

Dexchlorpheniramine Maleate (BANM, rINN^M)

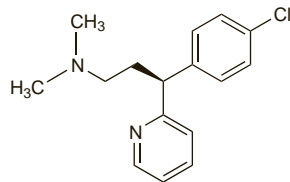
Deksklorfeniramin maleatas; Dekskloorfeniramiinmaleaatti; Dexchlorfeniramin-maleinát; Dexchlorphenamine Maleate; Dexchlorpheniramine, Maléate de; Dexchlorpheniramiini maleas; Deksklorfeniraminmaleat; Deksklorfeniramin-maleát; Maleato de dexchlorfeniramina.

Дексхлорфенирамина Малейат

CAS — 25523-97-1 (dexchlorpheniramine); 2438-32-6 (dexchlorpheniramine maleate).

ATC — R06AB02.

ATC Vet — QR06AB02.



(dexchlorpheniramine)

Pharmacopoeias. In *Eur.* (see p.vii), *Jpn.* and *US.*

Ph. Eur. 6.2 (Dexchlorpheniramine Maleate). A white or almost white, crystalline powder. Very soluble in water; freely soluble in alcohol, in dichloromethane, and in methyl alcohol. A 1% solution in water has a pH of 4.5 to 5.5. Protect from light.

USP 31 (Dexchlorpheniramine Maleate). A white, odourless, crystalline powder. Soluble 1 in 1.1 of water, 1 in 2 of alcohol, 1 in 1.7 of chloroform, and 1 in 2500 of ether; slightly soluble in benzene. pH of a 1% solution in water is between 4.0 and 5.0. Store in airtight containers. Protect from light.

Adverse Effects and Precautions

As for the sedating antihistamines in general, p.561. Exfoliative dermatitis may develop. Injections may be irritant and cause transient hypotension or stimulation of the CNS.

Effects on the blood. There are several old and isolated reports of blood dyscrasias after use of chlorphenamine maleate; these include agranulocytosis,^{1,2} thrombocytopenia,³ pancytopenia,⁴ and aplastic anaemia.⁵ Haemolytic anaemia has occurred after use of dexchlorpheniramine maleate.⁶ The association with antihistamine use has been questioned in some of these cases.⁷

- Shenfield G, Spry CJF. Unusual cause of agranulocytosis. *BMJ* 1968; **ii**: 52–3.
- Hardin AS. Chlorpheniramine and agranulocytosis. *Ann Intern Med* 1988; **108**: 770.
- Eisner EV, et al. Chlorpheniramine-dependent thrombocytopenia. *JAMA* 1975; **231**: 735–6.
- Deringer PM, Maniatis A. Chlorpheniramine-induced bone-marrow suppression. *Lancet* 1976; **i**: 432.
- Kanoh T, et al. Aplastic anaemia after prolonged treatment with chlorpheniramine. *Lancet* 1977; **i**: 546–7.
- Duran-Suarez JR, et al. The I antigen as an immune complex receptor in a case of haemolytic anaemia induced by an antihistaminic agent. *Br J Haematol* 1981; **49**: 153–4.
- Spry CJF. Chlorpheniramine-induced bone-marrow suppression. *Lancet* 1976; **i**: 545.

Effects on the senses. Chlorphenamine has been reported to affect the senses of smell and taste.¹

- Schiffman SS. Taste and smell in disease. *N Engl J Med* 1983; **308**: 1275–9.

Extrapyramidal disorders. Facial dyskinesias have been reported^{1,2} after oral doses of chlorphenamine maleate.

- Thach BT, et al. Oral facial dyskinesia associated with prolonged use of antihistaminic decongestants. *N Engl J Med* 1975; **293**: 486–7.
- Davis WA. Dyskinesia associated with chronic antihistamine use. *N Engl J Med* 1976; **294**: 113.

Interactions

As for the sedating antihistamines in general, p.563.

Antiepileptics. For a report of the effect of chlorphenamine on phenytoin, see p.499.

Pharmacokinetics

Chlorphenamine maleate is absorbed relatively slowly from the gastrointestinal tract, peak plasma concentrations occurring about 2.5 to 6 hours after oral doses. Bioavailability is low, values of 25 to 50% having been reported. Chlorphenamine appears to undergo considerable first-pass metabolism. About 70% of chlorphenamine in the circulation is bound to plasma proteins. There is wide interindividual variation in the pharmacokinetics of chlorphenamine; values ranging from 2 to 43 hours have been reported for the half-life. Chlorphenamine is widely distributed in the body, and enters the CNS.

Chlorphenamine maleate is extensively metabolised. Metabolites include desmethyl- and didesmethylchlorphenamine. Unchanged drug and metabolites are excreted primarily in the urine; excretion is dependent on urinary pH and flow rate. Only trace amounts have been found in the faeces.

A duration of action of 4 to 6 hours has been reported; this is shorter than may be predicted from pharmacokinetic parameters.

More rapid and extensive absorption, faster clearance, and a shorter half-life have been reported in children.

References

- Rumore MM. Clinical pharmacokinetics of chlorphenamine. *Drug Intell Clin Pharm* 1984; **18**: 701–7.
- Paton DM, Webster DR. Clinical pharmacokinetics of H₁-receptor antagonists (the antihistamines). *Clin Pharmacokinet* 1985; **10**: 477–97.
- Yasuda SU, et al. The roles of CYP2D6 and stereoselectivity in the clinical pharmacokinetics of chlorphenamine. *Br J Clin Pharmacol* 2002; **53**: 519–25.

Uses and Administration

Chlorphenamine maleate, an alkylamine derivative, is a sedating antihistamine that causes a moderate degree of sedation; it also has antimuscarinic activity.

Chlorphenamine is a racemic mixture; the dextrorotatory isomer, dexchlorpheniramine, has about twice the activity of chlorphenamine by weight.

Chlorphenamine maleate and dexchlorpheniramine maleate are used for the symptomatic relief of allergic conditions including urticaria and angioedema (p.565), rhinitis (p.565), and conjunctivitis (p.564), and in pruritic skin disorders (p.565). They are common ingredients of compound preparations for symptomatic treatment of coughs and the common cold (p.564). However, such preparations should be used with caution in children, and generally avoided in those under 2 years of age (see p.562). Chlorphenamine may be given intravenously as an adjunct in the emergency treatment of anaphylactic shock (p.563).

Chlorphenamine maleate is given in oral doses of 4 mg every 4 to 6 hours up to a maximum of 24 mg daily. Doses for children, according to age, are: 1 to 2 years, 1 mg twice daily; 2 to 5 years, 1 mg every 4 to 6 hours (maximum 6 mg daily); 6 to 12 years, 2 mg every 4 to 6 hours (maximum 12 mg daily). Although not licensed in the UK, the *BNFC* suggests that children aged 1 month and over may be given 1 mg twice daily.

Chlorphenamine maleate may be given by intramuscular, by subcutaneous, or by slow intravenous injection over a period of 1 minute. The usual dose is 10 to 20 mg and the total dose given by these routes in 24 hours should not normally exceed 40 mg. For children, doses of 87.5 micrograms/kg subcutaneously four times daily have been suggested. The following parenteral doses may also be used in children: the usual dose in those aged 1 month to 1 year is 250 micrograms/kg; those aged 1 to 5 years may be given a dose of 2.5 to 5 mg and those aged 6 to 12 years, 5 to 10 mg. Alternatively, children and adolescents aged 1 to 18 years may be given a dose of 200 micrograms/kg. The *BNFC* suggests that doses for children may be repeated if necessary up to 4 times in 24 hours.

Dexchlorpheniramine maleate is given in oral doses of 2 mg every 4 to 6 hours up to a maximum of 12 mg daily. Children aged 2 to 5 years may be given 0.5 mg every 4 to 6 hours (maximum 3 mg daily), and those aged 6 to 12 years, 1 mg every 4 to 6 hours (maximum 6 mg daily).

Modified-release oral preparations of chlorphenamine maleate or dexchlorpheniramine maleate are available in some countries; dosage is specific to a particular formulation.

Dexchlorpheniramine maleate has been applied topically in some countries, although as with other antihistamines there is a risk of sensitisation. Chlorphenamine

polistirex (a sulfonated diethenylbenzene-ethenylbenzene copolymer complex), chlorphenamine tannate, and dexchlorpheniramine tannate are given orally and are used similarly to the maleate.

Malaria. Chlorphenamine may be tried in patients with malaria who have chloroquine-induced pruritus (see Effects on the Skin, p.600), but additionally it has been shown to have some promise as an adjunct in the treatment of chloroquine-resistant malaria itself. Early studies indicated that chlorphenamine was only one of a number of drugs that reversed chloroquine resistance *in vitro* in isolates of *Plasmodium falciparum*. Later clinical studies in children in Nigeria showed enhanced efficacy when chlorphenamine was given with chloroquine.^{1–5} The overall management of malaria is discussed on p.594.

- Sowunmi A, et al. Enhanced efficacy of chloroquine-chlorphenamine combination in acute uncomplicated falciparum malaria in children. *Trans R Soc Trop Med Hyg* 1997; **91**: 63–7.
- Sowunmi A, Oduola AMJ. Comparative efficacy of chloroquine/chlorphenamine combination and mefloquine for the treatment of chloroquine-resistant *Plasmodium falciparum* malaria in Nigerian children. *Trans R Soc Trop Med Hyg* 1997; **91**: 689–93.
- Sowunmi A, et al. Comparative efficacy of chloroquine plus chlorphenamine and pyrimethamine/sulfadoxine in acute uncomplicated falciparum malaria in Nigerian children. *Trans R Soc Trop Med Hyg* 1998; **92**: 77–81.
- Sowunmi A, et al. Comparative efficacy of chloroquine plus chlorphenamine and halofantrine in acute uncomplicated falciparum malaria in Nigerian children. *Trans R Soc Trop Med Hyg* 1998; **92**: 441–5.
- Okonkwo CA, et al. Effect of chlorphenamine on the pharmacokinetics of and response to chloroquine of Nigerian children with falciparum malaria. *Trans R Soc Trop Med Hyg* 1999; **93**: 306–11.

Preparations

BP 2008: Chlorphenamine Injection; Chlorphenamine Oral Solution; Chlorphenamine Tablets;

USP 31: Acetaminophen, Chlorpheniramine Maleate, and Dextromethorphan Hydrobromide Tablets; Chlorpheniramine Maleate and Phenylpropanolamine Hydrochloride Extended-release Capsules; Chlorpheniramine Maleate and Phenylpropanolamine Hydrochloride Extended-release Tablets; Chlorpheniramine Maleate and Pseudoephedrine Hydrochloride Extended-release Capsules; Chlorpheniramine Maleate and Pseudoephedrine Hydrochloride Oral Solution; Chlorpheniramine Maleate Extended-release Capsules; Chlorpheniramine Maleate Injection; Chlorpheniramine Maleate Syrup; Chlorpheniramine Maleate Tablets; Dexchlorpheniramine Maleate Syrup; Dexchlorpheniramine Maleate Tablets.

Proprietary Preparations (details are given in Part 3)

Arg.: Ateme; Alergidryl; Alergitrat; Isomerine; Qura Plus; **Austral.:** Polaramine; **Austria:** Polaramin; **Belg.:** Polaramine; **Braz.:** Alergonil; Alergovale; Alergo; Alermine; Deflux; Dexclor; Dextler; Dexmin; Expectamin F; Histamin; Hystin; Polamin; Polaramine; Polaren; Polaryn; **Canada:** Chlor-Tripolon; Novo-Phenir; **Chile:** Asafen Nueva Formula; Clorimeton; Nipelon; Prodel; Scadan; **Dennm.:** Asafen; **F.:** Polaramine; **Ger.:** Polaroni; **Gr.:** Istamex; Polaramine; **Hong Kong:** Allermin; Apomin; Chlorpyrimine; Dapriton; Kenyamine; Medifent; Pirimat; **India:** Polaramine; Rhiniramine; Sprinsof; Synchronamin; Uni-Ramine; **Iran:** Cofton; **Indon.:** Chlorphenon; Cohistan; CTM; Orphen; Pehachlor; Polamec; Polaramine; Polaris; Polofar; **Irl.:** Piriton; **Israel:** Ahiston; Anaphyl; **Ital.:** Polaramin; Trimeton; **Malaysia:** Chloramine; Chlormine; Chlorpyrimine; D-Antihist; Dex-Anthist; Dexchloramine; Polamine; Polaramine; Somin; **Mex.:** Alerdil; Antadex-H; Blendox; Cloro-Trimeton; Cronal; Docsi; Hiberbal; Histadryl; Polaramine; **Neth.:** Polaramine; **Norw.:** Phenamin; Polaramin; **NZ:** Histafen; Polaramine; **Philipp.:** Antamin; Barominic; Chlor-Trimeton; Valerine; Virginome; **Port.:** Trenelone; **S.Afr.:** Allergex; Chlor-Trimeton; Chlorhist; Polaramine; Rhineton; **Singapore:** Allerphen; Chloramine; Chlorpyrimine; Dexchloramine; Dextramine; Piriton; Polaramine; Rhiniramine; Somin; **Spain:** Antihistaminico; Polaramine; **Swed.:** Polaramin; **Switz.:** Polaramine; **Thai.:** Allergin; Chlorleate; Chlorpheno; Chlorpyrimine; Cohistan; Histab; Histatapp; Icolid Plus; Kloramin; Nasamine; Piriton; **UAE:** Chlorhistol; UK: Allercalm; Allergy Relief; Allerief; Calimal; Hayleve; Piriton; Pollenase Antihistamine; **USA:** Aller-Chlor; Allergy; Allergy Relief; Chlo-Amine; Chlor-Pro; Chlor-Trimeton; Chlor-Tan; Ed-Chlor-Tan; Efidac 24 Chlorpheniramine; PediaCare Allergy Formula; Pediatan; Pediox-S; QDALL AR; TanaHist PD; Teldrin; **Venez.:** Clorotrimeton; Inquiramin; Liramin.

Multi-ingredient: numerous preparations are listed in Part 3.

Chlorphenoxamine Hydrochloride (BANM, rINN^M)

Chlorphénoxamine, Chlorhydrate de; Chlorphenoxamini Hydrochloridum; Hidrocloruro de clorfenoxamina; Klorfenoksamin Hidroklorür; 2-(4-Chloro- α -methylbenzhydryloxy)-*NN*-dimethylethylamine hydrochloride.

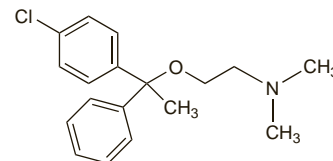
Хлорфеноксамин Гидрохлорид

C₁₈H₂₂ClNO₂·HCl = 340.3.

CAS — 77-38-3 (chlorphenoxamine); 562-09-4 (chlorphenoxamine hydrochloride).

ATC — D04AA34; R06AA06.

ATC Vet — QD04AA34; QR06AA06.



(chlorphenoxamine)

Profile

Chlorphenoxamine, a congener of diphenhydramine (p.577), has antimuscarinic and antihistaminic properties. It has been used in nausea, vomiting, and vertigo, and was formerly used in the symptomatic treatment of parkinsonism. Chlorphenoxamine has also been used in hypersensitivity reactions.

Preparations

Proprietary Preparations (details are given in Part 3)

Ger.: Systral; **Hong Kong:** Systral†; **Indon.:** Systral; **Philipp.:** Systral; **Port.:** Systral; **Thai.:** Systral; **Turk.:** Sistrall; Systral.

Multi-ingredient: **Austria:** Spirbon; **Ger.:** Systral C†; **S.Afr.:** Analgen-SA†.

Cinnarizine (BAN, USAN, rINN)

Cinarizin; Cinarizina; Cinarizinas; Cinnarin; Cinnarinum; Cynaryzina; 516-1MD; R-516; R-1575; Sinarizin; Sinaritsini. 1-Benzhydryl-4-cinnamylpiperazine; (E)-1-(Diphenylmethyl)-4-(3-phenylprop-2-enyl)piperazine.

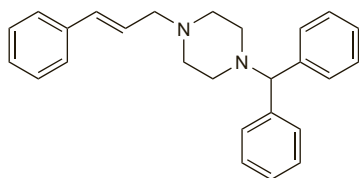
Циннаризин

$C_{26}H_{28}N_2 = 368.5$.

CAS — 298-57-7.

ATC — N07CA02.

ATC Vet — QN07CA02.



Pharmacopoeias. In *Chin.* and *Eur.* (see p.vii).

Ph. Eur. 6.2 (Cinnarizine). A white or almost white powder. Practically insoluble in water; slightly soluble in alcohol and in methyl alcohol; soluble in acetone; freely soluble in dichloromethane. Protect from light.

Adverse Effects and Precautions

As for the sedating antihistamines in general, p.561.

There have been rare reports of extrapyramidal symptoms after taking cinnarizine, sometimes associated with depressive feelings.

High doses of cinnarizine should be used with caution in patients with hypotension because of the possibility of decreasing blood pressure further.

Extrapyramidal disorders. For reference to extrapyramidal disorders associated with the use of cinnarizine, see Flunarizine, p.580.

Hypersensitivity. Immunologically-defined lichen planus pemphigoides has been reported¹ in a 72-year-old woman taking cinnarizine. Lesions began to clear when treatment was stopped but challenge with cinnarizine provoked severe itching and reactivation of pigmented lesions. Another case² has also been described.

1. Miyagawa S, *et al.* Lichen planus pemphigoides-like lesions induced by cinnarizine. *Br J Dermatol* 1985; **112**: 607–13.
2. Ramallal M, *et al.* Lichenoid eruption associated with cinnarizine use. *Pharm World Sci* 2002; **24**: 215–16.

Porphyria. Cinnarizine is considered to be unsafe in patients with porphyria because it has been shown to be porphyrinogenic in animals.

Tinnitus. The Spanish System of Pharmacovigilance had received reports¹ of tinnitus associated with calcium-channel blockers; some of the reports, including the one relating to cinnarizine, were in patients also receiving other ototoxic drugs. WHO was said to have additional reports of tinnitus associated with calcium-channel blockers including cinnarizine.

1. Narváez M, *et al.* Tinnitus with calcium-channel blockers. *Lancet* 1994; **343**: 1229–30.

Weight gain. There has been a report¹ of weight gain in 4 patients who had taken cinnarizine for 1 to 2 years; in all cases the weight gain was associated with increased appetite.

1. Navarro-Badenes J, *et al.* Weight-gain associated with cinnarizine. *Ann Pharmacother* 1992; **26**: 928–30.

Interactions

As for the sedating antihistamines in general, p.563.

Pharmacokinetics

Cinnarizine is absorbed from the gastrointestinal tract, peak plasma concentrations occurring 2 to 4 hours after oral doses. It undergoes metabolism and has a half-life

of 3 to 6 hours. Cinnarizine is excreted in the faeces mainly as unchanged drug, and in the urine predominantly as metabolites.

Uses and Administration

Cinnarizine is a piperazine derivative with antihistamine, sedative, and calcium-channel blocking activity. It is used for the symptomatic treatment of nausea and vertigo caused by Ménière's disease and other vestibular disorders (see Vertigo, p.565) and for the prevention and treatment of motion sickness (p.564). It is also used in the management of various peripheral and cerebral vascular disorders.

In the UK, the usual oral dose for vertigo and vestibular disorders is 30 mg three times daily. For motion sickness a dose of 30 mg is taken 2 hours before the start of the journey and 15 mg every 8 hours during the journey if necessary. Children aged 5 to 12 years are given half the adult dose for both indications. In other European countries, a dose of 75 mg once or twice daily has been given for vertigo and vestibular disorders. Doses of 75 mg have also been given 1 to 3 times daily for cerebrovascular disorders and 2 or 3 times daily for peripheral vascular disorders.

◇ References.

1. Shupak A, *et al.* Cinnarizine in the prophylaxis of seasickness: laboratory vestibular evaluation and sea study. *Clin Pharmacol Ther* 1994; **55**: 670–80.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg.: Dismaren; Fabracin; Focolad; Iroplex†; Natropas; Stugeron; **Austria:** Cinnabene; Pericaphal; Stutgeron; **Belg.:** Stugeron; **Braz.:** Antigeron; Cinaran; Cinarvert†; Cinarix†; Cinazin†; Cinazon; Civerim; Cronogeron; Fluxon; Laberit†; Labigeron; Nenizina†; Stugena†; Stugeron; Vertigeron; Verzum; Vessel†; **Chile:** Cingel; Sirdone; Stugeron; **Cz.:** Cinedit†; Cinnabene; Stugeron; **Denm.:** Sepan; **Gr.:** Derozin; Stugeron; **Hong Kong:** Celenid†; Medozine; Stugeron; **Hung.:** Stugeron; **India:** Avidazine; Cintigo; Diziron; Stugeron; Vertiron; **Indon.:** Merron; Naniz; Perifas; Stugeron; Vertizine; **Ir.:** Stugeron; **Israel:** Stunarone; **Ital.:** Cinazin; Stugeron; Toliman; **Malaysia:** Celenid†; Celeron†; Cinna; Cinnaron; Stugeron; Uphageron; **Mex.:** Bulasan; Cisaken; Dilateron-F; Dilper-INA; Kanlex; Oblant; Stugeron; Venoxil; Winpar; **Philipp.:** Dizzion; Niziran; Stugeron; Vertisin; **Port.:** Cinon; Stugeron; **Rus.:** Phezam (Фезам); Stugeron (Структурм); **S.Afr.:** Purazine; Stugeron; **Singapore:** Celenid; Cinna; Cinnar; Cinnaron; Stugeron†; Urzine†; **Spain:** Stugeron; **Switz.:** Cerepar; Cinnageron; Cinnamed†; Stugeron; **Thai.:** C-Pela†; Celenid; Cenai; Cerebroad; Ceremin; Cinerine; Cinna; Cinnar; Cinnaza; Cinnazine; CN-25†; Linazine; Manoron; Med-Circuron†; Medozine; Sianazine; Silicin; Sorebral; Stugeron; Stugin; Stuno; Urzine; Vernarin; **Turk.:** Sefal; **UK:** Arlevet; Cinaziere†; Stugeron; **Ven.:** Cinaren; Cinarin; Silver; Stugeron; Vericin.

Multi-ingredient: **Arg.:** Cadencial Plus; Cinacris; Difusil; Ribex; Vasodul†; **Austria:** Cinnarplus; **Belg.:** Touristil; **Braz.:** Coldrin; Exit; Fongrip†; Sureptil; **Cz.:** Arlevet; **Fin.:** Rinomar; **Ger.:** Arlevet; **Hong Kong:** C-Sik†; **Hung.:** Arlevet; **India:** Vertigil; **Neth.:** Primatour; **Rus.:** Omoron (Омрон); Piracezine (Пирацезин); **Spain:** Clinadil; Clinadil Compositum; Diclamina; **Swed.:** Rinomar.

Clemastine Fumarate

(BANM, USAN, rINNM)

Clémastine, fumarate de; Clemastini fumaras; Fumarato de clemastina; HS-592 (clemastine); Klemastiniifumaratti; Klemastin fumarat; Klemastin Hidrojen Fumarat; Klemastinfumarat; Klemastino fumaratas; Klemastiny fumaran; Klemastzin-fumarat; Meclastine Fumarate; Mecloprodine Fumarate. (+)-(2R)-2-[2-[(R)-4-Chloro- α -methylbenzhydryloxy]ethyl]-1-methylpyrrolidine hydrochloride fumarate.

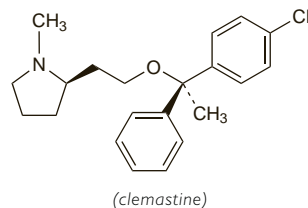
Клемастина Фумарат

$C_{21}H_{26}ClNO_4 \cdot C_4H_4O_4 = 460.0$.

CAS — 15686-51-8 (clemastine); 14976-57-9 (clemastine fumarate).

ATC — D04AA14; R06AA04.

ATC Vet — QD04AA14; QR06AA04.



(clemastine)

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Jpn.* and *US*.

Ph. Eur. 6.2 (Clemastine Fumarate). A white or almost white, crystalline powder. Very slightly soluble in water; sparingly soluble in alcohol (70%); slightly soluble in alcohol (50%) and in

methyl alcohol. A 10% suspension in water has a pH of 3.2 to 4.2.

USP 31 (Clemastine Fumarate). A colourless to faintly yellow, odourless, crystalline powder. Very slightly soluble in water; very slightly soluble in chloroform; slightly soluble in methyl alcohol. pH of a 10% suspension in water is between 3.2 to 4.2. Store in airtight containers at a temperature not exceeding 25°. Protect from light.

Adverse Effects and Precautions

As for the sedating antihistamines in general, p.561.

Breast feeding. The American Academy of Pediatrics¹ considers that clemastine should be given with caution to breast-feeding mothers, since it has been associated with adverse effects in the infant. Drowsiness, irritability, a high-pitched cry, neck stiffness, and refusal to feed in a 10-week-old breast-fed baby occurred 12 hours after her mother started treatment with clemastine.² Clemastine was detected in the mother's breast milk. The baby recovered and was feeding normally on the day after the drug was stopped.

1. American Academy of Pediatrics. The transfer of drugs and other chemicals into human milk. *Pediatrics* 2001; **108**: 776–89. Correction. *ibid.*; 1029. Also available at: <http://aappolicy.aappublications.org/cgi/content/full/pediatrics%3b108/3/776> (accessed 08/04/04)
2. Kok THHG, *et al.* Drowsiness due to clemastine transmitted in breast milk. *Lancet* 1982; **i**: 914–15.

Porphyria. Clemastine has been associated with acute attacks of porphyria and is considered unsafe in porphyric patients.

Interactions

As for the sedating antihistamines in general, p.563.

Pharmacokinetics

Clemastine fumarate is rapidly and almost completely absorbed from the gastrointestinal tract; peak plasma concentrations are achieved in 2 to 4 hours. Unchanged drug and metabolites are excreted principally in the urine. An elimination half-life of about 21 hours has been reported. Clemastine is distributed into breast milk.

◇ References.

1. Schran HF, *et al.* The pharmacokinetics and bioavailability of clemastine and phenylpropanolamine in single-component and combination formulations. *J Clin Pharmacol* 1996; **36**: 911–22.

Uses and Administration

Clemastine fumarate, a monoethanolamine derivative, is a sedating antihistamine with antimuscarinic and moderate sedative properties. It has been reported to have a duration of action of about 10 to 12 hours. It is used for the symptomatic relief of allergic conditions including urticaria and angioedema (p.565), rhinitis (p.565) and conjunctivitis (p.564), and in pruritic skin disorders (p.565).

Clemastine is given as the fumarate although doses are expressed in terms of the base. Clemastine fumarate 1.34 mg is equivalent to about 1 mg of clemastine base. The usual oral dose is 1 mg twice daily. Up to 6 mg daily has been given, particularly for urticaria and angioedema. Children aged 1 to 3 years may be given 250 to 500 micrograms twice daily; those aged 3 to 6 years, 500 micrograms twice daily; and those aged 6 to 12 years, 0.5 to 1 mg twice daily.

Clemastine fumarate may be given by intramuscular or slow intravenous injection in a total daily dose equivalent to 4 mg of clemastine for acute allergic reactions; for prophylaxis 2 mg is given by intravenous injection. The dose for children is 25 micrograms/kg daily in two divided doses by intramuscular injection.

Clemastine fumarate has also been used topically, although as with other antihistamines, there is a risk of sensitisation.

Preparations

BP 2008: Clemastine Oral Solution; Clemastine Tablets;

USP 31: Clemastine Fumarate Tablets.

Proprietary Preparations (details are given in Part 3)

Austria: Tavegil; **Braz.:** Agastin; **Canad.:** Tavist; **Cz.:** Tavegil†; **Denm.:** Tavegil†; **Ger.:** Tavegil; **India:** Clamist; **Indon.:** Tavegil†; **Ital.:** Tavegil†; **Mex.:** Tavist; **Neth.:** Tavegil; **Philipp.:** Marsthine; Tavegil†; **Port.:** Tavegil†; **Rus.:** Tavegil (Тавегил); **S.Afr.:** Tavegil†; **Spain:** Tavegil; **Swed.:** Tavegil†; **Switz.:** Tavegil†; **Turk.:** Tavegil†; **UK:** Tavegil; **USA:** Contac 12 Hour Allergy; Dayhist-1; Tavist Allergy.

Multi-ingredient: **Braz.:** Emistin; **Ger.:** Corto-Tavegil†; **Mex.:** Tavist-D†; **Spain:** Dexa Tavegil.

The symbol † denotes a preparation no longer actively marketed