



Ultraviolet light is invisible electromagnetic radiation between visible blue light and x-rays.

In a medical environment the light generally originates from fluorescent tubes and is delivered to the patient in safe and controlled doses via whole body cabinets for treating the whole body, or smaller units used to treat only certain parts of the body, such as the hands or feet.

This series of leaflets highlights the science and the scientists behind some widely used medical techniques.


They are produced by the Institute of Physics and Engineering in Medicine. To find out more about Medical Physics or Clinical or Biomedical Engineering, or to request free leaflets or posters in this series, contact us:

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The techniques described in this leaflet are only suitable in certain cases and some are not yet widely available. If you need ultraviolet phototherapy, your doctor will advise you. This leaflet was produced with the help of IPEM's Ultrasound and Non Ionising Radiation Special Interest Group.

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The Science & The Scientists

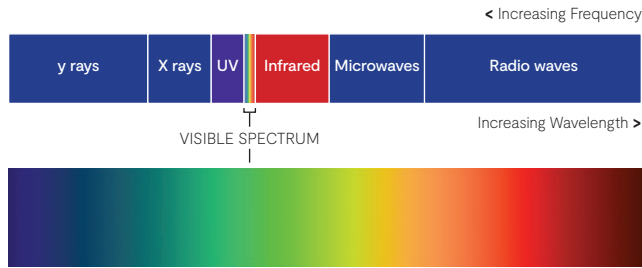
Treating the body with light

Ultraviolet Phototherapy is a method of treating a wide variety of skin disorders such as eczema, psoriasis and vitiligo.



The Science

Ultraviolet light, also present in sunlight, can be divided into three main spectral bands. Long wavelength UVA (the nearest to visible blue light but still invisible), UVB and UVC. Both UVA and UVB are often used in the healthcare sector, the former in conjunction with either topical or systemic drugs to increase the skin's sensitivity to the UV light. This light introduces changes in the skin to clear or control the symptoms.



Quality control being carried out on a UV Phototherapy cabinet

Some of the conditions that can be treated.

Ultraviolet light can be used to treat a wide variety of diseases. The type of ultraviolet light selected depends on the effect and depth on the skin that is required or the stubborn nature of the symptoms. Most skin disease is a result of erroneous immune system responses. Some examples are:

Psoriasis

Red, flaky, crusty patches of skin covered with silvery scales. UV is used to cause damage to the DNA of immune cells causing the patches.

Eczema

Dry, itchy, scaly red skin. UV is used to regulate the problem immune cells.

Vitiligo

A loss of skin pigment that often appears as white patches on the skin. The immune cells attacking the pigment-producing cells are inhibited, allowing the pigment cells to function normally.

Cutaneous T-cell lymphoma

A rare form of skin cancer in which abnormalities in T-cells cause them to attack the skin.

Graft versus host disease

A condition that can occur following a bone marrow transplant where immune cells attack grafted tissue.

Scleroderma and Systemic sclerosis

Immune cells attack the collagen and elastic fibres deep in the skin causing the skin to become hard and inflexible.

Some conditions, such as scleroderma and cutaneous T-cell lymphoma, are skin manifestations of serious systemic disease.

The Scientists

Ultraviolet irradiation measurements are important to ensure consistency and repeatability of treatment doses over time. It is also important to confirm the validity of the treatment doses by use of calibrated meters, traceable back to national standards.

Medical physicists and **technologists** provide scientific, safety and technical expertise on the use of phototherapy, ensuring that devices are operating correctly and delivering the intended doses. This involves regular quality control checks on the equipment, commissioning tests on new machines and advising on the purchase of new equipment.



What conditions can phototherapy treat?



Skin disorders (eg psoriasis, vitiligo)
UV Phototherapy



Some skin-related cancer symptoms
UV Phototherapy



Other phototherapy sources (non UV)

Mood and sleep disorders (eg SAD)
Blue light



Hyperbilirubinemia and jaundice
Blue / Turquoise light



Some cancers and precancers
Photodynamic Therapy – Mainly red light