

Photodynamic therapy (PTD)

PTD is a treatment that uses a drug called a photosensitising agent, combined with a particular wavelength of light, such that when the photosensitising agent is exposed to that light wavelength, it produces a form of oxygen that kills adjacent cells. PTD is licenced for treating non-melanoma skin cancers,¹⁴ with evidence demonstrating that PTD has significantly better outcomes for actinic keratosis, superficial and nodular basal cell carcinoma, and squamous cell in situ (known as Bowen's disease) than other standard treatments.¹⁵ Nurse prescriber and aesthetic practitioner Anna Baker performs this treatment protocol using a topical photosensitising agent methylaminolevulinate (MAL, known as Metvix). Baker explains how the procedure works, "Metvix is applied to the skin cancer lesion, and left under an occlusive dressing for three hours, during which time the patient can go off and do what they want to do. The drug is very selective and only binds to certain kinds of cells – dysplastic or neoplastic cells – within the lesion, in which uptake of the drug is rapid. During that three-hour timeframe, these cells become saturated with photoactive porphyrins." When the wavelength of light is applied later and mixes with these porphyrins, a chemical response is generated, the by-product of which is a form of oxygen called singlet oxygen, which in turn breaks down the damaged cells in the lesion. Sometimes, a small amount of the photosensitising agent is taken up by healthy tissue around the dysplastic or neoplastic cells, but this is minimal. The treatment uses a red LED light with a wavelength of around 630 nm, administered after the area to which the drug has been applied has been cleansed thoroughly. "This light wavelength is typically capable of treating an area roughly around 6x16cm," Baker adds, "but this is very much dependent on how much patients can tolerate in one

Figure 3 – main indications for light colours¹⁸

Light colour	Main indication
RED light	<p>Main indication: rejuvenation</p> <ul style="list-style-type: none"> Stimulates collagen synthesis and growth factor production Increases hydration levels and moisture retention Evens skin tone and texture Reduces pigmentation Calms redness and inflammation Shrinks pores and sebaceous glands Stimulates circulation & lymphatic system Accelerates skin repair
BLUE light	<p>Main indication: acne</p> <ul style="list-style-type: none"> Powerful anti-bacterial treatment Treats all grades of acne without irritation Reduces oil production Prevents future breakouts UV free alternative for eczema and psoriasis Anti-inflammatory / cooling effect
NEAR-IRRED light	<p>Main indication: deep pigmentation</p> <ul style="list-style-type: none"> Most deeply absorbed wavelength by skin tissue Increases cell permeability and absorption Reduces pain and inflammation Accelerates wound healing Heals cystic acne

session." One advantage here is that PTD can be repeated as often as is required – particularly useful in cases of field cancerisation, in which multiple lesions cover large areas. "We treat these patients on a maintenance basis, maybe every six months or every year, often for several years," explains Baker. In addition, there is evidence that PTD can potentially delay the development of actinic keratosis and basal cell carcinoma, with limited evidence that it can prevent invasive squamous cell carcinoma.¹⁶ Interestingly, PTD has also been indicated for skin rejuvenation, in which aesthetic results can be significantly improved when combined with pre-treatment systems such as microneedling, microdermabrasion or fractional lasers.¹⁷

In safe hands

The light-based technologies discussed are routinely used in a number of treatments and are safe and effective in skilled hands. However,



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severe adverse events can occur when administered by untrained practitioners: Mr Shoab recalls treating a patient who had been left with a 4cm-diameter hole burnt into their skin due to poorly performed laser tattoo removal. "When you're performing a treatment, you need to be able to look after and manage the side effects," he says. That being the case, light-based skin treatments not only remain an established protocol for a range of medical and aesthetic indications, but also show a great deal of promise in treating many more in the future.

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