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PBM - Photobiomodulation of the retina

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A brighter horizon for age-related macular degeneration and retinal disorders

Age-related macular degeneration (AMD) is a disease associated with advancing age that affects a specific area of the retina, namely the macula. Two types of AMD can be detected: dry or wet. For dry AMD and certain retinal diseases, there is now a remedy based on photobiomodulation. Photobiomodulation (PBM) is a non-invasive treatment, which uses specific low-voltage light frequencies. It uses photons - infinitesimally small light particles already used to treat vision disorders and certain corneal diseases - which also treat retinal diseases.

How is photobiomodulation performed?

The treatment performed at the Switzerland Eye Research Institute (SERI Lugano) uses a light to direct a calibrated amount of energy onto the retina.

The entire procedure takes about ten minutes and does not require any anaesthesia or hospitalisation: the patient is discharged immediately after treatment. The patient sits in front of the device, fully awake, and does not feel any pain.

PBM consists of four phases: a first and a third phase with the eyes open, each phase lasting approximately 35 seconds, with the eyes being exposed to the wavelengths of yellow pulsed light and near-infrared radiation (NIR); a second and a fourth phase with eyes closed, each phase lasting 90 seconds, with exposure to the wavelengths of continuous red light. During treatment and immediately afterwards, the patients experience a sensation of glare and a slight feeling of heat, which they describe as very pleasant.

The retina

The retina forms the innermost layer of the eyeball. It is a delicate structure, particularly in the peripheral part and especially in myopic patients. It may undergo degenerative processes that cause thinning; these, in turn, may cause the detachment of the retina itself.

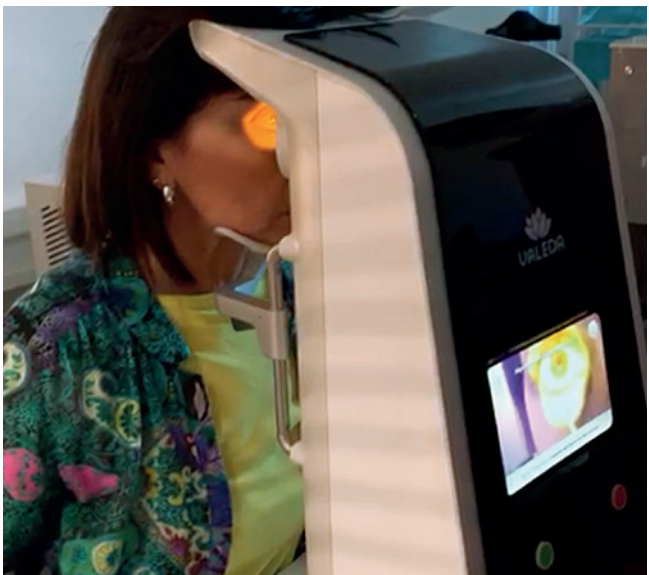
In particular conditions, holes or even lacerations in the retinal lining may occur: the tell-tale symptom is usually the perception of flashes or floating bodies (the so-called “flying flies”). Sometimes, however, the lesions are found during an eye examination even when there are no symptoms.

What is Photobiomodulation?

The mechanism of Photobiomodulation (PBM) at the cellular level comprises the irradiation of a pre-established frequency of light on the mitochondria - those microscopic components of the cells that produce the energy necessary to drive the biological functions of those very cells. This irradiation activates mitochondrial respiration, thus promoting cell proliferation and cytoprotection, i.e., the cells' ability to defend themselves.

How does Photobiomodulation act on the cells?

Photobiomodulation acts through the absorption of photons by the photoreceptors of the target tissue. In this way, increases in energy production and the supply of oxygen, nitric oxide and calcium occur at the cellular level. This slows down the aging process, delays cell death and improves cell survival.



The use of Photobiomodulation In medicine

Photobiomodulation is a painless, non-invasive process that stimulates a cellular response without damaging tissue. It is currently used in various fields of medicine and physiotherapy to treat arthritis, for wound repair, and to soothe trauma, sprains and heal musculoskeletal and ligament damage. Its benefits are also increasingly being recognized for certain neurological disorders, traumatic events such as stroke or global ischemia, degenerative diseases such as Alzheimer's or Parkinson's disease, and certain psychiatric disorders such as depression and anxiety.

Indications for Photobiomodulation treatment in ophthalmology

Photobiomodulation is indicated for the treatment of eye diseases and injuries, including inflammation, oedema, or deposition of drusen. It also contributes to wound healing following trauma or eye surgery. It leads to an increase in visual acuity and contrast sensitivity in patients with degenerative diseases, such as dry age-related macular degeneration.

The Switzerland Eye Research Institute (SERI Lugano) is a centre for research and innovation in vision science. Founded in Lugano in 2013, it offers solutions for all visual impairments (including presbyopia) through scientifically validated, non-invasive, bilateral procedures that are consistently pain-free.

SERI Lugano not only deals with the correction of visual defects, but also offers services recognized by LAMal (the Swiss Federal Law on Health Insurance) for personalized diagnosis and treatment in all areas of ophthalmology, from retinal disorders to pediatric ophthalmology.

Under its Scientific Director, Dr. Roberto Pinelli, SERI Lugano is continuously developing its research in the fields of vision science, medical ophthalmology, paediatric ophthalmology, and the use of nutraceuticals and light in ophthalmology.

SERI Lugano delivers a range of treatments, whether medical or involving a range of photon-based procedures, which are always in keeping with the most innovative, safe, and effective scientific developments. These results have been brought about through continuous ongoing research and state-of-the-art diagnostic and procedural tools and technology.

The treatment procedures are many and varied; the approach is completely personalized and based on the use of sophisticated equipment. The latest generation of advanced technology is always combined with the technical and interpersonal skills of the various specialists who work within the institute.

SERI Lugano is inspired by, and committed to, an institutional culture of excellence in the field of vision science and in patient satisfaction.

Switzerland Eye Research Institute SA (SERI Lugano)



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