SKIN DISORDERS. PUVA has been used in a wide range of skin disorders and guidelines have been published by the British Photodermatology Group,[1,2] which are summarised as follows:

- Indications for PUVA in chronic plaque **psoriasis** include severe extensive psoriasis unresponsive to conventional topical therapies, relapse within 3 to 6 months of successful topical treatment, or patient refusal of topical treatment if UVB phototherapy has failed (see p.1583 for a discussion of the various treatments of psoriasis). Initial UVA exposure should preferably be determined on the basis of prior measurement of the minimal phototoxic dose rather than on the skin type. Increases in UVA irradiation are then calculated as a percentage of previous doses.

  Methoxsalen in an oral dose of 600 micrograms/kg given 2 hours before UVA exposure is the widely accepted standard regimen. Alternatively, 5-methoxypsoralen 1.2 mg/kg, again 2 hours before UVA exposure, can be given and appears to be almost free of the adverse reactions such as nausea, pruritus, and erythema induced by methoxsalen. However, until the clinical efficacy of 5-methoxypsoralen has been clearly shown, methoxsalen should remain the psoralen of choice for most clinical situations.

  Alternatives to oral PUVA are baths or soaks using methoxsalen or trioxysalen. For whole body bathing a concentration of methoxsalen 2.6 mg/litre is typically utilised with the patient bathing for 15 minutes followed by immediate exposure to UVA. For hand and foot soaks a concentration of methoxsalen 3 mg/litre is used with the affected area immersed for 15 minutes followed by a delay of 30 minutes before UVA exposure. For trioxysalen a concentration of about 330 micrograms/litre is used for a 15-minute whole body bath or hand and foot soak followed by immediate UVA exposure for whole body therapy, or a 30 minute delay before hand and foot UVA exposure. Whole body baths or hand and foot soaks are given twice each week.

  Methoxsalen may also be applied topically to the affected areas. A concentration of about 0.15% (or 0.015% if erythema occurs) is used in an emulsion, or 0.005% in an aqueous gel, and applied 15 minutes before UVA exposure.

  PUVA treatment should be stopped as soon as disease clearance is achieved; maintenance PUVA should be avoided to minimise cumulative UVA exposure, but may be considered if there is rapid relapse. A combination of PUVA with acitretin (300 to 700 micrograms/kg orally) or etretinate (0.5 to 1 mg/kg orally) may be considered in patients who have reached 50 treatment sessions or relapsed within 6 months of PUVA. PUVA and methotrexate are also effective for severe psoriasis but should be reserved for such cases because of the possible increased risk of skin cancer
- Oral PUVA twice weekly with methoxsalen 600 micrograms/kg or 5-methoxypsoralen 1.2 mg/kg has been effective in many patients with **vitiligo** (see Pigmentation Disorders, p.1582). If patches are well demarcated topical application of methoxsalen 0.15% may be preferable
- In **mycosis fungoides** PUVA is an effective symptomatic treatment for early disease and a useful adjunct for late-stage disease but optimal regimens have not been established (see above)
- PUVA is effective for atopic **eczema** (p.1579) but clearance is less certain than for psoriasis, twice the number of treatments may be needed, and relapse is more frequent. It should therefore be reserved for severe disease unresponsive to conventional treatments. Optimal regimens have not been established
- In **polymorphic light eruptions** (see Photosensitivity Disorders, p.1581) PUVA is effective in up to 90% of patients but is only indicated in those who are frequently or severely affected despite the regular use of high-protection broad-spectrum sunscreens. Several arbitrary regimens are in use
- Variable results have also been reported in a variety of other disorders but data has been insufficient to establish precise guidelines. Such disorders include actinic prurigo, alopecia areata, aquagenic pruritus, chronic actinic dermatitis, granuloma annulare, lichen planus, nodular prurigo, pityriasis lichenoides, localised scleroderma, solar urticaria, and urticaria pigmentosa. In most cases relapse occurs in the absence of maintenance therapy and PUVA should usually only be tried as a last resort.

Extracorporeal PUVA has been tried in patients with severe epidermolysis bullosa acquisita,[3,4] lichen planus,[5] and scleroderma.[6,7]

1. British Photodermatology Group. British Photodermatology Group guidelines for PUVA. *Br J Dermatol* 1994; **130:** 246–55.
2. Halpern SM, *et al.* Guidelines for topical PUVA: a report of a workshop of the British Photodermatology Group. *Br J Dermatol* 2000; **142:** 22–31. Also available at: http://www.bad.org.uk/healthcare/guidelines/Topical_PUVA_Therapy.pdf (accessed 27/09/07)
3. Miller JL, *et al.* Remission of severe epidermolysis bullosa acquisita induced by extracorporeal photochemotherapy. *Br J Dermatol* 1995; **133:** 467–71.
4. Gordon KB, *et al.* Treatment of refractory epidermolysis bullosa acquisita with extracorporeal photochemotherapy. *Br J Dermatol* 1997; **136:** 415–20.
5. Guyot AD, *et al.* Treatment of refractory erosive oral lichen planus with extracorporeal photochemotherapy: 12 cases. *Br J Dermatol* 2007; **156:** 553–6.
6. Zic JA, *et al.* The North American experience with photopheresis. *Ther Apher* 1999; **3:** 50–62.
7. Knobler RM, *et al.* A randomized, double-blind, placebo-controlled trial of photopheresis in systemic sclerosis. *J Am Acad Dermatol* 2006; **54:** 793–9.

Preparations

USP 31: Methoxsalen Capsules; Methoxsalen Topical Solution.

Proprietary Preparations (details are given in Part 3)
Arg.: Oxsoralen Ultra; ***Austral.:*** Oxsoralen; ***Austria:*** Oxsoralen; ***Belg.:*** Mopsoralen; ***Braz.:*** Oxsoralen; ***Canad.:*** Oxsoralen; Ultramop; ***Chile:*** Oxsoralen; ***Cz.:*** Oxsoralen; Uvadex; ***Denm.:*** Geroxalen†; ***Fr.:*** Meladinine; Uvadex; ***Ger.:*** Meladinine; ***Gr.:*** Melaoline; ***Hong Kong:*** Oxsoralen; ***Hung.:*** Geroxalen†; Oxsoralen; ***India:*** Macsoralen†; Manaderm; Melanocyl; ***Indon.:*** Delsoralen; Oxsoralen; ***Irl.:*** Deltasoralen; ***Ital.:*** Oxsoralen†; ***Jpn:*** Oxsoralen; ***Malaysia:*** Meladinine†; Oxsoralen; ***Mex.:*** Dermox; Meladinina; Oxsoralen; ***Neth.:*** Geroxalen; Meladinine; Oxsoralen†; ***Norw.:*** Geroxalen†; ***NZ:*** Oxsoralen; ***Pol.:*** Geralen; Oxsoralen; ***Rus.:*** Oxsoralen (Оксорален); ***S.Afr.:*** Oxsoralen; ***Singapore:*** Oxsoralen; ***Spain:*** Oxsoralen; ***Switz.:*** Meladinine; ***Thai.:*** Meladinine†; ***Turk.:*** Geroxalen; Vitspo; ***UK:*** Puvasoralen; ***USA:*** Oxsoralen; Uvadex.

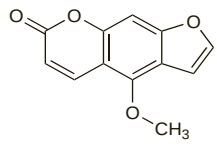
Multi-ingredient: ***India:*** Melanocyl.

5-Methoxypsoralen

Bergapteeni; Bergapten; Bergapteno; Bergaptenum; 5-Metoxipsoraleno; 5-MOP. 4-Methoxy-7*H*-furo[3,2-g]chromen-7-one.

5-Метоксипсорален

$C_{12}H_8O_4$ = 216.2.
CAS — 484-20-8.
ATC — D05BA03.
ATC Vet — QD05BA03.



Profile

5-Methoxypsoralen is a photosensitiser with actions similar to those of methoxsalen (above). It may be given orally in the PUVA therapy (see under Methoxsalen, above) of psoriasis and vitiligo.

5-Methoxypsoralen is included in some cosmetic suntan preparations to enhance tanning but because of its potential phototoxicity this is considered unwise by authorities in Europe and the USA. Photosensitivity caused by 5-methoxypsoralen is sometimes known as Berloque dermatitis.

5-Methoxypsoralen is an ingredient of bergamot oil (p.2265).

◊ References.

1. McNeely W, Goa KL. 5-Methoxypsoralen: a review of its effects in psoriasis and vitiligo. *Drugs* 1998; **56:** 667–90.

Hypersensitivity. For mention of anaphylaxis associated with the use of 5-methoxypsoralen, see Hypersensitivity, under Adverse Effects of Methoxsalen, p.1605.

Preparations

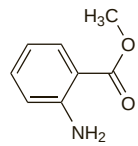
Proprietary Preparations (details are given in Part 3)
Austral.: Pentaderm†; ***Austria:*** Geralen; ***Fr.:*** Psoraderm 5†; ***UK:*** Pentaderm.

Methyl Anthranilate

Metilo, antranilato de; Metylu antranilan. Methyl 2-aminobenzoate.

Метилантранилат

$C_8H_9NO_2$ = 151.2.
CAS — 134-20-3.



NOTE. Do not confuse with menthyl anthranilate (see Meradimate, p.1604).

Profile

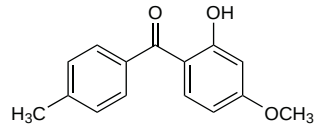
Methyl anthranilate has been used in sunscreen preparations. It is a constituent of several essential oils.

Mexenone *(BAN, pINN)*

Benzofenon-10; Benzophenone-10; Mexenona; Mexénone; Mexenonum. 2-Hydroxy-4-methoxy-4′-methylbenzophenone.

Мексенон

$C_{15}H_{14}O_3$ = 242.3.
CAS — 1641-17-4.



Pharmacopoeias. In *Br.*
BP 2008 (Mexenone). A pale yellow odourless or almost odourless crystalline powder. Practically insoluble in water; sparingly soluble in alcohol; freely soluble in acetone.

Profile

Mexenone, a substituted benzophenone, is a sunscreen (p.1576) with actions similar to those of oxybenzone (p.1608). It is effective against UVB and some UVA light (for definitions, see p.1580)

Preparations

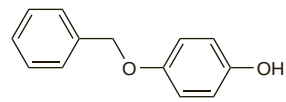
BP 2008: Mexenone Cream.

Monobenzone *(rINN)*

Benoquina; Hydroquinone Monobenzyl Ether; Monobenzona; Monobenzonum. 4-Benzyloxyphenol.

Монобензон

$C_{13}H_{12}O_2$ = 200.2.
CAS — 103-16-2.
ATC — D11AX13.
ATC Vet — QD11AX13.



Pharmacopoeias. In *US.*
USP 31 (Monobenzone). Store at a temperature not exceeding 30° in airtight containers. Protect from light.

Adverse Effects and Precautions

Monobenzone may cause skin irritation and sensitisation. In some patients this is transient and the drug need not be withdrawn. In others, an eczematous sensitisation may occur. Excessive depigmentation may occur even beyond the areas under treatment and may produce unsightly patches.

Monobenzone frequently produces permanent depigmentation and should not be used as a substitute for hydroquinone.

Interactions

Agalsidase. For the recommendation that monobenzone not be used with agalsidase alfa or beta, see p.2252.

Uses and Administration

Monobenzone has actions similar to those of hydroquinone (p.1598) but in some patients it also produces extensive and selective destruction of melanocytes. It is used locally for final, permanent depigmentation of normal skin in extensive vitiligo (see Pigmentation Disorders, p.1582). Monobenzone is not recommended for freckling, chloasma, or hyperpigmentation following skin inflammation or due to photosensitisation after the use of certain perfumes. It has no effect on melanomas or pigmented naevi.

For vitiligo a cream containing monobenzone 20% is applied to the affected areas two or three times daily until a satisfactory response is obtained, and thereafter as necessary, usually about twice weekly. Depigmentation only becomes apparent when the preformed melanin pigments have been lost with the normal sloughing of the stratum corneum and this may take several months. If, however, no improvement is noted after 4 months, treatment should be stopped. Excessive exposure to sunlight should be avoided during treatment. After depigmentation the skin will be sensitive for the rest of the patient's life and a sunscreen must be used during sun exposure.

Preparations

USP 31: Monobenzone Cream.

Proprietary Preparations (details are given in Part 3)
Canad.: Benoquin; ***India:*** Benoquin†; ***USA:*** Benoquin.
