

Heat and light – a therapeutic combination

When applied individually, the use of heat and light is extremely widespread in human as well as veterinary medicine. When it comes to heat, everyone is familiar with the therapeutic benefits of warming substances, warming compresses, and heat lamps in particular. They generally take effect by promoting the circulation, and this can for example relax the musculature, improve lymphatic drainage, and so forth.

If one compares heat lamps with products that combine heat and light, one is initially struck by the fact that they both radiate red light. In the case of heat lamps, this red light nevertheless merely serves to raise the temperature. By contrast, the red light in the therapy devices that are currently available - such as tendon boots or flat pads - is produced by LEDs which only heat up to a negligible extent: what matters here is the wavelength of the light.

Ever since the 1960s there have been numerous scientific studies concerning treatment with low-energy light; nonetheless, this form of therapy still has something mystical or “esoteric” about it, particularly from the standpoint of academic medicine. The fact that the latter takes a very critical view - to say the least - of this form of treatment is firstly because the studies that have examined wavelengths, the strength and density of radiation, the length of treatment (and the intervals between treatments) have varied greatly; secondly, the mode of action has not yet been fully explained.

If white light is passed through a prism, it is refracted twice and the colors of the spectrum (from short-wave ultraviolet right through to long-wave infrared) are displayed, i.e. with wavelengths ranging from approx. 370 nm through to approx. 800 nm.

Or to put it another way: the light from an incandescent bulb (for example) - namely white light - is composed of

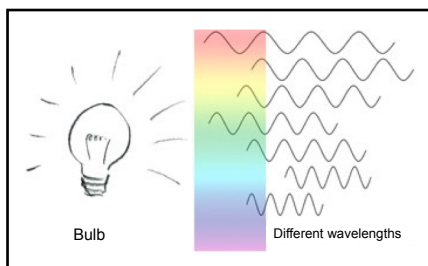
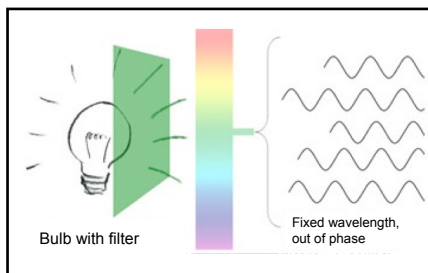


Fig. 1: White light

many different colors, and thus different wavelengths too.

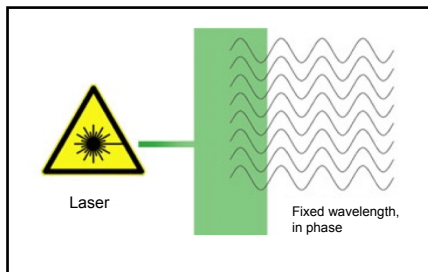
The photons are not only to be found on different wavelengths: in addition, some of them are located in the trough of the wave, some on the peak, and most of them somewhere in between.

However, if we add a color filter we end up with a uniform wavelength, whereas the energy state of the photons still lacks any sort of order.



Abf. 2: gekleurd licht

This changes if - in addition to the color filter - the phases of the waves are synchronized, thereby producing laser light.



Abf. 3: Laser light

Almost as soon as the laser had been developed, studies were able to demonstrate that synchronization of the individual phases is not required for most indications; it is often sufficient to use the corresponding wavelength.

But why red light in particular? Whenever light hits the skin, it is absorbed to a greater or lesser extent and the rate of absorption is firstly determined by the wavelength of the light and secondly by the substance that the light comes into contact with. Three components of the skin/cells should primarily be mentioned at this point: water, hemoglobin, and melanin. The corresponding absorption curves are shown in Fig. 4.

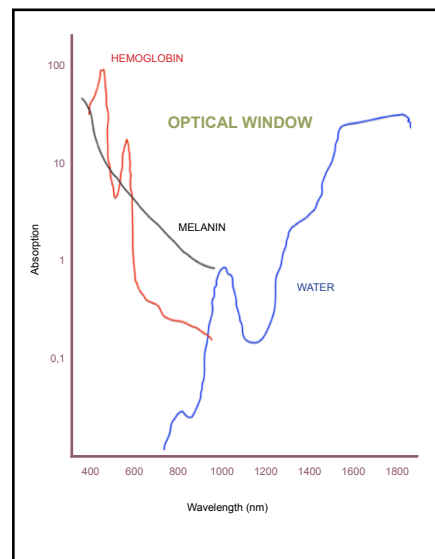


Fig. 4: Absorption curves

One is thus left with an “optical window” via which the light can penetrate the skin; maximum penetration is achieved if the wavelength is approximately 1200 nm. However, we also need a receptor for the photons in order to register any effect.

The individual cells contain mitochondria (in the form of organelles), and this is where energy is obtained by means of the respiratory chain. Cytochrome c oxidases are some of the most important enzymes in the respiratory chain, and they all respond to wavelengths of approx. 630 nm. One therefore needs to realize that this light therapy is not based upon thermal activity, but chemical activity instead. Activating the cytochrome c oxidases via the light of a defined wavelength initiates a chemical reaction which is similar to photosynthesis in plants.

These processes are identical in every

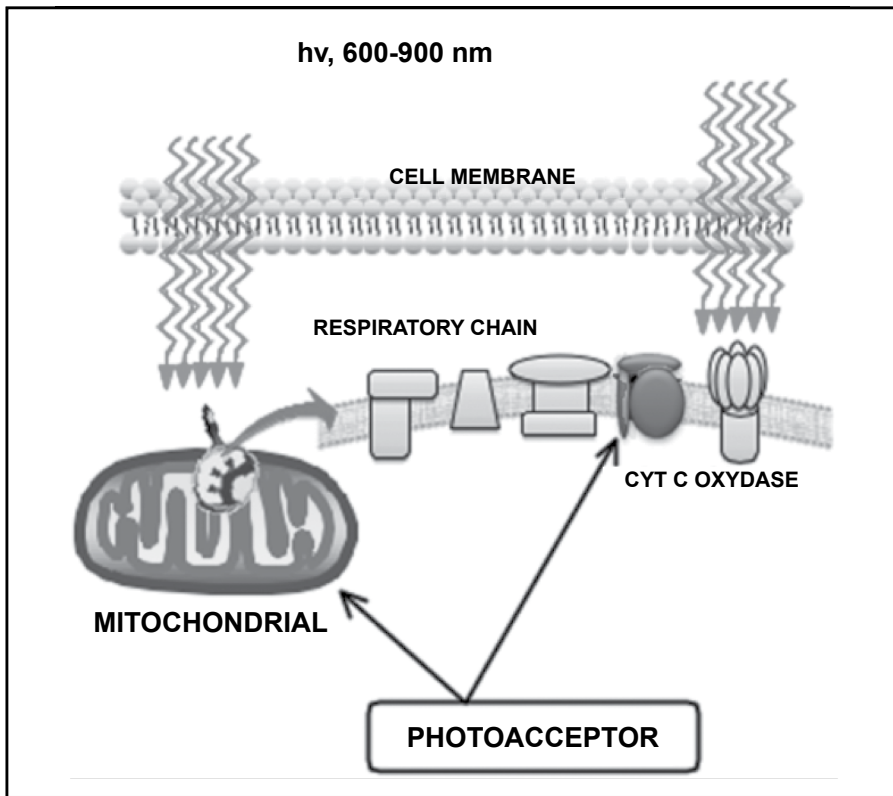


Fig. 5: Light therapy

cell, regardless of whether one is dealing with muscle cells, nerve cells, connective tissue cells, and so forth, so we can positively stimulate the respiratory chain

in the various types of tissue.

Some case studies should serve to illustrate the possible range of therapies.

Case Study 1 Froni

Froni is a Leonberger, and her problem is profound, active spondylosis which occasionally makes it almost impossible for her to stand up or lie down, as one can easily imagine if one looks at the X-ray. Drug-based pain therapy is out of the question for Froni because she can't really tolerate any sort of medication. She comes to the practice at irregular intervals and receives the combined heat and light therapy, which already leads to a significant improvement after only 20 minutes. Further measures are not required for the time being.

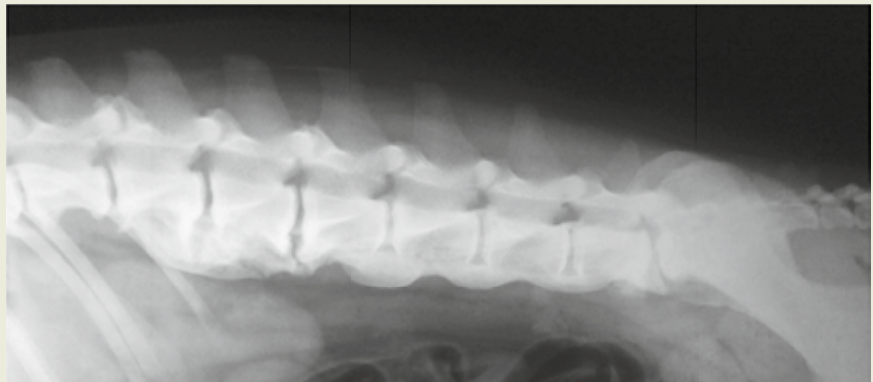


Fig. 6: X-ray of Froni: spondylosis



Fig. 7: Froni with Flat Pad

Erhard Schulze, Veterinarian

Erhard Schulze had his own practice from 1984 to 2010, specializing in horses and small animals. Since 1992 he has devoted himself to acupuncture and an additional qualification in "Acupuncture" from the Chamber of Veterinarians. He has published numerous articles about gold acupuncture and Yamamoto New Scalp Acupuncture in various journals and magazines. He has made regular presentations at national and international conferences such as IVAS (International Veterinary Acupuncture Society) and WATCVM (World Association of Traditional Chinese Veterinary Medicine), and has written a book about Yamamoto New Scalp Acupuncture. In 2014 he founded the Veterinary Center for Traditional Chinese Veterinary Medicine in Herne - www.tiecam.de

Case Study 2

Amadeus

Amadeus is a 19 year-old Dutch riding pony which has been trained to compete in dressage. A gall on the fetlock joint developed without any discernable external cause, and failed to properly respond to any kind of

treatment. The circumference reduced from 28.5 cm to 26 cm after the first treatment, although it swelled to 28 cm after 30 minutes. Amadeus duly received this treatment every day for a period of one month.

Treatment then became weekly, and after 3 months the gall on the fetlock joint had disappeared (Fig. 10).



Fig. 8: Amadeus beforehand



Fig. 9: Amadeus with tendon boot



Fig. 10: Amadeus afterwards

Case Study 3

Jamie

Jamie is an example of the fact that one can not only treat pain caused by orthopedic problems, but that internal medication can be supported too.

This tomcat suffers from Feline Urolo-

gical Syndrome (FUS), and tenses his entire back as a reaction to the pain in his kidneys; he noticeably relaxes while the treatment is being applied.



Fig. 11: Jamie

Summary and conclusions

This combined heat and light therapy provides us with a tool that can be used on its own as well as to support other therapeutic measures; it can also be used for prophylaxis. The various indications are derived from the mechanism that underlies light therapy. It can principally be applied to muscles and fasciae, tendons and joints, localized nerve damage, and for the treatment of pain. One major advantage is that heat and light can be controlled separately, thereby enabling one to also treat those cases — such as suppurating wounds — where the addition of heat is contraindicated.

New, innovative therapy options make it relatively simple and uncomplicated to use.

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