a cardiologist. In CLARINEX-treated subjects, there was an increase in mean heart rate of 9.2 bpm relative to placebo. The QT interval was corrected for heart rate (QT_c) by both the Bazett and Fridericia methods. Using the QT_c (Bazett) there was a mean increase of 8.1 msec in CLARINEX-treated subjects relative to placebo. Using QT_c (Fridericia), there was a mean increase of 0.4 msec in CLARINEX-treated subjects relative to placebo. No clinically relevant adverse events were reported.

In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Desloratadine and 3-hydroxy-desloratadine are not eliminated by hemodialysis.

Lethality occurred in rats at oral doses of 250 mg/kg or greater (estimated desloratadine and desloratadine metabolite exposures were approximately 120 times the AUC in humans at the recommended daily oral dose). The oral median lethal dose in mice was 353 mg/kg (estimated desloratadine exposures were approximately 290 times the human daily oral dose on a mg/m² basis). No deaths occurred at oral doses up to 250 mg/kg in monkeys (estimated desloratadine exposures were approximately 810 times the human daily oral dose on a mg/m² basis).

DOSAGE AND ADMINISTRATION: In adults and children 12 years of age and over; the recommended dose of CLARINEX Tablets is 5 mg once daily. In patients with liver or renal impairment, a starting dose of one 5 mg tablet every other day is recommended based on pharmacokinetic data.

HOW SUPPLIED: CLARINEX Tablets: Embossed "C5", light blue film coated tablets; that are packaged in high-density polyethylene plastic bottles of 100 (NDC 0085-1264-01) and 500 (NDC 0085-1264-02). Also available, CLARINEX Unit-of-Use package of 30 tablets (3 x 10; 10 blisters per card) (NDC 0085-1264-04); and Unit Dose-Hospital Pack of 100 Tablets (10 x 10; 10 blisters per card) (NDC 0085-1264-03).

Protect Unit-of-Use packaging and Unit Dose-Hospital Pack from excessive moisture. Store between 2° and 25°C (36° and 77°F).

Heat sensitive. Avoid exposure at or above 30°C (86°F).

Schering

Schering Corporation
Kenilworth, NJ 07033 USA

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