

PRODUCT MONOGRAPH

Pr CONDYLIN[®]

Podofilox Topical Solution 0.5%

Antimitotic Agent

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PRODUCT MONOGRAPH

NAME OF DRUG

PrCONDYLINE®

Podofilox Topical Solution 0.5%

THERAPEUTIC CLASSIFICATION

Antimitotic Agent

ACTIONS

Necrosis of visible tissue is observed following treatment of genital warts with CONDYLINE (Podofilox Topical Solution 0.5%). The exact mechanism of action is unknown. CONDYLINE (Podofilox Topical solution 0.5%) is believed to exert its antimitotic effect by binding to tubulin, at a site close to but not identical to the binding site of colchicine; it is thought that this antimitotic effect causes necrosis of wart tissue, the observed clinical effect. In addition, podofilox is known to interfere with nucleoside transport which may also contribute to its action (1). Crude podophyllum resin, from which podofilox is extracted, has been shown to produce mitotic arrest and necrosis of wart tissue.

INDICATIONS

CONDYLINE (Podofilox Topical Solution 0.5%) is indicated for the topical treatment of external genital warts (Condylomata acuminata) confined to the penile and vulvar regions. The effectiveness of podofilox in the treatment of perianal or mucous membrane warts has not been established.

CONTRAINDICATIONS

CONDLYINE (Podofilox Topical Solution 0.5%) is contraindicated in:

- Patients who have hypersensitivity to podofilox or intolerance to any component of the formulation.
- Patients with open wounds, inflamed or bleeding lesions.
- Pregnant or breast-feeding women.
- Children under 12 years of age.
- In combination with other podophyllin containing preparations.

WARNINGS

Condyline (podofilox topical solution 0.5%) is intended for topical use only.

Women of child-bearing age should be using effective contraception before being administered CONDYLINE.

The consumption of alcoholic beverages for several hours after treatment is to be avoided.

Condyline is a potent vesicant and is to be used only as directed by a physician. Extreme care should be taken to avoid contact with the healthy skin, eyes, face, tongue or any mucosal tissue of the genital area (including vagina, cervix, anus or perianus) because of severe irritation. If contact with the eyes occurs, flush immediately with copious amounts of water and see a doctor immediately.

Lesions in the female and lesions greater than 4 cm² in male should be treated under direct medical supervision.

The risk of systemic toxicity after topical application is increased by the treatment of large areas with excessive amounts for prolonged periods, by the treatment of friable, bleeding, or recently removed warts, and by inadvertent application to normal skin or mucous membranes.

PRECAUTIONS

Diagnosis

Although Condylomata (genital warts) have a characteristic appearance, histopathologic confirmatory tests should be obtained if there is any question of the diagnosis. Differential diagnosis from squamous cell carcinoma (so called "Bowenoid papulosis") is of particular concern. Squamous cell carcinoma may also be associated with human papillomavirus but **should not** be treated with CONDYLINE (Podofilox Topical Solution 0.5%).

General

CONDYLINE (Podofilox Topical Solution 0.5%) may not prevent either the recurrence of previously resolved warts or the development of new warts at sites remote from the treatment site. The recommended method of application, frequency of application and duration of usage should not be exceeded (See DOSAGE and ADMINISTRATION).

The use of large volumes, greater than 0.25 mL per application or 0.5 mL per day, should be avoided. This can best be accomplished by limiting the treatment area to less than 4 square centimeters and instructing the patient in the proper application of the product. Lesions in the female and lesions greater than 4 cm² in male should be treated under direct medical Supervision.

Genital warts may be contagious and the patient should be instructed to abstain from sexual intercourse. If this is not possible, a latex condom must be used until the infected partner is declared cured by the physician.

The patient should be instructed that if the product is accidentally spilled on undiseased skin, it should be wiped off at once and the exposed skin washed vigorously with warm soapy water and rinsed thoroughly. This product should not be used if growth or surrounding tissue is inflamed or irritated. Self-treatment of genital warts with surface areas greater than 10 square centimeters

should not be permitted. The patient should be cautioned against applying the drug to lesions other than warts.

Information for Patients

The patient should be provided with a Patient Information leaflet when a CONDYLINE prescription is filled.

Long Term Safety

Reports of lifetime carcinogenicity studies in rodents with podofilox, the drug substance, are not available. In general, podofilox was not shown to be carcinogenic in published animal studies (5, 6, 7, 8, 9). There are published reports that, in the mouse studies, crude podophyllin resin (containing podofilox) applied topically to the cervix produced changes resembling carcinoma *in situ*. These changes were reversible at five weeks after cessation of treatment. In another published study, epidermal carcinoma of the vagina and cervix was found in 1 out of 18 mice following 120 applications of podophyllin, applied twice weekly over a 15-month treatment period.

Although studies to assess the genotoxic potential of Podofilox were conducted, a definitive assessment of the potential for mutagenicity could not be concluded. Podofilox was not mutagenic in the Ames plate reverse mutation assay, either with or without metabolic activation, at concentrations up to 5 mg/plate. There was no evidence of potential oncogenicity in the BALB/3T3 cell transformation assay. Results from the mouse micronucleus *in vivo* assay using podofilox 0.5% solution in concentrations up to 25 mg/kg indicate that podofilox should be considered a potential clastogen (a chemical that induces disruption and breakage of chromosomes).

Daily topical application of CONDYLINE (Podofilox Topical Solution 0.5%) at doses up to the equivalent of 0.2 mg/kg (5 times the recommended maximum human dose) to rats throughout gametogenesis, mating, gestation, parturition and lactation for two generations demonstrated no impairment of fertility. As a cytotoxic agent Podofilox has teratogenic potential.

Use in Pregnancy

There is limited amount of data from the use of Podofilox in pregnant women. Animal studies are insufficient with respect to reproductive toxicity. CONDYLINE is contraindicated in pregnant women. Women of child-bearing potential should use effective contraception when administered CONDYLINE.

Use in Nursing Mothers

CONDYLINE is contraindicated in breast-feeding women. It is not known whether this drug is excreted in human milk. Because of the potential for serious adverse reactions in nursing infants from podofilox, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

Fertility

CONDYLINE is not recommended in women of child-bearing potential not using effective contraception. There are no limited amount of data on fertility. Animal studies are insufficient with respect to effect on fertility.

Pediatric Use

CONDYLINE is contraindicated in children younger than 12 years of age.

Use in patients with special diseases and conditions

CONDYLINE (Podofilox Topical Solution 0.5%) should not be used in diabetics or people with poor blood circulation. Podofilox should not be applied on moles, birthmarks or unusual warts with hair growing from them. Podofilox should not be used on tissue which was recently exposed to laser surgery or cryosurgery.

Effects on Ability to Drive and Use Machines

Podofilox has no or only negligible effect on the ability to drive or operate machines

Drug Interactions

Co-administration of CONDYLINE and other podophyllin containing preparations is contraindicated, because it may increase the risk of toxicity or overdose.

Drug abuse and dependence

Podofilox has no known potential for abuse or dependence.

ADVERSE REACTIONS

In clinical trials (16) the following have been shown to be the most common local adverse events which were reported at some time during treatment:

Inflammation - 67 %

Burning - 62 %

Erosion - 59 %

Pain - 49 %

Other - *e. g.*, bleeding, itching, dizziness, insomnia - 21 %

These reactions may be greater in the occluded prepuce of the uncircumcised male patient.

In addition to the above, the following common ($\geq 1/100$ to $< 1/10$) adverse events provided in the table below, were reported and have been reported during post-marketing safety surveillance and in the scientific literature ⁽²⁰⁻²⁶⁾.

System Organ Class	Common frequency ($\geq 1/100$ to $< 1/10$)
Nervous System Disorders	Burning sensations
Skin and Subcutaneous Tissue Disorders	Application site irritation including pruritus, erythema, skin lesion
Reproductive System and Breast Disorders	Balanoposthitis
General Disorders and administration site conditions	Pain, Tenderness

OVERDOSAGE

Topical - symptoms and treatment:

In cases of tingling, burning or extreme tenderness, soak the area in cold water for 10 minutes; repeat as required for the relief of pain. A mild analgesic, *e.g.* acetylsalicylic acid with codeine or acetaminophen with codeine may be beneficial for pain management in some cases. Adjuvant topical anti-inflammatory therapy *e.g.* hydrocortisone acetate, can be advantageous for alleviation of local discomfort.

Systemic - symptoms and treatment:

Topically applied CONDYLINE (Podofilox Topical solution 0.5%) may be absorbed systemically. The risk of systemic toxicity after topical application is increased by the treatment of large areas for prolonged periods, by the treatment of friable, bleeding, or recently removed warts, and by inadvertent application to normal skin or mucous membranes. It may cause systemic toxicity after oral ingestion. Neurotoxic reactions are observed after oral doses exceeding 0.5 mg podofilox per kg body weight. For an adult this dose corresponds to the equivalent of the content of two bottles of 3.5 mL CONDYLINE.

Symptoms include nausea, vomiting, abdominal pain and diarrhoea; thrombocytopenia, leucopenia, hepatotoxicity or renal failure may occur. Additional severe symptoms, including central nervous system (CNS) related adverse events are delayed in onset and prolonged in duration and include acute psychotic reactions, hallucinations, confusion, dizziness, stupor, ataxia, hypotonia, and seizures. A later symptom may be coma with the risk of respiratory failure, ileus, vascular crisis and death. Systemic toxicity may lead to prolonged peripheral and autonomic neuropathies and may result in paraesthesias, reduced reflexes, muscle weakness, tachycardia, apnoea, orthostatic hypotension, paralytic ileus and urinary retention. If the eyes are involved, rinse thoroughly with water or if available with an appropriate eye-cleaning solution.

Treatment of overdose is principally symptomatic and supportive therapy. Hemoperfusion through coal filter and symptomatic treatment may prevent a fatal outcome. If accidentally ingested, give stomach washout and monitor electrolyte balance, blood gases, liver function and blood picture. Possible toxic effects of the bone marrow (e.g. leukocytosis, pancytosis) are generally transitory.

DOSAGE AND ADMINISTRATION

Apply twice daily, morning and evening (every 12 hours) for three consecutive days followed by four days without treatment. The use of CONDYLINE (Podofilox Topical Solution 0.5%) twice a day for three days constitutes a treatment cycle. Treatment cycles should be repeated up to four times until there is no visible wart tissue. Only a small area or number of warts should be treated at any one time.

If there is incomplete response after four treatment cycles, alternative treatment should be considered.

CONDYLINE is applied to the warts with a cotton tipped applicator supplied with the drug. The wetted applicator should be touched to the wart to be treated, applying the minimum amount of solution necessary to cover the lesion. **Treatment should be limited to less than 4 cm² of wart tissue and to no more than 500 µg (0.5 mL) of the solution per day.** Lesions in the female and lesions greater than 4 cm² in male should be treated under direct medical supervision. To ensure that only the genital warts are treated and properly applied, the physician performs the first application for the patient as an office procedure. The patient is shown how to minimize contact with the surrounding healthy tissue and the use of a hand mirror which may help, when he/she applies the solution at home. There is no evidence to suggest that more frequent application will increase efficacy, but this would be expected to increase the rate of local adverse reactions and systemic absorption.

Before applying the medication, the area to be treated should be gently washed with soap and water and gently patted dry. If an area in the occluded prepuce (under the foreskin) is being treated, care should be taken to allow the solution to dry before letting the foreskin return to its normal position. Avoid contact with clothing until the solution has dried. After each treatment, the used applicator should be properly and safely disposed of in a garbage can, out of reach of children, and the patient should wash his/her hands. It is recommended that the **area not be**

was hed following application of CONDYLINE as is the practice with traditional podophyllum resin preparations.

PHARMACEUTICAL INFORMATION

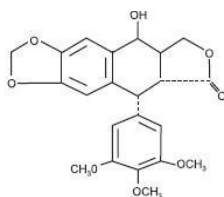
Proper name of the drug substance: Podofilox

Chemical name: (5R, 5aR, 8aR, 9R) – 5, 8, 8a, 9 – Tetrahydro – 9 – hydroxy – 5 – (3, 4, 5 – trimethoxyphenyl) – furo [3', 4':6, 7] naphthol - [2, 3-d] – 1, 3 – dioxol – 6 (5aH) – one

Molecular formula: C₂₂H₂₂O₈

Molecular weight: 414.40

Molecular structure:



Description: A white or almost white crystalline powder with no characteristic odour, freely soluble in acetone and 96% alcohol; soluble in chloroform, toluene, methylene chloride and ethyl acetate; and very slightly soluble in water and hexane.

Composition: CONDYLINE (Podofilox Topical Solution 0.5%) is a hydro-alcoholic solution containing 5 mg/mL podofilox; a sodium lactate buffer stabilizes a 1:10 aqueous solution between 2.5 and 4.

Stability and storage recommendations:

Store at 15-25°C, away from light and heat, in a tightly-closed container.

DOSAGE FORM

CONDYLINE is available in an amber glass bottle with plastic child-resistant cap containing 3.5 mL of 0.5% podofilox. Package includes a sealed bag containing thirty cotton-tipped applicators.

PATIENT INFORMATION LEAFLET

Pr CONDYLINE®
Podofilox Topical Solution 0.5%

NOTICE: Treat only the warts indicated by the healthcare professional.

CONTENTS

CONDYLINE is a hydro-alcoholic solution containing 5 mg/mL podofilox, with a sodium lactate buffer that stabilizes the 1:10 aqueous solution with a pH between 2.5 and 4.

INDICATIONS

For the removal of external genital warts located on the penis and vulva.

PRECAUTIONS

CONDYLINE may not be able to prevent the reappearance of previously healed warts or the development of new warts at a location that was not previously treated.

CONDYLINE is for external use only.

If CONDYLINE is accidentally spilled on healthy skin, wipe off at once and wash vigorously with warm soapy water and rinse well.

If spilled on mucous membranes or the eyes, flush repeatedly with a large amount of water for fifteen minutes. See a healthcare professional **immediately**.

Keep this medication safely out of the reach and sight of children.

DO NOT use if pregnant or breast feeding.

DO NOT use if you are a woman who is able to get pregnant and you are not on birth control.

DO NOT use on children under 12 years.

DO NOT consume alcoholic beverages for several hours after treatment.

DO NOT permit CONDYLINE to contact healthy skin, eyes, face, tongue or any mucosal tissue of the genital area including vagina, cervix, anus or perianus.

DO NOT use if growth or surrounding tissue is inflamed, irritated or bleeding.

DO NOT use on open wounds.

If you are a diabetic or have poor blood circulation, talk your healthcare professional before using this product.

DO NOT use on moles, birthmarks or unusual warts with hair growing from them.

DO NOT use on tissue which was recently exposed to laser surgery or cryosurgery.

DO NOT self-treat genital warts with surface areas greater than 4 square centimeters (approximately the size of a dollar coin). Lesions in the female and lesions greater than 4 cm² in male should be treated under direct medical supervision

DO NOT apply the solution to any other warts. Only apply the solution to the genital warts instructed. Always wash hands after using the solution.

DO NOT use if hypersensitive (allergic) to podofilox or any ingredients in this product.

DO NOT use with other podofilox containing products.

WARNINGS

Condyline should be used only as directed by a healthcare professional. Keep out of the reach and sight of children. Cap the bottle tightly and immediately after use. Extreme care should be taken to avoid all contact with the eyes, face, and healthy skin due to the risk of severe skin irritation.

SIDE EFFECTS

Local discomfort is inevitable with the topical treatment of genital warts. Topical reactions are common and usually experienced on the second and third day of treatment in association with the beginning of necrosis of the warts. These reactions tend to be mild and well tolerated. However, a mild analgesic such as acetylsalicylic acid with codeine or acetaminophen with codeine may be taken for pain management in some cases. Burning, inflammation, redness with some pain, tenderness and/or superficial ulceration of the skin in the treated area are to be expected.

DOSAGE AND ADMINISTRATION

The first application of CONDYLINE is to be administered by a healthcare professional. You will then apply the solution yourself, at home, and only on those warts pointed out by your doctor. Before applying the medication, gently wash the area to be treated with soap and water and gently pat dry. A skin protectant, such as petrolatum jelly, should be applied to the normal skin adjacent to the wart. Using one of the cotton-tipped applicators supplied, carefully apply only as much CONDYLINE as is necessary to cover the warts while taking care to minimize contact with the surrounding healthy skin. **If you have multiple warts, you may need more solution to cover all the warts. In that case, you must take a fresh applicator. Never reuse an applicator or dip a used applicator into the bottle.** The use of a hand mirror may be helpful for proper application. If an area under the foreskin is being treated, care should be taken to allow the solution to dry before letting the foreskin return to its normal position. Avoid contact with clothing until the solution has dried. Apply in the morning and evening for three consecutive days. **After each treatment, the used applicator should be properly and safely disposed of in a garbage can, out of the reach and sight of children, and the hands should be properly washed.**

Do not use more than 2 times a day and not more than 3 days in a row.

This treatment procedure may be repeated at one week intervals with a four day time lapse between treatments, until a cure is obtained.

This should not exceed a four week treatment schedule. If excessive burning or irritation occurs, discontinue treatment and tell your healthcare professional.

Genital warts may be contagious and the patient should abstain from sexual intercourse. If this is not possible, a latex condom must be used by the male patient until the sexual partner receiving the treatment for genital warts is declared cured by a healthcare professional. When using a condom, avoid the simultaneous use of petrolatum or other lubricants because it may increase the risk of rupture of the condom during sexual intercourse.

SUPPLIED

CONDYLINE is available in an amber glass bottle with plastic child-resistant cap containing 3.5 mL of 0.5% podofilox. Package includes a sealed bag containing thirty cotton-tipped applicators. Store at 15-25°C, away from light and heat, in a tightly-closed container.

Product Monograph available to healthcare professionals on request.

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CYTOLOGY

In-vitro, podofilox at 0.01 to 5.0 $\mu\text{g}/\text{mL}$ causes reversible and concentration dependent cytostatic and mitotic arresting effects on human leukaemic lymphoblasts (2). At concentrations of 1 to 10 $\mu\text{g}/\text{mL}$, podofilox has been shown to be toxic to leukaemic cells but not to normal lymphocytes (3).

VIROLOGY

Human papillomaviruses (HPV) cause either clinical or subclinical disease, or both. Clinical disease includes Condylomata acuminata of the vulva and vagina, as well as of the cervix, anus and penis. Warts with verrucous surface develop in genital skin that is susceptible to trauma such as the introitus, prepuce and anus. These findings are consistent with the concept that the causative virus, HPV, infects first the lower most basal cells of the squamous epithelium. Indeed, fissures in the genital skin enhance viral entry.

Molecular biology has assisted in the identification and characterisation of 66 different types of HPV's, 23 of which infect the lower genital tract. HPV types 6 and 11 are found in benign Condylomata acuminata, whereas HPV-16, 18, 31, 33, 35, 39 and the 50's and 60's groups are found in genital squamous cell carcinoma, and particularly in their precursor lesions. Among HPV's, the most frequent type in the genital skin is HPV type 16 (1, 14).

Experimentally, when HPV-infected squamous epithelial cells are grafted into immunologically incompetent nude mice, Condylomata develop. HPV DNA was found in fomites such as underwear, various surgical instruments, and the plume of laser smoke.

CLINICAL PHARMACOLOGY

The **systemic absorption** of topical 0.5% podofilox in alcohol has been evaluated in 52 patients (4). Absorption was related to the volume applied to the wart being treated. When 0.05 mL of 0.5% podofilox was applied to wart tissue, the drug was not detected in serum. When volumes of 0.1 to 1.5 mL were applied, peak levels of 1 to 17 ng/mL in serum were detectable at one to two hours after application. The **half-life** ranged from 1.0 to 4.5 hours. The drug did not accumulate after multiple treatments.

Volumes of less than or equal to 100 μL per application are adequate to treat most cases of genital warts and volumes of less than or equal to 250 μL twice daily for three days is safe. If 100% of the maximum recommended daily dose (0.5 mL) were absorbed, this would correspond to a dose of approximately 0.04 mg/kg in a 70 kg adult.

PHARMACODYNAMICS

The following table demonstrates the total exposure to podofilox within the range of recommended dosing:

0.5 % Drug

<u>Volume (μL)</u>	<u>mg/dose</u>	<u>mg/kg/dose</u>	<u>mg/kg/24 doses*</u>
50	0.25	0.005	0.12
100	0.50	0.010	0.24
200	1.00	0.020	0.48

* Four 3-day treatment cycles of twice daily application and assuming a 50 kg adult.

TOXICOLOGY

Animal Toxicology and/or Pharmacology

Podofilox toxicity in animals is related to its cytotoxic activity. Acute toxicity of Podofilox has been assessed in multiple species (mice, rats, and rabbits) and with multiple routes of administration resulting in a wide range of lethal dose (LD₅₀) values and described toxicities.

The repeat dose toxicity of Podofilox has been assessed in multiple species and with multiple routes of administration. GLP toxicity studies included those in rats and dogs. In a 90-day dermal toxicity study in rats the higher doses (equivalent to 2 and 10 mg/kg/day) resulted in necrosis, ulceration and/or hyperplasia at the site of administration and in adjacent skin, as well as corneal lesions, renal pathology, and death at 10 mg/kg due to application site toxicity. The NOAEL was the low dose equivalent to 0.25 mg/kg/day.

In 26-week dietary toxicity studies in rats and dogs (using doses of 0,0.03, 0.15 and 0.3 mg/kg/day), other than a slight reduction in body weight in the dog study there were no significant Podofilox related effects. The NAEDLs was considered to be 0.3 mg/kg^(17, 18).

Carcinogenesis

An in vitro cell transformation assay was negative. Long-term topical treatment with Podofilox in mice did not cause skin tumors, but epithelial hyperplasia of the skin was observed. Dietary carcinogenicity studies in mice and rats for 80 weeks or 104 weeks respectively, were negative for oncogenic effects induced by Podofilox at doses up to 0.3 mg/kg/day (0.6 times and 1.7 times the recommended maximum human dose, respectively).^(17, 18, 19)

Reports of lifetime carcinogenicity studies in mice are not available. Published animal studies, in general, have shown the drug substance, podofilox to be not carcinogenic^(5, 6, 7, 8, 9). There are published reports that, in mouse studies, crude podophyllin resin (containing podofilox) applied topically to the cervix produced changes resembling carcinoma *in situ*⁽¹⁰⁾. These changes were reversible at five weeks after cessation of treatment. In one reported experiment, epidermal carcinoma of the vagina and cervix was found in 1 out of 18 mice after 120 applications of podophyllin⁽¹¹⁾ (the drug was applied twice weekly over a 15-month period).

Mutagenesis

Results from genotoxicity studies suggest Podofilox has aneugenic activity consistent with its pharmacological action as a microtubule inhibitor. Although studies to assess the genotoxic potential of Podofilox were conducted, a definitive assessment of the potential for mutagenicity could not be concluded.

Podofilox was not mutagenic in the Ames plate incorporation assay when tested at concentration up to 5 mg/plate, with and without metabolic activation. No cell transformation was observed in BALB/3T3 cells after exposure to podofilox at concentrations up to 0.008 microgram/mL without metabolic activation and 12 microgram/mL podofilox with metabolic activation. Results from the mouse micronucleus *in vivo* assay using podofilox 0.5% solution in concentrations up to 25 mg/kg, indicate that podofilox should be considered a potential clastogen.

Reproduction and fertility

Reproductive toxicity and fertility studies after oral administration were conducted in rats. The study was conducted to determine the effect of podophyllotoxin and fertility and reproductive capacity by daily oral administration of 0.4, 1.0 or 2.5 mg/kg before and during mating and during gestation, partus, and lactation. The highest oral dose (2.5 mg/kg) influenced the body weight gain of the maternal rats, leading to effects on the survival and development of the offspring in this group by no effects on male or female fertility or foetal development were noted.

Daily topical application of CONDYLINE (Podofilox Topical Solution 0.5%) at doses up to the equivalent of 0.2 mg/kg (5 times the recommended maximum human dose) to rats throughout gametogenesis, mating, gestation, parturition and lactation for two generations demonstrated no impairment of fertility.

Teratology

As a cytotoxic agent, Podofilox has teratogenic potential. Reproductive toxicity and fertility studies after local application, or oral or intraperitoneal administration, were conducted in rats and rabbits. Podophyllotoxin was not teratogenic and there was no impact on fertility, pregnancy, lactation, or post-natal development.

No evidence of teratogenicity or embryotoxicity was observed in a reproduction study in rabbits that were administered podophyllotoxin at dermal doses of up to 0.21 mg/kg podophyllotoxin during the 6th to 18th day of gestation. In a teratology study in rats, doses of 0.5 to 5 mg/kg were given as intraperitoneal injections. Fetotoxicity was reported in one rat study with intraperitoneal administration. No effects of foetal development were observed in a rat study using oral doses of 0.4, 1.0 and 2.5 mg/kg podophyllotoxin.

Tritiated Podofilox was administered orally or intravenously to pregnant mice and quickly crossed the placenta into the fetus. Radioactivity quickly cleared from the fetuses and at 24 hours after dosing was only present in intestinal contents.

Teratogenicity and embryotoxicity have not been studied with intravaginal application. Many antimetabolic drug products are known to be embryotoxic. There are no adequate and well controlled studies in pregnant women.

REFERENCES AND SELECTED BIBLIOGRAPHY

1. Krogh, G. von : Condylomata acuminata 1983: an updated review. *Seminars in Dermatology* 1983; 2:109-129
2. Krishan, A., Paika, K. and Frei, E. : Cytofluorometric studies on the action of podophyllotoxin and epipodophyllotoxins (VM-26, VP-16-213) on the cell cycle traverse of human lymphoblasts. *J.Cell Biology* 1975; 66: 521-530
3. Schrek, R. and Stefani, S.S. : Toxicity of microtubular drugs to leukaemic lymphocytes. *Experimental and Molecular Pathology* 1974; 38:369-378.
4. Krogh, G. von : Podofiloxtoxin in serum: absorption subsequent to three-day repeated applications of a 0.5% ethanolic preparation in condylomata acuminata. *Sexually Transmitted Diseases* 1982;9:26-33
5. Beremblum, I. : The Effect of Podofiloxtoxin on the Skin of the Mouse with Reference to Carcinogenic, Co-carcinogenic and Anticarcinogenic Action. *J. Natl. Cancer Inst.* 1951;11:839-841.
6. Kaminetzky, H.A. and Swerdlow, M. : Podofiloxtoxin and the Mouse Cervix: Assessment of Carcinogenic Potential. *Amer. J. Obst. Gynec.* 1965;93:486-490.
7. McGrew, E.A. and Kaminetzky, H.A. : The Genesis of Experimental Cervical Epithelial Dysplasia. *Amer. J. Clin. Path.* 1961;35:538-545.
8. Roe, F.J.C. and Salaman, M.H. : Further studies on Incomplete Carcinogenesis: Triethylene Melemine (T.E.M.), 1,2-Benzanthracene and Beta-Propiolactone, as Initiators of Skin Tumour Formation in the Mouse. *Brit. J. Cancer.* 1955;9:177-203.
9. Taper, H.S. : Induction of the Deficient Acid DNase Activity in Mouse Interfollicular Epidermis by Croton Oil as a Possible Tumour Promoting Mechanism. *Z. Kerbsforsch.* 1977;90:197-210.
10. Kaminetzky, H.A., McGrew, E.A. and Phillips, R.L. : Experimental Cervical Epithelia Dysplasia. *Am. J. Obst. Gyn.* 1959;14:1-3.
11. Kaminetzky, H.A. and McGrew, E.A.: Podofiloxtoxin and Mouse Cervix. *Arch. Path.* 1963;73:481-485.
12. Didcock, K., Jackson, D. and Robson, J.M. : The Action of Some Nucleotoxic Substances on Pregnancy. *Brit. J. Pharmacol.* 1956;11:437-441.
13. Thiersch, J. B. : Effect of Podophyllin (P) and Podofiloxtoxin on the Rat Liver in Utero. *Proc. Soc. Exp. Biol. Med.* 1963; 113: 124-127.
14. Ferenczy, A. : Management strategies for genital HPV infection in men. *Contemporary Urology (Canada)* 1990;1,2:649-658.
15. Savel, H. : "Clinical Experiences with Intravenous Podofiloxtoxin" *Proc. Amer. Assoc. Cancer Res.* 1964; 5.
16. American Clinical Trials: Friedman-Kein; Beutner; Conant. Documents available on file at Canderm Pharmacal Ltd.
17. Buchan P., Van Eeken C.J., Ten Winkel E. *Condylina Expert Report* 1987.
18. Longstaff E., Van Krogh G. *Condyloma Eradication: Self-Therapy with 0.15–0.5% Podofilox versus 20–25% Podophyllin Preparations—An Integrated Safety Assessment*1. *Regulatory Toxicology and Pharmacology* 2001;33:117-13
19. Nycomed Pharma-Medica, Addendum to Expert Report on Toxicological and Pharmacological Documentation 1990

20. von Krogh G, Lacey CJ, Gross G, Barrasso R, Schneider A. European course on HPV associated pathology: guidelines for primary care physicians for the diagnosis and management of anogenital warts. *Sex Transm Infect* 2000;76(3):162-8
21. Petersen CS, Agner T, Ottevanger V, Larsen J, Ravenborg L. A single-blind study of podophyllotoxin cream 0.5% and podophyllotoxin solution 0.5% in male patients with genital warts. *Genitourin Med* 1995;71(6):391-2.
22. Lacey CJ, Woodhall SC, Wikstrom A, Ross J. 2012 European guideline for the management of anogenital warts. *J Eur Acad Dermatol Venereol* 2013;27(3):e263-70.
23. Strand A, Brinkeborn RM, Suboulet A. Topical Treatment of genital warts in men, an open study of podophyllotoxin cream compared with solution. *Genitourin Med* 1995;387-90.
24. Yanofsky VR, Patel RB, Goldenberg G. Genital warts: a comprehensive review. *J Clin Aesthet Dermatol* 2012;5(6):25-36.
25. guideline EC. Excipients in the labelling and package leaflet of medicinal products for human use (SANTE-2017-11668).
26. Beutner K, Friedman-Kien A, Artman N, Conant M, Illeman M, Thisted R, et al. PATIENT-APPLIED PODOFILOX FOR TREATMENT OF GENITAL WARTS. *The Lancet* 1989; 333(8642):831-4.