age, at the same doses used in adults (see Uses and Administration, above).

Fenoterol hydrobromide is also given orally to children for the relief of bronchospasm in the following doses:

- children aged 1 to 3 years, 1.25 mg three times daily
- children aged 4 to 10 years, 2.5 mg three times daily
- children aged over 10 years, as for adults (see Uses and Administration, above)

Preparations

BP 2008: Fenoterol Pressurised Inhalation.

Proprietary Preparations (details are given in Part 3)
Arg.: Alveofen; Asmopul; Berotec; ***Austral.:*** Berotec†; ***Austria:*** Berotec; ***Belg.:*** Berotec; ***Braz.:*** Berotec; Bromifen; Bromotec; Febiotec†; Fenozan; ***Canad.:*** Berotec; ***Chile:*** Berotec†; Parsistene†; ***Cz.:*** Berotec; Partusisten†; ***Denm.:*** Berotec; ***Fin.:*** Berotec†; ***Ger.:*** Berotec; Partusisten; ***Hong Kong:*** Berotec†; ***Hung.:*** Berotec; ***Indon.:*** Berotec; ***Ital.:*** Dosberotec; ***Jpn:*** Berotec; ***Malaysia:*** Berotec; Feno; ***Mex.:*** Berotec†; Partusisten; ***Neth.:*** Berotec; Partusisten; ***Norw.:*** Berotec; ***Philipp.:*** Berotec; ***Pol.:*** Berotec; ***Port.:*** Berotec; ***Rus.:*** Berotec (Беротек); Partusisten (Партусистен); ***S.Afr.:*** Berotec; ***Singapore:*** Berotec; ***Spain:*** Berotec†; ***Swed.:*** Berotec†; ***Switz.:*** Berotec; ***Thai.:*** Berotec; ***Venez.:*** Berotec†; Segamol.

Multi-ingredient: ***Arg.:*** Berodual; Duotec†; Ipradual; ***Austria:*** Berodual; Berodualin; Ditec; ***Belg.:*** Duovent; ***Braz.:*** Duovent; Fymnal†; ***Canad.:*** Duovent; ***Chile:*** Berodual; ***Cz.:*** Berodual; Ditec†; ***Denm.:*** Berodual; ***Fin.:*** Atrovent Comp; ***Fr.:*** Bronchodual; ***Ger.:*** Berodual; Ditec†; ***Gr.:*** Berodual; ***Hong Kong:*** Berodual†; ***Hung.:*** Berodual; Duotec†; ***India:*** Fenovent; ***Indon.:*** Berodual; ***Irl.:*** Duovent; ***Ital.:*** Duovent; Iprafen; ***Malaysia:*** Berodual; Duovent; ***Mex.:*** Berodual; Berosolvon; ***Neth.:*** Berodual; ***Philipp.:*** Berodual; ***Pol.:*** Berodual; ***Port.:*** Berodual; ***Rus.:*** Berodual (Бородуал); Ditec (Дитек); ***S.Afr.:*** Atrovent Beta; Berodual; Duovent; Sabax Nebrafen; ***Singapore:*** Berodual; Duovent; ***Spain:*** Berodual†; ***Switz.:*** Berodual; ***Thai.:*** Berodual; Inhalex; Punol; ***UK:*** Duovent; ***Venez.:*** Berodual; Berosolvon†; Duovent; Respidual.

Fenspiride Hydrochloride *(USAN, rINNM)*

Decaspiride; Fenspiride, Chlorhydrate de; Fenspiridi Hydrochloridum; Hidrocloruro de fenspirida; JP-428; NAT-333; NDR-5998A. 8-Phenethyl-1-oxa-3,8-diazaspiro[4.5]decan-2-one hydrochloride.

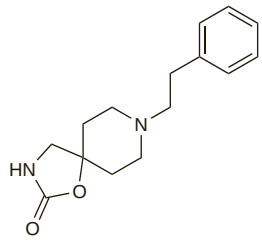
Фенспирида Гидрохлорид

$C_{15}H_{20}N_2O_2.HCl$ = 296.8.

CAS — 5053-06-5 (fenspiride); 5053-08-7 (fenspiride hydrochloride).

ATC — R03BX01; R03DX03.

ATC Vet — QR03BX01; QR03DX03.



(fenspiride)

Profile

Fenspiride is reported to have bronchodilator and anti-inflammatory properties. It is given as the hydrochloride in asthma (p.1108) and other respiratory disorders in usual oral doses of 160 to 240 mg daily in divided doses before meals. It has also been given rectally and by intramuscular or intravenous injection.

Preparations

Proprietary Preparations (details are given in Part 3)
Fr.: Pneumorel; ***Hong Kong:*** Pneumorel; ***Ital.:*** Pneumorel; ***Pol.:*** Eurespal; ***Port.:*** Fenspin†; Pneumorel; ***Rus.:*** Eurespal (Эреспал).

Formoterol Fumarate *(BANM, USAN, rINNM)* ⊗

BD-40A; CGP-25827A; Eformoterol Fumarat; Eformoterol Fumarate; Formoterol Fumarat; Formotérol, fumarate de; Formoterolfumarat; Formoterol-fumarát; Formoteroli fumaras; Formoterolifumaraatti; Formoterolio fumaratas; Formoterolu fumaran; Fumarato de formoterol; YM-08316. (±)-2′-Hydroxy-5′-[(*RS*)-1-hydroxy-2-{[(*RS*)-*p*-methoxy-α-methylphenethyl]amino}ethyl]formanilide fumarate.

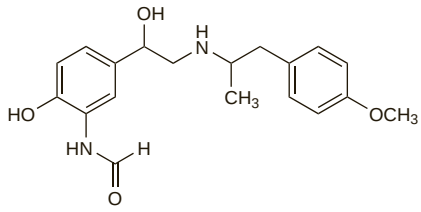
Формотерола Фумарат

$(C_{19}H_{24}N_2O_4)_2.C_4H_4O_4$ = 804.9.

CAS — 73573-87-2 (formoterol); 43229-80-7 (formoterol fumarate).

ATC — R03AC13.

ATC Vet — QR03AC13.



(formoterol)

Pharmacopoeias. In *Jpn. Eur.* (see p.vii) includes the dihydrate.

Ph. Eur. 6.2 (Formoterol Fumarate Dihydrate; Formoteroli Fumaras Dihydricus). A white or almost white or slightly yellow powder. Slightly soluble in water and in isopropyl alcohol; practically insoluble in acetonitrile; soluble in methyl alcohol. A 0.1% solution in water has a pH of 5.5 to 6.5. Protect from light.

Adverse Effects and Precautions

As for Salbutamol, p.1131. Inhalation of formoterol may be associated with paradoxical bronchospasm, and high doses have been associated with an increase in severe exacerbations of asthma. It should not be used in patients who are not also receiving an inhaled corticosteroid.

Long-acting $beta_2$ agonists such as formoterol are not appropriate for the treatment of acute bronchospasm.

Conjunctival irritation and eyelid oedema have been reported in isolated cases.

◊ References.

1. Wilton LV, Shakir SA. A post-marketing surveillance study of formoterol (Foradil): its use in general practice in England. *Drug Safety* 2002; **25:** 213–23.
2. Pauwels RA, *et al.* Formoterol as relief medication in asthma: a worldwide safety and effectiveness trial. *Eur Respir J* 2003; **22:** 787–94.

Asthma. A review of 3 controlled studies comparing inhaled formoterol with placebo, concluded that regular use of high-dose formoterol (48 micrograms daily) may be associated with more frequent serious asthma exacerbations.[1] The concomitant use of inhaled corticosteroids was allowed but not mandatory, and was not reported in the review, which led to debate on whether the results of the study would be applicable when current prescribing guidelines for asthma were followed.[2,3]

In contrast to this, a subsequent study,[4] designed to test the hypothesis of a dose-related increase in serious asthma exacerbations with formoterol therapy, did not show any increase in serious asthma exacerbations between different formoterol doses and placebo. Again, inhaled corticosteroid use was allowed but not mandatory, with 62.4% of patients reported as receiving regular anti-inflammatory therapy.

A systematic review[5] firmly concluded that the addition of a long-acting $beta_2$ agonist (such as formoterol) to low or high doses of inhaled corticosteroids reduced the risk of asthma exacerbations compared with ongoing treatment with similar doses of inhaled corticosteroids alone. The addition of a long-acting $beta_2$ agonist reduced by 19% the relative risk and by 5% the absolute risk of patients requiring systemic corticosteroids for an asthma exacerbation, over 4 to 54 weeks.

For discussion of serious adverse effects associated with long-acting $beta_2$ agonists in asthma, see Increased Mortality, under Salmeterol p.1135.

1. Mann M, *et al.* Serious asthma exacerbations in asthmatics treated with high-dose formoterol. *Chest* 2003; **124:** 70–4.
2. Rissmiller RW, *et al.* Asthma exacerbations and formoterol. *Chest* 2004; **125:** 1590–1.
3. van der Molen T. Formoterol and asthma exacerbations. *Chest* 2004; **125:** 1591.
4. Wolfe J, *et al.* Formoterol, 24μg bid, and serious asthma exacerbations: similar rates compared with formoterol, 12μg bid, with and without extra doses taken on demand, and placebo. *Chest* 2006; **129:** 27–38.
5. Ni Chroinin M, *et al.* Long-acting beta2-agonists versus placebo in addition to inhaled corticosteroids in children and adults with chronic asthma. Available in The Cochrane Database of Systematic Reviews; Issue 4. Chichester: John Wiley; 2005 (accessed 15/01/08).

Effects on skeletal muscle. Myalgia and muscle weakness associated with elevated creatine kinase has been reported during formoterol therapy.[1] Subsequent muscle biopsy suggested mitochondrial dysfunction. No inflammatory changes were seen and symptoms resolved on withdrawal of formoterol.

1. Kiernan MC, *et al.* Mitochondrial dysfunction and rod-like lesions associated with administration of β2 adrenoceptor agonist formoterol. *Neuromuscul Disord* 2004; **14:** 375–7.

Tolerance. Regular use of formoterol produced bronchodilator desensitisation,[1-3] and tachyphylaxis to bronchoprotection against methacholine, effects that have been noted with other long-acting $beta_2$ agonists (see Salmeterol, p.1135) and short-acting $beta_2$ agonists (see Salbutamol, p.1132).

1. van der Woude HJ, *et al.* Decreased bronchodilating effect of salbutamol in relieving methacholine induced moderate to severe bronchoconstriction during high dose treatment with long acting β agonists. *Thorax* 2001; **56:** 529–35.
2. Jones SL, *et al.* Reversing acute bronchoconstriction in asthma: the effect of bronchodilator tolerance after treatment with formoterol. *Eur Respir J* 2001; **17:** 368–73.
3. Haney S, Hancox RJ. Tolerance to bronchodilation during treatment with long-acting beta-agonists, a randomised controlled trial. *Respir Res* 2005; **6:** 107. Also available at: http://respiratory-research.com/content/pdf/1465-9921-6-107.pdf (accessed 15/01/08)

Interactions

As for Salbutamol, p.1132.

Pharmacokinetics

Inhaled formoterol is rapidly absorbed. It is largely metabolised by glucuronidation and *O*-demethylation, with about 10% being excreted in the urine as unchanged drug. The mean terminal elimination half-life after inhalation is estimated to be 10 hours.

Stereoselectivity. Formoterol occurs as a racemic mixture, of which arformoterol (p.1115) is the *R,R*-enantiomer. Only the *R,R*-enantiomer is active.[1,2] It has been suggested that stereoselective metabolism and excretion may account for the individual variation in duration of effect seen with formoterol, although the exact mechanism remains unclear.[1,3]

1. Zhang M, *et al.* Stereoselective glucuronidation of formoterol by human liver microsomes. *Br J Clin Pharmacol* 2000; **49:** 152–7.
2. Lötvall J, *et al.* The effect of formoterol over 24 h in patients with asthma: the role of enantiomers. *Pulm Pharmacol Ther* 2005; **18:** 109–13.
3. Zhang M, *et al.* Stereoselective urinary excretion of formoterol and its glucuronide conjugate in human. *Br J Clin Pharmacol* 2002; **54:** 246–50.

Uses and Administration

Formoterol is a direct-acting sympathomimetic with mainly beta-adrenoceptor stimulant activity specific to $beta_2$ receptors (a $beta_2$ agonist). It has properties similar to those of salbutamol (p.1133), but like salmeterol (p.1135) it has a prolonged duration of action of up to 12 hours; it is therefore not considered suitable for the symptomatic relief of acute attacks of bronchospasm. It is used when the regular use of a long-acting $beta_2$ agonist is needed for management of reversible airways obstruction, as in chronic asthma (p.1108) or in some patients with chronic obstructive pulmonary disease (p.1112).

Formoterol is given by inhalation as the fumarate but how the dose is expressed may depend on the formulation.

- A usual dose is 12 micrograms of formoterol fumarate twice daily from inhalational capsules, increased to 24 micrograms twice daily if necessary in severe disease.
- Metered doses from a dry powder inhaler may be expressed as the amount delivered *into* the mouthpiece (multiples of 6 micrograms per inhalation) or the amount delivered *from* the mouthpiece (corresponding to multiples of 4.5 micrograms per inhalation). Usual doses, expressed as the amount delivered *into* the mouthpiece, are 6 or 12 micrograms once or twice daily, increased if necessary in severe disease to 24 micrograms twice daily.
- Metered doses from an aerosol inhaler may also be expressed as the amount delivered *into* the mouthpiece (12 micrograms per inhalation) or the amount delivered *from* the mouthpiece (corresponding to 10.1 micrograms per inhalation). Usual doses are 1 or 2 inhalations twice daily.

Treatment should be reassessed if this proves inadequate; in the UK, some preparations are licensed for additional short-term symptom relief, but such use is contrary to current asthma guidelines (see p.1108).

Formoterol fumarate may also be inhaled via a nebuliser in a dose of 20 micrograms twice daily. Oral doses of 80 micrograms have been given twice daily in adults.

For doses of formoterol fumarate used in children, see Administration in Children, below.

◊ Reviews.

1. Faulds D, *et al*. Formoterol: a review of its pharmacological properties and therapeutic potential in reversible obstructive airways disease. *Drugs* 1991; **42:** 115–37.
2. Bartow RA, Brogden RN. Formoterol: an update of its pharmacological properties and therapeutic efficacy in the management of asthma. *Drugs* 1998; **55:** 303–22.
3. Sovani MP, *et al*. A benefit-risk assessment of inhaled long-acting β -agonists in the management of obstructive pulmonary disease. *Drug Safety* 2004; **27:** 689–715.

Administration in children. Doses of formoterol fumarate inhaled from inhalational capsules in children aged 5 years or older are the same as those for adults, see Uses and Administration, above.

Formoterol fumarate may be given by metered-dose dry powder inhaler to children 6 years of age and over. The usual dose, expressed as the amount delivered *into* the mouthpiece, is 6 to 12 micrograms once or twice daily. Occasionally up to 48 micrograms daily may be required (maximum single dose should not exceed 12 micrograms).

In some countries, such as Japan, formoterol fumarate has been given orally to children from the age of 6 months at a dose of 4 micrograms/kg daily, in 2 or 3 divided doses.

Asthma. Formoterol is a long-acting beta$_2$ agonist (duration of action about 12 hours). Guidelines on the management of asthma, see p.1108, generally recommend that the use of long-acting beta$_2$ agonists be reserved for patients with chronic asthma who have already progressed to inhaled corticosteroids; it is not a substitute for corticosteroids. The exact dose of inhaled corticosteroid at which to add additional therapy, such as a long-acting beta$_2$ agonist, has yet to be determined. There is some evidence to suggest that, apart from in severe exacerbations, adding a long-acting beta$_2$ agonist to standard dose inhaled corticosteroid therapy may be more effective than increasing the dose of corticosteroid, or than combining a corticosteroid and an anti-leukotriene drug. Combinations of formoterol with an inhaled corticosteroid, used as both maintenance and reliever therapy, have also been studied. Results are seemingly encouraging, although what role such combinations should play in therapy is not yet clearly defined. Some asthma guidelines include this regimen as an option for adults at treatment step 3, see p.1108. Formoterol may also be useful in controlling persistent nocturnal asthma or preventing exercise-induced attacks. There is some evidence that after prolonged use, protection against bronchoconstriction is reduced (see Tolerance, above), and high-dose therapy may be associated with an increased rate of severe exacerbations (see Asthma under Adverse Effects and Precautions, above).

References.

1. van der Molen T, *et al*. Effects of the long acting β agonist formoterol on asthma control in asthmatic patients using inhaled corticosteroids. *Thorax* 1996; **52:** 535–9.
2. Pauwels RA, *et al*. Effect of inhaled formoterol and budesonide on exacerbations of asthma. *N Engl J Med* 1997; **337:** 1405–11. Correction. *ibid*.; 1998; **338:** 139.
3. O'Byrne PM, *et al*. Low dose inhaled budesonide and formoterol in mild persistent asthma: the OPTIMA randomized trial. *Am J Respir Crit Care Med* 2001; **164:** 1392–7.
4. Goldsmith DR, Keating GM. Budesonide/formoterol: a review of its use in asthma. *Drugs* 2004; **64:** 1597–1618.
5. Rabe KF, *et al*. Effect of budesonide in combination with formoterol for reliever therapy in asthma exacerbations: a randomised controlled, double-blind study. *Lancet* 2006; **368:** 707–8.
6. Pedersen S. Budesonide plus formoterol for reliever therapy in asthma. *Lancet* 2006; **368:** 707–8.
7. Pohunek P, *et al*. Budesonide/formoterol improves lung function compared with budesonide alone in children with asthma. *Pediatr Allergy Immunol* 2006; **17:** 458–65. Correction. *ibid*.; 551.
8. Berger WE. The use of inhaled formoterol in the treatment of asthma. *Ann Allergy Asthma Immunol* 2006; **97:** 24–33. Correction. *ibid*.; 562. [dosage error in text]
9. Hermansen MN, *et al*. Acute relief of exercise-induced bronchoconstriction by inhaled formoterol in children with persistent asthma. *Chest* 2006; **129:** 1203–9.
10. Bateman ED, *et al*. Budesonide/formoterol and formoterol provide similar rapid relief in patients with acute asthma showing refractoriness to salbutamol. *Respir Res* 2006; **7:** 13.
11. O'Byrne PM, Parameswaran K. Pharmacological management of mild or moderate persistent asthma. *Lancet* 2006; **368:** 794–803.
12. O'Byrne PM, *et al*. Budesonide/formoterol combination therapy as both maintenance and reliever medication in asthma. *Am J Respir Crit Care Med* 2005; **171:** 129–36.

Stuttering. Inhaled formoterol 12 micrograms daily was reported to improve stuttering (p.1001) in 3 children between 14 and 20 years old. In 2 males, the onset of effect was about 6 weeks, but long-term follow-up was not possible. In the female patient there was early improvement that persisted during 45 weeks of treatment.[1]

1. Pešák J. Preliminary experience with formoterol for the treatment of stuttering. *Ann Pharmacother* 2004; **38:** 1323.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Fordilen; Oxis; Xanol; ***Austral.:*** Foradile; Oxis; ***Austria:*** Foradil; Oxis; ***Belg.:*** Foradil; Oxis; ***Braz.:*** Fluir; Foradil; Formocaps; Oxis; ***Canad.:*** Foradil; Oxeze; ***Cz.:*** Atimos; Foradil; Forair; Formano; Formovent; Oxis; ***Denm.:*** Delnil; Foradil; Oxis; ***Fin.:*** Foradil; Oxis; ***Fr.:*** Foradil; ***Ger.:*** Foradil; Forair; Formatris; FormoLich; Formotop; Oxis; ***Gr.:*** Broncoteril; Foradil; Forair; Forcap; Formopen; Formotil; Imotec; Oxez; ***Hong Kong:*** Foradil†; Oxis; ***Hung.:*** Atimos; Diffumax; Foradil; Fortofan; Oxis; ***India:*** Foratec; ***Irl.:*** Foradil; Oxis; ***Israel:*** Foradil; Oxis; ***Ital.:*** Atimos; Eolus; Foradil; Liferol; Oxis; ***Jpn:*** Atock; ***Malaysia:*** Foradil†; Oxis; ***Mex.:*** Foradil; Oxis; ***Neth.:*** Foradil; Oxis; ***Norw.:*** Foradil; Oxis; ***NZ:*** Foradil; Oxis; ***Philipp.:*** Atock; Foradil; Oxis; ***Pol.:*** Atimos; Diffumax; Foradil; Forastmin; Oxis; Oxodil; Zafiron; ***Port.:*** Asmatec; Atimos; Eformax; Foradil; Forair; Formaxa; Oxis; ***Rus.:*** Atimos (Атимос); Foradil (Форадил); Oxis (Оксис); ***S.Afr.:*** Foradil; Foratec; Oxis; ***Singapore:*** Foradil; Oxis; ***Spain:*** Broncoral; Foradil; Neblik; Oxis; ***Swed.:*** Foradil; Oxis; ***Switz.:*** Foradil; Oxis; ***Thai.:*** Oxis†; ***Turk.:*** Foradil; Oxis; ***UK:*** Atimos Modulite; Foradil; Oxis; ***USA:*** Foradil; Perforomist; ***Venez.:*** Fluir; Foradil; Formotec; Oxis†.

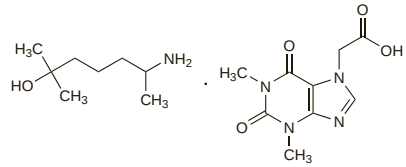
Multi-ingredient: ***Arg.:*** Neumoterol; Symbicort; ***Austral.:*** Symbicort; ***Austria:*** Symbicort; ***Belg.:*** Symbicort; ***Braz.:*** Alenia; Foraseq; Symbicort; ***Canad.:*** Symbicort; ***Chile:*** Symbicort; ***Cz.:*** Combair; Formodual; Symbicort; ***Denm.:*** Symbicort; ***Fin.:*** Symbicort; ***Fr.:*** Innovair; Symbicort; ***Ger.:*** Symbicort; ***Gr.:*** Symbicort; ***Hong Kong:*** Symbicort; ***Hung.:*** Symbicort; ***India:*** Duova; Foracort; ***Indon.:*** Symbicort; ***Irl.:*** Symbicort; ***Israel:*** Symbicort; ***Ital.:*** Assieme; Sinestic; Symbicort; ***Malaysia:*** Foracort; Symbicort; ***Mex.:*** Symbicort; ***Neth.:*** Assieme; Sinestic; Symbicort; ***Norw.:*** Symbicort; ***NZ:*** Symbicort; ***Philipp.:*** Symbicort; ***Pol.:*** Symbicort; ***Port.:*** Assieme; Formodual; Foster; Symbicort; ***Rus.:*** Simbicort (Симбикорт); ***S.Afr.:*** Symbicord; ***Singapore:*** Symbicort; ***Spain:*** Rilast; Symbicort; ***Swed.:*** Symbicort; ***Switz.:*** Symbicort; ***Thai.:*** Symbicort; ***Turk.:*** Symbicort; ***UK:*** Fostair; Symbicort; ***USA:*** Symbicort; ***Venez.:*** Foraseq; Symbicort.

Heptaminol Acefyllinate *(rINNM)*

Acefilinato de heptaminol; Acéfyllinate d'Heptaminol; Acefyllinum Heptaminolum; Heptaminol Acéfylline; Heptaminol Acephyllinate; Heptaminol Theophylline Ethanoate; Heptaminol Theophylline-7-acetate; Heptaminoli Acefyllinas. The 6-amino-2-methylheptan-2-ol salt of theophyllin-7-ylacetic acid .

Гептаминола Ацефилинат

$C_8H_{19}NO,C_9H_{10}N_4O_4$ = 383.4.
CAS — 5152-72-7; 10075-18-0.
ATC — C01DX08.
ATC Vet — QC01DX08.



Profile

Heptaminol acefyllinate is a derivative of theophylline (p.1140) that has been used for its bronchodilator and cardiovascular effects.

Preparations

Proprietary Preparations (details are given in Part 3)
Indon.: Cariamyl.

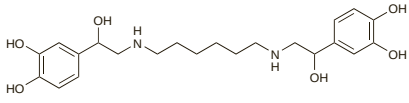
Multi-ingredient: ***Braz.:*** Sureptil; ***Spain:*** Clinadil Compositum; Diclamina.

Hexoprenaline Hydrochloride *(BANM, rINNM)* ⊗

Hexoprénaline, Chlorhydrate d'; Hexoprenalini Hydrochloridum; Hidrocloruro de hexoprenalina; ST-1512. *N,N′*-Hexamethylenebis[4-(2-amino-1-hydroxyethyl)pyrocatechol] dihydrochloride; *N,N′*-Hexamethylenebis[2-amino-1-(3,4-dihydroxyphenyl)ethanol] dihydrochloride.

Гексопреналина Гидрохлорид

$C_{22}H_{32}N_2O_6,2HCl$ = 493.4.
CAS — 3215-70-1 (hexoprenaline); 4323-43-7 (hexoprenaline dihydrochloride).
ATC — R03AC06; R03CC05.
ATC Vet — QR03AC06; QR03CC05.



(hexoprenaline)

Hexoprenaline Sulfate *(USAN, rINNM)* ⊗

Hexoprénaline, Sulfate d'; Hexoprenaline Sulphate *(BANM)*; Hexoprenalini Sulfas; Sulfato de hexoprenalina. (±)-α,α′-[Hexamethylenebis(iminomethylene)]-bis[3,4-dihydroxybenzyl alcohol] sulfate (1:1).

Гексопреналина Сульфат

$C_{22}H_{32}N_2O_6,H_2SO_4$ = 518.6.
CAS — 32266-10-7.
ATC — R03AC06; R03CC05.
ATC Vet — QR03AC06; QR03CC05.

Profile

Hexoprenaline is a direct-acting sympathomimetic with mainly beta-adrenergic activity selective to beta$_2$ receptors (a beta$_2$ agonist). It has properties similar to those of salbutamol (p.1131) and has been used as a bronchodilator in the treatment of reversible airways obstruction as occurs with asthma (p.1108) and in some patients with chronic obstructive pulmonary disease (p.1112). It has sometimes been used similarly to salbutamol in the management of premature labour (p.2003).

Hexoprenaline is usually given as the hydrochloride or sulfate.

For the relief of **bronchoconstriction**, a typical adult oral dose of the salts has been 0.5 to 1 mg three times daily. By inhalation, hexoprenaline sulfate has been given by aerosol inhaler in doses of 100 to 200 micrograms up to 6 times daily, and the hydrochloride has been given by nebulisation in doses of 250 to 500 micrograms every 4 to 6 hours to a maximum of 3 mg daily. In patients with asthma, as-required beta agonist therapy is preferable to regular use. An increased need for, or decreased duration of effect of, hexoprenaline indicates deterioration of asthma control and the need for review of therapy.

In the management of **premature labour** an intravenous infusion of hexoprenaline sulfate, diluted in glucose 5% or sodium chloride 0.9%, can be given at an initial rate of about 300 nanograms/minute. Infusion may be preceded by slow intravenous injection of 10 micrograms as a loading dose over 5 to 10 minutes. A prolonged infusion of 75 nanograms/minute has been used when there is no cervical change. Therapy may be changed from intravenous to oral once suppression of labour has been achieved for at least 24 hours.

Preparations

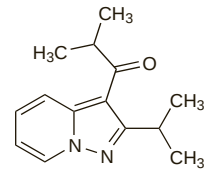
Proprietary Preparations (details are given in Part 3)
Arg.: Argocian; ***Austria:*** Gynipral; Ipradol; ***Chile:*** Gynipral†; ***Cz.:*** Gynipral; ***Hong Kong:*** Ipradol; ***Hung.:*** Gynipral†; Ipradol†; ***Rus.:*** Gynipral (Гинипрал); ***S.Afr.:*** Ipradol; ***Switz.:*** Gynipral; ***Thai.:*** Ipradol†.

Ibudilast *(rINN)*

AV-411; Ibudilastum; KC-404; MN-166. 1-(2-Isopropylpyrazolo[1,5-*a*]pyridin-3-yl)-2-methyl-1-propanone.

Ибудиласт

$C_{14}H_{18}N_2O$ = 230.3.
CAS — 50847-11-5.
ATC — R03DC04.
ATC Vet — QR03DC04.



Profile

Ibudilast is an orally active leukotriene antagonist (p.1108), phosphodiesterase inhibitor, and platelet-activating factor antagonist. It is given orally in the management of asthma (p.1108) in a dose of 10 mg twice daily.

Ibudilast is also promoted for the management of dizziness secondary to impaired cerebral circulation following cerebral infarction, in doses of 10 mg three times daily.

Ibudilast is also under investigation for the treatment of multiple sclerosis and for chronic neuropathic pain.

Preparations

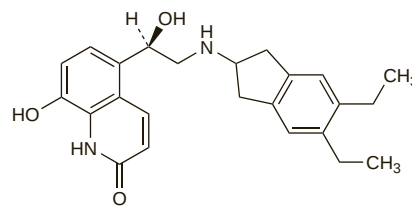
Proprietary Preparations (details are given in Part 3)
Jpn: Ketas.

Indacaterol *(rINN)* ⊗

Indacatérol; Indacaterolum; QAB-149. 5-{(1*R*)-2-[(5,6-Diethyl-2,3-dihydro-1*H*-inden-2-yl)amino]-1-hydroxyethyl}-8-hydroxyquinolin-2(1*H*)-one.

Индакатерол

$C_{24}H_{28}N_2O_3$ = 392.5.
CAS — 312753-06-3.



Profile

Indacaterol is a long-acting beta$_2$ agonist under investigation in asthma and chronic obstructive pulmonary disease.
