PRODUCT MONOGRAPH

ALLERGY CONTROL DESLORATADINE

Desloratadine tablets

5 mg

Histamine H_1-Receptor Antagonist

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ALLERGY CONTROL DESLORATADINE

Desloratadine Tablets

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	All Nonmedicinal Ingredients
oral	tablet 5 mg	FD & C Blue No.2 Aluminum Lake, Hypromellose, lactose, magnesium oxide, microcrystalline cellulose, polyethylene glycol, pregelatinized starch, titanium dioxide, zinc stearate

INDICATIONS AND CLINICAL USE

ALLERGY CONTROL DESLORATADINE (desloratadine) tablets are indicated for:

- the fast 24 hour relief of multi nasal and non-nasal symptoms associated with allergic rhinitis, including sneezing, nasal discharge and itching, congestion/stuffiness, itching of the palate and/or ears and/or throat and/or eyes and allergic cough, as well as tearing and redness of the eyes.
- the rapid relief of symptoms associated with chronic idiopathic urticaria, such as pruritus and hives.

CONTRAINDICATIONS

- *Patients who are hypersensitive to this drug or to any ingredient in the formulation or component of the container. For a complete listing, see the Dosage Forms, Composition and Packaging.section of the product monograph.*

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

In the case of severe hepatic or renal insufficiency, use with caution.

Hepatic/Biliary/Pancreatic

In a single-dose (7.5 mg) pharmacokinetic study, subjects with mild to severe hepatic dysfunction (n=4/group) had mean AUC and Cmax values up to 2.4 times higher than healthy subjects (n=8); however, these findings are not considered to be clinically relevant.

Desloratadine 5 mg was administered for 10 days to subjects with normal hepatic function (n=9) or moderate dysfunction (n=11). Subjects with hepatic dysfunction could experience a 3-fold increase in exposure (AUC) to desloratadine, but these findings are not considered to be clinically relevant.

Therefore no dosage modification is recommended in individuals with hepatic dysfunction (***see DETAILED PHARMACOLOGY/ Human Pharmacokinetics/ Hepatic Dysfunction).***

Renal

In a single-dose (7.5 mg) pharmacokinetic study, subjects (n=25) with varying degrees of renal insufficiency (mild, moderate, severe and hemodialysis) had 1.7 to 2.5 fold increases in desloratadine mean AUC with minimal change in 3-hydroxy desloratadine concentrations. However, these findings are not considered to be clinically relevant *(see **DETAILED PHARMACOLOGY / Human Pharmacokinetics/ Renal Dysfunction)***.

In the case of severe renal insufficiency, desloratadine tablets should be used with caution.

Respiratory

Use in Asthmatics: Desloratadine tablets have been safely administered to patients with mild to moderate asthma **(***see **CLINICAL TRIALS / Efficacy in Seasonal Allergic Rhinitis: Patients with SAR and Concomitant Mild to Moderate Asthma*).

Desloratadine tablets did not cause exacerbation of asthma symptoms *(see **DETAILED PHARMACOLOGY/Human Pharmacokinetics/Asthmatics)***.

Special Populations

Pregnant Women: Since no clinical data on exposed pregnancies are available with desloratadine, the safe use of desloratadine tablets during pregnancy has not been established. The use of desloratadine tablets during pregnancy is therefore not recommended.

No overall effect on rat fertility was observed with desloratadine at an exposure that was 34 times higher than the exposure in humans at the recommended clinical dose. No teratogenic or mutagenic effects were observed in animal trials with desloratadine (*see **TOXICOLOGY***).

Nursing Women: Desloratadine passes into breast milk; therefore, breast-feeding is not recommended in lactating women taking desloratadine tablets.

Pediatrics: The efficacy and safety of desloratadine tablets in children under 12 years of age

have not been established.

Geriatrics (> *65* years of age): In a multiple dose study with desloratadine 5 mg, subjects >65 years of age (n=17) had AUC and C_{max} values 20% greater and plasma elimination half-life approximately 30% longer than in younger subjects; however, these changes are not considered to be clinically relevant and no dosage adjustment is warranted in this age subgroup. ***(see DETAILED PHARMACOLOGY/Human Pharmacokinetics/Elderly)***

ADVERSE REACTIONS

Adverse Drug Reaction Overview

No clinically relevant drug-related adverse effects including cardiovascular effects were observed with desloratadine in clinical trials.

Very rare cases of hypersensitivity reactions including anaphylaxis and rash have been reported during the marketing of desloratadine. In addition, cases of tachycardia, palpitations, psychomotor hyperactivity, seizures, elevations of liver enzymes, hepatitis, and increased bilirubin have been reported very rarely.

Clinical Trial Adverse Drug Reactions

> *Because clinical trials are conducted under very specific conditions the adverse reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates*.

The frequency of reasonably related undesirable effects is presented as the excess incidence in 1866 patients who received desloratadine 5 mg tablets compared to that seen in 1857 patients who received placebo in multiple-dose clinical trials evaluating the treatment of seasonal and allergic rhinitis and chronic idiopathic urticaria. The type and frequency of undesirable effects reported throughout the desloratadine allergic rhinitis and CIU clinical trials were comparable to those reported with placebo.

At the recommended dose of 5 mg daily, undesirable effects with desloratadine were reported in only 3% of patients in excess of those treated with placebo. No excess incidence of somnolence was reported in patients treated with desloratadine. Headache was reported in only 0.6% of patients in excess of those treated with placebo. The incidence of treatment-related adverse events reported by ≥1% of subjects treated with desloratadine 5 mg in multiple-dose clinical trials is presented in **Table 1.**

Table 1: Incidence of Treatment-related Adverse Events Reported by ≥2% of Subjects Treated with Desloratadine 5 mg in Multiple-dose Seasonal Allergic Rhinitis and Chronic Idiopathic Urticaria Studies

	Number[a] (%) of Subjects	
	Desloratadine 5.0 mg (n=1866)	**Placebo (n=1857)**
No. of Subjects (%) with Any Related Adverse Event[b]	281 (15.1)	232 (12.5)
Autonomic Nervous System Disorders	**51 (2.7)**	**36 (1.9)**
Dry Mouth	49 (2.6)	34 (1.8)
Fatigue	33 (1.8)	12(0.6)
Body As a Whole-General Disorders	**124 (6.6)**	**88 (4.7)**
Headache	84 (4.5)	72 (3.9)
Psychiatric Disorders	**53 (2.8)**	**48 (2.6)**
Somnolence	36 (1.9)	35(1.9)

[a.] Number of subjects reporting related adverse events at least once during the study. Some subjects may have reported more than 1 adverse event.
[b.] Considered by the investigator to be possibly or probably related to treatment.

Post-Market Adverse Drug Reactions

Very rare cases of hypersensitivity reactions, including anaphylaxis and rash have been reported during the marketing of desloratadine. In addition, cases of tachycardia, palpitations, psychomotor hyperactivity, seizures, elevations of liver enzymes, hepatitis, and increased bilirubin have been reported very rarely.

DRUG INTERACTIONS

Overview

Desloratadine taken concomitantly with alcohol did not potentiate the performance impairing effects of alcohol (***see DETAILED PHARMACOLOGY/Human Pharmacodynamics/Psychomotor Pharmacodynamics).***

Drug-Drug Interactions

No clinically relevant interactions with desloratadine were observed in clinical trials investigating the potential for interaction with azithromycin, erythromycin, ketoconazole, fluoxetine, and cimetidine ***(see DETAILED PHARMACOLOGY/Human Pharmacokinetics /Drug-Drug Interactions).***

Drug-Food Interactions

There was no effect of food or grapefruit juice on the disposition of desloratadine ***(see DETAILED PHARMACOLOGY/Human Pharmacokinetics /Effect of food).***

Drug-Herb Interactions

Interactions with herbal products have not been established.

Drug-Laboratory Interactions

Interactions with laboratory test have not been established.

Drug-Lifestyle Interactions

Effects on Ability to Drive and Use Machines: None. (***see DETAILED PHARMACOLOGY/Human Pharmacodynamics/Psychomotor Pharmacodynamics).***

DOSAGE AND ADMINISTRATION

Dosing Considerations

In the case of severe hepatic or renal insufficiency, desloratadine should be used with caution.

Recommended Dose and Dosage Adjustment

Adults and adolescents (12 years of age older):
One ALLERGY CONTROL DESLORATADINE 5 mg tablet daily regardless of mealtime. For oral use.

OVERDOSAGE

In the event of overdose, consider standard measures to remove unabsorbed active substance. Symptomatic and supportive treatment is recommended. Desloratadine tablets administered at a dose of 45 mg daily (nine times the clinical dose) for ten days showed no statistically or clinically relevant prolongation of the QTc interval. The mean changes in QTc were 0.3 msec and 4.3 msec for placebo and desloratadine, respectively (p=0.09; Lower confidence interval (LCI)=−0.6; Upper confidence interval (UCI)=8.7).

Desloratadine is not eliminated by hemodialysis; it is not known if it is eliminated by peritoneal dialysis.

For management of a suspected drug overdose, contact your regional Poison Control Centre Immediately

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

Desloratadine is a non-sedating long-acting antihistamine with selective peripheral H_1-receptor antagonist activity, which has demonstrated antiallergic, antihistaminic, and anti-inflammatory activity.

Desloratadine does not exacerbate asthma.

Pharmacodynamics

After oral administration, desloratadine selectively blocks peripheral histamine H_1-receptors as the drug is effectively excluded from entry into the central nervous system.

Wheal and Flare: Desloratadine 5mg was significantly better than placebo, as measured by a reduction in histamine-induced wheal and flare areas for all days tested (1, 7, 14, 21, 28). There was no evidence of tachyphylaxis over the 28-day dosing period.

Psychomotor Pharmacodynamics: Clinical trials have demonstrated that there was no difference in the incidence of somnolence in subjects treated with desloratadine 5 mg as compared to subjects treated with placebo.

No significant differences were found in the psychomotor test results between desloratadine and placebo groups, whether administered alone or with alcohol. Co-administration of alcohol with desloratadine did not increase the alcohol-induced impairment in performance or increase in sleepiness. No effects on the ability to drive and use machines have been observed. A single dose of desloratadine did not affect standard measures of flight performance including exacerbation of subjective sleepiness or tasks related to flying.

Cardiovascular Pharmacodynamics: In a multiple dose clinical trial, in which up to 20 mg of desloratadine was administered daily for 14 days to 49 healthy volunteers, no statistically or clinically relevant cardiovascular effects were observed. In another trial, desloratadine was administered at a dose of 45 mg daily (nine times the clinical dose) for ten days; no prolongation of the QTc interval was seen (see ***OVERDOSAGE***).

The potential for desloratadine to interact with ketoconazole (N=24), erythromycin (N=24), azithromycin (N=90), fluoxetine (N=54), and cimetidine (N=36) was investigated in separate interaction studies. Ketoconazole co-administered with desloratadine increased C_{max} and AUC values for desloratadine by 29% and 21% respectively, and 3-hydroxy desloratadine Cmax and AUC values by 77% and 110%, respectively. Erythromycin co-administered with desloratadine increased the Cmax and AUC values for desloratadine by 24% and 14%, respectively. The increases were 43% and 40%, respectively, for 3-hydroxy desloratadine. Azithromycin co-administered with desloratadine increased the C_{max} and AUC values for desloratadine by 15% and 5%, respectively. The increases were 15% and 4%, respectively, for 3-hydroxy desloratadine. Fluoxetine co-administered with desloratadine resulted in no change in the AUC of desloratadine and an increase of 15% in the Cmax of desloratadine. The C_{max} and AUC values for 3-hydroxy desloratadine were increased by 17% and 13% respectively. Cimetidine co-administered with desloratadine increased Cmax and AUC values by 12% and 19% respectively while the Cmax and AUC of 3-hydroxy desloratadine were reduced by 11.2% and 2.8% respectively. However, as there was no evidence of change in the safety profile of desloratadine throughout these studies, the increases in plasma concentrations are not considered to be clinically relevant. In addition, no clinically relevant changes in electrocardiographic pharmacodynamics (QTc) were observed.

Pharmacokinetics

Absorption: Desloratadine plasma concentrations can be detected within 30 minutes of desloratadine administration. Desloratadine is well absorbed with maximum concentrations achieved after approximately 3 hours; the mean elimination half-life is approximately 27 hours. The bioavailability of desloratadine is dose proportional over the range of 5 mg to 20 mg. Equivalent exposure (AUC) to desloratadine, 3-hydroxy desloratadine, and 3-hydroxy desloratadine glucuronide was achieved after desloratadine 5mg and loratadine 10 mg.

Distribution: No information available.

Metabolism: Desloratadine is extensively metabolized. The results of metabolic profiling indicated that hydroxylation of desloratadine to 3-hydroxy desloratadine (3-OH desloratadine)

followed by its subsequent glucuronidation was the major pathway of metabolism of desloratadine. The enzyme responsible for the metabolism of desloratadine has not been identified yet, and therefore some interactions with other drugs cannot be fully excluded. In-vivo studies with specific inhibitors of CYP3A4 and CYP2D6 have shown that these enzymes are not important in the metabolism of desloratadine. Desloratadine does not inhibit CYP3A4 and CYP2D6 and is neither a substrate nor an inhibitor of p-glycoprotein.

Data from clinical pharmacology studies indicate that a subset of the general adult population has a decreased ability to form 3-hydroxydesloratadine. 440 adult subjects were phenotyped for the polymorphism in clinical pharmacology studies. The incidence of the trait was approximately 8.6% in adult subjects. In adult studies the slow metabolizer trait is more frequent in subjects of African descent than Caucasians. The desloratadine exposure (AUC) associated with the slow metabolizer phenotype has been well characterized (~4 times that of normal metabolizers) in single dose studies and is similar in adult subjects at various doses. The Median (range) AUC for adult normal and slow metabolizers were 33.5 (8.7-99) ng·h/mL and 139 (82-393) ng·h/mL, respectively. In adults characterized as slow metabolizers, desloratadine exposure (AUC) after multiple doses has been demonstrated to be about six fold higher than that of normal metabolizers. The safety profile of adult slow metabolizers of desloratadine was not different from that of the general population.

Desloratadine is moderately bound (83% to 87%) to plasma proteins.

Following administration of desloratadine 5mg for 28 days, the approximate two-fold degree of accumulation of desloratadine and 3-OH desloratadine is consistent with the half-life of DL and its active metabolite and a once daily dosing frequency. This accumulation is not clinically meaningful. The pharmacokinetics of desloratadine and 3-OH desloratadine do not change after daily dosing for 7 consecutive days.

There is no evidence of clinically relevant drug accumulation following once daily dosing of desloratadine (5 mg to 20 mg) for 14 days.

Results from a single dose trial of 7.5 mg desloratadine demonstrate that there was no effect of food (high-fat, high caloric breakfast) on the disposition of desloratadine. In another study, grapefruit juice had no effect on the disposition of desloratadine.

Excretion: 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.

Special Populations and Conditions

See DETAILED PHARMACOLOGY/ Human Pharmacokinetics for:

- Geriatrics
- Gender
- Race
- Hepatic Insufficiency

- Renal Insufficiency

STORAGE AND STABILITY

Temperature and Moisture

Tablets: Store between 15°C and 30°C. Protect from excessive moisture. Blisters are to be stored in box.

Others: Keep in a safe place out of the reach of children.

SPECIAL HANDLING INSTRUCTIONS

None.

DOSAGE FORMS, COMPOSITION AND PACKAGING

Dosage Forms:
ALLERGY CONTROL DESLORATADINE: Tablets: 5 mg tablet for oral administration

Composition:
ALLERGY CONTROL DESLORATADINE are formulated as blue, round, coated tablets debossed with a "D" on one side of the tablet and plain on the other. Each tablet contains 5 mg of active ingredient, desloratadine.

Non-medicinal ingredients: FD & C Blue No.2 aluminium lake, hypromellose, lactose, magnesium oxide, microcrystalline cellulose, polyethylene glycol, pregelatinized starch, titanium dioxide, zinc stearate

Packaging:
Available in blisters of 10's, 20's, 30's and 50's tablets, and in bottles of 100, 120 and 180 tablets.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

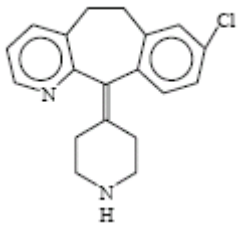
Drug Substance

Common name: Desloratadine

Chemical name: 8-chloro-6,11-dihydro-11-(4-piperidinylidene)-5H-benzo-[5,6]cyclohepta[1,2-b]pyridine

Molecular formula and molecular mass: $C_{19}H_{19}CIN_2$ and 310.8

Structural formula:



Physicochemical properties:

Physical Form:	White to off-white powder	
Solubility:	ethanol	>100 mg/mL (freely soluble)
	methylene chloride	>100 mg/mL (freely soluble)
	methanol	>100 mg/mL (freely soluble)
	octanol	>100 mg/mL (freely soluble)
	0.1N HCl	39.7 mg/mL (soluble)
	DMSO	24.5 mg/mL (soluble)
	water	0.1mg/mL (very slightly soluble)
	pH 7.4 phosphate buffer	1.5 mg/mL (slightly soluble)
	0.1N NaOH	<0.1 mg/mL (practically insoluble)
pKa Values:	pyridine functional group	4.2
	piperidine functional group	9.7
Partition Coefficient:		log $K_{O/W}$
	n-octanol/0.1N HCl	-2.27
	n-octanol/pH 3 buffer	-1.44
	n-octanol/pH 6 buffer	0.342
	n-octanol/pH 7 buffer	1.02
	n-octanol/pH 8 buffer	0.944
Melting Point:	Form I	156.0 to 157.5°C

CLINICAL TRIALS

Comparative Bioavailability Studies

The objective of this study was to evaluate and compare the relative bioavailability and therefore the bioequivalence of two formulations of Desloratadine 5 mg tablets after a single oral dose administration under fasting conditions. The study was a single center, randomized, single dose, blinded, crossover design planned for 22 healthy male subjects.

SUMMARY TABLE OF THE COMPARATIVE BIOAVAILABILITY DATA

Desloratadine (1 x 5 mg tablet of Desloratadine) From measured data **uncorrected for potency** Geometric Mean Arithmetic Mean (CV %)				
Parameter	Test*	Reference†	% Ratio of Geometric Means	Confidence Interval 90%
AUC_{0-72} (pg·h/mL)	31151.4 33318.3 (39.6)	31807.1 34358.6 (43.3)	97.94	91.11 – 105.28
AUC_I (pg·h/mL)	33853.0 36525.3 (44.4)	34952.7 38504.9 (51.4)	96.85	89.10 – 105.28
C_{max} (pg/mL)	1596.3 1686.1 (33.1)	1650.6 1750.2 (36.0)	96.71	89.97 – 103.95
T_{max}§ (h)	5.00 (1.00 – 12.00)	5.00 (1.50 – 6.03)		
$T_{½}$€ (h)	19.17 (25.6)	20.04 (35.3)		

* ALLERGY CONTROL DESLORATADINE
† Aerius®, Schering Canada, Inc.
§ Expressed as the median (range)
€ Expressed as the arithmetic mean (CV%)

Efficacy in Seasonal Allergic Rhinitis

Study demographics and trial design

The clinical efficacy of desloratadine in the treatment of seasonal allergic rhinitis (SAR) was demonstrated in four multiple-dose, placebo-controlled clinical trials (C98-001, C98-223, C98-224, and C98-225). A total of 2499 subjects with SAR were randomized to treatment with either desloratadine or placebo. Of these, 1838 patients received active treatment. Efficacy endpoints in the clinical trials included Total Symptom Score, Total Nasal Symptom Score, Total Non-Nasal Symptom Score, and Quality of Life analysis. Desloratadine 5 mg once daily significantly reduced the Total Symptom Scores (the sum of individual scores for rhinorrhea, sneezing, congestion/stuffiness, nasal itching, itchy/burning eyes, tearing, ocular redness, and itchy ears/palate).

Study Results

Desloratadine 5 mg was significantly more effective than placebo in reducing Total Nasal Symptoms including congestion and Total Non-Nasal Symptoms. Instantaneous assessments of efficacy at the end of the dosing interval demonstrated that reductions in symptoms which were observed following the first dose of desloratadine 5 mg were maintained for the full 24 hour dosing interval. There was no significant difference in the effectiveness of desloratadine 5 mg across subgroups of patients defined by gender, age, or race.

Onset of Action Studies: Results from onset of action studies utilizing controlled-exposure chambers indicated that subjects first became aware of significant improvements in their SAR symptoms as early as 1 hour and 15 minutes following a 5.0 mg dose of desloratadine.

Quality of Life (QOL) Assessments: Exploratory assessments of quality of life in clinical trials indicated that SAR produced a consistent burden of disease. Improvements in therapeutic responses with desloratadine 5 mg were also associated with improvements in various QOL domains including but not limited to: activity limitations, sleep problems, general problems, practical problems, nasal symptoms, ocular problems, emotional function, vitality and social functioning (see Table 2).

Table 2: Desloratadine 5 mg effectiveness in alleviating the burden of SAR: improvement in QOL domains.

Study	Study Description	Results
Pradalier A. *et al.* (2007)	*Methods:* A multicenter, double-blind, randomized, placebo-controlled, parallel-group study of desloratadine 5 mg vs placebo in patients with symptomatic SAR. *Objective:* To compare the effects of desloratadine and placebo on QOL in seasonal AR *Study duration:* Two weeks. *Population:* ITT population consisted of 483 subjects (234 patients in the desloratadine 5 mg arm vs 249 patients in the placebo arm). *Validated QOL measurement tool:* French-language version of RQLQ. The questionnaire includes 28 items in seven domains (activity limitations, sleep problems, general problems, practical problems, nasal symptoms, ocular symptoms, and emotional function). Patients rated experiences over the previous week using a 7-point scale: 0 (not bothered at all) to 6 (extremely bothered); the total score was the mean of the domain scores. *Secondary efficacy variables:* The change from baseline to D14 in TNSS. *Primary efficacy variable:* QOL assessment, and change from baseline in TNSS, TNNSS, TSS and individual symptom score and diary symptom score.	Mean total RQLQ score at D14: desloratadine was associated with a significantly larger improvement from baseline vs placebo (P=0.0003). Compared to placebo, desloratadine demonstrated significant improvement (decrease in symptoms) in all RQLQ sub-domains (activity limitations, sleep problems, general problems, practical problems, nasal symptoms, ocular problems, and emotional function) vs placebo (P≤0.043). The desloratadine group demonstrated significant decrease in TNSS (P=0.0003), TNNSS (P=0.001) and TSS (P=0.0001) at D14 compared to D0 vs placebo. The desloratadine group demonstrated a significant decrease in morning and evening AR symptoms after just 1 day of treatment (P≤0.02).

*QOL: Quality of Life
ITT: Intent-To-Treat
D0: day 0;
D14: day 14;
RQLQ: French-language version of Rhinoconjunctivitis Quality of Life Questionnaire.
TNSS: Total Nasal Symptoms Score;
TNNSS: Total Non-Nasal Symptoms Score
TSS: Total Symptoms Score

Efficacy in Perennial Allergic Rhinitis

Study demographics and trial design

The clinical efficacy of desloratadine in the treatment of perennial allergic rhinitis (PAR) was evaluated in two multiple-dose, placebo-controlled clinical trials (P00218 and P00219). A total of 1374 subjects with PAR were randomized to treatment with either desloratadine or placebo. Of these, 685 patients received active treatment.

Study Results

One of the two perennial allergic rhinitis trials supported efficacy of desloratadine, compared with placebo, for the primary efficacy endpoint (average am/pm instantaneous total symptom

score excluding nasal stuffiness/congestion expressed as change from baseline). In that study, the majority of the secondary efficacy endpoints supported treatment efficacy. The second pivotal trial did not achieve statistical significance for the primary efficacy endpoint "average am/pm instantaneous total symptom score excluding nasal stuffiness/congestion, expressed as change from baseline". A statistically significant difference between desloratadine and placebo was shown in this trial for one of the secondary efficacy variables "joint investigator-subject evaluation of therapeutic response".

Efficacy in Seasonal Allergic Rhinitis: Patients With SAR and Concomitant Mild to Moderate Asthma.

Berger *et al* (2002) published results from a study evaluating safety and efficacy of (5 mg desloratadine) in patients with SAR and mild seasonal allergic asthma. The four week multicenter, double-blind, placebo-controlled study included 331 patients (ages 15 or older) with a two year history of SAR and increased asthma signs or symptoms in conjunction with fall/winter allergy season. Patients were clinically symptomatic at screening and were assigned to take either 5 mg desloratadine or placebo once daily for 4 weeks. The following symptoms were evaluated in the study: rhinorrhea, nasal stuffiness/congestion, nasal itching, sneezing, itching/burning eyes, tearing/watering eyes, redness of eyes, and itching of ears/palate. Patients evaluated symptoms twice daily (morning/evening) and the primary efficacy parameter was difference from baseline in AM/PM reflective total symptom scores. The results showed that compared to placebo, desloratadine significantly reduced SAR total symptom scores with first dose, which continued throughout the study duration ($p < 0.001$). Desloratadine was safe and well tolerated in patients with SAR and mild seasonal allergic asthma. The number and type of treatment-related adverse events were similar between the desloratadine and placebo groups.

Table 3: Published clinical trial evaluating safety and efficacy of desloratadine 5 mg in treating SAR in patients with SAR and concomitant mild to moderate asthma.

Study	Study Description	Results
Berger WE. *et al.* (2002)	*Methods:* A multicenter, parallel-group, double-blind, placebo-controlled, study of desloratadine 5 mg vs placebo in patients with SAR and mild seasonal allergic asthma. *Objective:* To evaluate the safety and efficacy of desloratadine 5 mg in patients experiencing moderate SAR, nasal congestion, and symptoms of seasonal allergic asthma. *Study duration:* Four weeks. *Population:* ITT population consisted of 331 subjects (168 patients in the desloratadine 5 mg arm vs 163 patients in the placebo arm). *Primary efficacy variable:* The mean AM/PM reflective TSS, expressed as the change from baseline for the averages of days 1 to 15, with additional analyses at days 1 to 29.	Desloratadine significantly reduced mean AM/PM reflective TSS for SAR, beginning with the first dose ($P<0.001$) and continuing throughout days 1 to 15 (-4.90 vs -2.98;$P<0.001$) and days 1 to 29 (-5.47 vs -3.73; $P<0.001$).

SAR: Seasonal allergic rhinitis;
ITT: Intent-To-Treat;
TSS: Total Symptoms Score;

Efficacy in Chronic Idiopathic Urticaria

Study demographics and trial design

The clinical efficacy of desloratadine in the treatment of chronic idiopathic urticaria (CIU) was documented in over 400 chronic idiopathic urticaria patients 12 to 84 years of age in 2 double-blind, placebo-controlled, randomized clinical trials of 6 weeks duration as demonstrated by reduction of associated itching and hives.

Study Results

Desloratadine tablets significantly reduced the severity of pruritus, number of hives, size of largest hive, and total symptom score when compared to placebo. Symptoms were effectively reduced as early as one day after initiation of treatment with desloratadine and were sustained for the full 24-hour dosing interval.

Treatment with desloratadine also improved sleep and daytime functions as measured by reduced interference with sleep and routine daily activities.

There was no significant difference in the effectiveness of desloratadine 5 mg across subgroups of patients defined by gender, age, or race.

Quality of Life (QOL) Assessment

A number of published clinical trials, evaluating the impact of AERIUS (5 mg desloratadine) on chronic idiopathic urticaria on QOL have demonstrated that AERIUS 5 mg significantly improves a variety of QOL domains. A summary is provided in **Table 4**.

Table 4: Clinical trials demonstrating desloratadine 5 mg effectiveness in alleviating the burden of chronic idiopathic urticaria: improvement in QOL domains.

Study	Study Description	Results
Grob JJ *et al* (2008)	*Methods:* A multicentered, double-blinded, randomized, placebo-controlled study of desloratadine 5 mg vs placebo in patient with a history of CIU. *Objective:* To evaluate the effect of desloratadine 5 mg on QOL scores in patients with CIU. *Study duration:* Six weeks. *Population:* ITT population consisted of 137 subjects (65 patients in the desloratadine arm vs 72 patients in the placebo arm). *Validated QOL measurement tool:* DLQI comprises 10 equally weighted items that evaluate the effect of skin problems on patients' lives: itchiness/soreness/ pain; embarrassment; interference with shopping; clothes purchases; social leisure; difficulty playing sports; difficulty with work or study; problems with partner; sexual difficulties; and problems at home caused by treatment. Each item is scored on a continuum from 0 (least impairment) to 3 (worst impairment), with total DLQI scores ranging from 0 to 30) and VQ-Dermato questionnaire comprises	A significantly greater improvement from D0 to D24 was associated with desloratadine treatment compared to placebo in DLQI overall score (18.5 *vs.* 29.1 points; *P*=0.009). Desloratadine treated patients had a significantly lower mean VQ-Dermato scores vs the placebo group in daily activities (18.1 vs. 32.6; *P*=0.001), mood (7.5 vs. 14.7; *P*=0.027), social life (10 vs. 21; *P*=0.005) and physical pain (42.3 vs. 58.2; *P*=0.006) from D1 to end of study. Desloratadine demonstrated trend toward significance in a fifth domain, self-image (21.5 vs. 30; *P*=0.075).

	28 items in seven domains (self-perception, daily living activity, mood state, social functioning, leisure activity, treatment induced restriction and physical discomfort), with each item scored on a scale of 0 to 4. Total VQ-Dermato scores range from 0 (least serious effect) to 112 (worst effect).	
Monroe E. *et al.* (2003)	*Methods:* A multicentered, double-blinded, randomized, placebo-controlled, parallel-group study of desloratadine 5mg vs placebo in patient with moderate to severe CIU. *Objective:* To determine the efficacy (including secondary efficacy QOL sleep and daily activities parameters) and safety of desloratadine 5 mg in patients with moderate to severe CIU. *Study duration:* Six weeks. *Population:* ITT population consisted of 226 subjects (116 patients in the desloratadine arm vs 110 patients in the placebo arm). *Primary efficacy measure:* The change in average reflective AM/PM pruritus scores from baseline. *Secondary efficacy outcomes:* The reflective average AM/PM scores for number of hives, size of largest hive, and total symptom score (sum of pruritus, number of hives, and size of largest hive scores) as well as, QOL measurements, interference with sleep (AM reflective), and interference with daily activities (PM reflective).	There was a significant improvement with desloratadine for pruritus (58.4% vs 40.4% placebo; P=0.004), the number of hives (40.8% vs 19.9% placebo; P<0.001), and the size of the largest hive (39% vs 19.3% placebo; P<0.001); Desloratadine significantly reduced interference of CIU on sleep. Days 1 to 8 resulted in a 44.0% improvement in sleep from baseline compared to a 14.4% improvement in the placebo group (P=0.007). As early as 24 hours after the first dose, interference with sleep was improved by 30.6% vs 2.8% for placebo (P=0.044). Desloratadine significantly reduced interference of CIU on daily activity performance as early as D2 (40.9% improvement vs 5.6% for placebo group; P=0.002). The effect was also sustained for the entire treatment duration (46.9%for desloratadine vs 17.2% for placebo group; P=0.001).
Lachapelle JM *et al.* 2006	*Methods:* A multicentered, open label study of desloratadine 5 mg in patient with CIU. *Objective:* To assess the effect of once daily desloratadine 5 mg on the QOL of patients suffering from CIU. *Study duration:* Six weeks. *Population:* ITT population consisted of 121 patients. *Validated QOL measurement tool:* DLQI comprises 10 equally weighted items that evaluate the effect of skin problems on patients' lives: itchiness/soreness/ pain; embarrassment; interference with shopping; clothes purchases; social leisure; difficulty playing sports; difficulty with work or study; problems with partner; sexual difficulties; and problems at home caused by treatment. Each item is scored on a continuum from 0 (least impairment) to 3 (worst impairment), with total DLQI scores ranging from 0 to 30); pruritus, number and maximum size of hives, sleep quality and activity impairment were also assessed.	Desloratadine demonstrated a statistically significant decrease in the Mean DLQI at baseline, D7, and D42 (13.4, 9.1, and 6.6 respectively). The mean proportional scores observed with desloratadine-treatment at D0, D7 and D42 (44.5%, 30.3%, and 21.9% respectively). The relative proportional changes from baseline were observed with desloratadine on both D7 and D42 (-31.6% and -50.9% respectively). All these changes were statistically significant (P<0.0001). A clinically significant change (i.e. a decrease of at least 2 points) from baseline was observed with desloratadine for 66% of patients at D7 and 77% of patient at D42. (P<0.0001) There was complete relief by D2 in 33.3% of patients, marked relief by D2 in 35.1% of patients and approximately 9.6% who experienced no relief.

		Pruritus and size of the hives significantly improved with desloratadine-treatment (P<0.005).
Grob JJ and Lachapelle JM (2008)	<u>*Methods:*</u> A structured search of the MEDLINE database was conducted to identify papers published between 1 January 1991 and 30 September 2007 on the treatment of CIU with the second-generation antihistamines cetirizine, desloratadine, fexofenadine, and levocetirizine, and their effects on patient-reported QOL. The Following search terms were used alone or in combination: 'chronic idiopathic urticaria'; 'pruritus'; 'wheals'; 'hives'; 'secondgeneration antihistamines'; 'cetirizine'; 'desloratadine'; 'fexofenadine'; 'levocetirizine'; and 'quality of life'. <u>*Validated QOL measurement tool:*</u> DLQI and VQDermato validated instruments.: DLQI comprises 10 equally weighted items that evaluate the effect of skin problems on patients' lives: itchiness/soreness/ pain; embarrassment; interference with shopping; clothes purchases; social leisure; difficulty playing sports;difficulty with work or study; problems with partner; sexual difficulties; and problems at home caused by treatment. Each item is scored on a continuum from 0 (least impairment) to 3 (worst impairment), with total DLQI scores ranging from 0 to 30) and VQ-Dermato questionnaire comprises 28 items in seven domains (selfperception, daily living activity, mood state, social functioning, leisure activity, treatment induced restriction and physical discomfort), with each item scored on a scale of 0 to 4. Total VQ-Dermato scores range from 0 (least serious effect) to 112 (worst effect).	Desloratadine 5 mg significantly lowered QOL scores in three studies (n=364) (P<0.05). Three 6-week double-blind, placebo-controlled trials (n=553) establish that desloratadine significantly improved patient-reported pruritus, sleep disruption, and interference with daily activities (P<0.05). Significant improvements were observed in QOL domains such as but not limited to selfconsciousness regarding skin, problems with partner, and interference of CIU on outdoor activity, sport, leisure, work/study, and sexual activity (P<0.0001).

CIU: chronic idiopathic urticaria;
QOL: Quality of Life;
ITT: Intent-To-Treat;
DLQI: Dermatology Life Quality Index;
VQ-Dermato: Questionnaire; reproducible dermatology instrument designed to assess QOL outcomes in French speakers;
RQLQ: French-language version of Rhinoconjunctivitis Quality of Life Questionnaire;
D0: day 0;
D7: day 7;
D42: day 42.

Safety Evaluation

Study demographics and trial design
A total of 3758 subjects who received desloratadine in clinical programs for the allergic rhinitis and CIU indications were evaluable for safety. Of these, 3045 were treated with desloratadine in multiple-dose trials, with 2872 receiving doses of 5 mg or higher.

Study Results
The overall incidence of treatment-related adverse events (AEs) in patients treated with desloratadine 5 mg was comparable to the incidence in patients treated with placebo (15.1% with desloratadine 5 mg vs. 12.5% with placebo).

The most common adverse event thought to be at least possibly related to treatment was headache. Treatment-related headache was reported in 4.5% of subjects treated with desloratadine 5 mg compared with 3.9% of placebo subjects. There is no significant difference in the safety of desloratadine among subgroups defined by gender, age or race. There were no indications of any particular cardiovascular safety concerns during the clinical trials based on adverse events, vital signs and ECG assessments. No particular safety concerns relevant to the hepatic system were demonstrated. Overall, the incidence of AEs observed in this program was comparable to placebo, giving desloratadine an acceptable safety profile.
Very rare cases of hypersensitivity reactions, including anaphylaxis and rash have been reported during the marketing of desloratadine.

DETAILED PHARMACOLOGY

Preclinical Pharmacology

Desloratadine is an active metabolite of loratadine that possesses qualitatively similar pharmacodynamic activity with a relative oral potency in animals 2.5 to 4 times greater than loratadine. In guinea pigs, the antihistamine effect after a single dose of desloratadine lasts 24 hours.

In addition to antihistaminic activity, desloratadine has demonstrated antiallergic and anti-inflammatory activity in a number of *in vitro* (mainly conducted on cells of human origin) and *in vivo* studies. These studies have shown that desloratadine inhibits the broad cascade of events that initiate and propagate allergic inflammation, including:

- the release of proinflammatory cytokines including IL-4, IL-6, IL-8 and IL-13,
- the release of important proinflammatory chemokines such as RANTES (Regulated upon Activation, Normal T-cell Expressed and Secreted),
- superoxide anion production by activated polymorphonuclear neutrophils,
- eosinophil adhesion and chemotaxis,
- the expression of the adhesion molecules such as P-selectin,
- IgE-dependent release of histamine, prostaglandin (PGD2) and leukotriene (LTC4)

• the acute allergic bronchoconstrictor response and allergic cough.

Desloratadine exhibits excellent receptor specificity for histamine H1-receptors. This selectivity together with a limited entry to the CNS accounts for the little or no sedation liability observed in clinical studies. Although antimuscarinic activity is significant from *in vitro* studies, this activity does not seem to be relevant *in vivo* where anticholinergic effects are only seen at very high doses, well in excess of the antihistamine dose.

Reports of serious cardiac arrhythmias with the use of some antihistamines prompted a careful and extensive evaluation of the cardiovascular safety of desloratadine. Years of clinical experience with loratadine, and indirectly with desloratadine, indicates that desloratadine has not been associated with ventricular arrhythmias. Studies with desloratadine in rats, guinea pigs and monkeys, at multiples of the clinical dose, have confirmed there is no effect on important components of the ECG such as PR interval, QRS interval or QTc interval. Further studies on cardiac K^+ channels, including the important HERG channel, have shown no effect at 1 micromolar desloratadine concentration, which is well in excess of therapeutic plasma levels.

Pharmacokinetics

In laboratory animals and humans, desloratadine was extensively absorbed (> 90%) following oral administration. In laboratory animals, accurate exposure estimates to desloratadine were only obtained at low doses since duration (0-24 hr) of plasma sampling did not allow for an accurate determination of AUC(0-∞). In rats and monkeys, CL/F values for desloratadine decreased with duration of dosing; however in humans, single dose and multiple dose CL/F values were the same. The cause for the changes in CL/F in rats and monkeys is unknown. In all species, exposure to desloratadine was greater following desloratadine administration than following an equal dose (mg/kg or mg) of loratadine.

The low amounts of desloratadine recovered in urine and feces indicate that, in laboratory animals and humans (normal metabolizers), desloratadine is metabolically cleared from plasma.

In vivo and *in vitro* metabolic profiles for desloratadine, loratadine and their metabolites were obtained in laboratory animals and humans. The metabolic pathways for desloratadine were the same within each species following ^{14}C-desloratadine and ^{14}C-loratadine administration. The primary pathways for desloratadine metabolism involved hydroxylation at either the 3-, 5-, or 6-positions. All desloratadine metabolites identified in human plasma and excreta following desloratadine and loratadine administration were also observed in profiles from at least one of the preclinical species.

The major (>5%) human metabolites of desloratadine were present in all species (mouse, rat, rabbit, monkey) after exposure to desloratadine and loratadine. In laboratory animals, hydroxylation was primarily at the 5- and 6-position while in humans hydroxylation occurred primarily at the 3-position.

Human Pharmacodynamics

Cardiovascular Pharmacodynamics: To confirm the cardiovascular safety of desloratadine, a study to evaluate the electrocardiographic effects of desloratadine in subjects (n=24) treated with 45 mg desloratadine (nine times the clinical dose) once daily for 10 days was conducted. The primary endpoint of this study was the difference between Baseline (Day -1) maximum ventricular rate, PR, QRS, QT and QTc intervals and the corresponding Day 10 maximum ECG parameters. At 9-fold the proposed clinical dose, there was no statistically or clinically relevant prolongation of the QTc interval. The mean changes in QTc were 0.3 msec and 4.3 msec for placebo and desloratadine, respectively (p=0.09; Lower confidence interval (LCI) = -0.6; Upper confidence interval (UCI) = 8.7). It should be noted that in a separate rising, multiple dose study in which up to 20 mg of desloratadine was administered daily for 14 days, no statistically or clinically relevant cardiovascular effects were observed.

Psychomotor Pharmacodynamics: Drowsiness and somnolence, which affect psychomotor performance, have been reported with first generation antihistamines. The co-administration of alcohol with such products has resulted in further impairment of psychomotor performance. In a previous study, CLARITIN (loratadine) did not increase the alcohol-induced impairment in performance or increase in sleepiness.

In the previously mentioned clinical study, which utilized a 45 mg dose of desloratadine (nine times the clinical dose) (see ***Cardiovascular Pharmacodynamics***), there were no reports of somnolence. In a separate randomized, single-dose, double-blind, placebo-controlled, 4-way crossover study, 25 healthy volunteers were treated with desloratadine 7.5 mg/juice, desloratadine 7.5 mg/alcohol in juice, placebo tablet/alcohol in juice and placebo tablet/juice. No significant differences were found in the psychomotor test results between desloratadine and placebo groups, whether given alone or with alcohol. In a study with desloratadine no effects on the ability to drive and use machines have been observed. In a separate study in normal volunteers administered a single dose of 5mg desloratadine, no effects on standard measures of flight performance were observed.

Human Pharmacokinetics

A multiple-dose pharmacokinetic study was conducted at the clinical dose of 5 mg in a large cohort of subjects (n=112) comprised of a 1:1 ratio of males to females and in which patient demographics were comparable to those of the general SAR population. Subjects received their treatment once daily for 10 days. Steady state for desloratadine and 3-hydroxy desloratadine (3-OH DL) was attained by Day 7. In this study, 4% of the subjects, defined as slow metabolizers, achieved a higher concentration of desloratadine. Maximum desloratadine concentration was about 3-fold higher at approximately 7 hours with a terminal phase half-life of approximately 89 hours. In these subjects, desloratadine is cleared from plasma by elimination of parent drug in urine and feces. The safety profile of these subjects was not different from that of the general population. The accumulation (R=1.11-1.64) after 14 days of once daily dosing was consistent with desloratadine half-life (~27 hours) and the once daily dosing frequency.

The influence of sex and race (Caucasian, Black) on the pharmacokinetic parameters (area under the curve [AUC], maximum concentration [Cmax]) for desloratadine and 3-OH desloratadine was examined in a second multiple dose study. The mean AUC and Cmax were higher in

females (desloratadine: 3 and 10%, respectively, and 3-OH desloratadine: 48% and 45%, respectively) compared to males. With regards to race, AUC and Cmax were higher (18% and 32%, respectively) in Blacks than Caucasians. In contrast, the 3-OH desloratadine parameters were lower (10%). Considering the magnitude of the changes and safety demonstrated following administration of a dose of 45 mg desloratadine, the increases are not clinically relevant, therefore, no dosage adjustment is required for race or gender.

Protein Binding: The *in vitro* protein binding of desloratadine to human plasma protein was determined by ultrafiltration and ranges between 82.8% to 87.2% over the concentration range of 5 to 400 ng/mL. For this degree of protein binding (free fraction 13%), interactions involving displacement are not known to be clinically important.

Effect of Food: Results from a single dose food effect study using a 7.5 mg dose of desloratadine demonstrated that there was no effect of food (high-fat, high caloric breakfast) on the disposition of desloratadine. In another study, grapefruit juice had no effect on the disposition of desloratadine.

Drug-Drug Interactions: Two randomized, two-way crossover, third-party blind, multiple dose (10 days), placebo-controlled studies characterized the effect of CYP3A4 inhibitors ketoconazole (N=24) and erythromycin (N=24) on the pharmacokinetics and cardiovascular safety of desloratadine.

A third study (N=90) with similar design, except comparing parallel groups, investigated the effect of azithromycin, an azilide antibiotic that also inhibits CYP3A4, on the pharmacokinetics and cardiovascular pharmacodynamics of desloratadine.

Two additional randomized, multiple dose, parallel group studies investigated the effect of cimetidine (N=36) and fluoxetine (N=54) on the pharmacokinetics and cardiovascular pharmacodynamics of desloratadine.

Ketoconazole co-administered with desloratadine increased C_{max} and AUC values for desloratadine by 29% and 21%, respectively, and 3-hydroxy desloratadine C_{max} and AUC values by 77% and 110%, respectively. Erythromycin increased C_{max} and AUC values for desloratadine by 24% and 14%, respectively. The increases were 43% and 40%, respectively, for 3-hydroxy desloratadine. Azithromycin co-administered with desloratadine increased the C_{max} and AUC values for desloratadine by 15% and 5%, respectively. The increases were 15% and 4%, respectively, for 3-hydroxy desloratadine. Throughout these studies, there was no evidence of change in the safety profile of desloratadine, therefore the increases in plasma concentrations are not considered to be clinically relevant. Ketoconazole induced a small increase in the plasma desloratadine concentrations compared with those reported for loratadine. These data suggest that desloratadine has a reduced potential for interacting with inhibitors of CYP3A4. The similarity of the erythromycin concentrations from this study to previous studies suggests that desloratadine is unlikely to inhibit the metabolism of substrates of CYP3A4, which comprise at least 50% of drugs currently marketed. Fluoxetine co-administered with desloratadine resulted in no change in the AUC of desloratadine and an increase of 15% in the C_{max} of desloratadine. The

C_{max} and AUC for 3-hydroxy desloratadine were increased by 17% and 13% respectively. Cimetidine co-administered with desloratadine increased C_{max} and AUC values by 12% and 19% respectively and the C_{max} and AUC of 3-hydroxy desloratadine were reduced by 11.2% and 2.8% respectively.

Serial ECG measurements showed no statistically significant or clinically relevant changes in QTc intervals. Mean changes in QTc were 5.4 msec and 2.3 msec for ketoconazole/desloratadine and desloratadine/placebo, respectively (p=0.14; LCI = -7.3; UCI= 11). Mean changes in QTc were 9.8 msec and 7.8 msec for erythromycin/desloratadine and desloratadine/placebo, respectively (p=0.53; LCI = -8.4; UCI = 4.5). Mean changes in QTc were -4.2 msec and -6.3 msec for desloratadine/Azithromycin and desloratadine/placebo, respectively (p = 0.61).

Hepatic Dysfunction: In a single-dose (7.5 mg) study, the pharmacokinetics of subjects with mild, moderate and severe hepatic dysfunction (n=4/group), as defined by the Child-Pugh Classification (A, B or C), were compared with data from healthy subjects (n=8) without any evidence of hepatic dysfunction. Within the various subgroups of hepatic dysfunction, there were no significant differences in pharmacokinetics. Subjects with hepatic dysfunction had mean AUC and C_{max} values up to 2.4 times greater than healthy subjects. The pharmacokinetics of desloratadine was evaluated in subjects with normal hepatic function (n=9) or moderate dysfunction (n=11) following once daily administration of desloratadine 5mg for 10 days. Subjects with hepatic dysfunction could experience a 3-fold increase in exposure (AUC) to desloratadine. The exposure to 3-OH DL in subjects with hepatic dysfunction was similar to that in normal subjects. The adverse event profile and electrocardiograms showed no consistent changes of clinical relevance in any subject with hepatic dysfunction. Since the increased concentrations are not considered clinically relevant, no dosage adjustment is recommended for subjects with hepatic dysfunction.

Renal Dysfunction: The pharmacokinetics of desloratadine following a single dose of 7.5 mg was evaluated in patients with mild (n=7), moderate (n=6), and severe (n=6) renal impairment or hemodialysis dependent (n=6) patients. There was little difference between the Cmax and AUC values for subjects with mild and moderate insufficiency. Patients with varying degrees of renal dysfunction including dialysis dependent subjects experienced a 1.7- to 2.5-fold increase in desloratadine median AUC with minimal change in 3-hydroxy desloratadine concentrations. Desloratadine, and 3-hydroxy desloratadine were not removed by hemodialysis. Plasma protein binding of desloratadine and 3-hydroxy desloratadine was unaltered by renal disease. The results show that patients with varying degrees of renal dysfunction, including those with severe renal impairment or on dialysis, demonstrated no clinically relevant changes from baseline in pharmacokinetic parameters. In the case of severe renal insufficiency, desloratadine should be used with caution.

Elderly: The pharmacokinetics of desloratadine was evaluated in a subset (n= 17) of subjects >65 years of age who participated in a multiple dose (5 mg once daily x 10 days) study. The mean AUC and Cmax were 20% greater than in subjects <65 years old. The apparent total body clearance adjusted for body weight was similar between the two age groups. The mean plasma elimination half-life was prolonged by approximately 30% (33.7 hours) in subjects > 65 years

old. There was no difference in the adverse event reporting frequency in this group. These age related changes are not clinically relevant, therefore, no dosage adjustment is warranted in subjects >65 years of age.

Asthmatics: In 2 four-week studies of 924 patients (aged 15 to 75 years) with seasonal allergic rhinitis and concomitant asthma, desloratadine 5mg tablets improved rhinitis symptoms, with no decrease in pulmonary function. This supports the safety of administering desloratadine 5mg tablets to adult patients with seasonal allergic rhinitis with mild to moderate asthma.

MICROBIOLOGY

Not applicable

TOXICOLOGY

Acute Toxicity

The acute oral (gavage) and intraperitoneal toxicity of desloratadine was evaluated in six week old Sprague-Dawley rats and CD-1 mice. Estimated oral and intraperitoneal LD_{50} values in both rats and mice were significant multiples of a human dose of 5.0 mg desloratadine/day. Oral LD_{50} values were 3530 and ≥ 5490 times the daily human dose in mice and rats respectively. Intraperitoneal LD_{50} values were ≥ 460 and ≥ 680 times a daily human dose in mice and rats, respectively (**Table 5**).

Table 5. Desloratadine LD_{50} Values

Species	Sex	Route	LD_{50} Value (mg/kg) (Clin. Dose Multiple)[a]
Mouse	Male	PO	353 (3530X)
	Female	PO	353 (3530X)
Mouse	Male	IP	49 (490X)
	Female	IP	46 (460X)
Rat	Male	PO	616 (6160X)
	Female	PO	549 (5490X)
Rat	Male	IP	178 (1780X)
	Female	IP	68 (680X)

In an oral (gavage) rising-dose tolerance study in young adult cynomolgus monkeys, emesis was observed at doses ≥ 23.5 and ≥ 93.75 mg/kg in males and females, respectively. Emesis occurred approximately 15 minutes after and/or up to three hours post dose. The maximum dose that did not produce emesis in male monkeys (11.75 mg/kg) still represents an 118-fold multiple of the human dose (0.10 mg desloratadine/kg/day), and an 92-fold monkey-to-human systemic exposure multiple compared to an arithmetic mean Cmax value of 4.0 ng/mL in humans following a 5.0 mg/day dose of desloratadine.

Repeated-Dose Toxicity

Two-week, one-month and three-month desloratadine studies were conducted in rats at doses of up to 240 mg/kg for an initial pilot two-week study, up to 8 mg/kg for the second two-week study and up to 120 mg/kg for one- and three-months. Desloratadine systemic exposure at 60 mg/kg is similar to that achieved with a 120 mg/kg dose of loratadine. The no-effect level for the three-month study was ≥ 3 mg/kg (low-dose) but less than 30 mg/kg. Mortality was observed in the 30, 60 and 120 mg/kg dose groups and in the comparative control (120 mg loratadine/kg) dose group in the three-month study. Fecal changes were observed and were considered related to the anticholinergic effect of this class of compounds. Clinical pathology changes occurred at desloratadine doses ≥ 30 mg/kg (systemic exposure multiple of at least 458 times). The findings associated with target organs/tissues consisted mainly of vacuolation corresponding to phospholipidosis. Phospholipidosis is a common finding of amphiphilic compounds like desloratadine and loratadine. Centrilobular hepatocyte hypertrophy occurred at desloratadine doses of ≥ 30 mg/kg and at 120 mg/kg of loratadine. There was no evidence of phospholipidoses at the 3 mg/kg dose.

Renal tubular cell necrosis and/or renal tubular dilatation were observed at desloratadine doses ≥ 60 mg/kg (systemic exposure multiple of at least 605 times) or at a loratadine dose of 120 mg/kg (desloratadine systemic exposure multiple of at least 663 times).

Renal tubular casts were seen in males given either 60 mg/kg of desloratadine or 120 mg/kg of loratadine. Myofiber degeneration, muscle fibrosis and/or mononuclear infiltrates in muscle occurred at desloratadine doses of ≥ 60 mg/kg and at 120 mg/kg of loratadine. Luminal cellular debris was seen in the seminiferous tubules of the testes at a desloratadine dose of 60 mg/kg and at 120 mg/kg dose of loratadine.

Hypospermatogenesis occurred in the testes of one or more males given 120 mg loratadine/kg or desloratadine doses ≥ 30 mg/kg. Luminal cellular debris was present in the epididymides of the loratadine-dosed males and in the desloratadine-dosed males at doses ≥ 30 mg/kg. Oligospermia was also seen in the epididymides of one male given 30 mg/kg of desloratadine, in one male given 60 mg/kg of desloratadine, and in some males given 120 mg/kg of desloratadine or loratadine. However, there were no testicular changes observed in the one-month study at doses up to 120 mg/kg. Furthermore, these testicular-related changes were consistent with those previously observed with loratadine at doses as low as 2 mg loratadine/kg in rats but with a loratadine no effect dose of 1 mg loratadine/kg for similar findings after one year of dosing. This effect on rat testes has been reported with other antihistamines. With loratadine and desloratadine, this effect is only observed in rats. In the three-month study, granulosa cell necrosis was seen in the ovaries of many females given 120 mg/kg of desloratadine and in some females given 120 mg/kg of loratadine. Uterine immaturity occurred in some females given 60 mg/kg of desloratadine and in many females given 120 mg/kg of desloratadine or loratadine.

A seven-day, a two-week, two one-month and a three-month study were conducted in monkeys with desloratadine. Desloratadine doses of up to 12 mg/kg (systemic exposure multiple of at least 182 times) were well tolerated for up to three-months of dosing and was the no-effect dose in the

one-month studies. Doses ≥ 36 mg/kg (systemic exposure multiple of at least 842 times) in the repeat one-month study caused emesis.

In the three-month study, the high dose of 18 mg/kg of desloratadine was increased to 24 mg/kg and the loratadine dose was increased from 22 mg/kg to 72 mg/kg on Day 36. Clinical signs, including few or no feces, extended abdomen, hunched posture and/or lethargy, at the 18/24 mg/kg of desloratadine (systemic exposure multiple of at least 953 times) and 22/72 mg/kg of loratadine (desloratadine systemic exposure multiple of at least 1147 times) doses were attributed to the anticholinergic effects of this class of compounds. Decreases in serum cholesterol and alkaline phosphatase were noted in the 18/24 mg/kg desloratadine group and in the 22/72 mg/kg loratadine group. Evaluation of histopathologic findings from the desloratadine 18/24 mg/kg dose group suggests that this dose produces phospholipidosis similar to that produced by the 22/72 mg/kg loratadine dose. There was no evidence of phospholipidosis following desloratadine doses of 6 mg/kg. There were no testicular changes observed in monkeys dosed for three months at doses up to 18/24 mg desloratadine/kg or 22/72 mg loratadine/kg. In this three-month study, the only effects observed at the 12 mg/kg dose of desloratadine were vacuolation in the salivary glands and lungs. A dose of 6 mg/kg (systemic exposure multiple 204 times) was the no-effect dose. The toxicity studies demonstrate adequate exposure multiples at the no-effect levels and ensure an acceptable safety profile for desloratadine (**Table 6**).

Table 6. Systemic Exposure of Desloratadine in Animals Following PO Dose Repeated Administration of Desloratadine.

Species	**Study**	**Dose Route/ No-Effect Dose (mg/kg)**	**Gender**	**AUC(0-24 hr) (ng• hr/mL)**	**Animal to Human Exposure Ratio (5.0 mg/day human dose)**
Rat	3 Month Toxicity (Day 57)	Gavage 3	M F	1950 1890	34 33
Monkey	2-Week Toxicity (Day 14)	Gavage 6.5	M,F[a]	5115	90
Monkey	1-Month Toxicity (Day 15)	Gavage 12	M,F	10388	182
Monkey	1-Month Toxicity Repeat (Day 15)	Gavage 12	M,F	16002	281
Monkey	3-Month Toxicity (Day 57)	Gavage 6	M,F	11623	204

a: M,F equals values for males and females combined.

Carcinogenicity

Since animals and humans are exposed to desloratadine through metabolism of loratadine, carcinogenicity studies conducted with loratadine also assessed the carcinogenic risk of desloratadine.

In an 18-month carcinogenicity study in mice and a 2-year study in rats, loratadine was administered in the diet at doses up to 40 mg/kg/day (mice) and 25 mg/kg/day (rats). Pharmacokinetic assessments were carried out to determine the animal exposure to desloratadine as well as to loratadine in the carcinogenicity studies. Desloratadine AUC data demonstrated that the exposure of mice given 40 mg/kg/day loratadine was 33 times higher than in humans given the maximum recommended daily oral dose of desloratadine. Desloratadine exposure of rats given 25 mg/kg/day of loratadine was 123 times higher than in humans given the highest recommended dose of desloratadine (5mg/day). Male mice given 40 mg/kg/day of loratadine had a significantly higher incidence of hepatocellular tumors (adenomas and carcinomas combined) than concurrent controls. In rats, a significantly higher incidence of hepatocellular tumors (adenomas and carcinomas combined) was observed in males given 10 mg/kg/day and in males and females given 25 mg/kg/day. The liver tumors observed in the loratadine carcinogenicity studies were considered to be due to nongenotoxic mechanism(s) that were observed only at high doses of loratadine; thus, these animal carcinogenicity findings were not considered relevant to humans taking recommended therapeutic doses of either loratadine or desloratadine.

Mutagenicity

In mutagenicity studies with desloratadine, there was no evidence of mutagenic potential in a reverse point 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).

Reproductive Toxicology

There was no effect on female fertility at doses up to 24 mg/kg/day which produced systemic exposure levels in female rats which were at least 506 times those in humans given the highest recommended clinical dose of desloratadine. In a separate study, decreased fertility in male rats was shown by lower female conception rates associated with decreases in sperm numbers and motility and histopathologic testicular changes, which occurred at an oral dose of desloratadine of 12 mg/kg (systemic exposure approximately 175 times higher than in humans given the maximum recommended dose of desloratadine). Although there was no overall effect on mean sperm motility or concentration, a few rats given desloratadine at a dose of 3 mg/kg/day appeared to have testicular findings consistent with those observed previously with loratadine, which had a no effect dose of 1 mg/kg/day for similar findings after one year of administration. There was no effect on fertility at 3 mg/kg/day, which produced plasma levels (AUC) in rats that were 34 times higher than in humans receiving the maximum clinical dose of desloratadine. This effect on rat testes has been reported with other antihistamines but as with desloratadine and loratadine, this effect is not observed in other laboratory animal species and appears to be unique to the rat.

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PART III: CONSUMER INFORMATION

ALLERGY CONTROL DESLORATADINE
Desloratadine Tablets

This leaflet is part III of a three-part "Product Monograph" published when ALLERGY CONTROL DESLORATADINE was approved for sale in Canada and is designed specifically for Consumers. This leaflet is a summary and will not tell you everything about ALLERGY CONTROL DESLORATADINE. Contact your doctor or pharmacist if you have any questions about the drug.

ABOUT THIS MEDICATION

What the medication is used for:

ALLERGY CONTROL DESLORATADINE

- fast 24 hour relief from seasonal allergies (trees, grass, pollen and ragweed) and year round allergies (dust mites, animal dander and molds) resulting in symptoms including nasal congestion, sneezing, runny nose, itchy nose, stuffiness, itchy palate, itchy ears, itchy throat and allergic cough, as well as itchy watery red eyes.
- fast relief of allergic skin conditions, such as skin itch and hives.

What it does:
Desloratadine is a long-acting antihistamine; it blocks the action of histamine and relieves allergy symptoms. Histamine is a chemical released by the immune system – the body's defence against invading substances – when the body is affected by substances that you are allergic to (allergens).

Most people will feel relief of allergy symptoms within 75 minutes of taking Desloratadine.

Symptom relief will be maintained for 24 hours.

ALLERGY CONTROL DESLORATADINE does not cause drowsiness.

ALLERGY CONTROL DESLORATADINE can be used by people with mild to moderate asthma.

When it should not be used:
Desloratadine tablets should not be used:

- if you are allergic to desloratadine or to any of the other product ingredients (see "What the non-medicinal ingredients are").
- if you are pregnant or nursing.

What the medicinal ingredient is:
Desloratadine

What the non-medicinal ingredients are:
FD & C Blue No.2 aluminum lake, hypromellose, lactose, magnesium oxide, microcrystalline cellulose, polyethylene glycol, pregelatinized starch, titanium dioxide, zinc stearate

What dosage forms it comes in:
Tablets: 5 mg.

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

- Tell your doctor if you have severe liver or kidney disease.

BEFORE you use ALLERGY CONTROL DESLORATADINE talk to your doctor or pharmacist if:

- you have severe liver disease
- you have severe kidney disease

Keep out of reach of children.

INTERACTIONS WITH THIS MEDICATION

None of the drugs tested have been found to interact with desloratadine.

If you are taking any medication, it is important to ask your physician or pharmacist before taking ALLERGY CONTROL DESLORATADINE.

PROPER USE OF THIS MEDICATION

Usual dose:
Tablets: Adults and adolescents (12 years of age and older): Swallow one tablet with water, once daily, regardless of mealtime.

Overdose:

In case of drug overdose, contact a health care practitioner, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

Missed dose:
If you miss taking your dose on time, do not worry; take your dose when you remember. Do not exceed more than one dose in 24 hours.

SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Along with its desired effects, desloratadine tablets may cause undesirable effects.

Side effects that may occur include, dry mouth, fatigue and headache.

Rarely, you may experience allergic reactions to the medication, which may appear as a rash or difficulty in breathing. Very rarely, the following side effects may occur: abnormally fast heart rate or heart palpitations, restlessness with increased body movement, seizures and liver dysfunctions such as hepatitis (inflammation of the liver) – which may be recognized by jaundice (yellowing of the skin).

SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM

Symptom / effect		Talk with your doctor or pharmacist		Stop taking drug and seek immediate emergency medical attention
		Only if severe	In all cases	
Rare	Allergic reaction (rash, difficulty in breathing)			√
	Fast heart rate or heart palpitations			√
	Restlessness with increased body movement			√
	Seizures			√
	Liver dysfunctions – i.e. inflammation of the liver (appearance of jaundice – yellowing of the skin)			√

This is not a complete list of side effects. For any unexpected effects while taking ALLERGY CONTROL DESLORATADINE, contact your doctor or pharmacist.

HOW TO STORE IT

Store between 15° and 30°C.
Protect tablets from excessive moisture.
Blisters are to be stored in box.

Keep out of reach of children.

REPORTING SUSPECTED SIDE EFFECTS

You can report any suspected adverse reactions associated with the use of health products to the Canada Vigilance Program by one of the following 3 ways:

- **Report online at www.healthcanada.gc.ca/medeffect**
- **Call toll-free at 1-866-234-2345**
- **Complete a Canada Vigilance Reporting Form and:**
  - **Fax toll-free to 1-866-678-6789, or**
  - **Mail to: Canada Vigilance Program**
    Health Canada
    Postal Locator 0701E
    Ottawa, Ontario
    K1A 0K9

Postage paid labels, Canada Vigilance Reporting Form and the adverse reaction reporting guidelines are available on the MedEffect™ Canada Web site at www.healthcanada.gc.ca/medeffect.

NOTE: Should you require information related to the management of side effects, contact your health professional. The Canada Vigilance Program does not provide medical advice.

MORE INFORMATION

This document, plus the full product monograph prepared for health professionals, can be found by contacting by Pharmascience Inc., at 1-888-550-6060.

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