By applying a special cream (**Metvix**) to affected areas of skin and some time later activating it with a specific wavelength light some special benefits can be achieved. These include clearing areas of sun-damaged skin that can lead to skin cancer over the years, clearing certain types of shallow skin cancers and, more recently, clearing active acne for long periods of time. The treatments are generally very comfortable with very little to no down time.

WHAT IS TREATED?

- Solar keratoses. These are the pinkish to skin coloured areas that have a clear to white crusty top. The crusting tends to be worse, or more noticeable, in the summer months, settling quite a bit over winter. They are a marker of excessive sun exposure occurring on the sun-exposed areas of the body like the face, back of hands and bald heads. They may persist relatively unchanged over many years. But they can change into active skin cancers – not melanomas.
- Skin cancers such as squamous cell carcinomas and basal cell carcinomas. These are best treated when they are shallow. There are a couple of forms that do not respond well, and, as noted, melanomas are not treated this way. A specific advantage with the treatment is the avoidance of surgery if this is possible. And in difficult areas for good surgical results (such as the edge of the nose) it gives a good cosmetic outcome.
- Active acne. This is not a current regulatory authority approved indication for Metvix, but has been proven to work well in a number of trials. People have been treating acne with blue (and other coloured) lights with some success claimed. The public perception of this is that it is very effective. The reality of the research and published results though is that a very limited number of affected people respond. This is explained below.

HOW DOES IT WORK?

Beginning in the early 1900s photodynamic therapy (PDT) of various forms has been used. Usually what is required is a medicine that is applied, injected or taken that preferentially absorbs into the tissue that is being treated. The tissue is then exposed to light which causes a chemical reaction to occur that activates the medicine to another form that creates the effect. Usually the effect desired is one that destroys tissue that is not wanted such as cancer cells.

For many years jaundiced newborn babies have been exposed to light to enable them to break down the bilirubin that causes the jaundice. It accumulates because it is not being broken down quickly enough by their young livers. Too high levels of bilirubin can cause brain damage in young babies. By exposing their skin to light the bilirubin converts to a soluble form that can be excreted by their kidneys.

People with extensive psoriasis that is not responding well to other treatments can be given a special medicine that absorbs into their body. This is then activated by ultraviolet light selectively affecting the psoriasis plaques and improving the condition.

In more recent times certain early lung cancers and others that have become end stage and therefore not treatable by other means have been treated by giving a special medication that is specifically absorbed by the cancer cells. The area of the cancer cells is then irradiated by laser light that activates the medication, causing it to selectively kill the cancer cells.

In recent years aminolevulinic acid has been used in treating superficial skin problems such as sun damage and skin cancers. Aminiolevulinic acid (ALA) is a molecule that is produced naturally in the body as part of the process in the manufacture of haemoglobin. There is a feedback loop from the haemoglobin molecule stage to limit the further production of activated aminolevulinic acid. By applying extra ALA this feedback control is effectively bypassed allowing extra molecules in the pathway to be produced. One of these, a porphyrin molecule (protoporphyrin IX), is toxic to cells in high doses, causing their destruction. Because ALA absorbs preferentially into more rapidly developing cells, cancerous and pre-cancerous cells absorb more and are destroyed on activation. The activation is achieved by exposing the absorbed molecule to light of certain wavelengths that the molecule preferentially absorbs. Traditionally ALA has been activated by blue light.

The treatment of acne by blue light arises from this premise. The particular bacterium that is associated with acne pimples has an excess of ALA and will therefore be sensitive to activation by particular wavelengths of light. The problem is that a lot of acne lesions do not have these bacteria present or, at times, not in sufficient numbers to cause a response. In ALA treatments, ALA absorbs into the sebaceous (oily) skin glands that are the site of the acne problem. When activated the sebaceous gland activity is reduced.

Metvix is methyl aminolevulinic acid. It has a number of advantages. Straight ALA is water-soluble, which means it does not readily absorb into the skin and cells (which all have a fatty membrane). Therefore careful cleaning (such as with acetone) before treatment and a long application time (twenty-four hours in sun damage and cancers and several hours for acne treatments) is required to achieve a good effect. Methyl ALA, on the other hand, is lipid (or fat) soluble. This means it readily absorbs into the skin cells. And

absorption time is quicker – usually about three hours for sun damage and skin cancers, and twenty minutes or so for acne. And no special skin preparation is required apart from removing make-up and other surface products.

In the preparation of Metvix for PDT, red light activation has been used. The advantage of red light is that it penetrates more deeply than the shorter wavelength blue, meaning better penetration for the depth of the problem areas.

We have used a 633nm red light helium neon laser beam to activate the Metvix. Lasers have some special properties beyond regular light with better penetration and areas of high local energy to achieve effects often not seen with regular light.

IS IT PAINFUL?

Commonly there is a little tingling noticed at the time of laser activation. If unactivated Metvix is still present on the skin before or after a treatment and it is exposed to strong direct sunlight a more uncomfortable burning sensation is noticed. In our experience, a proper laser activation session clears the product and subsequent sunlight exposure is not a problem. If the cream is applied to areas that are covered by such things as the protective laser goggles, then there is a risk of later sunlight activation. Therefore we apply the cream with the goggles in place or ensure the cream is well clear of the area the goggles will cover.

WHAT RESULTS WILL I SEE?

The most commonly observed results are the redness and scaling of affected skin areas in sun damaged and skin cancer problems. In acne there is usually no observable reaction apart from the clearing of the acne lesions. There could at times be little local redness.

HOW QUICKLY WILL I SEE RESULTS?

The scaling changes usually clear in about a week in the face area and two to three weeks in the rest of the body. For acne it is more a clearing of the active red and pustular lesions.

HOW MANY TREATMENTS WILL I NEED?

One treatment will achieve a good clearance of most sun-damaged areas. But a second is recommended at about three months or so to achieve a more complete clearance for a longer lasting effect. Nodular basal cell cancers are recommended to be treated a second time a week or so after the first allowing further penetration into the lesion.

For acne four to six sessions three to four weeks apart is recommended and continued as needed. As in other acne treatments, some people will get a long term clearance with this. Others will require further sessions as the problem recurs.

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