TOPICAL PHOTODYNAMIC THERAPY FOR MEDICAL PROFESSIONALS

WHAT IS PHOTODYNAMIC THERAPY (PDT)?

Photodynamic Therapy (PDT) is a non-invasive procedure that is licensed for the treatment of Non Melanoma Skin Cancers (NMSC). It involves the topical application of a photosensitiser prodrug combined with a light source to selectively destroy abnormal/ damaged cells and tissue.

Accumulating evidence supports the use of PDT for acne, more severe inflammatory conditions and photodamage, although clinical protocols for these indications are not yet defined.

Independently the photosensitiser prodrug and light source are harmlesss. When the prodrug is exposed to the light source, it activates or 'turns on' a free radical (ROS) reaction which selectively destroys target cells.

Photodynamic Therapy is a widely used therapeutic option as an alternative to surgical intervention for certain dermatological indications. Patient satisfaction is high, downtime is low and cosmetic outcomes are proven and excellent.

KEY INDICATIONS FOR PDT

The following indications are well evidenced for successful treatment outcomes and supported by independent clinical data.

- Actinic Keratosis (AK)
- Non-hyperkeratotic Keratosis
- Bowens disease
- Superficial Basal Cell Carcinoma (BCC)
- Superficial Squamous Cell Carcinoma (SCC)

Other dermatological inflammatory indications in early stages of research showing promising treatment outcomes include

- Acne Vulgaris
- Rosacea
- Sebaceous Hyperplasia
- Hidradentis Suppurativa
- Psoriasis
- Lichen Planus
- Lichen Sclerosis
- Scleroderma
- Cutaneous Sarcoidosis
- Necrobiosis Lipoidica
- Granuloma Annulare
- Fungal infections
- Dermatitis
- Folliculitis
- Hypertrophic scars
- Viral Warts
- Alopecia Areata
- Photodamage

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HOW DOES PDT WORK?

A typical PDT treatment is characterised by the application of a topical chemical compound called 5-Aminolevulinic Acid (5-ALA) or its methylated ester, Methyl Aminolevulinate (MAL) to the affected area.

5-ALA penetrates the stratum corneum and is selectively absorbed by actinically damaged skin cells, non-melanoma skin cancer cells and the pilosebaceous units of the skin. The skin converts the ALA to its active form; a natural intracellular photosensitiser called Protoporphyrin IX.

Protoporphyrin IX (PpIX) is naturally occurring in all living cells in small amounts as a precursor of heme. Heme makes up part of the molecule haemoglobin which turns blood red and transports oxygen around the body and is characterised by its ability to carry iron.

PpIX accumulates in damaged and highly proliferative epidermal cells as well as melanin, blood vessels and sebaceous glands. Damaged cells naturally produce more PpIX and excessive levels can cause photosensitivity of the skin.

Following a specified accumulation period (usually up to 3 hours), the affected area is irradiated by a specific wavelength of light and PpIX is oxidised through a process called photobleaching. During this process, singlet oxygen and free radicals are generated leading to apoptosis (selective cell death). Note only target cells and tissue are damaged during this process but the skin can remain photosensitive for up to 48 hours post treatment.

As a result of the PDT treatment, the damaged cells slough off, allowing new healthy cells to form.

Photosenstiser prodrugs can be activated by Red light or Blue light and is indication dependant. Accumulation time is subject to the concentration of the prodrug. The light radiation dose (joules) should be specified by the prodrug manufacturer/supplier.