

0010096 Rev. 06/17

(Imiquimod) Cream

ZYCLARA®

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(Imiquimod) Cream

Rev. 06/17 9600100

HIGHLIGHTS OF PRESCRIBING INFORMATION: CONTENTS*
These highlights do not include all the information needed to use ZYCLARA Cream safely and effectively. See full prescribing information for ZYCLARA Cream.
ZYCLARA® (Imiquimod) Cream, 3.75%, for topical use
ZYCLARA® (Imiquimod) Cream, 2.5%, for topical use
Initial U.S. Approval: 1997
INDICATIONS AND USAGE
 • ZYCLARA Cream, 2.5% and 3.75% are indicated for the topical treatment of clinically typical, visible or palpable actinic keratoses (AK) of the full face or balding scalp in immunocompetent adults. (1.1)
 • ZYCLARA Cream, 3.75% is also indicated for the topical treatment of external genital and perianal warts/condylooma acuminata (EGW) in patients 12 years or older. (1.2)
 • Limitations of Use: Efficacy of Imiquimod cream was not demonstrated for molluscum contagiosum in children 2 to 12 years of age. (1.3, 8.4)

DOSAGE AND ADMINISTRATION
 • For topical use only; not for oral, ophthalmic, intra-oral or intravaginal use. (2)
 • Actinic Keratosis: Once daily to the skin of the affected area (either the entire face or balding scalp) for two 2-week treatment cycles separated by a 2-week no-treatment period. (2.1)
 • External Genital Warts: Once daily to the external genital/perianal warts until total clearance or up to 8 weeks. (2.2)

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FULL PRESCRIBING INFORMATION
1 INDICATIONS AND USAGE
1.1 Actinic Keratosis
 ZYCLARA Cream, 2.5% and 3.75% are indicated for the topical treatment of clinically typical visible or palpable, actinic keratoses (AK) of the full face or balding scalp in immunocompetent adults.
1.2 External Genital Warts
 ZYCLARA Cream, 3.75% is indicated for the treatment of external genital and perianal warts (EGW)/condylooma acuminata in patients 12 years or older.
1.3 Limitations of Use
 Imiquimod cream has been evaluated in children ages 2 to 12 years with molluscum contagiosum and these studies failed to demonstrate efficacy *[see Use in Specific Populations (8.4)]*.
 Treatment with ZYCLARA Cream has not been studied for prevention or transmission of HPV.
1.4 Unevaluated Populations
 The safety and efficacy of ZYCLARA Cream have not been established in the treatment of:
 • urethral, intravaginal, cervical, rectal or intra-anal human papilloma viral disease.
 • actinic keratosis when treated with more than one 2-cycle treatment course in the same area.
 • patients with xeroderma pigmentosum.
 • superficial basal cell carcinoma.
 • immunosuppressed patients.

2 DOSAGE AND ADMINISTRATION
 For topical use only; ZYCLARA Cream is not for oral, ophthalmic, intra-anal or intravaginal use.
2.1 Actinic Keratosis
 ZYCLARA Cream should be applied once daily before bedtime to the skin of the affected area (either entire face or balding scalp) for two 2-week treatment cycles separated by a 2-week no-treatment period. ZYCLARA Cream should be applied as a thin film to the entire treatment area and rubbed in until the cream is no longer visible. Up to 0.5 grams (2 packets or 2 full actuations of the pump) of ZYCLARA Cream may be applied to the treatment area at each application. ZYCLARA Cream should be left on the skin for approximately 8 hours, after which time the cream should be removed by washing the area with mild soap and water. The prescriber should demonstrate the proper application technique to maximize the benefit of ZYCLARA Cream therapy.
 Patients should wash their hands before and after applying ZYCLARA Cream.
 Avoid use in or on the lips and nostrils. Do not use in or near the eyes.

Local skin reactions in the treatment area are common *[see Adverse Reactions (6.1)]*. A rest period of several days may be taken if required by the patient's discomfort or severity of the local skin reaction. **However, neither 2-week treatment cycle should be extended due to missed doses or rest periods.** A transient increase in lesion counts may be observed during treatment. Response to treatment cannot be adequately assessed until resolution of local skin reactions. The patient should continue dosing as prescribed. Treatment should continue for the full treatment course even if all actinic keratoses appear to be gone. Lesions that do not respond to treatment should be carefully re-evaluated and management reconsidered.
 Prescribe no more than 2 boxes (56 packets) or two 7.5 g pumps for the total 2-cycle treatment course. Partially-used packets should be discarded and not reused.
2.2 External Genital Warts
 Patients should apply a thin layer of ZYCLARA Cream once a day to the external genital/perianal warts until total clearance or for up to 8 weeks. Patients should use up to 0.25 grams (one packet or one full actuation of the pump) at each application, which is a sufficient amount of cream to cover the wart area. ZYCLARA Cream should be applied prior to normal sleeping hours and left on the skin for approximately 8 hours, then removed by washing the area with mild soap and water. The prescriber should demonstrate the proper application technique to maximize the benefit of ZYCLARA Cream therapy.
 Patients should wash their hands before and after applying ZYCLARA Cream.
 Local skin reactions at the treatment site are common *[see Adverse Reactions (6.2)]*, and may necessitate a rest period of several days; resume treatment once the reaction subsides. Non-occlusive dressings such as cotton gauze or cotton underwear may be used in the management of skin reactions.
 Prescribe up to 2 boxes (56 packets) or two 7.5 g pumps for the total treatment course. Use of excessive amounts of cream should be avoided. Partially-used packets should be discarded and not reused.

2.3 Pump Administration
 ZYCLARA (Imiquimod) Cream pumps should be primed before using for the first time by repeatedly depressing the actuator until cream is dispensed. It is not necessary to repeat this priming process during treatment.
3 DOSAGE FORMS AND STRENGTHS
 ZYCLARA Cream, 2.5% is a white to faintly yellow cream available in pump bottles. Each pump bottle, when actuated after priming, delivers 0.235 grams of cream.
 ZYCLARA Cream, 3.75% is a white to faintly yellow cream available in single-use packets and pump bottles. Each packet administers 0.25 grams of cream and each pump bottle, when actuated after priming, delivers 0.235 grams of cream (a similar amount as one packet).
4 CONTRAINDICATIONS
 None.

5 WARNINGS AND PRECAUTIONS
5.1 Local Skin Reactions
 Intense local skin reactions including skin weeping or erosion can occur after a few applications of ZYCLARA Cream and may require an interruption of dosing *[see Dosage and Administration (2) and Adverse Reactions (6)]*. ZYCLARA Cream has the potential to exacerbate inflammatory conditions of the skin, including chronic graft versus host disease.
 Severe local inflammatory reactions of the female external genitalia can lead to severe vulvar swelling. Severe vulvar swelling can lead to urinary retention. Dosing should be interrupted or discontinued for severe vulvar swelling.
 Administration of ZYCLARA Cream is not recommended until the skin is healed from any previous drug or surgical treatment.
5.2 Systemic Reactions
 Flu-like signs and symptoms may accompany, or even precede, local skin reactions and may include fatigue, nausea, fever, myalgias, arthralgias, malaise and chills. An interruption of dosing and an assessment of the patient should be considered *[see Adverse Reactions (6)]*.
 Lymphadenopathy occurred in 2% of subjects with actinic keratosis treated with ZYCLARA Cream, 3.75% and in 3% of subjects treated with ZYCLARA Cream, 2.5% *[see Adverse Reactions (6)]*. This reaction resolved in all subjects by 4 weeks after completion of treatment.
5.3 Ultraviolet Light Exposure Risks
 Exposure to sunlight (including sunbaths) should be avoided or minimized during use of ZYCLARA Cream. Patients should be warned to use protective clothing (e.g., a hat) when using ZYCLARA Cream. Patients with sunburn should be advised not to use ZYCLARA Cream until fully recovered. Patients who may have considerable sun exposure, e.g., due to their occupation, and those patients with inherent sensitivity to sunlight should exercise caution when using ZYCLARA Cream.
 In an animal photo-carcinogenicity study, imiquimod cream shortened the time to skin tumor formation. *[see Nonclinical Toxicology (13.1)]*. The enhancement of ultraviolet carcinogenicity is not necessarily dependent on phototoxic mechanisms. Therefore, patients should minimize or avoid natural or artificial sunlight exposure.
5.4 Increased Risk of Adverse Reactions with Concomitant Imiquimod Use
 Concomitant use of ZYCLARA Cream and any other Imiquimod products, in the same treatment area, should be avoided since they contain the same active ingredient (Imiquimod) and may increase the risk for and severity of local skin reactions. The safety of concomitant use of ZYCLARA Cream and any other Imiquimod products has not been established and should be avoided since they contain the same active ingredient (Imiquimod) and may increase the risk for and severity of systemic reactions.
5.5 Immune Cell Activation in Autoimmune Disease
 ZYCLARA Cream should be used with caution in patients with pre-existing autoimmune conditions because Imiquimod activates immune cells *[see Clinical Pharmacology (12.2)]*.

6 ADVERSE REACTIONS
 Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.
6.1 Clinical Trials Experience: Actinic Keratosis
 The data described below reflect exposure to ZYCLARA Cream or vehicle in 479 subjects enrolled in two double-blind, vehicle-controlled trials. Subjects applied up to two packets of ZYCLARA Cream or vehicle daily to the skin of the affected area (either entire face or balding scalp) for two 2-week treatment cycles separated by a 2-week no-treatment period.
Table 1: Selected Adverse Reactions Occurring in ≥2% of ZYCLARA-Treated Subjects and at a Greater Frequency than with Vehicle in the Combined Studies (AK)

Adverse Reactions	ZYCLARA Cream, 3.75% (N=160)	ZYCLARA Cream, 2.5% (N=160)	Vehicle (N=159)
Headache	10 (6%)	3 (2%)	5 (3%)
Application site pruritus	7 (4%)	6 (4%)	1 (<1%)
Fatigue	7 (4%)	2 (1%)	0
Nausea	6 (4%)	1 (1%)	2 (1%)
Influenza-like illness	1 (<1%)	6 (4%)	0
Application site irritation	5 (3%)	4 (3%)	0
Pyrexia	5 (3%)	0	0
Anorexia	4 (3%)	0	0
Dizziness	4 (3%)	1 (<1%)	0
Herpes simplex	4 (3%)	0	1 (<1%)
Application site pain	5 (3%)	2 (1%)	0
Lymphadenopathy	3 (2%)	4 (3%)	0
Oral herpes	0	4 (3%)	0
Arthralgia	2 (1%)	4 (3%)	0
Cheilitis	0	3 (2%)	0
Diarrhea	3 (2%)	2 (1%)	0

Local skin reactions were recorded as adverse reactions only if they extended beyond the treatment area, if they required any medical intervention, or if they resulted in patient discontinuation from the study. The incidence and severity of selected local skin reactions are shown in Table 2.
Table 2: Local Skin Reactions in the Treatment Area in ZYCLARA-Treated Subjects as Assessed by the Investigator (AK)

All Grades* (%) Severe (%)	ZYCLARA Cream, 3.75% (N=160)	ZYCLARA Cream, 2.5% (N=160)	Vehicle (N=159)
Erythema* Severe erythema	96% 25%	96% 14%	78% 0%
Scabbing/Crusting* Severe scabbing/crusting	93% 14%	84% 9%	45% 0%
Edema* Severe edema	75% 6%	63% 4%	19% 0%
Erosion/Ulceration* Severe erosion/ulceration	62% 11%	52% 9%	9% 0%
Exudate* Severe exudate	51% 6%	39% 1%	4% 0%
Flaking/Scaling/Dryness* Severe flaking/scaling/dryness	91% 8%	88% 4%	77% 1%

* Mild, moderate or severe
 Overall, in the clinical trials, 11% (17/160) of subjects in the ZYCLARA Cream, 3.75% arm, 7% (11/160) of subjects in the ZYCLARA Cream, 2.5% arm, and 0% in the vehicle cream arm required rest periods due to adverse local skin reactions.
 Other adverse reactions observed in subjects treated with ZYCLARA Cream include: application site bleeding, application site swelling, chills, dermatitis, herpes zoster, insomnia, lethargy, myalgia, pancytopenia, pruritus, squamous cell carcinoma, and vomiting.
6.2 Clinical Trials Experience: External Genital Warts
 In two double-blind, placebo-controlled studies, 602 subjects applied up to one packet of ZYCLARA Cream or vehicle daily for up to 8 weeks.
 The most frequently reported adverse reactions were application site reactions and local skin reactions. Selected adverse reactions are listed in Table 3.
Table 3: Selected Adverse Reactions Occurring in ≥2% of ZYCLARA-Treated Subjects and at a Greater Frequency than with Vehicle in the Combined Trials (EGW)

Preferred Term	ZYCLARA Cream, 3.75% (N=400)	Vehicle Cream (N=202)
Application site pain	28 (7%)	1 (<1%)
Application site irritation	24 (6%)	2 (1%)
Application site pruritus	11 (3%)	2 (1%)
Vaginitis bacterial*	6 (3%)	2 (2%)
Headache	6 (2%)	1 (<1%)

* percentage based on female population of 6/216 for ZYCLARA Cream 3.75% and 2/106 for vehicle cream

Local skin reactions were recorded as adverse reactions only if they extended beyond the treatment area, if they required any medical intervention, or if they resulted in patient discontinuation from the study. The incidence and severity of selected local skin reactions are shown in Table 4.

Table 4: Selected Local Skin Reactions in the Treatment Area Assessed by the Investigator (EGW)

All Grades* (%) Severe (%)	ZYCLARA Cream, 3.75% (N=400)	Vehicle Cream (N=202)
Erythema* Severe erythema	70% 9%	27% <1%
Edema* Severe edema	41% 2%	8% 0%
Erosion/ulceration* Severe erosion/ulceration	36% 11%	4% <1%
Exudate* Severe exudate	34% 2%	2% 0%

* Mild, Moderate, or Severe
 The frequency and severity of local skin reactions were similar in both genders, with the following exceptions:
 a) flaking/scaling occurred in 40% of men and in 26% of women and b) scabbing/crusting occurred in 34% of men and in 16% of women.

In the clinical trials, 32% (126/400) of subjects who used ZYCLARA Cream and 2% (4/202) of subjects who used vehicle cream discontinued treatment temporarily (required rest periods) due to adverse local skin reactions, and 1% (3/400) of subjects who used ZYCLARA Cream discontinued treatment permanently due to local skin/application site reactions.
 Other adverse reactions reported in subjects treated with ZYCLARA Cream include: rash, back pain, application site rash, application site cellulitis, application site excoriation, application site bleeding, scrotal pain, scrotal erythema, scrotal ulcer, scrotal edema, sinusitis, nausea, pyrexia, and influenza-like symptoms.

6.3 Postmarketing Experience
 The following adverse reactions have been identified during post-approval use of Imiquimod. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Application Site Disorders: tingling at the application site
Body as a Whole: angioedema
Cardiovascular: capillary leak syndrome, cardiac failure, cardiomyopathy, pulmonary edema, arrhythmias (tachycardia, supraventricular tachycardia, atrial fibrillation, palpitations), chest pain, ischemia, myocardial infarction, syncope
Endocrine: thyroiditis
Gastrointestinal System Disorders: abdominal pain
Hematological: decreases in red cell, white cell and platelet counts (including idiopathic thrombocytopenic purpura), lymphoma
Hepatic: abnormal liver function
Infections and Infestations: herpes simplex
Musculoskeletal System Disorders: arthralgia
Neuropsychiatric: agitation, cerebrovascular accident, convulsions (including febrile convulsions), depression, insomnia, multiple sclerosis aggravation, paresis, suicide
Respiratory: dyspnea
Urinary System Disorders: proteinuria, urinary retention, dysuria
Skin and Appendages: exfoliative dermatitis, erythema multiforme, hyperpigmentation, hypertrophic scar, hypopigmentation
Vascular: Henoch-Schonlein purpura purpura
8 USE IN SPECIFIC POPULATIONS
8.1 Pregnancy
 Pregnancy Category C:
 There are no adequate and well-controlled studies in pregnant women. ZYCLARA Cream should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.
 The animal multiples of human exposure calculations were based on daily dose comparisons for the reproductive toxicology studies described in this section and in Section 13.1. The animal multiples of human exposure were based on weekly dose comparisons for the carcinogenicity studies described in Section 13.1. For the animal multiple of human exposure ratios presented in this section and Section 13.1, the Maximum Recommended Human Dose (MRHD) was set at 2 packets (500 mg cream) per treatment of actinic keratosis with ZYCLARA Cream (Imiquimod 3.75%, 18.75 mg Imiquimod) for BSA comparison. The maximum human AUC value obtained in the treatment of external genital and perianal warts was higher than that obtained in the treatment of actinic keratosis and was used in the calculation of animal multiples of MRHD that were based on AUC comparisons.
 Systemic embryofetal development studies were conducted in rats and rabbits. Oral doses of 1, 5 and 20 mg/kg/day Imiquimod were administered during the period of organogenesis (gestational days 6–15) to pregnant female rats. In the presence of maternal toxicity, fetal effects noted at 20 mg/kg/day (15X MRHD based on AUC comparisons) included increased resorptions, decreased fetal body weights, delays in skeletal ossification, bent limb bones, and two fetuses in one litter (2 of 1567 fetuses) demonstrated exencephaly, protruding tongues and low-set ears. No treatment related effects on embryofetal toxicity or teratogenicity were noted at 5 mg/kg/day (26X MRHD based on AUC comparisons).
 Intravenous doses of 0.5, 1 and 2 mg/kg/day Imiquimod were administered during the period of organogenesis (gestational days 6–18) to pregnant female rabbits. No treatment related effects on embryofetal toxicity or teratogenicity were noted at 2 mg/kg/day (2.1X MRHD based on BSA comparisons), the highest dose evaluated in this study, or 1 mg/kg/day (1.1X MRHD based on AUC comparisons).

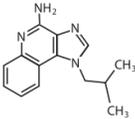
A combined fertility and peri- and post-natal development study was conducted in rats. Oral doses of 1, 1.5, 3 and 6 mg/kg/day Imiquimod were administered to male rats from 70 days prior to mating through the mating period and to female rats from 14 days prior to mating through parturition and lactation. No effects on growth, fertility, reproduction or post-natal development were noted at doses up to 6 mg/kg/day (25X MRHD based on AUC comparisons), the highest dose evaluated in this study. In the absence of maternal toxicity, bent limb bones were noted in the F1 fetuses at a dose of 6 mg/kg/day (25X MRHD based on AUC comparisons). This fetal effect was also noted in the oral rat embryofetal development study conducted with Imiquimod. No treatment related effects on teratogenicity were noted at 3 mg/kg/day (12X MRHD based on AUC comparisons).
8.2 Nursing Mothers
 It is not known whether Imiquimod is excreted in human milk following use of ZYCLARA Cream. Because many drugs are excreted in human milk, caution should be exercised when ZYCLARA Cream is administered to nursing women.
8.4 Pediatric Use
 AK is a condition not generally seen within the pediatric population. The safety and effectiveness of ZYCLARA Cream for AK in patients less than 18 years of age have not been established.
 Safety and effectiveness in patients with external genital/perianal warts below the age of 12 years have not been established. Imiquimod 5% cream was evaluated in two randomized, vehicle-controlled, double-blind trials involving 702 pediatric subjects with molluscum contagiosum (MC) (470 exposed to Imiquimod; median age 5 years, range 2-12 years). Subjects applied Imiquimod cream or vehicle 3 times weekly for up to 16 weeks. Complete clearance (no MC lesions) was assessed at Week 18. In Study 1, the complete clearance rate was 24% (52/217) in the Imiquimod cream group compared with 26% (28/106) in the vehicle group. In Study 2, the clearance rates were 24% (60/253) in the Imiquimod cream group compared with 28% (35/126) in the vehicle group. These studies failed to demonstrate efficacy.
 Similar to the studies conducted in adults, the most frequently reported adverse reaction from 2 studies in children with molluscum contagiosum was application site reaction. Adverse events which occurred more frequently in Imiquimod-treated subjects compared with vehicle-treated subjects generally resembled those seen in studies in indications approved for adults and also included otitis media (5% Imiquimod vs. 3% vehicle) and conjunctivitis (3% Imiquimod vs. 2% vehicle).
 Erythema was the most frequently reported local skin reaction. Severe local skin reactions reported by Imiquimod-treated subjects in the pediatric studies included erythema (28%), edema (8%), scabbing/crusting (5%), flaking/scaling (5%), erosion (2%) and weeping/exudate (2%).
 Systemic absorption of Imiquimod across the affected skin of 22 subjects aged 2 to 12 years with extensive MC involving at least 10% of the total body surface area was observed after single and multiple doses at a dosing frequency of 3 applications per week for 4 weeks. The investigator determined the dose applied, either 1, 2 or 3 packets per dose, based on the size of the treatment area and the subject's weight. The overall median peak serum drug concentrations at the end of week 4 was between 0.26 and 1.06 ng/mL except in a 2-year-old female who was administered 2 packets of study drug per dose, had a C_{max} of 9.66 ng/mL after multiple dosing. Children aged 2-5 years received doses of 12.5 mg (one packet) or 25 mg (two packets) of Imiquimod and had median multiple-dose peak serum drug levels of approximately 0.2 or 0.5 ng/mL, respectively. Children aged 6-12 years received doses of 12.5 mg, 25 mg, or 37.5 mg (three packets) and had median multiple dose serum drug levels of approximately 0.1, 0.15, or 0.3 ng/mL, respectively. Among the 20 subjects with evaluable laboratory assessments, the median WBC count decreased by 1.4*10⁹/L and the median absolute neutrophil count decreased by 1.42*10⁹/L.

8.5 Geriatric Use
 Of the 320 subjects treated with ZYCLARA Cream in the AK clinical studies, 150 subjects (47%) were 65 years or older. No overall differences in safety or effectiveness were observed between these subjects and younger subjects.
 Clinical studies of ZYCLARA Cream for EGW did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Of the 400 subjects treated with ZYCLARA Cream, 3.75% in the EGW clinical studies, 5 subjects (1%) were 65 years or older.

10 OVERDOSAGE
 Topical overdosing of ZYCLARA Cream could result in an increased incidence of severe local skin reactions and may increase the risk for systemic reactions.
 Hypotension was reported in a clinical trial following multiple oral Imiquimod doses of >200 mg (equivalent to ingestion of the Imiquimod content of more than 21 packets or pump actuations of ZYCLARA Cream, 3.75% or more than 32 pump actuations of ZYCLARA Cream, 2.5%). The hypotension resolved following oral or intravenous fluid administration.

11 DESCRIPTION
 ZYCLARA (Imiquimod) Cream, 2.5% or 3.75% is intended for topical administration. Each gram contains 25 mg or 37.5 mg of Imiquimod, respectively, in a white to faintly yellow oil-in-water cream base consisting of isosteatic acid, cetyl alcohol, stearyl alcohol, white petrolatum, polyisobutyl 60, sorbitan monoesterate, glycerin, xanthan gum, purified water, benzyl alcohol, methylparaben, and propylparaben.

Chemically, Imiquimod is 1-(2-(methylpropyl)-1H-imidazo[4,5-c]quinolin-4-amine. Imiquimod has a molecular formula of C₁₈H₁₆N₄ and a molecular weight of 240.3. Its structural formula is:



ZYCLARA (Imiquimod) Cream, 3.75% comes as a premeasured packet containing 9.4 mg of Imiquimod in 0.25 g of cream. ZYCLARA (Imiquimod) Cream, 2.5% and 3.75% also come in pumps which dispense 5.9 mg or 8.8 mg of Imiquimod, respectively, in 0.235 g of cream per full actuation of the pump after priming.

12 CLINICAL PHARMACOLOGY
12.1 Mechanism of Action
 The mechanism of action of ZYCLARA Cream in treating AK and EGW lesions is unknown.

12.2 Pharmacodynamics
 The pharmacodynamics of ZYCLARA Cream are unknown.
 Imiquimod is a Toll-like receptor 7 agonist that activates immune cells. Topical application to skin is associated with increases in markers for cytokines and immune cells.
Actinic Keratosis
 In a study of 16 subjects with AK comparing Imiquimod cream, 5% to vehicle, increases from baseline in week 2 biomarker levels were reported for CD3, CD4, CD8, CD11c, and CD68 for Imiquimod cream, 5% treated subjects; however, the clinical relevance of these findings is unknown.

External Genital Warts
 Imiquimod has no direct antiviral activity in cell culture.
12.3 Pharmacokinetics
 Following dosing with 2 packets of ZYCLARA Cream, 3.75% once daily (18.75 mg Imiquimod/day) for up to three weeks, systemic absorption of Imiquimod was observed in all subjects when ZYCLARA Cream was applied to the face and/or scalp in 17 subjects with at least 10 AK lesions. The mean peak serum Imiquimod concentration at the end of the trial was approximately 0.323 ng/mL. The median time to maximal concentrations (T_{max}) occurred at 9 hours after dosing. Based on the plasma half-life of Imiquimod observed at the end of the study, 29.3±17.0 hours, steady-state concentrations can be anticipated to occur by day 7 with once daily dosing.
 Systemic absorption of Imiquimod (up to 9.4 mg [one packet]) across the affected skin of 18 subjects with EGW was observed with once daily dosing for 3 weeks in all subjects. The subjects had either a minimum of 8 warts (range 8-93) or a surface area involvement of greater than 100 mm² (range 15-620 mm²) at study entry. The mean peak serum Imiquimod concentration at Day 21 was 0.488 +/- 0.368 ng/mL. The median time to maximal concentrations (T_{max}) occurred 12 hours after dosing. Based on the plasma half-life of Imiquimod observed at the end of the study, 24.1 +/- 12.4 hours, steady-state concentrations can be anticipated to occur by day 7 with once daily dosing. Because of the small number of subjects present (13 males, 5 females) it was not possible to select out or do an analysis of absorption based on gender/site of application.

13 NONCLINICAL TOXICOLOGY
13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility
 In an oral (gavage) rat carcinogenicity study, Imiquimod was administered to Wistar rats on a 2X/week (up to 6 mg/kg/day) or daily (3 mg/kg/day) dosing schedule for 24 months. No treatment related tumors were noted in the oral rat carcinogenicity study up to the highest doses tested in this study of 6 mg/kg administered 2X/week in female rats (7.1X MRHD based on weekly AUC comparisons), 4 mg/kg administered 2X/week in male rats (6.1X MRHD based on weekly AUC comparisons) or 3 mg/kg administered 7X/week to male and female rats (12X MRHD based on weekly AUC comparisons).
 In a dermal mouse carcinogenicity study, Imiquimod cream (up to 5 mg/kg/application Imiquimod or 0.3% Imiquimod cream) was applied to the backs of the mice for 24 months. A statistically significant increase in the incidence of liver adenomas and carcinomas was noted in high dose male mice compared to control male mice (21X MRHD based on weekly AUC comparisons). An increased number of skin papillomas was observed in vehicle cream control group animals at the treated site only.
 In a 52-week dermal phototoxicity study, the median time to onset of skin tumor formation was decreased in hairless mice following chronic topical dosing (3X/week; 40 weeks of treatment followed by 12 weeks of observation) with concurrent exposure to UV radiation (5 days per week) with vehicle alone. No additional effect on tumor development beyond the vehicle effect was noted with the addition of the active ingredient, Imiquimod, to the vehicle cream.
 Imiquimod revealed no evidence of mutagenic or clastogenic potential based on the results of five *in vitro* genotoxicity tests (Ames assay, mouse lymphoma L5178Y assay, Chinese hamster ovary cell chromosome aberration assay, human lymphocyte chromosome aberration assay and SHE cell transformation assay) and three *in vivo* genotoxicity tests (rat and hamster bone marrow cytogenetics assay and a mouse dominant lethal test).

Daily oral administration of Imiquimod to rats, throughout mating, gestation, parturition and lactation, demonstrated no effects on growth, fertility or reproduction, at doses up to 25X MRHD based on AUC comparisons.
14 CLINICAL STUDIES
14.1 Actinic Keratosis
 In two double-blind, randomized, vehicle-controlled clinical studies, 479 subjects with AK were treated with ZYCLARA Cream, 3.75%, ZYCLARA Cream, 2.5%, or vehicle cream. Studies enrolled subjects 18 years of age or older with 5 to 20 typical visible or palpable AK lesions of the face or scalp. Study cream was applied to either the entire face (excluding ears) or balding scalp once daily for two 2-week treatment cycles separated by a 2-week no-treatment period. Subjects then continued in the study for an 8-week follow-up period during which they returned for clinical observations and safety monitoring. Study subjects ranged from 36 to 90 years of age and 54% had Fitzpatrick skin type I or II. All ZYCLARA Cream-treated subjects were Caucasians.

On a scheduled dosing day, up to two packets of the study cream were applied to the entire treatment area prior to normal sleeping hours and left on for approximately 8 hours. Efficacy was assessed by AK lesion counts at the 8-week post-treatment visit. All AKs in the treatment area were counted, including baseline lesions as well as lesions which appeared during therapy.
 Complete clearance required absence of any lesions including those that appeared during therapy in the treatment area. Complete and partial clearance rates are shown in the tables below. Partial clearance rate was defined as the percentage of subjects in whom the number of baseline AKs was reduced by 75% or more. The partial clearance rate was measured relative to the numbers of AK lesions at baseline.

Table 5: Rate of Subjects with Complete Clearance at 8 Weeks Post-Treatment

	ZYCLARA Cream, 3.75%	ZYCLARA Cream, 2.5%	Vehicle Cream
Study AK1	26% (21/81)	23% (19/81)	3% (2/80)
Study AK2	46% (36/79)	38% (30/79)	10% (8/79)

Table 6: Rate of Subjects with Partial Clearance (≥75%) at

