

PRODUCT MONOGRAPH

PrDom-VALACYCLOVIR

Valacyclovir Hydrochloride Caplets, House Standard

500 mg

(valacyclovir as valacyclovir hydrochloride)

Antiviral Agent

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PrDom-VALACYCLOVIR

Valacyclovir Hydrochloride Caplets, House Standard

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	All Non-Medicinal Ingredients
Oral	Caplets 500 mg	Crospovidone, FD&C blue #2 aluminum lake, hydroxypropyl methylcellulose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, polysorbate, titanium dioxide.

INDICATIONS AND CLINICAL USE

Dom-VALACYCLOVIR (valacyclovir hydrochloride) caplets are indicated:

- For the treatment of herpes zoster (shingles).
- For the treatment or suppression of genital herpes in immunocompetent individuals and for the suppression of recurrent genital herpes in HIV infected individuals.
- To reduce the risk of transmission of genital herpes with the use of suppressive therapy. Safer sex practices should be used with suppressive therapy.
- For the treatment of cold sores (herpes labialis).

Geriatrics (> 65 years of age): Use in the geriatric population may be associated with differences in safety due to age-related changes in renal function and a brief discussion can be found in the appropriate sections (see WARNINGS AND PRECAUTIONS).

Pediatrics (< 12 years old): No data is available.

CONTRAINDICATIONS

Dom-VALACYCLOVIR (valacyclovir hydrochloride) caplets are contraindicated in patients with a known hypersensitivity or intolerance to valacyclovir, acyclovir, or any component of the formulation. For a complete listing of ingredients, see DOSAGE FORMS, COMPOSITION AND PACKAGING section.

WARNINGS AND PRECAUTIONS

General

Care should be taken to ensure adequate fluid intake in patients who are at risk of dehydration particularly in geriatric patients.

The safety and efficacy of valacyclovir hydrochloride have not been established for the treatment of disseminated herpes zoster.

The safety and efficacy of valacyclovir hydrochloride have not been established in immunocompromised patients other than for the suppression of ano-genital herpes in HIV-infected patients. The safety and efficacy of valacyclovir hydrochloride for the suppression of recurrent ano-genital herpes in patients with advanced HIV disease (CD4 cell count < 100 cells/mm³) have not been established.

Patients should be informed that valacyclovir hydrochloride is not a cure for genital herpes.

Safer sex practices should be used in combination with suppressive therapy. Valacyclovir hydrochloride alone should not be used for reducing the risk of transmitting genital herpes. Because genital herpes is a sexually transmitted infection, patients should, in order to further reduce the risk of infecting partners, avoid contact with lesions, damaged skin/mucosa, and also avoid intercourse when lesions and/or symptoms are present. Genital herpes is frequently transmitted in the absence of symptoms through asymptomatic viral shedding; therefore patients should be counselled to use safer sex practices. The effect of valacyclovir hydrochloride on transmission of sexually transmitted infections other than herpes (including HIV, gonorrhea, syphilis and Chlamydia) is unknown.

The efficacy of valacyclovir hydrochloride for reducing transmission of genital herpes has not been established in individuals with multiple partners, non-heterosexual couples, and couples not counselled to use safer sex practices.

Central Nervous System

Central nervous system adverse reactions (e.g., agitation, hallucinations, confusion, and encephalopathy): May occur in both adult and pediatric (> 12 years of age) patients (with or without reduced renal function) and in patients with underlying renal disease who receive higher than recommended doses of valacyclovir hydrochloride for their level of renal function. Elderly patients are more likely to have central nervous system adverse reactions. Use with caution in elderly patients and reduce dosage in patients with renal impairment.

Hepatic/Biliary/Pancreatic

Dose modification is not required in patients with mild or moderate cirrhosis (hepatic synthetic function maintained). Pharmacokinetic data in patients with advanced cirrhosis (impaired hepatic synthetic function and evidence of portal-systemic shunting) do not indicate the need for dosage adjustment. There are no data available on the use of higher doses of valacyclovir hydrochloride (4 g or more per day) in patients with liver disease. Caution should therefore be exercised when administering higher doses of valacyclovir hydrochloride to these patients.

Renal

Renal insufficiency or acute renal failure has been observed in patients taking valacyclovir hydrochloride at the recommended dosage and/or with no previous renal conditions and may be associated with renal pain (see ADVERSE REACTIONS, Post-Market Adverse Drug Reactions).

Acyclovir, the active metabolite of valacyclovir, is eliminated by renal clearance, therefore the dose of valacyclovir hydrochloride must be reduced in patients with renal impairment (see DOSAGE AND ADMINISTRATION, Patients with Acute or Chronic Renal Impairment). Geriatric patients are likely to have reduced renal function and therefore the need for dose reduction must be considered in this group of patients. Both geriatric patients and patients with a history of renal impairment are at increased risk of developing neurological side effects and should be closely monitored for evidence of these effects. In the reported cases, these reactions were generally reversible on discontinuation of treatment (see ADVERSE REACTIONS).

Cases of acute renal failure have been reported in patients without adequate hydration. Precipitation of acyclovir in renal tubules may occur when the solubility (2.5 mg/mL) is exceeded in the intratubular fluid. Adequate hydration should be maintained for all patients.

Caution should be exercised when administering valacyclovir hydrochloride to patients with significant renal impairment or those receiving potentially nephrotoxic agents, since this may increase the risk of renal dysfunction (see DOSAGE AND ADMINISTRATION, Patients with Acute or Chronic Renal Impairment) and/or the risk of reversible central nervous system symptoms such as those that occur infrequently in patients treated with intravenous acyclovir.

Given the dosage recommendations for treatment of cold sores, special attention should be paid when prescribing valacyclovir hydrochloride for cold sores in patients who are geriatric or who have impaired renal function (see DOSAGE AND ADMINISTRATION, Patients with Acute or Chronic Renal Impairment, Table 8). Treatment should not exceed 1 day (2 doses of 2000 mg in 24 hours). Therapy beyond 1 day does not provide additional clinical benefit.

In the event of acute renal failure and anuria, the patient may benefit from hemodialysis until renal function is restored.

Thrombotic Thrombocytopenic Purpura/ Hemolytic Uremic Syndrome (TTP/HUS)

Thrombotic Thrombocytopenic Purpura/ Hemolytic Uremic Syndrome (TTP/HUS), in some cases resulting in death, has occurred in patients with advanced HIV-1 disease, and also in allogenic bone marrow transplant and renal transplant recipients participating in clinical trials of valacyclovir hydrochloride at a dose of 8000 mg per day. Treatment with Dom-VALACYCLOVIR should be stopped immediately if clinical signs, symptoms, and laboratory abnormalities consistent with TTP/HUS occur.

Special Populations

Pregnant Women: There are no adequate and well-controlled studies with either acyclovir or

valacyclovir hydrochloride in pregnant women. In a study of the pharmacokinetics of valacyclovir and acyclovir during late pregnancy, the steady-state daily acyclovir AUC (area under plasma concentration-time curve) following valacyclovir 1000 mg was approximately 2 times greater than that observed with oral acyclovir at 1200 mg daily. Valacyclovir hydrochloride caplets should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Pregnancy registries have documented the pregnancy outcomes in women exposed to valacyclovir hydrochloride or to any formulation of acyclovir (the active metabolite of valacyclovir); 111 and 1246 outcomes (29 and 756 exposed during the first trimester of pregnancy), respectively, were obtained from women prospectively registered. The findings of the acyclovir pregnancy registry have not shown an increase in the number of birth defects amongst acyclovir-exposed subjects compared with the general population, and any birth defects showed no uniqueness or consistent pattern to suggest a common cause. Given the small number of women enrolled into the valacyclovir pregnancy registry, reliable and definitive conclusions could not be reached regarding the safety of valacyclovir hydrochloride in pregnancy.

Valacyclovir hydrochloride was not teratogenic in rats or rabbits given 400 mg/kg (which results in 10 and 7 times human plasma levels, respectively) during the period of major organogenesis. However, in a non-standard test in rats given three subcutaneous doses of 100 mg/kg acyclovir (20 times human plasma levels) on gestation day 10, there were fetal abnormalities, such as head and tail anomalies, and maternal toxicity.

Nursing Women: Acyclovir, the principal metabolite of valacyclovir, is excreted in breast milk. Following oral administration of a 500 mg dose of valacyclovir, peak acyclovir concentrations (C_{max}) in breast milk ranged from 0.5 to 2.3 (median 1.4) times the corresponding maternal acyclovir serum concentrations. The acyclovir breast milk to maternal serum AUC ratios ranged from 1.4 to 2.6 (median 2.2).

The median acyclovir concentration in breast milk was 2.24 mcg/mL (9.95 mcM). With a maternal valacyclovir dosage of 500 mg twice daily, this level would expose a nursing infant to a daily oral acyclovir dosage of about 0.61 mg/kg/day. The elimination half-life of acyclovir from breast milk was similar to that for serum.

Unchanged valacyclovir was not detected in maternal serum, breast milk, or infant urine.

Caution should be exercised when valacyclovir hydrochloride is administered to a nursing woman. Consideration should be given to temporary discontinuation of nursing, as the safety of valacyclovir hydrochloride has not been established in infants.

Pediatrics: Safety and efficacy in children have not been established.

Geriatrics: Of the total number of patients included in clinical studies of valacyclovir hydrochloride, more than 800 were age 65 or older, and more than 300 were age 75 or older. A total of 34 volunteers age 65 or older completed a pharmacokinetic trial of valacyclovir hydrochloride. The pharmacokinetics of acyclovir following single- and multiple-dose oral

administration of valacyclovir hydrochloride caplets in geriatric volunteers varied with renal function. The possibility of renal impairment in geriatric patients must be considered and the dosage should be adjusted accordingly (see WARNINGS AND PRECAUTIONS, Renal, and DOSAGE AND ADMINISTRATION, Patients with Acute or Chronic Renal Impairment). Adequate hydration should be maintained.

ADVERSE REACTIONS

Serious Adverse Drug Reactions

The following serious adverse reactions are discussed in greater detail in WARNINGS AND PRECAUTIONS:

- Thrombotic Thrombocytopenic Purpura/ Hemolytic Uremic Syndrome
- Acute Renal Failure
- Central Nervous System Effects

Adverse Drug Reaction Overview

The most frequent adverse reactions associated with the use of valacyclovir hydrochloride are headache and nausea.

Neurological side effects have also been reported in rare instances. Geriatric patients and patients with a history of renal impairment are at increased risk of developing these effects. In the reported cases, these reactions were generally reversible on discontinuation of treatment (see WARNINGS AND PRECAUTIONS; and ADVERSE REACTIONS, Post-Market Adverse Drug Reactions).

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.

Herpes Zoster: Adverse drug reactions were not significantly different in recipients of valacyclovir hydrochloride compared to placebo or acyclovir in the two double-blind, randomized clinical trials of treatment of herpes zoster (shingles) in immunocompetent patients. The most frequent adverse drug reactions reported in recipients of valacyclovir hydrochloride are listed in Table 1.

Table 1 Incidence (%) of Drug-Related Adverse Reactions Occurring in $\geq 1\%$ of Patients Receiving Valacyclovir Hydrochloride in Two Clinical Trials of Treatment of Herpes Zoster

Adverse Drug Reaction	Herpes Zoster			
	18-50 Years		> 50 Years	
	Valacyclovir Hydrochloride (n=202) (%)	Placebo (n=195) (%)	Valacyclovir Hydrochloride (n=765) (%)	Acyclovir (n=376) (%)
Nausea	8	6	12	14
Headache	11	8	8	7
Diarrhea	4	4	4	4
Vomiting	2	2	4	3
Asthenia	1	3	3	2
Constipation	< 1	< 1	3	3
Abdominal pain	< 1	1	2	1
Anorexia	< 1	2	2	2
Dizziness	1	1	2	2
Dry Mouth	< 1	0	2	1
Dyspepsia	0	< 1	2	1
Flatulence	0	0	1	1
Pruritus	1	0	< 1	0

Genital Herpes: In two double-blind, randomized trials of treatment of recurrent genital herpes in immunocompetent patients, adverse drug reactions were not significantly different in recipients of valacyclovir hydrochloride compared to placebo. The most frequent adverse reactions are listed in Table 2.

Table 2 Incidence (%) of Drug-Related Adverse Reactions Occurring in $\geq 1\%$ of Patients Receiving Valacyclovir Hydrochloride in two Clinical Trials of Treatment of Recurrent Genital Herpes

Adverse Drug Reaction	Valacyclovir Hydrochloride (n=1235) (%)	Placebo (n=439) (%)
Headache	11	9
Nausea	5	6
Diarrhea	4	4
Dizziness	2	2
Abdominal pain	2	1
Asthenia	1	3

In two recurrent genital herpes suppression studies of immunocompetent patients, adverse drug reactions were not significantly different in recipients of valacyclovir hydrochloride 1000 mg once daily or valacyclovir hydrochloride 500 mg once daily, compared to placebo or acyclovir 400 mg twice daily. The most frequent adverse reactions are reported in Table 3.

Table 3 Incidence (%) of Drug-Related Adverse Reactions Occurring in $\geq 1\%$ of Patients Receiving Valacyclovir Hydrochloride in Two Clinical Trials for Suppression of Recurrent Genital Herpes

Adverse Drug Reaction	Trial 123-026 (52 Weeks)				Trial 123-037 (16 Weeks)	
	Valacyclovir Hydrochloride 1000 mg q.d. (n=269) (%)	Valacyclovir Hydrochloride 500 mg q.d. (n=266) (%)	Acyclovir 400 mg b.i.d. (n=267) (%)	Placebo (n=134) (%)	Valacyclovir Hydrochloride 500 mg q.d. (n=288) (%)	Placebo (n=94) (%)
Headache	13	13	12	11	7	6
Nausea	8	8	6	5	6	9
Abdominal pain	4	2	3	3	2	2
Diarrhea	4	3	5	7	2	0
Dyspepsia	3	< 1	3	2	< 1	0
Dizziness	2	2	1	1	< 1	1
Pain	2	2	< 1	< 1	< 1	1
Acne	1	< 1	< 1	0	< 1	0
Arthralgia	1	0	0	0	0	0
Constipation	1	< 1	1	0	< 1	0
Flu syndrome	1	< 1	< 1	< 1	0	0
Vomiting	1	< 1	1	0	< 1	2
Depression	< 1	1	< 1	1	< 1	0
Insomnia	< 1	2	< 1	< 1	0	0
Migraine	< 1	< 1	< 1	1	1	1
Paresthesia	< 1	1	< 1	< 1	0	0
Rash	< 1	2	1	1	1	0
Asthenia	0	2	1	< 1	0	1
Dry mouth	0	3	< 1	< 1	< 1	1
Eczema	0	1	< 1	0	< 1	1
Pruritis	0	1	1	0	< 1	0
Vasodilatation	0	< 1	0	0	1	0

In one multicenter, double-blind, randomized study of immunocompetent patients for the treatment of an initial episode of genital herpes, the frequency of adverse events, regardless of attributability to study medication, was similar in both treatment groups: valacyclovir hydrochloride 1000 mg twice daily (n=318) compared to acyclovir 200 mg five times a day (n=318). The most frequent adverse events were headache (13% with valacyclovir hydrochloride versus 10% with acyclovir) and nausea (6% with both treatments). All other adverse events were reported by 3% or less of patients.

In a 6-month study of suppression of recurrent genital herpes in HIV-infected patients, adverse drug reactions were similar in nature and incidence in the groups receiving valacyclovir hydrochloride 500 mg twice daily and placebo when duration of exposure was considered. Adverse reactions reported with an incidence $\geq 1\%$ during the double-blind phase are detailed in Table 4.

Table 4 Incidence (%) of Drug-Related Adverse Reactions Occurring in \geq 1% of Patients Receiving Valacyclovir Hydrochloride in a Clinical Trial for Suppression of Recurrent Genital Herpes in HIV-Infected Patients

Adverse Drug Reaction	Valacyclovir 500 mg b.i.d. (n=194) (%)	Placebo (n=99) (%)
Headache	5	3
Diarrhea	3	2
Nausea	2	5
Constipation	1	0
Dizziness	1	0

Adverse reactions reported by patients receiving valacyclovir hydrochloride 500 mg once daily (n=743) or placebo once daily (n=741) in a clinical study for the reduction of transmission of genital herpes are listed below in Table 5.

Table 5 Incidence (%) of Drug-Related Adverse Reactions Occurring in \geq 1% of Patients Receiving Valacyclovir Hydrochloride in a Clinical Trial for the Reduction of Transmission of Genital Herpes

Adverse Drug Reaction	Valacyclovir Hydrochloride (n=743) (%)	Placebo (n=741) (%)
Headache	6	4
Diarrhea	2	1
Nausea	2	2
Dyspepsia	1	1

Of the 1484 patients enrolled in the reduction of transmission study, 1018 entered the open-label phase of the study (\leq 12 months), 499 from the placebo group and 519 from the valacyclovir hydrochloride group. The nature and incidence of events in the open-label phase were similar to those observed during the double-blind phase of the study (Table 6).

Table 6 Incidence (%) of Drug-Related Adverse Reactions Occurring in $\geq 1\%$ of Patients Receiving Valacyclovir Hydrochloride in the Double-Blind, Open-Label, and Combined Double-Blind + Open-Label Phases of a Clinical Trial for the Reduction of Transmission of Genital Herpes

Adverse Drug Reaction	Double-Blind Phase (≤ 8 months)		Open-Label Phase (≤ 12 months)	Combined Double-Blind + Open-Label Phases (≤ 20 months)
	Valacyclovir Hydrochloride (n=519 ¹) (%)	Placebo (n=499 ²) (%)	Valacyclovir Hydrochloride (n=1018 ³) (%)	Valacyclovir Hydrochloride (n=519 ⁴) (%)
Headache	5	4	2	6
Diarrhea	2	2	<1	2
Nausea	1	3	<1	1
Dyspepsia	1	<1	<1	2
Abdominal pain, upper	1	0	<1	1

¹ Number of patients from the valacyclovir hydrochloride group of the double-blind phase who entered the open-label phase of the study.

² Number of patients from the placebo group of the double-blind phase who entered the open-label phase of the study.

³ Total number of patients (Valacyclovir Hydrochloride + placebo groups) from the double-blind phase who entered the open-label phase of the study. All patients in the open-label phase received valacyclovir hydrochloride 500 mg once daily.

⁴ Number of patients who received valacyclovir hydrochloride during the double-blind phase followed by open-label valacyclovir hydrochloride suppressive therapy.

Cold Sores: Adverse drug reactions reported by patients receiving valacyclovir hydrochloride 2000 mg twice daily for one day (n=609) or placebo (n=609) in clinical studies for the treatment of cold sores are listed below in Table 7.

Table 7 Incidence (%) of Drug-Related Adverse Reactions Occurring in $\geq 1\%$ of Patients Receiving Valacyclovir Hydrochloride in Two Clinical Trials for the Treatment of Cold Sores

Adverse Drug Reaction	Valacyclovir Hydrochloride (n=609) (%)	Placebo (n=609) (%)
Headache	9	5
Nausea	4	5
Diarrhea	3	3
Dyspepsia	1	1

Abnormal Hematologic and Clinical Chemistry Findings

In herpes zoster trials, the frequencies of white blood cells abnormality (< 0.75 times the lower limit of normal) were 1.3% for patients receiving valacyclovir hydrochloride compared with 0.6% for patients receiving placebo. This difference was not clinically or statistically significant.

In studies of suppression of genital herpes in HIV-infected patients and of reduction of transmission of genital herpes, there were no clinically significant changes from baseline in laboratory parameters in patients receiving valacyclovir hydrochloride compared to placebo.

In clinical studies for the treatment of cold sores, the frequencies of abnormal ALT values (> 2 times the upper limit of normal) were 1.8% for patients receiving valacyclovir hydrochloride at the recommended clinical dose and 0.8% for placebo. Other laboratory abnormalities (hemoglobin, white blood cells, alkaline phosphatase, and serum creatinine) occurred with similar frequencies in the 2 groups.

Post-Market Adverse Drug Reactions

The following events have been reported voluntarily during post-approval use of valacyclovir hydrochloride in clinical practice. These events have been chosen for inclusion due to either their seriousness, frequency of reporting, causal connection to valacyclovir hydrochloride, or a combination of these factors. Post-market adverse events are reported spontaneously from a population of unknown size, thus estimates of frequency cannot be made.

Allergic: Acute hypersensitivity reactions including anaphylaxis, angioedema, dyspnea, pruritus, rash and urticaria.

Central Nervous System Symptoms: Headache. Reports of neurological reactions including dizziness, confusion, hallucinations (auditory and visual), aggressive behaviour, decreased consciousness, tremor, ataxia, dysarthria, convulsions, encephalopathy, coma, mania, and seizures. Agitation and psychotic symptoms have also been reported. These events are generally reversible and usually seen in patients with renal impairment or with other predisposing factors (see WARNINGS AND PRECAUTIONS).

General: Facial edema, hypertension, tachycardia.

Gastrointestinal: Nausea, abdominal discomfort, vomiting and diarrhea.

Hematological: Reports of thrombocytopenia, aplastic anemia, leukocytoclastic vasculitis, thrombotic thrombocytopenic purpura / hemolytic uremic syndrome (TTP/HUS). Leukopenia, mainly reported in immunocompromised patients.

Hepatobiliary Tract and Pancreas: Reports of reversible increases in liver function test, hepatitis.

Ophthalmologic: Visual abnormalities.

Renal: Reports of renal impairment, elevated blood creatinine and blood urea nitrogen (BUN) Acute renal failure, renal pain and hematuria. Renal pain may be associated with renal failure (see WARNINGS AND PRECAUTIONS).

Skin: Erythema multiforme, rashes including photosensitivity.

Other: There have been reports of renal insufficiency, microangiopathic hemolytic anemia and thrombocytopenia (sometimes in combination) in severely immunocompromised patients, particularly those with advanced HIV disease, receiving high doses (8000 mg daily) of valacyclovir for prolonged periods in clinical trials. These findings have also been observed in patients not treated with valacyclovir who have the same underlying or concurrent conditions.

DRUG INTERACTIONS

Drug-Drug Interactions

No clinically significant interactions have been identified.

No dosage adjustment is recommended when valacyclovir hydrochloride is co-administered with digoxin, antacids, thiazide diuretics, cimetidine, or probenecid in subjects with normal renal function (see Part II, DETAILED PHARMACOLOGY).

Acyclovir is eliminated primarily unchanged in the urine via active renal tubular secretion. Any drugs administered concurrently that compete with this mechanism may increase acyclovir plasma concentrations following valacyclovir administration.

Following administration of valacyclovir 1000 mg, cimetidine and probenecid increase the area under the curve (AUC) of acyclovir by this mechanism, and reduce acyclovir renal clearance. However, no dosage adjustment is necessary at this dose because of the wide therapeutic index of acyclovir (see Part II, DETAILED PHARMACOLOGY).

Care is also required (with monitoring for changes in renal function) if administering higher-doses of valacyclovir hydrochloride (4 g or more/day) with drugs which affect other aspects of renal physiology (e.g. cyclosporin, tacrolimus).

Drug-Food Interactions

There is no known interaction with food (see Part II, DETAILED PHARMACOLOGY).

Drug-Herb Interactions

Interactions with herbal products have not been established.

Drug-Laboratory Test Interactions

Interactions with laboratory tests have not been established.

DOSAGE AND ADMINISTRATION

Dosing Considerations

- The dosage of Dom-VALACYCLOVIR (valacyclovir hydrochloride) should be reduced in patients with impaired renal function (see Table 8).
- Therapy should be initiated as soon as possible after a diagnosis of herpes zoster, or at the first sign or symptoms of an outbreak of oral or genital herpes.
- The recommended dose and duration of use is dependent on the indication.
- The safety and tolerability of Dom-VALACYCLOVIR 500 mg once daily has been

established for up to 20 months (see CLINICAL TRIALS and ADVERSE REACTIONS).

Recommended Dose and Dosage Adjustment

Dom-VALACYCLOVIR caplets may be given without regard to meals.

Herpes Zoster (shingles): The recommended dosage of Dom-VALACYCLOVIR caplets for the treatment of herpes zoster is 1000 mg orally three times daily for 7 days. Treatment with valacyclovir hydrochloride should be initiated within 72 hours of the onset of rash.

Initial Episode of Genital Herpes: The recommended dosage of Dom-VALACYCLOVIR caplets for the treatment of an initial episode of genital herpes is 1000 mg orally twice daily for 10 days. There are no data on the effectiveness of treatment with Dom-VALACYCLOVIR when initiated more than 72 hours after the onset of signs and symptoms. Therapy was most effective when administered within 48 hours of the onset of signs and symptoms.

Recurrent Episodes of Genital Herpes: The recommended dosage of Dom-VALACYCLOVIR caplets for the treatment of recurrent episodes of genital herpes is 500 mg orally twice daily for 3 days. Therapy should be initiated at the earliest sign or symptom of recurrence. Valacyclovir hydrochloride can prevent lesion development when taken at the first signs and symptoms of a genital herpes recurrence.

Suppression of Genital Herpes: The recommended dosage of Dom-VALACYCLOVIR caplets for chronic suppressive therapy of recurrent genital herpes is 1000 mg orally once daily in patients with normal immune function. The safety and efficacy of Dom-VALACYCLOVIR 1000 mg once daily beyond 1 year have not been established. In patients with a history of 9 or fewer recurrences per year, an alternative dose is 500 mg orally once daily. The safety and tolerability of valacyclovir hydrochloride 500 mg once daily have been established for up to 20 months (see CLINICAL TRIALS and ADVERSE REACTIONS).

In patients with HIV infection with CD4 cell count > 100 cells/mm³, the recommended dosage of Dom-VALACYCLOVIR caplets for chronic suppressive therapy of recurrent genital herpes is 500 mg orally twice daily. The safety and efficacy of therapy with valacyclovir hydrochloride beyond 6 months in patients with HIV infection have not been established.

Reduction of Transmission of Genital Herpes: The recommended dosage of Dom-VALACYCLOVIR caplets for reduction of transmission of genital herpes in patients with a history of 9 or fewer recurrences per year is 500 mg orally once daily for the source partner. The efficacy of reducing transmission beyond 8 months in couples discordant for HSV-2 infection has not been established. The safety and tolerability of valacyclovir hydrochloride 500 mg once daily has been established for up to 20 months (see CLINICAL TRIALS and ADVERSE REACTIONS).

Cold Sores (Herpes Labialis): The recommended dosage of Dom-VALACYCLOVIR for the treatment of cold sores (herpes labialis) is 2000 mg orally twice daily for 1 day (24-hour period). The second dose should be taken approximately 12 hours after the first dose, but not less than 6

hours after the first dose. Therapy should be initiated at the earliest symptom of a cold sore (e.g., tingling, itching, or burning). There are no data on the efficacy of treatment initiated after the development of clinical signs of a cold sore (e.g., papule, vesicle or ulcer).

Patients with Acute or Chronic Renal Impairment: Caution is advised when administering valacyclovir to patients with impaired renal function. Adequate hydration should be maintained.

Pharmacokinetic and safety evaluations following administration of oral valacyclovir hydrochloride have been performed in patients with renal impairment and volunteers with end-stage renal disease (ESRD) managed by hemodialysis. Based on these studies and extensive experience with acyclovir, the following dosage adjustments are recommended (data are not available for the use of valacyclovir hydrochloride in pediatric patients with a creatinine clearance less than 50 mL/min/1.73m²):

Table 8 Dosage Adjustments for Adults Renal Impairment

	Creatinine Clearance(mL/min)			
	≥ 50	30 to <50	10 to <30	< 10
Herpes Zoster	1000 mg every 8 hours [†]	1000 mg every 12 hours	1000 mg every 24 hours	500 mg every 24 hours
Recurrent Episodes of Genital Herpes	500 mg every 12 hours [†]	500 mg every 12 hours [†]	500 mg every 24 hours	500 mg every 24 hours
Suppression of Genital Herpes				
Immunocompetent patients	1000 mg every 24 hours [†]	1000 mg every 24 hours [†]	500 mg every 24 hours	500 mg every 24 hours
Alternate dose for immunocompetent patients with less than or equal to 9 recurrences/year	500 mg every 24 hours [†]	500 mg every 24 hours [†]	500 mg every 48 hours	500 mg every 48 hours
HIV-infected patients	500 mg every 12 hours [†]	500 mg every 12 hours [†]	500 mg every 24 hours	500 mg every 24 hours
Initial Episode of Genital Herpes	1000 mg every 12 hours [†]	1000 mg every 12 hours [†]	1000 mg every 24 hours	500 mg every 24 hours
Cold Sores (Herpes Labialis)[§]	Two 2000 mg doses taken 12 hours apart [†]	Two 1000 mg doses taken 12 hours apart	Two 500 mg doses taken 12 hours apart	500 mg single dose

[†] Standard dose - adjustment not necessary

[§] Do not exceed one day of treatment

Intermittent Hemodialysis: During hemodialysis, the half-life of acyclovir after administration of valacyclovir hydrochloride is approximately 4 hours. About 1/3 of acyclovir in the body is removed by dialysis during a 4-hour hemodialysis session. These patients should receive the daily dose of valacyclovir hydrochloride recommended (Table 8), the dose administered after hemodialysis on the days it is performed.

Peritoneal Dialysis: There is no information specific to administration of valacyclovir hydrochloride. The effect of continuous ambulatory peritoneal dialysis (CAPD) and continuous arteriovenous hemofiltration/dialysis (CAVHD) on acyclovir pharmacokinetics has been studied. The removal of acyclovir after CAPD and CAVHD is less pronounced than with hemodialysis, and the pharmacokinetic parameters closely resemble those observed in patients with ESRD not receiving hemodialysis. Therefore, supplemental doses of valacyclovir hydrochloride should not be required following CAPD or CAVHD.

Missed Dose

If a dose of Dom-VALACYCLOVIR is missed, the patient should be advised to take it as soon as he/she remembers, and then continue with the next dose at the proper time interval.

OVERDOSAGE

Activated charcoal may be administered to aid in the removal of unabsorbed drug. General supportive measures are recommended.

Acute renal failure and neurological symptoms, including confusion, hallucinations, agitation, decreased consciousness and coma, have been reported in patients receiving overdoses of valacyclovir hydrochloride. Nausea and vomiting may also occur. Caution is required to prevent inadvertent overdose. Many of the reported cases involved renally impaired and geriatric patients receiving repeated overdoses, due to lack of appropriate dosage reduction (see WARNINGS AND PRECAUTIONS, Renal; and ADVERSE REACTIONS).

Patients should be observed closely for signs of toxicity. Hemodialysis significantly enhances the removal of acyclovir from the blood and may, therefore be considered a management option in the event of symptomatic overdose. However, it is known that precipitation of acyclovir in renal tubules may occur when the solubility (2.5 mg/mL) is exceeded in the intratubular fluid. In the event of acute renal failure and anuria, the patient may benefit from hemodialysis until renal function is restored (see DOSAGE AND ADMINISTRATION).

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

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

Valacyclovir (valacyclovir hydrochloride) is the L-valyl ester and a pro-drug of the antiviral drug acyclovir. Valacyclovir hydrochloride is rapidly converted to acyclovir, which has in vitro and in vivo inhibitory activity against human herpes viruses including herpes simplex virus types 1 (HSV-1) and 2 (HSV-2), and varicella-zoster virus (VZV).

The inhibitory activity of acyclovir is highly selective due to its unique affinity for the thymidine kinase (TK) encoded by HSV and VZV. This viral enzyme converts acyclovir into acyclovir monophosphate, a nucleotide analogue. The monophosphate is further converted into diphosphate by cellular guanylate kinase and into triphosphate by a number of cellular enzymes. In vitro, acyclovir triphosphate terminates growing chains of viral DNA. Once incorporated, acyclovir irreversibly binds to viral DNA polymerase, effectively inactivating the enzyme. Acyclovir triphosphate is a potent inhibitor of all of the human herpes virus DNA polymerases studied.

Acyclovir is virtually inactive in uninfected cells, since it is preferentially taken up and selectively converted to the active triphosphate form by herpes virus-infected cells. Additionally, the enzyme thymidine kinase of uninfected cells does not effectively use acyclovir as a substrate and cellular α -DNA polymerase is less sensitive than viral DNA polymerase to the effects of acyclovir.

A combination of the thymidine kinase specificity, competitive inhibition of DNA polymerase and incorporation and termination of the growing viral DNA chain results in inhibition of herpes virus replication. No effect on latent non-replicating virus has been demonstrated. Inhibition of viral replication reduces the period of viral shedding, limits the degree of spread and level of

pathology, and thereby facilitates healing. The pain of shingles is related to viral damage to neurons which takes place during viral replication.

Pharmacokinetics

Absorption: After oral administration, valacyclovir hydrochloride is rapidly absorbed from the gastrointestinal tract and nearly completely converted to acyclovir and L-valine by first-pass intestinal and/or hepatic metabolism. The absolute bioavailability of acyclovir after administration of valacyclovir hydrochloride is $54.5\% \pm 9.1\%$ as determined following a 1000 mg oral dose of valacyclovir hydrochloride and a 350 mg intravenous acyclovir dose to 12 healthy volunteers.

Valacyclovir hydrochloride pharmacokinetics are not dose-proportional. The rate and extent of absorption decreases with increasing dose, resulting in a less than proportional increase in C_{max} over the therapeutic dose range and a reduced bioavailability at doses above 500 mg.

Acyclovir pharmacokinetics are unaltered after multiple-dose administration.

Distribution: The binding of valacyclovir to human plasma proteins ranged from 13.5% to 17.9%.

Metabolism: Following absorption, valacyclovir is rapidly and nearly completely hydrolyzed to acyclovir and L-valine, an essential amino acid, by first-pass metabolism. This hydrolysis is mediated primarily by the enzyme valacyclovir hydrolase, and occurs predominantly in the liver.

Elimination: The pharmacokinetic disposition of acyclovir delivered by valacyclovir is consistent with previous experience from intravenous and oral acyclovir. Acyclovir is eliminated primarily by urinary excretion of unchanged drug. In all studies of valacyclovir hydrochloride, the half-life of acyclovir typically averages 2.5 to 3.3 hours in subjects with normal renal function.

Special Populations and Conditions

Pediatrics: The pharmacokinetics of valacyclovir hydrochloride have not been evaluated in pediatric patients.

Geriatrics: The pharmacokinetics of acyclovir following single- and multiple-dose oral administration of valacyclovir hydrochloride caplets in geriatric volunteers varied with renal function. Dosage reduction may be required in geriatric patients with reduced renal function (see DOSAGE AND ADMINISTRATION).

Renal Insufficiency: The half-life and total body clearance of acyclovir are dependent on renal function. A dosage adjustment is recommended for patients with reduced renal function (see DOSAGE AND ADMINISTRATION).

STORAGE AND STABILITY

Store between 15°C and 30°C. Protect from light.

DOSAGE FORMS, COMPOSITION AND PACKAGING

Capsule-Shaped Tablets (Caplets)

500 mg: Each blue, coated, capsule-shaped tablet (caplet), debossed with "VC" followed by "500" on one side and nothing on the other side, contains valacyclovir hydrochloride equivalent to 500 mg valacyclovir and the following non medicinal ingredients: crospovidone, FD&C blue #2 aluminum lake, hydroxypropyl methylcellulose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, polysorbate and titanium dioxide. Available in bottles of 100 caplets.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

Drug Substance

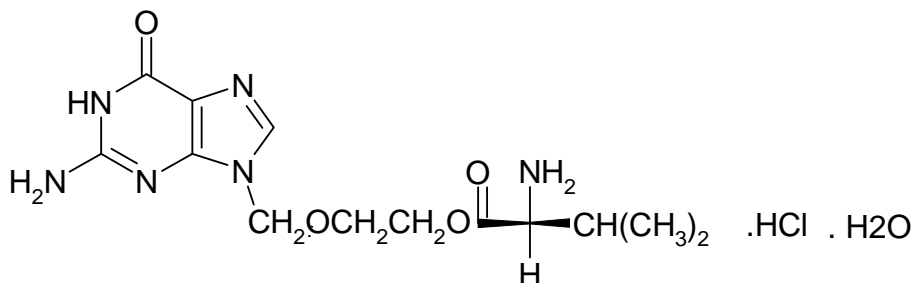
Proper name: Valacyclovir hydrochloride monohydrate

Chemical name: *L*-valine, 2-[(2-amino-1,6-dihydro-6-oxo-9*H*-purin-9-yl) methoxy]ethyl ester, monohydrochloride
[USAN]

Molecular formula: $C_{13}H_{20}N_6O_4 \cdot HCl \cdot H_2O$

Molecular mass: 378.80 g/mol

Structural formula:



Physicochemical properties: Valacyclovir hydrochloride is a white to off-white powder with a maximum solubility in water of 300 mg/mL at 25°C. Valacyclovir hydrochloride monohydrate starts melting at 150°C (solid shrinks) followed by a color change to pale yellow at 170°C, followed by decomposition with color change to dark brown above 195°C. A saturated solution (4.82×10^{-1}) of valacyclovir HCl in distilled water has a pH of 3.5 at 25°C. The pKa values of valacyclovir are $pK_{a1} = 1.90$, $pK_{a2} = 7.47$ and $pK_{a3} = 9.43$.

CLINICAL TRIALS

Comparative Bioavailability Studies

One crossover, blinded bioequivalence study was performed on the 500 mg strength. The Study was performed following a randomized, blinded, single-dose, two-period crossover design in 28 normal, healthy, non-smoking male under fasting conditions. The pharmacokinetic data calculated for the Valacyclovir 500 mg caplets and ^{Pr}VALTRESX[®] 500 mg caplets formulation is tabulated below:

SUMMARY TABLE OF THE COMPARATIVE BIOAVAILABILITY DATA

Valacyclovir (1 x 500 mg) From measured data uncorrected for potency Geometric Mean Arithmetic Mean (CV %)				
Parameter	Test*	Reference†	% Ratio of Geometric Means	Confidence Interval (90%)
AUC _T (ng·h/mL)	136.1494 138.7 (18.89)	126.4631 129.7 (22.12)	107.66	103.22 – 112.29
AUC _I (ng·h/mL)	138.4390 141.0 (18.88)	128.5046 131.7 (22.12)	107.73	103.36 – 112.28
C _{max} (ng/mL)	92.8710 97.7 (30.95)	98.9126 106 (38.82)	93.89	83.26 – 105.88
T _{max} [§] (h)	1.00 (0.35 – 2.50)	1.00 (0.33 – 2.50)		
T _{1/2} [¶] (h)	0.56 (40.29)	0.51 (61.29)		

* Dom-VALACYCLOVIR

† Valtrex[®], was manufactured by GlaxoSmithKline Inc., and was purchased in Canada

§ Expressed as the median (range) only

¶ Expressed as the arithmetic mean (CV%) only

Herpes Zoster

Two randomized double-blind clinical trials in 1540 immunocompetent patients with localized herpes zoster were conducted. In patients less than 50 years of age, valacyclovir hydrochloride 1000 mg three times daily for 7 days was compared to placebo. In patients greater than 50 years of age, valacyclovir hydrochloride 1000 mg three times daily for 7 days or 14 days was compared to acyclovir 800 mg five times daily for 7 days. All patients were treated within 72 hours of appearance of zoster rash.

In patients less than 50 years of age, the median time to cessation of new lesion formation was shorter for those treated with valacyclovir hydrochloride (2 days) compared with those treated with placebo (3 days, $p=0.03$). In patients greater than 50 years of age, the median time to cessation of new lesion formation was three days in patients treated with either valacyclovir hydrochloride or acyclovir.

In both studies, the median time to at least 50% crusting or healing was 5 days for all treatment groups.

These trials also included assessment of pain. The primary endpoint for pain was time to complete cessation of zoster-associated pain. Zoster-associated pain, as defined in these trials, combined acute pain (pain associated with zoster lesions) and post-herpetic neuralgia (pain after 100% crusting/healing of lesion rash), a definition that is not universally accepted; most experts consider each pain component to have different pathogenesis and different morbidity. The clinical trials were not designed to look specifically at post-herpetic neuralgia. However, a post-hoc analysis for post-herpetic neuralgia was requested and carried out.

In patients greater than 50 years of age, the median time to resolution of post-herpetic neuralgia for the study population (including those with zero post-herpetic neuralgia) was significantly shorter in patients treated with valacyclovir hydrochloride compared with patients treated with acyclovir (9 and 4 days shorter for patients treated with valacyclovir hydrochloride for 7 days and 14 days respectively, $p < 0.05$). In patients greater than 50 years of age, the incidence of chronic pain after 100% crusting/healing of lesion rash was not significantly different among the three treatment groups (79% and 80% in patients treated with valacyclovir hydrochloride for 7 or 14 days and 85% in patients treated with acyclovir). In patients less than 50 years of age, there was no statistically significant difference in the median time to cessation of post-herpetic neuralgia between the recipients of valacyclovir hydrochloride and placebo.

There were no significant differences in secondary endpoints, such as use of analgesics or quality of life, for patients treated with valacyclovir hydrochloride compared to placebo or acyclovir. In addition, no significant differences were found among the three groups with respect to intensity of pain.

Initial Episode of Genital Herpes

643 immunocompetent adults with first episode of genital herpes who presented within 72 hours of symptom onset were randomized in a double-blind trial to receive 10 days of valacyclovir hydrochloride 1000 mg twice daily ($n=323$) or acyclovir 200 mg five times a day ($n=320$). For both treatment groups: the median time to lesion healing was 9 days, the median time to

cessation of pain was 5 days, the median time to viral shedding was 3 days.

Recurrent Episodes of Genital Herpes

Three randomized, double-blind trials (2 of them placebo-controlled) in immunocompetent patients with recurrent genital herpes were conducted. Patients self-initiated therapy within 24 hours of the first sign or symptom of a recurrent genital herpes episode.

In one study (004), patients were randomized to receive five days of treatment with either valacyclovir hydrochloride 1000 mg twice daily, acyclovir 200 mg five times daily, or placebo. In a second study (028), patients were randomized to receive either valacyclovir hydrochloride 1000 mg, valacyclovir hydrochloride 500 mg, or placebo, administered twice daily for 5 days.

Valacyclovir hydrochloride significantly accelerated lesion healing and resolved episodes faster compared to placebo in both studies ($p=0.0001$). The median time to lesion healing was 4.8 days and 4.1 days for the groups receiving valacyclovir hydrochloride versus 6.0 days and 6.0 days for the placebo groups, for studies 004 and 028, respectively. The median length of an episode was 4.8 days and 4.0 days for the groups receiving valacyclovir hydrochloride versus 5.9 days and 5.9 days for the placebo groups, for studies 004 and 028, respectively ($p=0.0001$). There were no differences between active treatment groups in both studies.

In study 028, there was a significantly higher proportion of patients with aborted episodes in the groups receiving valacyclovir hydrochloride 1000 mg (28%) and 500 mg (31%) compared to placebo (21%) ($p=0.042$ and $p=0.005$ respectively). In study 004, the proportion of patients with aborted episodes was higher in the group receiving valacyclovir hydrochloride (25.9%) than in the placebo group (19.8%), although this was not statistically significant ($p=0.097$).

The duration of lesion pain/discomfort was significantly shorter in the groups receiving valacyclovir hydrochloride compared to placebo ($p=0.0014$ for study 004 and $p=0.0001$ for study 028). In study 028, the median time to cessation of pain was 2.8 days in the group treated with valacyclovir hydrochloride 500 mg versus 3.9 days for the placebo group. There were no differences between active treatments groups in either study.

In studies 028 and 004, valacyclovir hydrochloride significantly shortened the duration of viral shedding compared to placebo ($p=0.0001$). The median time to cessation of viral shedding in patients with at least one positive culture was two days in the groups receiving valacyclovir hydrochloride versus four days in the placebo group, for both studies. There were no differences between active treatments groups in either study.

In a third study, patients were randomized to receive valacyclovir hydrochloride 500 mg twice daily for 5 days ($n = 398$) or valacyclovir hydrochloride 500 mg twice daily for 3 days (and matching placebo twice daily for 2 additional days) ($n = 402$). The median time to lesion healing was about 4.5 days in both treatment groups. The median time to cessation of pain was about 3 days in both treatment groups.

Suppression of Genital Herpes

Two randomized, double blind trials for the suppression of recurrent genital herpes were

conducted in immunocompetent patients. In one study, 1479 immunocompetent patients received suppressive therapy daily for 1 year. This study included three once-daily regimens of valacyclovir hydrochloride (250 mg, 500 mg, and 1000 mg) and valacyclovir hydrochloride 250 mg twice daily which were compared with acyclovir (400 mg twice daily) and placebo. All regimens of valacyclovir hydrochloride were significantly better than placebo ($p < 0.0001$) in preventing or delaying recurrences of genital herpes during the 1-year study period. The once-daily regimens of valacyclovir hydrochloride showed a strong dose relationship in the efficacy parameters. Analysis of the time to first recurrence revealed that the 250 mg, 500 mg, and 1000 mg once-daily regimens and 250 mg twice daily regimen of valacyclovir hydrochloride prevented or delayed recurrences compared to placebo by 54%, 71%, 78%, and 79% respectively. The proportions of patients recurrence free at 1 year from a time-to-event analysis were 22%, 40%, 48% and 51% for the 250 mg, 500 mg, and 1000 mg once-daily doses and 250 mg twice daily dosing respectively. The proportion of patients recurrence free was 5% in the placebo group. In patients with a history of nine or fewer recurrences per year, valacyclovir hydrochloride 250 mg twice daily and 500 mg once daily provided comparable clinical efficacy (59% and 46% of patients were recurrence free at 1 year respectively). In patients with ten or more recurrences per year, 40% of patients receiving 250 mg twice daily were recurrence free at 1 year, while 30% of patients receiving 500 mg once daily were recurrence free at 1 year.

In the second study, 382 immunocompetent patients received daily suppressive therapy for 16 weeks. Valacyclovir hydrochloride 500 mg once daily was shown to prevent or delay 85% of the recurrences experienced by patients receiving placebo. At the end of the 16 weeks, the proportions of patients recurrence free were 69% for the patients receiving valacyclovir hydrochloride 500 mg once daily and 9.5% for those receiving placebo.

In an open-label suppression study, 1018 patients received valacyclovir hydrochloride 500 mg once daily suppressive therapy for 12 months after receiving either valacyclovir hydrochloride 500 mg or placebo during the 8 month double-blind phase of the study (see CLINICAL TRIALS, Reduction of Transmission of Genital Herpes). During the 12 month open-label phase, 44% of source partners had a recurrence of genital HSV. This was similar to that observed in the valacyclovir hydrochloride group (39%) during the 8 month double-blind phase of the study. In the combined double-blind/open-label suppression phases, the median time to first recurrence of genital HSV was 49 days for source partners originally randomized to placebo and 405 days for source partners originally randomized to valacyclovir hydrochloride.

In a randomized, double-blind, placebo-controlled trial for the suppression of recurrent anogenital herpes in subjects infected with Human Immunodeficiency Virus (HIV), a total of 293 adult subjects on stable antiretroviral therapy with a history of 4 or more recurrences of anogenital herpes per year were randomized to receive either valacyclovir hydrochloride 500 mg twice daily ($n=194$) or matching placebo ($n=99$) for 6 months. The median pre-study HIV-1 RNA was 2.6 \log_{10} copies/mL (range: 2.6 - 5.9 \log_{10} copies/mL) in both treatment groups. Among the 194 subjects who received valacyclovir, the pre-study median CD4 cell count was 336 cells/ mm^3 ; 11% had < 100 cells/ mm^3 , 16% had 100-199 cells/ mm^3 , 42% had 200-499 cells/ mm^3 , and 31% had > 500 cells/ mm^3 . The proportions of patients who were recurrence free at 6 months were 65% in the group receiving valacyclovir hydrochloride versus 26% in the placebo group. Any subject who experienced a breakthrough episode of genital herpes received

valacyclovir hydrochloride 1000 mg twice daily for 5 to 10 days. Ten percent (10/99) of subjects receiving placebo compared to four percent (7/194) of subjects receiving valacyclovir hydrochloride reported an oral HSV outbreak during the double-blind phase of the study. Time to first oral HSV outbreak was significantly shorter in the placebo group ($p < 0.001$).

Reduction of Transmission of Genital Herpes

A double-blind, placebo-controlled study to assess transmission of genital herpes was conducted in 1484 monogamous, heterosexual, immunocompetent adult couples. The couples were discordant for HSV-2 infection. The source partners had a history of 9 or fewer genital herpes episodes per year. Both partners were counselled on safer sex practices and supplied with condoms for use throughout the study period. Source partners were randomized to treatment with either valacyclovir hydrochloride 500 mg once daily or placebo once daily for 8 months.

In the double-blind phase of the study, transmission of genital herpes to the susceptible partner (as measured by the proportion of susceptible partners with clinical evidence of a first episode of genital herpes) was 2.2% (16/741) in the placebo group and 0.5% (4/743) in the group receiving valacyclovir hydrochloride, a reduction of 75%. The proportions of susceptible partners with acquisition of genital herpes infection were 3.6% (27/741) in the placebo group and 1.9% (14/743) in the group receiving valacyclovir hydrochloride, a reduction of 48%.

After successful completion of the 8 month double-blind phase of the study, 1018 patients (499 from the placebo group and 519 from the valacyclovir hydrochloride group) entered into an open-label phase of the study where they were treated with valacyclovir hydrochloride 500 mg once daily for up to 12 months. The 519 patients formerly in the valacyclovir hydrochloride group of the double-blind study received valacyclovir hydrochloride 500 mg once daily for a total of up to 20 months in the combined double-blind/open-label phases. The safety profile of valacyclovir hydrochloride in the open-label suppression phase of this study (12 months) was similar to that observed during the double-blind phase of this study (8 months). The safety and tolerability of valacyclovir hydrochloride 500 mg once daily has been established for up to 20 months.

Cold Sores (Herpes Labialis)

Two double-blind, placebo-controlled clinical trials were conducted in 1856 immunocompetent adults and adolescents (> 12 years old) with a history of cold sores. Patients were randomized to one of 3 treatment arms: valacyclovir hydrochloride 2000 mg twice daily on Day 1 followed by placebo on Day 2; valacyclovir hydrochloride 2000 mg twice daily on Day 1 followed by 1000 mg twice daily on Day 2; or, Placebo on Days 1 and 2. Patients self-initiated therapy at the earliest symptom of a cold sore (e.g., tingling, itching or burning). The majority of patients initiated treatment within two hours after onset of symptoms.

The mean duration of episode, measured as the time from initiation of treatment to the day the lesion was assessed as being healed (loss of crust in patients whose lesions progressed to the vesicular stage; return to normal skin and/or cessation of all signs and symptoms in patients whose lesions were not vesicular in nature) by the physician, was 1.1 days shorter (5.0 days vs. 6.1 days) in subjects treated with valacyclovir hydrochloride 2000 mg twice daily for 1 day (n=311) compared with subjects treated with placebo (n=292) in one study, and 1.0 days shorter

(5.3 days vs. 6.3 days) in subjects treated with valacyclovir hydrochloride 2000 mg twice daily for 1 day (n=298) compared with subjects treated with placebo (n=317) in the second study. The 2-day regimen did not provide additional benefit overall.

There was no significant difference between subjects receiving valacyclovir hydrochloride or placebo in the prevention of cold sore lesions beyond the papular stage.

For those patients whose lesions progressed to the vesicular stage (valacyclovir hydrochloride 2000 mg twice daily for 1 day, 53% in one study and 54% in the second study; placebo, 59% and 61%), the mean time to lesions healing (loss of crust) was 4.8 days vs. 6.1 days in one study, and 5.1 days vs. 6.4 days in the second study in patients treated with valacyclovir hydrochloride 2000 mg twice daily for 1 day (n=164 and n=161) compared with placebo (n=171 and n=192).

The mean time to cessation of pain/discomfort was 2.1 days vs. 2.9 days in one study, and 2.3 days vs. 3.1 days in the second study in patients treated with valacyclovir hydrochloride 2000 mg twice daily for 1 day (n=311 and n=298) compared with placebo (n=292 and n=317).

DETAILED PHARMACOLOGY

Pharmacokinetics

The pharmacokinetics of valacyclovir and acyclovir after oral administration of valacyclovir hydrochloride have been investigated in 12 volunteer studies involving 253 adults.

Absorption and Bioavailability: The absolute bioavailability of acyclovir after administration of valacyclovir hydrochloride is $54.5\% \pm 9.1\%$ as determined following a 1000 mg oral dose of valacyclovir hydrochloride and a 350 mg intravenous acyclovir dose to 12 healthy volunteers. Acyclovir bioavailability from the administration of valacyclovir hydrochloride is not altered by administration with food [30 minutes after an 873 Kcal (3654 Kj) breakfast, which included 51 grams of fat].

There was a lack of proportionality in acyclovir maximum concentration (C_{max}) and area under the acyclovir concentration-time curve after single-dose administration of 100 to 1000 mg of valacyclovir hydrochloride, in eight healthy volunteers. The mean C_{max} (\pm S.D.) ranged from 0.83 (\pm 0.14) to 5.65 (\pm 2.37) mcg/mL, and the mean AUC (\pm SD) ranged from 2.28 (\pm 0.40) to 19.52 (\pm 6.04) hr•mcg/mL. There was also a lack of dose proportionality in acyclovir C_{max} and AUC after multiple-dose administration of 250 to 1000 mg of valacyclovir hydrochloride administered four times daily for 11 days in parallel groups in eight healthy volunteers. The mean C_{max} (\pm SD) ranged from 2.11 (\pm 0.33) to 4.96 (\pm 0.64) mcg/mL, and the mean AUC (\pm SD) ranged from 5.66 (\pm 1.09) to 15.70 (\pm 2.27) hr•mcg/mL.

There is no accumulation of acyclovir after the administration of valacyclovir at the recommended dosage regimens in healthy volunteers with normal renal function.

Metabolism: After oral administration, valacyclovir hydrochloride is rapidly absorbed from the gastrointestinal tract. Valacyclovir is rapidly and nearly completely converted to acyclovir and

L-valine by first-pass intestinal and/or hepatic metabolism. Acyclovir is converted to a small extent to inactive metabolites by aldehyde oxidase and by alcohol and aldehyde dehydrogenase. Neither valacyclovir nor acyclovir metabolism is associated with liver microsomal enzymes. Plasma concentrations of unconverted valacyclovir are low and transient, generally less than 0.5 mcg/mL at all doses. After single-dose administration of 1000 mg of valacyclovir hydrochloride, average plasma valacyclovir concentrations observed were 0.5, 0.4 and 0.8 mcg/mL in patients with hepatic dysfunctions, renal insufficiency, and in healthy volunteers who received concomitant cimetidine and probenecid, respectively.

Elimination: The pharmacokinetic disposition of acyclovir delivered by valacyclovir is consistent with previous experience from intravenous and oral acyclovir. Following the oral administration of a single 1000 mg dose of radiolabeled valacyclovir to four healthy subjects, 45.6% and 47.1% of administered radioactivity was recovered in urine and feces over 96 hours, respectively. Acyclovir accounted for 88.6% of the radioactivity excreted in the urine. Renal clearance of acyclovir following the administration of a single 1000 mg dose of valacyclovir hydrochloride to 12 healthy volunteers was approximately 255 ± 86 mL/min, which represents 41.9% of the total acyclovir apparent plasma clearance.

The plasma elimination half-life of acyclovir typically averaged 2.5 to 3.3 hours in all studies of valacyclovir hydrochloride in volunteers with normal renal function.

Geriatrics: Following administration of valacyclovir hydrochloride, the half-life of acyclovir in geriatric patients is slightly longer and a 35% to 50% increase in AUC is observed relative to estimates in young healthy volunteers. These differences are consistent with the age-related decline in renal function. Population pharmacokinetic results obtained in efficacy trials are consistent with these observations. Dosage modification may be necessary in geriatric patients with reduced renal function (see DOSAGE AND ADMINISTRATION).

Renal Impairment: The elimination of acyclovir is correlated to renal function, and exposure to acyclovir will increase with increased renal impairment. In patients with end-stage renal disease, the average elimination half-life of acyclovir after valacyclovir administration is approximately 14 hours, compared with about 3 hours for normal renal function. During hemodialysis, the acyclovir half-life is approximately 4 hours. Approximately 1/3 of acyclovir in the body is removed by dialysis during a 4-hour hemodialysis session. Dosage reduction is recommended in patients with renal impairment (see DOSAGE AND ADMINISTRATION).

Liver Disease: Administration of valacyclovir hydrochloride to patients with moderate or severe liver disease indicated that the rate but not the extent of conversion of valacyclovir to acyclovir is reduced, and the acyclovir half-life is not affected.

HIV Disease: In patients with advanced HIV disease (CD_4 cell counts < 150 cells/mm³) who received a dose of valacyclovir hydrochloride of 1000 mg or 2000 mg four times daily for 30 days, the pharmacokinetics of valacyclovir and acyclovir are not different from that observed in healthy volunteers (see WARNINGS AND PRECAUTIONS, General).

Drug Interactions

Cimetidine and Probenecid: Co-administration of probenecid with intravenous acyclovir has been shown to increase the mean elimination half-life, and the AUC of acyclovir. Urinary excretion and renal clearance of acyclovir were correspondingly reduced. The administration of cimetidine and probenecid, separately or together, reduced the rate but not the extent of conversion of valacyclovir to acyclovir. Reductions in the renal clearance of acyclovir were observed, resulting in higher acyclovir plasma concentrations. In volunteers with normal renal function, the renal clearance of acyclovir was reduced by approximately 22% and 33%, respectively, with concomitant cimetidine or probenecid administration. Renal clearance of acyclovir was reduced by approximately 46% in patients receiving cimetidine, probenecid, and valacyclovir hydrochloride.

An additive increase in acyclovir AUC with concomitant administration of valacyclovir hydrochloride, cimetidine, and probenecid has also been observed. Acyclovir C_{max} was increased $8.4\% \pm 27.8\%$, $22.5\% \pm 25.3\%$, and $29.6\% \pm 27.5\%$ by cimetidine, probenecid, and combination treatment (concomitant cimetidine and probenecid administration), respectively. Acyclovir AUC (0 to 24 hours) was increased $31.9\% \pm 22.9\%$, $49.0\% \pm 27.9\%$, and $77.9\% \pm 38.6\%$ by cimetidine, probenecid, and combination treatment, respectively.

Digoxin: The pharmacokinetics of digoxin (two 0.75 mg doses, 12 hours apart) were not affected by multiple dose administration of valacyclovir hydrochloride (1000 mg every 8 hours for 8 days beginning 12 hours before digoxin dosing) in a study with 12 volunteers. Acyclovir pharmacokinetics after single dose administration of valacyclovir hydrochloride (1000 mg) remained unchanged when the same dose was administered immediately after the second of two 0.75 mg doses of digoxin given 12 hours apart.

Antacids: The administration of an aluminum hydroxide and magnesium hydroxide containing antacid either 30 minutes before or 65 minutes after administration of valacyclovir hydrochloride 1000 mg had no effect on the pharmacokinetics of acyclovir in a study with 18 volunteers.

Thiazide diuretics: Thiazide diuretics do not affect acyclovir pharmacokinetics after administration of valacyclovir hydrochloride in a geriatric population.

MICROBIOLOGY

The quantitative relationship between the in vitro susceptibility of herpes viruses to antivirals and the clinical response to therapy has not been established in humans, and virus sensitivity testing has not been standardized. Sensitivity testing results, expressed as the concentration of drug required to inhibit by 50% the growth of virus in cell culture (IC_{50}), vary greatly depending upon the particular assay used, the cell type employed, and the laboratory performing the test. Using a plaque-reduction assay, the IC_{50} for acyclovir against VZV ranges from 0.12 to 4.0 mcg/mL. Acyclovir also demonstrates activity against the Oka vaccine strain of VZV with a mean IC_{50} of 1.35 mcg/mL. The IC_{50} against herpes isolates ranges from 0.02 to 13.5 mcg/mL for HSV-1 and from 0.01 to 9.9 mcg/mL for HSV-2.

Resistance

Resistance of VZV to antiviral nucleosides analogues can result from qualitative or quantitative changes in the viral TK or DNA polymerase. Clinical isolates of VZV with reduced susceptibility to acyclovir have been recovered rarely from patients with AIDS. In these cases, the TK-deficient phenotype was predominantly responsible.

Resistance of HSV to antiviral nucleoside analogues occurs by the same mechanisms as resistance to VZV. While most of the acyclovir-resistant mutants isolated thus far from immunocompromised patients have been found to be TK-deficient mutants, other mutants involving the viral TK gene (TK partial and TK altered) and DNA polymerase have also been isolated. TK-negative mutants may cause severe disease in immunocompromised patients. The possibility of viral resistance to valacyclovir (and therefore acyclovir) should be considered in patients who show poor clinical response during therapy.

TOXICOLOGY

Acute Toxicity

The acute toxicity of valacyclovir hydrochloride is low. Single oral doses give approximate lethal dose values > 2000 mg/kg for male mice, between 1000 and 2000 mg/kg for female mice and > 5000 mg/kg for male and female rats. All of the deaths occurred within 3 days of dose administration. The target organ in the acute studies was the kidney, as was expected. The valacyclovir hydrochloride tested produced obstructive nephropathy due to the precipitation of crystals of acyclovir in kidney tubules.

Long-Term Toxicity

Male and female rats were dosed with a single daily dose of 50, 150 and 300 mg/kg of valacyclovir hydrochloride for 97 days. Obstructive nephropathy, characterized by increased values for BUN and creatinine, dilated renal tubules, cellular debris and casts in renal collecting ducts, accumulations of a mixed population of inflammatory cells in the interstitium and the presence of crystals of precipitated acyclovir, was observed in rats given 150 and 300 mg/kg/day. Additional findings consisted of reversible decreases in values for erythrocyte counts, packed cell volume and hemoglobin at 150 mg/kg/day (minimal and inconsistent) and at 300 mg/kg/day. Reversible thymic involution and inconsistent, minimal atrophy of testes were limited to high dose males where renal damage was severe and not fully reversible. No toxicological effects were seen at 50 mg/kg/day valacyclovir hydrochloride.

Monkeys given oral doses of valacyclovir hydrochloride for three months also had obstructive nephropathy. Male and female cynomolgus monkeys were dosed at 200, 400 and 600 mg/kg/day. The daily dose was divided into two equal doses given six hours apart. Reversible obstructive nephropathy was observed at 400 and 600 mg/kg/day. The no-effect level was 200 mg/kg/day.

No additional signs of toxicity occurred in rats and monkeys given daily oral doses of valacyclovir hydrochloride for 1 year. Although high-dose rats (120 mg/kg/day) had obstructive nephropathy, none of the doses of valacyclovir hydrochloride given to monkeys (125, 250 and 500 mg/kg/day) produced toxicity.

Carcinogenicity

Carcinogenicity bioassays were conducted in mice given 40, 80 and 120 mg/kg/day and in rats given 50, 75 and 100 mg/kg/day valacyclovir hydrochloride by gavage. The high doses were maximum tolerated doses and produced expected obstructive nephropathy. Both bioassays were negative for tumorigenic and carcinogenic potential. Dosing was for 20 months in female mice, 18 months in male mice, 23 months in female rats and 24 months in male rats. Except for expected effects on the kidney, there were no signs of chronic toxicity.

Mutagenicity

Five mutagenicity studies were performed with valacyclovir hydrochloride. An Ames test including pre-incubation was negative at concentrations up to 10,000 mcg/plate (the highest concentration tested) with and without metabolic activation. An *in vitro* cytogenetic study in cultured human lymphocytes was negative at 500 mcg/mL without metabolic activation and at 1000 mcg/mL with metabolic activation. A mouse lymphoma assay was negative at 5000 mcg/mL without metabolic activation and at 300 mcg/mL with metabolic activation. Weak mutagenicity consistent with that previously encountered in testing acyclovir itself, occurred at 1000 mcg/mL valacyclovir hydrochloride in the presence of metabolic activation where it was estimated that concentrations of acyclovir averaged 400 mcg/mL over the 4-hour exposure period. There were no mutagenic effects at single doses up to and including 250 mg/kg (nephrotoxic) in a mouse micronucleus assay. Weak mutagenicity encountered at 500 mg/kg in this assay was fully explained by C_{max} acyclovir concentrations of 250 mcg/mL for males and 128 mcg/mL for females, as exposures in this range produced chromosomal damage when acyclovir itself was tested. These exposures also may have produced expected toxic effects on the bone marrow as there were decreased numbers of polychromatic erythrocytes in peripheral circulation. A rat cytogenetic study was negative at all doses including the highest one tested, 3000 mg/kg.

Table 9 Long-Term Toxicity Studies

Study Type	Species	Number Male/Female	Route	Dose (mg/kg)	Frequency	Duration	Drug-related Findings Lowest dose where effect noted
Subchronic	Rat	14 M/14 F	Oral (gavage)	0, 50, 150, 300	daily	97 days	150: Reversible decrease in body weight, increase in BUN and creatinine values. Obstructive nephropathy due to acyclovir crystals in kidney. 300: Reversible thymus involution (males only). Kidney damage (reversible in females only).
	Monkey	5 M/5 F	Oral (gavage)	0, 200, 400, 600 (divided dose)	daily	90 days	400: Reversible morphologic alterations of obstructive nephropathy. Reversible increase in BUN and creatinine.
Chronic	Rat	25 M/25 F	Oral (gavage)	0, 30, 60, 120	daily	1 year	120: Obstructive nephropathy minimal and reversible decreases in erythrocytic parameters (females only)
	Monkey	6 M/6 F	Oral (gavage)	0, 125, 250, 500 (divided dose)	daily	1 year	No obstructive nephropathy.
Carcinogenicity	Mouse	75 M/75 F	Oral (gavage)	0, 0, 40, 80, 120	daily	M:543-546 days F:613-618 days	80: Decreased activity, ataxia, hypothermia. Decreased survival and obstructive nephropathy. No carcinogenic or tumorigenic effects.
	Rat	75 M/75 F	Oral (gavage)	0, 0, 50, 75, 100	daily	M:733-737 days F:705-709 days	No treatment-related clinical signs or decreases in body weights.

Reproduction and Teratology

In reproductive toxicology studies, valacyclovir hydrochloride produced expected obstructive nephropathy in rats and rabbits. There were no teratogenic effects in either species.

Embryotoxicity in rats consisted of post-implantation loss, decreased fetal body weight and length, and increased incidences of minor skeletal variations at the high dose. Maternal plasma levels of approximately 50 mcg/mL acyclovir were achieved. This concentration of acyclovir is intermediate between that associated with an increased incidence of skeletal variations (but no embryolethality) in previous studies with acyclovir and that of 100 mcg/mL producing overt fetal malformations in rats. Plasma levels of 50 mcg/mL acyclovir are approximately 10 times those achieved in humans given the recommended oral dose (1000 mg 3 times per day) of valacyclovir to treat herpes zoster.

At high parenteral doses of acyclovir, testicular atrophy and aspermatogenesis have been observed in rats and dogs.

REFERENCES

1. Barry DW, Blum MR. Antiviral drugs: acyclovir. In: Turner P, Shand DG, eds. *Recent Advances in Clinical Pharmacology*, ed 3. New York: Churchill Livingstone 1983; 57-80.
2. Barry DW, Nusinoff-Lehrman S. Viral resistance in clinical practice: summary of five years experience with acyclovir. In: Kono R, Nakajima A, eds. *Herpes Viruses and Virus Chemotherapy (Ex Med Int Congr Ser 667)*. New York: Excerpta Medica 1985; 269-270.
3. Beutner KR, Friedman DJ, Forszpaniak C, Anderson PL, Wood MJ. Valacyclovir compared with acyclovir for improved therapy for herpes zoster in immunocompetent adults. *Antimicrob Agents Chemother* 1995; 39:1546-1553.
4. Bodsworth NJ, Crooks RJ, Borelli S, Vejlsgaard G, Paavonen J et al. Valacyclovir versus acyclovir in patient initiated treatment of recurrent genital herpes: a randomised, double-blind clinical trial. *Genitourin Med* 1997; 73:110-116.
5. Boivin G, Edelman CK, Pedneault L, Talarico CL, Biron KK et al. Acyclovir-resistant VZV strains from persons with AIDS: phenotypic and genotypic characterization of acyclovir-resistant varicella-zoster viruses isolated from persons with AIDS. *J Infect Dis* 1994; 170:68-75.
6. Burgess ED, Gill MJ. Intraperitoneal administration of acyclovir in patients receiving continuous ambulatory peritoneal dialysis. *J Clin Pharmacol* 1990; 30:997-1000.
7. Chulay JD, Bell AR. Long-term safety of valacyclovir for suppression of herpes simplex virus infections (Abstract). *Clin Infect Dis* 1996; 23:879.
8. Cole NL, Balfour HH Jr. Varicella-zoster virus does not become more resistant to acyclovir during therapy. *J Infect Dis* 1986; 153:605-608.
9. Collins P, Ellis MN. Sensitivity monitoring of clinical isolates of herpes simplex virus to acyclovir. *J Med Virol* 1993; 1:58-66.
10. Datta AK, Colby BM, Shaw JE, Pagano JS. Acyclovir inhibition of Epstein-Barr virus replication. *Proc Natl Acad Sci USA* 1980; 77:5163-5166.
11. de Bony F, Bidault R, Peck R, Posner J. Lack of interaction between valacyclovir, the L-valyl ester of acyclovir, and Maalox antacid. *J Antimicrob Chemother* 1996; 37:383-387.
12. DeClercq E. Comparative efficacy of antiherpes drugs in different cell lines. *Antimicrob Agents Chemother* 1982; 21:661-663.
13. Dekker C, Ellis MN, McLaren C, et al. Virus resistance in clinical practice. *J Antimicrob Chemother* 1983; 12 (Suppl B):137-152.

14. Derse D, Cheng YC, Furman PA, St.Clair MH, Elion GB. Inhibition of purified human and herpes simplex virus-induced DNA polymerases by 9-(2-hydroethoxymethyl)guanine triphosphate: effects on primer-template function. *J Biol Chem* 1981; 256:11447-11451.
15. Ellis MN, Keller PM, Fyfe JA, Martin JL, Rooney JF et al. Clinical isolates of herpes simplex virus type 2 that induces thymidine kinase with altered substrate specificity. *Antimicrob Agents Chemother* 1987; 31:1117-1125.
16. Fife KH, Barbarash RA, Rudolph T, Degregorio B, Roth R. Valaciclovir versus acyclovir in the treatment of first-episode genital herpes infection. Results of an international, multicenter, double-blind, randomized clinical trial. The Valaciclovir International Herpes Simplex Virus Study Group. *Sex Transm Dis* 1997; 24:481-486.
17. Furman PA, St.Clair MH, Fyfe JA, Rideout JL, Keller PM et al. Inhibition of herpes simplex virus-induced DNA polymerase activity and viral DNA replication by 9-(2-hydroxyethoxymethyl) guanine and its triphosphate. *J Virol* 1979; 32:72-77.
18. Jacobson MA, Berger TG, Fikrig S, Becherer P, Moohr JW et al. Acyclovir-resistant varicella zoster virus infection after chronic oral acyclovir therapy in patients with the acquired immunodeficiency syndrome (AIDS). *Ann Intern Med* 1990; 112:187-191.
19. Jones T, Alderman C. Acyclovir clearance by CAVHD. *Intensive Care Med* 1991; 17:125.
20. Laskin OL, deMiranda P, King DH, Page DA, Longstreth JA et al. Effects of probenecid on the pharmacokinetics and elimination of acyclovir in humans. *Antimicrob Agents Chemother* 1982; 21:804-807.
21. Lau RJ, Emery MG, Galinsky RE. Unexpected accumulation of acyclovir in breast milk with estimate of infant exposure. *Obstet Gynecol* 1987; 69:468-471.
22. Leone PA, Trottier S, Miller JM. Valacyclovir for Episodic Treatment of Genital Herpes: A Shorter 3-Day Treatment Course compared with 5-Day Treatment. *Clinical Infectious Diseases* 2002; 34:958-962.
23. Meyer LJ, deMiranda P, Sheth N, Spruance S. Acyclovir in human breast milk. *Am J Obstet Gynecol* 1988; 158:586-588.
24. O'Brien JJ, Campoli-Richards DM. Acyclovir – an updated review of its antiviral activity, pharmacokinetic properties, and therapeutic efficacy. *Drugs* 1989; 37:233-309.
25. Patel R, Bell AR. Valacyclovir for prevention of genital herpes simplex virus recurrences - Long-term safety (Abstract). *European Congress of Clinical Microbiology and Infectious Diseases* 1997; 1425.

26. Patel R, Bodsworth NJ, Peters B. Valacyclovir for the suppression of recurrent genital HSV infection: a placebo controlled study of once daily therapy. *Genitourin Med* 1997; 73:105-109.
27. Perry CM, Faulds D. Valacyclovir. A review of its antiviral activity, pharmacokinetic properties and therapeutic efficacy in herpesvirus infections. *Drugs* 1996; 52:754-772.
28. Spruance MD, Tyring SK, DeGregorio B, Miller C, Beutner K. A Large-Scale, Placebo-Controlled, Dose-Ranging Trial of Peroral Valacyclovir for Episodic Treatment of Recurrent Herpes Genitalis. *Arch Intern Med* 1996; 156:1729-1735.
29. Stahlmann R, Klug S, Lewandowski C, Chahoud I, Bochert G et al. Teratogenicity of acyclovir in rats. *Infection* 1987; 15:261-262.
30. Strauss SE, Takiff HE, Seidlin M, Bachrach S, Lininger L et al. Suppression of frequently recurring genital herpes: a placebo-controlled double-blind trial of oral acyclovir. *N Engl J Med* 1984; 310:1545-1550.
31. Weller S, Blum R, Doucette M, Burnette T, Cederberg DM et al. Pharmacokinetics of the acyclovir pro-drug valacyclovir after escalating single- and multiple-dose administration to normal volunteers. *Clin Pharmacol Ther* 1993; 54:595-605.
32. Product Monograph for ^{Pr}Valtrex[®] GlaxoSmithKline Inc., Mississauga, Ontario, Canada, Date of revision: August 10, 2015; Control number: 184897.

PART III: CONSUMER INFORMATION**Pr Dom-VALACYCLOVIR****Valacyclovir Hydrochloride Caplets, House Standard**

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

ABOUT THIS MEDICATION**What the medication is used for and what it does:**

Dom-VALACYCLOVIR is an antiviral medicine. It is used to lower the ability of herpes viruses to multiply in your body. Dom-VALACYCLOVIR does not cure herpes infections.

Treatment of shingles (herpes zoster)

Dom-VALACYCLOVIR is used to treat shingles (herpes zoster) infections. Shingles is caused by the varicella-zoster virus which damages nerves and skin. Dom-VALACYCLOVIR helps stop the virus from multiplying, therefore reducing the damage.

Treatment or suppression of genital herpes

Dom-VALACYCLOVIR 500 mg caplets are used to treat genital herpes which is caused by the herpes simplex virus (HSV).

HSV causes small, fluid-filled blisters in the genital area which break down into ulcers/sores which may be itchy or painful. The blisters contain many infectious HSV particles. Dom-VALACYCLOVIR helps stop HSV from multiplying which helps to shorten the time that the virus is shed from the skin and mucous membranes. It reduces the number of painful blisters and also helps them to heal more quickly.

If you start taking Dom-VALACYCLOVIR as soon as you feel an infection starting, you may actually prevent the blisters from developing. This type of treatment is called episodic therapy.

When taken every day, Dom-VALACYCLOVIR can also be used to prevent the HSV infection from coming back. This type of treatment is called suppressive therapy.

Reduction of transmission of genital herpes

Dom-VALACYCLOVIR taken every day and in combination with safer sex practices can reduce the risk of transmitting genital herpes to your sexual partner. This type of treatment is for reduction of transmission.

Sometimes the herpes simplex virus (HSV) may be released to the skin at levels too low to cause blisters – this is called viral shedding.

With no visible symptoms, viral shedding can occur anywhere in the "boxer short" area (from just below the waistline down to the upper thighs, including the buttocks). This means it is possible to transmit genital herpes through skin-to-skin contact with the "boxer short" area, even in the absence of blisters.

Dom-VALACYCLOVIR helps stop HSV from multiplying which helps to shorten the time that the virus is shed from the skin and mucous membranes.

Treatment of cold sores (herpes labialis)

Dom-VALACYCLOVIR is used to treat cold sores (herpes labialis) which are caused by the herpes simplex virus (HSV).

Cold sores are small, fluid-filled blisters that you get in or around your mouth. The blisters then break down into ulcers/sores which may be itchy or painful. The blisters contain many infectious HSV particles. Cold sores may be spread by kissing or other physical contact with the infected area of the skin.

Dom-VALACYCLOVIR helps stop HSV from multiplying which helps to shorten the time that the virus is released from the skin and mucous membranes. It reduces the number of painful blisters and also helps them to heal more quickly.

When it should not be used:

You should not use Dom-VALACYCLOVIR if you are allergic to or react badly to valacyclovir or acyclovir or any other components of the formulation of Dom-VALACYCLOVIR (see "What the non-medicinal ingredients are" section). Tell your doctor if you have ever had an allergic reaction to any of these ingredients.

What the medicinal ingredient is:

Valacyclovir hydrochloride

What the non-medicinal ingredients are:

Crospovidone, FD&C blue #2 aluminum lake, hydroxypropyl methylcellulose, magnesium stearate, microcrystalline cellulose, polyethylene glycol, polysorbate, titanium dioxide.

What dosage forms it comes in:

Caplets: 500 mg

WARNINGS AND PRECAUTIONS

Before using Dom-VALACYCLOVIR, tell your doctor if:

- You have kidney problems or you are 65 years of age or older. Your doctor may give you a lower dose of Dom-VALACYCLOVIR.
- You are pregnant, planning to become pregnant, breastfeeding, or planning to breastfeed. Your doctor may decide not to prescribe Dom-VALACYCLOVIR depending on your condition.

PROPER USE OF THIS MEDICATION

You must take Dom-VALACYCLOVIR as prescribed by your doctor. If you are not sure how many caplets to take, or how often to take them, consult your doctor or pharmacist.

You should not increase or decrease the prescribed dose or frequency unless advised by your doctor.

For shingles, genital herpes (initial and recurrent episodes) and cold sores, for best effect, start taking your Dom-VALACYCLOVIR caplets as soon as possible after your symptoms start.

Swallow the caplets with some water. It is important to drink enough water to prevent dehydration when you are taking Dom-VALACYCLOVIR. It does not matter if you take them with or without food.

Usual adult dose:**Shingles (herpes zoster):**

For the treatment of shingles, the usual dose of Dom-VALACYCLOVIR is 1000 mg orally three times a day for 7 days. Most people take one dose when they get up in the morning, one dose mid-afternoon and one dose before they go to bed at night. Spreading the doses evenly throughout the day will help to shorten your rash and discomfort.

Genital herpes:

- **Episodic Therapy**

For the treatment of an initial (first) episode of genital herpes, the usual dose of Dom-VALACYCLOVIR is 1000 mg orally two times a day. The treatment is usually taken for 10 days.

For the treatment of recurrent episodes of genital herpes, the usual dose of Dom-VALACYCLOVIR is 500 mg orally two times a day for 3 days. Take one dose in the morning and one in the evening. Take your Dom-VALACYCLOVIR caplets as soon as you get the warning signs of an outbreak (i.e., itching, burning, swelling or pain in your genital area). This may actually prevent the blisters from developing.

- **Suppressive Therapy**

For the suppression of genital herpes, the usual dose of Dom-VALACYCLOVIR is 1000 mg orally once a day. If you have a history of 9 or fewer recurrences per year, your doctor may prescribe an alternative dose of 500 mg orally once a day. You should continue to take this medicine every day and follow your doctor's instruction.

For the suppression of genital herpes in HIV-infected patients with CD4 cell count > 100 cells/mm³, the recommended dosage of Dom-VALACYCLOVIR is 500 mg orally two times a day.

- **Reduction of Transmission**

For the reduction of transmission of genital herpes in patients with a history of 9 or fewer recurrences per year, the usual

dose of Dom-VALACYCLOVIR is 500 mg once a day for the partner with the infection. Note that the efficacy of Dom-VALACYCLOVIR for reducing transmission of genital herpes has not been established in individuals with multiple partners, non-heterosexual couples, and couples not counselled to use safer sex practices.

Cold sores (herpes labialis):

For the treatment of cold sores, the usual dose of Dom-VALACYCLOVIR is 2000 mg orally two times a day for 1 day (24-hour period). The second dose should be taken around 12 hours after the first dose, but not less than 6 hours after the first dose. Do not exceed 1 day of treatment. Take your Dom-VALACYCLOVIR caplets as soon as you get the warning signs of an outbreak (i.e., tingling, itching or burning).

Overdose:

If you think you have taken too much Dom-VALACYCLOVIR, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

Missed dose:

If you forget to take a dose, take it as soon as you remember. Then continue with the next dose at the proper time interval. Do not double doses.

SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Dom-VALACYCLOVIR does not often have side effects. Some people may feel sick (nausea, vomiting, diarrhea and stomach pain) or have a mild headache. These side effects are generally mild and do not usually cause patients to stop taking Dom-VALACYCLOVIR.

If you experience any of the following side effects, contact your doctor as soon as possible:

- Skin rash (which may also occur after exposure to UV light e.g., sunbathing or using a sun bed)
- Pain in the side (between ribs and hip) or kidney area of your back

Tell your pharmacist or doctor if you notice any other side effects from your medicine which are not mentioned here. A complete listing of adverse events that have been reported is contained in the Product Monograph supplied to your doctor and pharmacist.

If you feel worse, or if you have taken all the caplets and do not feel better, tell your doctor as soon as possible.

Dom-VALACYCLOVIR can alter liver function tests. This is a blood test that lets your doctor know how well your liver is working. If there are any significant changes due to Dom-VALACYCLOVIR, your doctor will decide on the appropriate course of action.

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

Frequency	Symptom / effect	Talk with your doctor or pharmacist		Stop taking drug and seek immediate emergency medical attention
		Only if severe	In all cases	
Unknown	Blood clotting disorder with symptoms such as bruising, bleeding (from gums), fever, fatigue, headache, confusion, numbness, paralysis.		✓	✓
Unknown	Destruction of red blood cells creating anemia with symptoms such as bloody diarrhea, abdominal pain, fatigue, nausea, vomiting, confusion, swelling of hands and feet.		✓	✓
Rare	Central nervous system effects with symptoms such as dizziness, confusion, agitation, hallucinations, particularly in those with kidney problems.		✓	✓

This is not a complete list of side effects. For any unexpected effects while taking Dom-VALACYCLOVIR, contact your doctor or pharmacist.

HOW TO STORE IT

Store Dom-VALACYCLOVIR caplets between 15°C and 30°C. Keep the caplets away from direct heat and sunlight.

Keep your Dom-VALACYCLOVIR caplets in a safe place where children cannot reach or see them.

Do not take any caplets after the expiry date.

MORE FACTS ABOUT GENITAL HERPES

What is genital herpes?

Genital herpes, one of the most common sexually transmitted infections, is caused by the herpes simplex virus (HSV), the same family of viruses that causes cold sores or fever blisters. You can get genital herpes by having sex (skin-to-skin contact including genital, anal, and/or oral contact) with a person who has herpes. Genital herpes does not always occur on the genitals. It may occur anywhere in the “boxer short” area for both men and women (from just below the waistline down to the upper thighs, including the buttocks).

Are there any warning signs of a genital herpes outbreak?

Many people have genital herpes and don’t even know it. Here are some of the signs and symptoms that may signal a genital herpes outbreak:

- Swelling, pain, itching, or burning in your genital area
- Redness, tiny blisters, or sores
- Burning feeling when urinating
- Genital discharge
- Muscle aches, tiredness, or headaches

There is no cure for genital herpes. Once the herpes virus enters the body, it is present throughout life, alternating between active (outbreak or viral shedding) and inactive states.

Why outbreaks recur is still unknown. Some people know what triggers their genital herpes infection to become active again, while others do not. Some factors that may trigger the virus into activity are lack of sleep, poor diet, stress and menstruation.

Try to notice if these factors cause your infection to return, as you may be able to avoid some of them. Taking your Dom-VALACYCLOVIR caplets as soon as you get the warning signs may actually prevent the blisters from developing.

How did I get genital herpes?

Genital herpes is passed from one person to another through direct intimate contact. It can be transmitted sexually, by direct contact with blisters or sores, which contain many infectious virus particles. It can also be transmitted through skin-to-skin contact with the “boxer short” area even in the absence of blisters, because the virus can be active on the skin without causing symptoms.

Small cuts or scratches in the skin or mucous membranes allow the virus to gain entry into the body more easily. These may not be visible to the naked eye.

Genital herpes cannot be transmitted via handshakes, toilet seats, swimming pools, saunas, hot tubs or blood transfusions.

Can I transmit genital herpes to other people?

Yes. It is important to remember that the herpes virus can be shed from your skin even when you do not have any signs or symptoms. For this reason, you can transmit the infection to your partner through skin-to-skin contact with the “boxer short” area even in the absence of blisters or sores. In 70% of cases, genital herpes is transmitted when there are no signs or symptoms.

How can I reduce the risk of transmitting genital herpes to other parts of my body or to other people?

You do not have to stop having sex if you have genital herpes. However, here are some things you should consider in order to reduce the risk of transmission:

- Avoid sexual contact with your partner when you have an outbreak of genital herpes, or think you are about to have an outbreak.
- Use latex or polyurethane condoms each time you engage in sexual intercourse even when there are no signs of infection.
- Avoid touching or breaking the blisters or sores and do not pick the scabs when they form.
- Always wash your hands if you touch the blisters, sores, or scabs.
- If you or your partner has an active genital herpes infection (or even the warning signs), avoid contact with the blisters or sores.
- When combined with safer sex practices, including condoms, daily therapy with Dom-VALACYCLOVIR reduces the risk of transmitting genital herpes to your partner.
- Talk to your doctor about the best options for you and your partner.

What about genital herpes and pregnancy?

There is no evidence that having genital herpes affects fertility in men or women and is unlikely to complicate a pregnancy. The measures described above will also help to reduce the risk of transmitting genital herpes during pregnancy. Special precautions should be taken during pregnancy to avoid transmission to a pregnant woman if her partner has genital herpes. Care is needed at the time of birth if there is an active infection present. Discuss the options available with your doctor.

How can you treat (or manage) your genital herpes?

There are 3 different ways to manage genital herpes with Dom-VALACYCLOVIR :

Episodic therapy: Episodic therapy involves taking Dom-VALACYCLOVIR for a specific number of days during an outbreak to help speed the healing of blisters, shorten the duration of pain and discomfort, and reduce viral shedding (the stage during which herpes virus is secreted). If treatment with Dom-VALACYCLOVIR is started before the appearance of any sores, it may prevent sores from occurring.

Suppressive therapy: Dom-VALACYCLOVIR can also be used to help prevent outbreaks of genital herpes. Dom-

VALACYCLOVIR will not cure genital herpes, but, if taken every day, it may prevent genital herpes outbreaks before they start. Suppressive therapy can significantly reduce the frequency of outbreaks, although results will vary from person to person. Many people can remain recurrence-free while on suppressive treatment.

Reduction of Transmission: When taken every day, Dom-VALACYCLOVIR in combination with safer sex practices can also reduce the risk of transmitting genital herpes to your sexual partner.

Talk to your doctor if you have questions about treatment with Dom-VALACYCLOVIR and if you are concerned about transmitting genital herpes to your partner. Your physician will help you decide which type of therapy is best for you.

Reporting Side Effects

You can help improve the safe use of health products for Canadians by reporting serious and unexpected side effects to Health Canada. Your report may help to identify new side effects and change the product safety information.

3 ways to report:

- Online at [MedEffect](http://hc-sc.gc.ca/dhp-mps/medeff/index-eng.php) (<http://hc-sc.gc.ca/dhp-mps/medeff/index-eng.php>);
- By calling 1-866-234-2345 (toll-free);
- By completing a Consumer Side Effect Reporting Form and sending it by:
 - Fax to 1-866-678-6789 (toll-free), or
 - Mail to: Canada Vigilance Program
Health Canada, Postal Locator 0701E
Ottawa, ON
K1A 0K9Postage paid labels and the Consumer Side Effect Reporting Form are available at [MedEffect](http://hc-sc.gc.ca/dhp-mps/medeff/index-eng.php) (<http://hc-sc.gc.ca/dhp-mps/medeff/index-eng.php>).

NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.

MORE INFORMATION

This document plus the full product monograph, prepared for health professionals, can be obtained by contacting the sponsor, Dominion Pharmacal at, 1-888-550-6060.

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