

## Narrowband UVB Phototherapy - The Basics

"Narrowband" UVB has become the phototherapy treatment of choice for psoriasis, vitiligo, atopic dermatitis (eczema) and other photoresponsive skin disorders. Conventional "Broadband" UVB lamps emit light in a broad range over the UVB spectrum, including both the therapeutic wavelengths specific to the treatment of skin diseases, plus the shorter wavelengths responsible for sunburning (erythema). Sunburning has a negative therapeutic benefit, increases the risk of skin cancer, causes patient discomfort, and limits the amount of therapeutic UVB that can be taken.

"Narrowband" UVB lamps, on the other hand, emit light over a very short range of wavelengths concentrated in the therapeutic range, and minimally in the sunburning range. UVB Narrowband is therefore theoretically safer and more effective than UVB Broadband, but requires either longer treatment times or equipment with more bulbs to achieve the same dosage threshold. With the goal being to minimize the total cumulative dosage of erythemogenic ultraviolet light in a patient's lifetime, it follows that younger people should consider using UVB Narrowband. Phototherapy equipment sales are now dominated by UVB Narrowband; however, UVB Broadband will likely always have a role. Solarc's UVB Narrowband models have an "UVB-NB" suffix in the model number, such as 1780UVB-NB. Solarc's UVB Broadband models have only a "UVB" suffix, such as 1740UVB.

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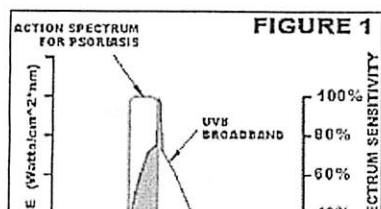
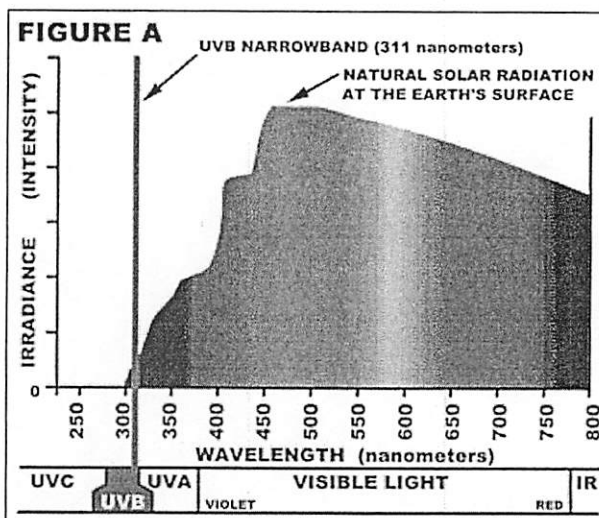
And for a more detailed explanation:

## Understanding Narrowband UVB Phototherapy

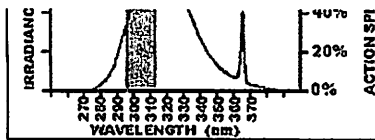
"Narrowband" UVB (UVB-NB) has become the phototherapy treatment of choice for psoriasis, vitiligo, atopic dermatitis (eczema) and other photoresponsive skin disorders. Understanding the benefits of "Narrowband" UVB versus conventional "Broadband" UVB phototherapy requires an understanding of light and the processes it affects.

The spectrum of optical radiation (light) is made up of different wavelengths of "light" ranging from 100 nanometers (nm) in the ultraviolet (UV) range to 1 millimeter (mm) in the infrared (IR) range. Visible light spans from about 380nm (violet) to 780nm (red) and are the "colors" that we see with our eyes. Ultraviolet is invisible and ranges from 380nm down to 100nm, and is further subdivided into UVA (315-380nm), UVB (280-315nm) and UVC (100-280nm).

Figure A shows the relative intensities of natural "light" reaching the earth's surface after filtering by the earth's atmosphere. Humans have evolved being exposed to all these wavelengths, so our skin has developed responses to use the light beneficially and to protect us from over-exposure (tanning). "UVB Narrowband" is highlighted at 311nm and occurs naturally in sunlight, but not in great amounts. The earth's atmosphere filters nearly all light less than 290 to 300nm, depending on solar conditions.

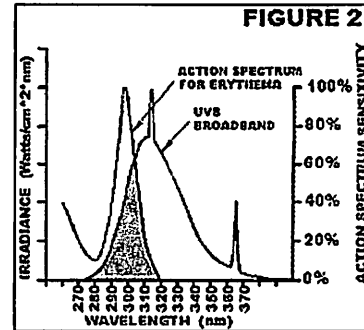


Different wavelengths of "light" produce different effects on materials. Many important processes have been scientifically studied to determine the relative contribution of each wavelength to the studied process. Graphs known as "action spectrum" are used to describe these relationships. The greater the "action spectrum sensitivity", the more responsive is the process to that wavelength.

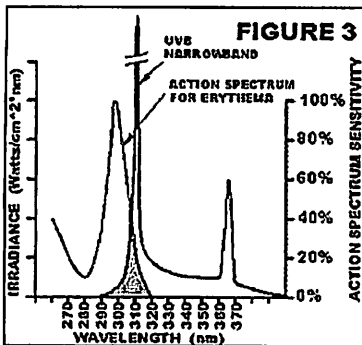


The action spectrum for Psoriasis has been studied<sup>1 2</sup> to determine that the most therapeutic wavelengths are 296 to 313 nm. Conventional UVB Broadband lamps cover this range and have been used successfully for many years. **Figure 1**

The action spectrum for "sunburning" of human skin, also known as "erythema", has also been studied. Erythema is dominated by the lower wavelengths (less than 305nm) of the UVB range. Unfortunately, conventional UVB Broadband lamps produce a large amount of "light" in this erythemogenic range. These wavelengths produce burning but have little therapeutic value. What's more, the onset of burning is normally the limiting factor in the amount of UVB that can be administered<sup>3</sup> and erythema is a major risk factor for skin cancer. Erythema also causes patient discomfort, which may discourage some patients from taking treatments. The grey shaded area in **Figure 2** gives a graphical representation of the substantial erythemogenic content of UVB Broadband lamps.



**So why not develop a light source that produces most of its output in the psoriasis action spectrum and minimizes light in the erythema action spectrum?**



In the late 1980's, Philips Lighting of Holland developed just such a lamp, known as the "TL-01" or "UVB Narrowband" lamp. The smaller grey shaded area in **Figure 3** shows that UVB Narrowband lamps have considerably less erythemogenic output (sunburning potential) than conventional UVB Broadband lamps. This means that more therapeutic UVB can be delivered before erythema occurs. And since erythema is a risk factor for skin cancer, these new lamps should theoretically be less carcinogenic for the same therapeutic results.<sup>4 5 6</sup>

<sup>7</sup> Furthermore, and critical to the success witnessed by home UVB-Narrowband phototherapy, it becomes much more possible that the disease is controlled without ever reaching the erythemogenic threshold<sup>9 10</sup>, which was always a problem with UVB Broadband treatments. With the goal being to minimize the total cumulative dosage of erythemogenic ultraviolet light in a patient's lifetime, it follows that younger people should consider using UVB Narrowband. It is interesting to note that the peak of the UVB-Narrowband curve is about ten times higher than the UVB-Broadband curve, thus the source of the name "Narrow Band".

More recent studies have confirmed these findings and also determined that UVB Narrowband has fewer burning incidents and longer remission periods than UVB Broadband. When compared to PUVA, UVB Narrowband has significantly fewer side effects and has replaced it in many cases.<sup>8</sup> UVB Narrowband is also capable of producing good therapeutic results without the patient ever reaching the erythemogenic threshold.<sup>9 10</sup>

One disadvantage of UVB Narrowband is that, because the maximum dosage is limited by the onset of slight erythema, and UVB Narrowband is less erythemogenic than UVB Broadband, longer treatment times are required. This can be compensated by increasing the number of bulbs in the device.<sup>4 5 6 7</sup> For instance, based on Solarc's home phototherapy **after sales follow-ups**, for UVB Broadband the 4-bulb 1740UVB provides reasonable treatment times; whereas for UVB Narrowband, the 8-bulb 1780UVB-NB is the preference. (For skin types I to III; which is generally white caucasians.) The theoretical ratio of erythemogenic potential of UVB-Broadband to UVB-Narrowband is in the range of 4:1 to 5:1.

Other diseases such as vitiligo, mycosis fungoides (CTCL), and many others have also been successfully treated with UVB Narrowband, generally for the same reasons as described above for psoriasis. UVB Narrowband also has applications for vitamin D3 photosynthesis in human skin; a subject receiving increasing attention. As a side note, it is interesting that one of the most commonly prescribed topical creams for psoriasis: Calcipotriol (trade name: Dovonex®) is actually a vitamin D derivative and is sometimes referred to as "sunshine in a tube".

The prevailing opinion in the dermatology community is that UVB Narrowband will largely replace UVB Broadband as a treatment option, especially for home phototherapy. This is clearly supported by Solarc Systems' trend in home phototherapy equipment sales, with the sales of UVB-NB devices now outpacing UVB-BB sales by at least 20:1. However, UVB Broadband will likely always have a role. Solarc's UVB Narrowband models have an "UVB-NB" suffix in the model number, such as 1780UVB-NB. Solarc's UVB Broadband models have only a "UVB" suffix, such as 1740UVB.

Solarc Systems would like to thank the good people at Philips Lighting for developing the UVB-Narrowband product line, and helping so many of us worldwide manage our skin problems safely and efficiently.

**Note:** The figures used in this document are simplified representations. The UVB Broadband curve is derived from the Solarc/SolRx 1740UVB and the UVB Narrowband curve is derived from the Solarc/SolRx 1760UVB-NB.

We encourage you to research this important topic further.

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#### References:

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- <sup>7</sup> GREEN C, FERGUSON J, LAKSHMIPATHI T, JOHNSON B 311 UV phototherapy - An effective treatment for psoriasis. Department of Dermatology, University of Dundee
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- <sup>9</sup> WALTERS I, (1999) Suberythemogenic narrow-band UVB is markedly more effective than conventional UVB in treatment of psoriasis vulgaris. J Am Acad Dermatol 1999;40:893-900
- <sup>10</sup> HAYKAL K-A, DESGROSEILLIERS J-P (2006)

#### **Are Narrow-band Ultraviolet B Home Units a Viable Option for Continuous or Maintenance Therapy of Photoresponsive Skin Diseases?**

Journal of Cutaneous Medicine & Surgery, Volume 10, Issue 5 : 234-240

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Physician approval / prescription is required for all ultraviolet home phototherapy device and UV bulb orders.

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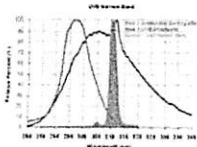
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Solarc Narrowband UVB Home



For Patients  
**Phototherapy Patient Information**



UVB light wavelengths (narrowband UVB in green)

**Narrowband UVB Light Therapy (NB-UVB)**

A UVB narrowband lamp emits safe light energy. **Narrowband UVB lights** (NB-UVB) comprises a subset of the UVB spectrum centered at roughly 311 nm. This is less than 1% of total range of wavelengths from sunlight.

**Narrowband UVB lamps (NB-UVB) are available on all National Biological home Phototherapy units.**

Of course, your doctor may prescribe another wavelength such as UVA or UVB. We carry those wavelengths on many of our units also.

**Studies have shown that:**

- Narrow band UVB light treatment uses the optimal part of the UVB light spectrum which slows growth of psoriasis lesions or re-pigmentation of one's natural skin coloring.
- Exposure time of narrowband UVB lamps can be longer than with traditional broadband UVB yielding more effective results. Recent studies have shown 75% clearing (PASI 75) with narrowband UVB.
- Erythral response (similar to sunburn) is nearly eliminated with narrowband UVB light.
- Risks and side effects of other treatments such as systemic drugs have not been found with narrowband UVB light therapy.

**NB-UVB therapeutic advantages for your skin condition**

- **Psoriasis** - Narrowband UVB light treatment provide faster clearing, less sun burning, and more complete disease resolution than traditional UVB and is much safer than biologics.
- **Vitiligo** - Narrowband UVB lights are proving to be very useful in the treatment of Vitiligo. Narrowband UVB light treatment is replacing traditional PUVA phototherapy treatment. UVB narrowband lamps for vitiligo require no photo-sensitizing agents.

**Find the right narrowband UVB light unit**

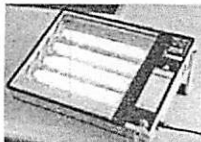
- Panosol 3D<sup>®</sup>
- Handisol II<sup>®</sup>
- DermaLume 2X<sup>™</sup>
- Equipment Selection Guide

Contact us to discuss a home Phototherapy unit today.

*Covered by most insurance carriers. Federal law restricts the sale of this device by or on the order of a physician. We are the only company certified to ship phototherapy units to Canada.*



Narrowband UVB lamps are available on all units. (Panosol-3D<sup>®</sup> pictured)



Handisol II<sup>®</sup> with narrowband UVB lamps



DermaLume 2X<sup>®</sup> with narrowband UVB lights

**Guides For Patients**

- Equipment Selection Guide
- Product Comparison Chart
- Insurance Guide

**Popular Home Phototherapy Units**

- Panosol 3D<sup>®</sup> Multidirectional NB-UVB
- Handisol II<sup>®</sup> Mobile Therapy
- DermaLume 2X<sup>™</sup> Handheld Wand Lamps and Goggles

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