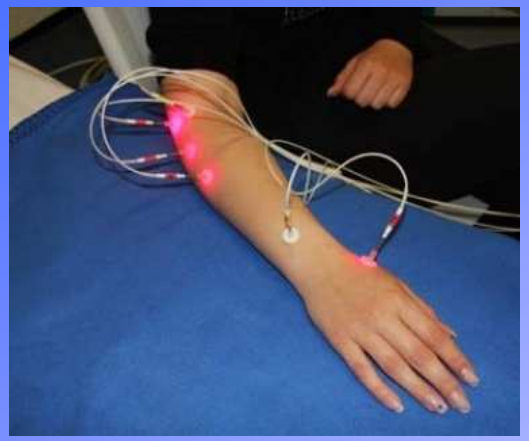
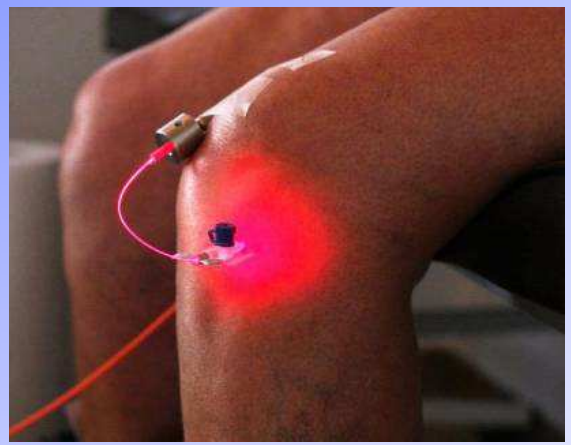
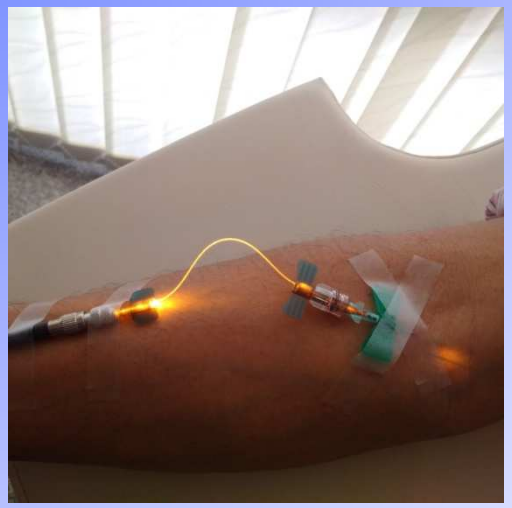
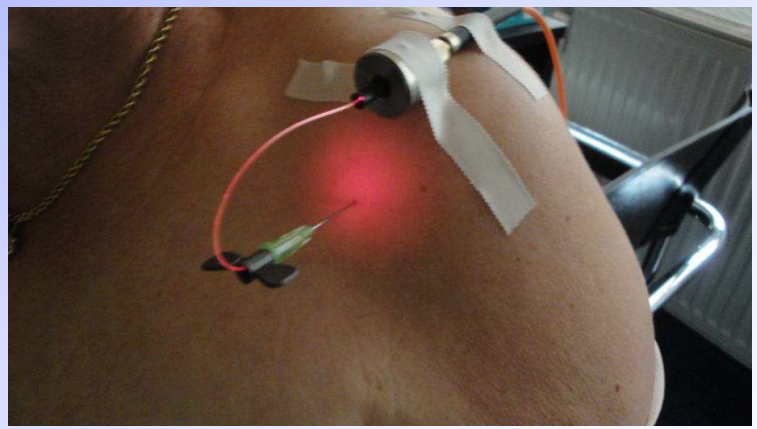
Michael H. Weber

Clinical Applications of Low- Intensity Lasertherapy









Weberinstitute for research and lasertherapy, Lauenförde & Göttingen,Germany

Topics

- Basics of laser physics and fiberoptic laser application
- Difference between externally and internally applied lasers
- Interstital, intraarticular and intravenous laser therapy
- Combination of lasers with PRP and stem cells
- Cosmetic laser therapy
- Photodynamic cancer therapy with different new photosensitizers and lasers
- New combinations of traditional photosensitizers with light sensitive chemodrugs and clinical results

Preliminary work in laser therapy

- Purpose of the invention in 2000 was to set up a modular new laser system for painfree therapy with multiple lasers of multiple points and areas of pain on the body simultaneously

- The system should be different from current ones which stimulate only one point or only one area and work normally with only one laser.

- Solution was a fiberoptic system for leading focussed laser beams on or in the body

Webermedical Germany

- 2003 Foundation of the new Webermedical GmbH, Germany

- Financial support for development of a new fiberoptic system with 12 channels with red and infrared laser by the Germany government and the European Union with 250 000 €

EGLA and ISLA Transcontinental

- 2006 Foundation of the scientific European Society for Biological Laser Therapy and Acupuncture
- 2012 Change to International Society for Medical Laser Applications **(ISLA transcontinental)**

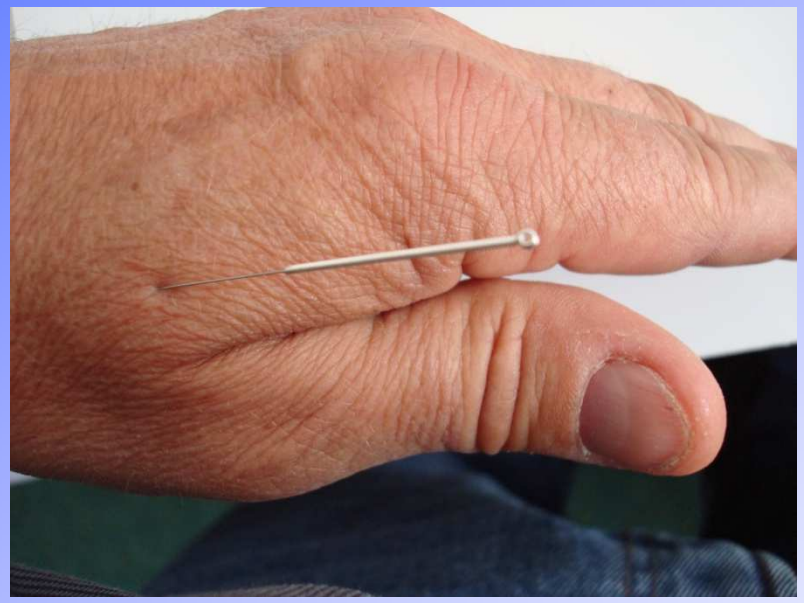
Presidents: Dr. M. Weber, Germany

(Clinical applications)

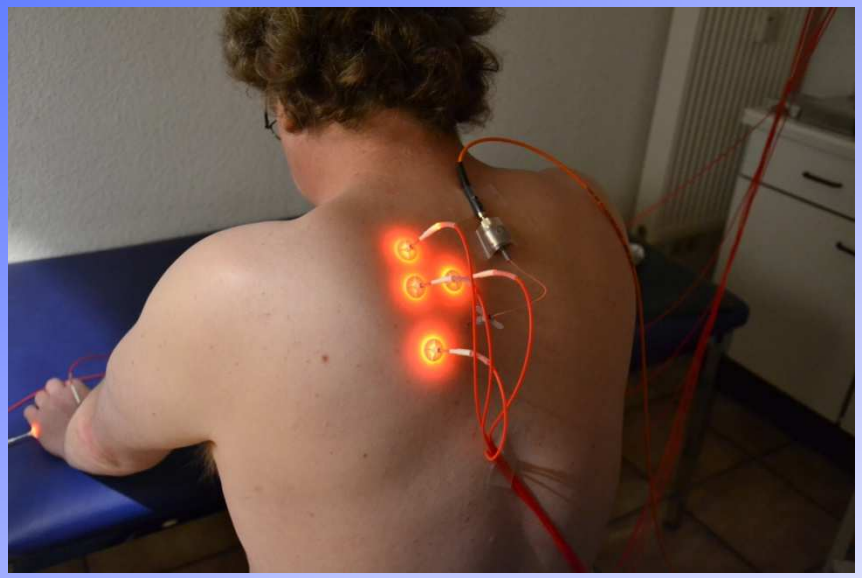
Prof. Dr. G. Litscher, Austria

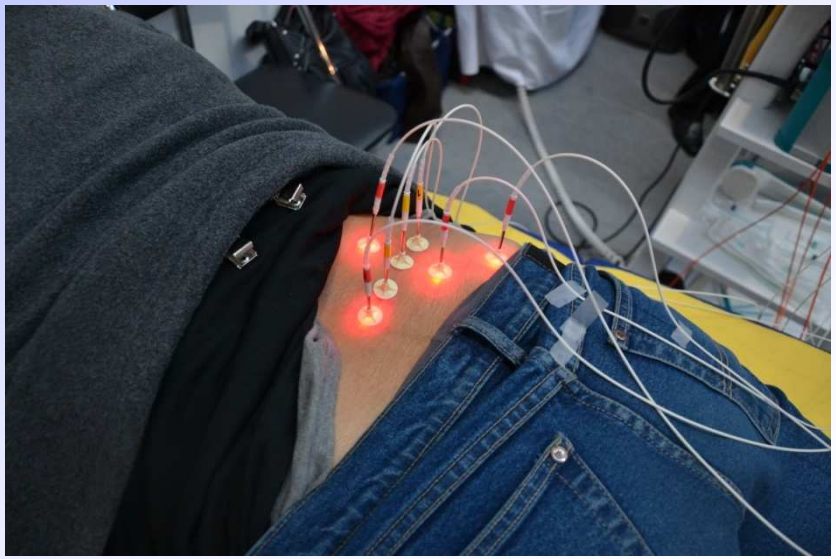
(Science)

The beginning:
Replacement of the metal needle by laserneedle für painfree acupuncture

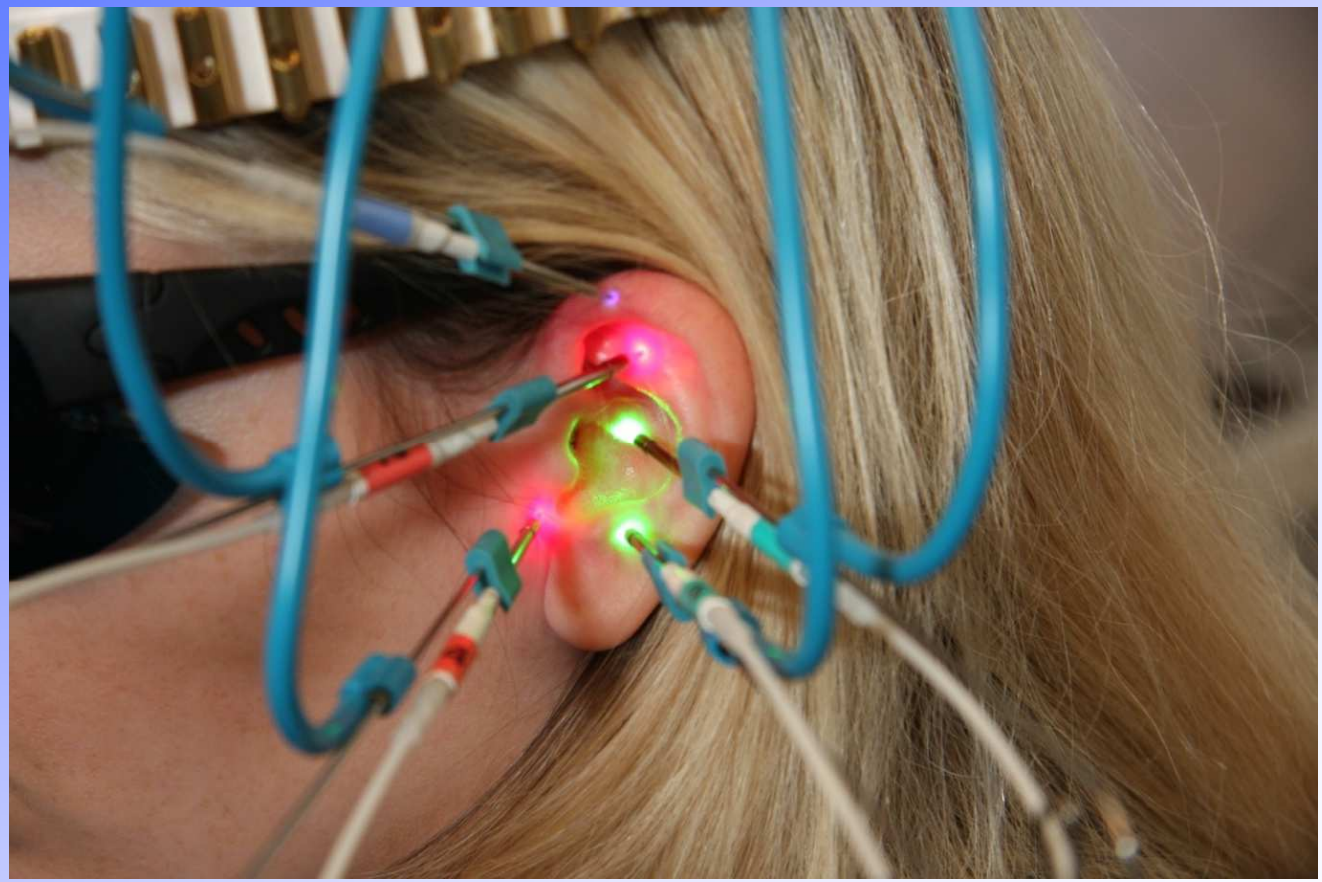


Use for acupuncture and trigger pints





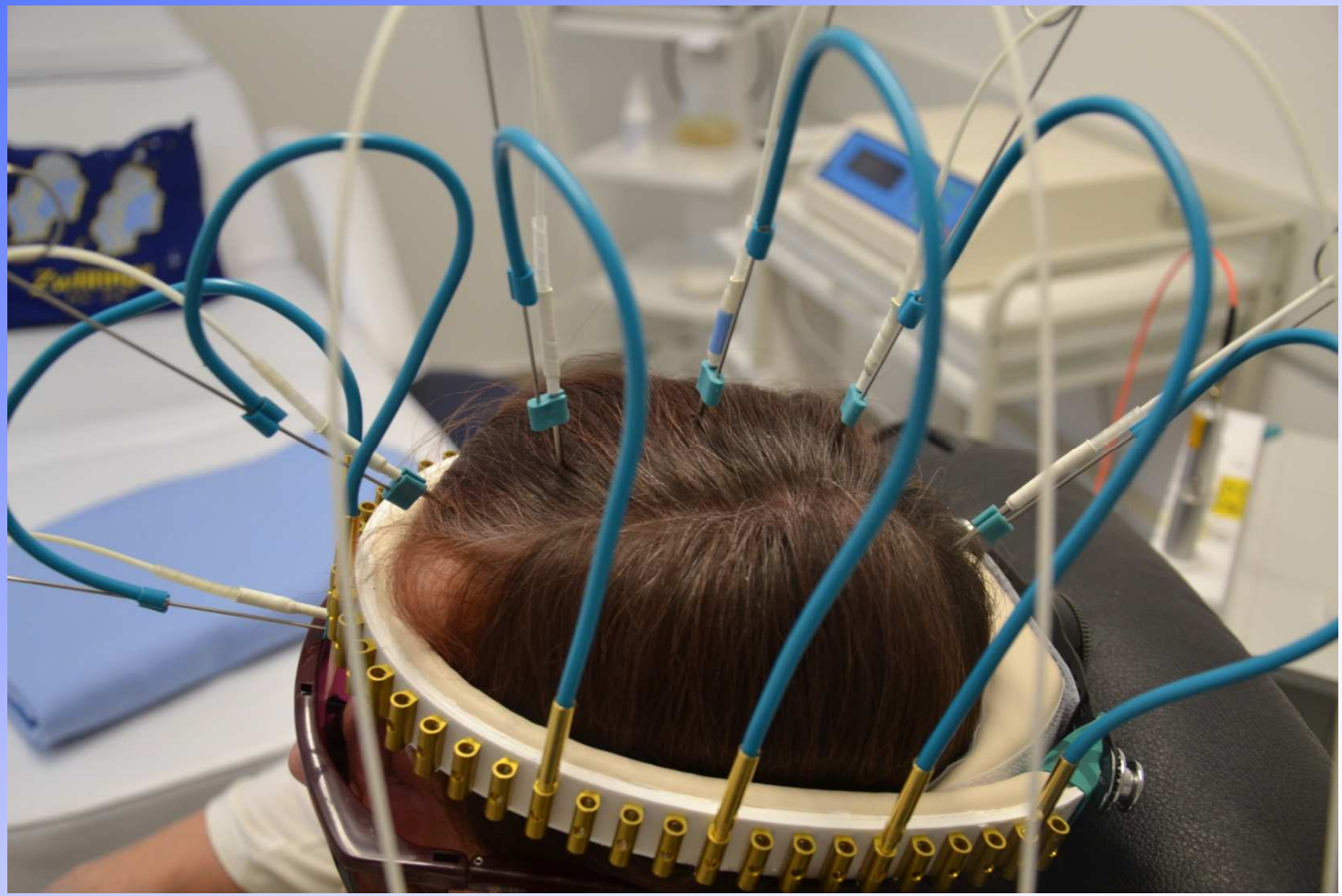
Use for ear acupuncture of pain



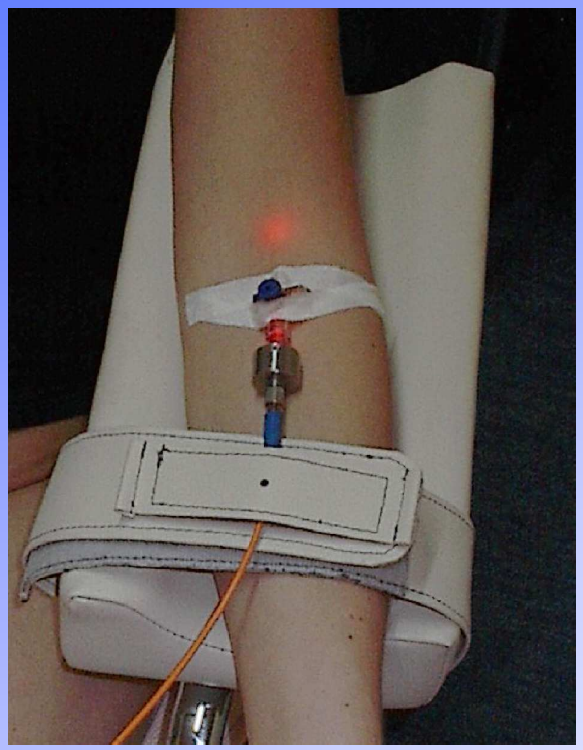
New headset for ear acupuncture

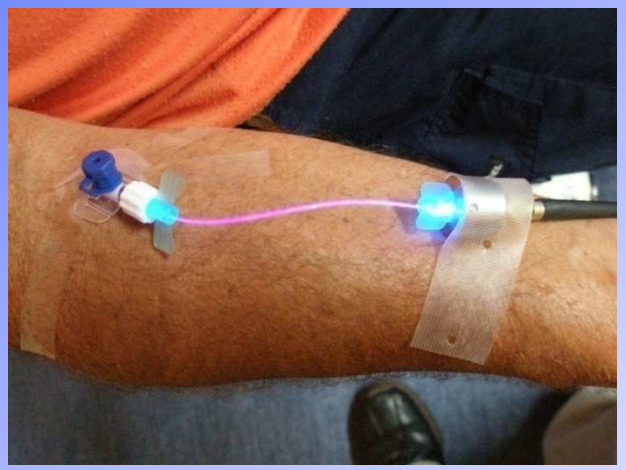
Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

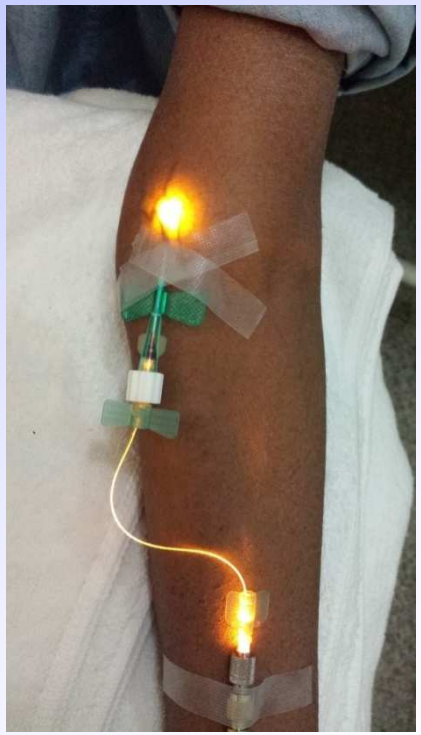
Use for skull acupuncture and transcranial laser therapy



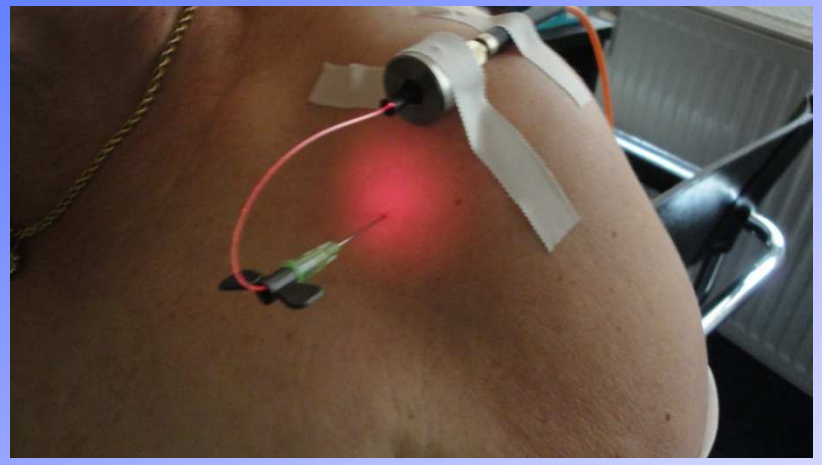
Use for intravenous laser therapy



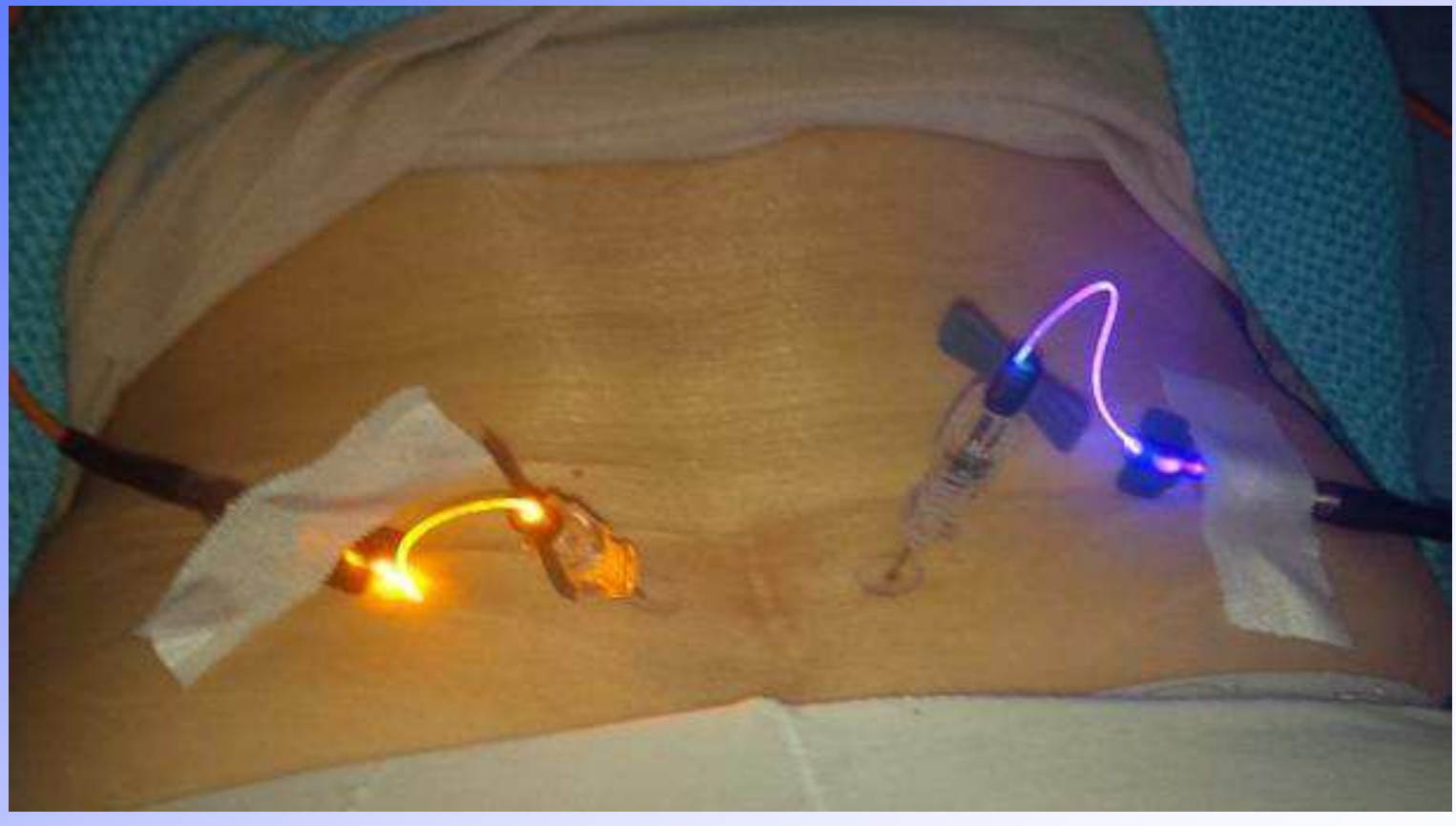




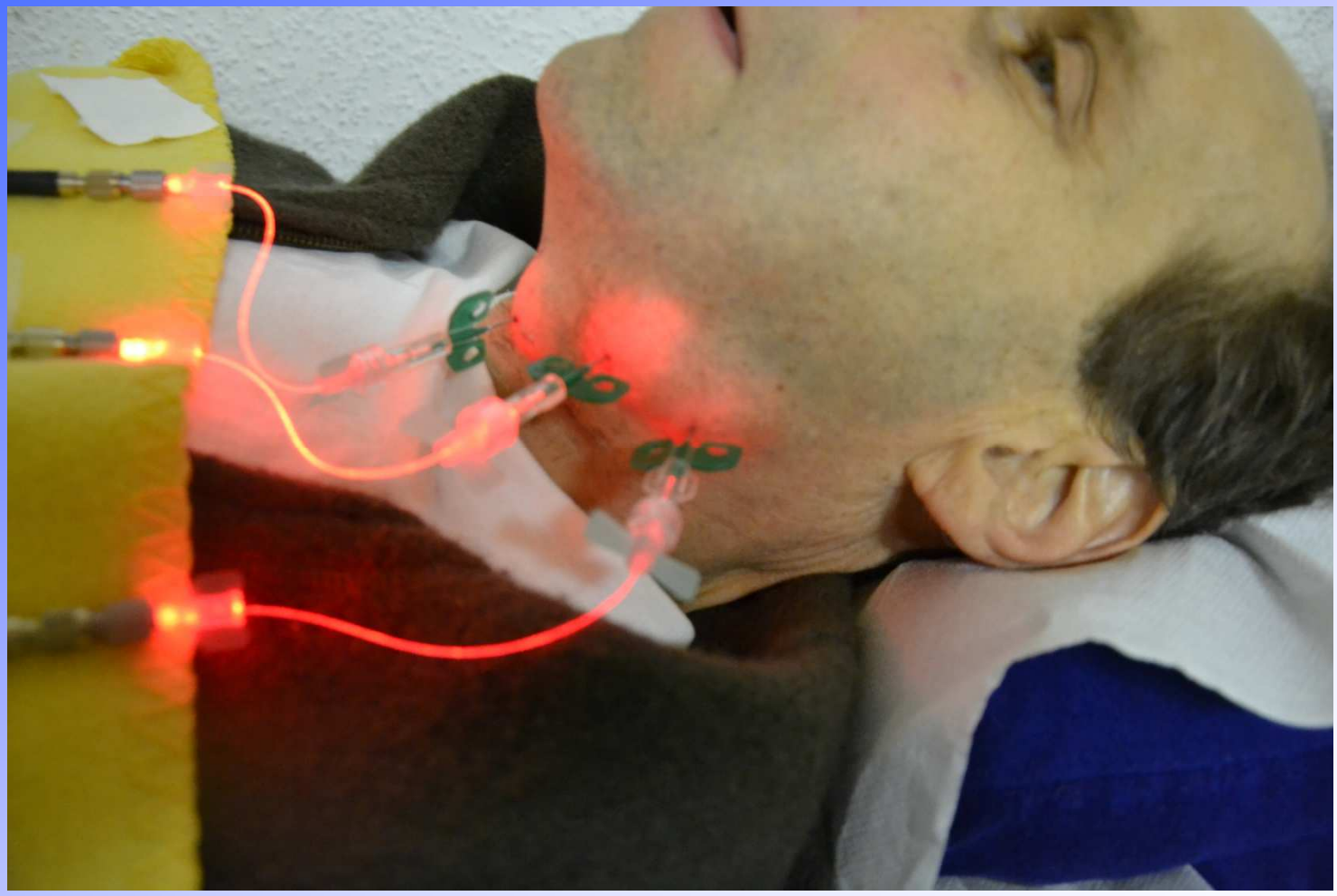
Use for interstitial and intraarticular laser therapy



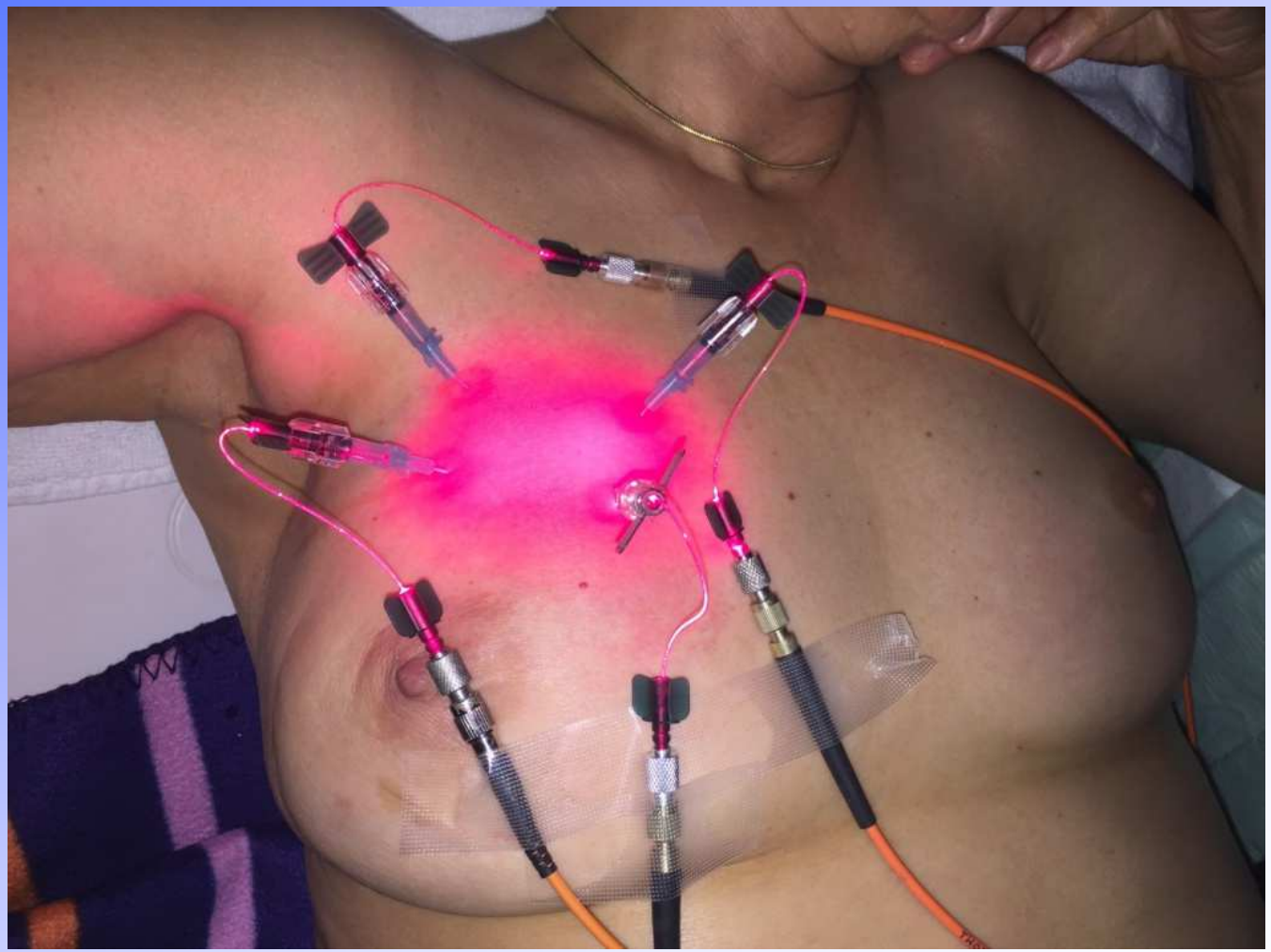
Use for interstitial spinal laser therapy



Use for interstitial photodynamic cancer therapy



Use for interstitial photodynamic cancer therapy



New Webermedical building with integrated Laser Research and Treatment Center (2013) in Lauenförde, Germany

New Webermedical building with integrated Laser Research and Treatment Center (2013)

CE-Certificate

TÜV NORD

EG-Zertifikat / *EC-Certificate*

gem. 93/42/EWG Anhang VI / *acc. 93/42/EEC Annex VI*

Reg.-Nr. / *Reg.-No.* 44 236 08 360287-001

Hiermit wird bescheinigt, dass die Firma / *This certifies, that the company*

weber medical GmbH

Sohnreystr. 6
37697 Lauenförde
Deutschland

für die Produkte / die Kategorie / *for the products / product category*
(Liste der Produkte siehe Anlage 1 / *List of products see annex 1*)

Lasernadelakupunktur, Epikutane und transkutane Lasertherapie

Laser needle acupuncture, epicutaneous and transcutaneous laser therapy

ein Qualitätssicherungssystem für die Endkontrolle der genannten Produkte nach Maßgabe des Anhang VI der Richtlinie 93/42/EWG für Medizinprodukte der Klasse IIa oder IIb anwendet. Die Übereinstimmung mit den Anforderungen wurde in einem Audit nachgewiesen. Zusätzlich zur CE-Kennzeichnung muss die Kennummer der Benannten Stelle angebracht werden. Die Gültigkeit dieses Zertifikats beruht auf der Aufrechterhaltung des Qualitätssicherungssystems in Übereinstimmung mit den Anforderungen der Richtlinie und seiner Überwachung durch die Benannte Stelle gem. Anhang VI Abschnitt 4. Das Zertifikat ist unter keinen Umständen übertragbar.

has established a quality system for final testing acc. to the requirements of Annex VI of the directive 93/42/EEC for medical devices of class IIa or IIb. Conformity with the requirements was proved within an audit. Additional to the CE-marking the notification number of the Notified Body has to be affixed. The validity of this certificate is based on the maintenance of the quality system in accordance with the requirements of the directive and its surveillance by the Notified Body according Annex VI section 4. The certificate may not be transferred under any circumstances.

TÜV NORD CERT GmbH, Langemarckstr. 20, D-45141 Essen
www.tuev-nord.de, medical@tuev-nord.de, ☎ +49 (0) 201-825-0, Fax +49 (0) 201-825-3243
Benannte Stelle Kenn-Nr. 0044
Notified Body ID. No. 0044

Aktenzeichen
File reference
2.4-1155/06

Ausstellungsdatum
Date of issue
2012-01-25 / ed. 2

Bericht Nr.
Report No.
11236395018

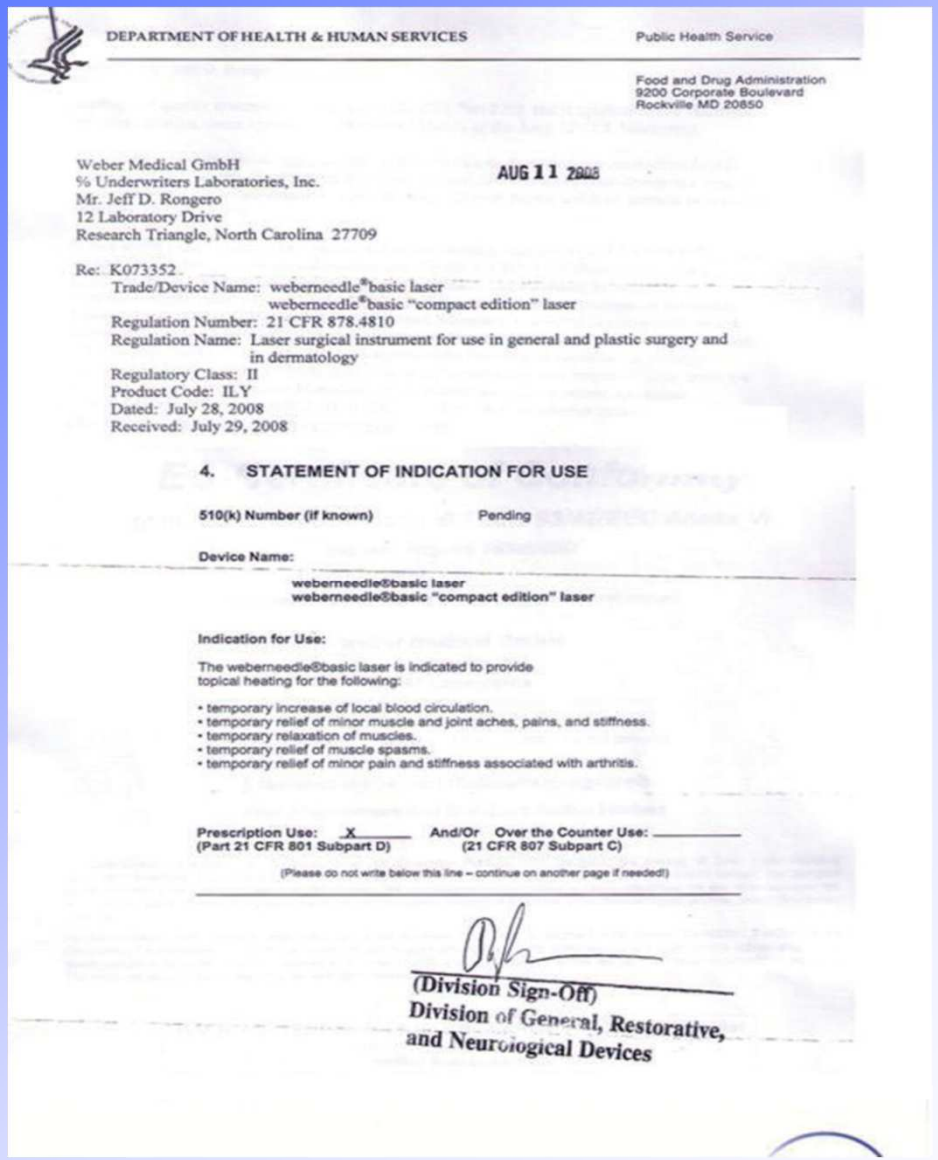
Benannt durch / *Notified by*
Anerkannt durch / *Recognized by*
ZLG, ZLS: www.zlg.de

Gültigkeit / *Validity*
von / *from* **2011-07-15**
bis / *until* **2014-07-14**

Michael Hartweg
Zertifizierungsstelle für Medizinprodukte
Certification body for medical devices

Vervielfältigung dieses Zertifikats nur unverändert zulässig. *Copies of this certificate only without changes.*

FDA Certificate, USA, 2007



DEPARTMENT OF HEALTH & HUMAN SERVICES — Public Health Service

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

Weber Medical GmbH
% Underwriters Laboratories, Inc.
Mr. Jeff D. Rongero
12 Laboratory Drive
Research Triangle, North Carolina 27709

AUG 11 2008

Re: K073352
Trade/Device Name: weberneedle®basic laser
weberneedle®basic "compact edition" laser
Regulation Number: 21 CFR 878.4810
Regulation Name: Laser surgical instrument for use in general and plastic surgery and in dermatology
Regulatory Class: II
Product Code: ILY
Dated: July 28, 2008
Received: July 29, 2008

4. STATEMENT OF INDICATION FOR USE

510(k) Number (if known) Pending

Device Name:

weberneedle®basic laser
weberneedle®basic "compact edition" laser

Indication for Use:

The weberneedle®basic laser is indicated to provide topical heating for the following:

- temporary increase of local blood circulation.
- temporary relief of minor muscle and joint aches, pains, and stiffness.
- temporary relaxation of muscles.
- temporary relief of muscle spasms.
- temporary relief of minor pain and stiffness associated with arthritis.

Prescription Use: X **And/Or Over the Counter Use:** _____
(Part 21 CFR 801 Subpart D) **(21 CFR 807 Subpart C)**

(Please do not write below this line – continue on another page if needed!)

(Division Sign-Off)
Division of General, Restorative, and Neurological Devices

Certificate Health Canada 2013

Santé Canada Health Canada

LN/NH: 91513

Therapeutic Products Directorate
Medical Devices Bureau
Direction des produits thérapeutiques
Bureau des matériels médicaux

Medical Device Licence — **Homologation d'un instrument médical**

Licence Number: 91513 **No d'homologation:**

First Issue Date: JUN 2 0 2013 **Première date de délivrance:**

Device Class/Classe de l'instrument: 3

This Licence is issued in accordance with the Medical Devices Regulations, Section 36, for the following medical device:

La présente homologation est délivrée en vertu de l'article 36 du Règlement sur les instruments médicaux pour l'instrument médical suivant:

Licence Name/Nom de l'homologation:
WEBERNEEDLE LASER SYSTEM

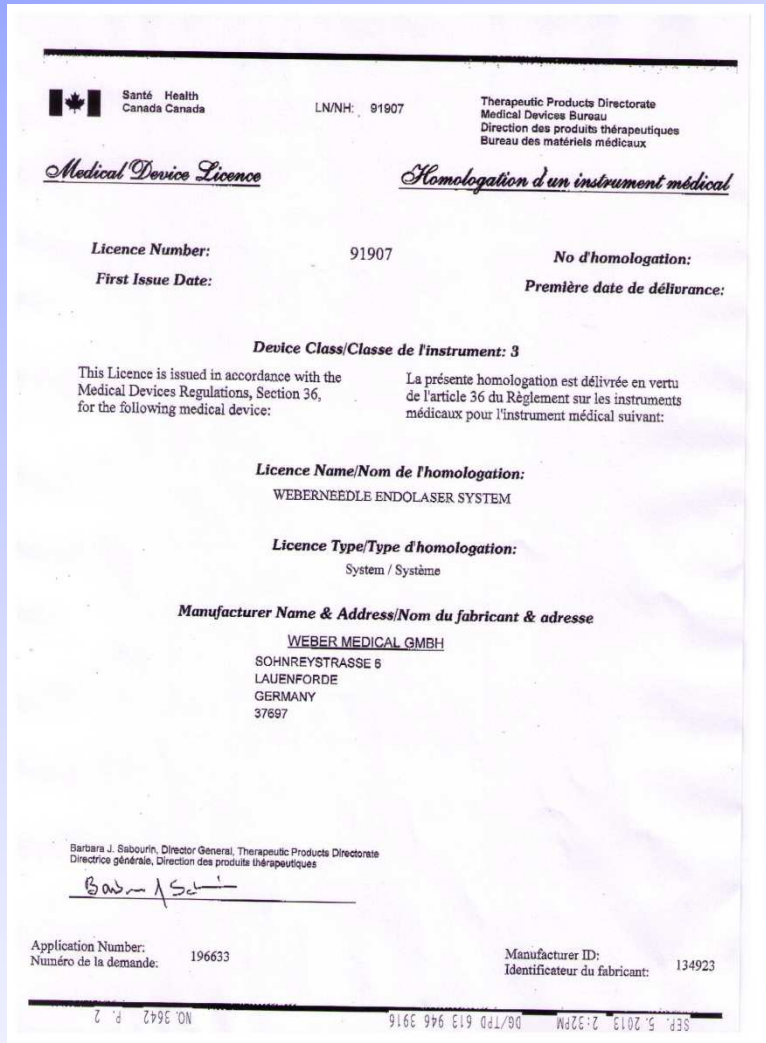
Licence Type/Type d'homologation:
System / Système

Manufacturer Name & Address/Nom du fabricant & adresse
WEBER MEDICAL GMBH
SOHNREYSTRASSE 6
LAUENFORDE
GERMANY
37697

Barbara J. Sabourin, Director General, Therapeutic Products Directorate
Directrice générale, Direction des produits thérapeutiques

Application Number: 196634
Numéro de la demande:

Manufacturer ID: 134923
Identificateur du fabricant:



Santé Canada Health Canada

LN/NH: 91907

Therapeutic Products Directorate
Medical Devices Bureau
Direction des produits thérapeutiques
Bureau des matériels médicaux

Medical Device Licence — **Homologation d'un instrument médical**

Licence Number: 91907 **No d'homologation:**

First Issue Date: **Première date de délivrance:**

Device Class/Classe de l'instrument: 3

This Licence is issued in accordance with the Medical Devices Regulations, Section 36, for the following medical device:

La présente homologation est délivrée en vertu de l'article 36 du Règlement sur les instruments médicaux pour l'instrument médical suivant:

Licence Name/Nom de l'homologation:
WEBERNEEDLE ENDOLASER SYSTEM

Licence Type/Type d'homologation:
System / Système

Manufacturer Name & Address/Nom du fabricant & adresse
WEBER MEDICAL GMBH
SOHNREYSTRASSE 6
LAUENFORDE
GERMANY
37697

Barbara J. Sabourin, Director General, Therapeutic Products Directorate
Directrice générale, Direction des produits thérapeutiques

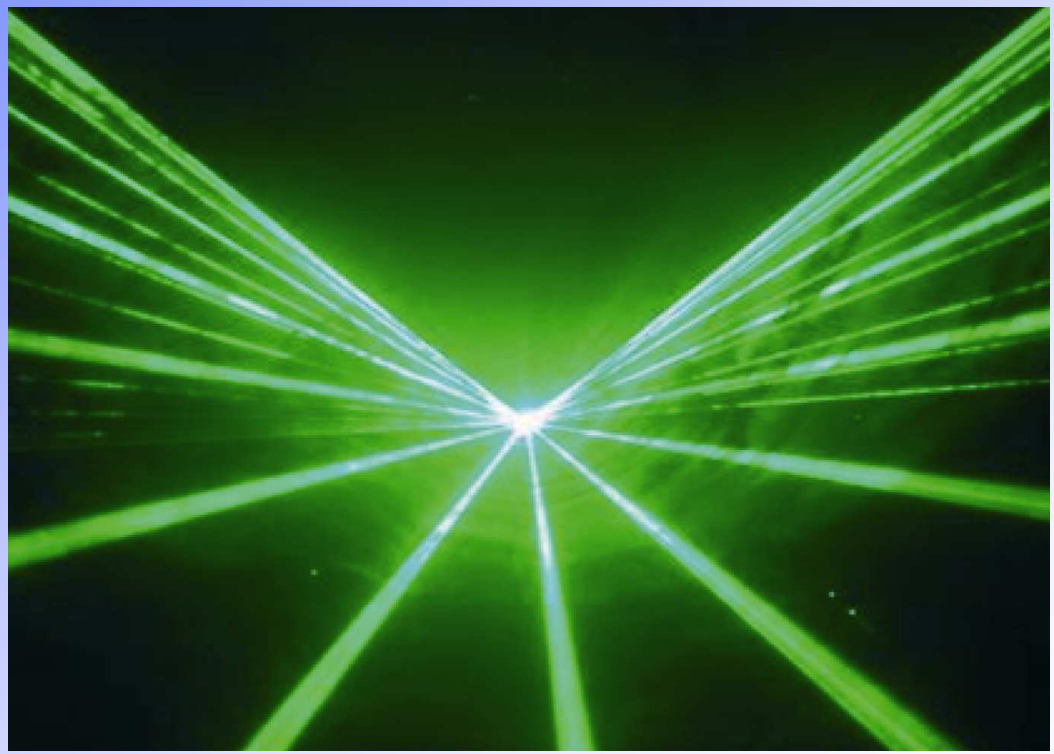
Application Number: 196633
Numéro de la demande:

Manufacturer ID: 134923
Identificateur du fabricant:

SEP. 5.2013 2:32PM DG/TPD 613 946 3916 NO. 3642 P. 2

What is light?

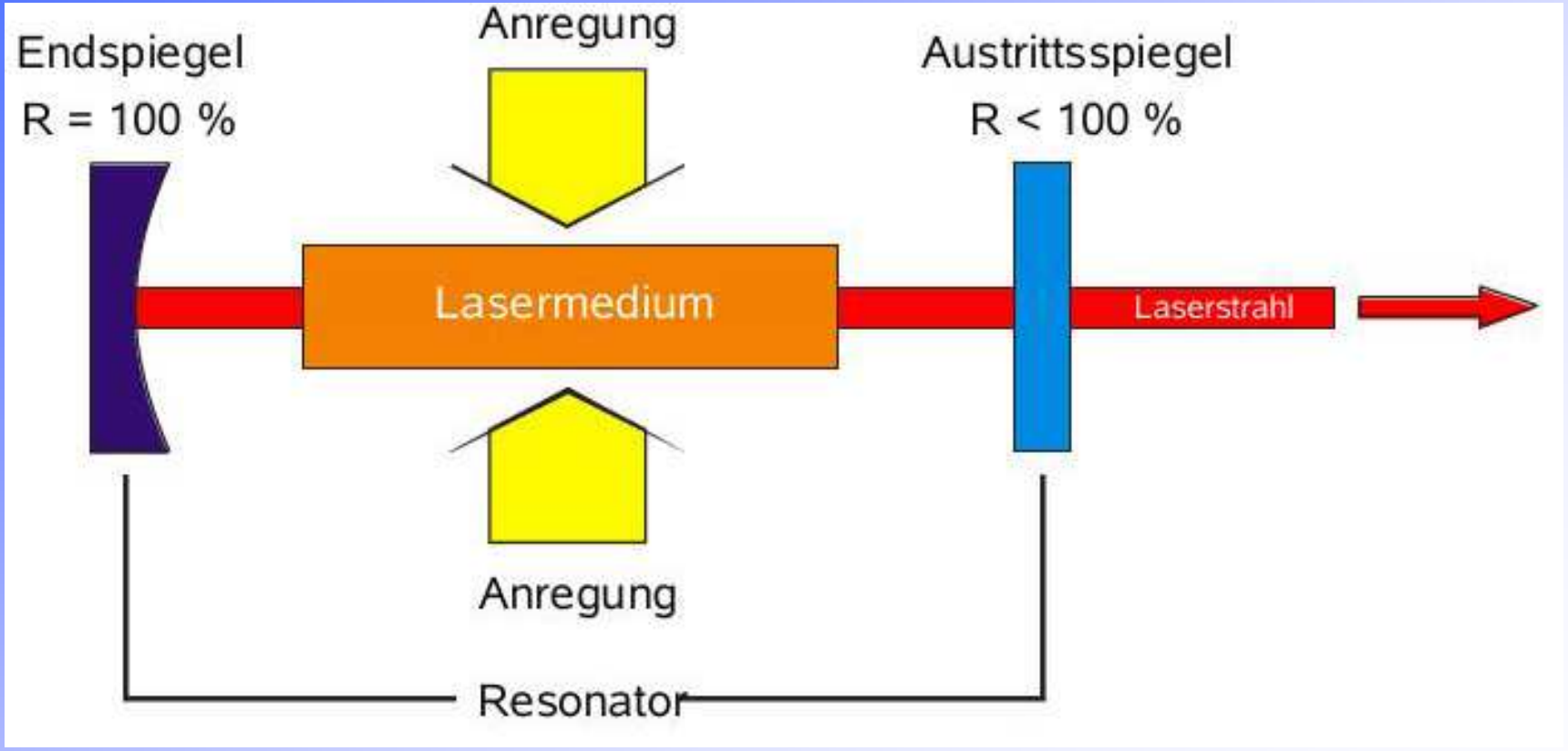
- Light can be described as electromagnetic waves
- Light can be described as particles: the photons
- We call it wave-particle dualism
- Light can have short and long wavelenghts



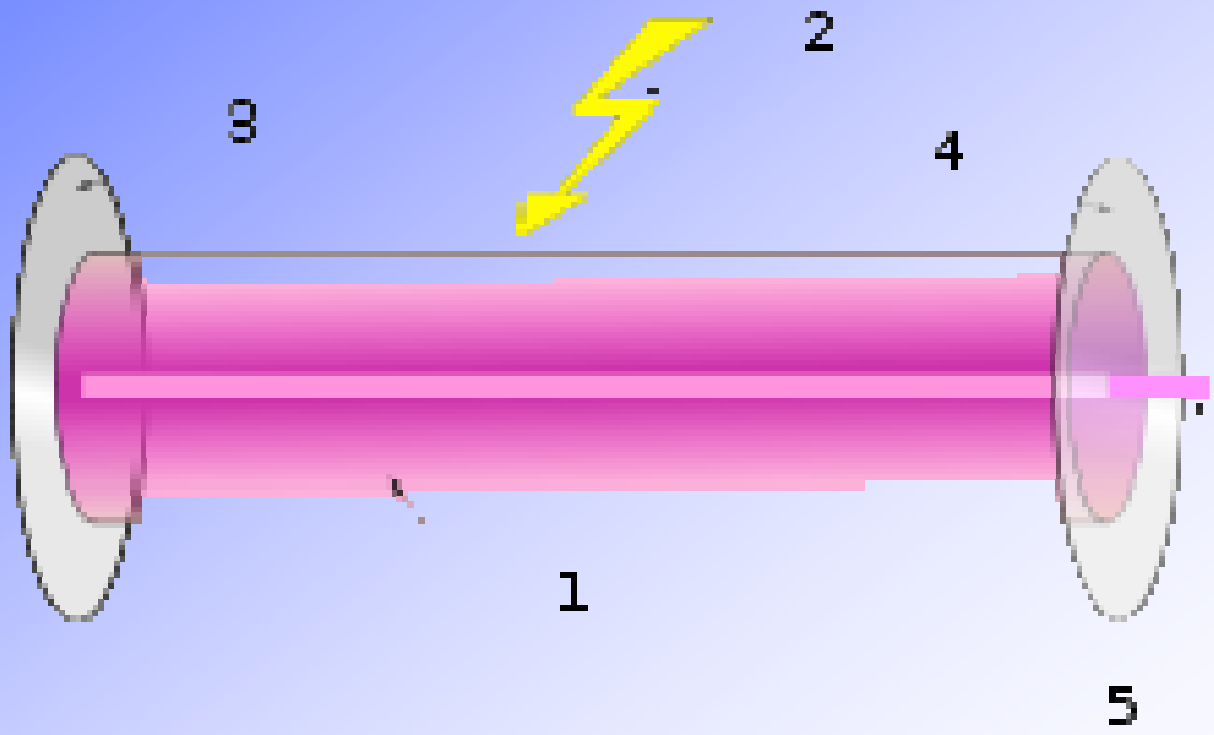
LASER
=

Light Amplification of
Stimulated Emission of
Radiation

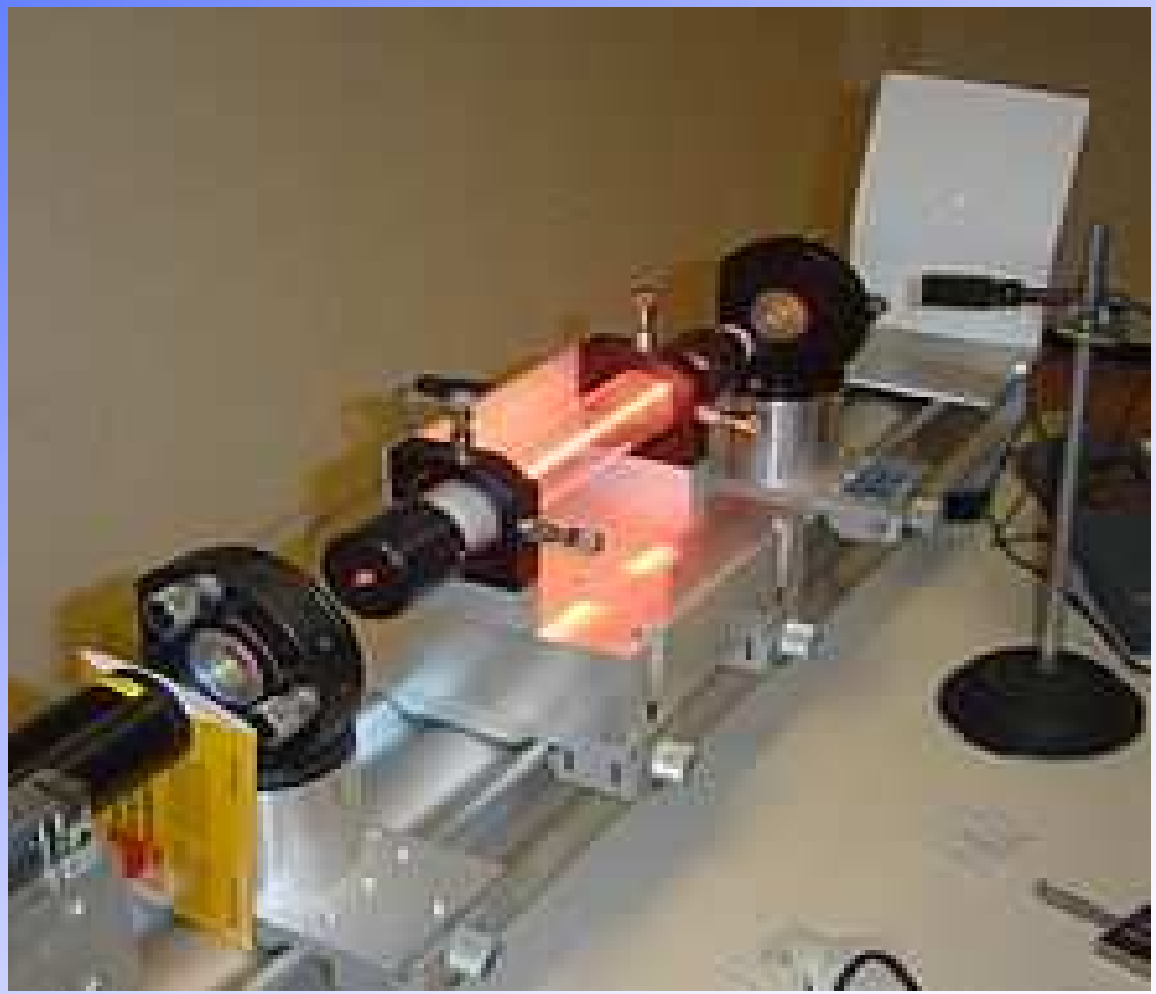
Principle of Lasers



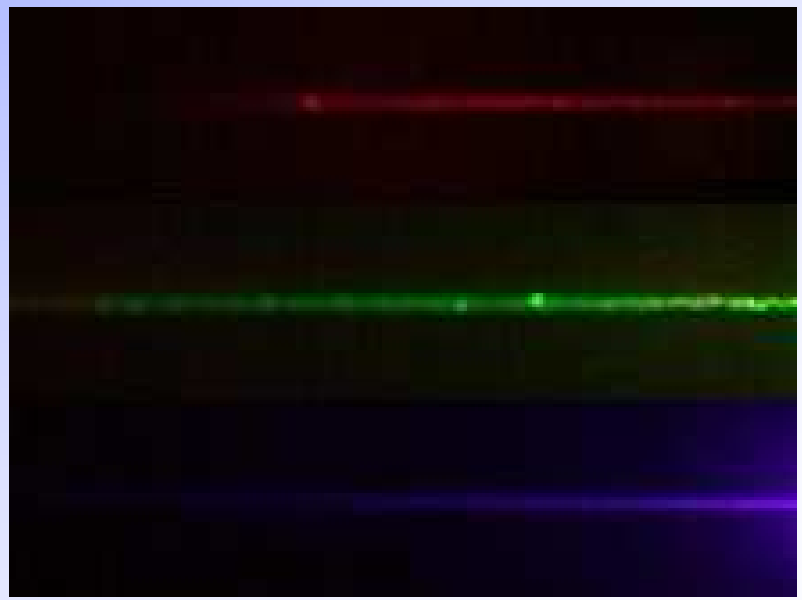
Gas laser



Gas laser



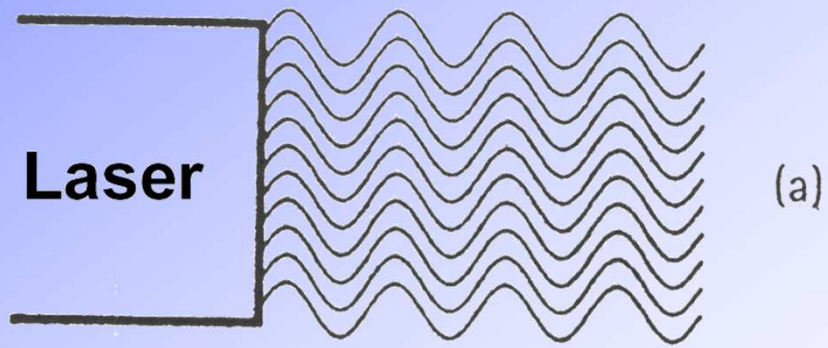
Diode laser



Difference between normal and laser light

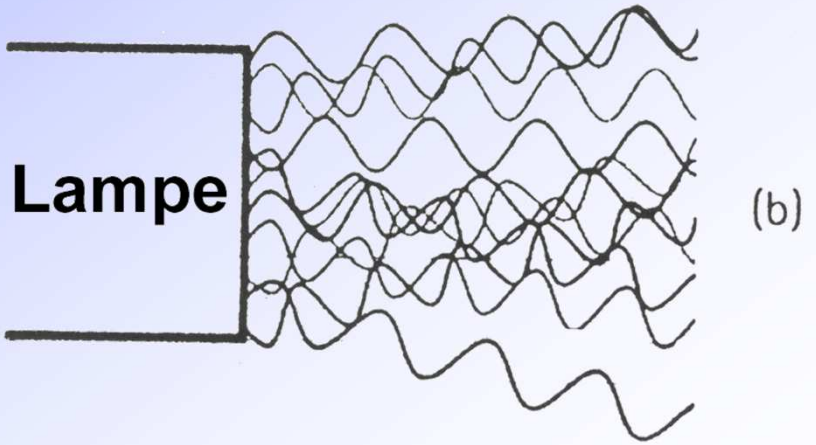
Laserlight

has a precise colour (Monochromasy) and is chracterized by an arranged photon stream (Coherence)



Conventional white light (bulb)

is a mixture of all colours, spreads in all directions



A number of very important terms used in laser physics

wavelength	Nm
frequency	Hz (waves/second)
power output	W or mW
energy	J (joules)
output intensity	W/cm^2
exposure energy	J/cm^2

Power and Energy

- Power in Watt (W) or Milliwatt (mW)
- Energy in Joule (J) or Millijoule (mJ)

- Example: Laser irradiation with 5 mW
  in1second = application of 5 mJ,
  in 10 seconds = application of 50 mJ.

- **Energy = Power x Time**

Power- and Energy density

- Power density = Watt/qcm
- Energy density = Joule/qcm

- Example

Irradiation of an area with 1 qcm with a 20 mW Laser = 20 mW/qcm.

Irradiation of an area with 1 qmm with a 20 mW Laser = 2000 mW (2W)/qcm.

Power- and Energy density

- For calculation of the energy density the values of the power density have to be multiplied with the time of laser application.

- Bear in mind: very often values have to be converted because different units are used in books or publications.

(f.e. W/qm, or mW/qm, or J/qmm/qcm/mm)

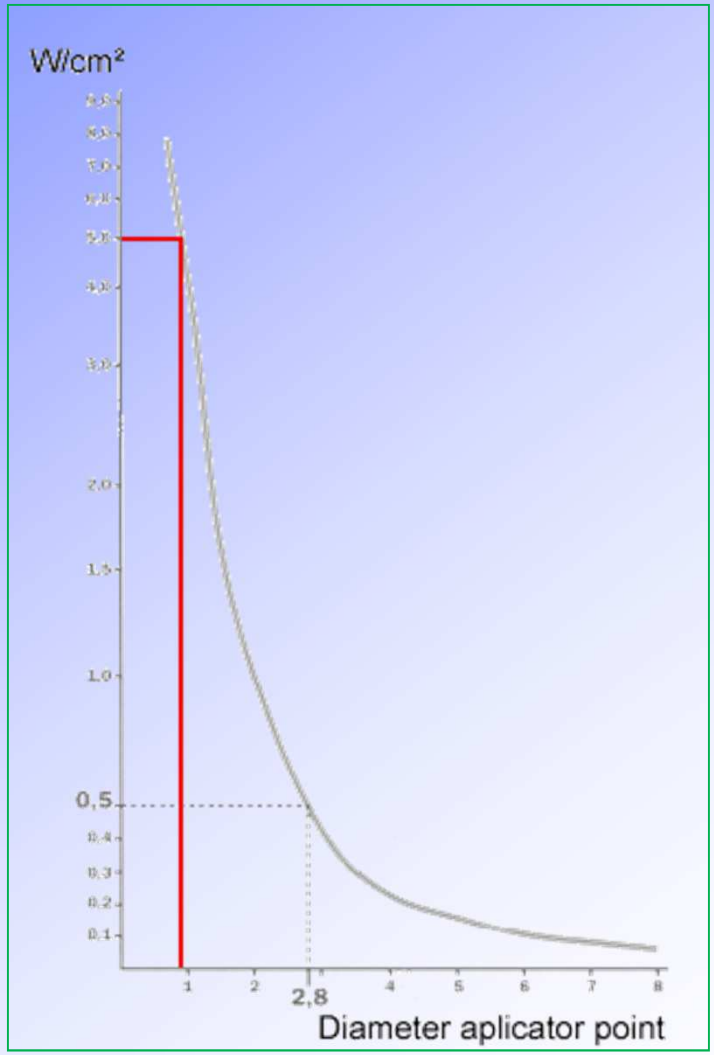
The optical power density

Power density in W/qcm

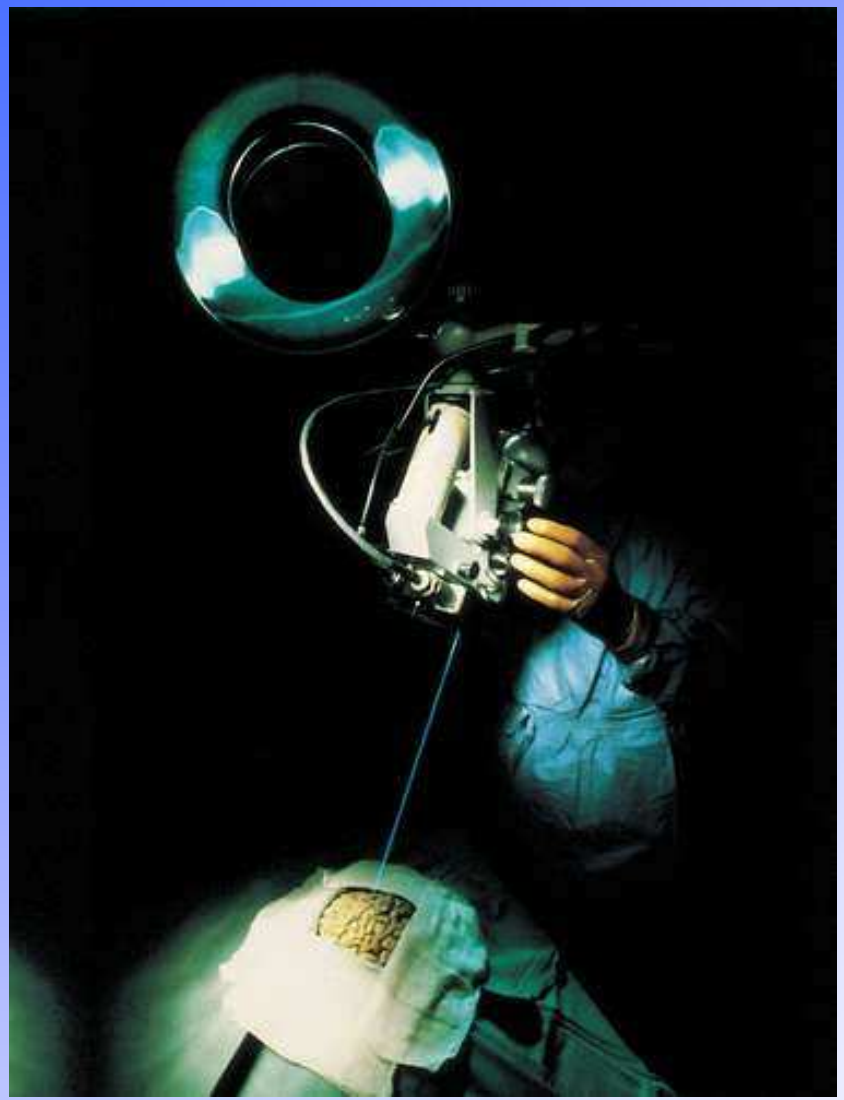
Dependent from optical diameter of the applicator

Diagram:

Relation between the optical density and the optical diameter of the applicator of a 30 mW laser



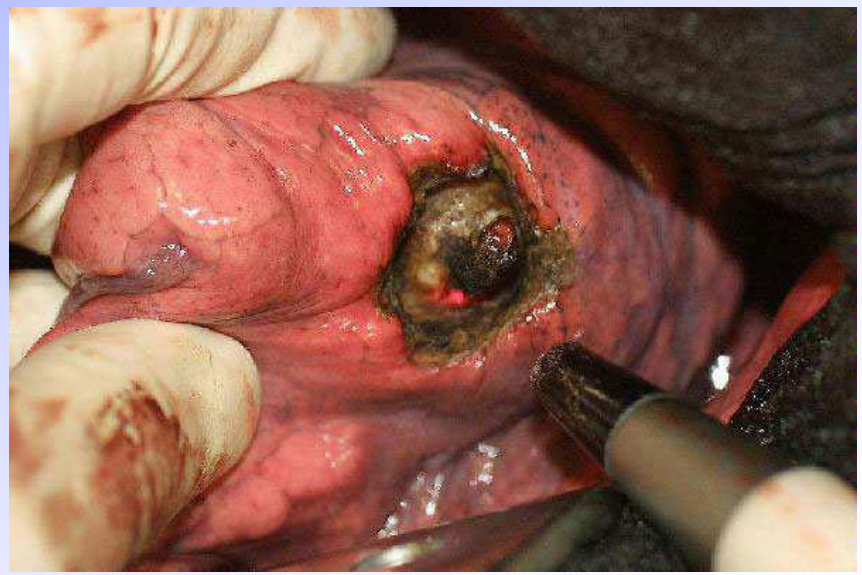
Hard lasers



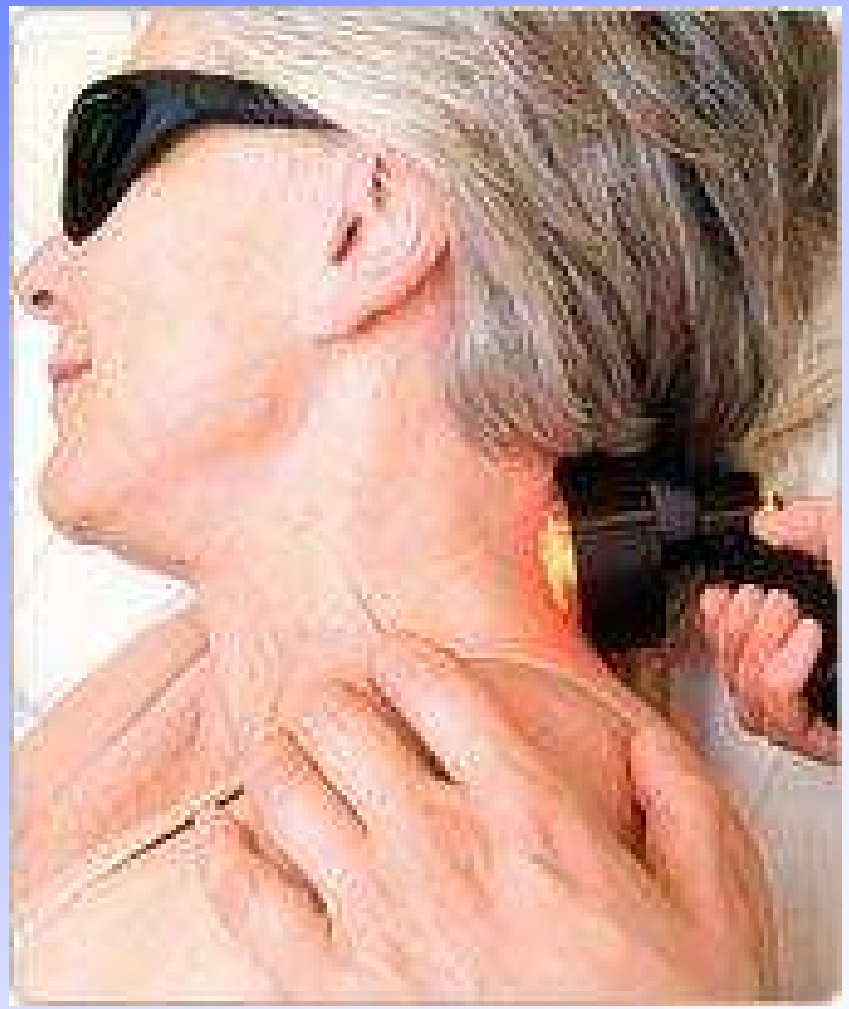
Hard lasers , more than 500 mW, class IV

are rich in energy, the radiation has direct physical effects,
example heating and coagulation. (Surgery laser).

Hard (surgical) lasers class IV
more than 500 mW



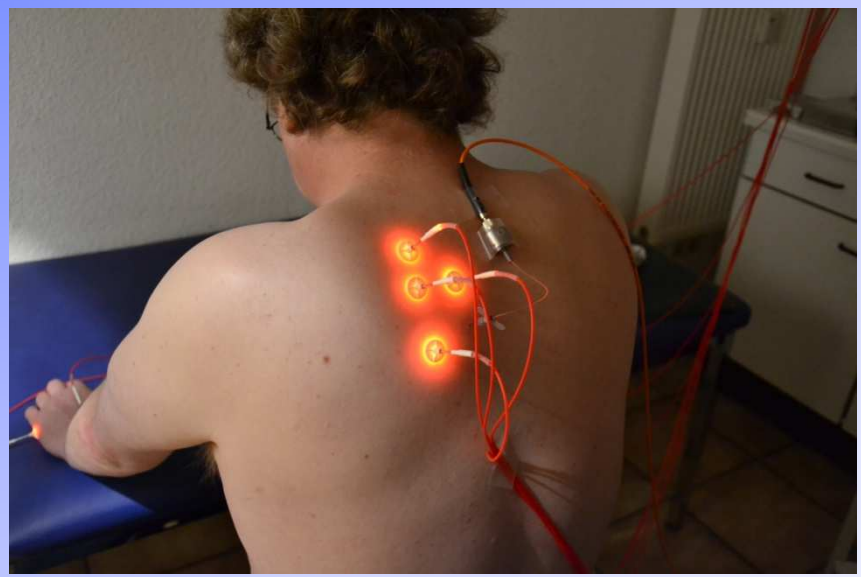
Low intensity (soft) lasers

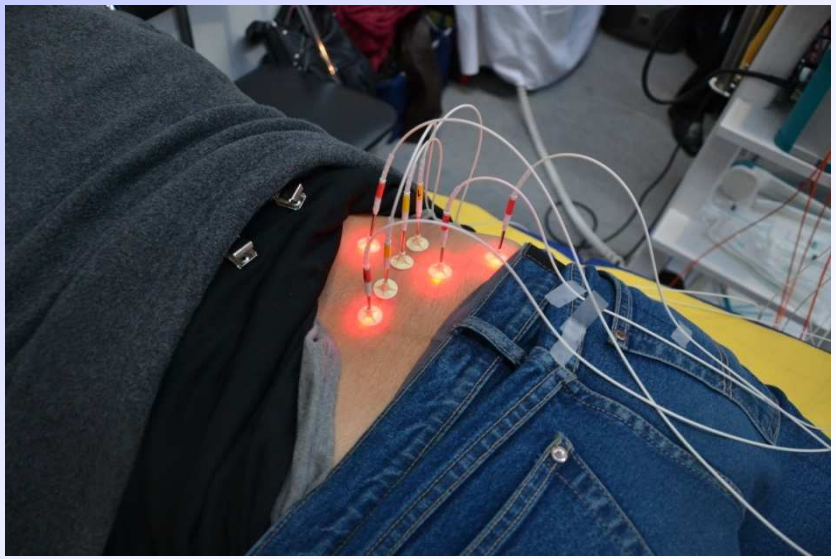


Low intensity (soft) lasers

Low intensity lasers, less than 500 mW, class III

work gently and without destruction of the tissue

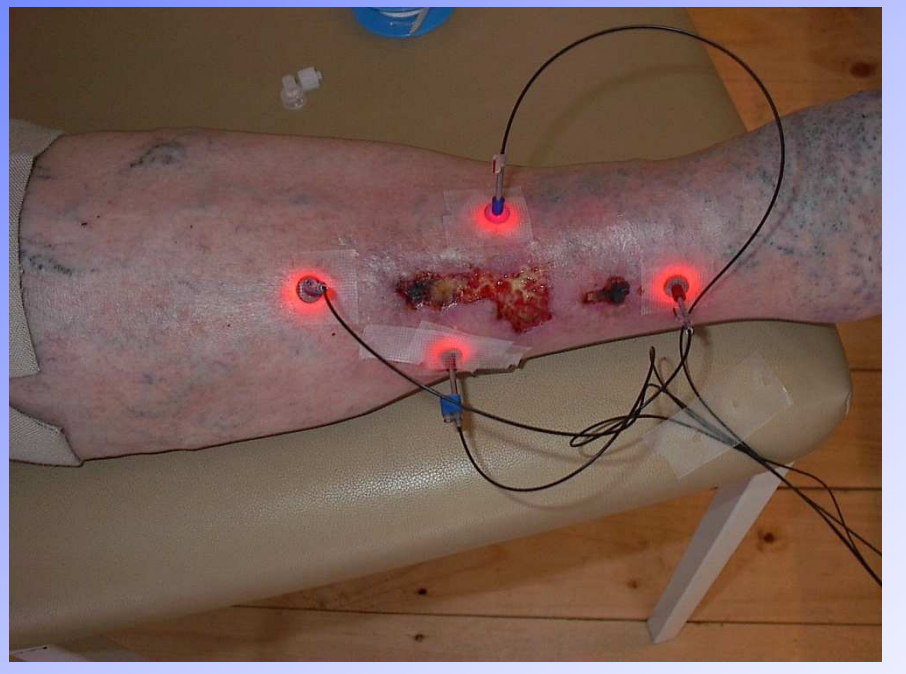




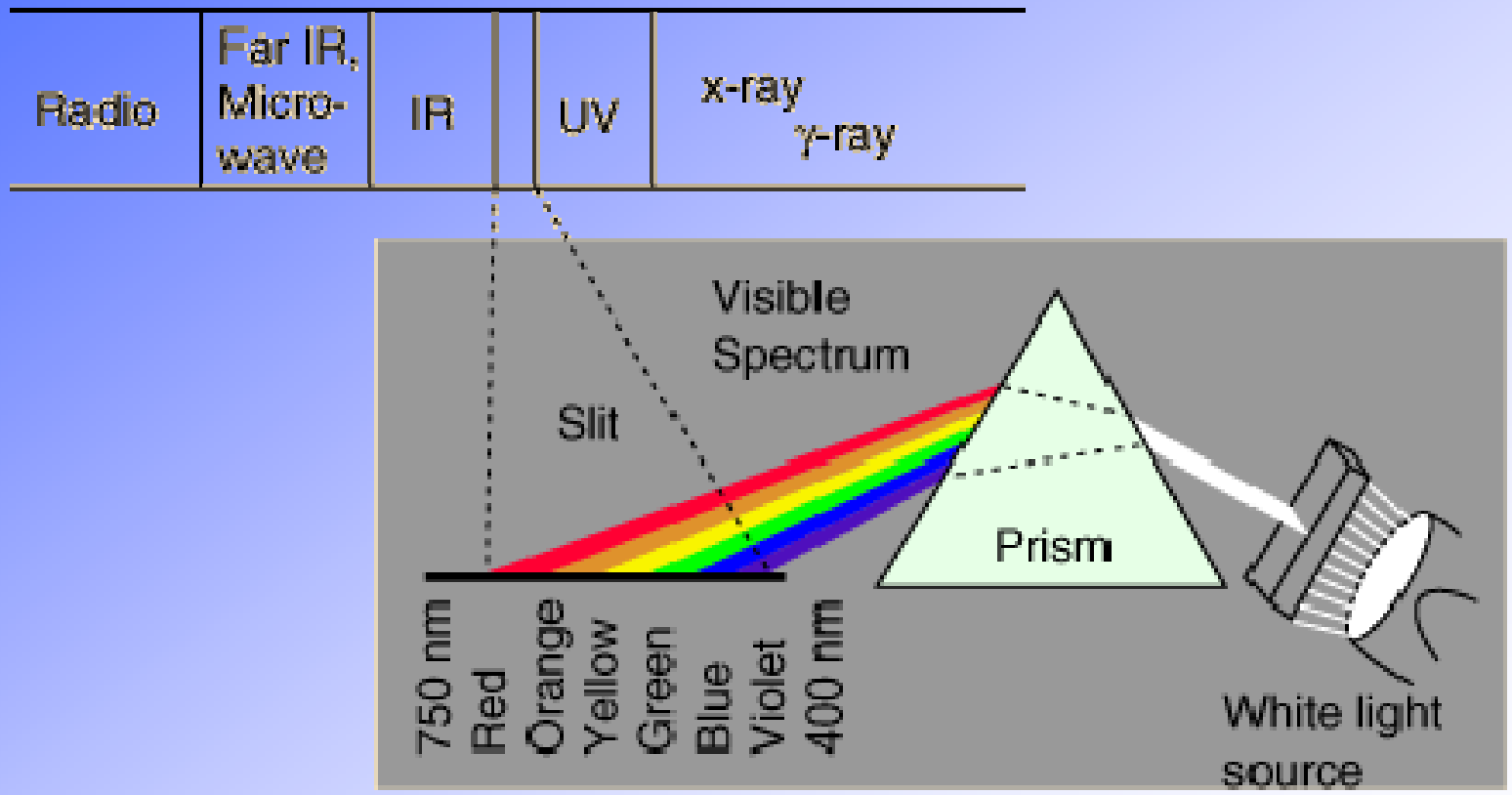
Low intensity (Soft) lasers

Soft lasers, less than 500 mW, class III

work gently and without destruction of the tissue

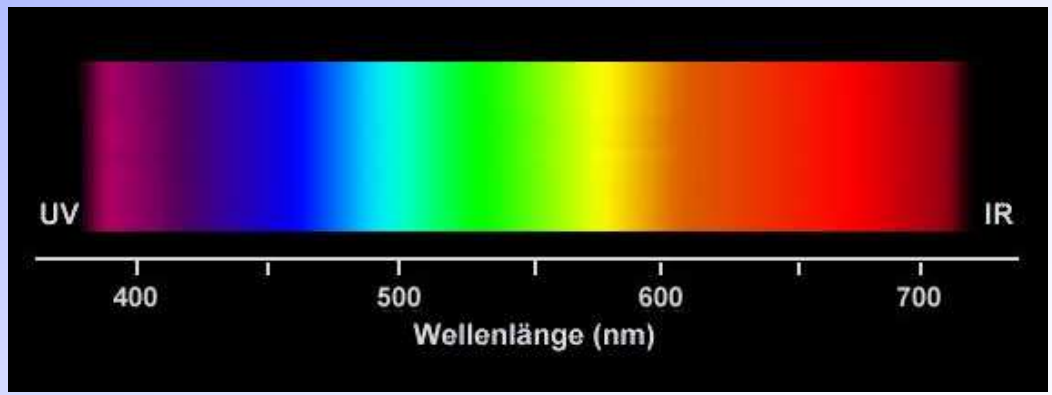


The visible spectrum of light

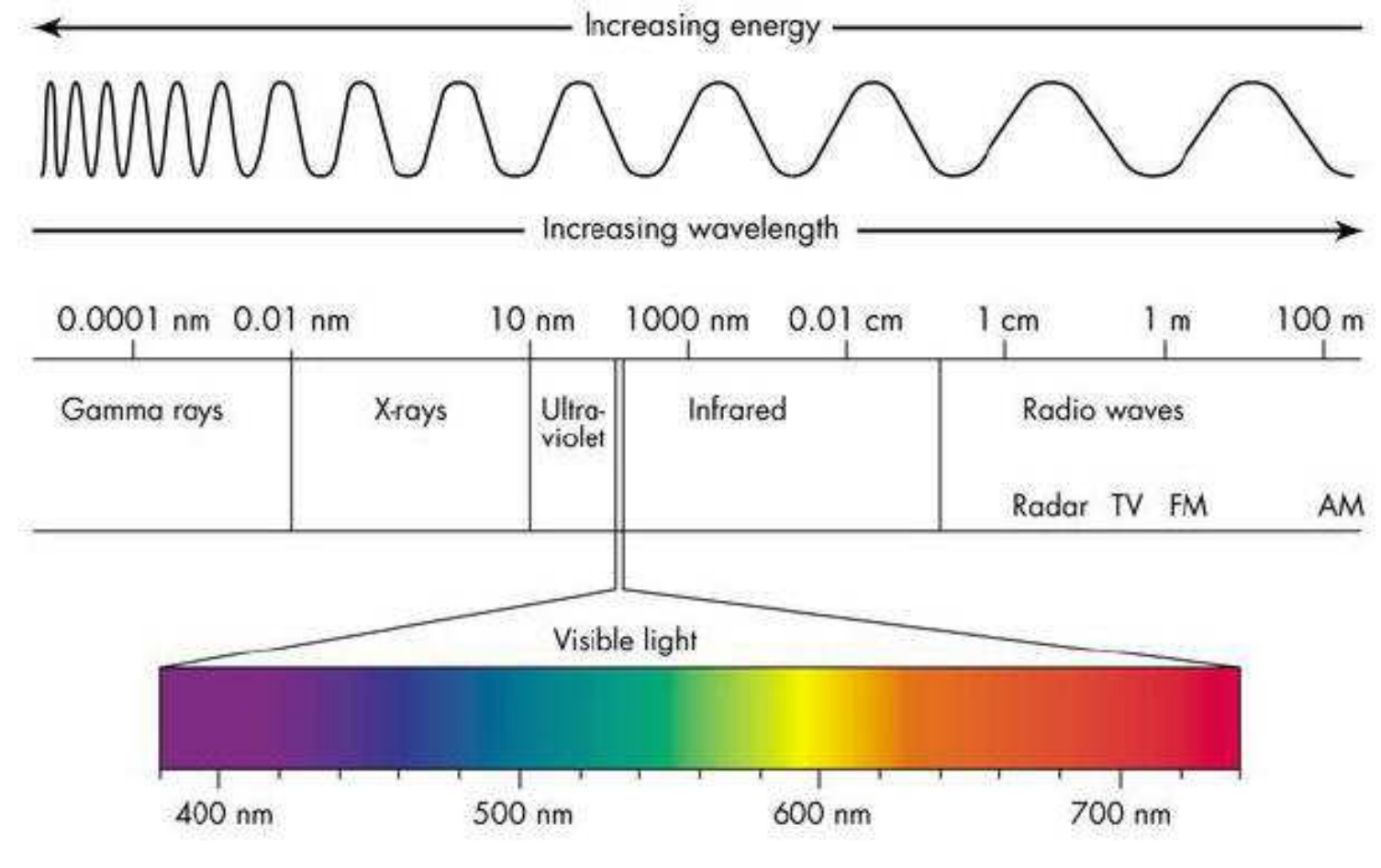


Laserclinic Dr. med. Dipl. chem. Michael Weber, Germany

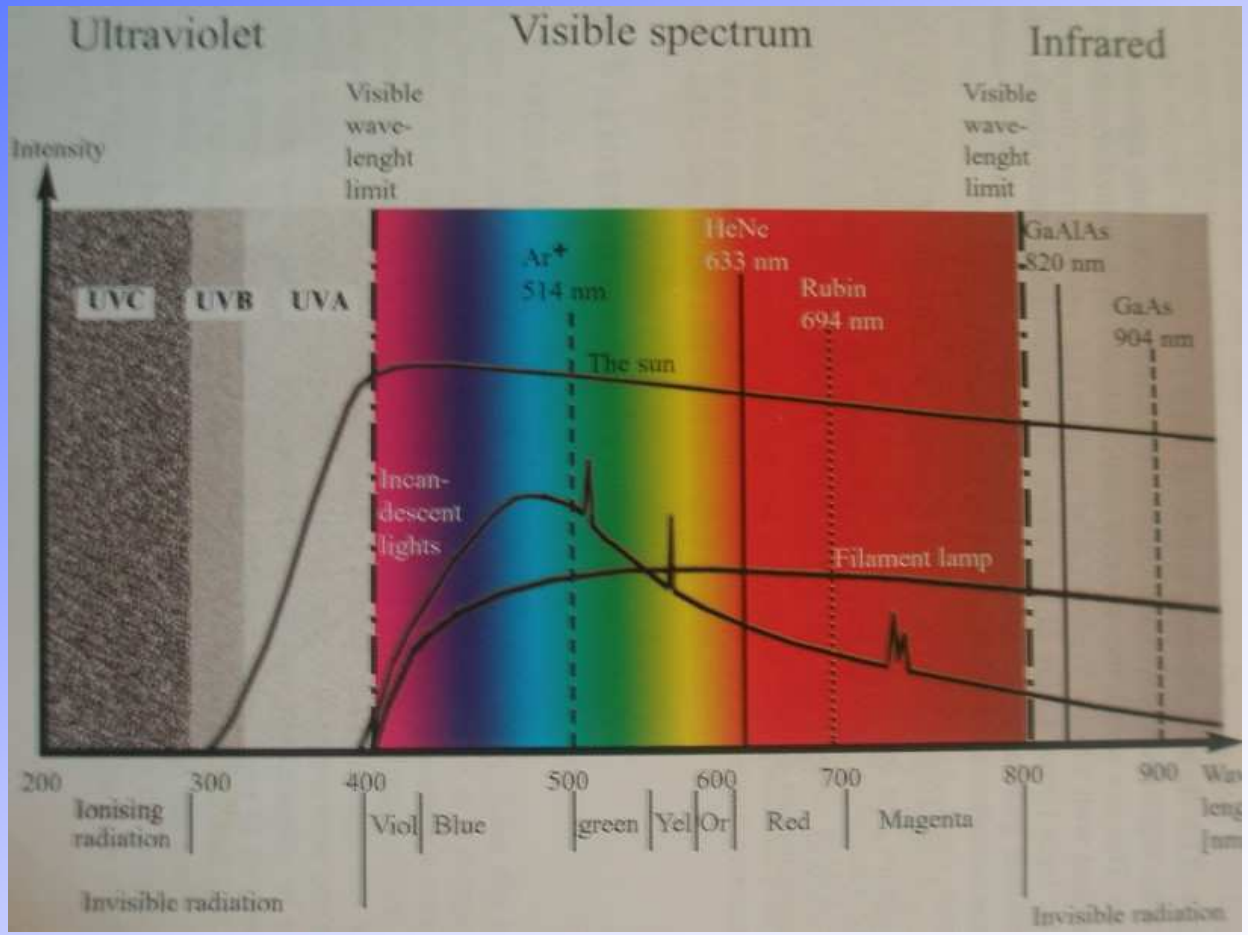
The visible spectrum of light



The electromagnetic spectrum

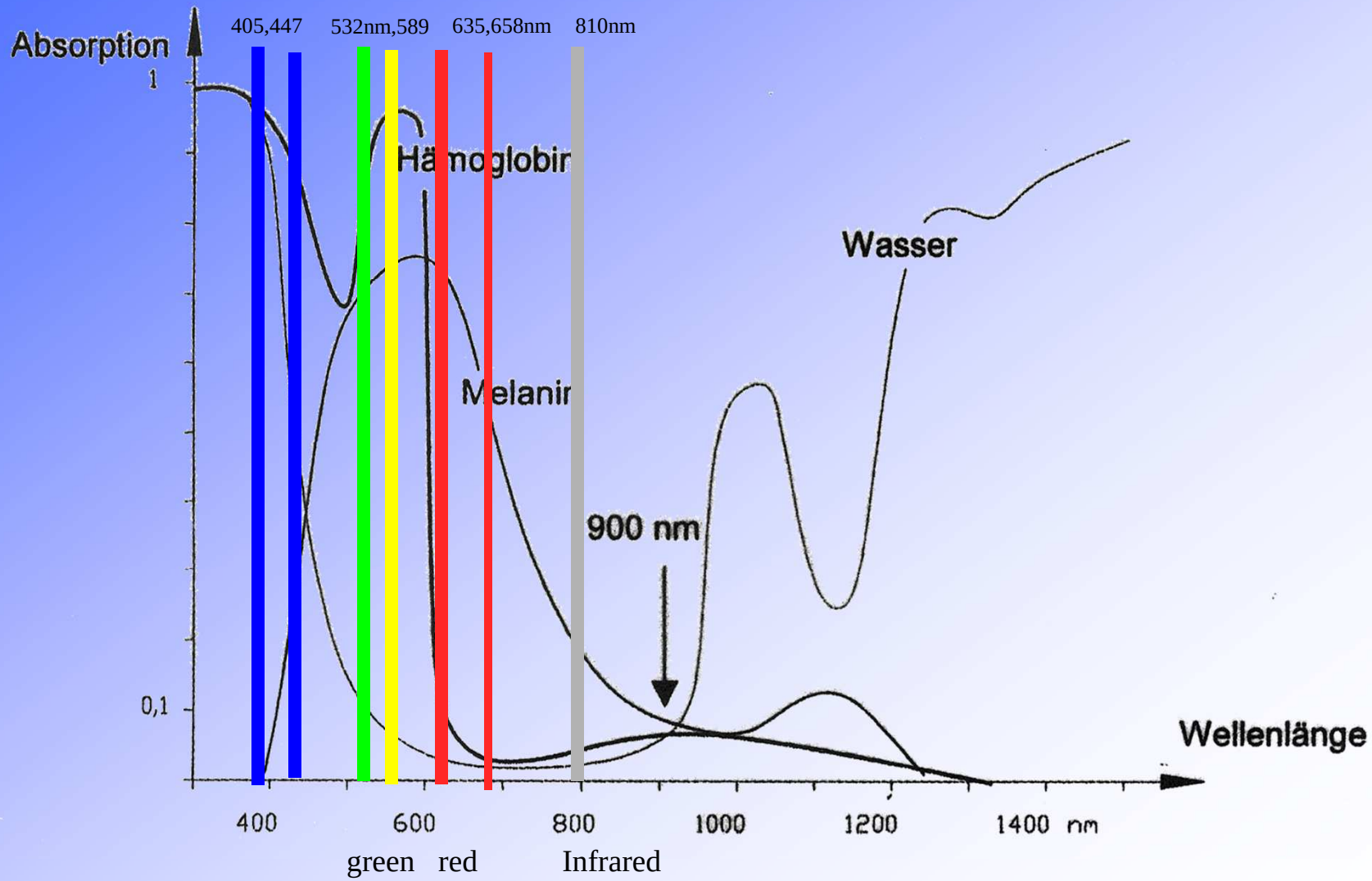


The natural spectrum of light

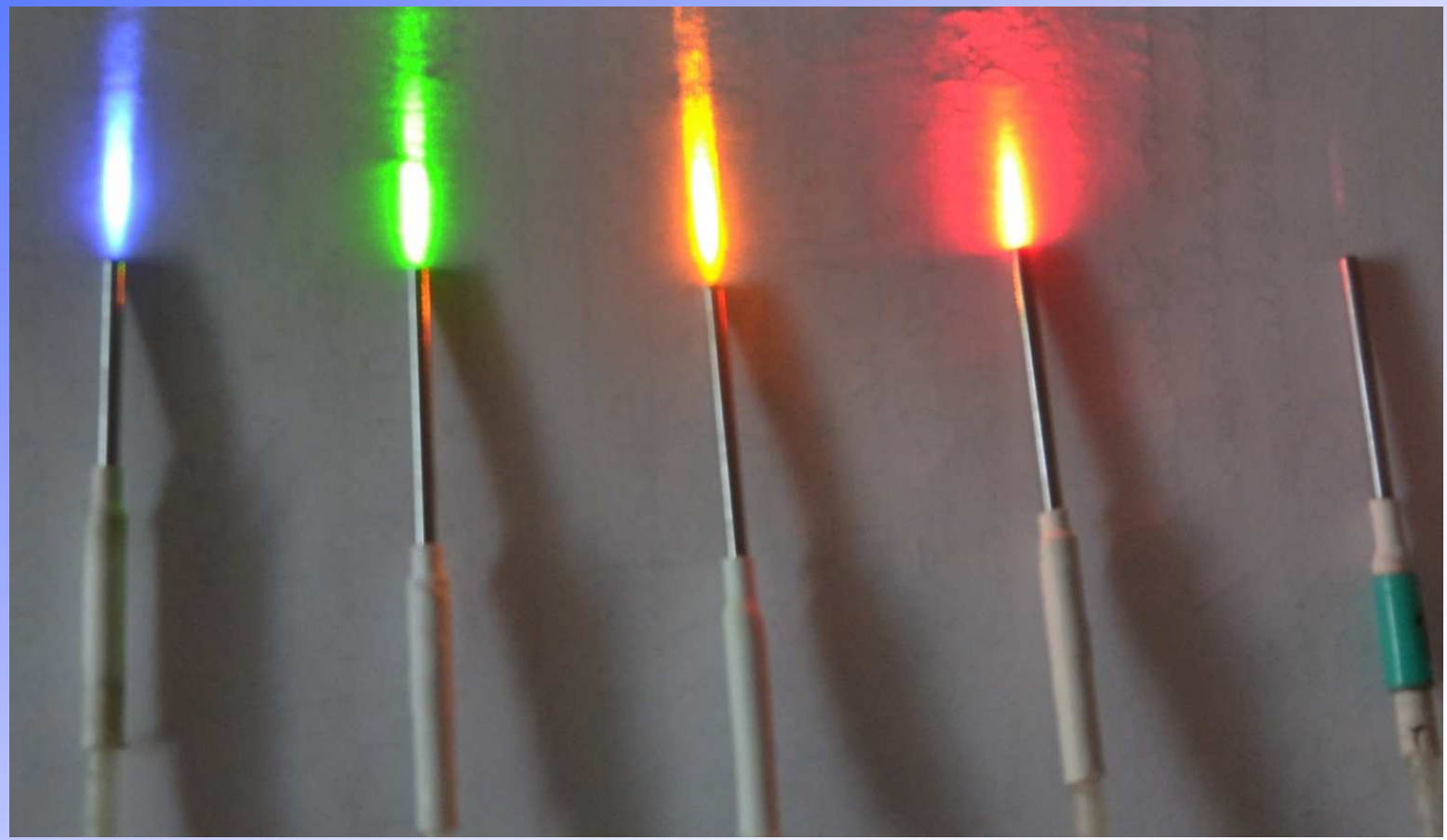


J. Tuner, L. Hode: Laser Therapy

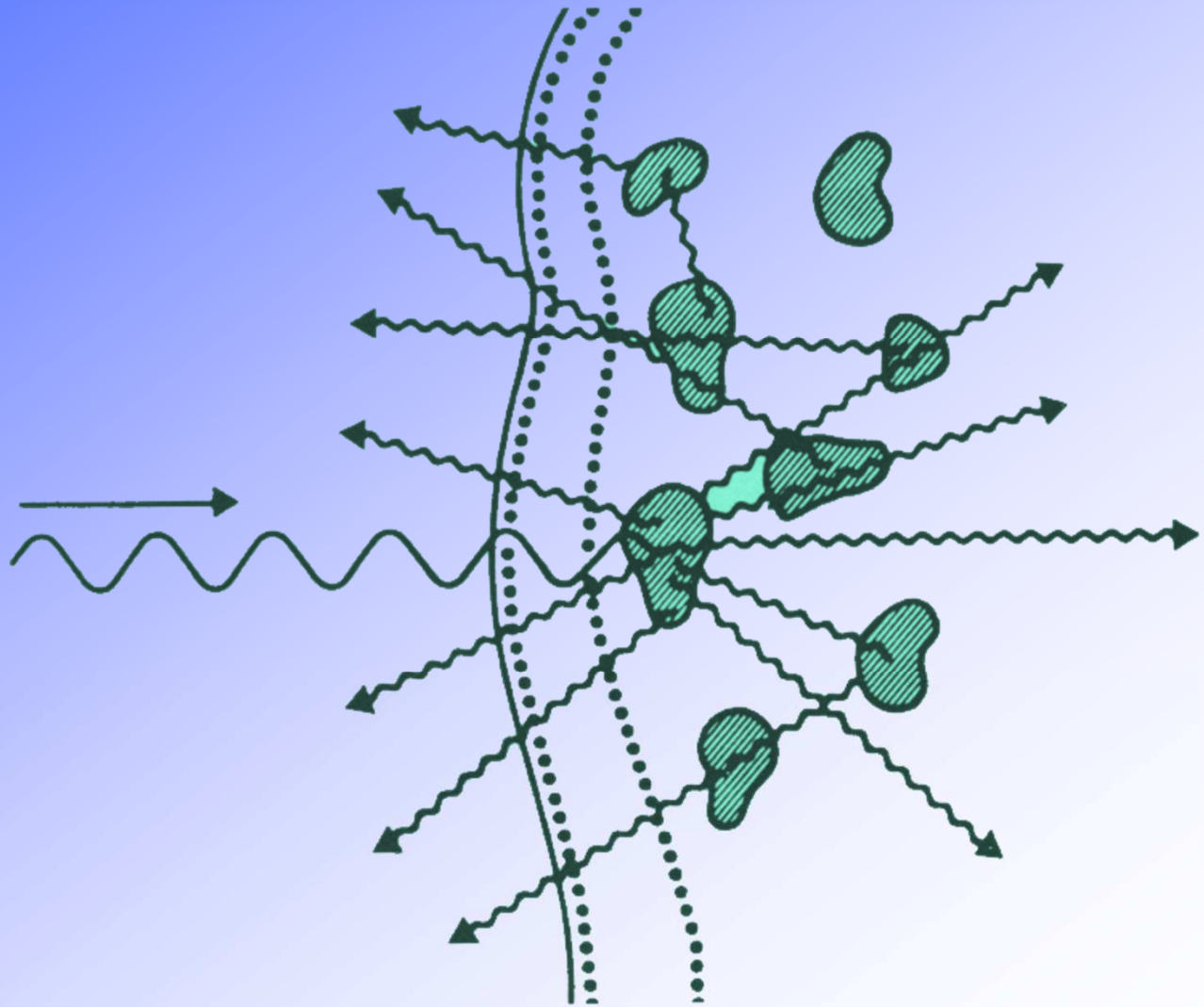
Absorption of laser light in biological tissue



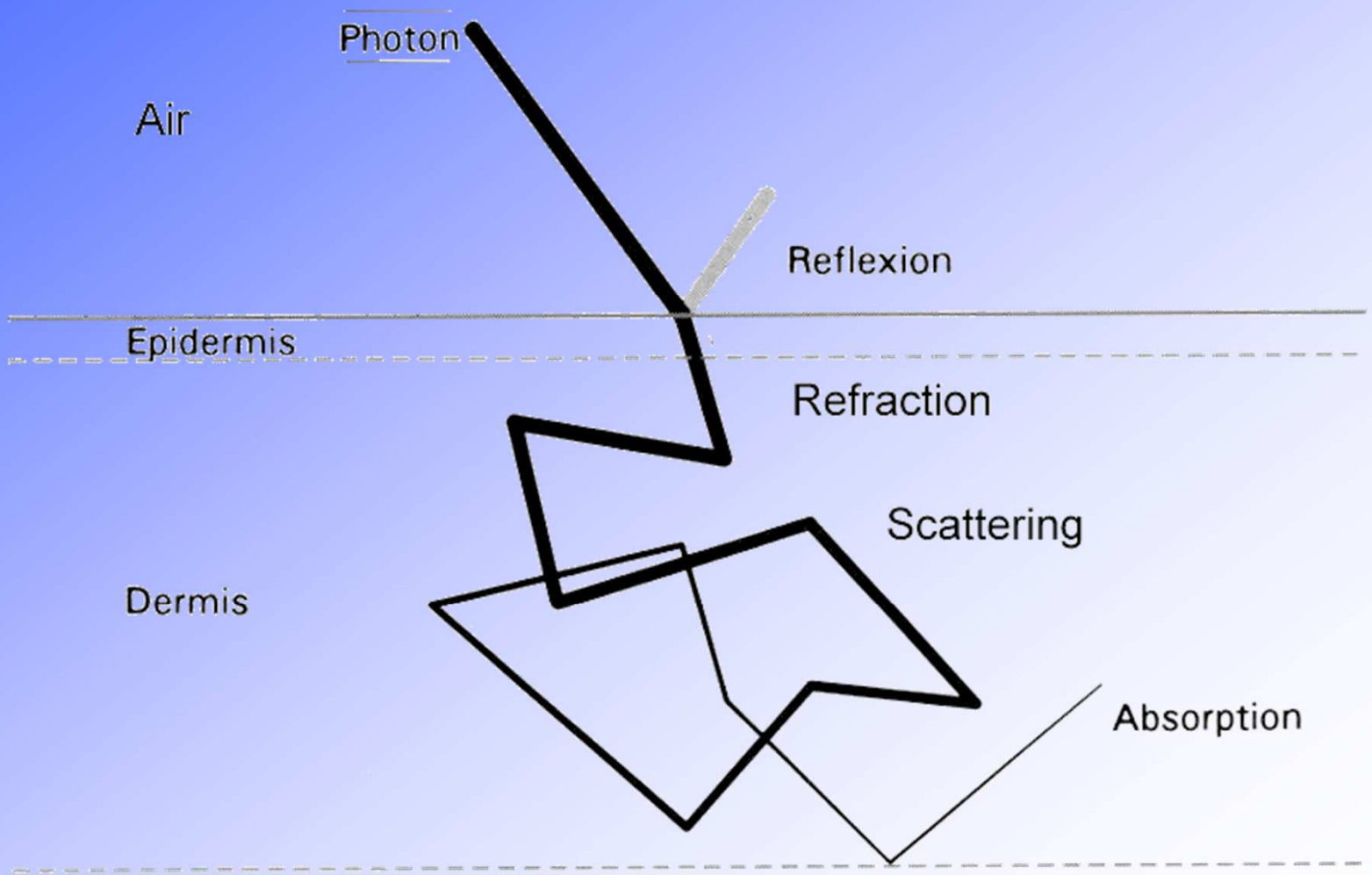
Fiberoptic laserneedles



The skin barrier

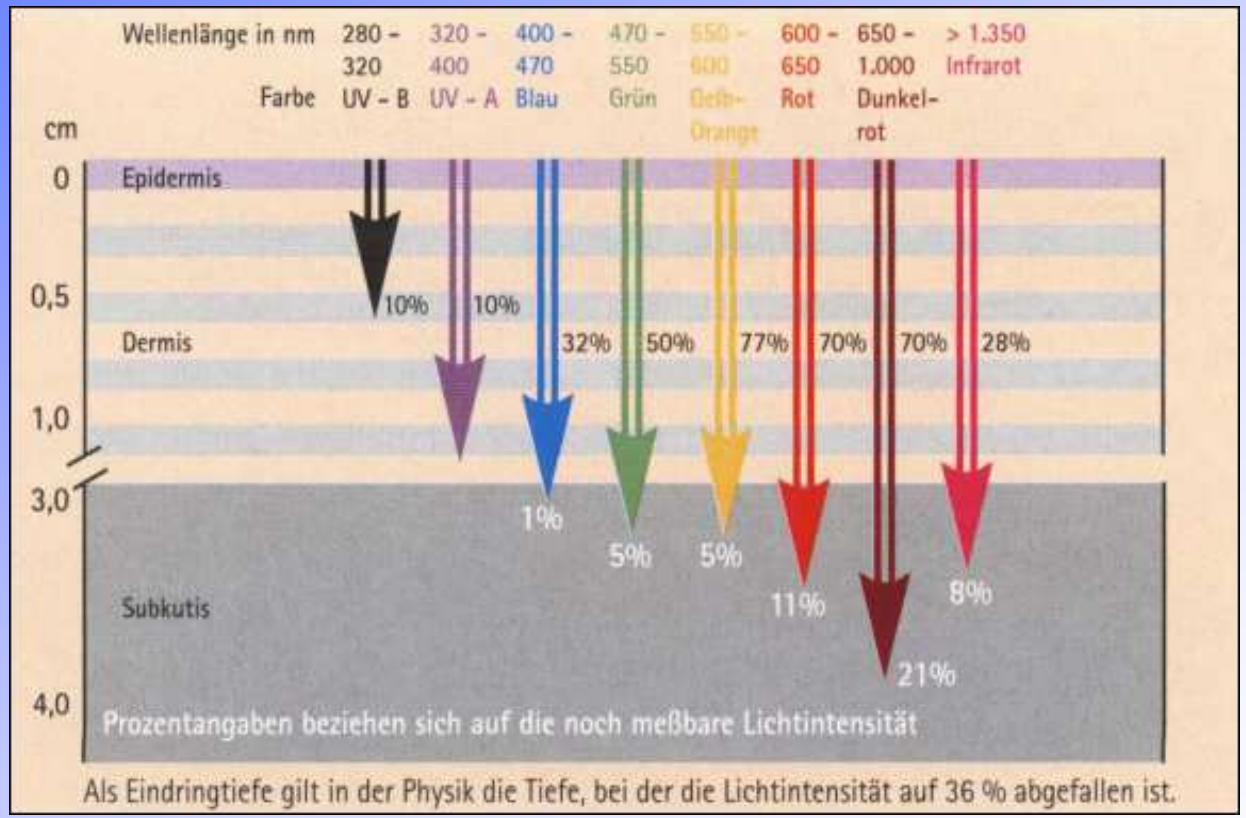


Disturbing effects of laser penetration in biological tissue



Optical penetration depth of different wavelengths

- *depends upon the wavelength*
- *Tissue penetration of blue laser very low, green laser ca. 5mm, red 3 cm, infrared 6 cm*



Biological molecular basics of LLLT

The absorption and action spectrum

- shows the effects of photons dependent from the wavelength and applied energy
- is similar to the absorption spectrum of the special photon receptors of the cells

Fig. 3: The absorption spectrum of chlorophyll a

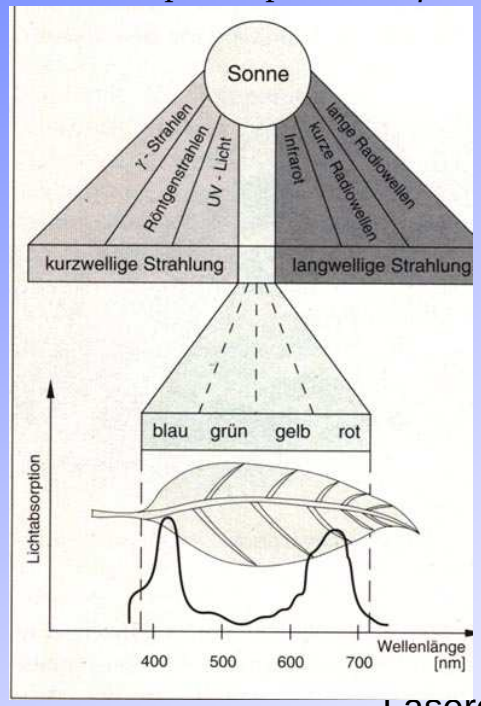
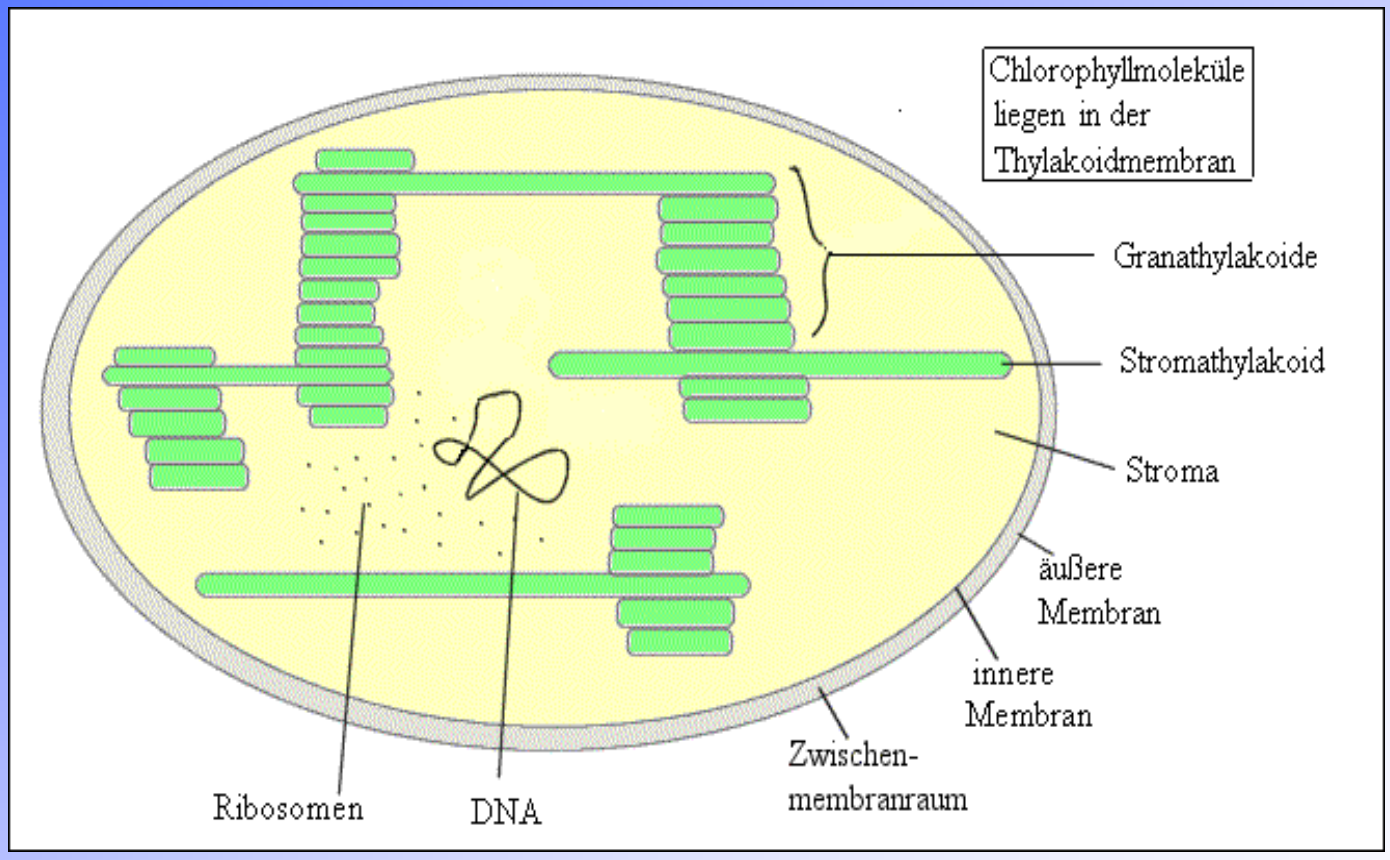


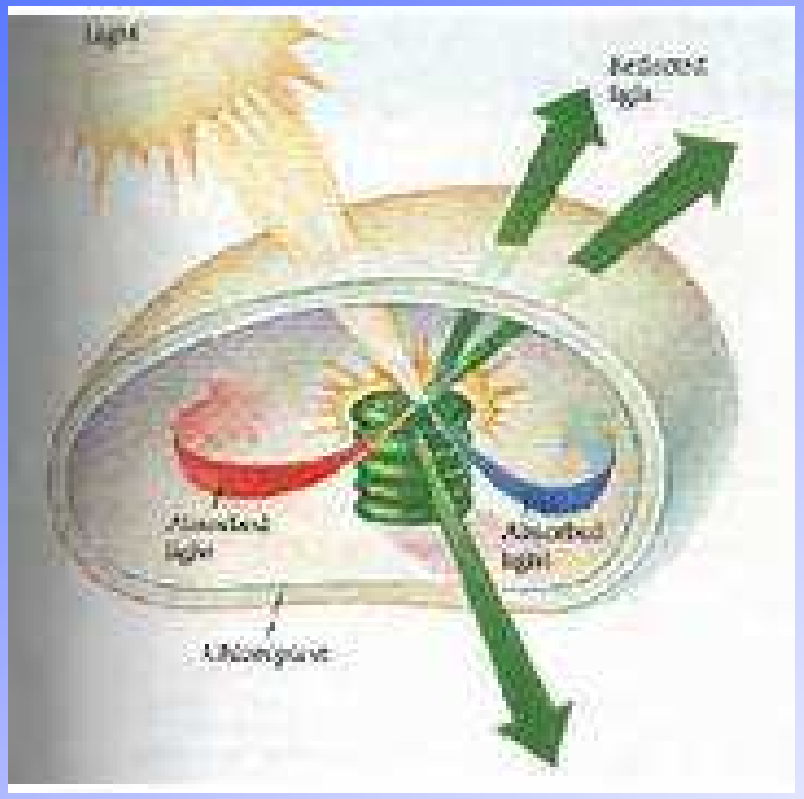
Fig. 3 shows the absorption spectrum of chlorophyll a of the green plants.

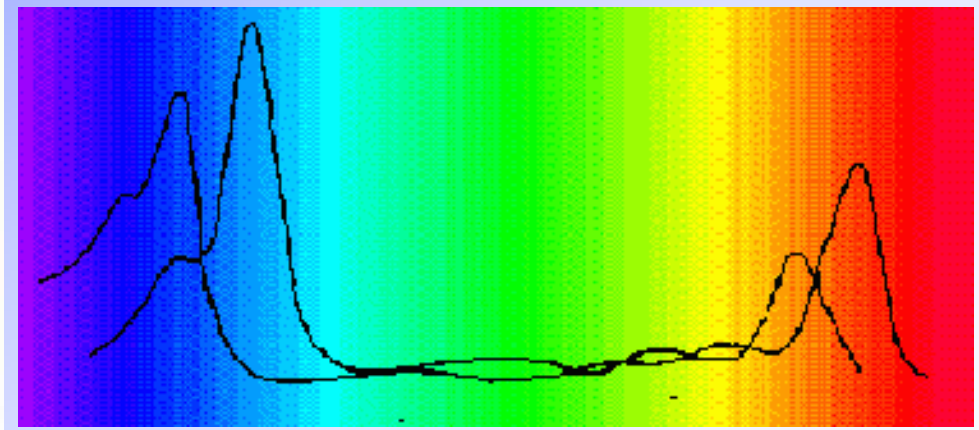
Chlorophyll absorbs light of the blue and infrared wave spectrum

Structure of the Chloroplast

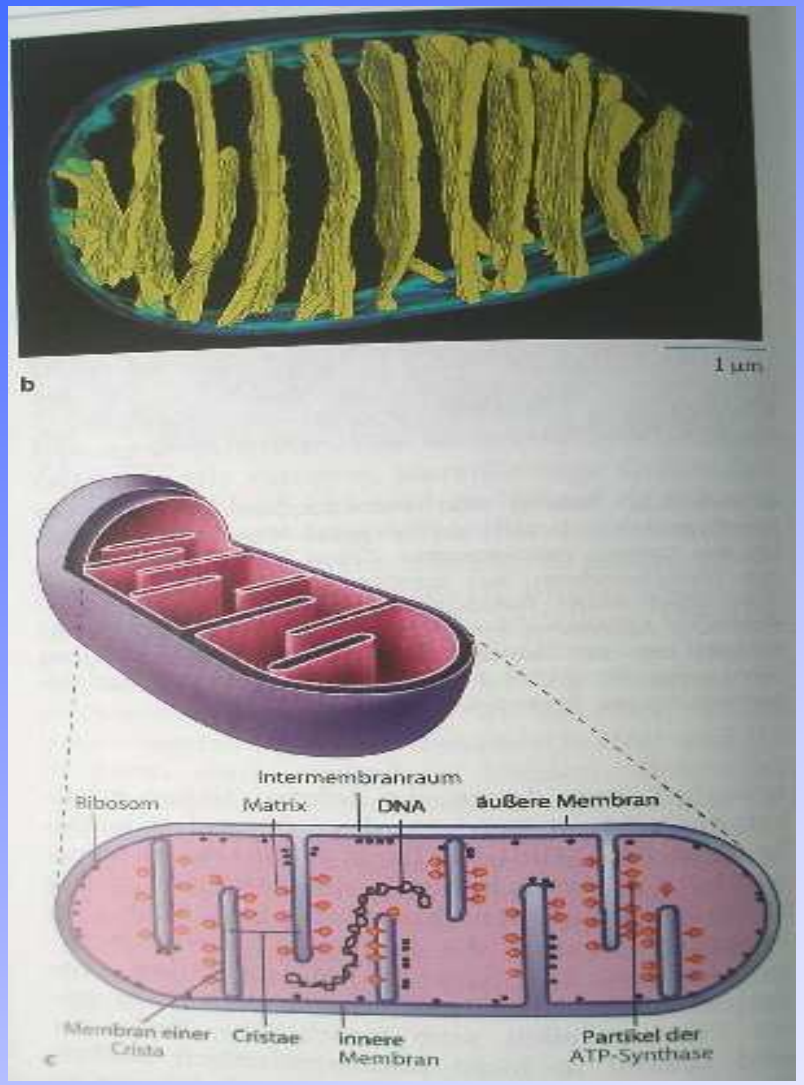


Chloroplast light absorption





The structure of the mitochondria



Laserclinic Dr. med. Dipl. chem. Michael Weber, Germany

The structure of the mitochondria can be different in the special types of tissue cells.

In living cells mitochondria have a dynamic structure; this means that they can vary their structure and size. They are able to merge or to divide themselves.

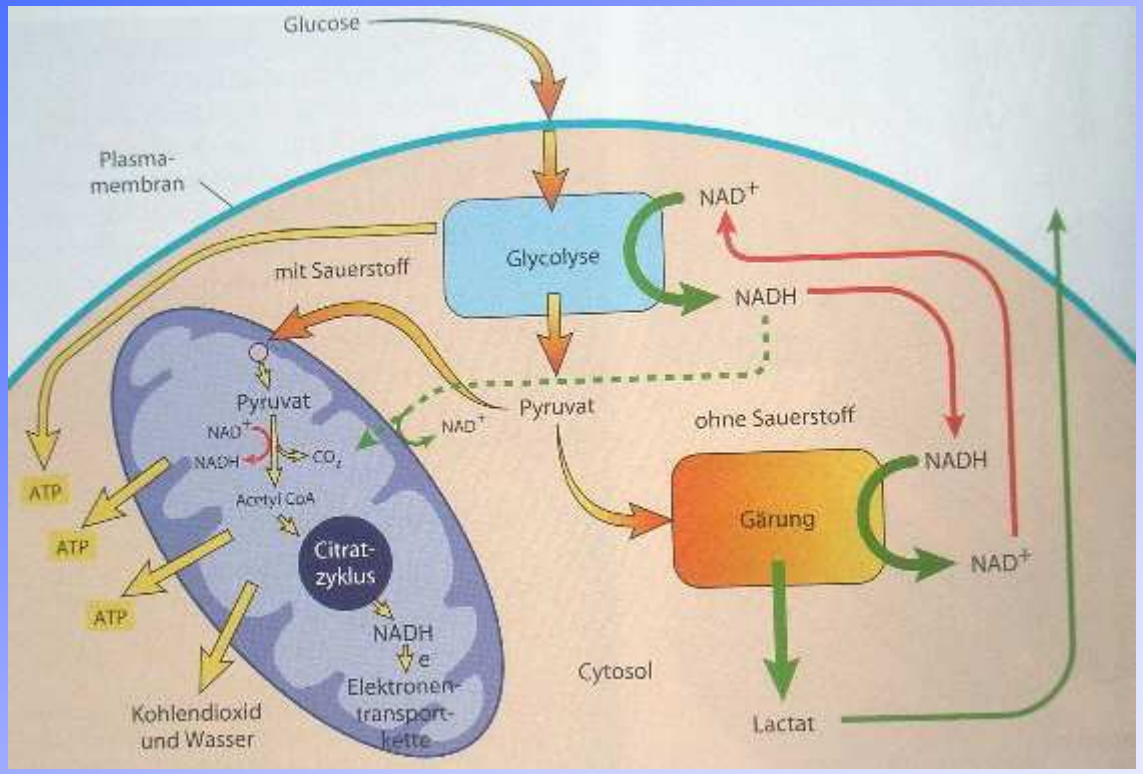
The mitochondria are making out about 10 – 15 % of the volume of a living cell.

Their main task is the production of ATP

The mitochondria have an inner and outer membrane.

In the inner room of the mitochondria we can find the christae, formed by double layer membranes, where the respiratory chain is located and the production of ATP.

The carbohydrate metabolism of eucaryotic cells

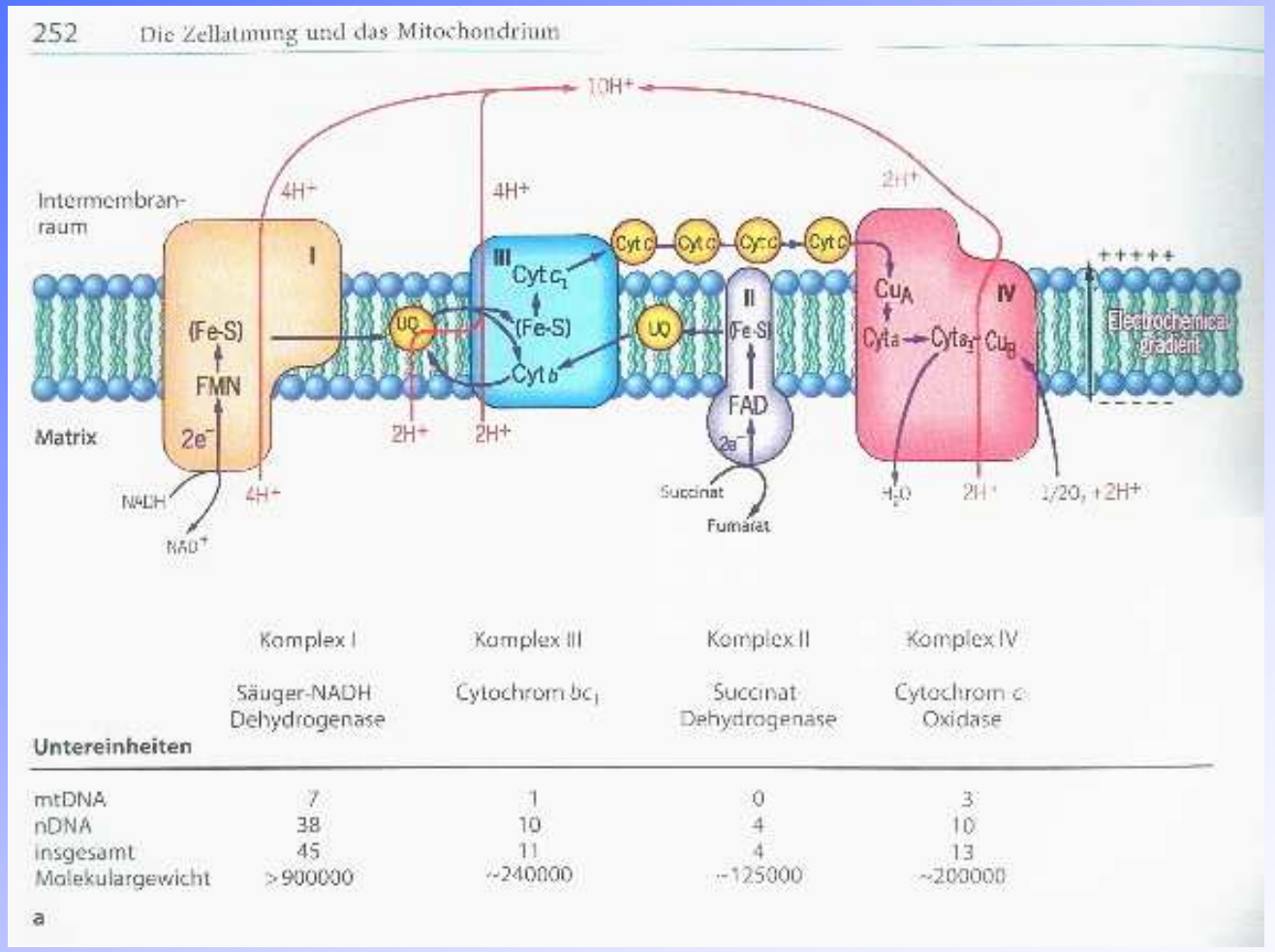


In figure 9 we see an overview about the carbohydrate metabolism of eucaryotic cells. In the glycolysis we find in the cytosole the production of pyruvate and NADH. Without oxygen the pyruvate is transformed in lacate. With oxygen pyruvate is infiltrated into the inner of the mitochondria and metabolised in Acetyle-Coenzyme-A. This is running through the citrate circle, where NADH and FADH2 are produced.

The electrons of these products are transferred to the electron-carriers of the respiratory

chain and in the last step on oxygen with the production of water. The released energy in these steps is needed for the production of ATP.

The respiratory chain in the mitochondria

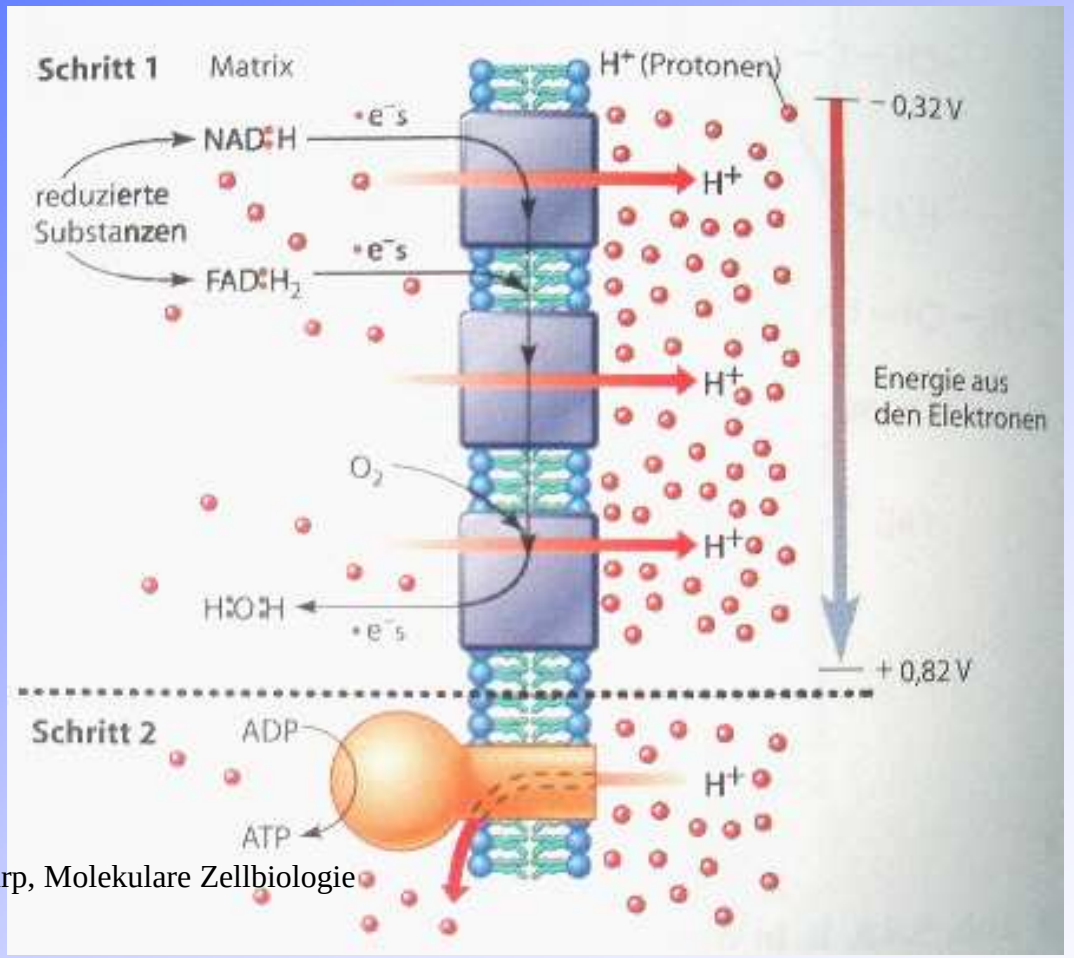


	Komplex I	Komplex III	Komplex II	Komplex IV
	Säuger-NADH Dehydrogenase	Cytochrom bc_1	Succinat Dehydrogenase	Cytochrom c Oxidase
Untereinheiten				
mtDNA	7	1	0	3
nDNA	38	10	4	10
insgesamt	45	11	4	13
Molekulargewicht	>900000	~240000	~125000	~200000

a

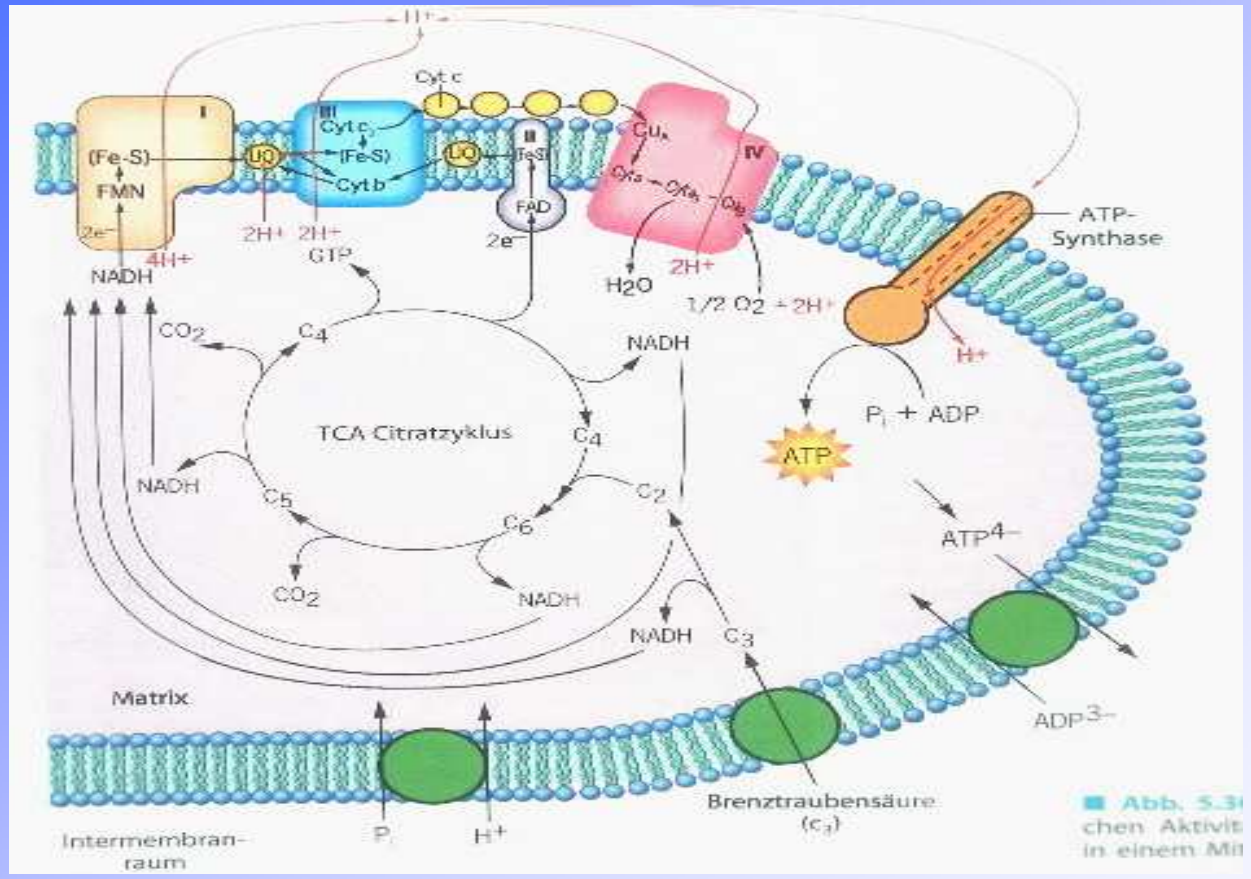
Karp, Molekulare Zellbiologie

The respiratory chain in the mitochondria



Karp, Molekulare Zellbiologie

The respiratory chain in the mitochondria



In figure 13 we find the processes of energy production in the mitochondria.

We should remember again that with the blue laser we will stimulate the starter complex NADH-dehydrogenase and with the red and infrared laser the end-complex cytochrome-c-oxydase.

The cellular signaling

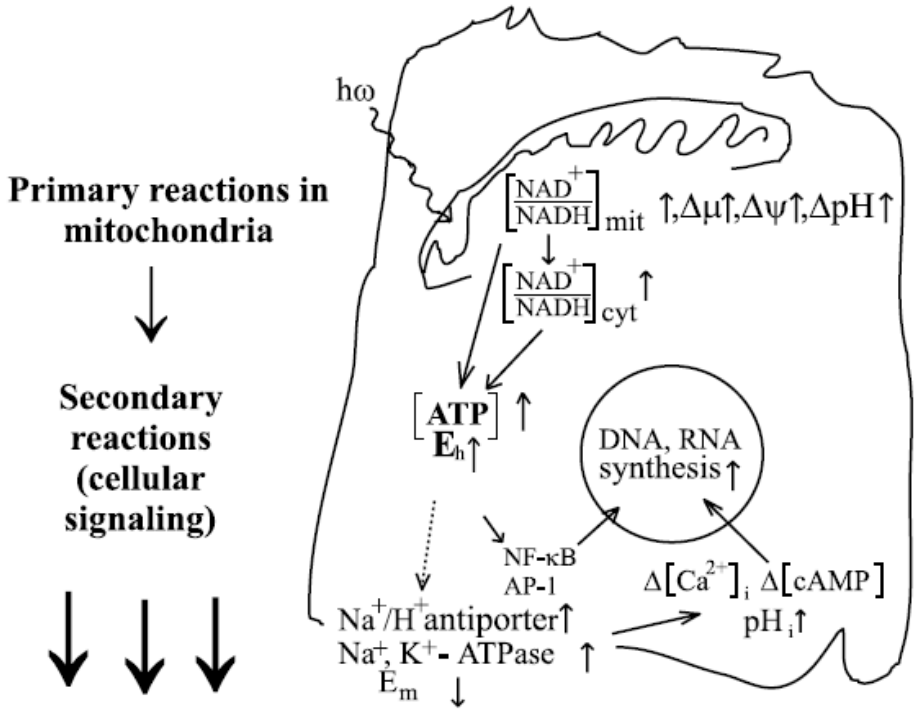
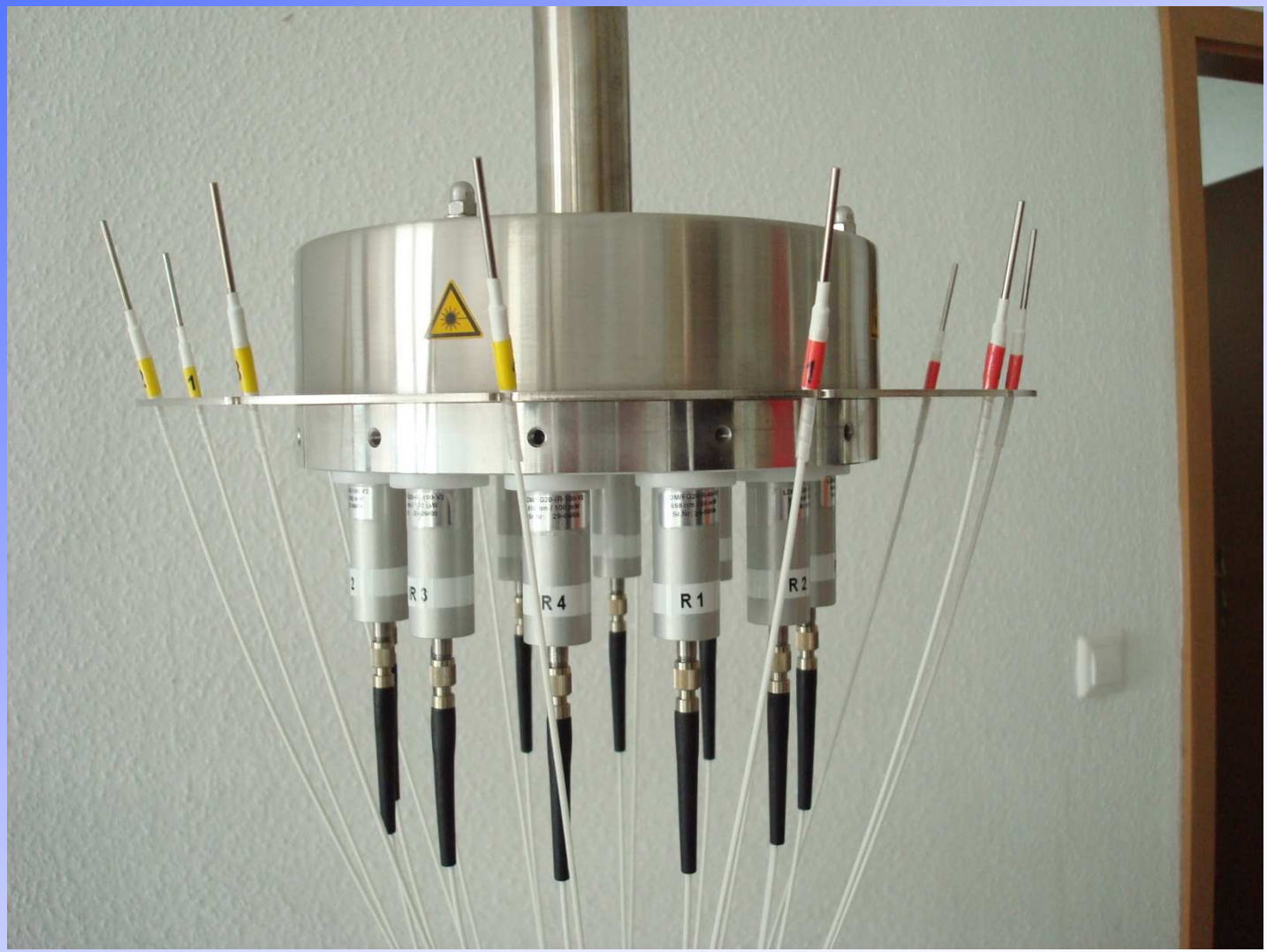


FIGURE 48.9 Scheme of cellular signaling cascades (secondary reactions) occurring in a mammalian cell after primary reactions in the mitochondria. E_h ↑ = shift of the cellular redox potential to more oxidized direction; the arrows ↑ and ↓ indicate increase or decrease of the respective values, brackets [ ] indicate the intracellular concentration of the respective chemicals.

T. Karu, Low-Power Laser Therapy

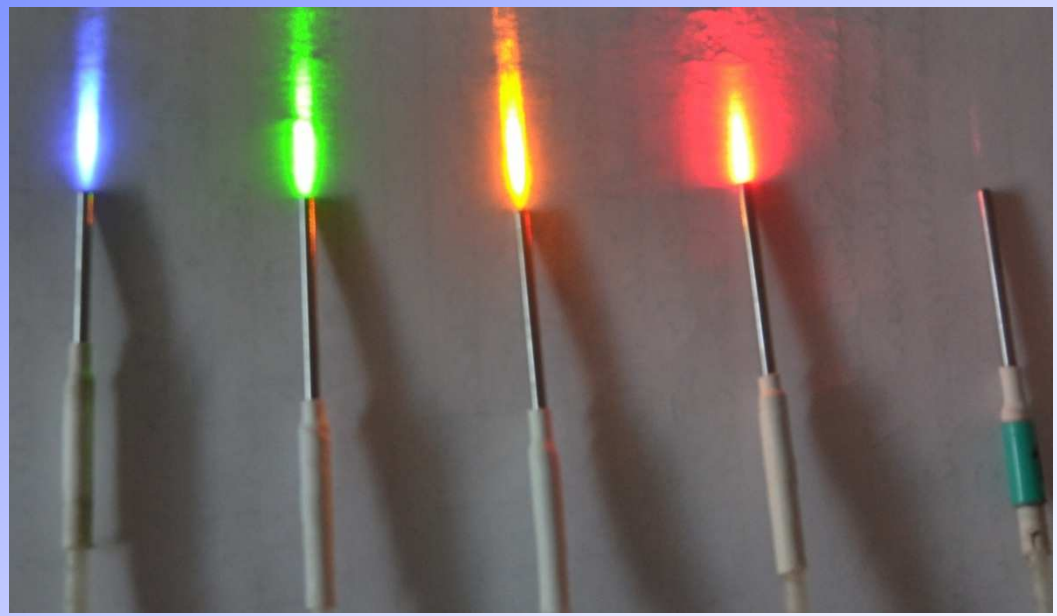
Modern new Laser-Needle system for external laser therapy (acupuncture)

Modern new Laser-Needle system for external laser therapy (acupuncture)



Laserneedles for external laser therapy and acupuncture

Laserneedles are the ends of optical fibers with high power density



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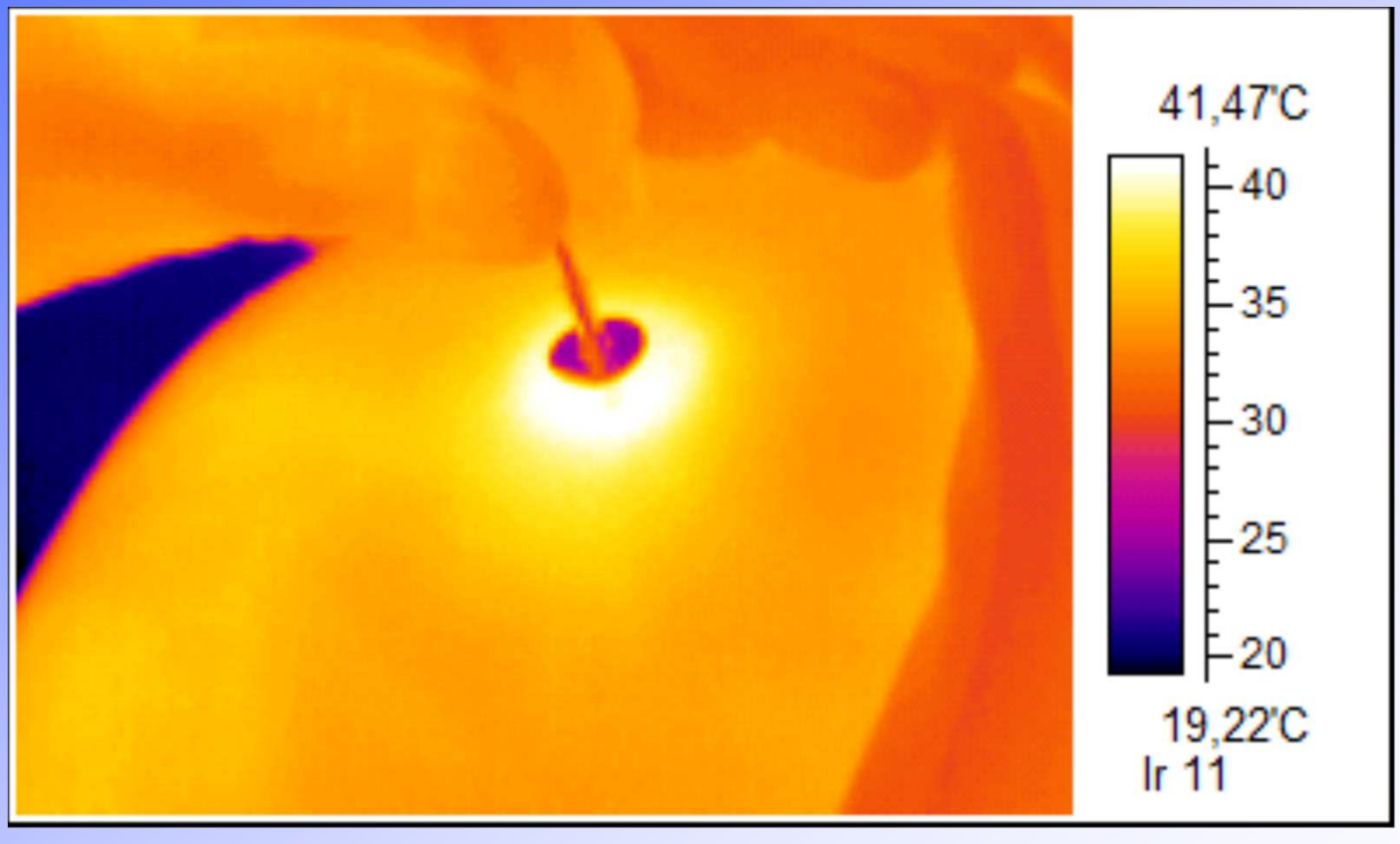
Michael Weber, Germany

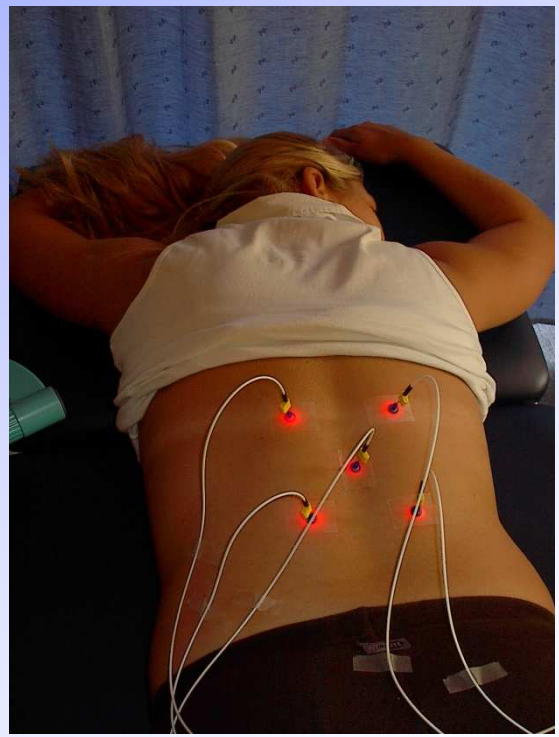
Application of laserneedles on the body

Laserneedle effects on tissue microcirculation

Laserneedle effects on tissue microcirculation in treatment of shoulder (single red laser 50 mW), FDA-approval, USA, 2008



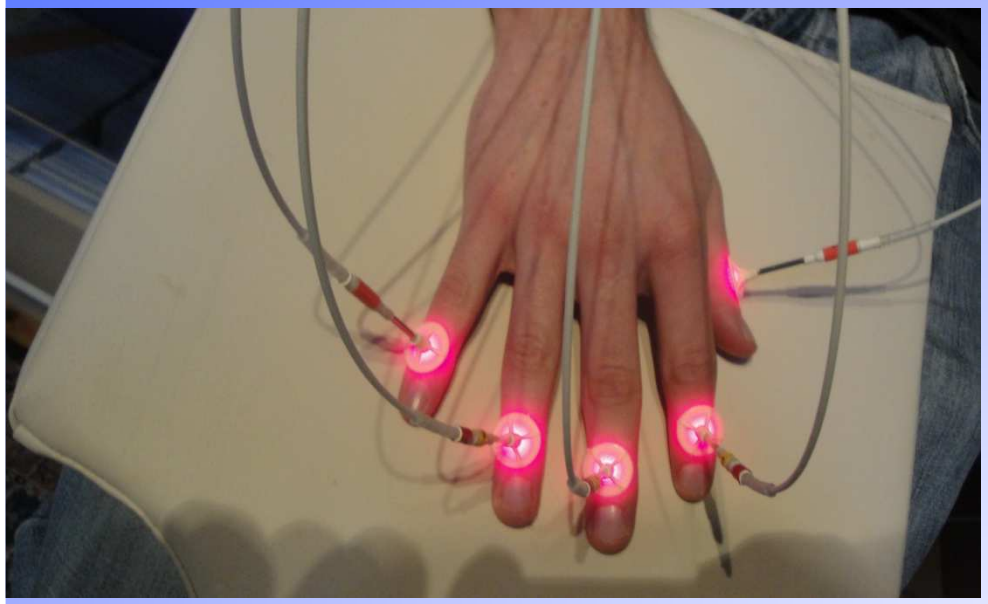
Treatment with single Laserpen in comparison with laser needles



Treatment protocols, general rules

Deepest
stimulation
by combining
red
and infrared
lasers

Protocol finger osteoarthritis



<u>End joints artritis</u>

(Heberden)

Treat directly on joints

(20 minutes, 50-100 %,any laser)

<u>Middle joints arthrits</u>

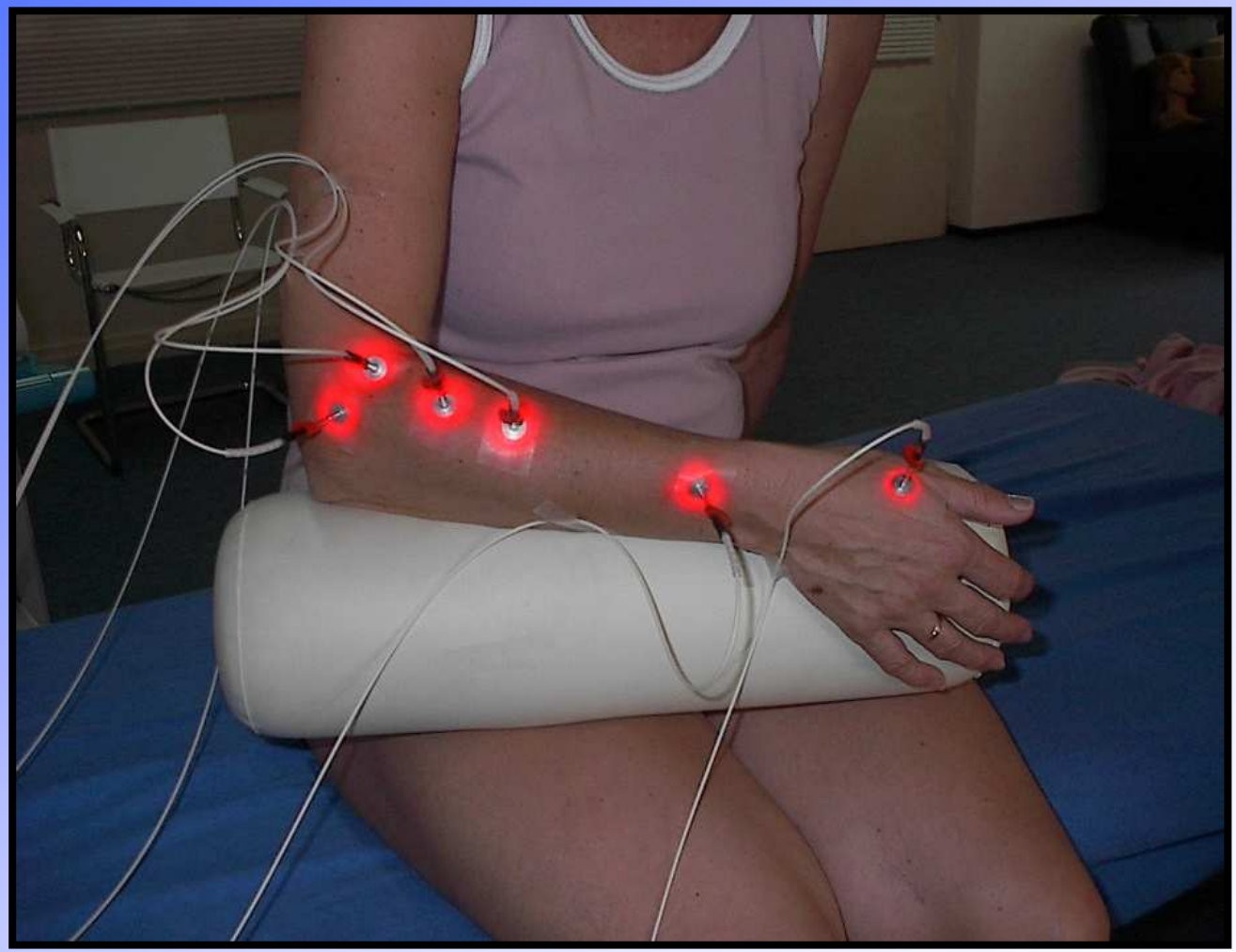
(Bouchard)

Same protocol on middle

Joints

(20 minutes, 50-100 %,any laser)

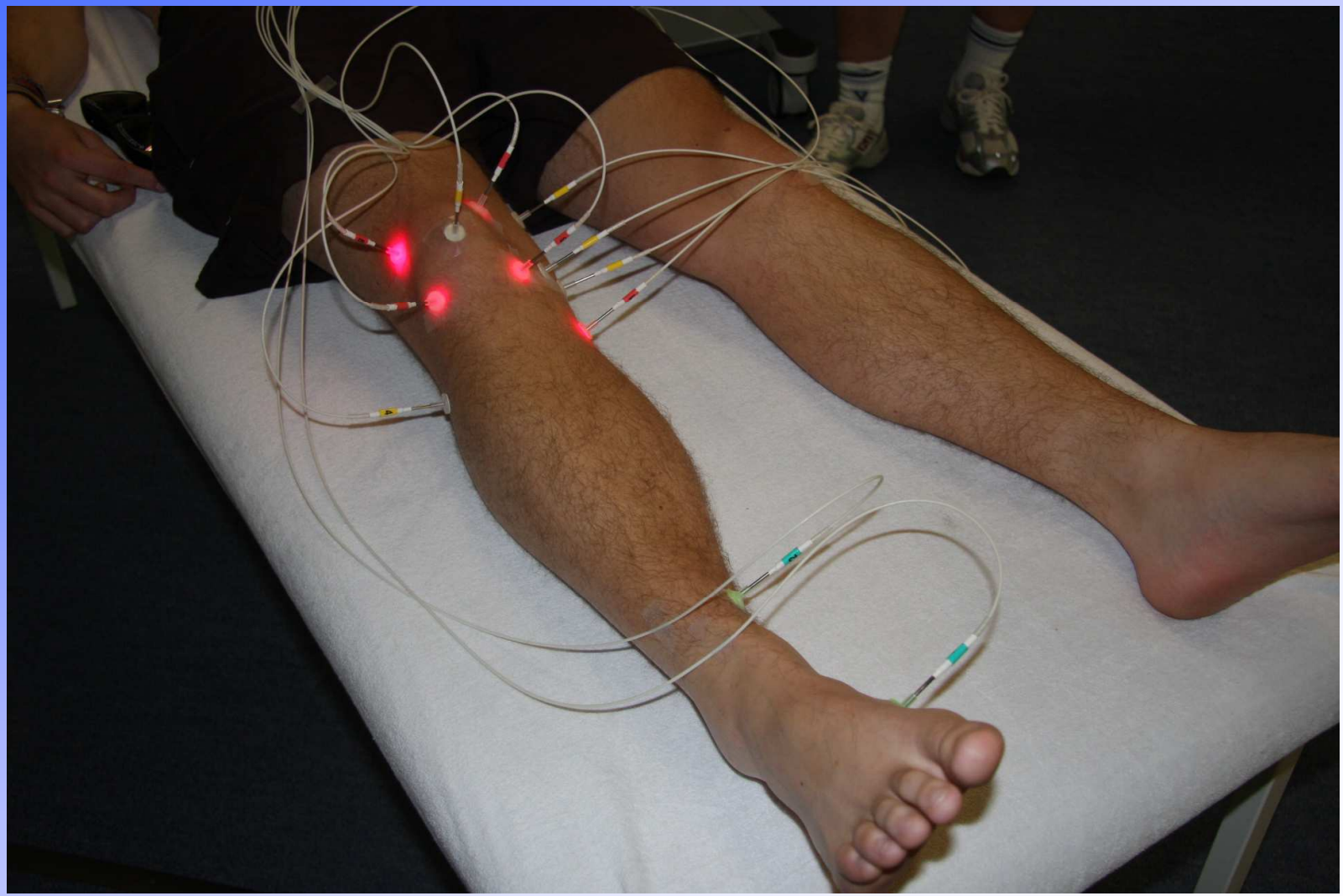
Tennis ellbow



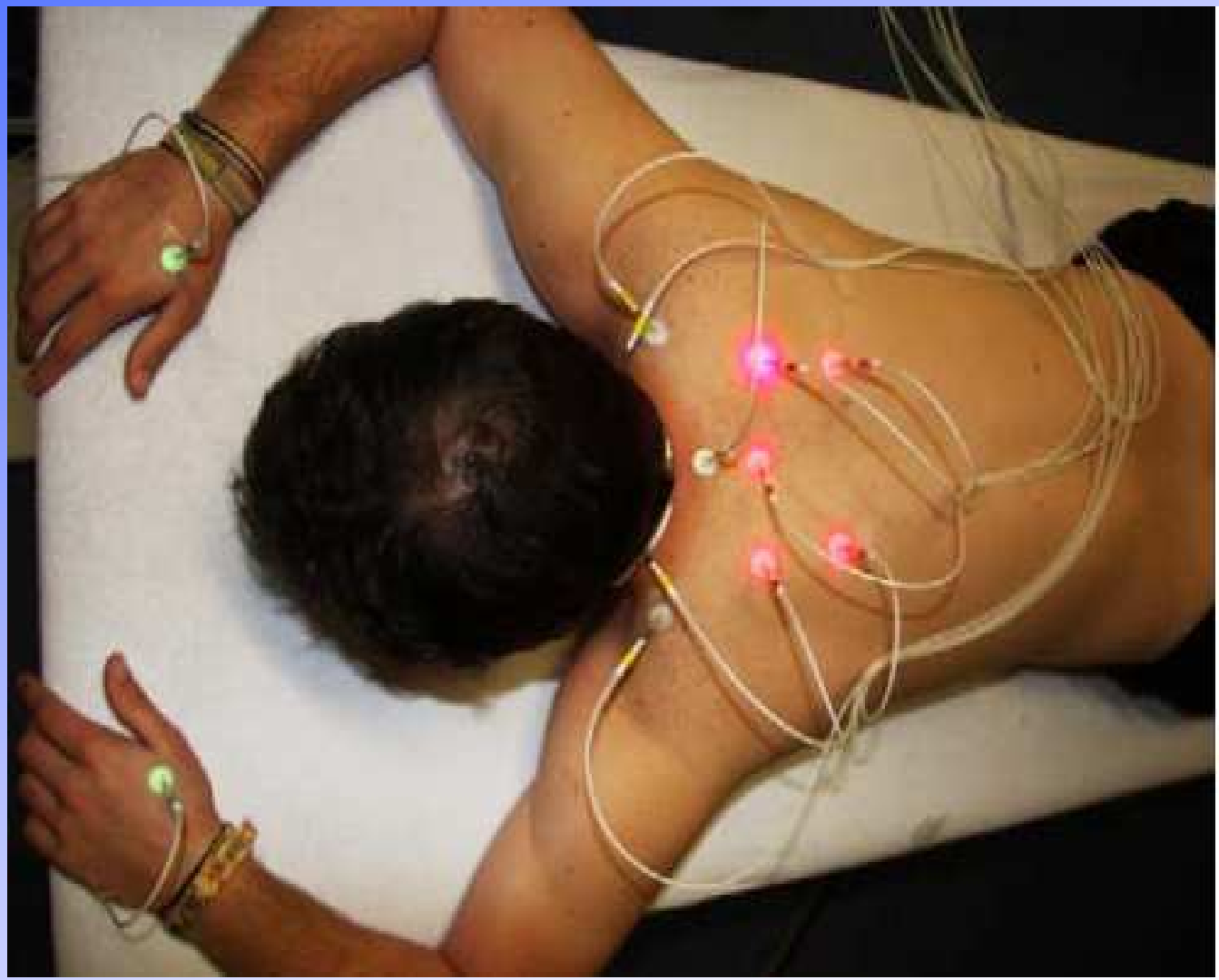
Tennisellenbogen

Shoulder syndrome

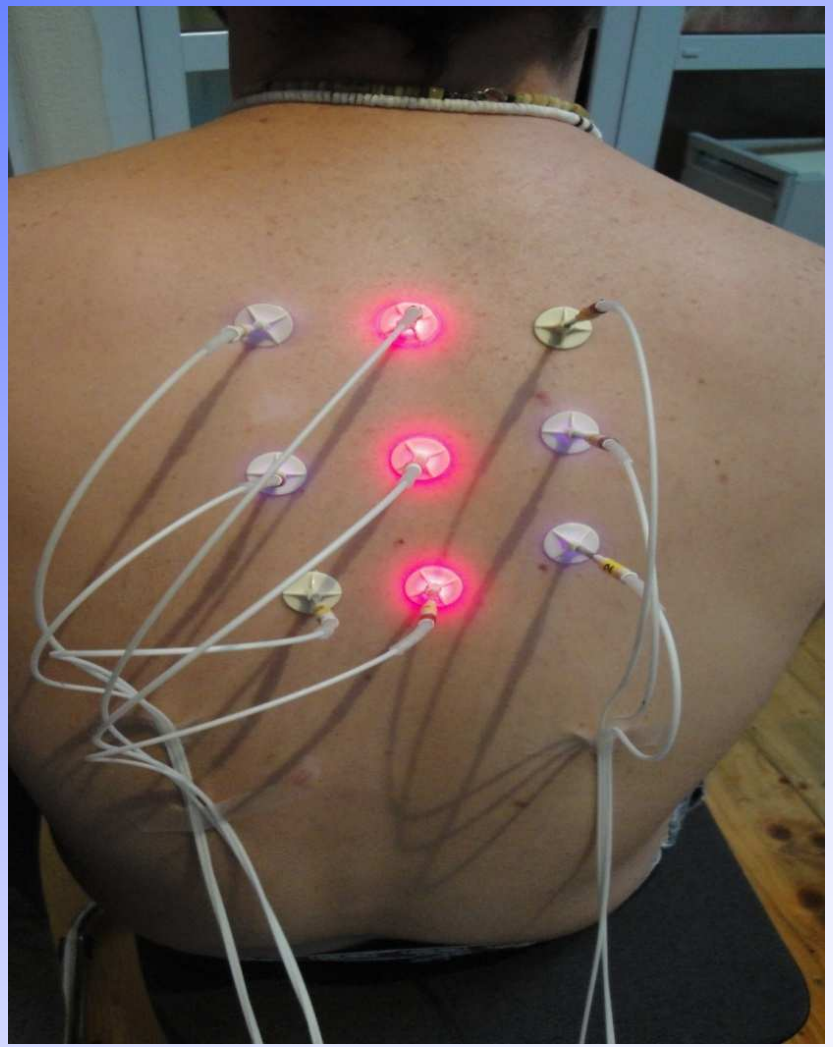
Knee osteoarthritis



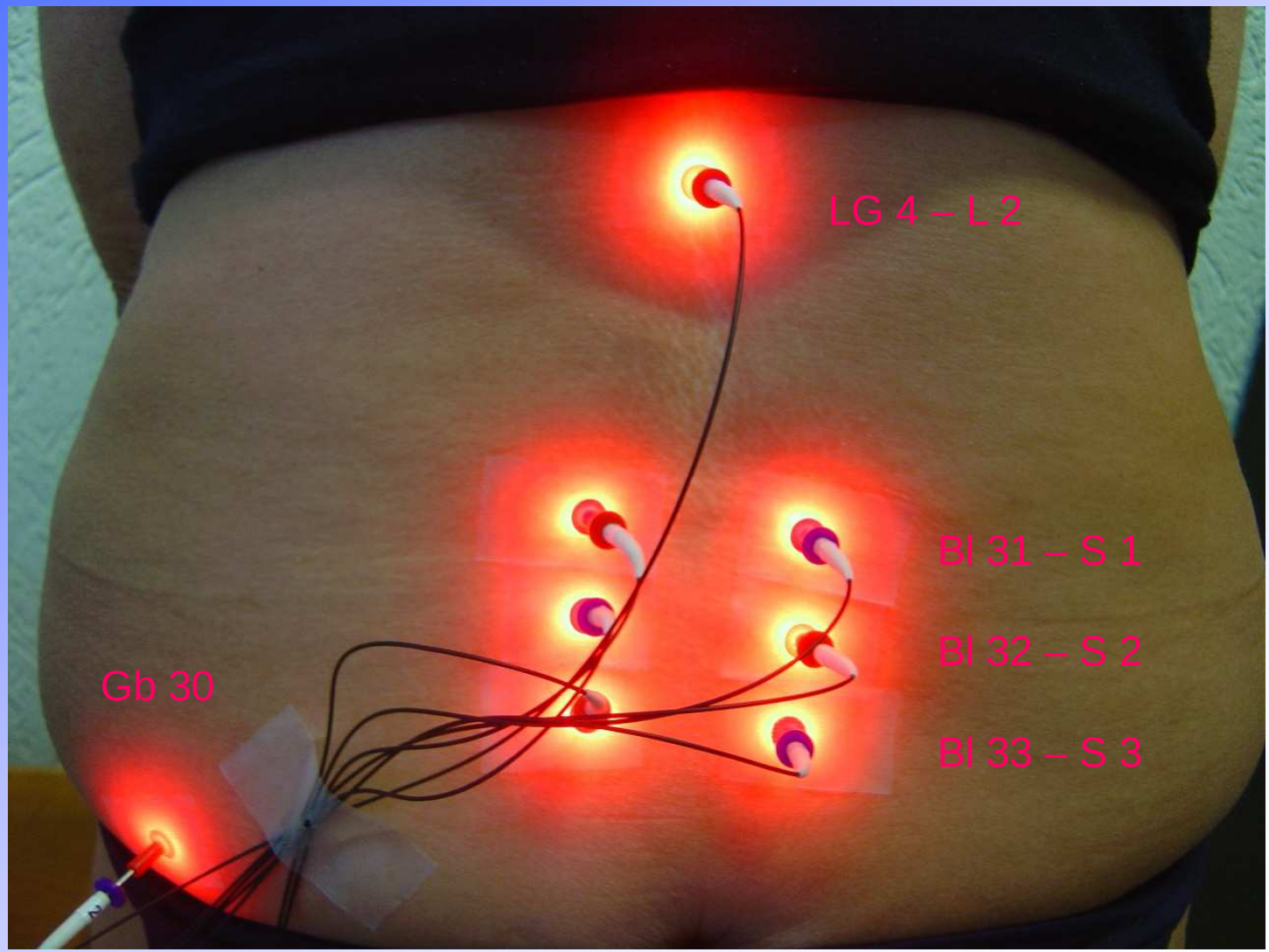
Ceervical spine syndrome



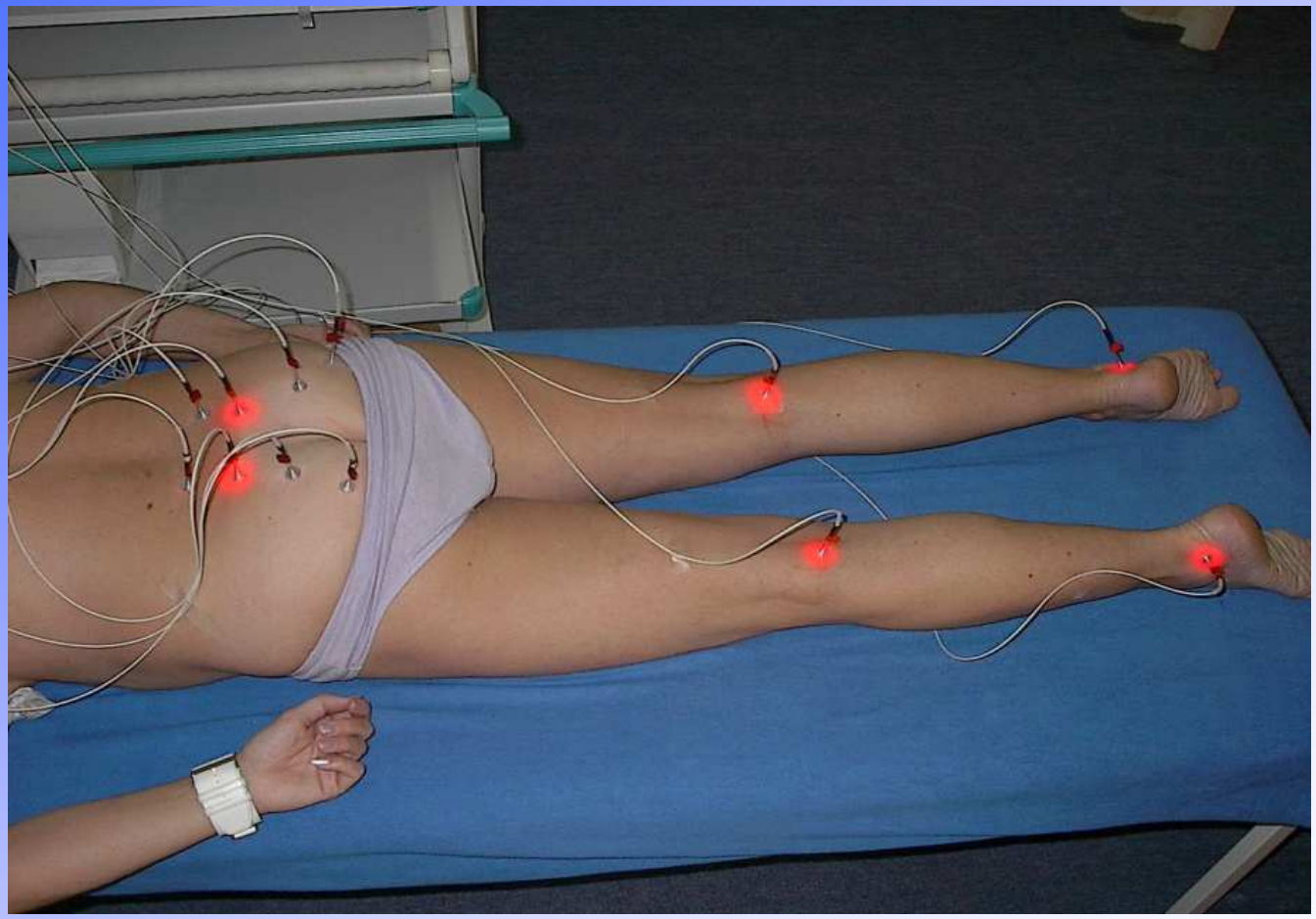
Thoracical spine syndrome



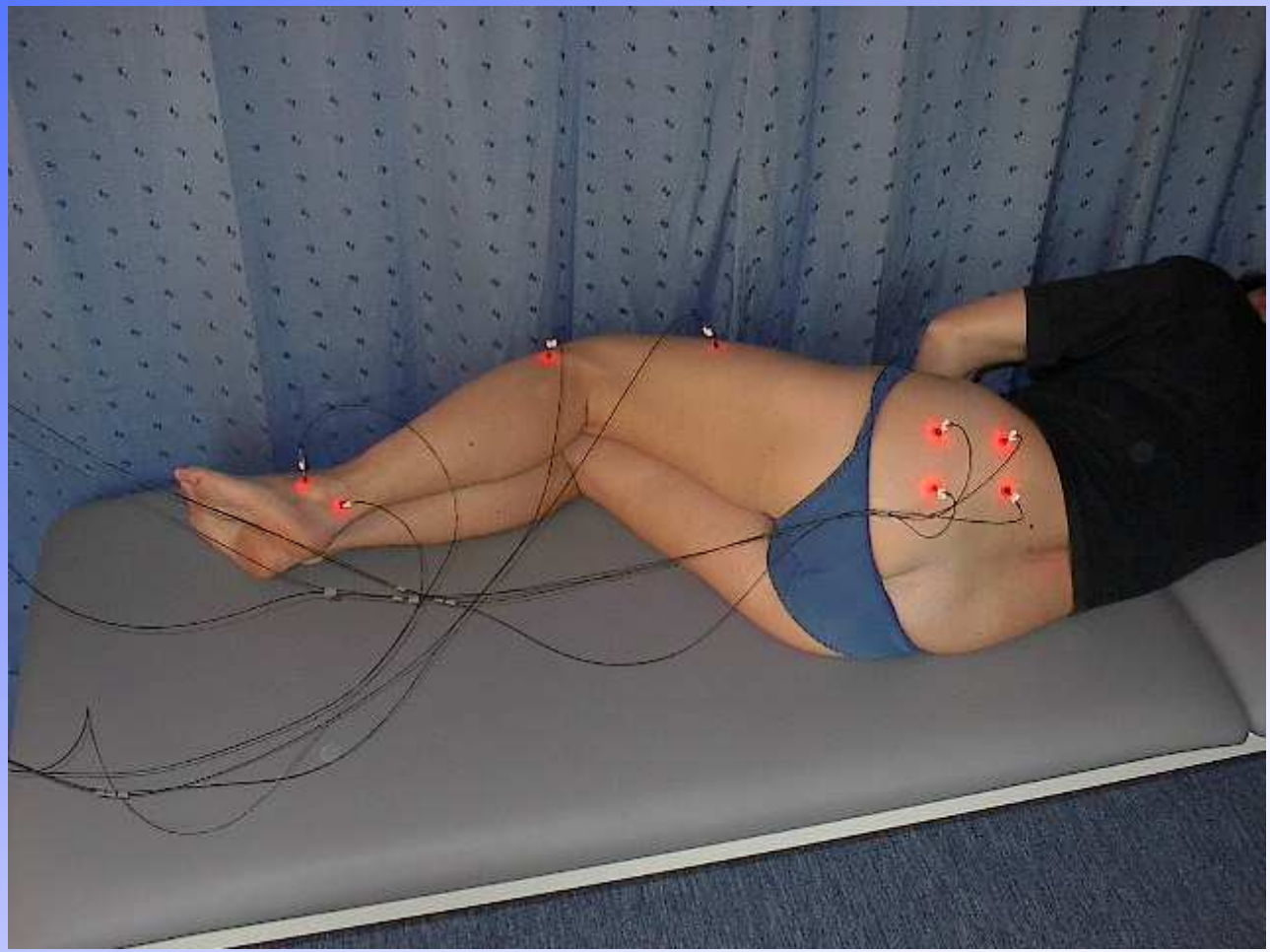
Lumbar spine syndrome



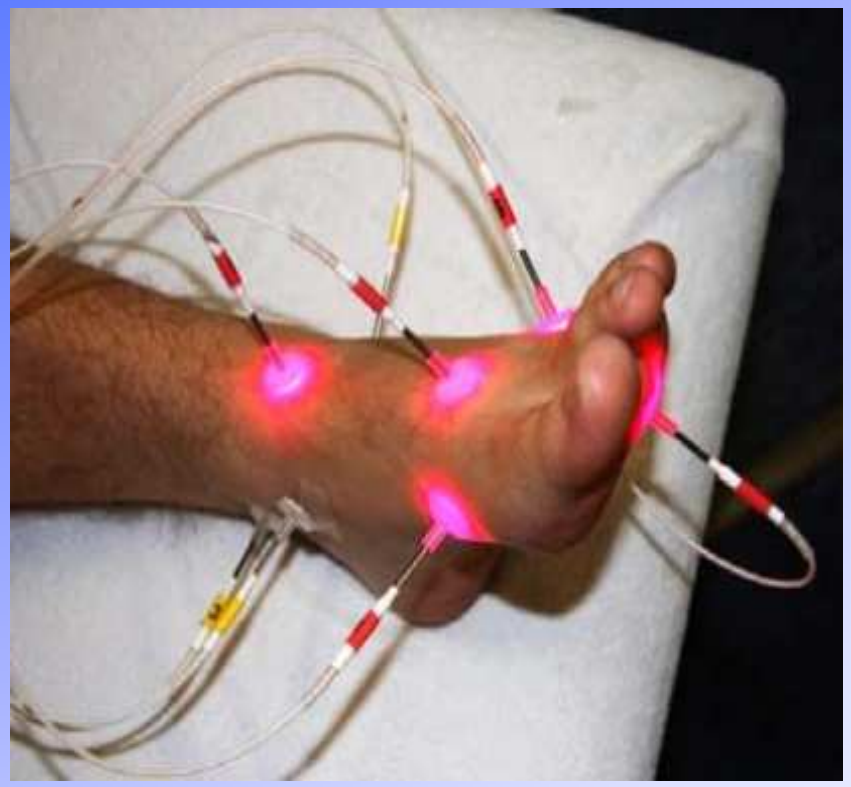
Lumbar spine syndrome



Hip osteoarthritis



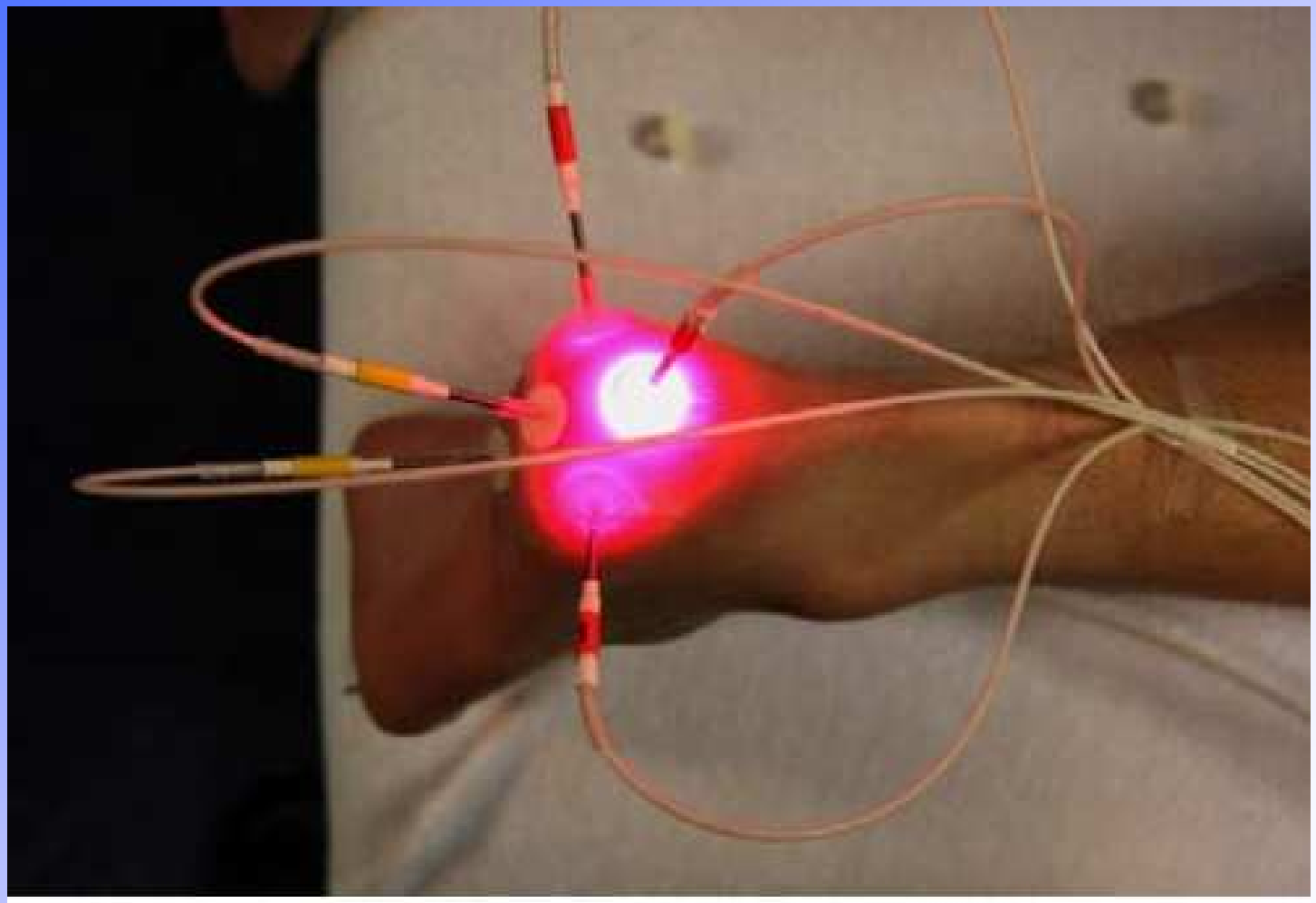
Laserneedle therapy of ancle joint osteoarthritis



Use pain points and
points all around the
Joint
Use red, infrared and green
(20 min, 50-100%)

(acupuncturists use Ki1 and
6, St 40, Sp 4 and 6, Bl 60
and Gbl 40)

Treatment of calcaneus pain



Calcaneal spur

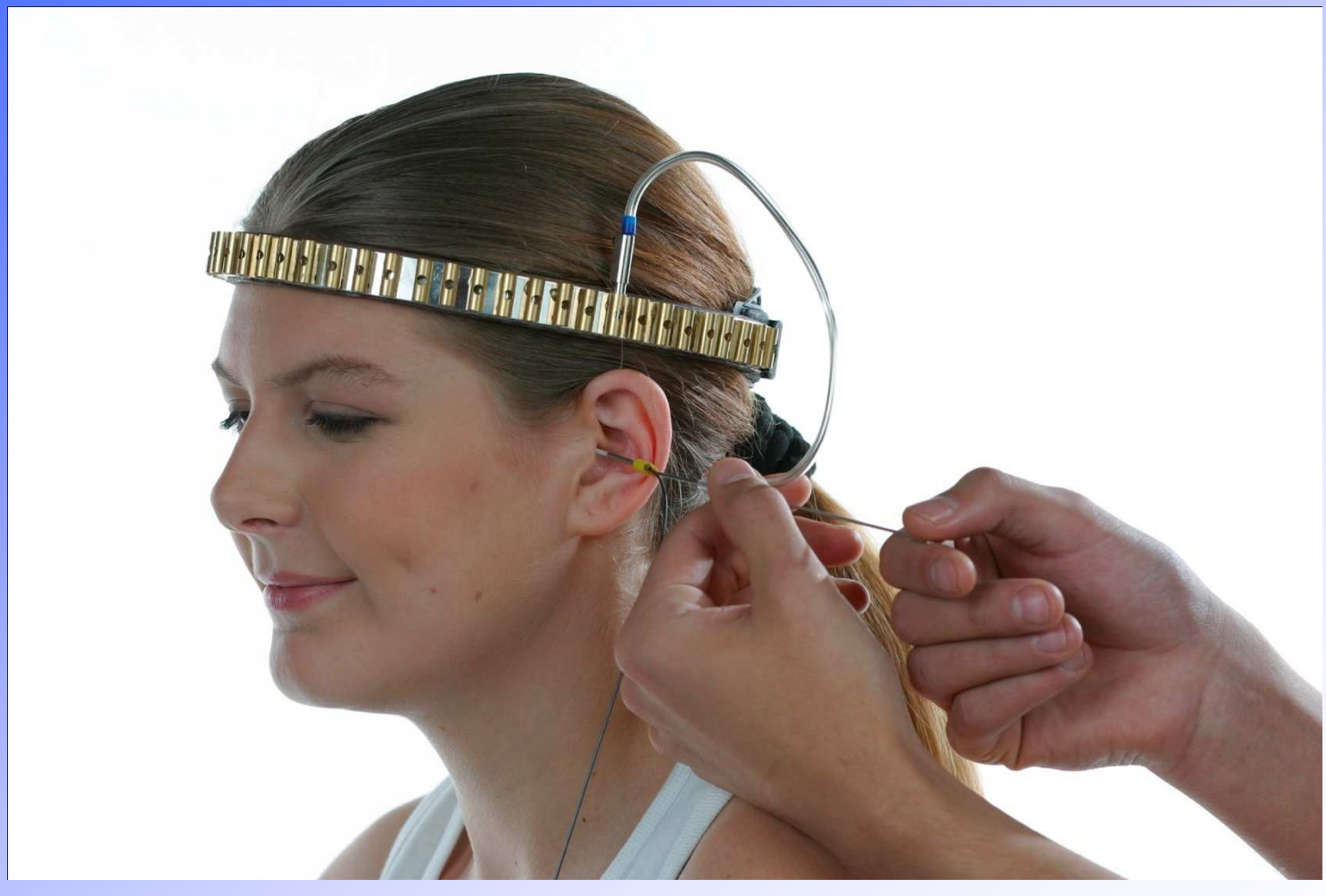
Treatment of children (bronchial asthma)

Preparation of birth in pregnancy

Treatment of children, pylorospasm

Acupuncture in children with pylorus spasm

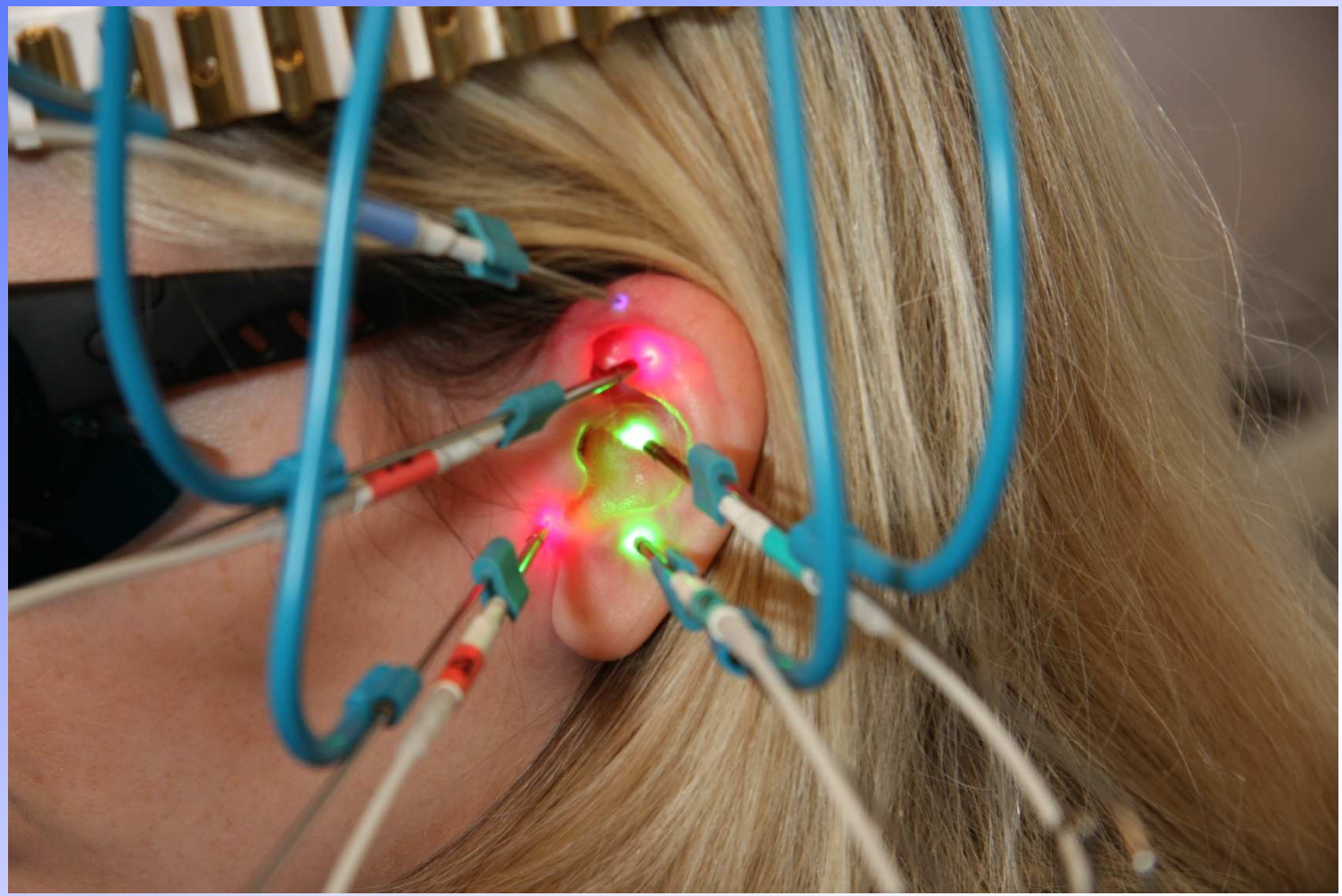
Ear acupuncture with laserneedles



Ohrakupunktur mit weberneedle Kopfadapter

Ear acupuncture with laserneedles

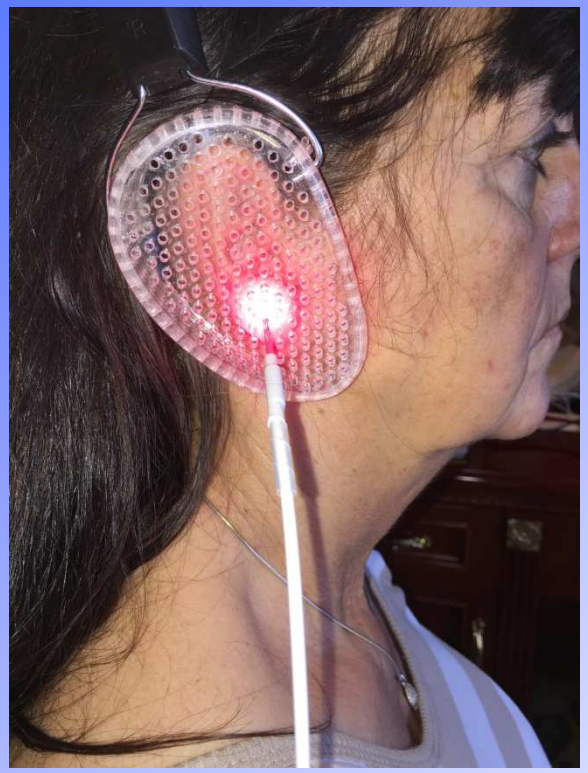
Battlefield Accupuncture, Dr. R. Niemtzow

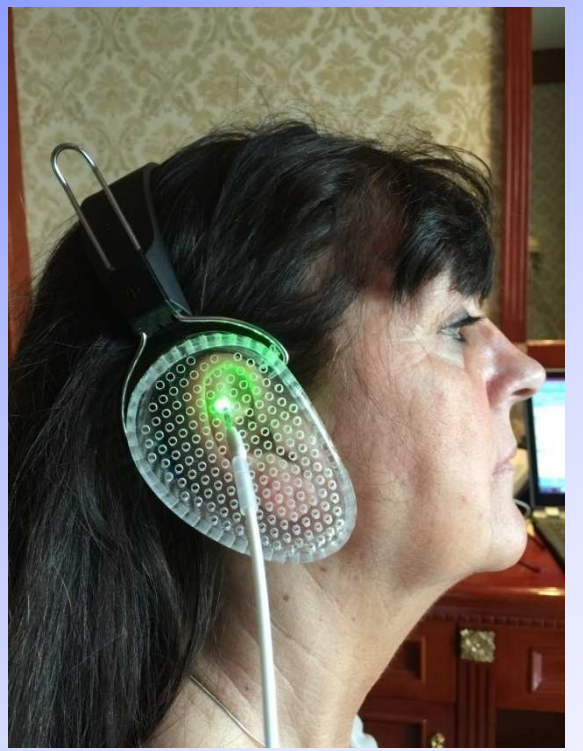


New headset für ear acupuncture

Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

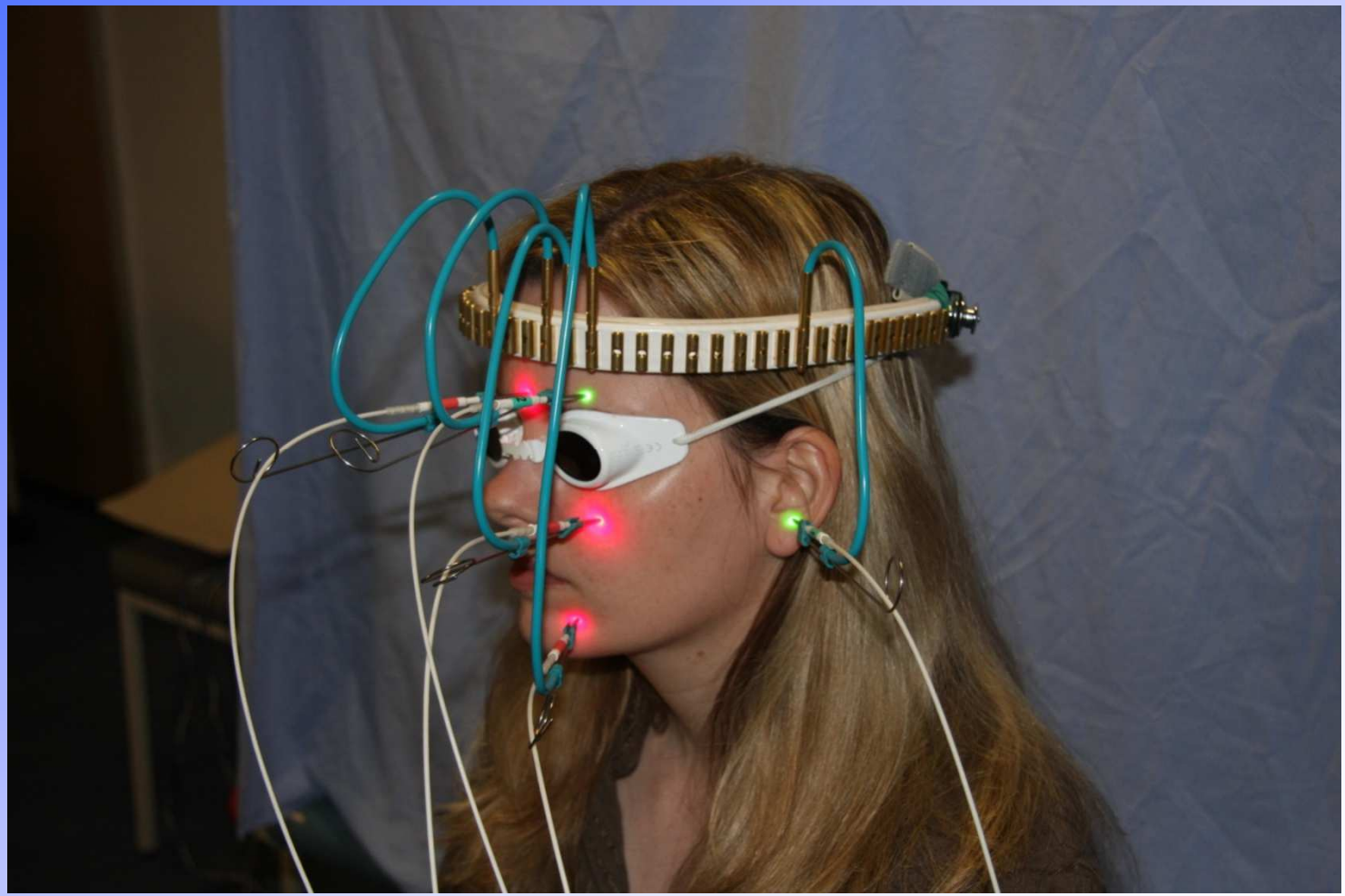
New headset für ear acupuncture





Skull and facial acupuncture with laserneedles

Facial trigeminal nerve acupuncture

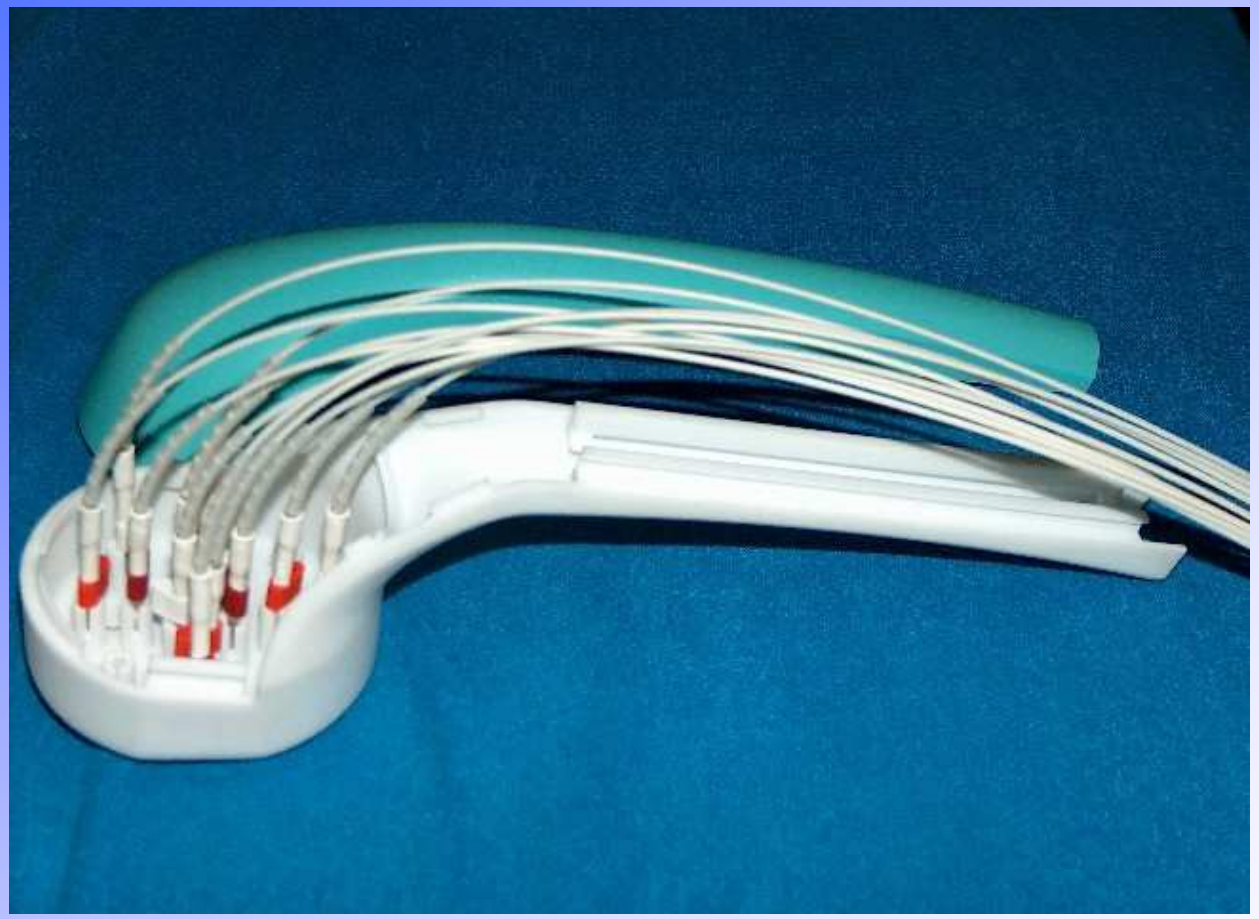


Facial acupuncture with laserneedles

Laserclinic Dr. med.
Dipl. chem. Michael
Weber, Germany

Cosmetic acupuncture with laserneeedles

The Laser body shower



Insertion of laser-needles with different wavelengths into a special shower head

Laser body shower

The weberneedle® body shower is set up with the laser-needles , with reach 5 mm out of the shower head.

Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

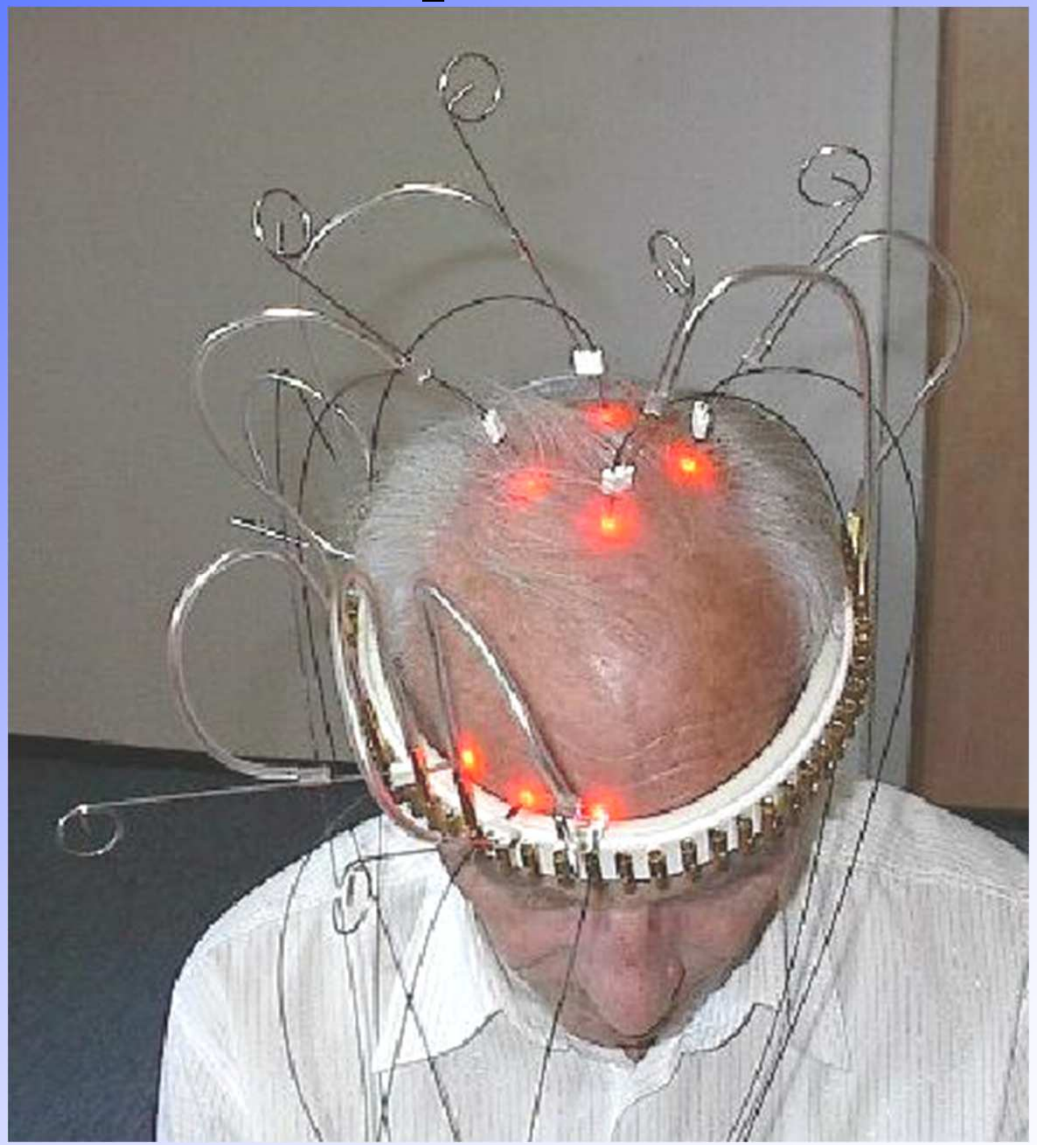
Laserneedle body shower

Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

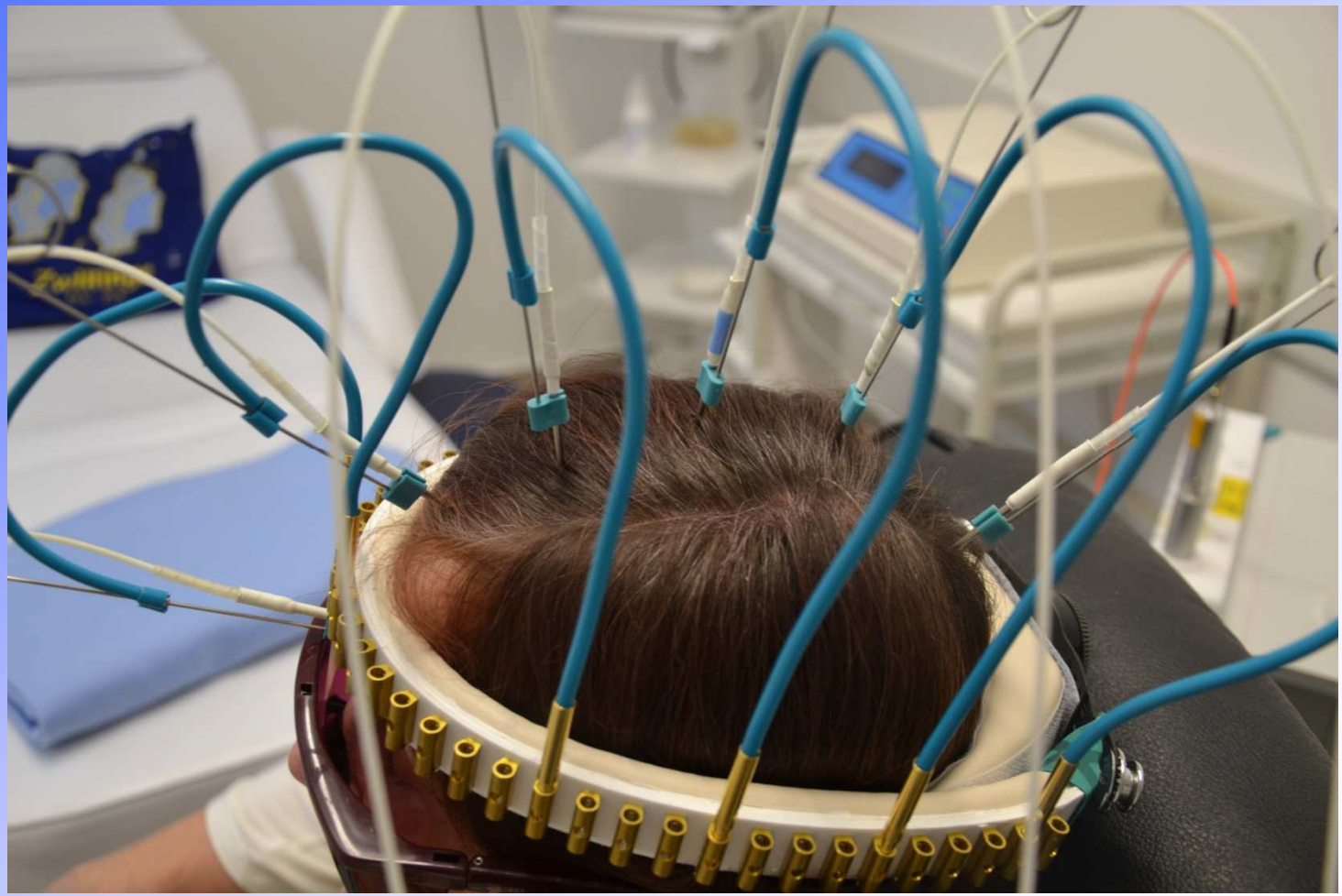
The Laser body shower

Laser small shower (mouth shower)

Transcranial laser therapy, skull acupuncture



Transcranial laser therapy for stroke and brain diseases



Clinical Studies

Measurement of blood flow rate in the A. ophthalmica after laserneedle acupuncture

(Professor Litscher, University Graz)

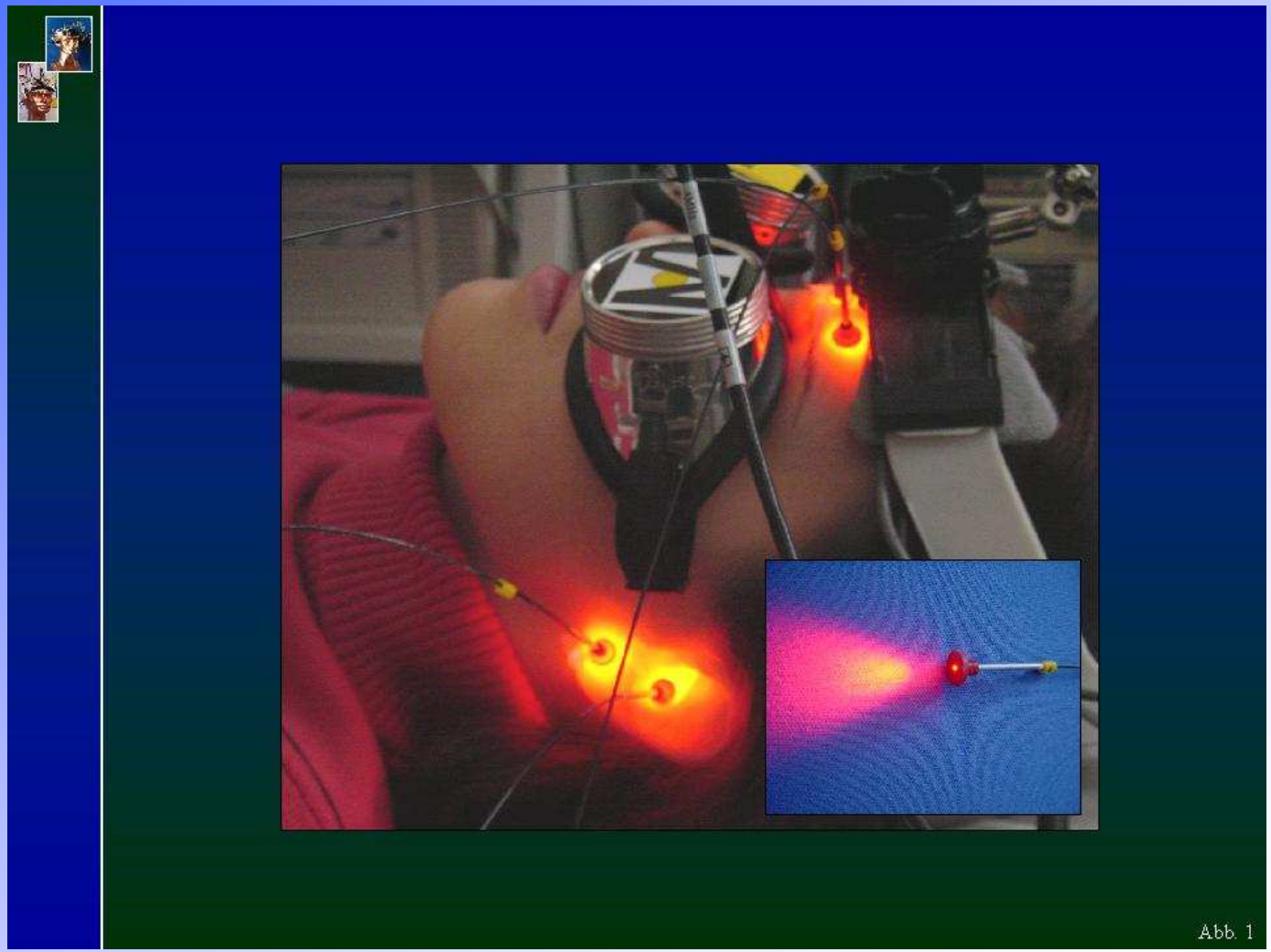
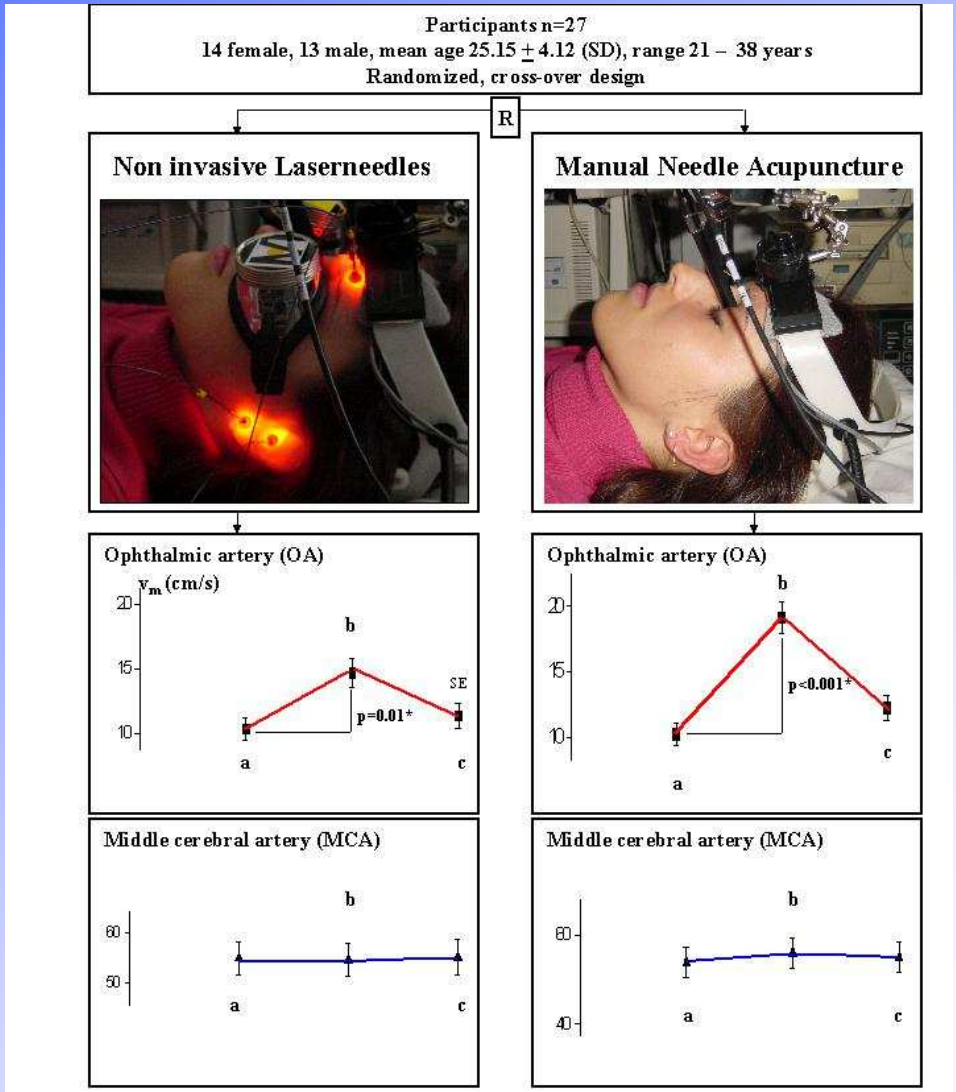


Abb. 1

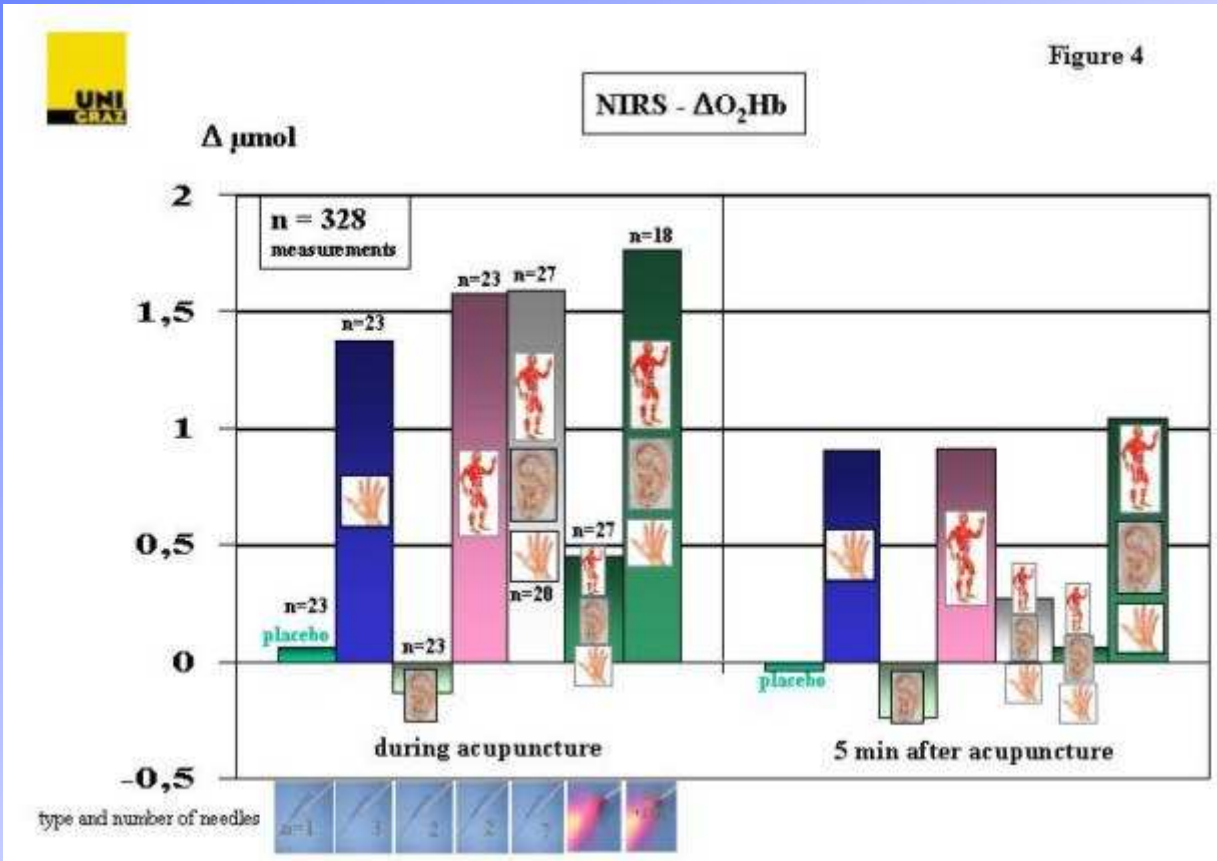
Measurement of blood flow rate in the A. ophthalmica after laserneedle acupuncture (Professor Litscher, University Graz)



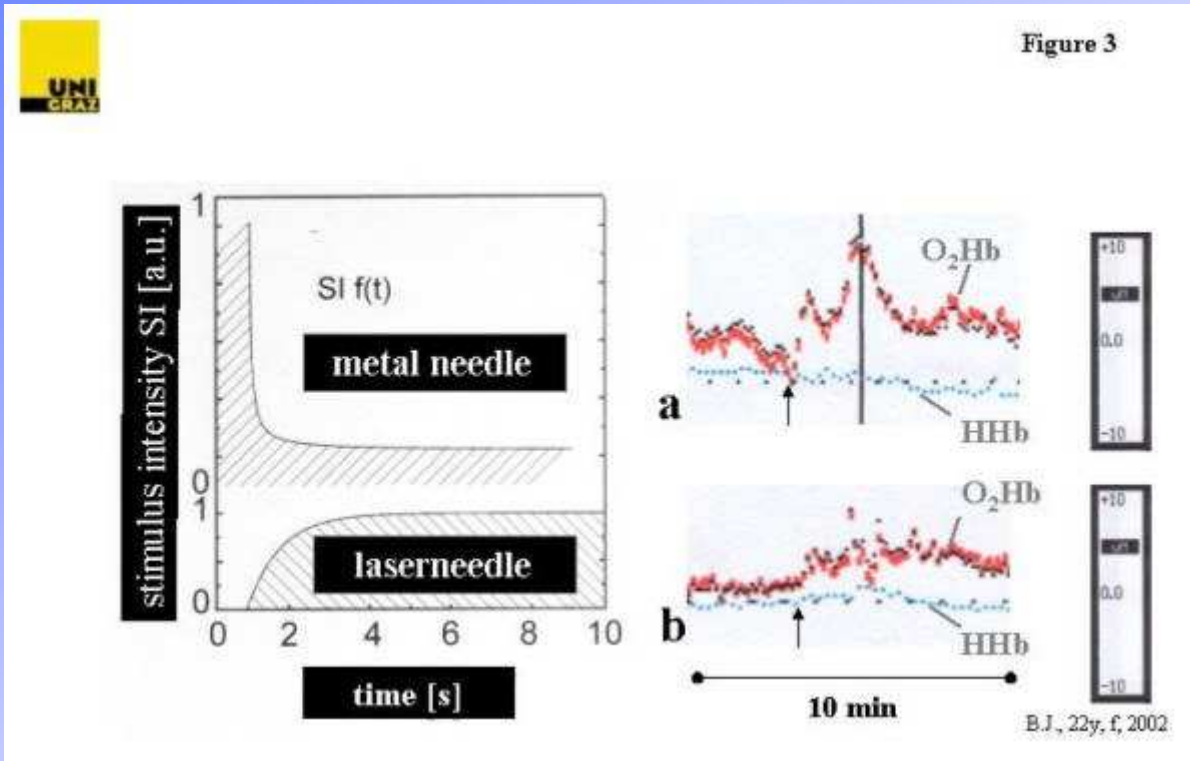
- **Litscher** G., L. Wang, E. Huber:
- **Cerebral changes measured with near infrared spectroscopy using laserneedle acupuncture**

- Biomed. Technik. (2002), 47: 76-79.

Laserneedle near infrared spectroscopy



Laserneedle comparison to metal needle



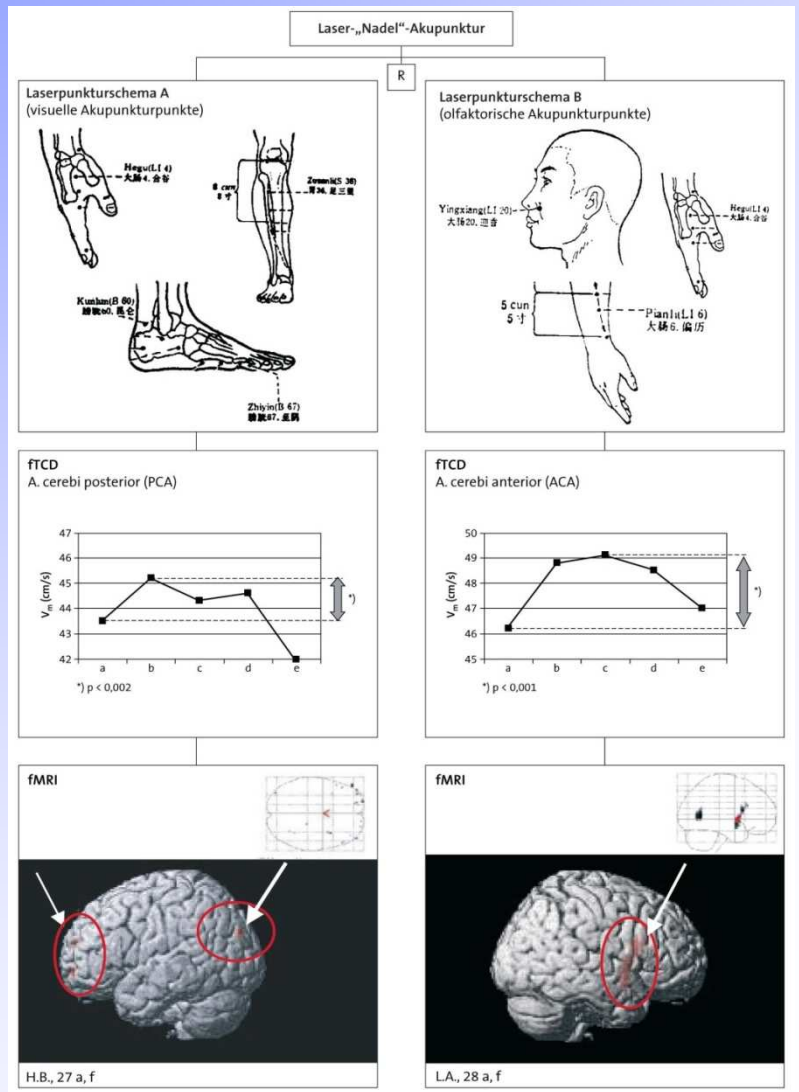
- **Acupuncture using laser needles modulates brain function: first evidence from functional transcranial Doppler sonography and functional magnetic resonance imaging.**

- Litscher G, Rachbauer D, Ropele S, Wang L, Schikora D, Fazekas F, Ebner F.
- Department of Biomedical Engineering and Research in Anesthesia and Critical Care, Medical University of Graz, Auenbruggerplatz 29, 8036, Austria. gerhard.litscher@meduni-graz.at

Laser needle acupuncture modulates brain activity

G. LITSCHER, D. RAUCHBAUER, S. ROPELE, L. WANG, D. SCHIKORA

Abb. 1: Erstes funktionelles Magnetresonanzimaging (fMRI) während Laser-„Nadel"-Stimulation von visuellen Akupunkturfernpunkten bei einer 27 Jahre alten Probandin an der Universität Graz.

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Medical Acupuncture

The Official Journal of the
American Academy of Medical Acupuncture

Mary Ann Liebert, Inc. publishers

The official journal of the American Acadamy of Medical Acupuncture

Issue No. 19, Sep 2007

TABLE 2. OVERVIEW OF TREATMENT DATA, 2001–2006*

Orthopedics	*Neurology/Psychology*	*Internal Medicine*
Gonarthrosis (n = 425)	Migraine and other headache syndromes (n = 343)	Allergic diseases (n = 76)
Spinal column syndromes (n = 405)	Psychovegetative fatigue (n = 98)	Gastrointestinal disorders (n = 65)
Tennis elbow (n = 144)	Depressions (n = 95)	Disorders in peripheral circulation (n = 49)
Coxarthrosis (n = 135)	Tinnitus (n = 81)	Bronchial asthma (n = 44)
Shoulder syndromes (n = 127)	Toxicomania (smoking, drugs) (n = 80)	
Morbus Bechterew and polyarthritis (n = 88)	Residual paresis after stroke (n = 77)	
Tendinitis (n = 88)	Trigeminal neuralgia (n = 29)	
Rhizarthrosis (n = 48)		
Fibromyalgia (n = 28)		

*Patients receiving ≥10 treatments

NEW THERAPEUTIC APPROACH

TABLE 3. ORTHOPEDIC PATIENTS RECEIVING ACUPUNCTURE (N = 1,500)*

	Mean (SD) Visual Analog Scale Score			
	Knee (n = 50)	*Low Back Pain* (n = 50)	*Shoulder* (n = 50)	*Headache/Migraine* (n = 50)
Baseline	6.7 (1.9)	6.6 (2.1)	6.3 (2.2)	7.3 (2.5)
3 Months	3.6 (2.5)	3.3 (2.6)	4.0 (2.4)	3.5 (2.7)
6 Months	3.8 (2.3)	3.5 (2.7)	4.1 (2.6)	3.4 (2.8)

*Significant differences were found between baseline and 3-6 months after treatment ($P < .01$ by t test), but not between the third and sixth months.

Pain relief of laserneedle acupuncture in 1500 patients

Weber et. al. 2007

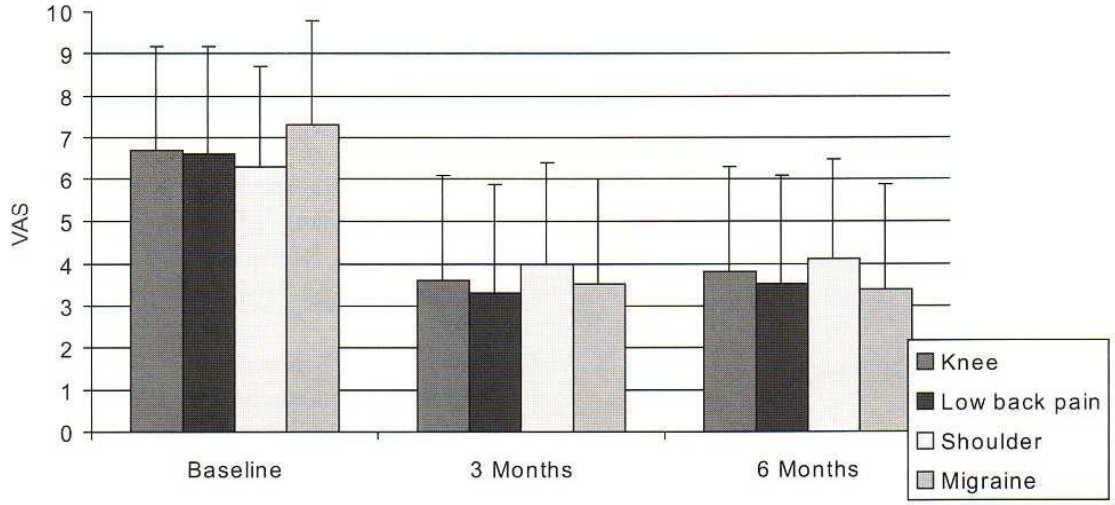


FIG. 10. Pain relief after treatment of 4 different pain syndromes 3-6 months later. VAS indicates visual analog scale. (This group of patients treated with laser needle acupuncture only.)

- Original Paper
- **Pilot Study of the Clinical Equivalence of Laser Needle to**
- **Metal Acupuncture Needle in Treating Musculoskeletal Pain**

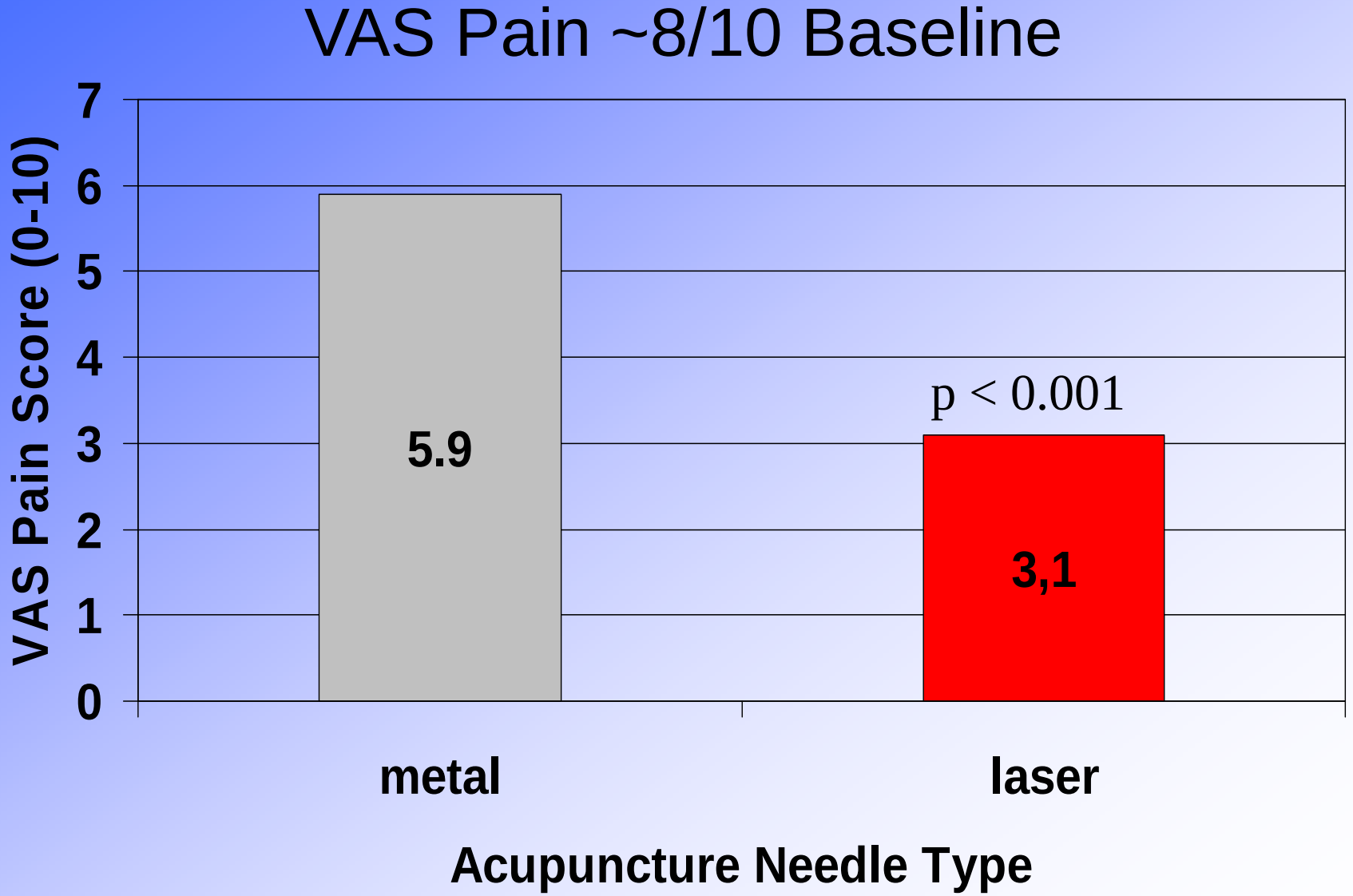
Peter T Dorsher MS, MD
Mayo Clinic Florida
4500 San Pablo Road
Jacksonville, Florida 32224
phone: 904-953-2823
fax: 904-953-0276
email: dorsher.peter@mayo.edu
abstract 267 words
text: 1985 without references, tables, and legends
figures: 3
tables: 4

Mayo Clinic Jacksonville

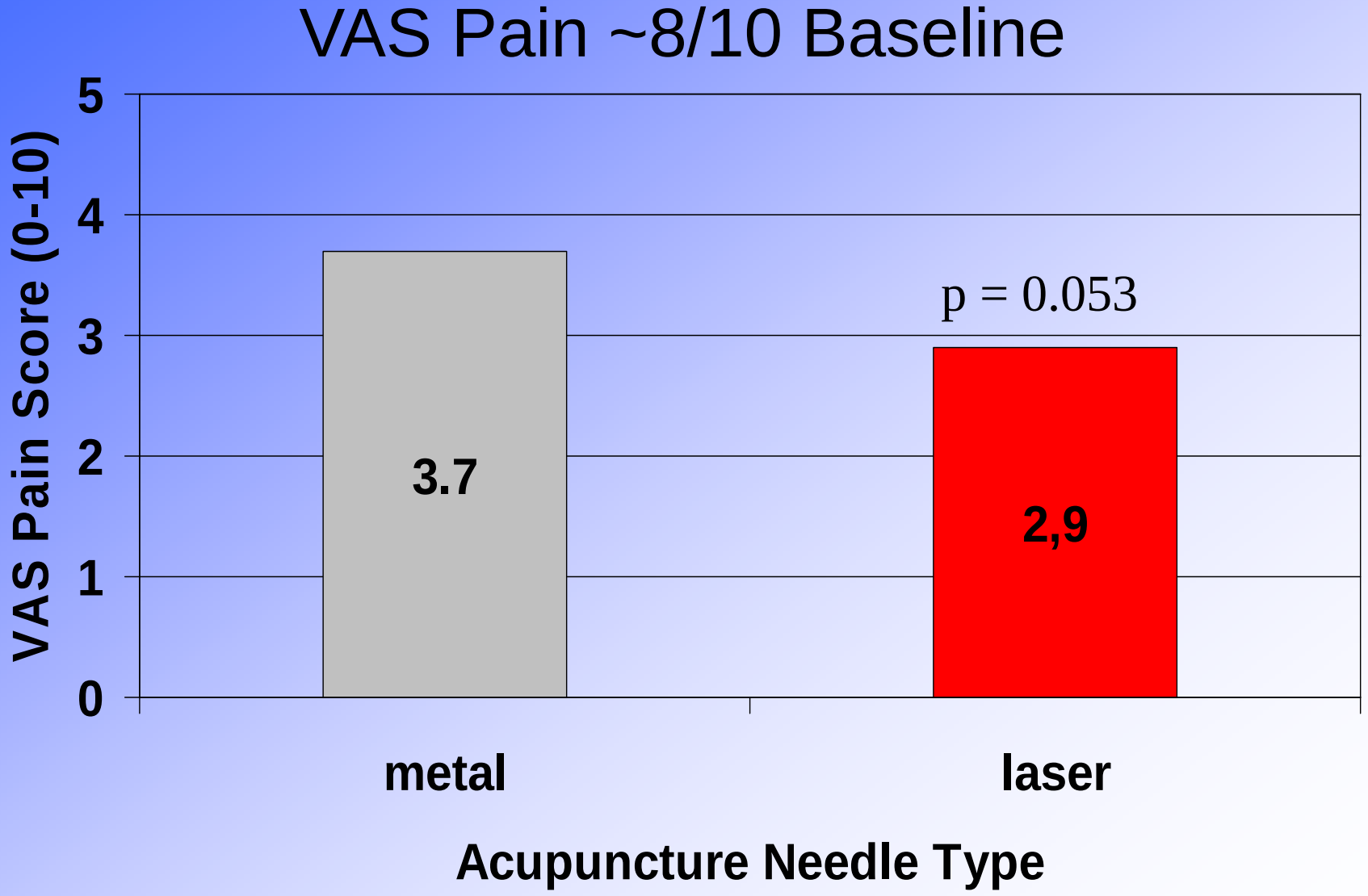
Pilot Study of the Clinical Equivalence of Laser Needle to Metal Acupuncture Needle in Treating Musculoskeletal Pain (Dorsher et al.)

- **Results: For subjects with knee and shoulder arthritis, metal needle *VAS was 5.9 while Laserneedle VAS was 3.1* (mean difference 2.8, P<0.001 single tail).**
- **For subjects with spine pain, the metal needle *VAS was 3.7 while Laserneedle VAS was 2.95* (mean difference 0.75, P<0.074).**
- **9/10 subjects with joint arthritis reported more efficacy with Laserneedle and the other found it equally efficacious.**
- ***10/20 spine pain subjects reported more pain relief efficacy with Laserneedle*, and another 6 found the interventions equally efficacious. No complications from the laser treatment were noted.**

Results: Knee & Shoulder Arthritis



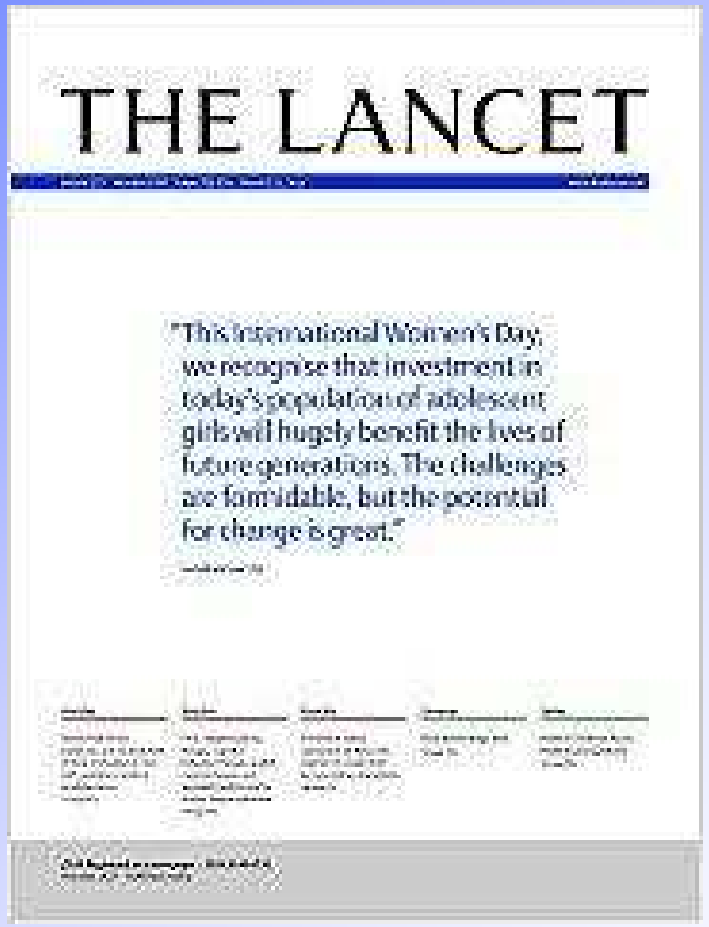
Results: Cervical & Lumbar Pain



Comparison between red and infrared laser: **Infrared laser can penetrate bones**

Bild 8: Rotes Laserlicht wird im Gewebe gestreut, teilweise absorbiert, aber auch an absorbierenden Strukturen (Knochen) vorbeigeleitet. Hier wird ein Finger von einem 250 mW starken roten Laser (660 nm), und einem 400 mW starken IR Laser (830 nm) bestrahlt. In der Handfläche ist kaum rote, wohl aber etwas IR Transmission sichtbar. Mit einem empfindlichen Messgerät liegt eine jeweilig emittierte Leistung bei etwa 0,002 mW/mm² (Finger rot), 0,012 mW/mm² (Finger IR), 0,00001 mW/mm² (Hand rot) und 0,0004 mW/mm2 (Hand IR). Die IR Bilder sind mit einer Sony HDR-SR1E im (unbeleuchteten) Night-Shot Modus aufgenommen, die roten Bilder auch mit einer Sony DSC-H1. Hier erscheint elektronisch bedingt ein besonders helles rotes Licht orange bis gelblich.

The Lancet publication about neck pain

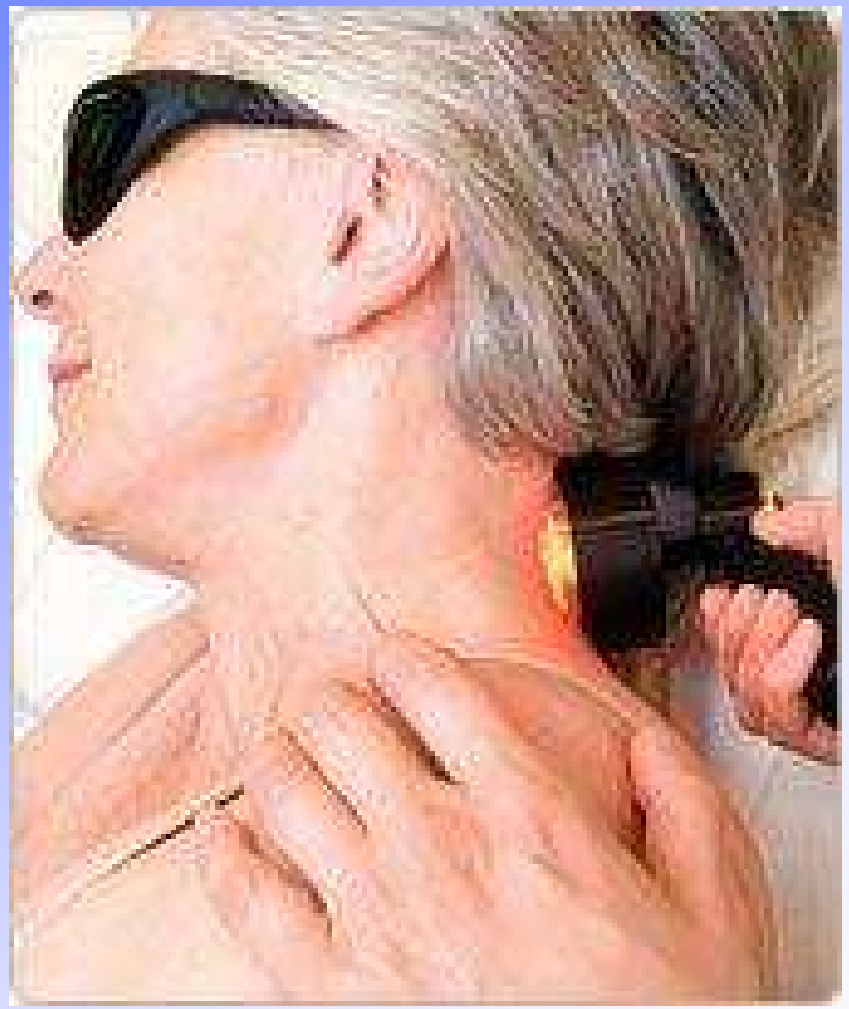


The Lancet Study

- **Efficacy of low-level laser therapy in the management of neck pain: a systematic review and meta-analysis of randomised placebo or active-treatment controlled trials**
- Roberta T Chow, Mark ‘Johnson, Rodrigo A B Lopes-Martins, Jan M Bjordal

Low Level Laser Therapy relief for chronic neck pain

Low Level Laser Therapy relief for chronic neck pain



The Lancet Study

RESULTS:

- Reduce pain intensity
- Reduced disability
- Reduces recurrence of acute neck pain
- Mean Pain intensity reduction over placebo 20mm (95%CI: 17.1 to 29.8 @ 10-22 weeks)

The Lancet Study

- **COMMENT:**

- This establishes LLLT as an evidence based treatment for neck pain. It is at least equivalent to and probably better than other accepted medical treatments for neck pain

Effects of laserneedle acupuncture on olfactory sensitivity of healthy human subjects: a placebocontrolled, double-blinded, randomized trial*

A. Anzinger1, J. Albrecht1, R. Kopietz1, A.M. Kleemann1, V. Schöpf1,
M. Demmel1, T. Schreder1, I. Eichhorn1, M. Wiesmann1,2
1 Department of Neuroradiology, Ludwig-Maximilians-University Munich, Germany
2 Department of Radiology and Neuroradiology, Helios Kliniken Schwerin, Germany

In conclusion,

laserneedle acupuncture is an effective method to improve olfactory sensitivity after one session of stimulation for at least one hour, independently of the attitude of subjects towards the stimulation

Photomedicine and Laser Surgery
Volume 26, Number 4, 2008

Pp. 301–306
DOI: 10.1089/pho.2007.2188

Laser-Needle Therapy for Spontaneous Osteonecrosis of the Knee

Winfried Banzer, M.D., Ph.D.,[1] Markus Hübscher, Ph.D.,[1] and Detlef Schikora, Ph.D.[2]

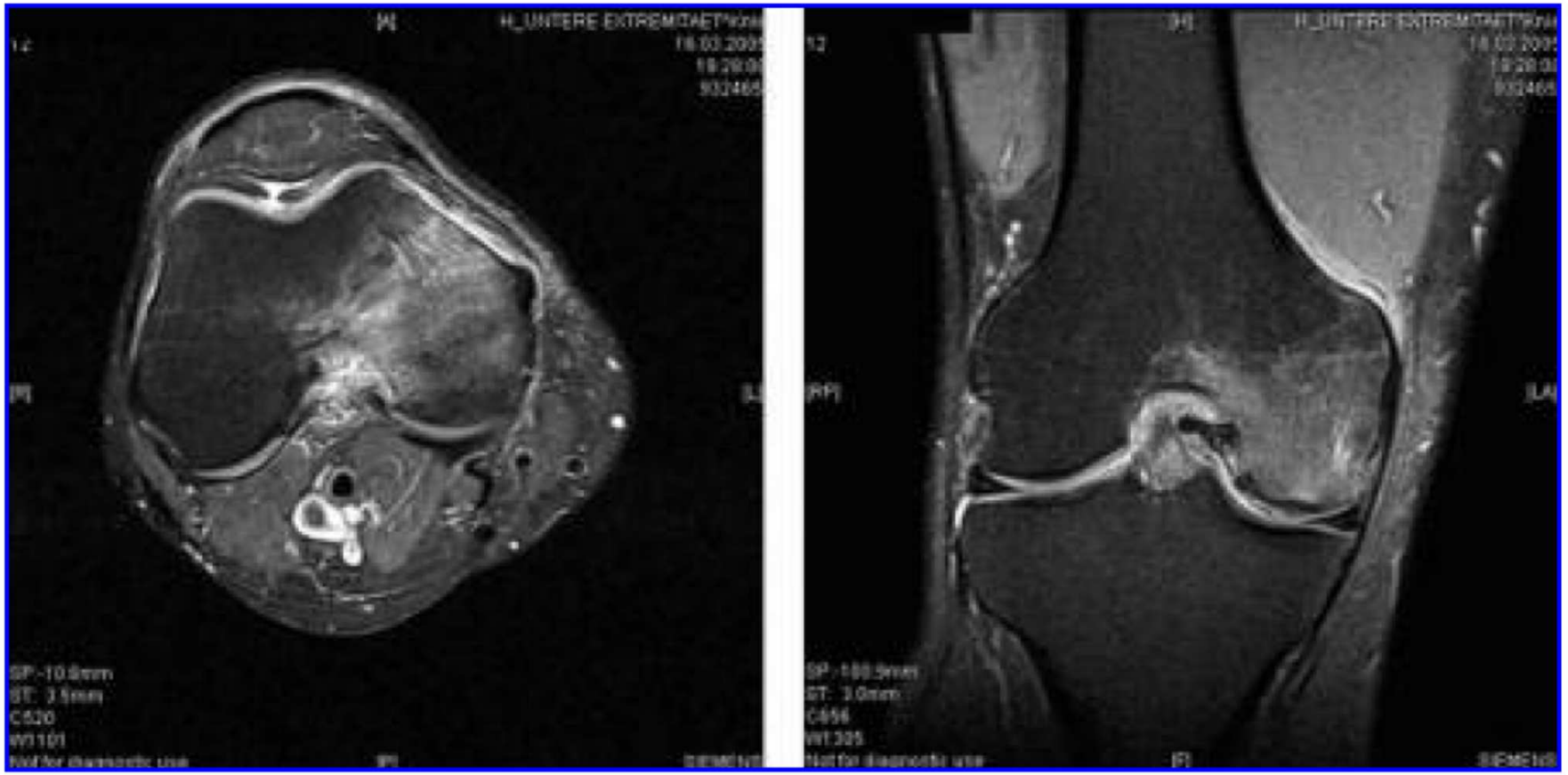


FIG. 1. These MRI images, made March 16, 2005, are a coronary fat-suppressed PD TSE sequence. (**A**) Axial and (**B**) frontal images, showing a linearly subcortical focus at the medial femur condyle with adjacent spongiosa edema (necrotic zone) reaching deep into the bone marrow.

FIG. 2. These MRI images, made on April 25, 2005, are a coronary fat-suppressed PD TSE sequence. (**A**) Axial and (**B**) frontal images, demonstrating distinct regression of the spongiosa edema at the medial femur, as well as a decrease in size of the subcortical focus.

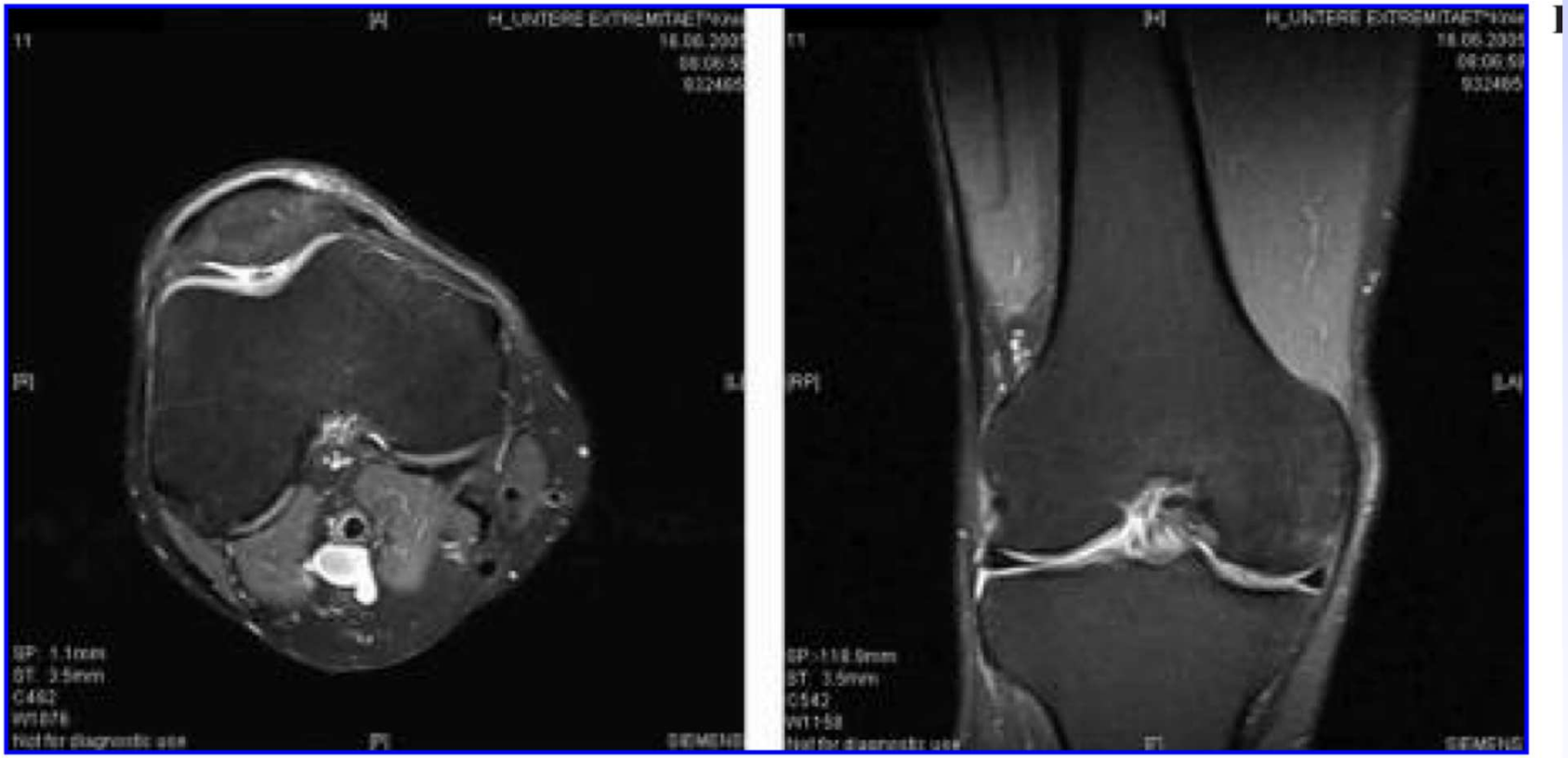


FIG. 3. These MRI images, made on June 16, 2005, are a coronary fat-suppressed PD TSE sequence. (**A**) Axial and (**B**) frontal images, showing almost complete restitution of the spongiosa edema.

Infrared Laser Therapy for Ischemic Stroke: A New Treatment Strategy

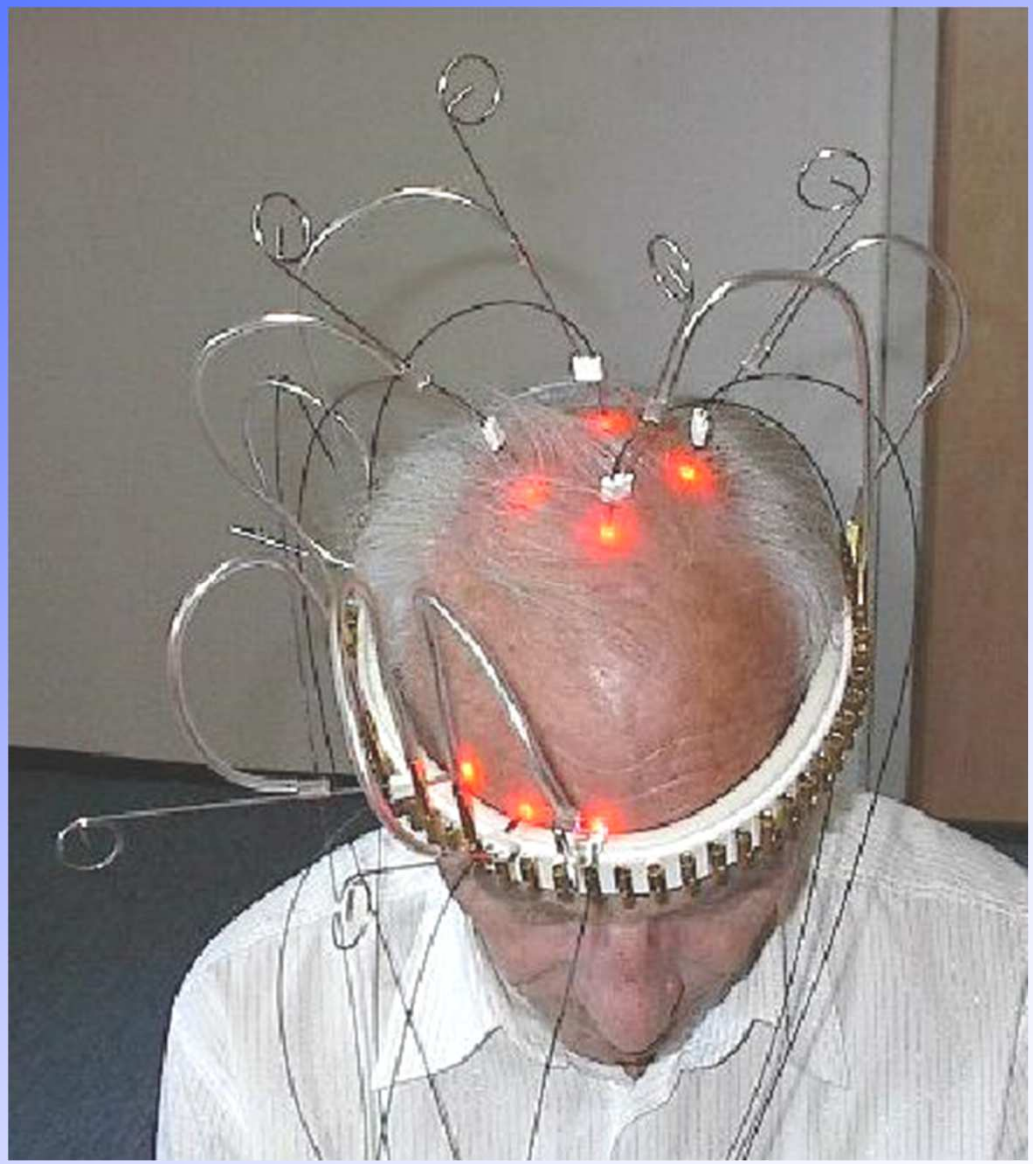
Results of the NeuroThera Effectiveness and Safety Trial–1 (NEST-1)

Yair Lampl, MD; Justin A. Zivin, MD, PhD; Marc Fisher, MD; Robert Lew, PhD; Lennart Welin, MD; Bjorn Dahlof, MD; Peter Borenstein, MD; Bjorn Andersson, MD; Julio Perez, MD; Cesar Caparo, MD; Sanja Ilic, MD, MS; Uri Oron, PhD

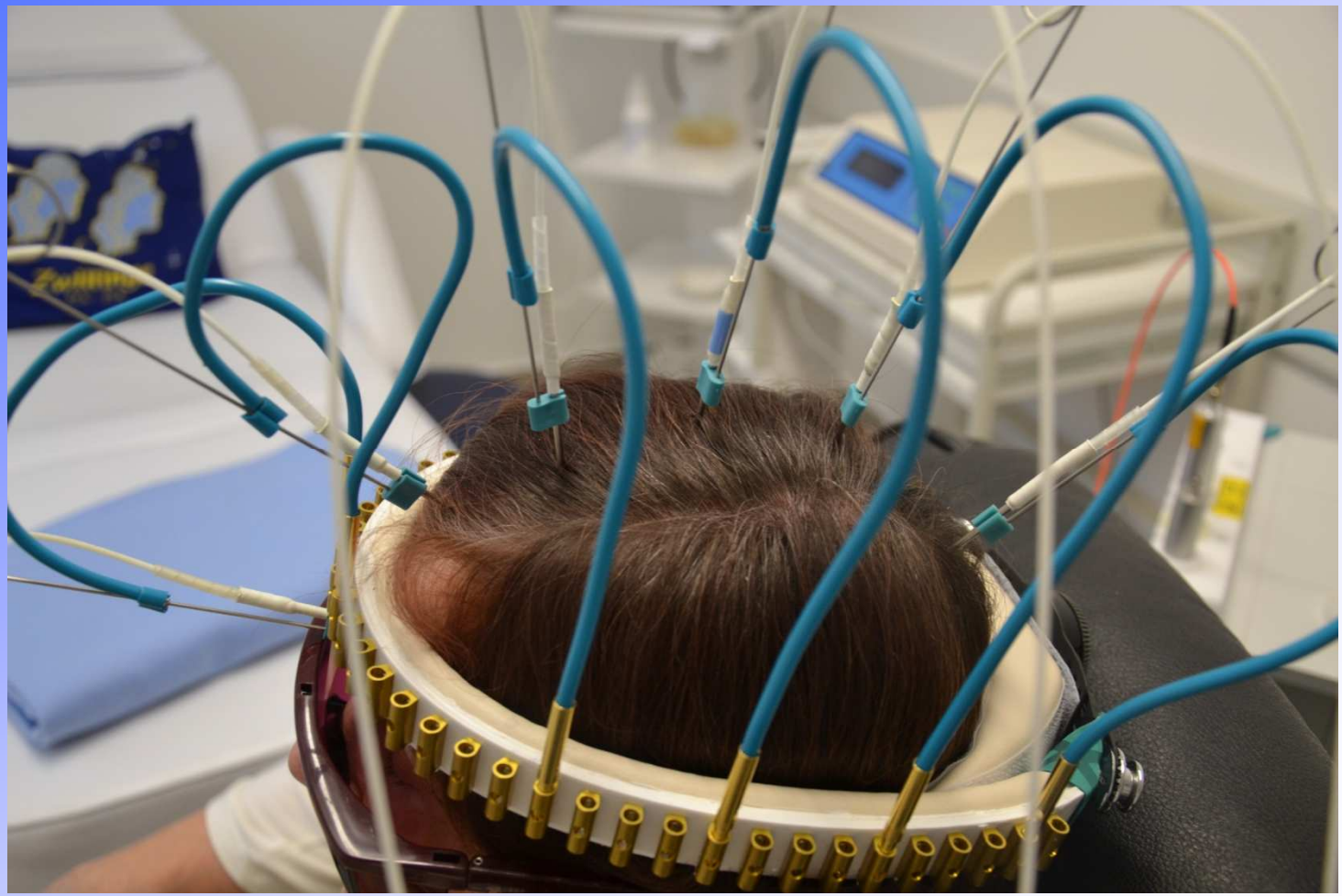
Background and Purpose—The NeuroThera Effectiveness and Safety Trial–1 (NEST-1) study evaluated the safety and preliminary effectiveness of the NeuroThera Laser System in the ability to improve 90-day outcomes in ischemic stroke patients treated within 24 hours from stroke onset. The NeuroThera Laser System therapeutic approach involves use of infrared laser technology and has shown significant and sustained beneficial effects in animal models of ischemic stroke.

Methods—This was a prospective, intention-to-treat, multicenter, international, double-blind, trial involving 120 ischemic stroke patients treated, randomized 2:1 ratio, with 79 patients in the active treatment group and 41 in the sham (placebo) control group. Only patients with baseline stroke severity measured by National Institutes of Health Stroke Scale (NIHSS) scores of 7 to 22 were included. Patients who received tissue plasminogen activator were excluded. Outcome measures were the patients' scores on the NIHSS, modified Rankin Scale (mRS), Barthel Index, and Glasgow Outcome

Transcranial laser therapy



Transcranial laser therapy



MRI-research institute Prof. Cho, Incheon, Südkorea

First MRI, Los Angeles, Prof. Cho


SIEMENS

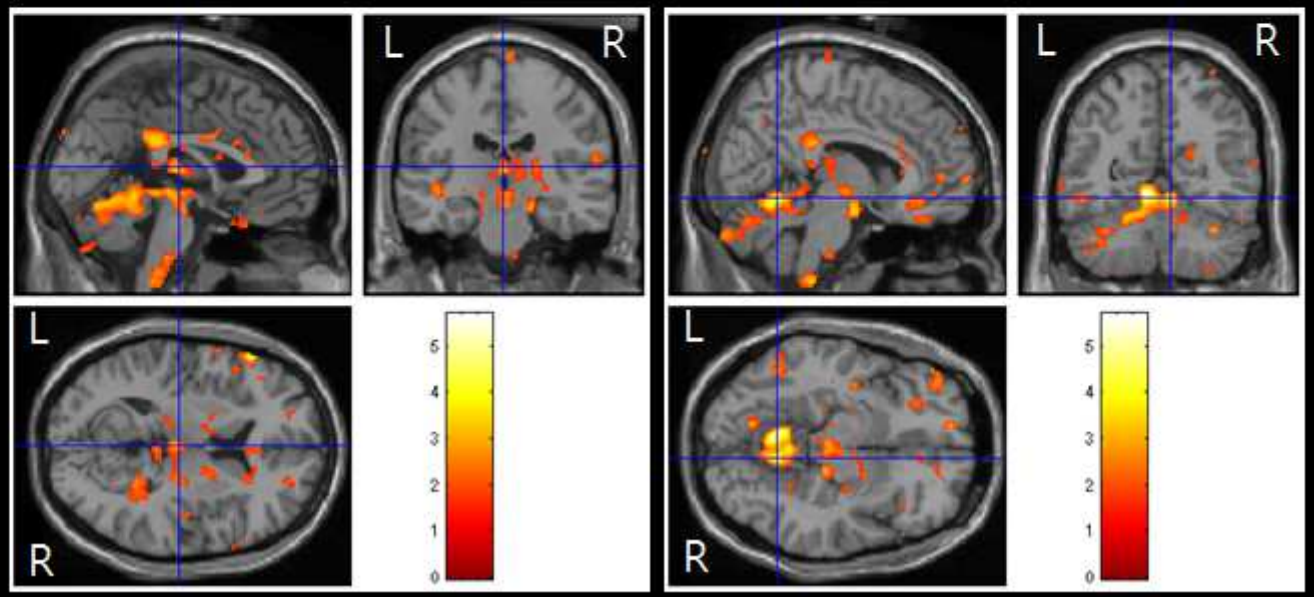
Laser Acupuncture

Intravascular + Head

2010-06-03

SUBJ2 Weber

P<0.05



Transcranial infrared laser (tILS) stimulation: Does it exert effects on the intact human brain?

Prof. Dr. Walter Paulus
Prof. Dr. Andrea Antal
Dr. Leila Chaieb
Department of Clinical Neurophysiology
University of Göttingen, Germany

UNIVERSITÄTSMEDIZIN GÖTTINGEN : UMG

Introduction: What effects does laser light have on the brain?

Application of low level laser therapy (LLLT) for wound healing, inflammation and chronic pain relief has now widened to include neurological disorders such as stroke, neurodegenerative diseases and the treatment of traumatic brain disorders (Hashmi et al, 2010).

• Stroke rehabilitation Recent studies have shown that mice models of stroke treated 4 and 24hrs after 'stroke induction' had reduced cognitive deficits (Oron et al., 2006); a large multi-centre study has shown that infrared laser therapy 24hrs after stroke onset was safe to use for the treatment of ischaemic stroke (Lampl et al., 2007).

• Alzheimer´s disease (AD) A recent study has shown that a near-infrared irradiation of tumour cells (containing amyloid plaques like those in AD), significantly reduced the number of plaques in cells treated with laser stimulation and green tea extract (Sommer et al., 2011); numbers of amyloid plaques were also significantly reduced in a mouse model of AD when treated with transcranial laser therapy (TLT) (Taboada et al., 2011).

• Traumatic brain injury (TBI) Low level laser therapy applied to mice with induced TBI, significantly reduced long term neurological damage (Oron et al., 2007); case study of two patients showed that after a series of transcranial light therapy (TLT) in the near-infrared range, showed improved cognition (Naeseret al., 2011).

Measurements and tILS: setup

Photographs courtesy of Géza-Gergely Ambrus, MA,
Department of Clinical Neurophysiology, Göttingen

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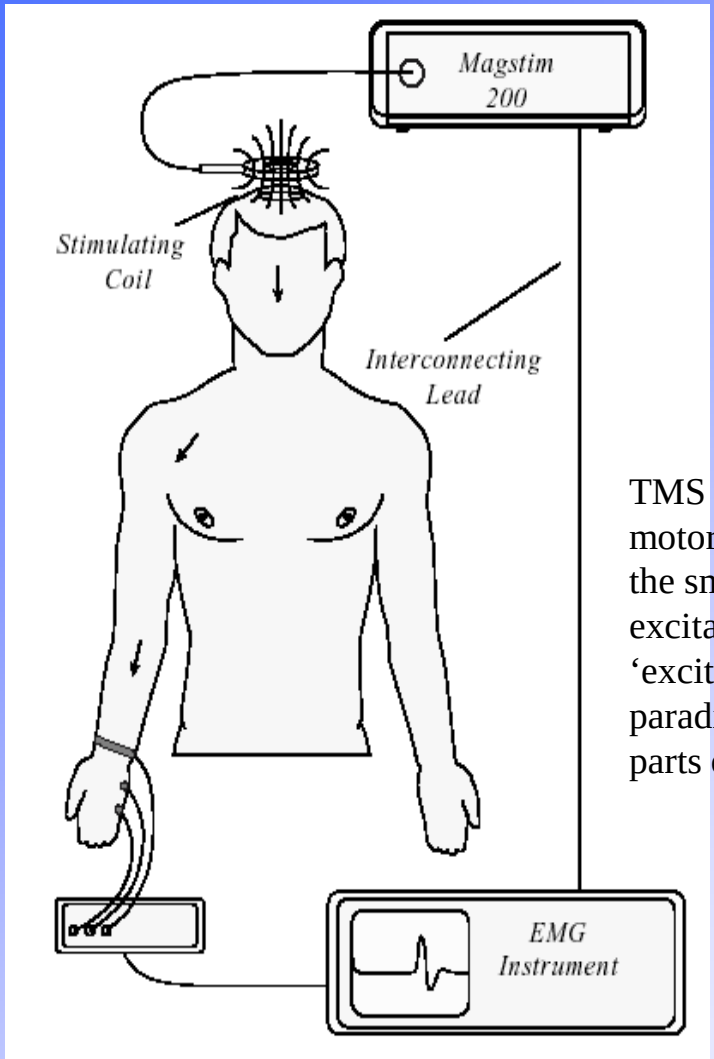
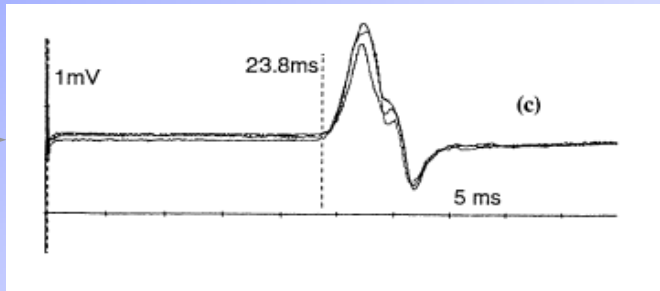
Measurements and tILS: the Motor System



Motor-evoked-potential (MEP)



TMS induces a brief electric field in the brain allowing the generation of a motor-evoked-potential (MEP), which can be easily seen as a 'twitch' in the small hand muscle. This is a global measure of motor cortical excitability. The amplitude of the elicited MEPs can show us how 'excitable' the brain is before and after stimulation. Different TMS paradigms show us how laser light stimulation interacts with different parts of the intact brain and how it affects different cortical populations.

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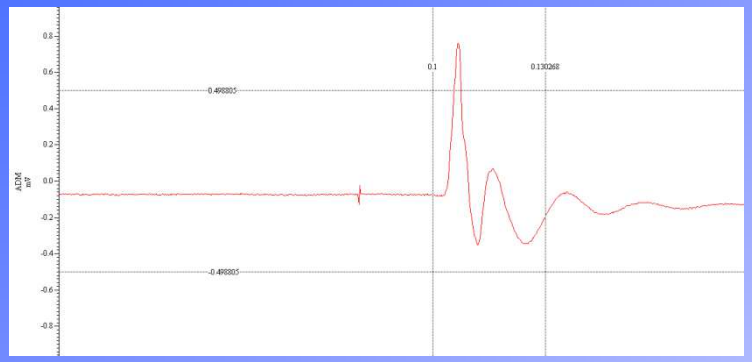
Measurements and tILS: the Motor System

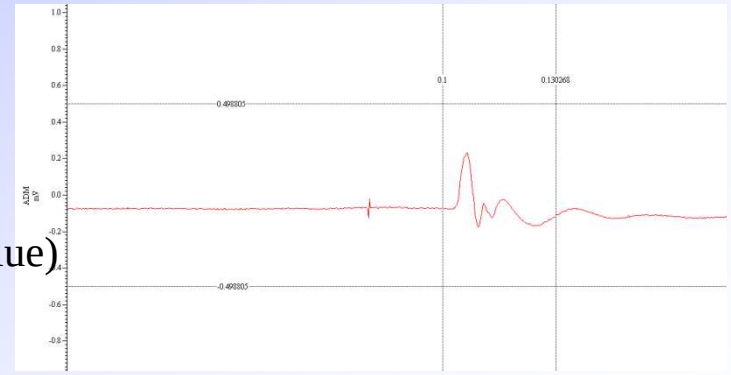


MEP BEFORE tIL stimulation

- MEP is averaged to 1 millivolt peak-to-peak

MEP AFTER tIL stimulation

- average MEP amplitude (peak-to-peak value) is decreased. MEP is become smaller



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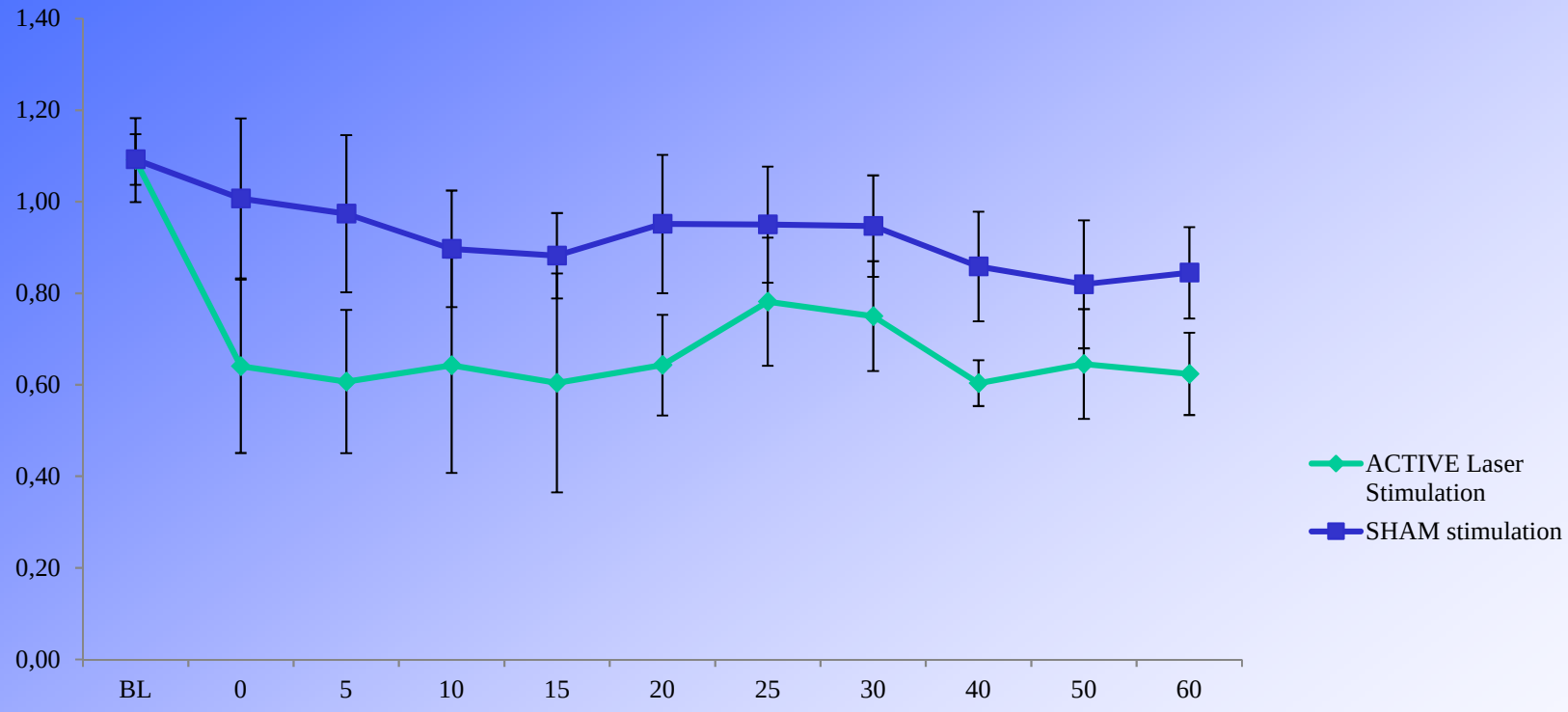
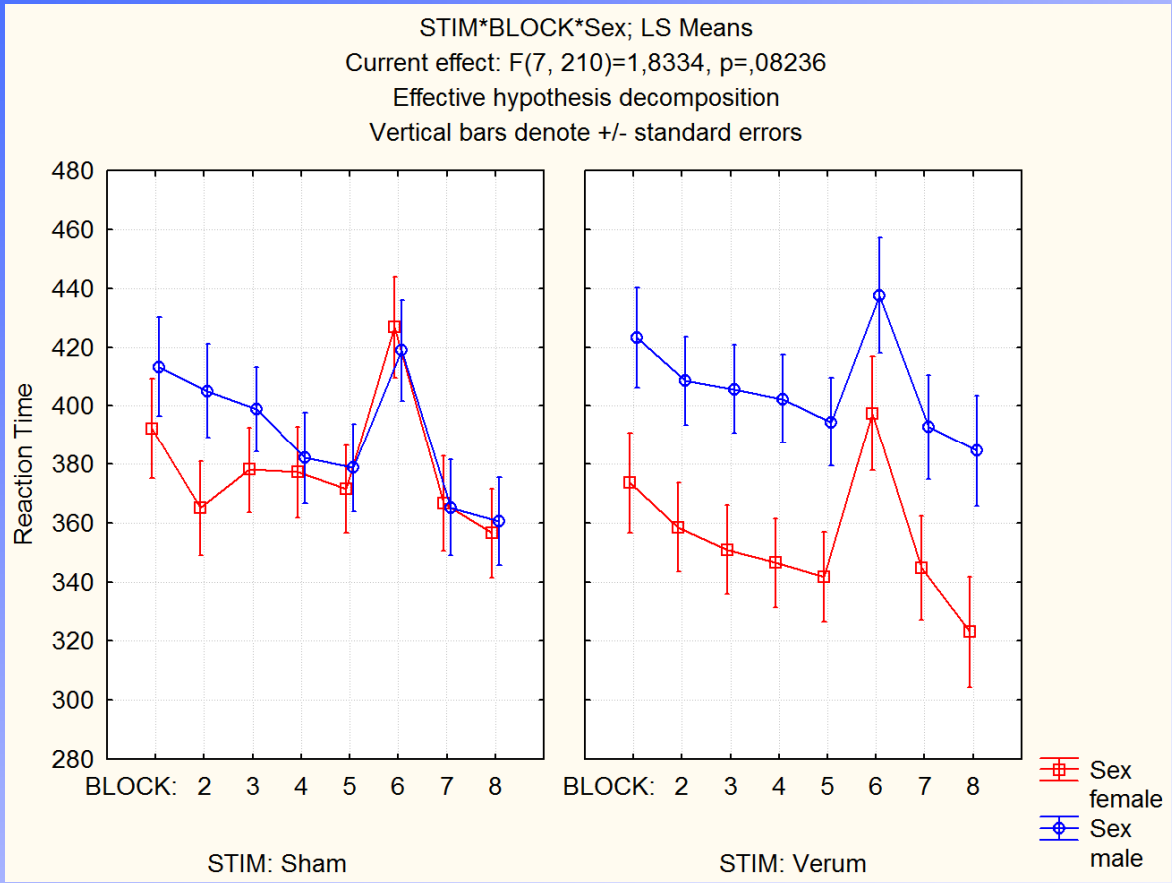
Preliminary results



Specifications: Laser light was applied for 10mins over the primary motor cortex; a configuration of 4 needles was used. Data is derived from 17 healthy participants. Sham (or placebo) stimulation was also applied, but indicates 'stimulation' without laser light.

Preliminary results: In the Visuomotor System



Here again we can see the tendency towards better performance by female participants in the SRTT during tIL stimulation; alterations in baseline values may be attributed to the perception of stimulation during the task.

tIL stimulation was administered throughout the duration of the task

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What do our results indicate?

- Our results suggest that laser light is neuromodulatory and that we can see clearly an attenuation in the amplitude of motor-evoked-potentials, corresponding to a decrease in the ‘excitation’ of the motor system, compared to placebo stimulation.

- We aim to adapt these current techniques for use in patient populations (traumatic brain injury, Alzheimer’s disease, stroke) once tILS has been characterised within our healthy participant group and once safety parameters have been established for stimulation.

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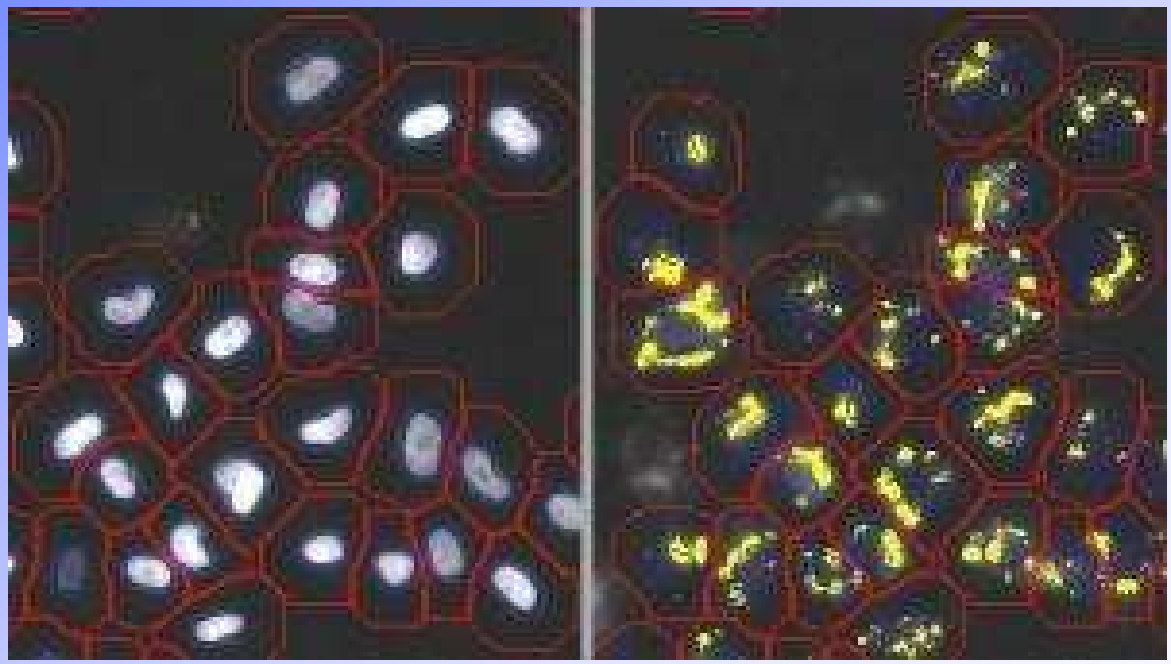
Alzheimer-Research: with the light pump against dementia

Frankfurter Allgemeine, Sonday, 8. January 2012

- 05.01.2012 · Engineers brought an extract of green tea (Epigallocatechingallate) in brain neuronal cells with following laser irradiation with red-infrared light and can push the Beta-Amyloid-Plaques of Alzheimer-Dementia successfully away

Alzheimer-research: with the light pump against dementia

Frankfurter Allgemeine, Sunday, 8. January 2012



The left picuture shows zeigt intakt Neuroblastoma cells, the cell nuclei are white and the cell membranes are red ; the right picture shows the Beta-Amyloid-Plaques in yellow.

Photomedicine and Laser Surgery
Volume X, Number X, 2011
[a] Mary Ann Liebert, Inc.
Pp. 1–8
DOI: 10.1089/pho.2011.3073

670nm Laser Light and EGCG Complementarily Reduce Amyloid-b Aggregates in Human Neuroblastoma Cells: Basis for Treatment of Alzheimer's Disease?

Andrei P. Sommer, Ph.D.,1 Jan Bieschke, Ph.D.,2 Ralf P. Friedrich, Ph.D.,2 Dan Zhu, M.Sc.,1
Erich E. Wanker, Ph.D.,2 Hans J. Fecht, Ph.D.,1,3 Derliz Mereles, M.D.,4 and Werner Hunstein, M.D.5

Abstract

Conclusions:

Irradiation with moderate levels of 670-nm light and EGCG supplementation complementarily reduces Aß-aggregates in SH-EP cells. Transcranial penetration of moderate levels of red to near-infrared (NIR) light has already been used in the treatment of patientswith acute stroke.

The blood–brain barrier (BBB) penetration of EGCG (Epigallocatechin gallate) has been demonstrated in animals. We hope that our approach will inspire a practical therapy for AD.

Gendjar

Andrea

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Frankfort, MI 49635

248-207-9507

avleigh@hotmail.com

Hello,
A Doctor Thomas Kabisch in Ann Arbor, Michigan was using your laserneedles on my elderly mom as therapy for her dementia. After only two sessions we saw a significant change in mom's abilities (for the better). We have recently moved out of the area, about 4 1/2 hours north by car and can no longer get mom that treatment. I have called the few natropathic doctors in the area and none have this therapy available I was wondering if I could get an idea of what the cost is for one of your machines with a headpiece for continuing on our own with the Transcranial laser therapy? Thank you in advance for your help. Andrea G.

Laser and brain

Research article

International Journal of Photoenergy

Special Issue: 'Laser Medicine Research and Laser Acupuncture'

December 3, 2013

Laser therapy and stroke – quantification of methodological requirements in consideration of yellow laser

Daniela Litscher, MSc and Gerhard Litscher, MSc, PhD, MDsc*

Laser and brain

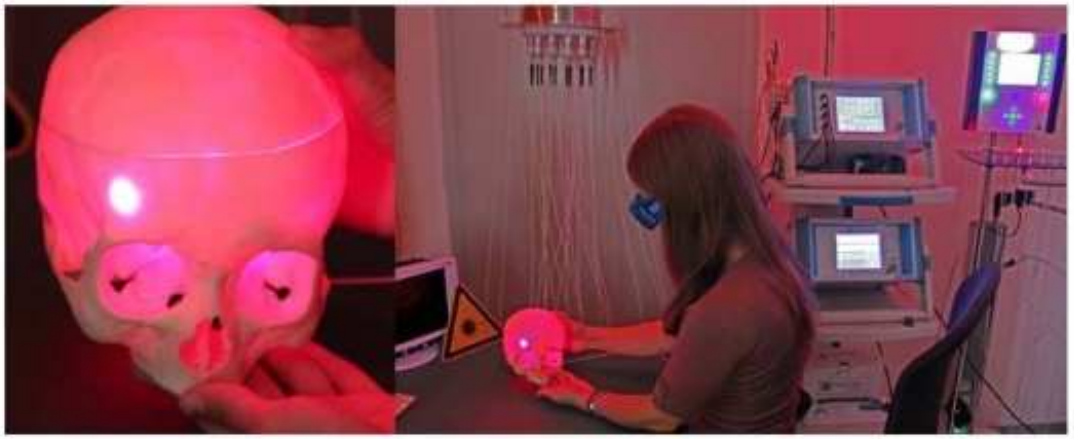


Fig. 1: Different kinds of laser equipment for transcranial laser stimulation.

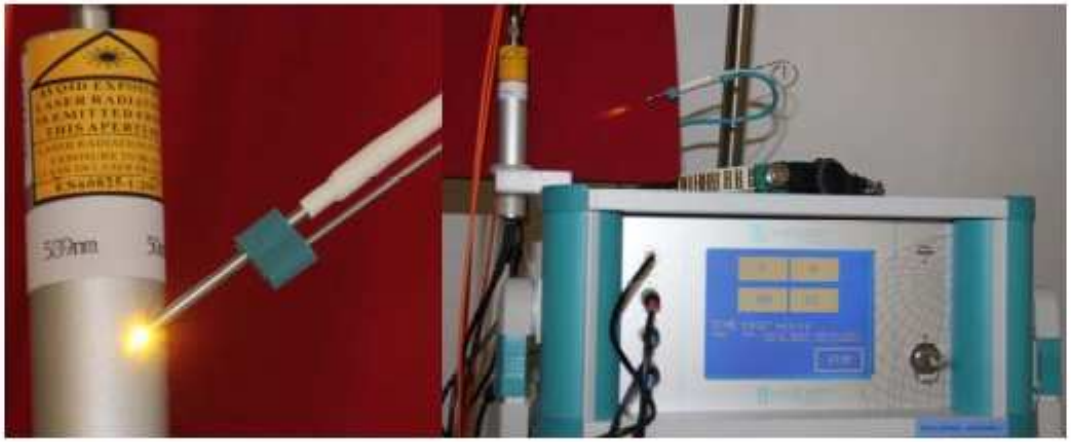
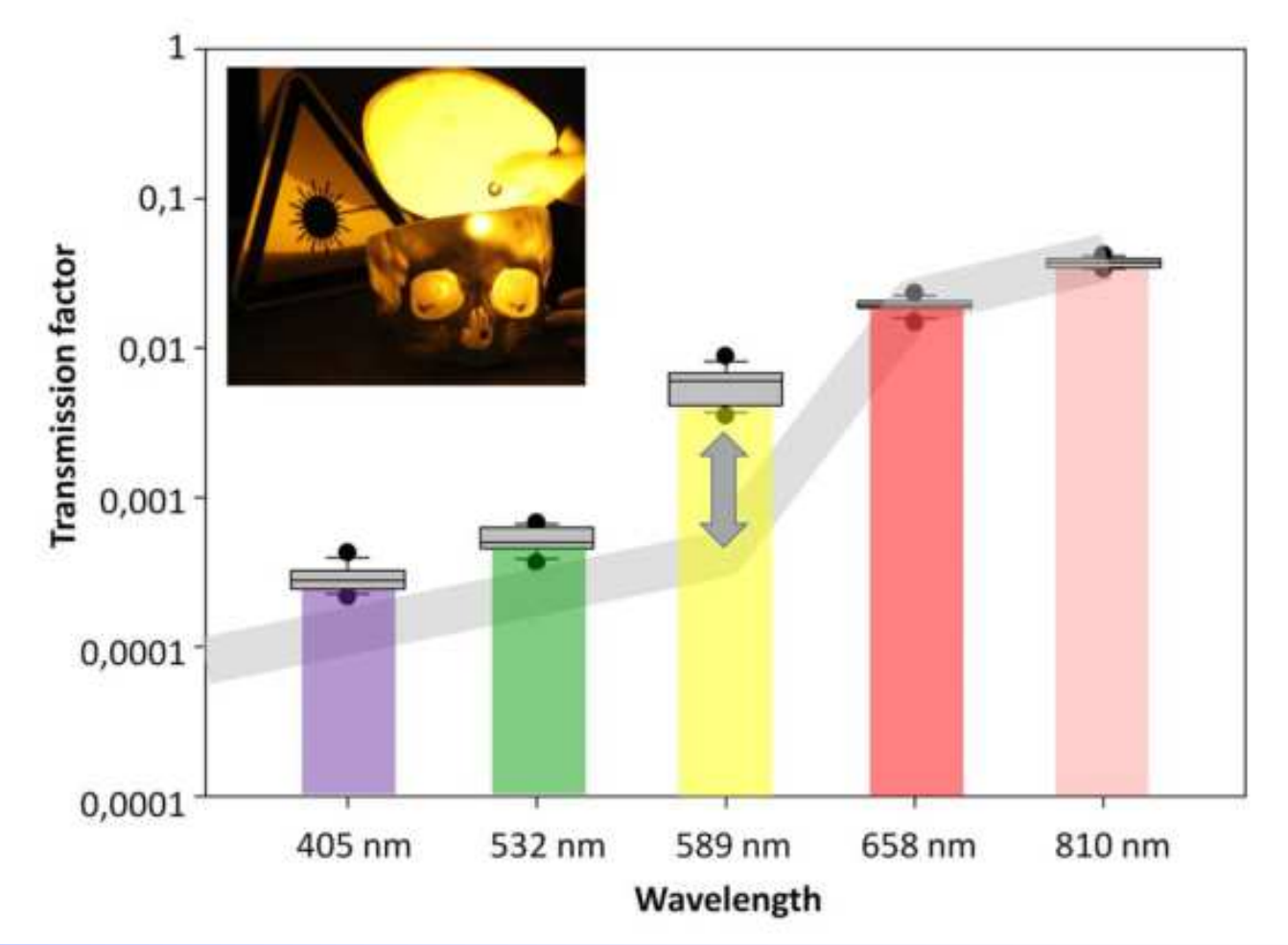


Fig. 2: First yellow laser (589 nm, 50 mW) for future medical applications at the Medical University of Graz.

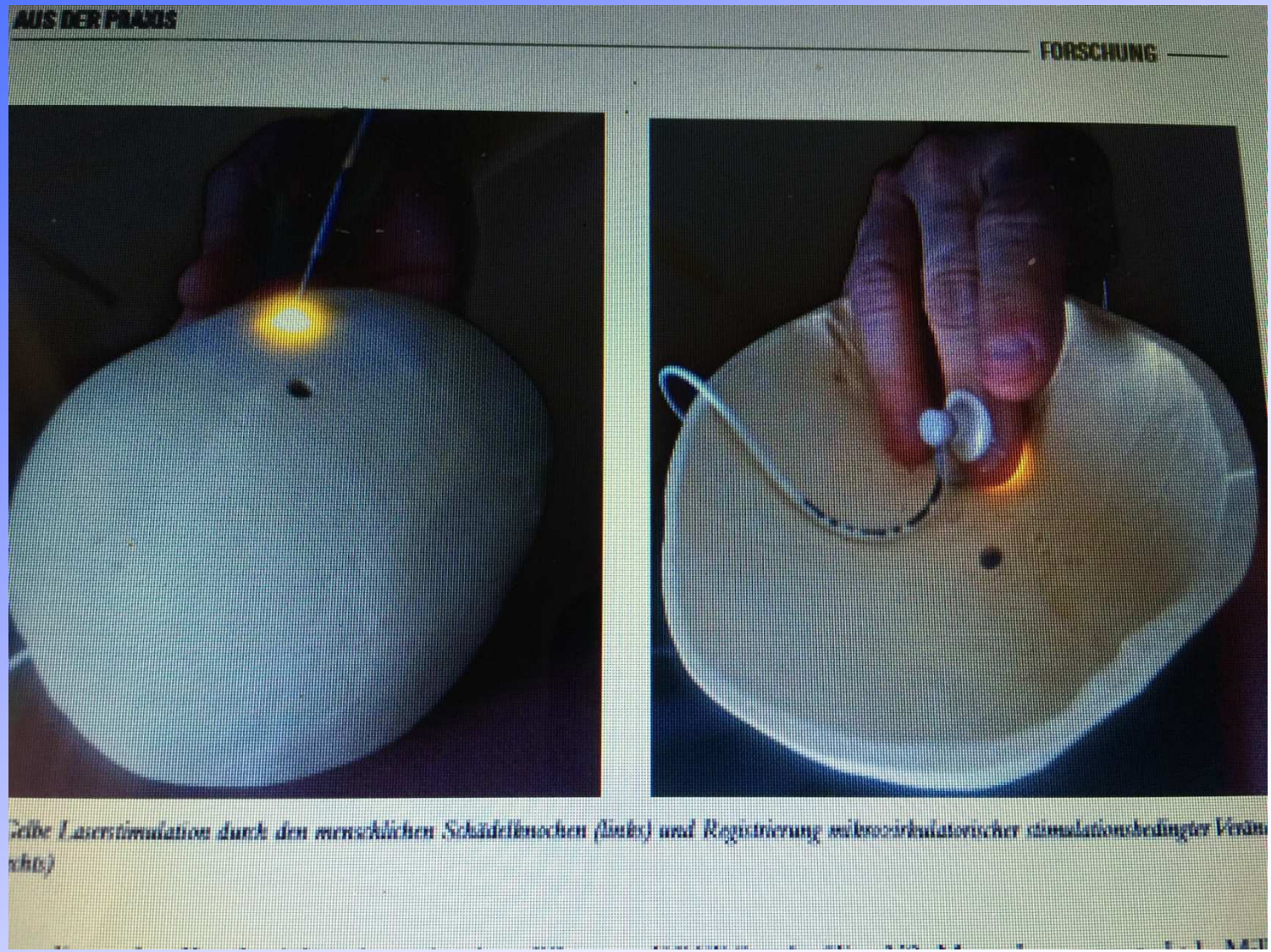
Laser and brain



Gerhard Litscher, Frank Bahr und Daniela Litscher
Pain and Acupuncture 3/2015

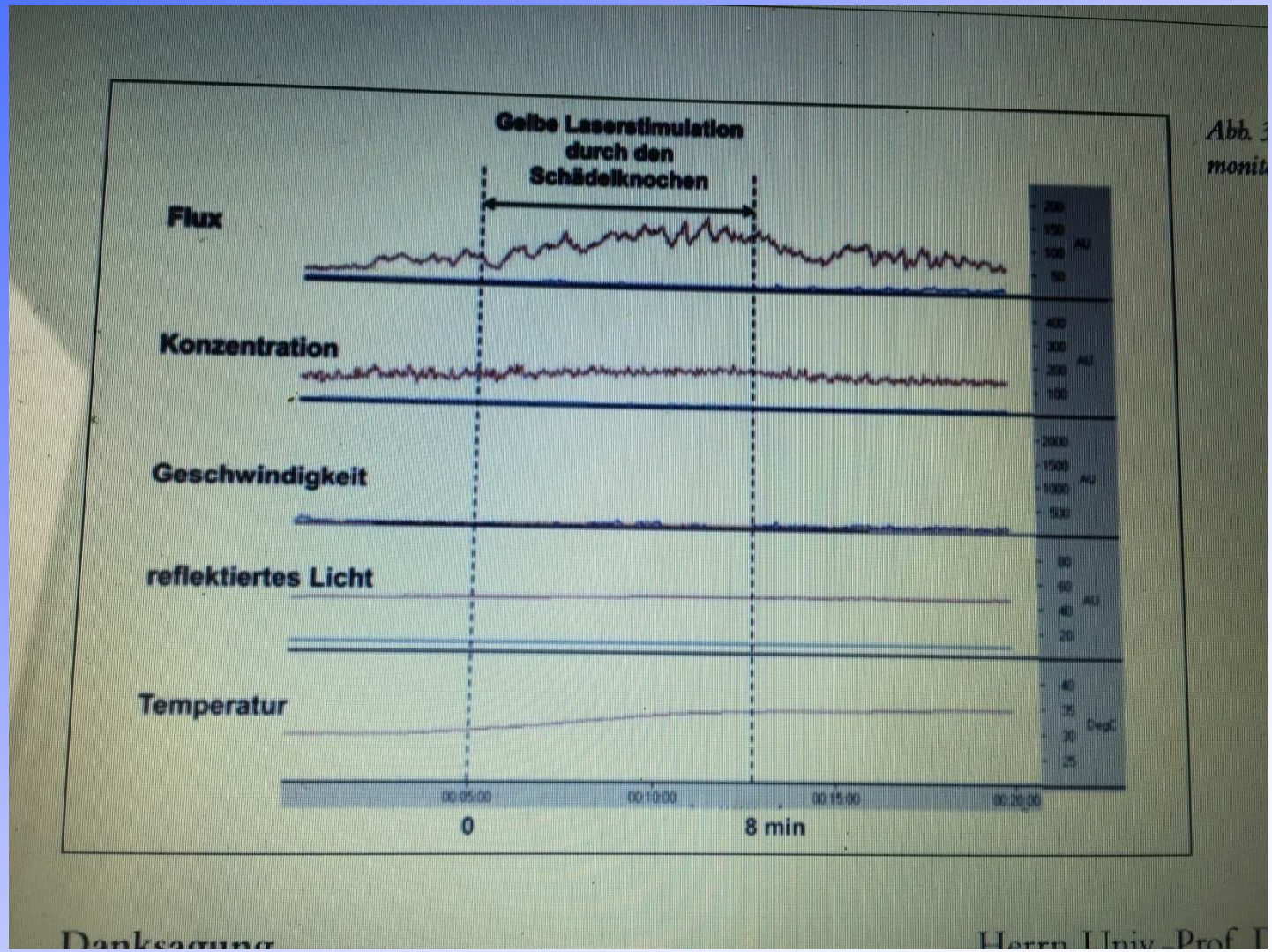
YELLOW LASER STIMULATION ON THE SKULL – FIRST EVIDENCE OF MICROCIRCULATORY CHANGES IN THE LAB

YELLOW LASER STIMULATION ON THE SKULL



Gelbe Laserstimulation durch den menschlichen Schädelknochen (links) und Registrierung mikrozirkulatorischer stimulationsbedingter Verän
chte)

YELLOW LASER STIMULATION ON THE SKULL

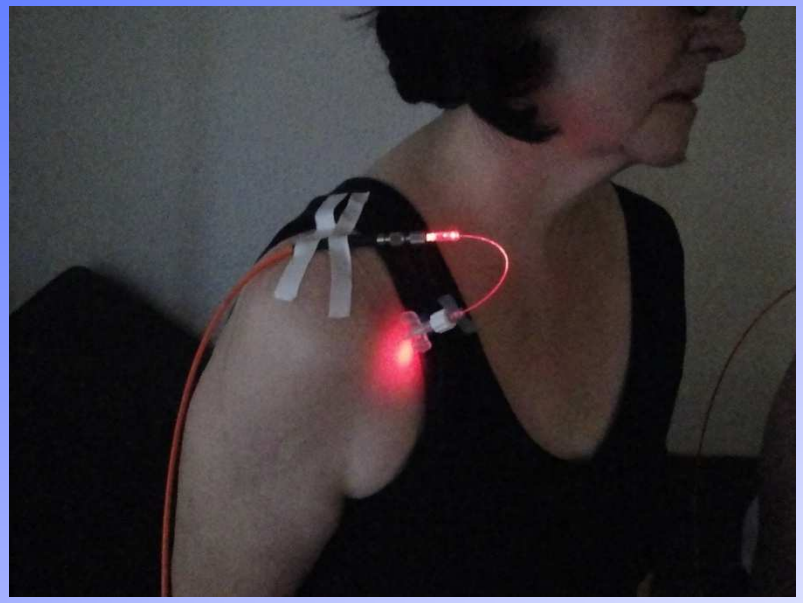


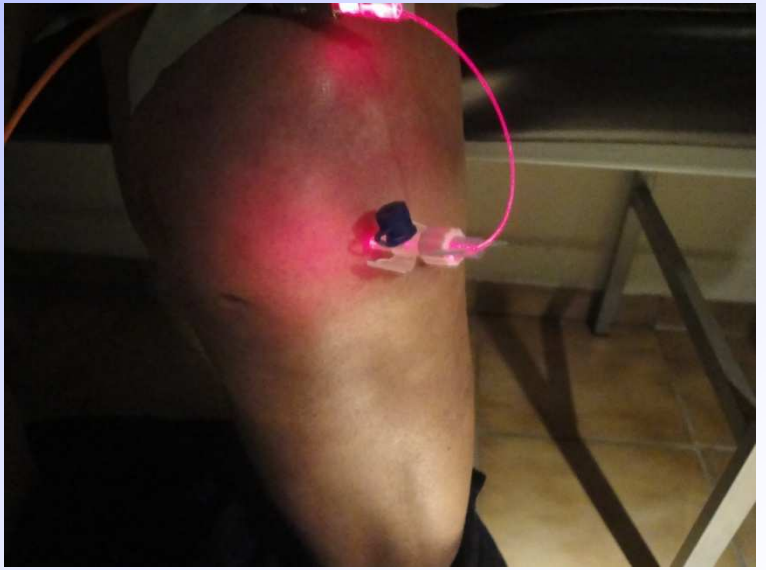
Summary :

Within this pilot study it could be shown for the first time that transcranial yellow laser stimulation (589 nm, 50 mW, 500 µm) is able to induce microcirculatory changes in human tissue.
The results are important for future applications of yellow laser in the field of different neurological diseases. Further investigations concerning the optimal technical parameters are necessary.

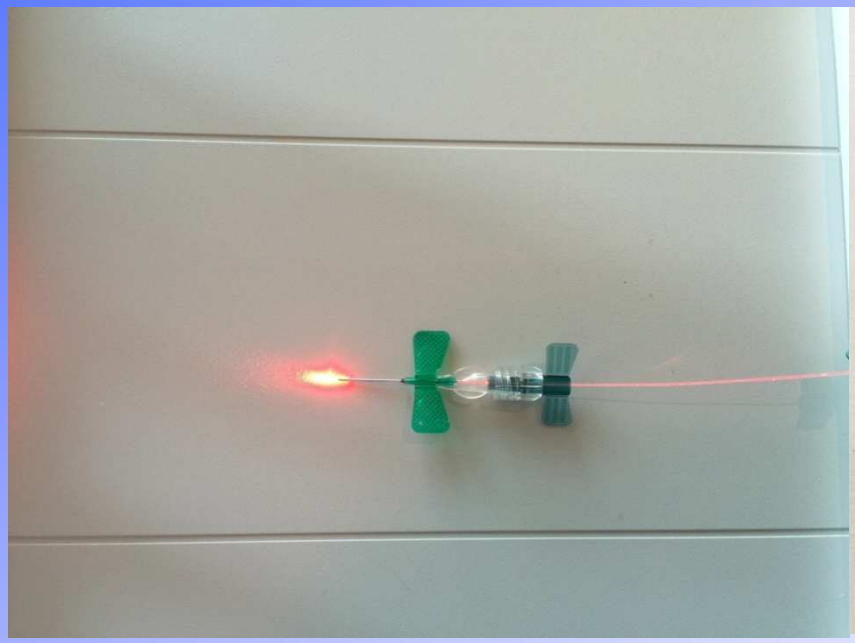
Interstitial and intraarticular laser therapy for spine syndromes, osteoarthritis of knee and shoulder joints

The interstitial and intraarticular laser therapy

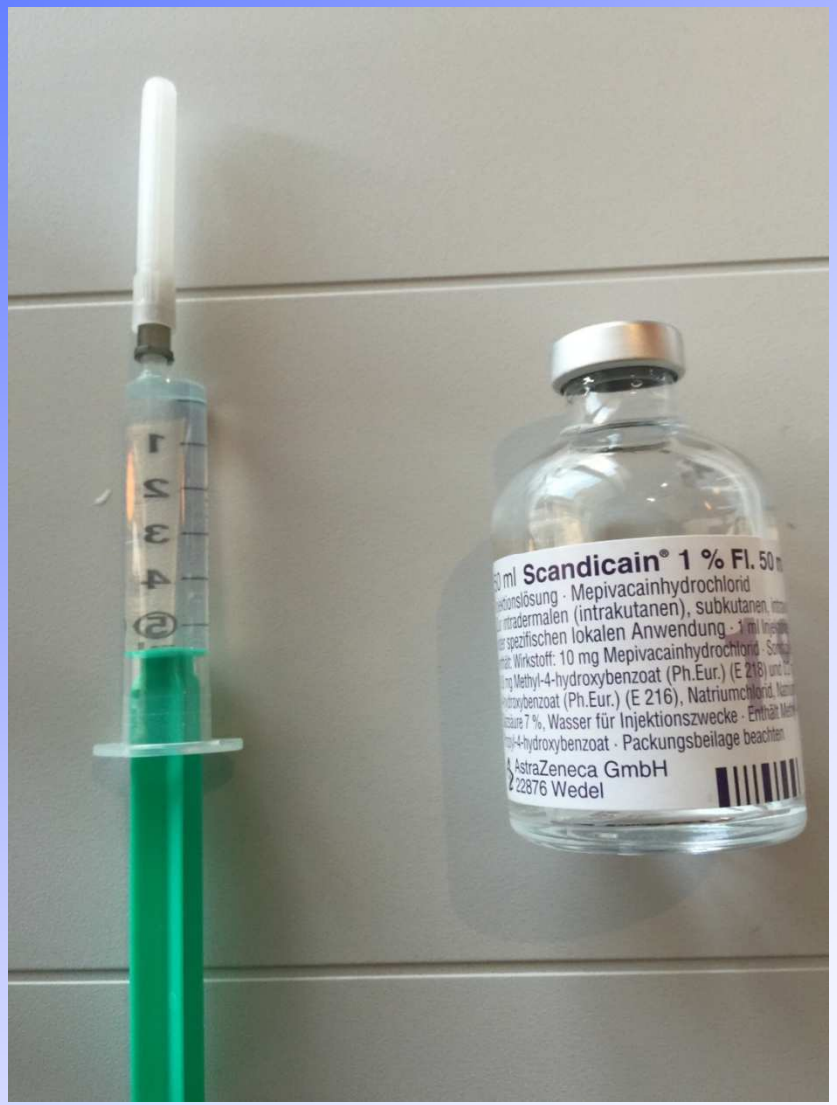




Fiberoptic puncture needles



Local anaesthesia

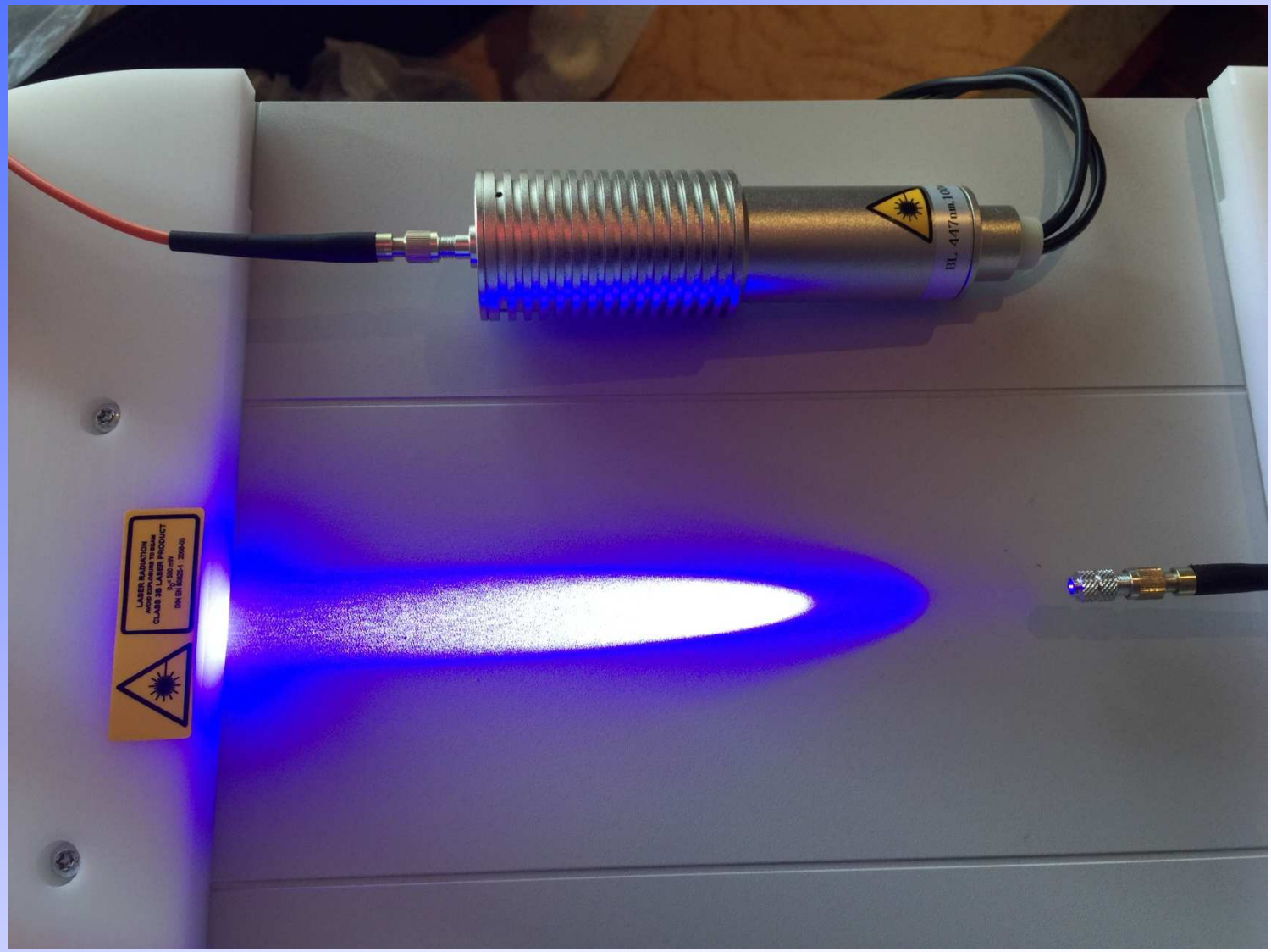


NaCl for improvement of beam spreading

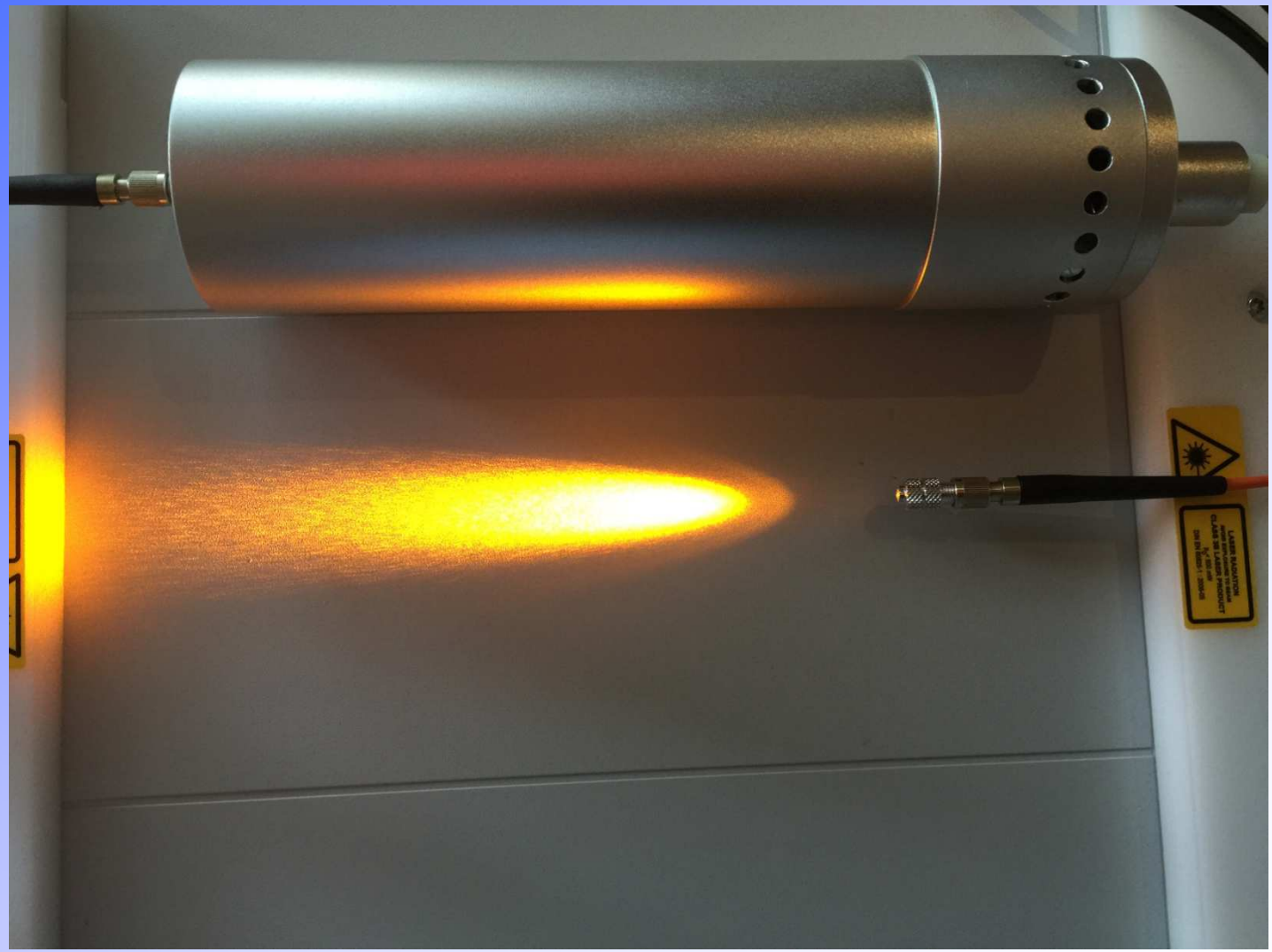
Interstitial fiberoptic canula (4,5,8,10,12 cm)

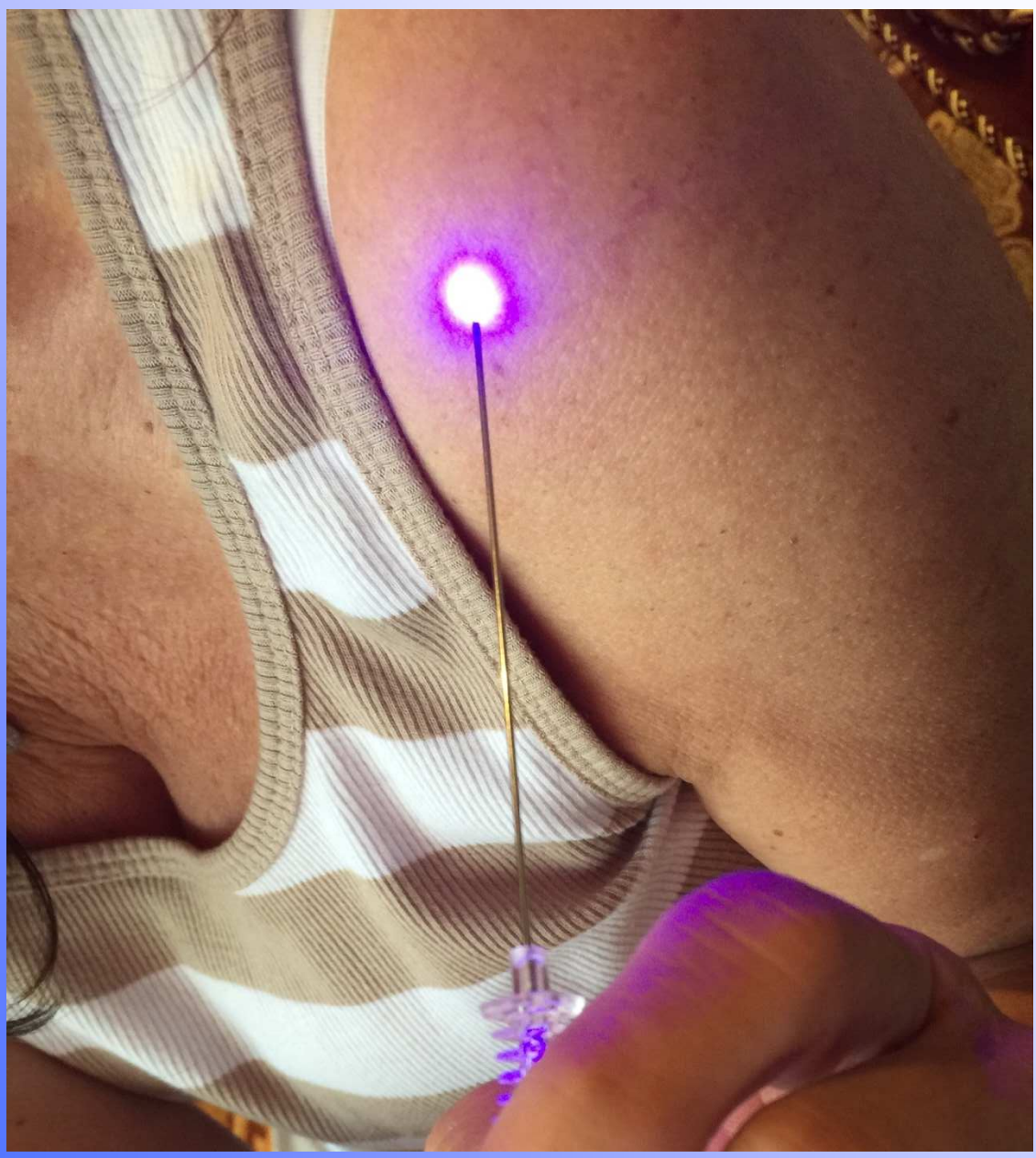
Interstitial fiberoptic canula (4,5,8,10,12 cm)

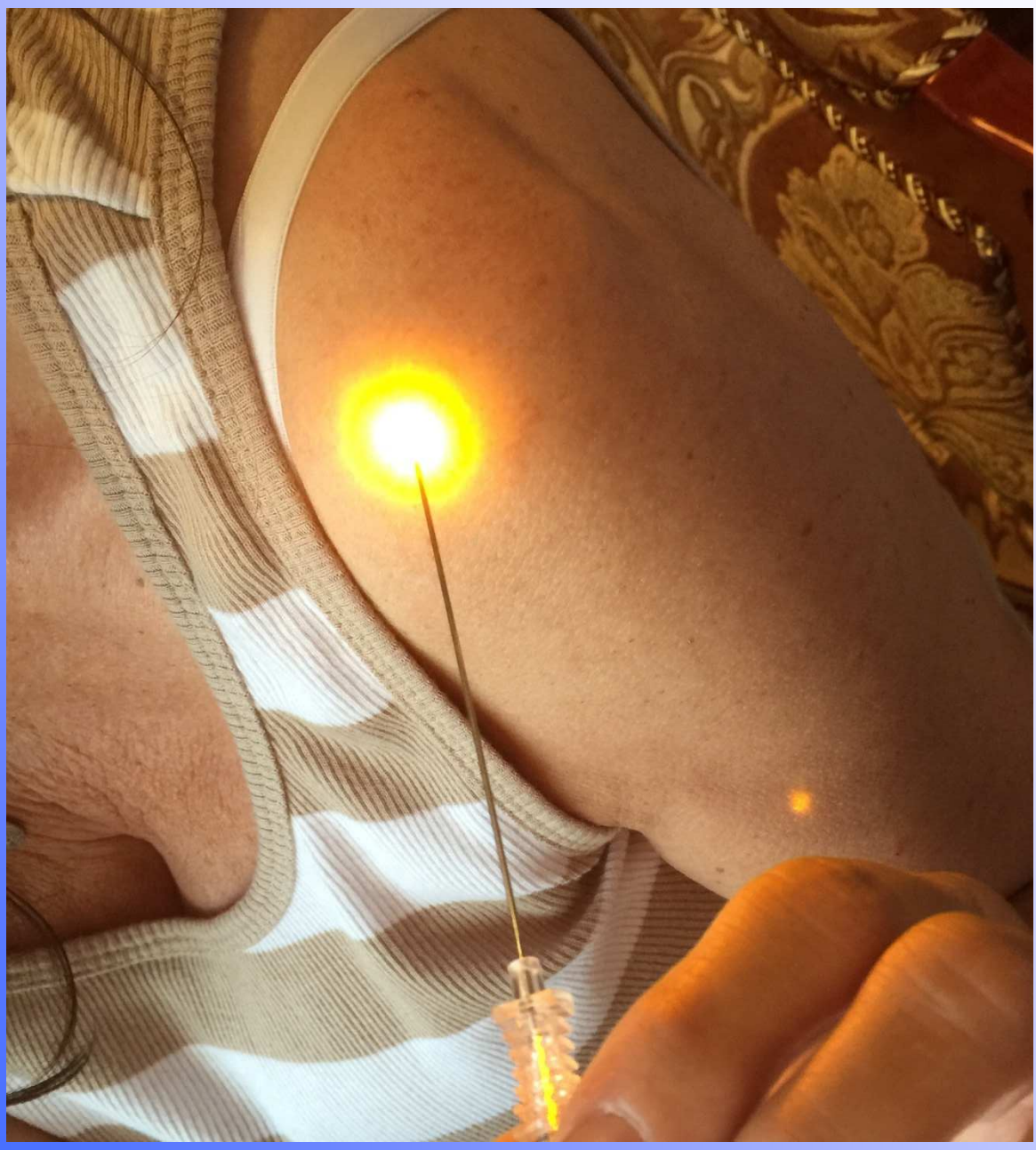
New blue laser 447 nm

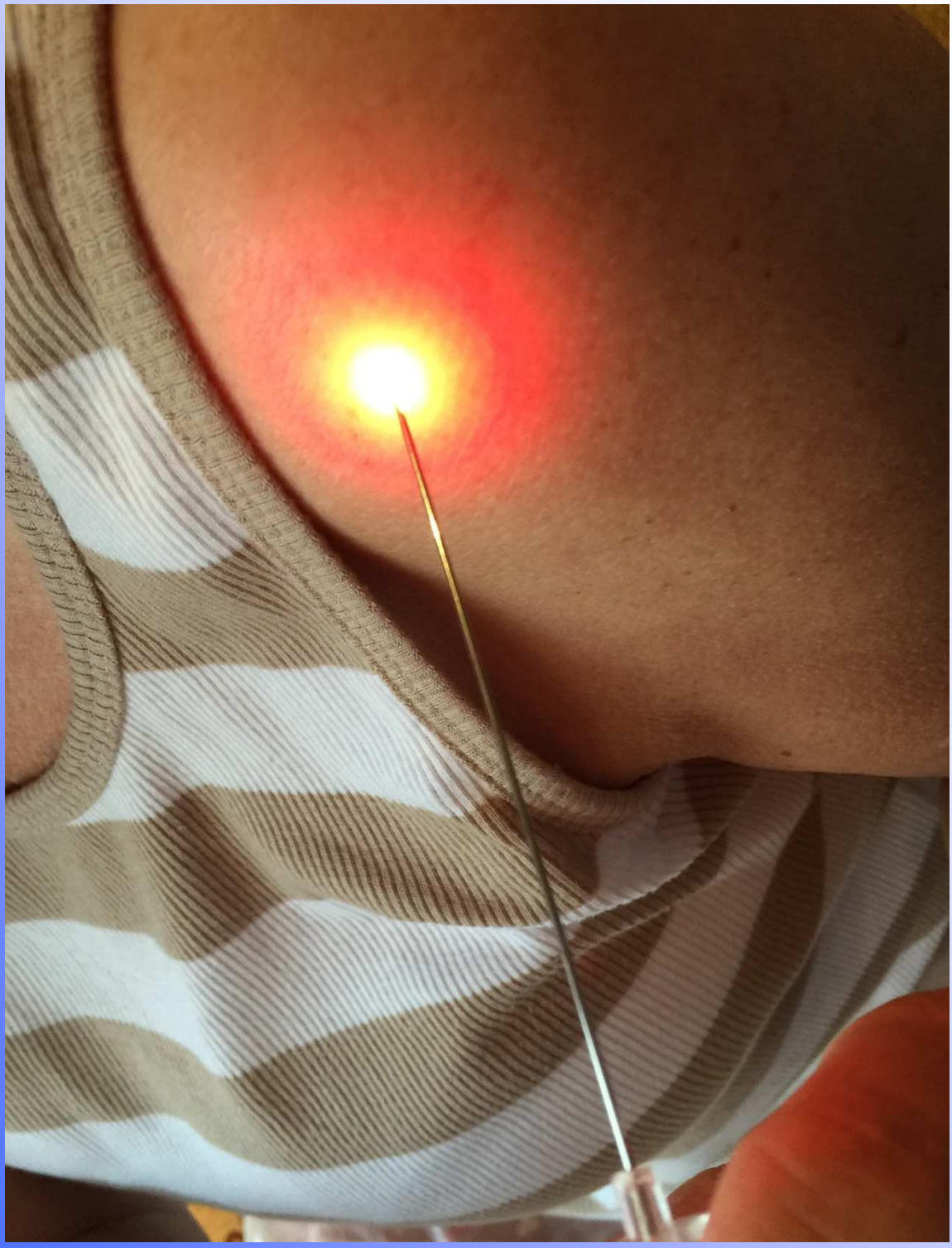


New yellow laser 589 nm

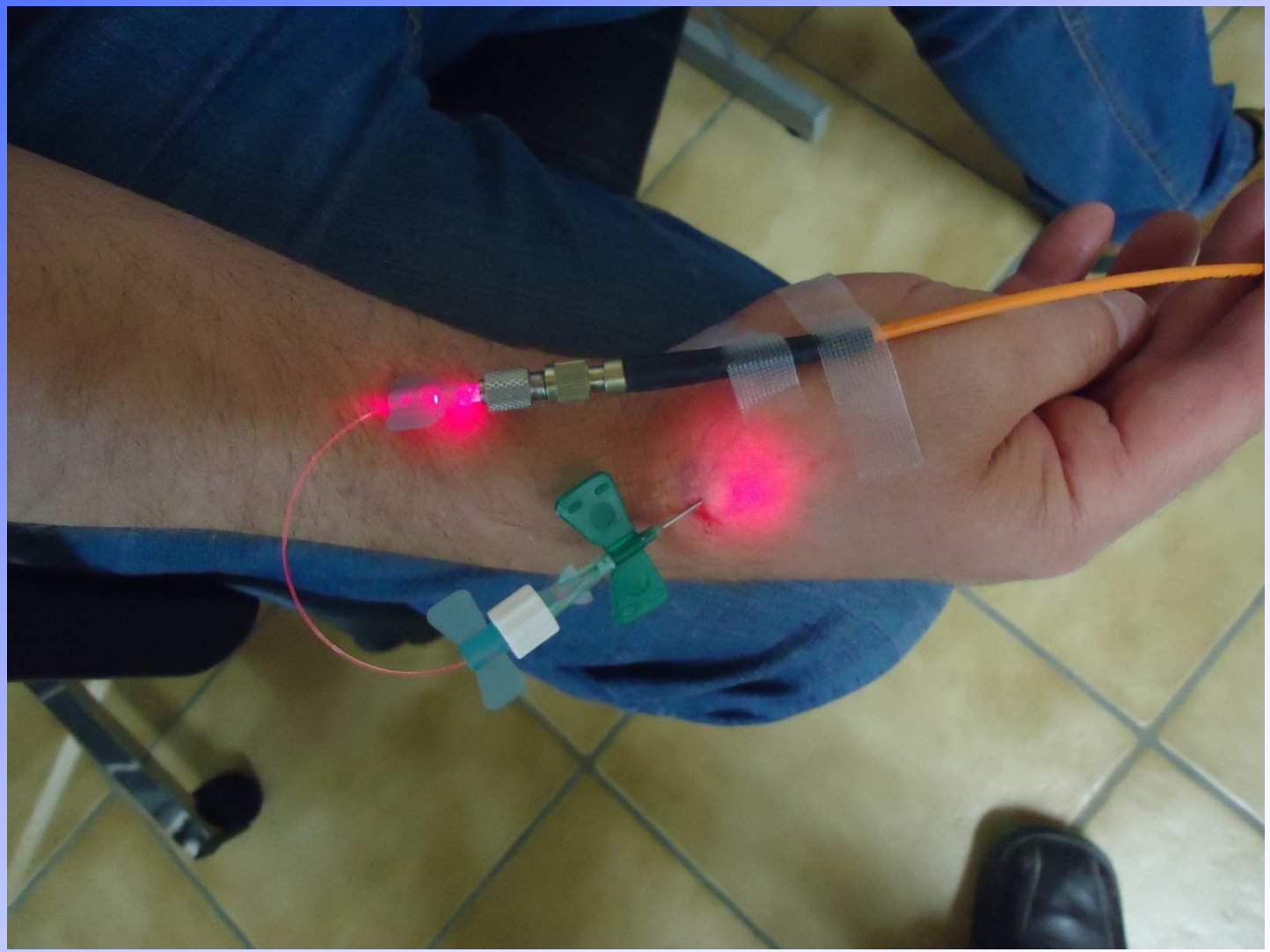








The interstitial laser therapy

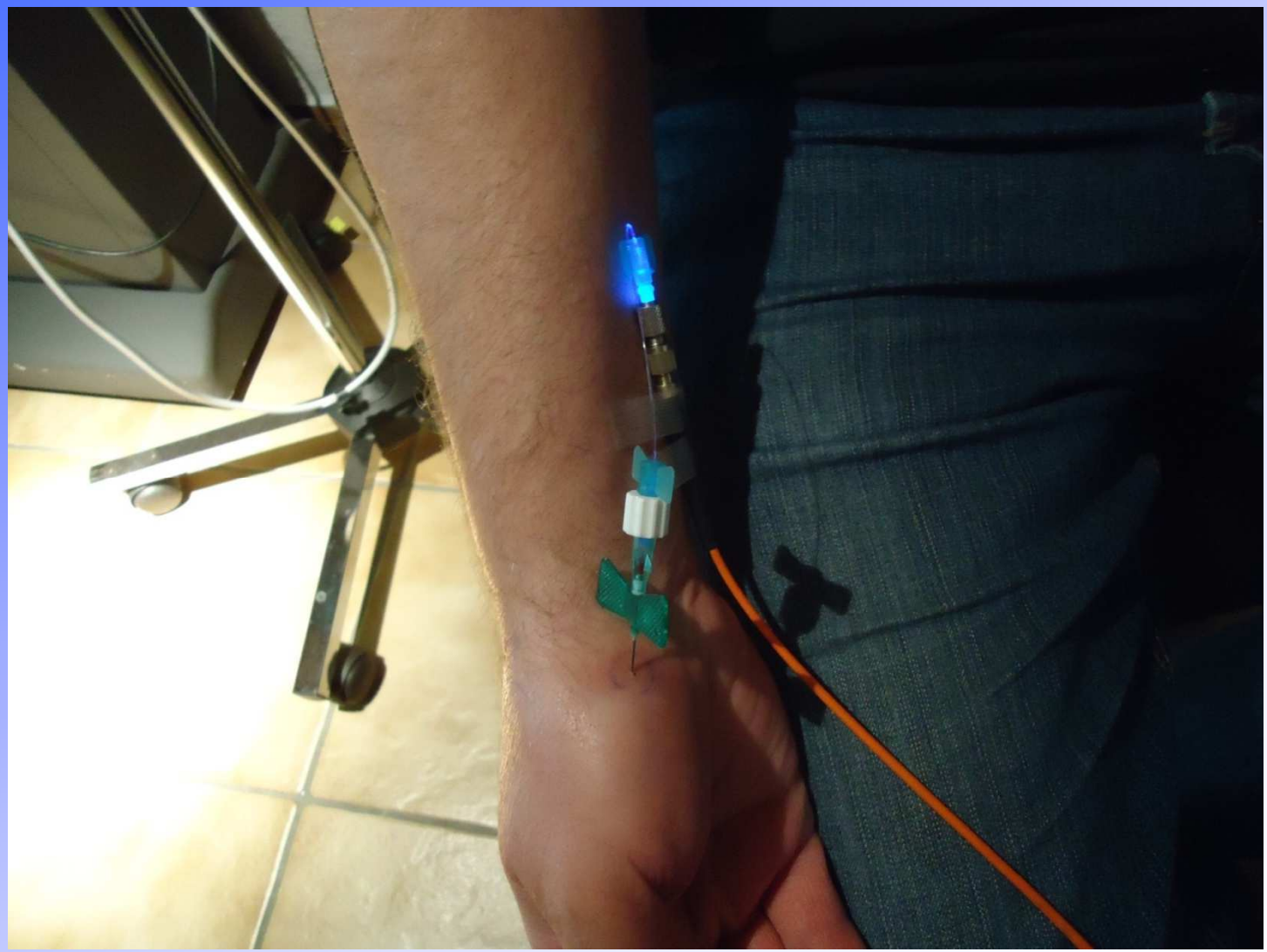


Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

The interstitial laser therapy

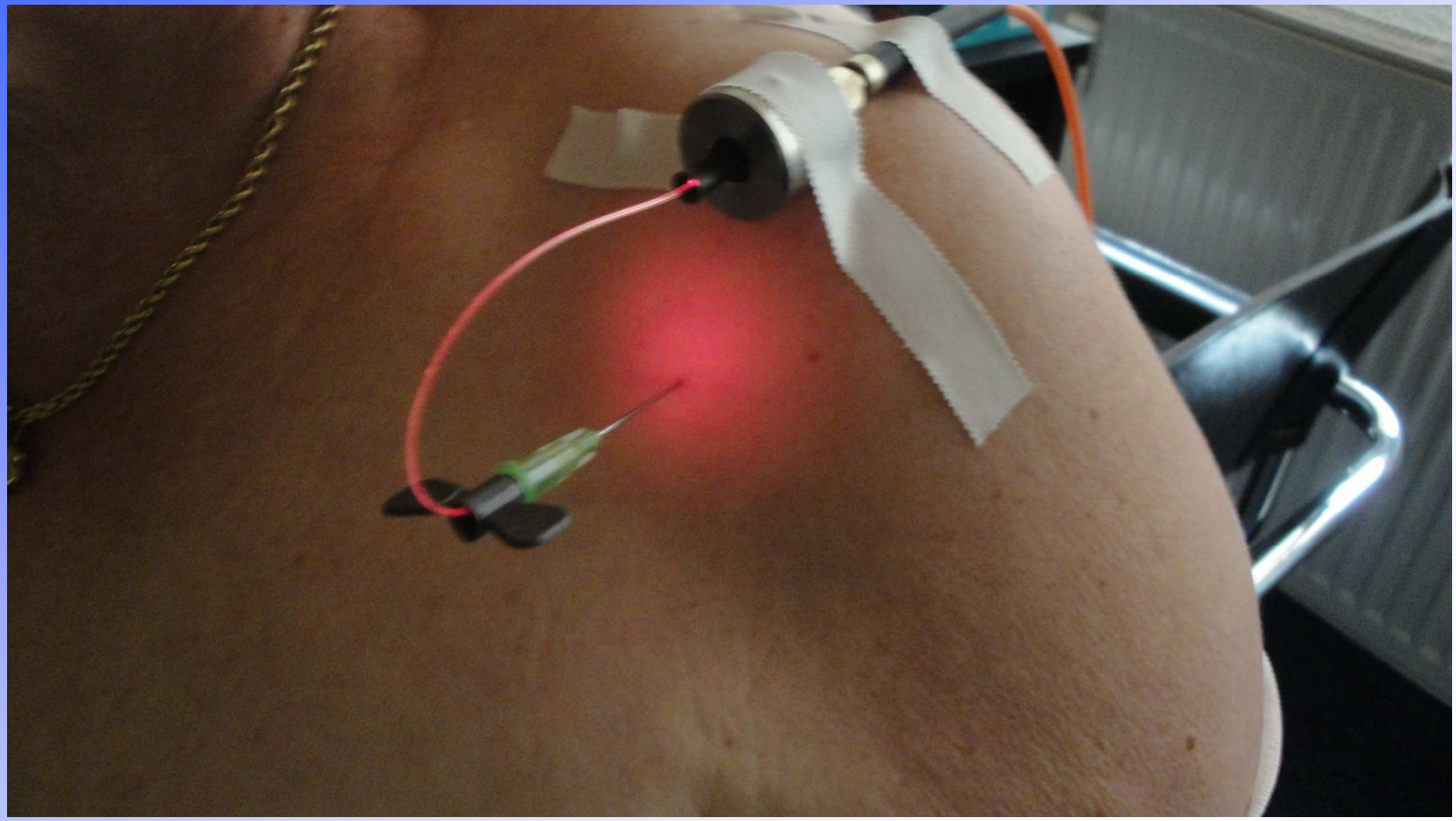
Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

The interstitial laser therapy

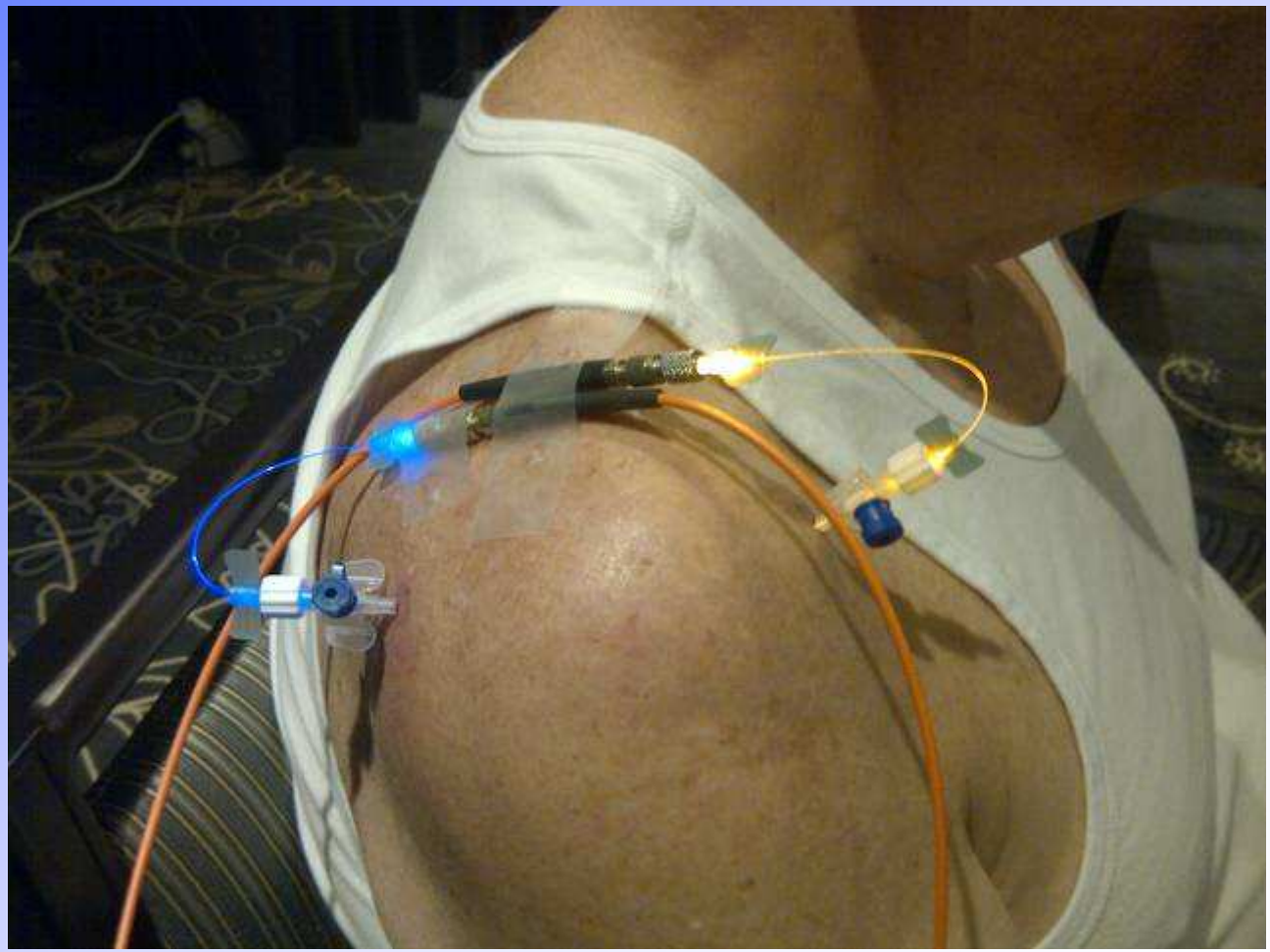


Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

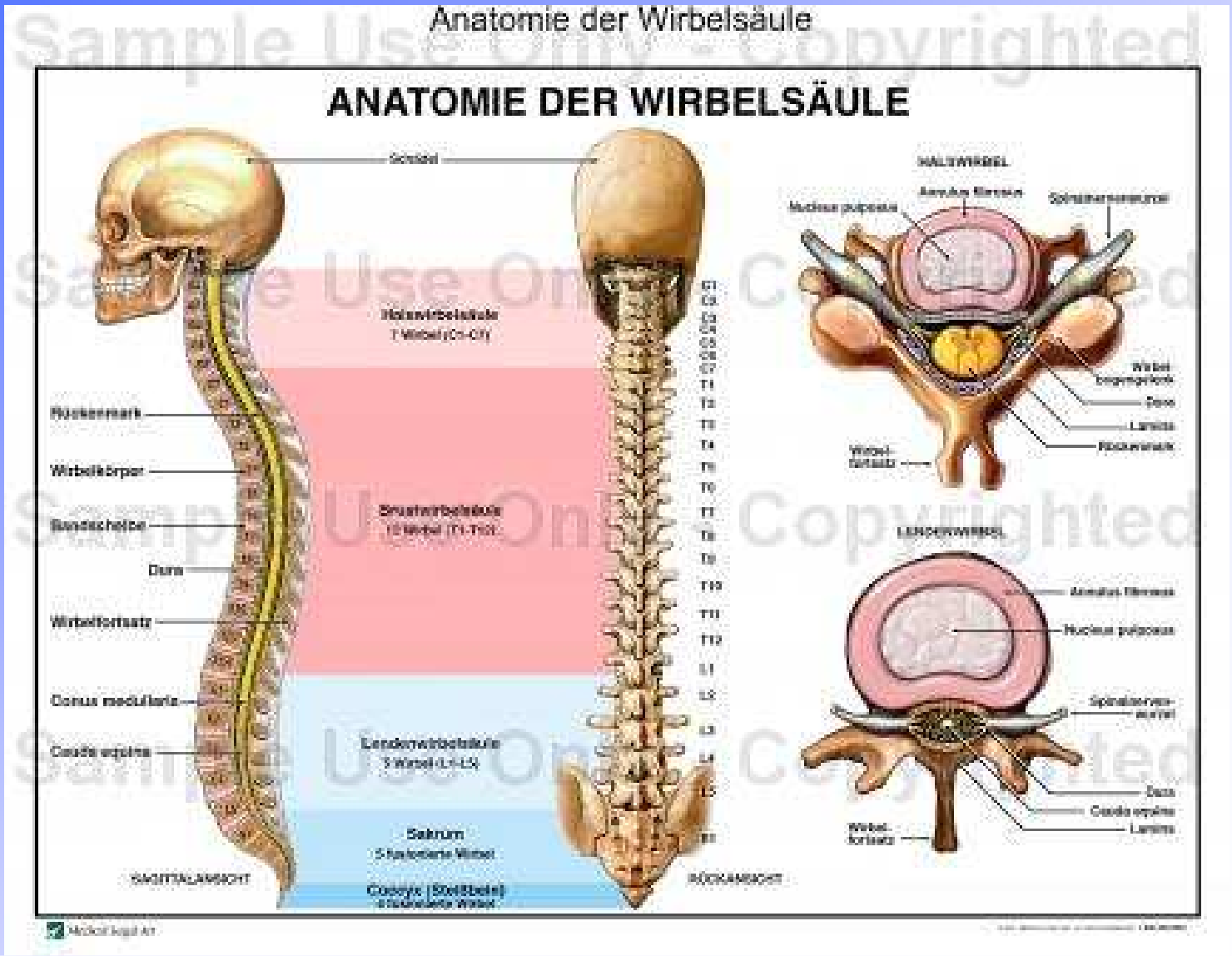
The intraarticular laser therapy



Intraarticular laser therapy



The interstital laser therapy for spine syndromes



The interstital laser therapy for spine syndromes

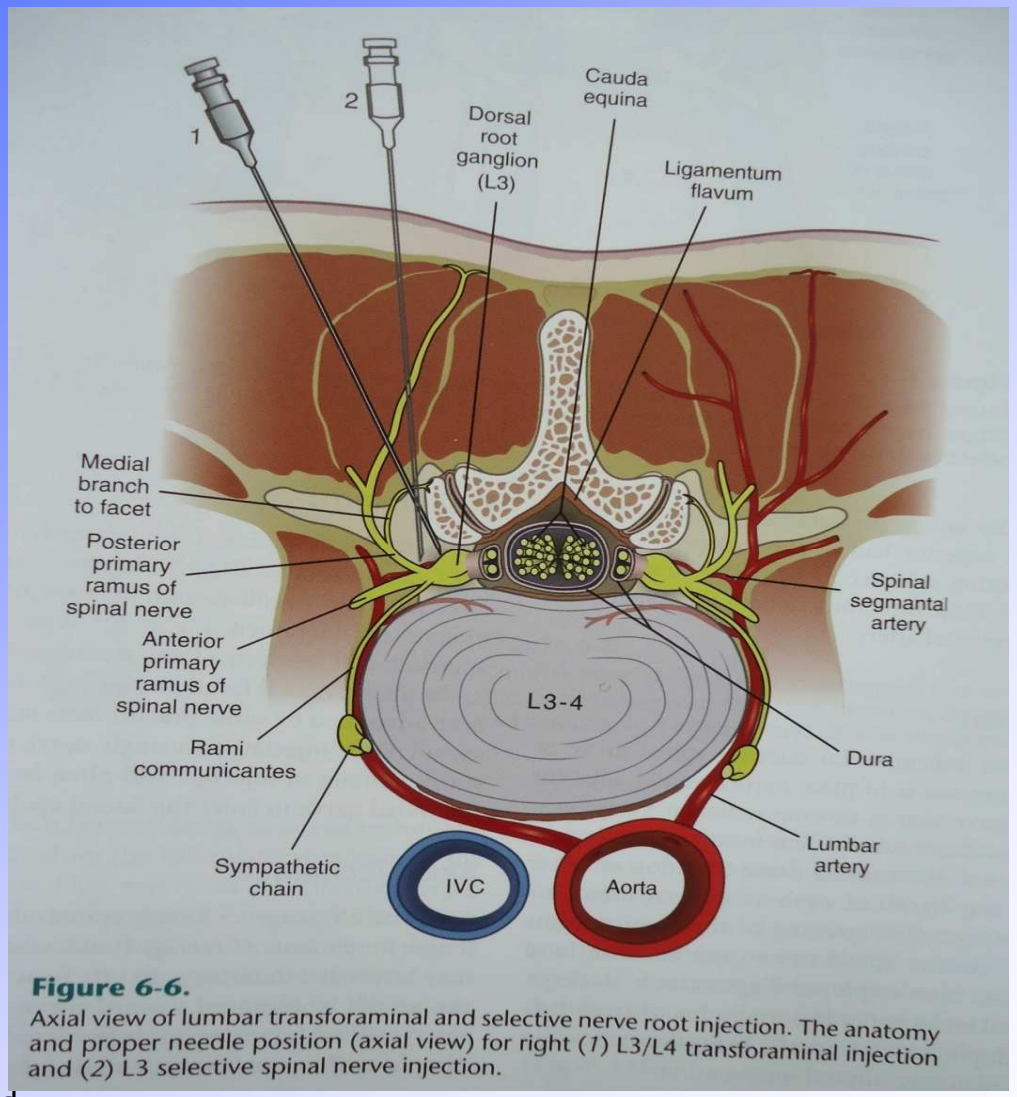
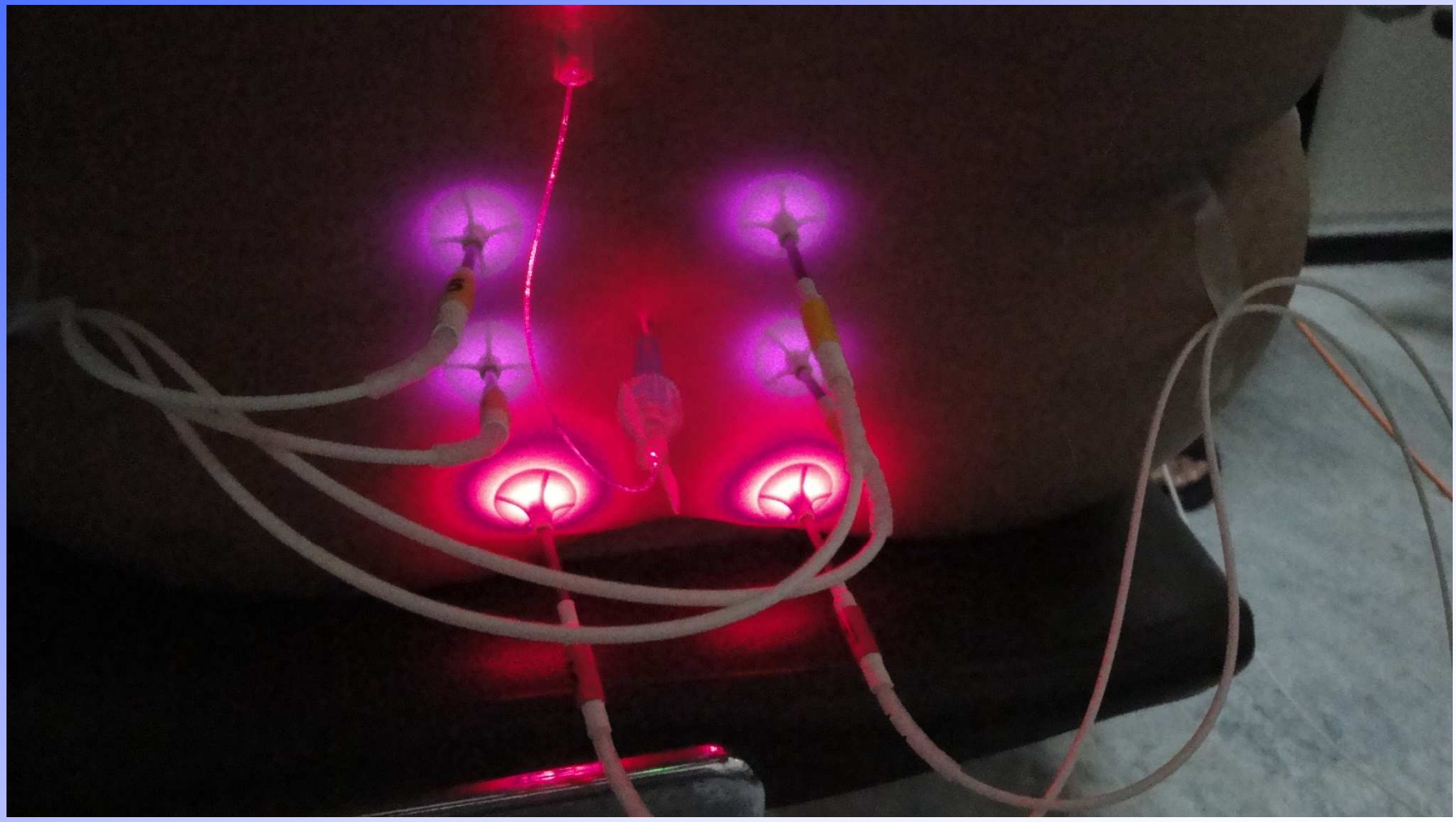


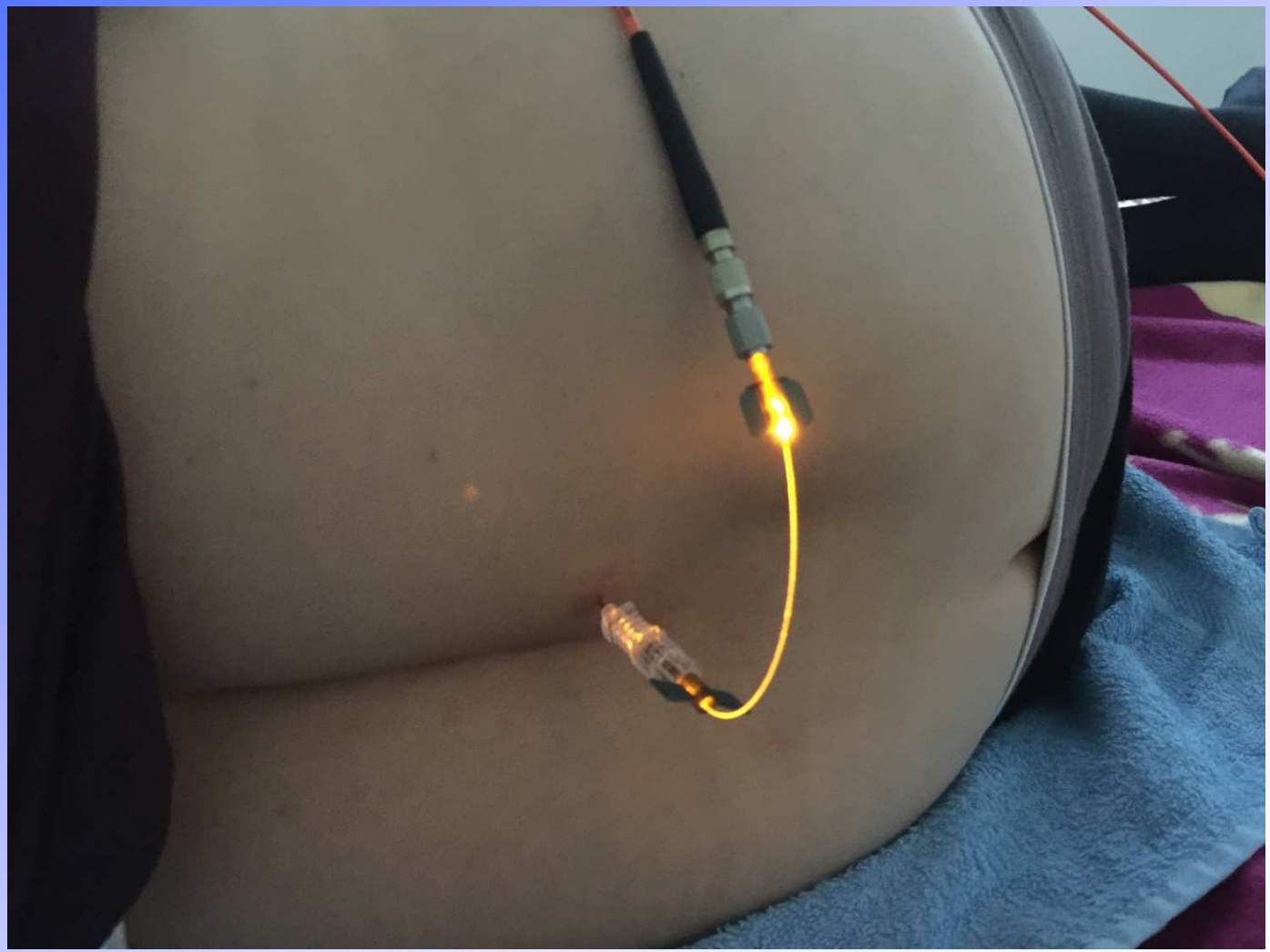
Figure 6-6.
Axial view of lumbar transforaminal and selective nerve root injection. The anatomy and proper needle position (axial view) for right (*1*) L3/L4 transforaminal injection and (*2*) L3 selective spinal nerve injection.

Laserclinic Dr. med. Dipl. chem. Michael Weber, Germany

The interstital laser therapy for spine syndromes

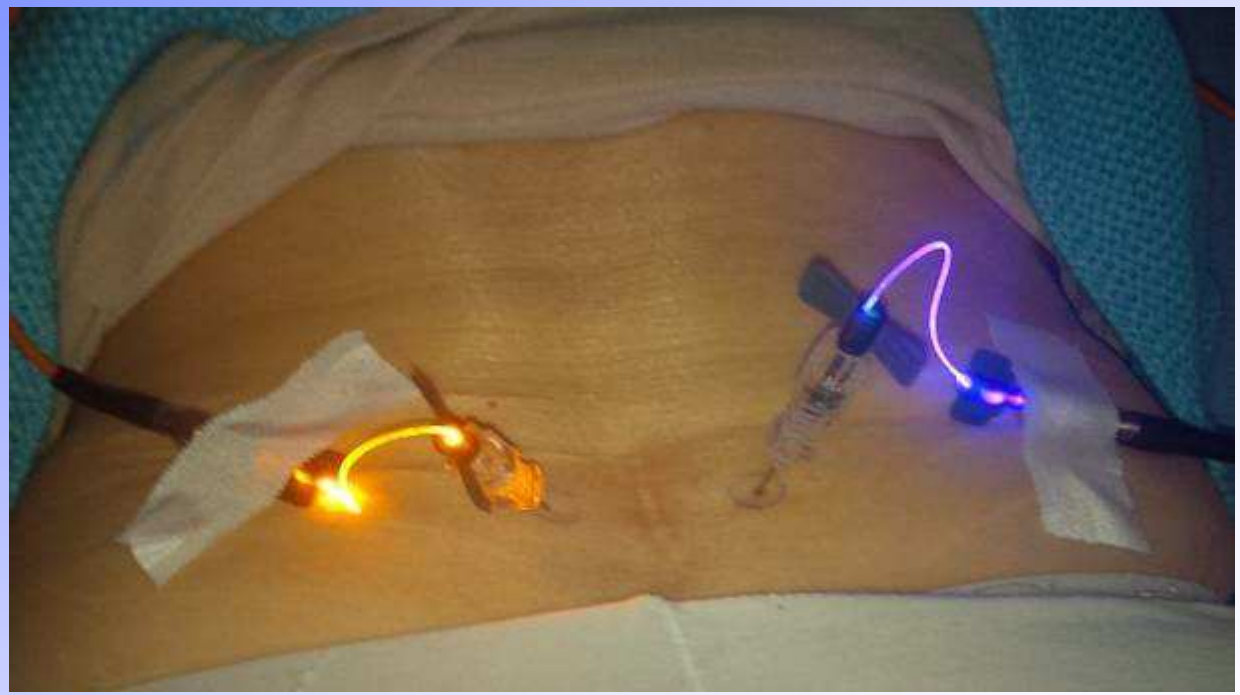


The interstitial laser therapy

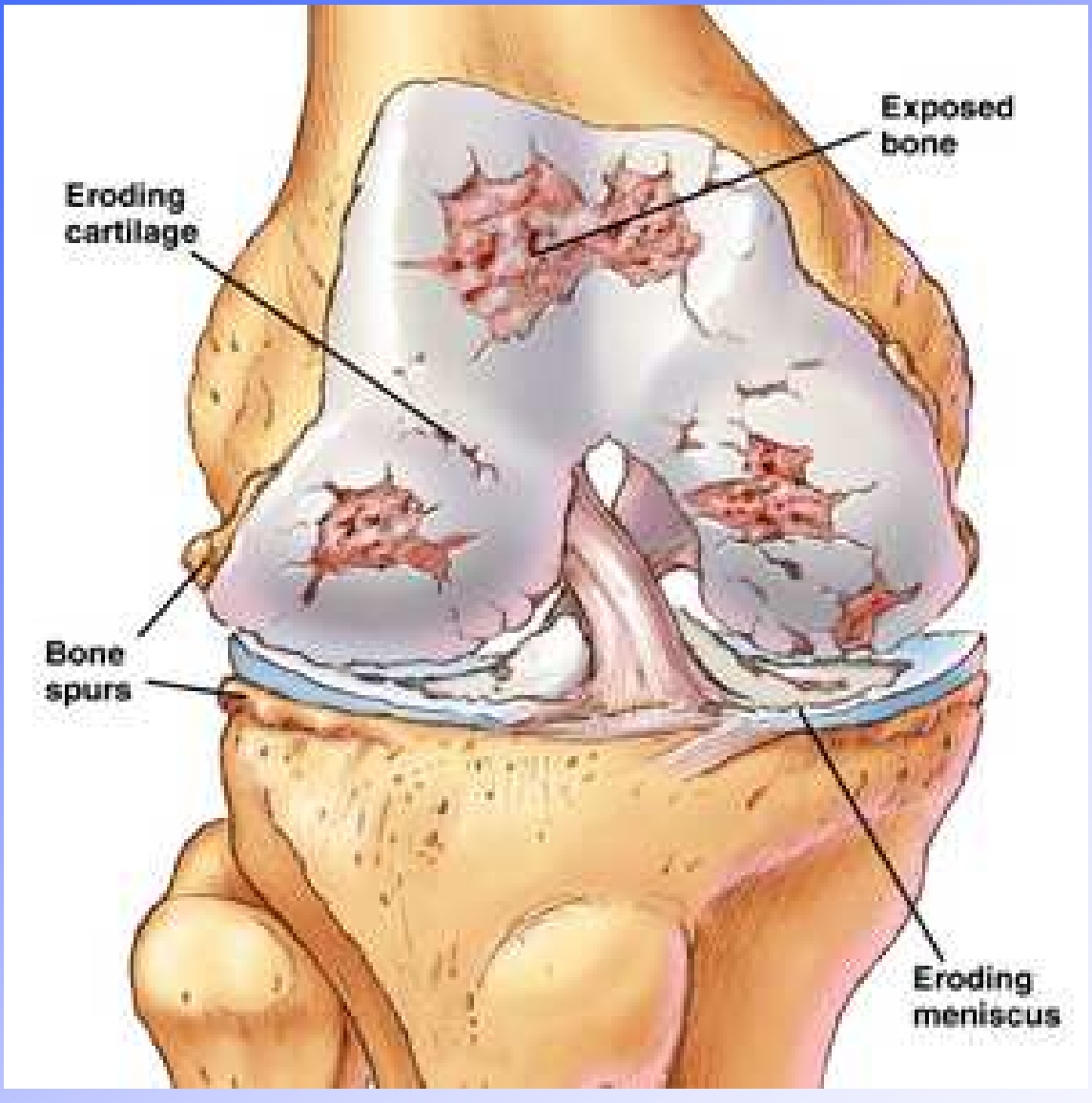


Interstitial laser application

- Blue Light and yellow light
- Anti-inflammatory effects
- Cooling effect



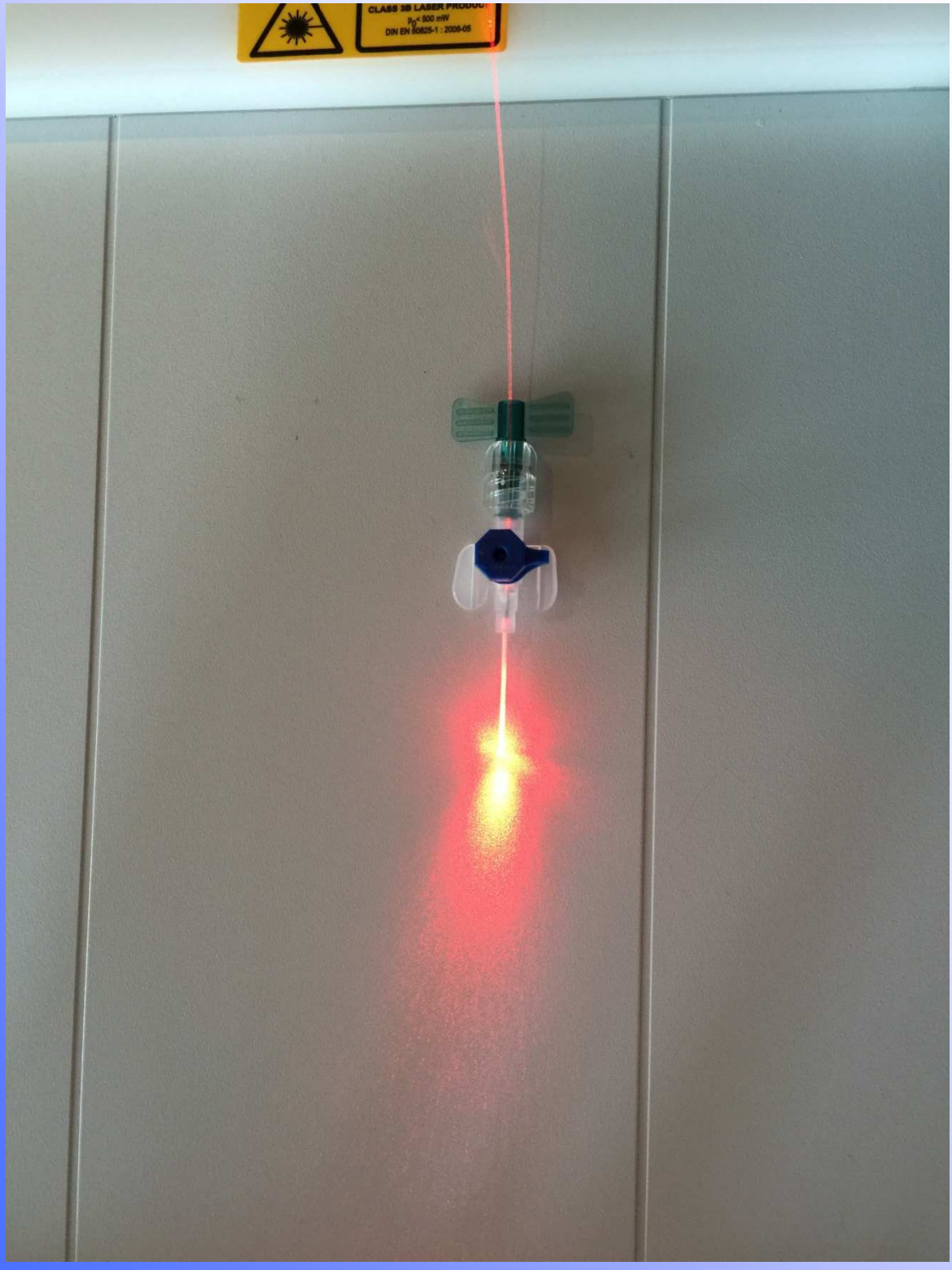
The intraarticular laser therapy



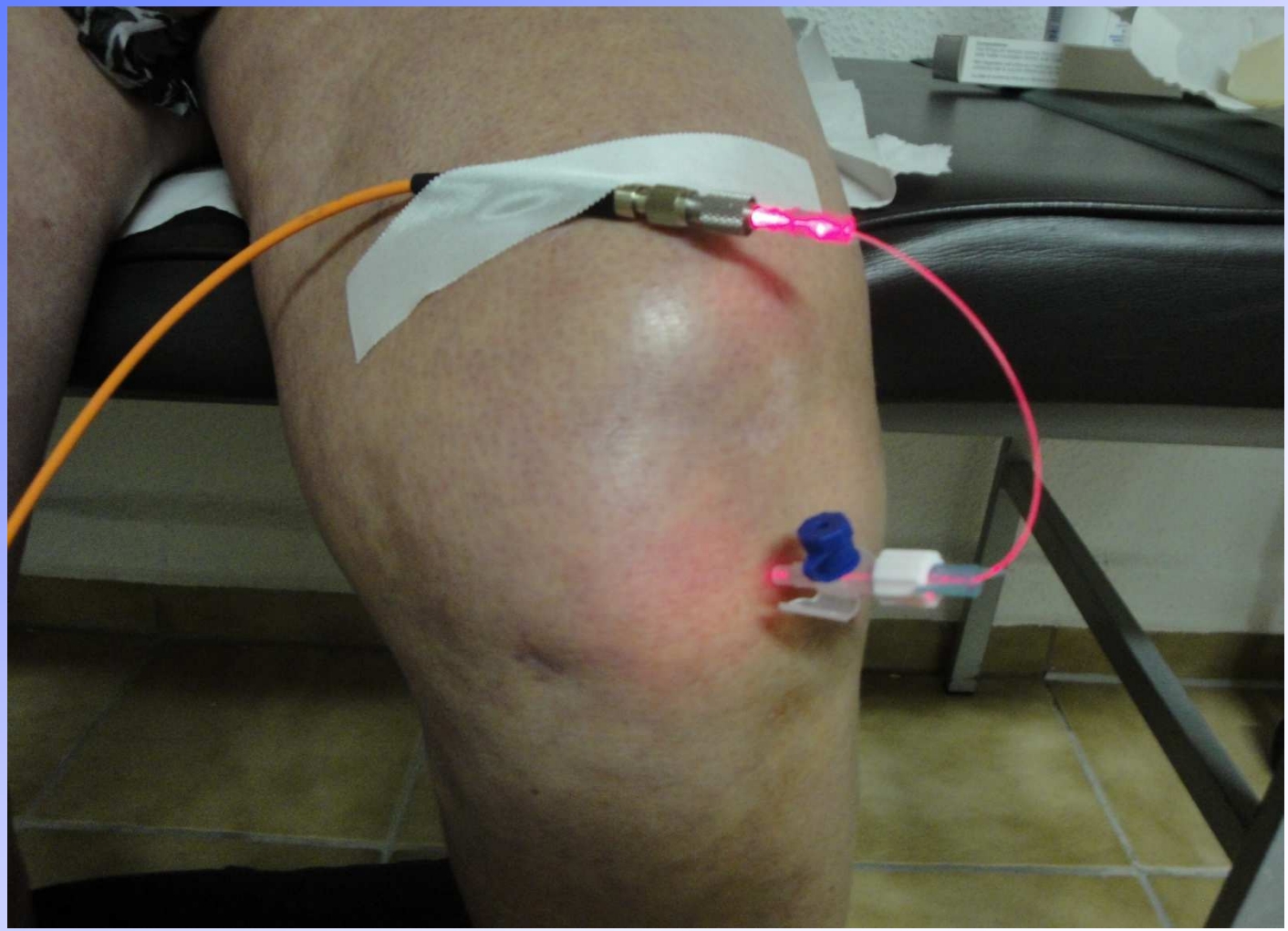
OA is a disease of joints that affects all of the weight-bearing components of the joint:

- Articular cartilage
- Menisci
- Bone

- Periarticular sclerosis
- Osteophytes
- Sub-chrondral bone cysts


CLASS 3B LASER PRODUC
P_{out}< 500 mW
DIN EN 60825-1 : 2008-05

The intraarticular laser therapy

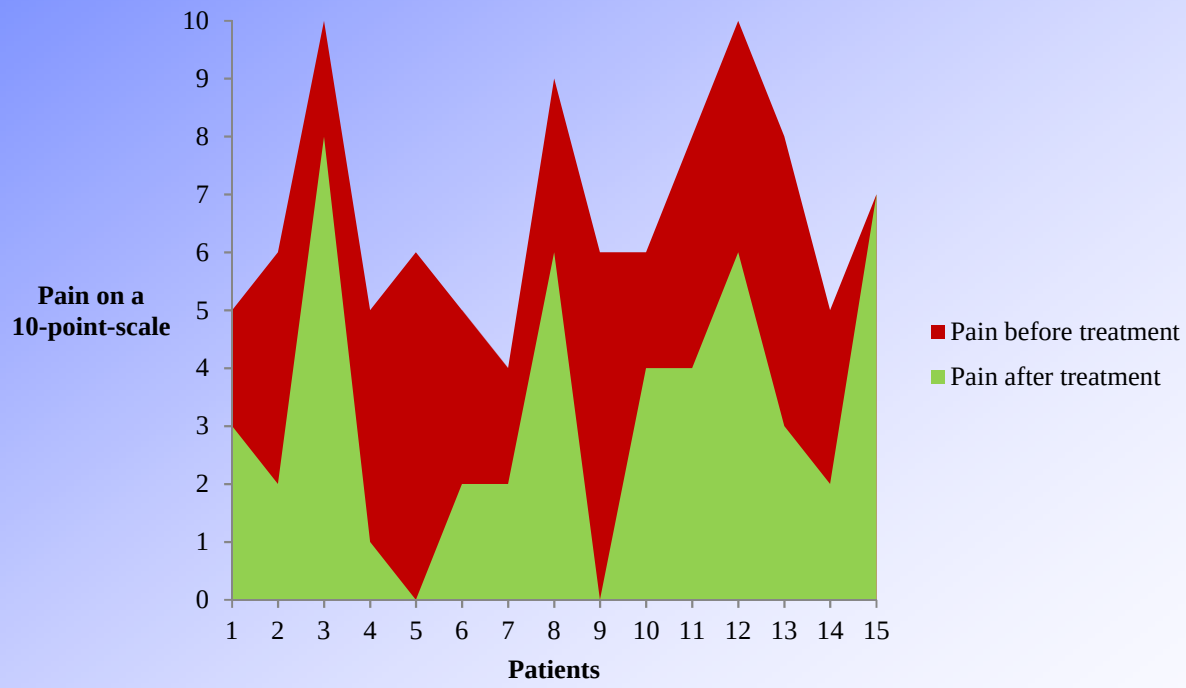


The intraarticular laser therapy

Shoulder syndromes

- Number of patients = 15
- Number of treatments mean value 9,40
  - VAS before 6,67
  - VAS after 3,33

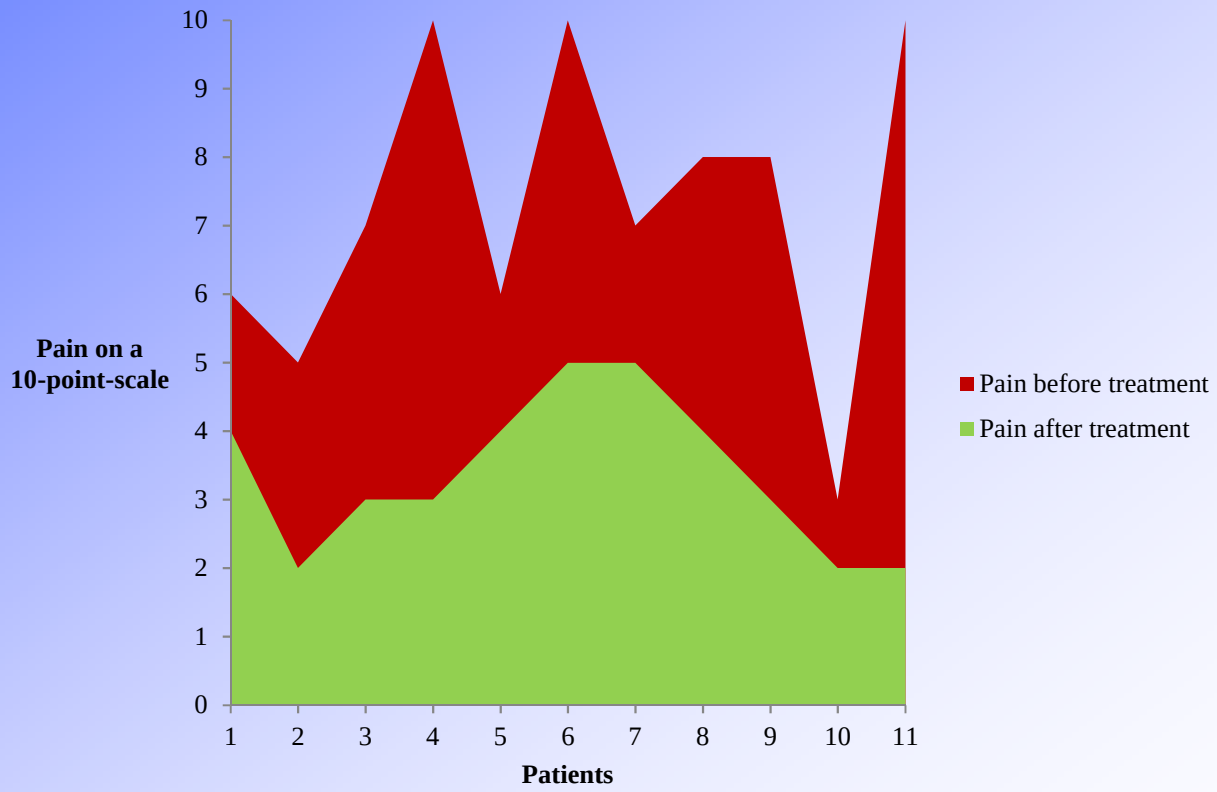
  (dose about 10 J)



Knee syndromes

- Number of patients = 11
- Number of treatments mean value 6
  - VAS before 7,27
  - VAS after 3,36

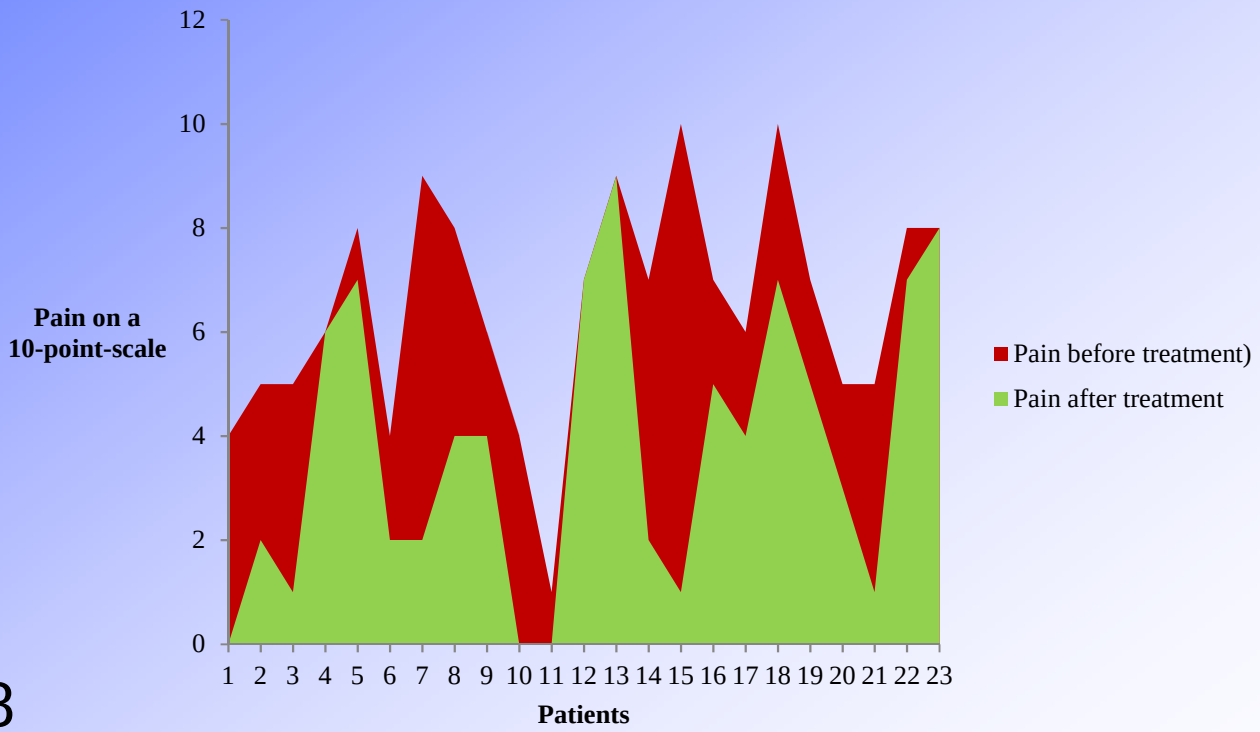
  (dose about 10 J)



Spine syndromes

- Number of patients = 23
- Number of treatments mean value 8,13
  - VAS before 6,48
  - VAS after 3,78

  (dose about 10 J)



3) Henry B.H. and Sherry N. Fanous, Spine Care Center, Cairo, Egypt (2015):

Knee Pain Management using Ultrasound-Guided Weberneedle Endolaser in Comparison to Fluoroscopy- Guided Continuous Radio-Frequency

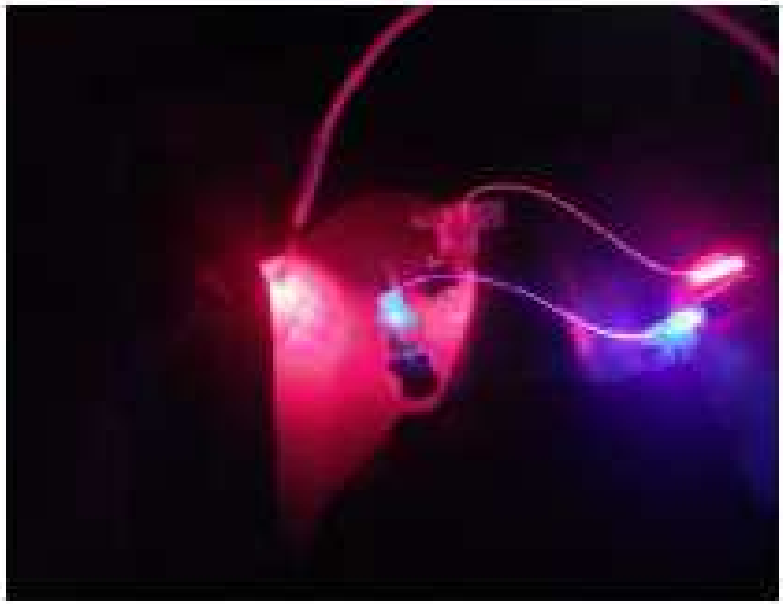
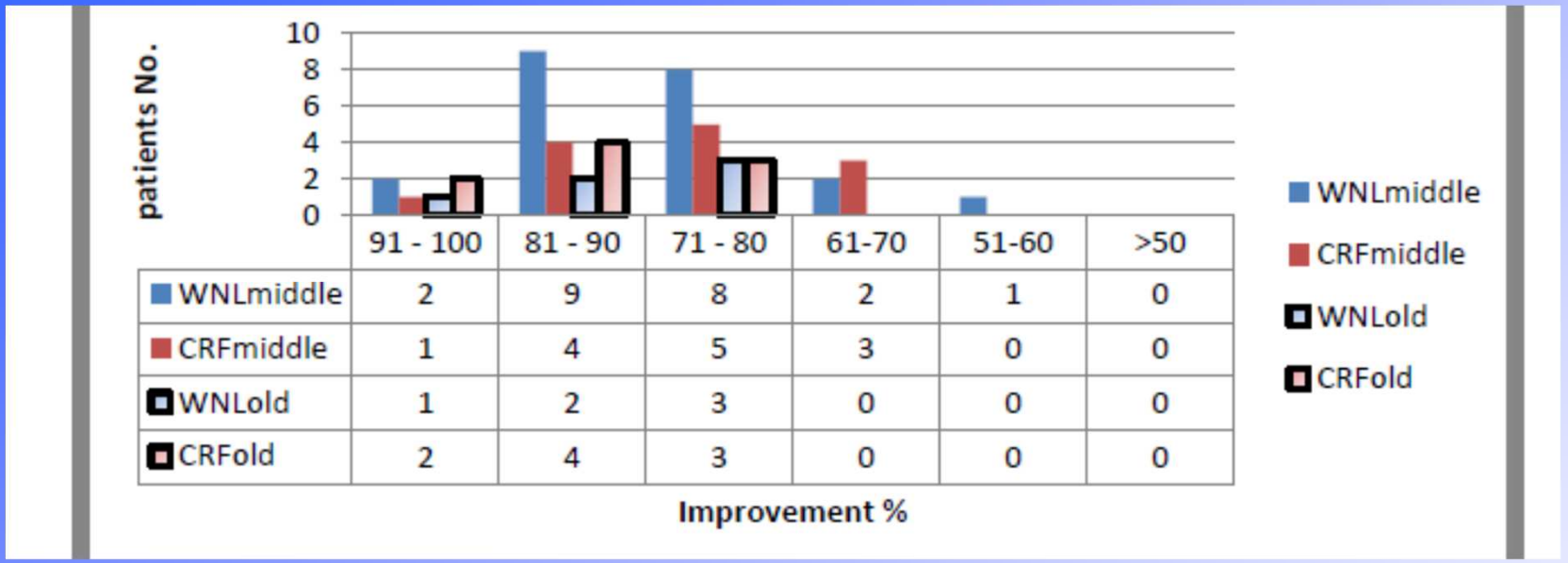


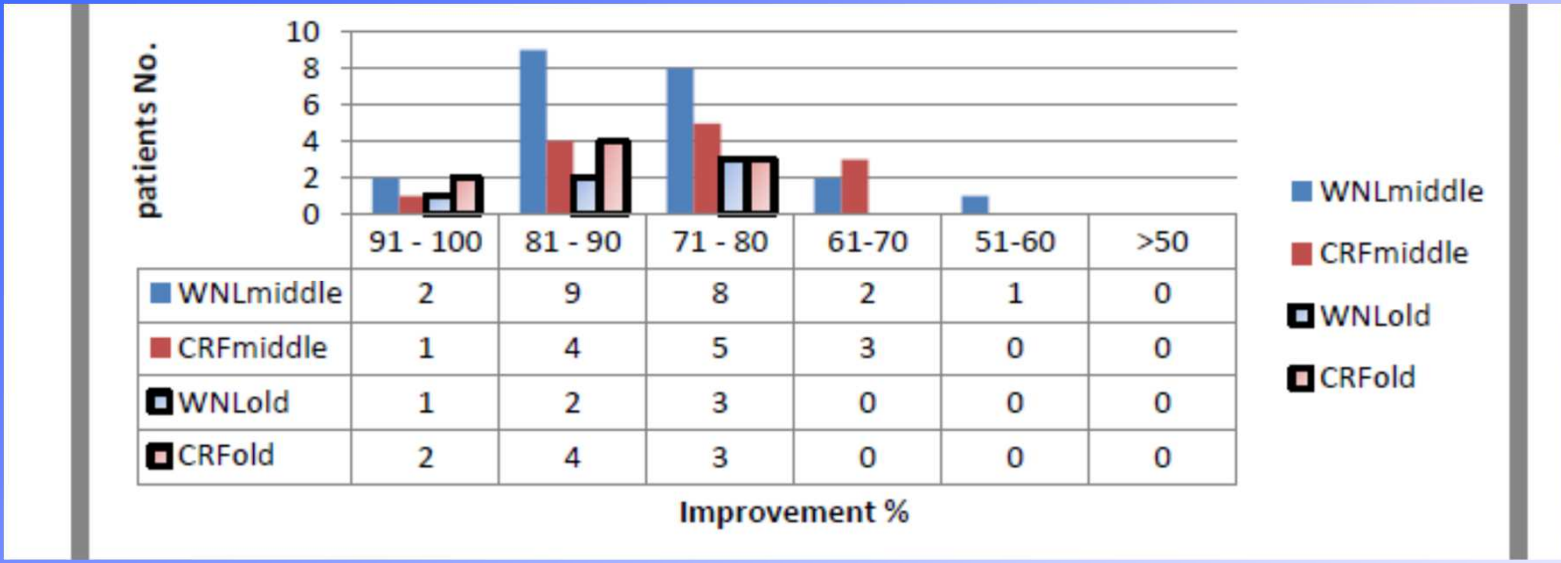
Abb. 20: Ultrasound Guidance

Abb. 21: Intra-articular use of two red lasers and one blue laser



Results Middle-age and old-age population

- 8 of 22 middle-age patients (36%) treated with laser therapy achieved 71-80 % pain relief after 6 months
- 9 of 22 middle-age patients (41%) treated with laser therapy achieved 81-90 % pain relief after 6 months
- 2 of 22 middle-age patients (9%) treated with laser therapy achieved 91-100 % pain relief after 6 months
- 3 of 6 old-age patients (50%) treated with laser therapy achieved 71-80 % pain relief after 6 months
- 2 of 6 old-age patients (33%) treated with laser therapy achieved 81-90 % pain relief after 6 months
- 1 of 6 old-age patients (17%) treated with laser therapy achieved 91-100 % pain relief after 6 months



	91 - 100	81 - 90	71 - 80	61-70	51-60	>50
WNLmiddle	2	9	8	2	1	0
CRFmiddle	1	4	5	3	0	0
WNLold	1	2	3	0	0	0
CRFold	2	4	3	0	0	0

Obese and overweight population:

- 2 of 10 obese patients (20%) treated with laser therapy achieved 61-70 % pain relief after 6 months
- 2 of 10 obese patients (20%) treated with laser therapy achieved 71-80 % pain relief after 6 months
- 4 of 10 obese patients (40%) treated with laser therapy achieved 81-90 % pain relief after 6 months
- 1 of 10 obese patients (10%) treated with laser therapy achieved 91-100 % pain relief after 6 months
- 7 of 16 overweight patients (44 %) treated with laser therapy achieved 71-80 % pain relief after 6 months
- 7 of 16 overweight patients (44 %) treated with laser therapy achieved 81-90 % pain relief after 6 months
- 2 of 16 overweight patients (12 %) treated with laser therapy achieved 91-100 % pain relief after 6 months

Dr. med. Volkmar Kreisel, Germany:

Neuraxial Low-Level- Laser Therapy for Lumbar Disc Herniation

Patient	Diagnose	VAS initial	Neuroaxiale LLLT	VAS final
BH	NPP L2/3	5	3	3
BM	NPP L4/5/S1	8-9	2	4
GG	NPP L4/5/S1	3-4	3	4
KH	NPP L4/5/S1	4-5	3	2-3
MH	NPP L5/S1	4-5	3	3
NN	NPP L4/5	2-3	3	1
SG	NPP L4/5	5-6	2	2
VR	NPP L3/4/5	8	7	2-3
WH	NPP L4/5/S1	7	3	2-3
WR	NPP L5/S1	6-7	4	3
Summe		**55,5**	**33**	**27,5**

- **Management Leader Pain Physicians NEW YORK Offers Groundbreaking Interstitial Laser Therapy**

- *November 13, 2014 1:35 PM*
- ***Innovative Treatment Reinvigorates Patients Suffering Chronic Pain***

Interstitial Laser therapy, NY

- Interstitial laser therapy is an innovative medical technology that has proven valuable in treating people suffering from chronically painful diseases.
- Pain Physicians NY have chosen interstitial laser therapy as its solution for alleviating symptoms, regenerating tissue, and reenergizing patients

The interstial and intraarticular laser therapy

- The laser can be applied in the depth of the tissue close to the spot of injury
- One or more interstitial needles can be added to superficially applied laserneedles
- Pain relief is quicker and more effective
- Combination of metal needle with fiberoptics (true laserneedle)

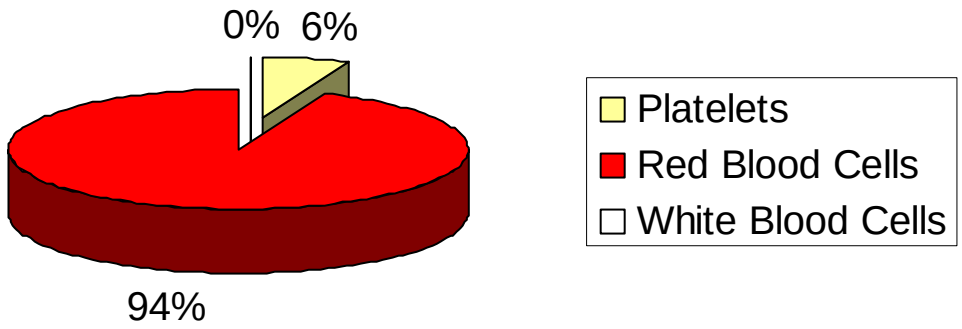
The interstial and intraarticular laser therapy

- Important in patients with dark skin
- Blue and green laser with anti-inflammatory effects can be applied as well
- Better effect on tissue regeneration

Combination of laser with platelet rich plasma (PRP)

- Serum from patient‘s blood, enriched with cytokines and gorwth factors
- Injected intraarticulary
- Intraarticular laser irradiation

Peripheral blood

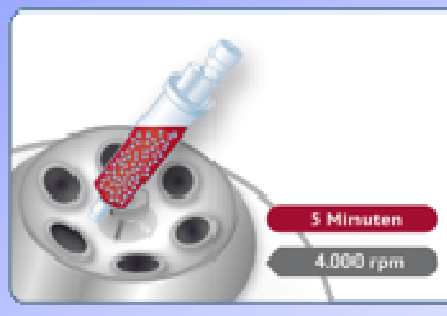


Preparation of PRP

10ml Blut aseptisch aus der Armvene des Patienten entnehmen, z. B. mit einem Butterfly oder einer Kanüle.

Anschließend wird das Blut unter Verwendung einer neuen Kanüle in das Medizinprodukt übergeleitet.

Die Kanüle befindet sich im Behandlungsset.



Nach der Inkubation muss das Medizinprodukt für 5 Min. bei 4.000 Umdrehungen zentrifugiert werden. Vorsichtige Entnahme des Medizinproduktes aus der Zentrifuge.

Das autologe konditionierte Serum sollte unter Anwendung eines Sterilfilters umgehend in das betroffene Gelenk reinjiziert werden.

Scientific BioTech

PRP- Zentrifuge (low speed)

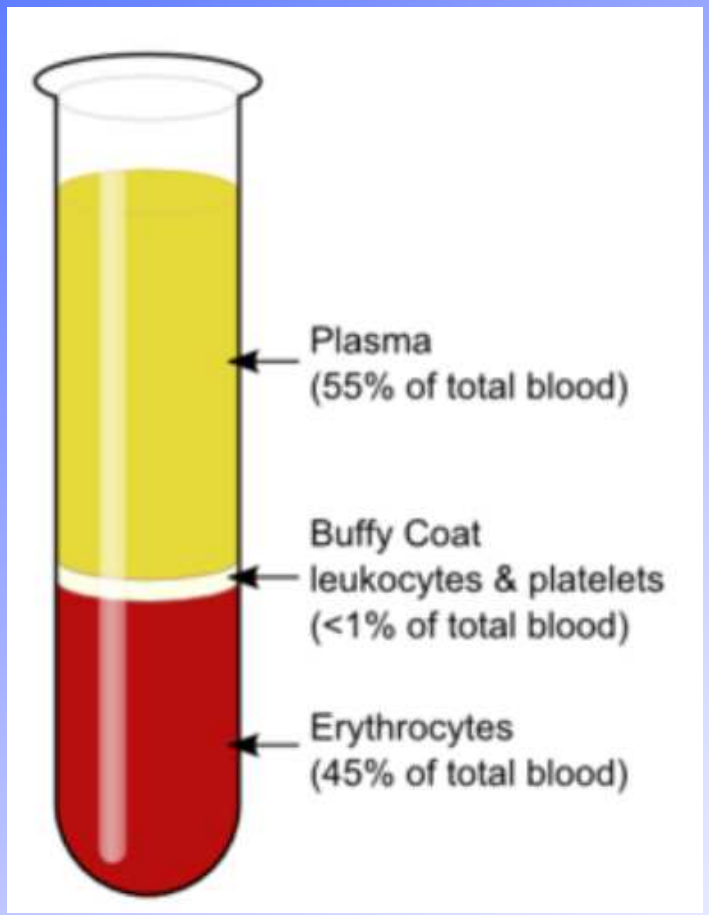
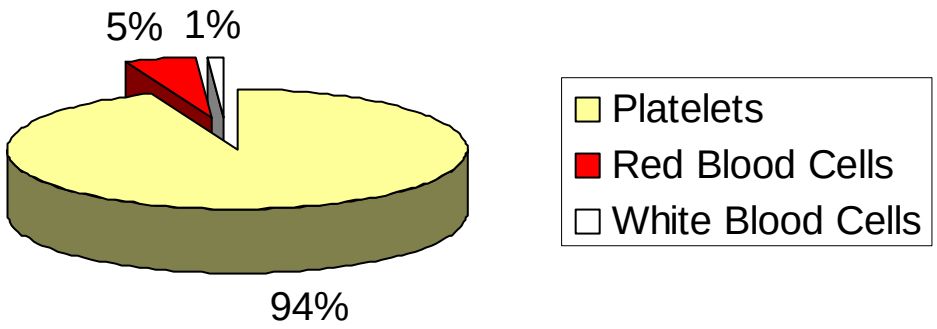


Figure 2 The components of whole blood and their function[2]

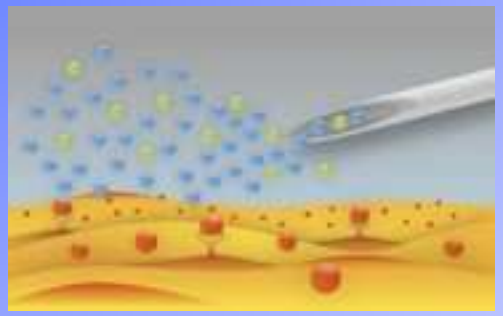
Platelets are crucial for tissue repair and vascular remodelling. The first stage of normal wound healing, immediately following injury or insult, is inflammation, where activated platelets adhere to the site of injury releasing growth factors including:

Platelets



PRP CONTENTS

1. Platelets
2. Neutrophil (PMN) - 40-75% of circulating leukocytes
3. Monocyte macrophage - 2-10% of circulating leukocytes. Highly motile and migrate to soft tissues
4. Fibroblast - produce collagen, reticular fibers, glycosaminoglycans, glycoprotein
5. Endothelial Cell - permeability barrier, regulate blood flow and vascular reactivity, vasodilators, vasoconstrictors, regulate inflammation and immunity
6. Keratinocyte - Stratified, squamous epithelial cells Primary function is to act as a barrier
7. Small number of primitive stem cells (VSEL)



- Interleukin 1 (Il-1) leads to cartilage damage
- Antagonist Il 1 – receptor antagonist
- The autologue serum contains increased amount of Il-1-receptor antagonist (Il 1 RA)
- Il 1 RA inhibits inflammation and imprves regeneration

- transforming growth factor (TGF-β): promotes formation of extracellular matrix and regulates bone cell metabolism;
- platelet-derived growth factor (PDGF): promotes cell replication, angiogenesis, epithelialisation and granulation tissue formation;
- basic fibroblast growth factor (bFGF): promotes proliferation of endothelial cells and fibroblasts and stimulation of angiogenesis;
- epidermal growth factor (EGF): promotes cell differentiation and stimulates re-epithelialisation, angiogenesis and collagenase activity;
- vascular endothelial growth factor: promotes angiogenesis; and
- connective tissue growth factor: promotes angiogenesis, vessel permeability, and stimulates mitogenesis for endothelial cells.[3, 4]

Advantages of PRP -Therapy

1. Boosts local healing and tissue (re)growth
2. Natural procedure with patient’s own blood , no side effects or toxicities
3. Individual therapy
4. Easy handling, procedure doesn’t take longer than 20 min.
5. Supports the body’s own potency of healing
6. Cartilage protection and anti-inflammatory effects
7. Prevention or delay of surgery
8. Improvement in quality of life
9. Cost efficiency (no other substances necessary)
10. Can be combined with other methods such as laser therapy

Indications of PRP applications:

- Wound healing
- Tendinopathies
- Fractures
- Bone regeneration
- Osteoarthritis
- Spinal syndromes
- Skin rejuvenation
- Hair loss

PRP ohne Laser

(Dr. Warmke Köln mit Sanakin)

Indication	Pain before therapy (VAS)	Pain after therapy (VAS)	Positive Change (%)
Shoulder (n= 11)	67,5	27,5	59,26
Spine (n = 5)	60,0	22,0	63,33
Thumb (n= 10)	64,5	21,0	67,44
Knee (n= 22)	66,43	23,67	64,37
Toe (n =2)	67,5	22,50	66,67
Total	**65,9**	**22,18**	**66,34**

Fig. 17: Results for body's own serum therapy

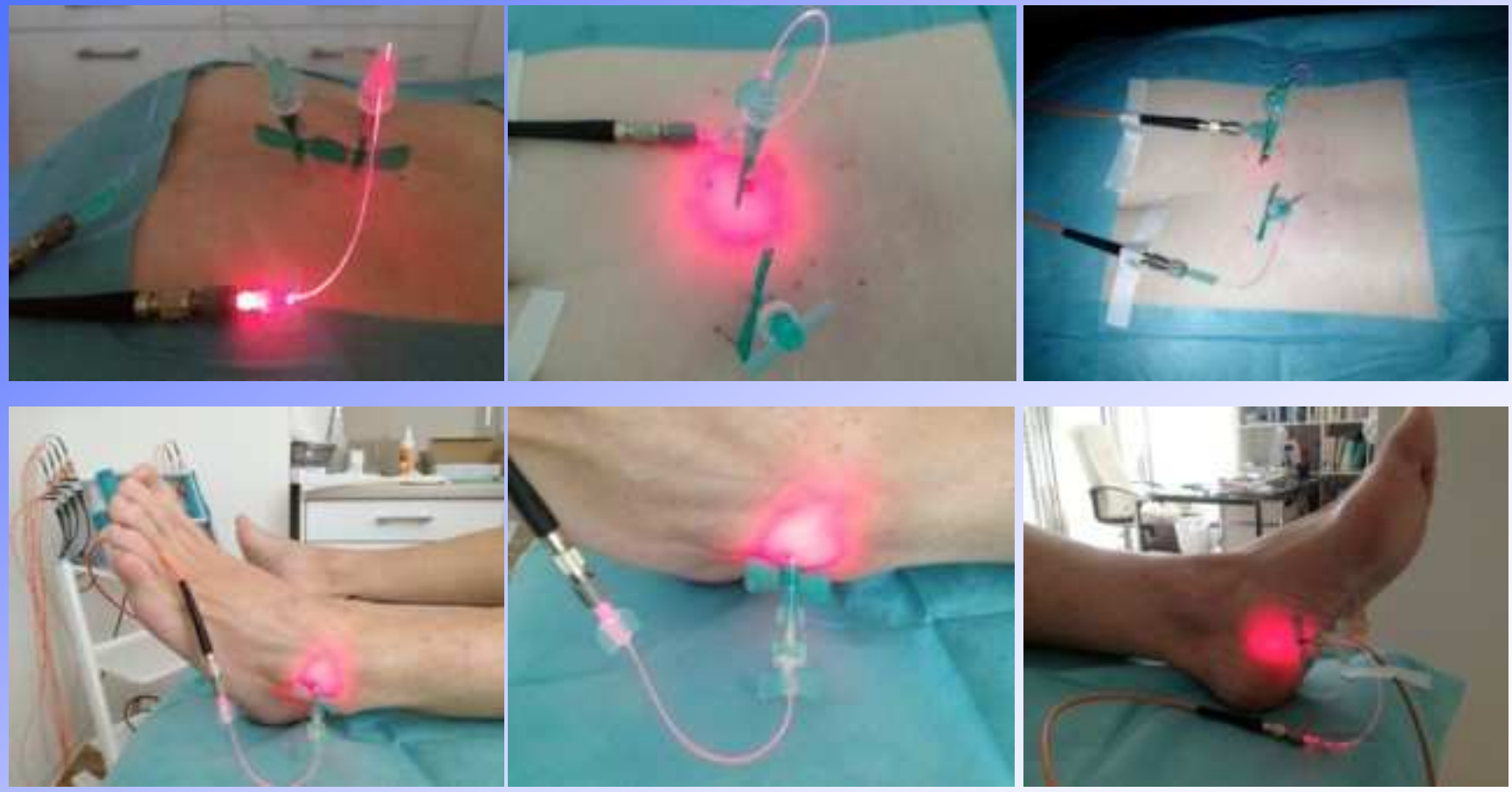
PRP mit Laser

(Dr. Warmke, Köln mit Sanakin)

Indication	Pain before therapy (VAS)	Pain after therapy (VAS)	Positive Change (%)
Shoulder (n= 6)	80,0	18,4	77,0
Spine (n = 2)	68,5	10,0	85,4
Thumb (n= 1)	20,0	0,0	100,0
Knee (n= 22)	65,6	21,7	66,92
Achilles tendon (n=3)	55,0	1,7	96,91
Heel spur (n=2)	81,0	10,0	87,65
Total	**61,68**	**10,3**	**83,30**

Fig. 18: Results for combination therapy of body's own serum and laser therapy

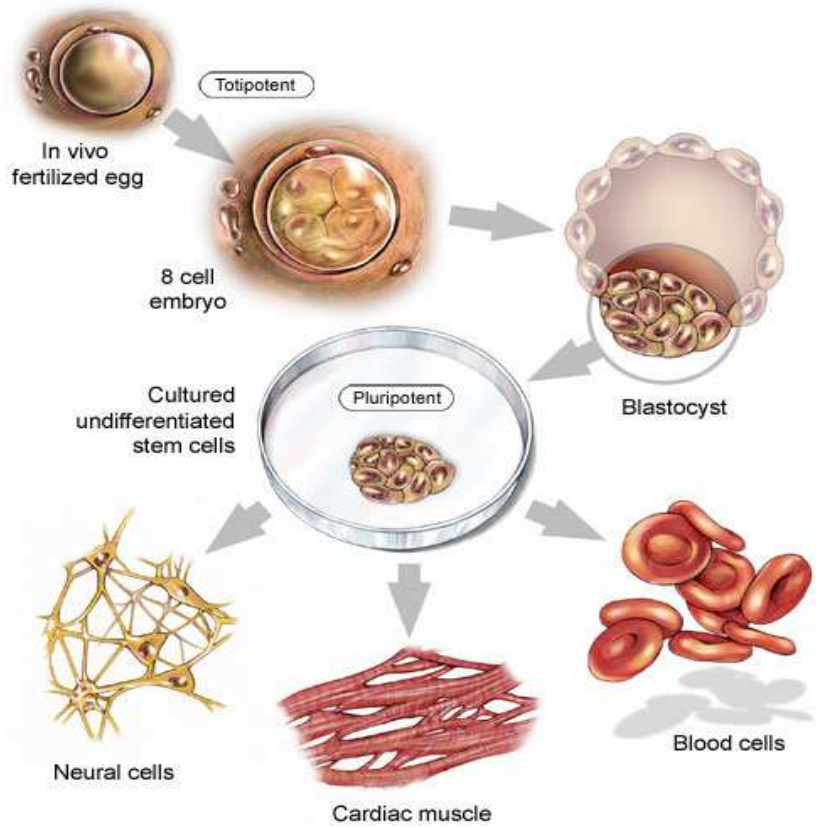
Laser + PRP



Scientific BioTech

STEM CELLS

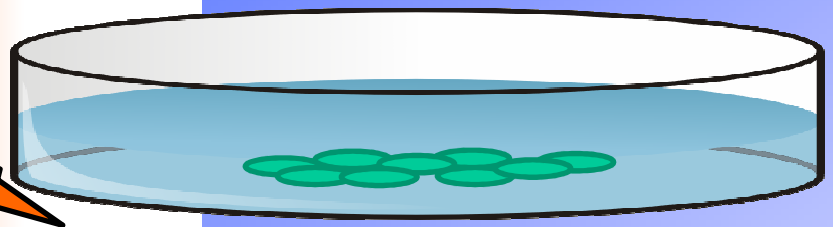
- Embryonic vs Adult Stem Cells



UNIVERSITY OF JOHANNESBURG

ADSCs & LILI

5-10 J/cm^2
@ 630-660nm

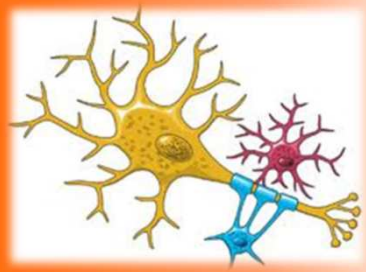


APPLICATION OF LILI TO STIMULATE ADSC PROLIFERATION AND VIABILITY

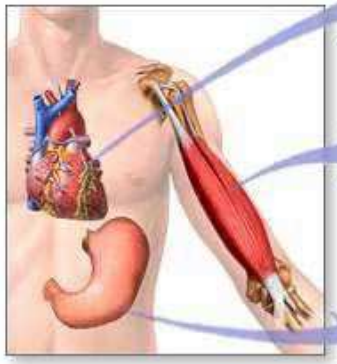
ADDITION OF GROWTH FACTORS TO INDUCE DIFFERENTIATION & APPLICATION OF LILI TO STIMULATE DIFFERENTATION AND PROLIFERATION

5-10 J/cm^2
@ 630-660nm

SKIN CELLS: KERATINOCYTES



NEURONS



CARDIAC MUSCLE

SKELETAL MUSCLE

SMOOTH MUSCLE

UNIVERSITY OF JOHANNESBURG

Lasers stimulate stem cells for heart repair (

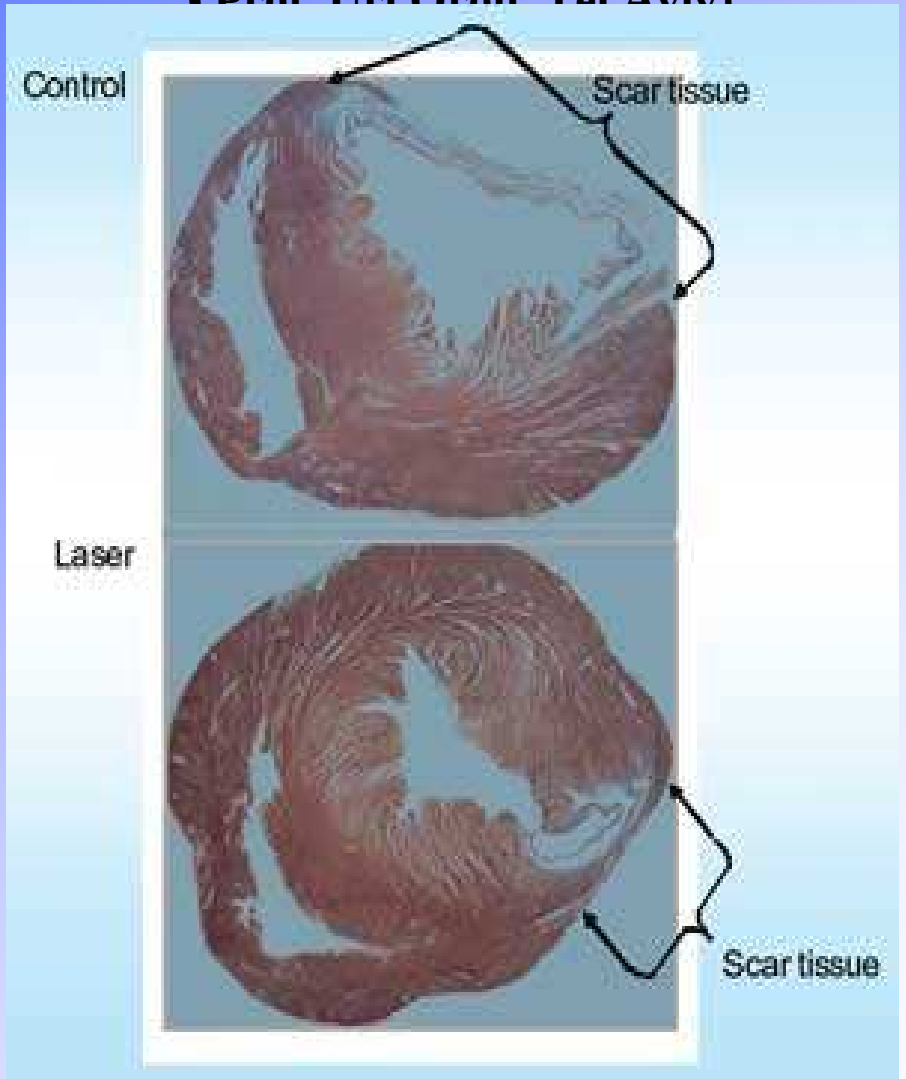
Prof. Uri Oron, Tel Aviv)

(WALT-Laserconference, Washington DC, September 2014)

- A simple new process significantly reduces heart scarring after an ischemic event.
- Discovered by professor Uri Oron at Tel Aviv University, the method, called shining, consists of applying low-level laser energy to living bone marrow stem cells a few hours after a heart attack.
- This procedure reduces scarring by up to 80 percent.

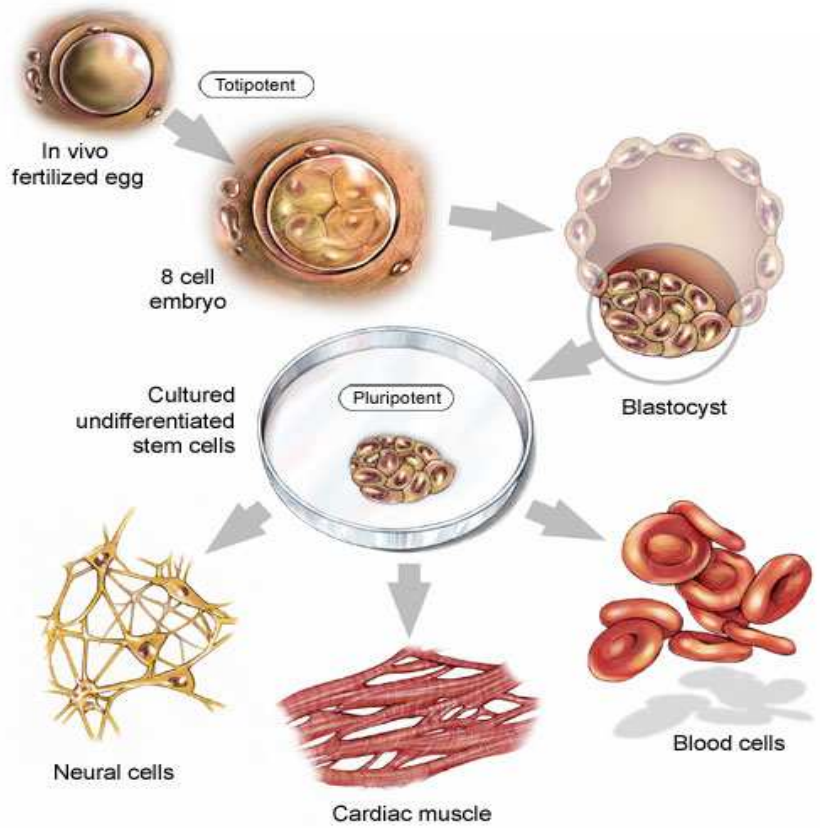
Lasers stimulate stem cells for heart repair

(Prof. Uri Oron, Tel Aviv)



STEM CELLS

- Embryonic vs Adult Stem Cells



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ADIPOSE STEM CELLS

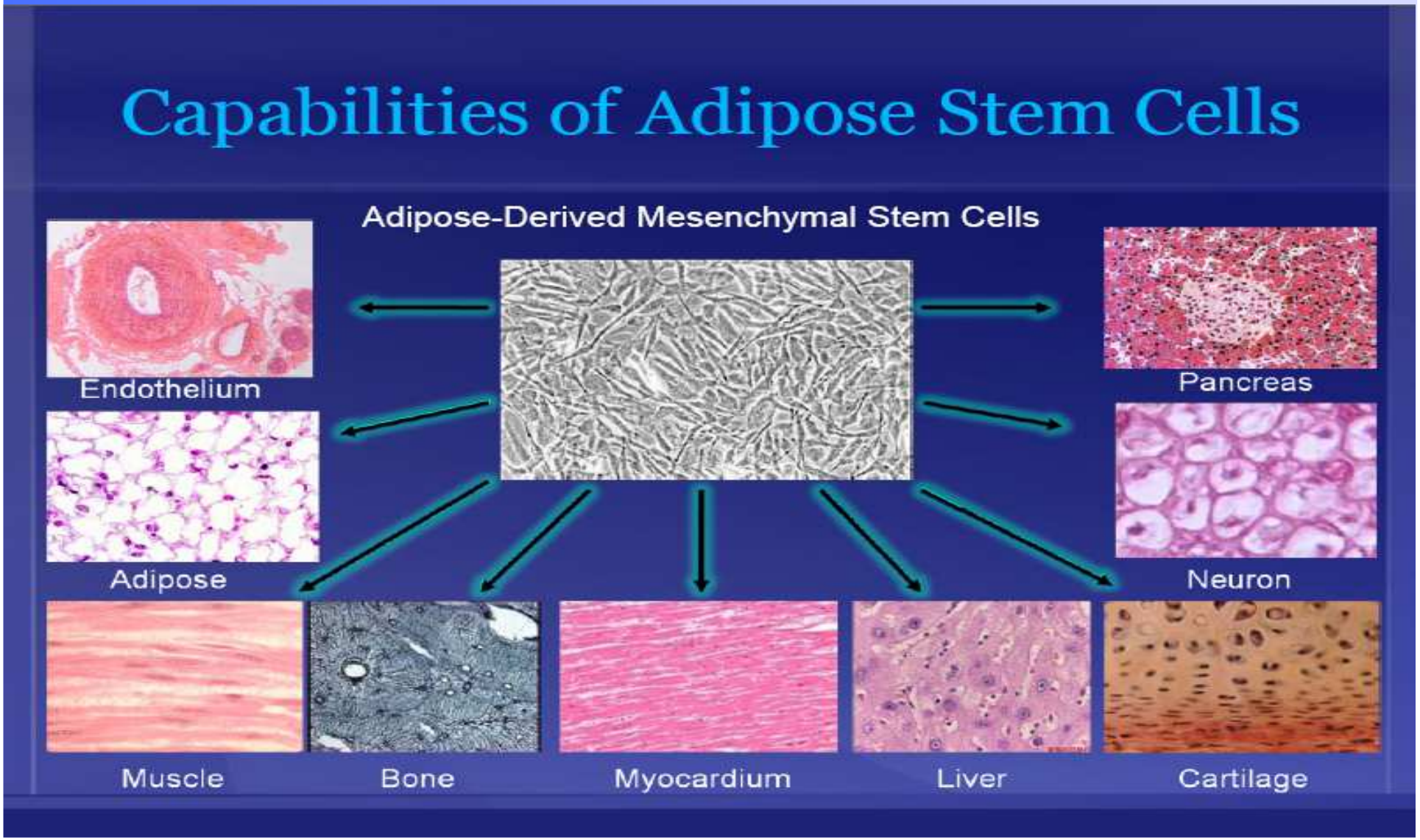
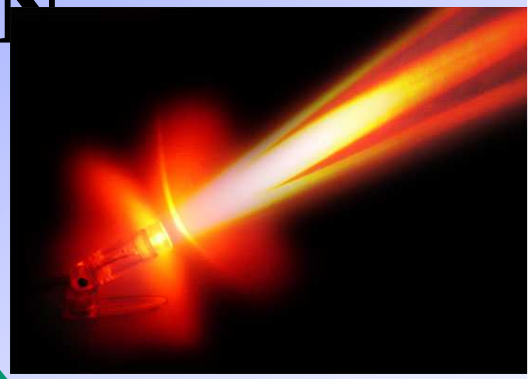
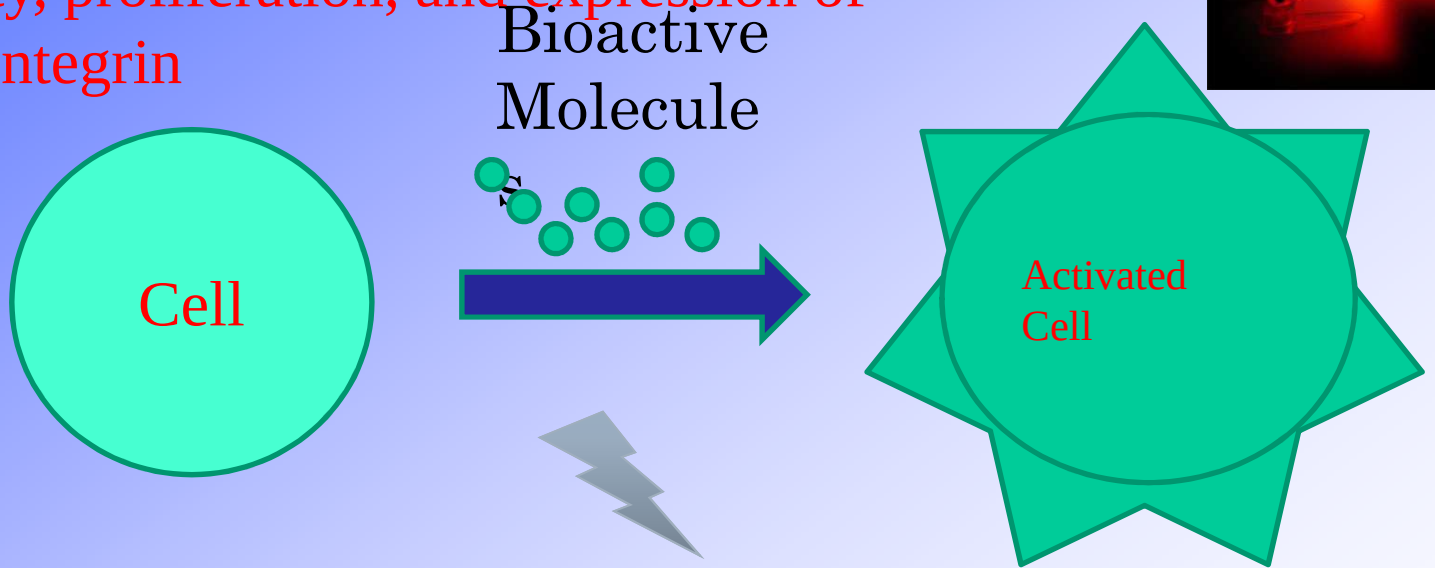


PHOTO ACTIVATION

laser irradiation can positively affect human stem cells by increasing cellular viability, proliferation, and expression of beta1-integrin





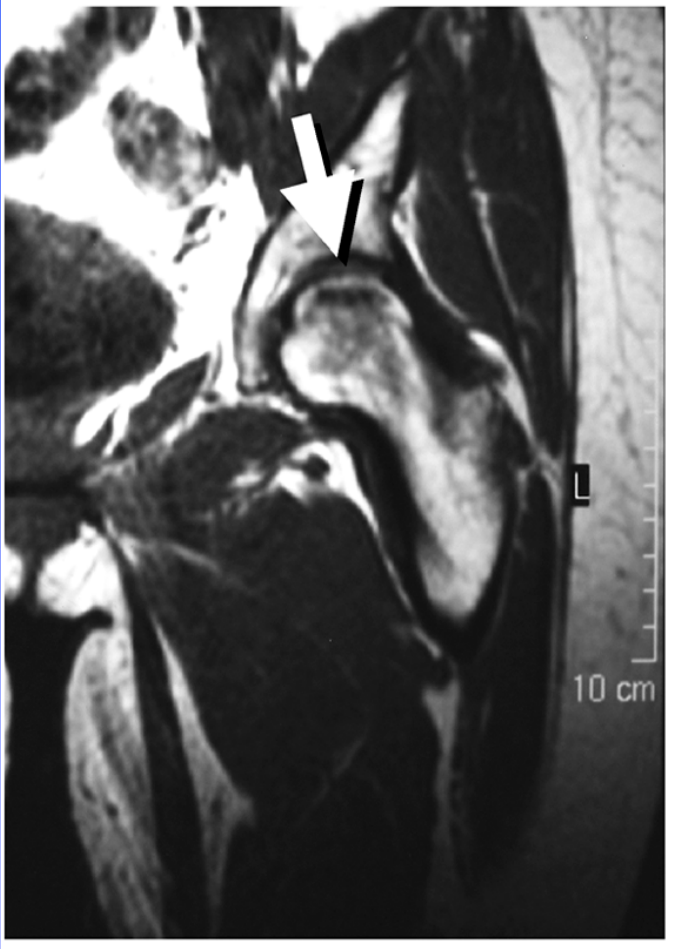
light activates cells

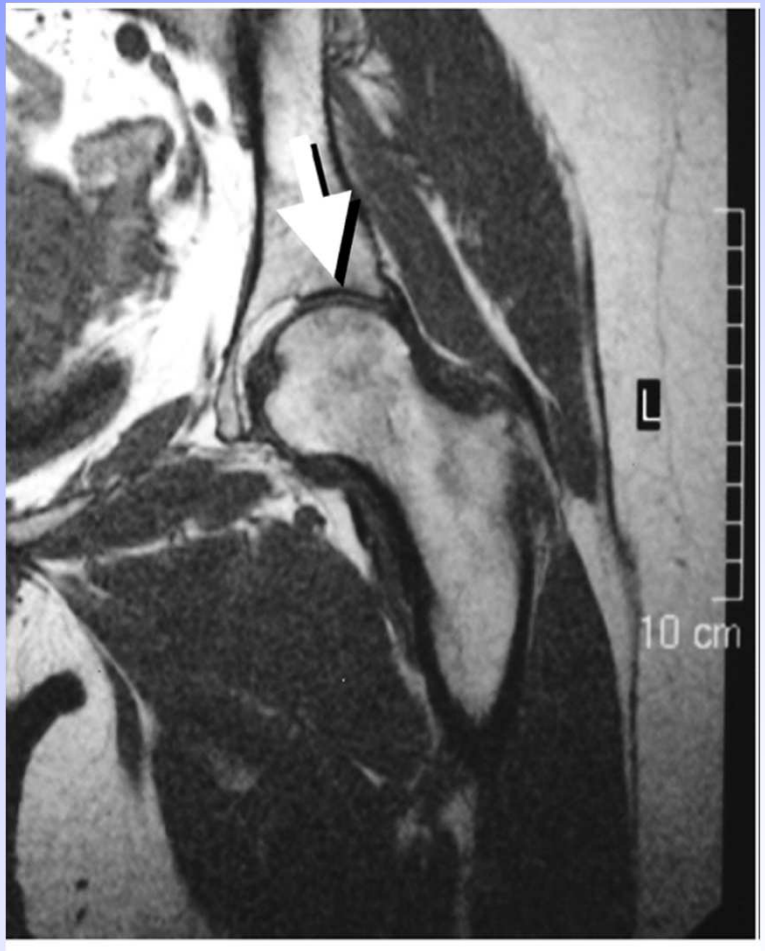
Fat is a "High Density" Source of Stem Cells

Tissue/Source of SCs	Stem Cell Density
Heart	1 out of 40,000 cells
Bone marrow	1 out of 100,000 cells
Adipose tissue	1 out of 100 cells

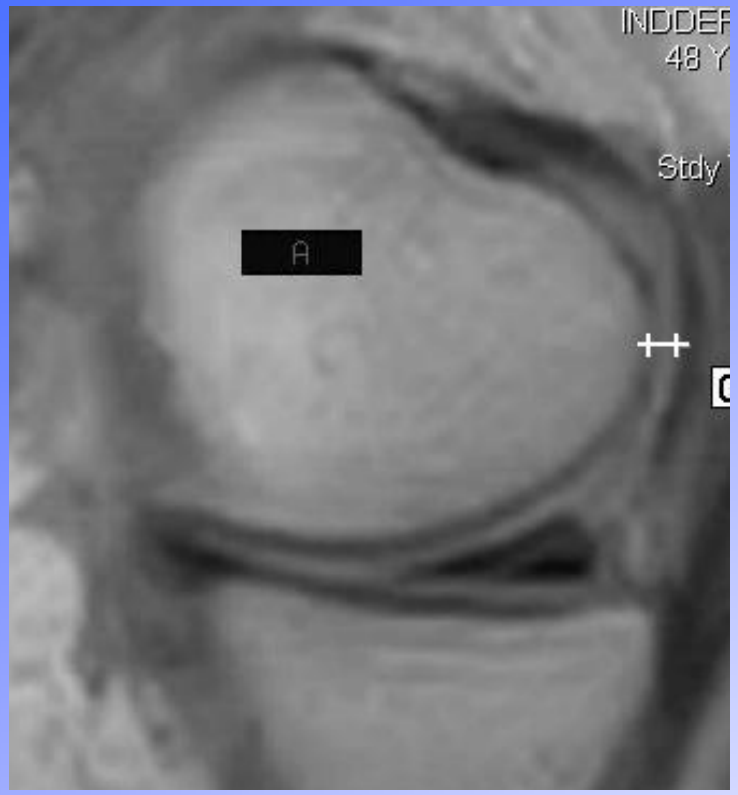
* In old age

Before and 1 year after stem cell therapy





Stem cell therapy for knee osteoarthritis

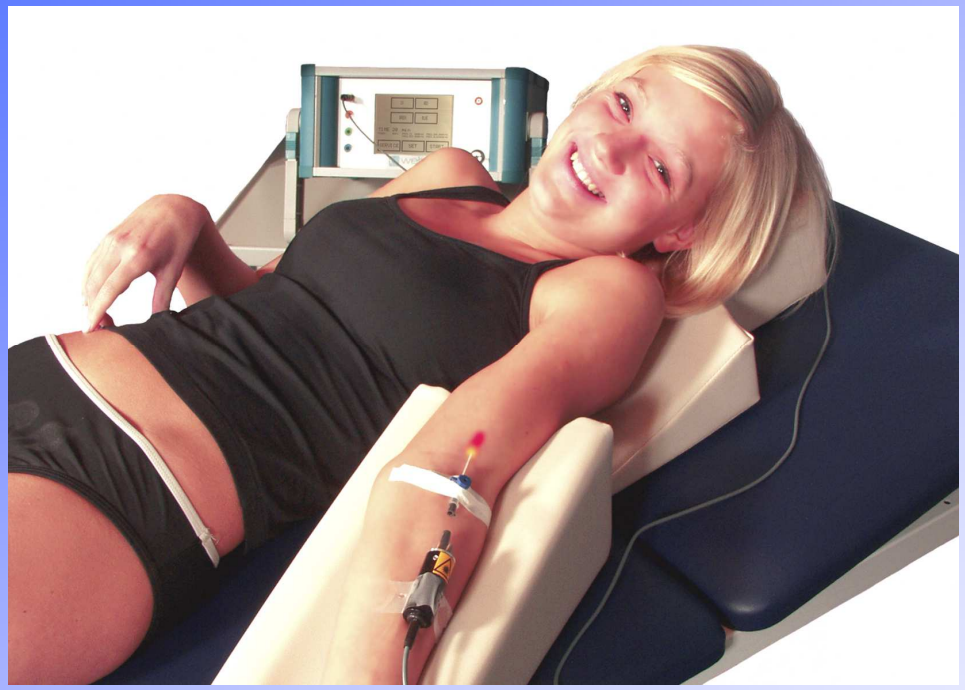


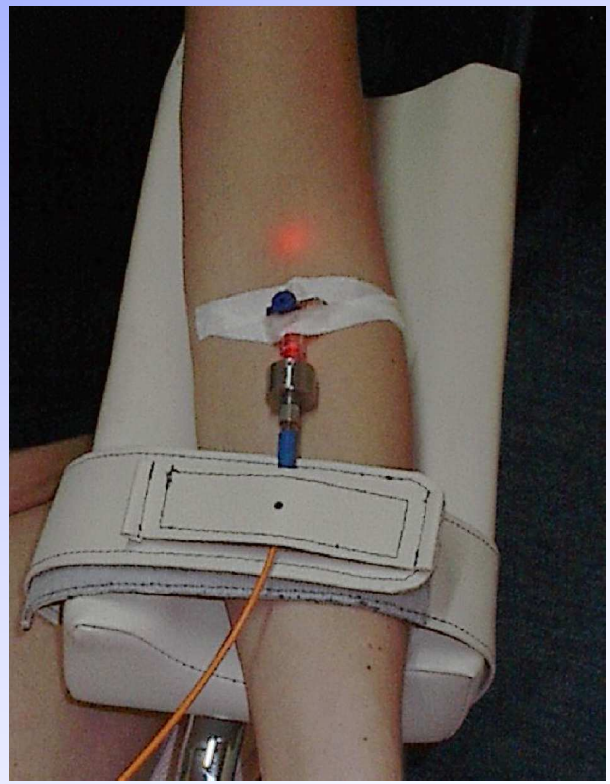
Post cell therapy at 12 months improvement of 0.3 mm at posterior condyle

The method of intravenous laser blood irradiation and clinical applications

Dr. Michael H. Weber

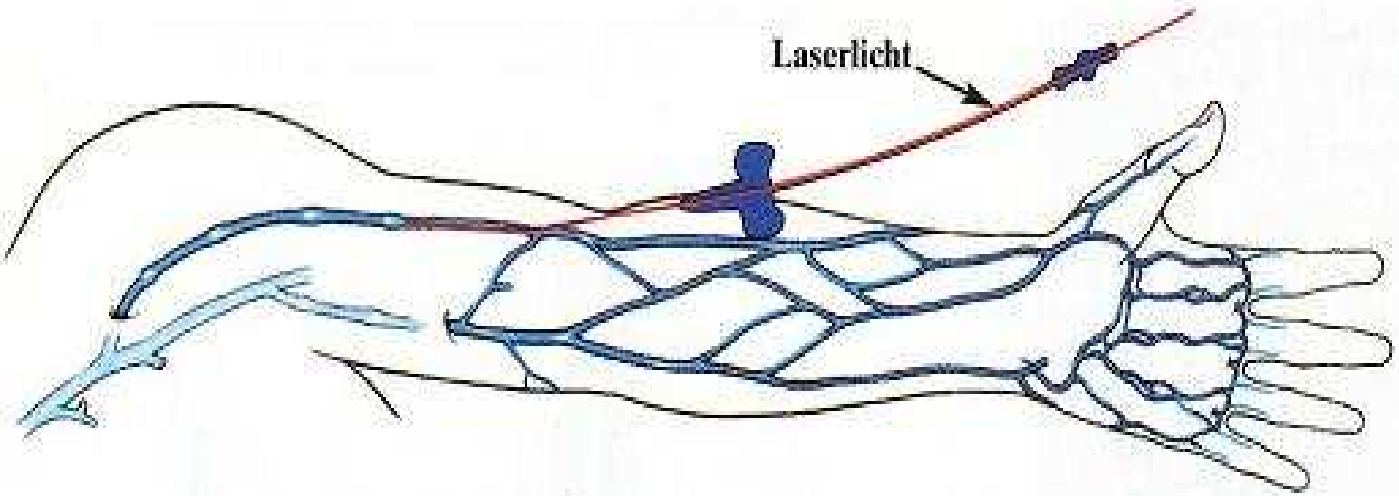
IV Laser Blood Irradiation





How is the laser light applied in the blood stream?

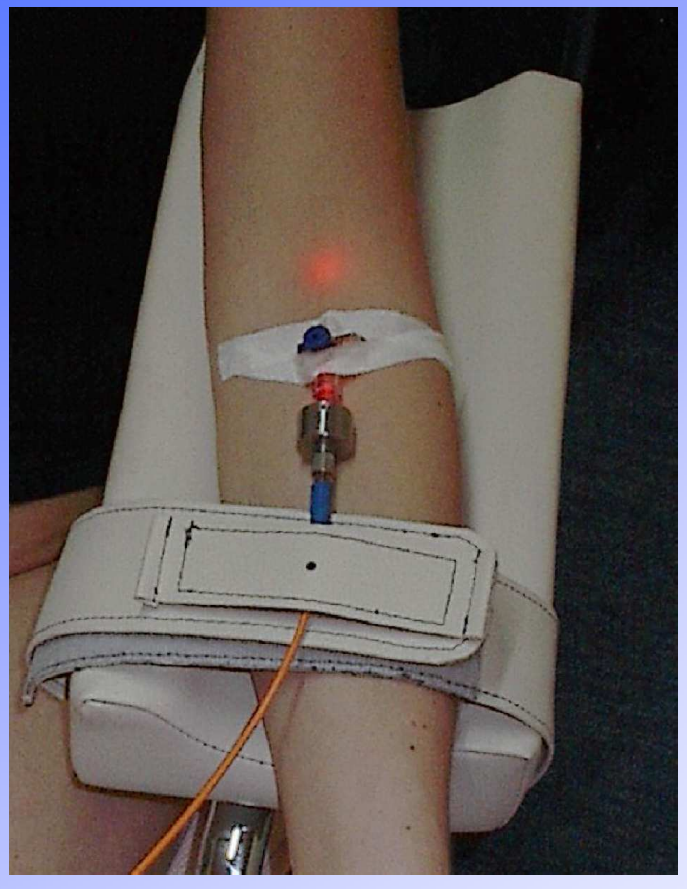
-

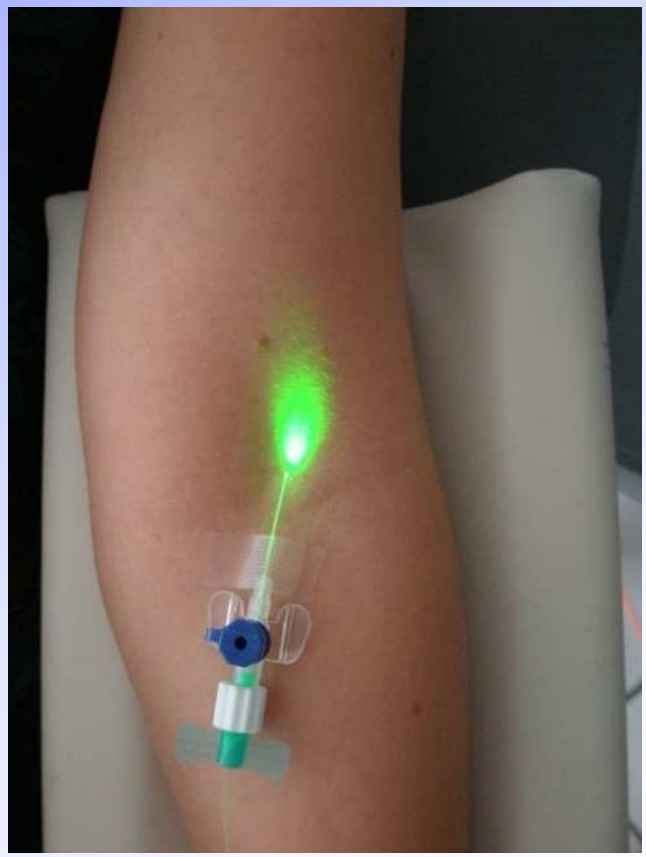


Bei der intravenösen Laserbehandlung wird ein Lichtleiter (Quarzfaser) in die Ellenbogenvene eingeführt.

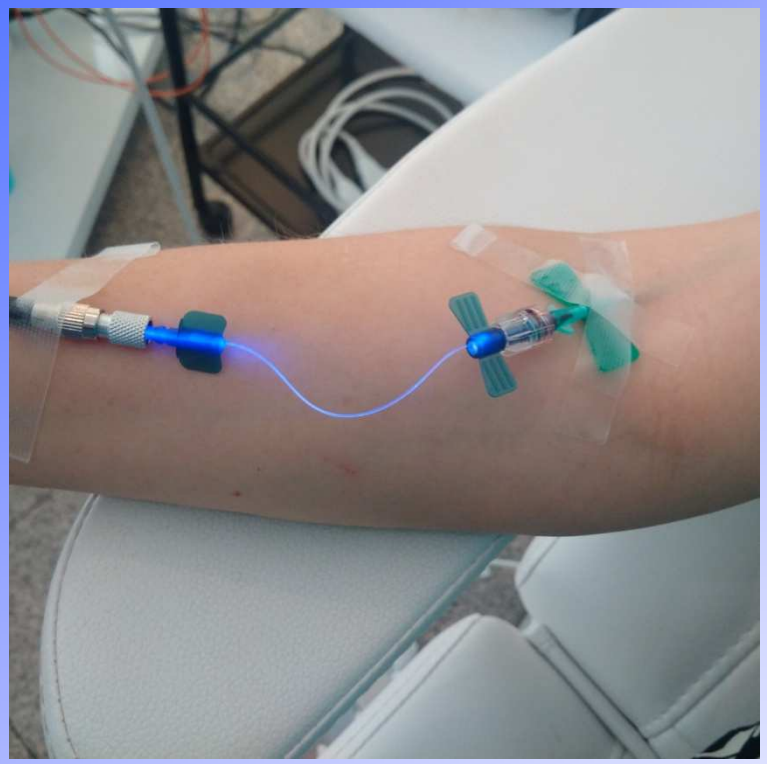
IV Lasertreatment with

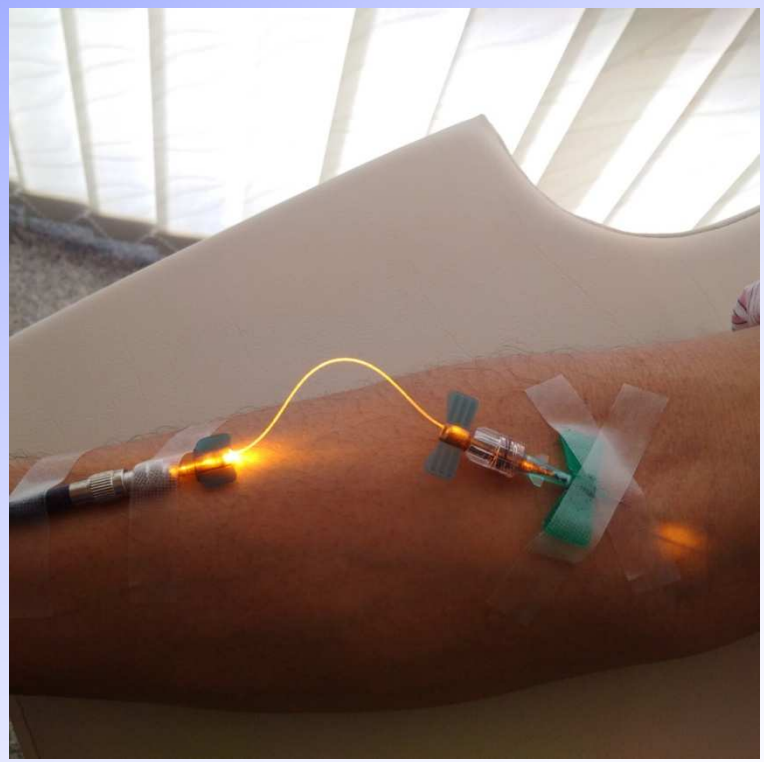
Red and green laser



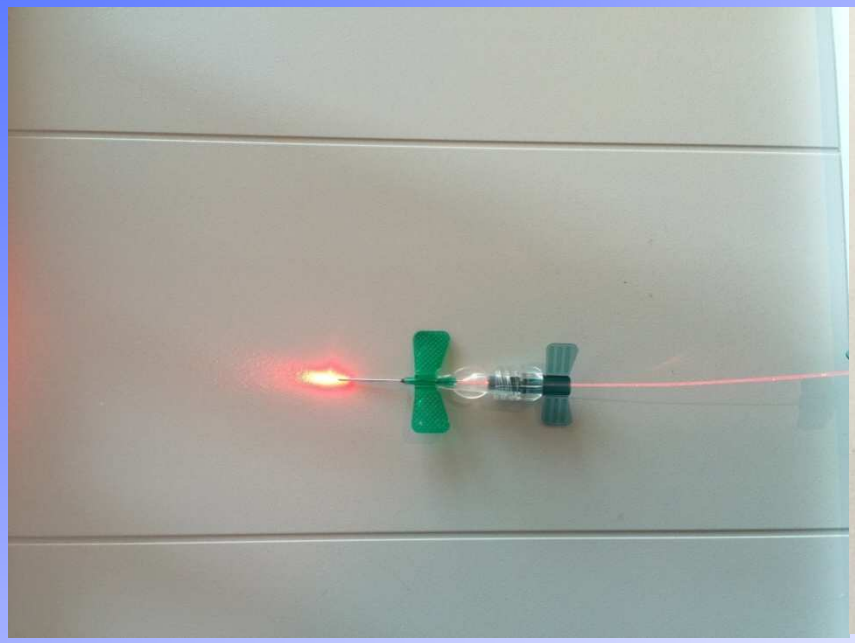


Iv-laser treatment with blue and yellow laser



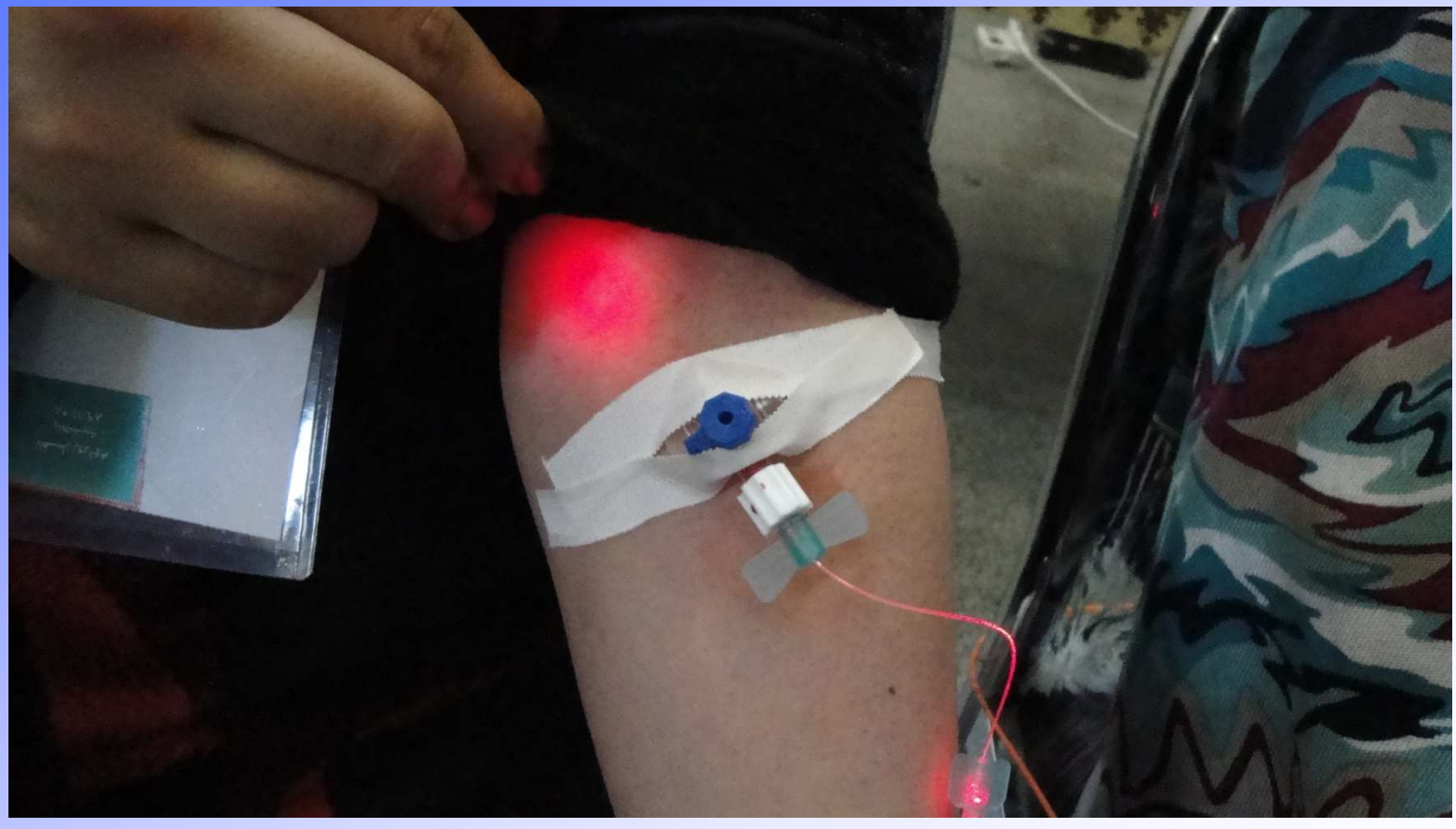


Puncture needles for intravenous laser therapy

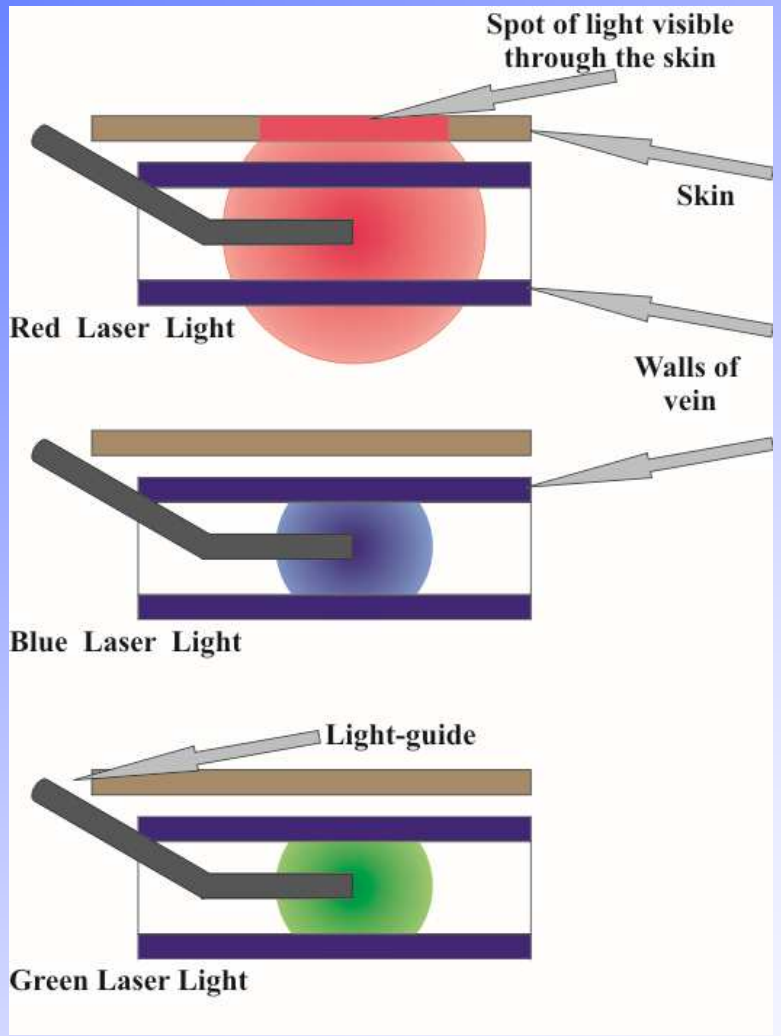


Y-needle with 3 luer-lock for iv-Laser with simultaneous infusion

IV – Lasertherapie mit rotem Laser



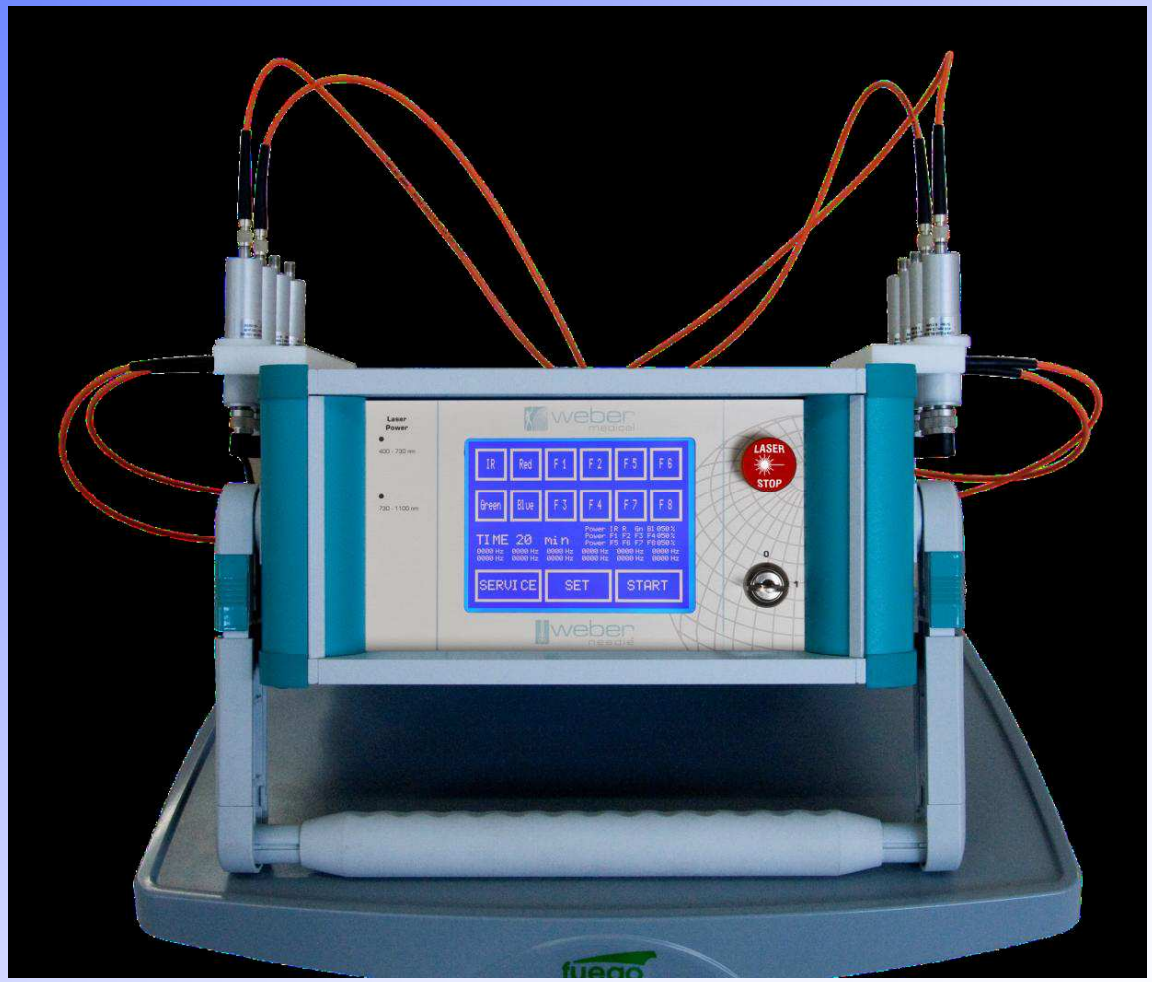
Intravenöse Laserblutbehandlung mit verschiedenen Wellenlängen:



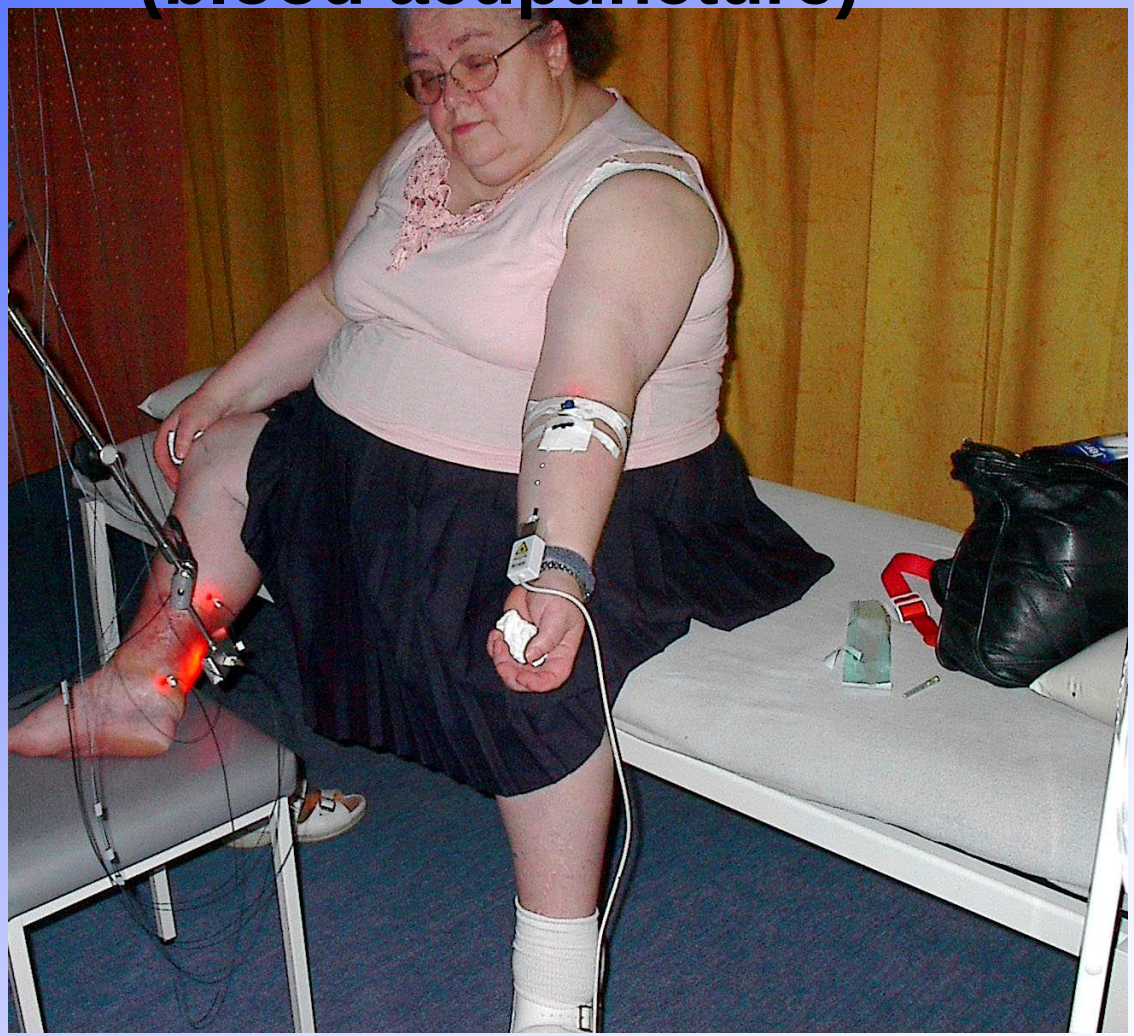
The laser-needle mouth shower

The laser-needle mouth shower for systemic sublingual laser energy application

Weberneedle 12-channel modular **Endolaser system**

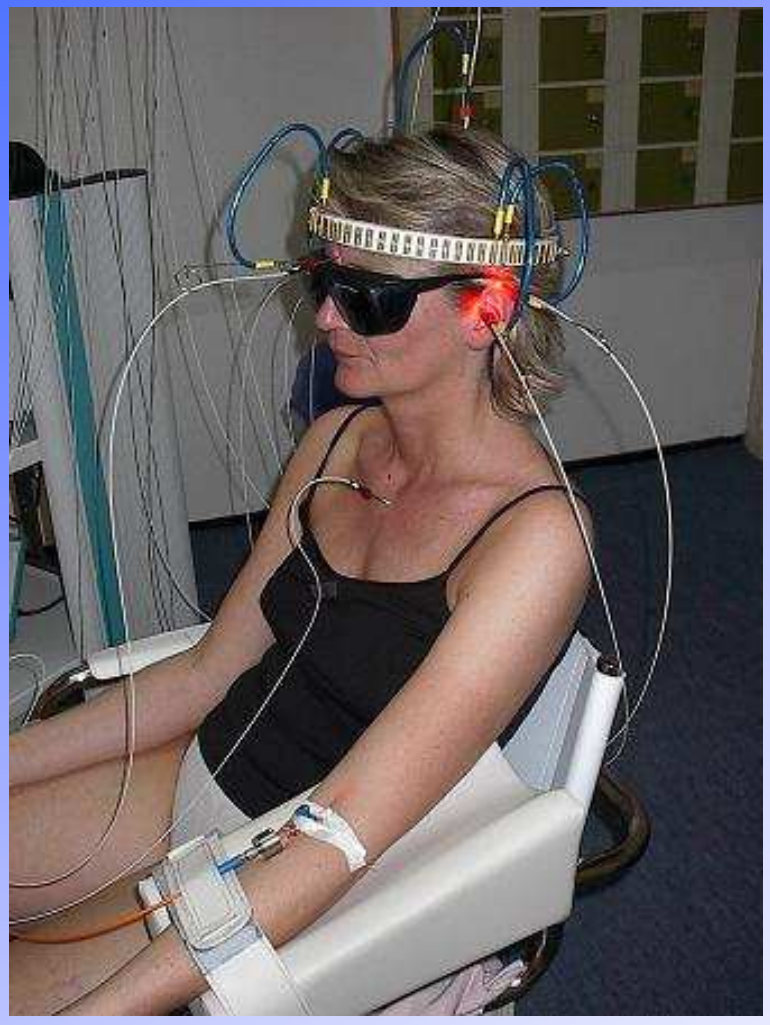


The intravenous laser blood irradiation for diabetes (blood acupuncture)



Diabetes mellitus with leg ulcer

The intravenous laser blood irradiation for allergy (blood acupuncture)



Treatment of severe allergie with combined laser therapy

Effects of intravenous laser light irradiation

Red laser

Stimulation of the immune system, improvement of blood viscosity

Green laser

Increased oxygen supply

Blue laser:

Increased NO, bactericidal effects

Yellow laser:

Detoxification, antidepressive

Effects of intravenous laser blood irradiation on mitochondria

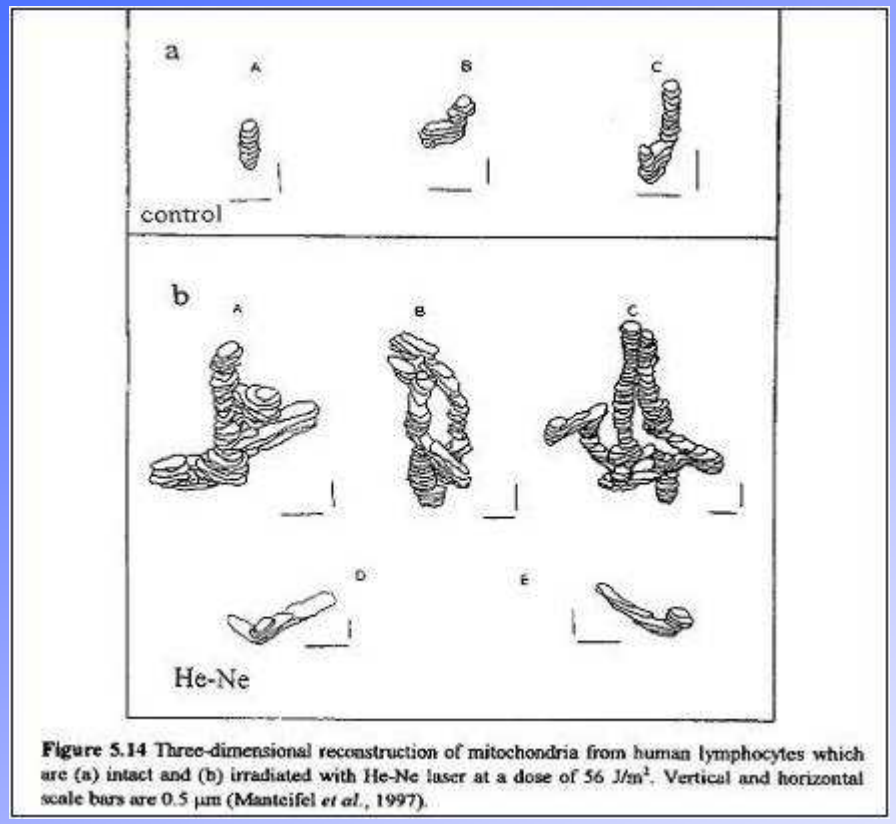


Figure 5.14 Three-dimensional reconstruction of mitochondria from human lymphocytes which are (a) intact and (b) irradiated with He-Ne laser at a dose of 56 J/m^2. Vertical and horizontal scale bars are 0.5 µm (Manteifel *et al.*, 1997).

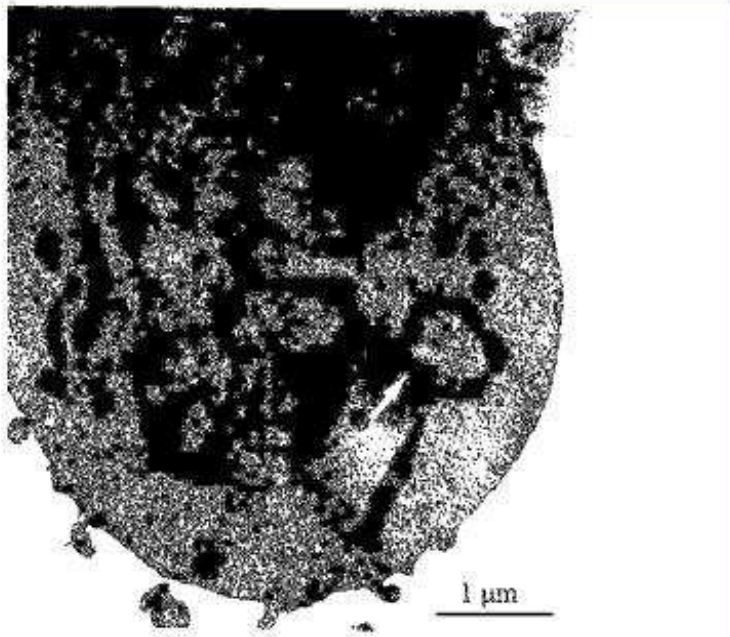


Figure 5.15 Electron micrograph of a section through an irradiated (632.8 nm, 56 J/m^2) human lymphocyte. The experimental details are described by Manteifel *et al.*, 1997. The arrow points to the ring-shaped mitochondrial profile that belongs to the giant mitochondrion (B) presented in Fig. 5.14b.

„Giant-mitochondria“ in human lymphocytes after laser irradiation (632 nm)

Ring-shaped mitochondria in human lymphocytes after laser irradiation (632nm)

Improvement of RNA-synthesis

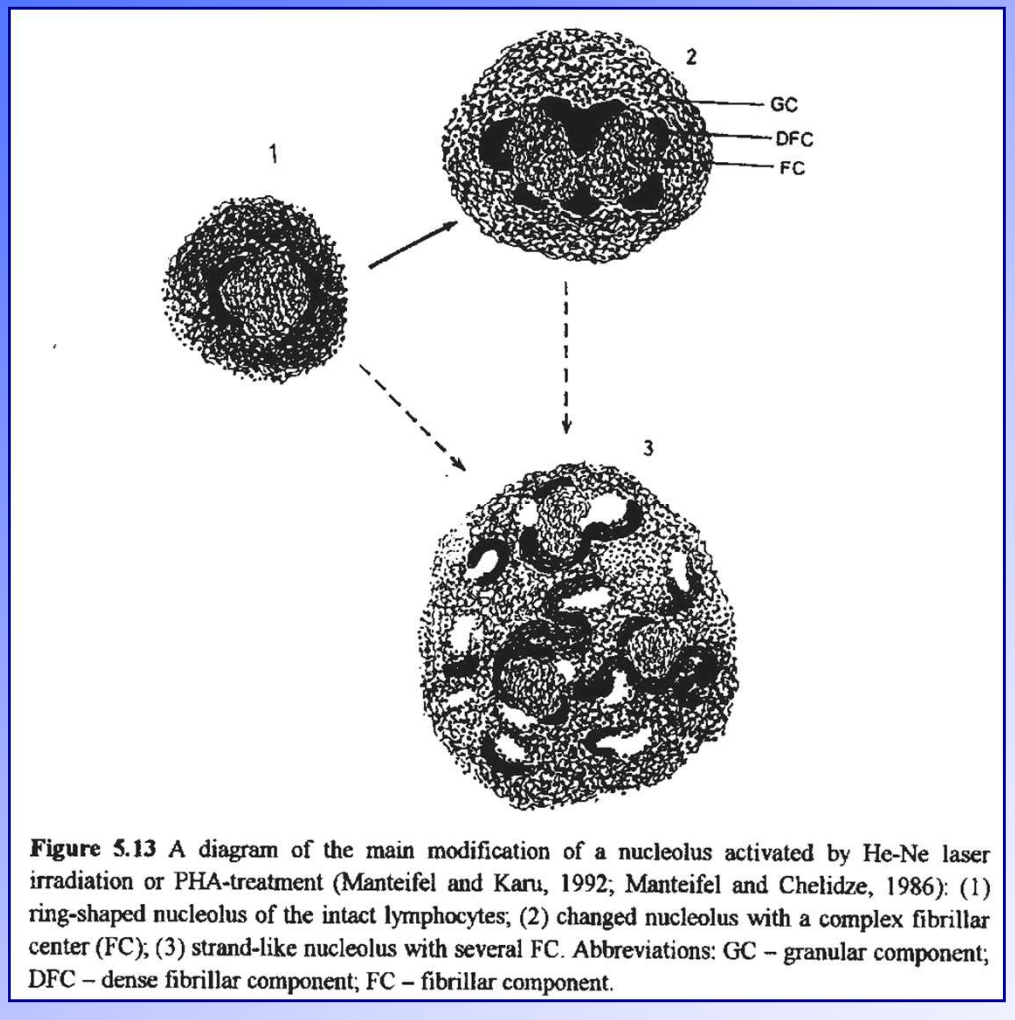


Figure 5.13 A diagram of the main modification of a nucleolus activated by He-Ne laser irradiation or PHA-treatment (Manteifel and Karu, 1992; Manteifel and Chelidze, 1986): (1) ring-shaped nucleolus of the intact lymphocytes; (2) changed nucleolus with a complex fibrillar center (FC); (3) strand-like nucleolus with several FC. Abbreviations: GC – granular component; DFC – dense fibrillar component; FC – fibrillar component.

Manteifel et al 1997

1. ringförmiger Nucleolus eines intakten Lymphocyten.

2. veränderter Nucleolus mit komplexen zentralen Fibrillen nach He-Ne Laser Bestrahlung.

3. strangartiger Nucleolus mit fibrilären Komponenten

Increased ATP production

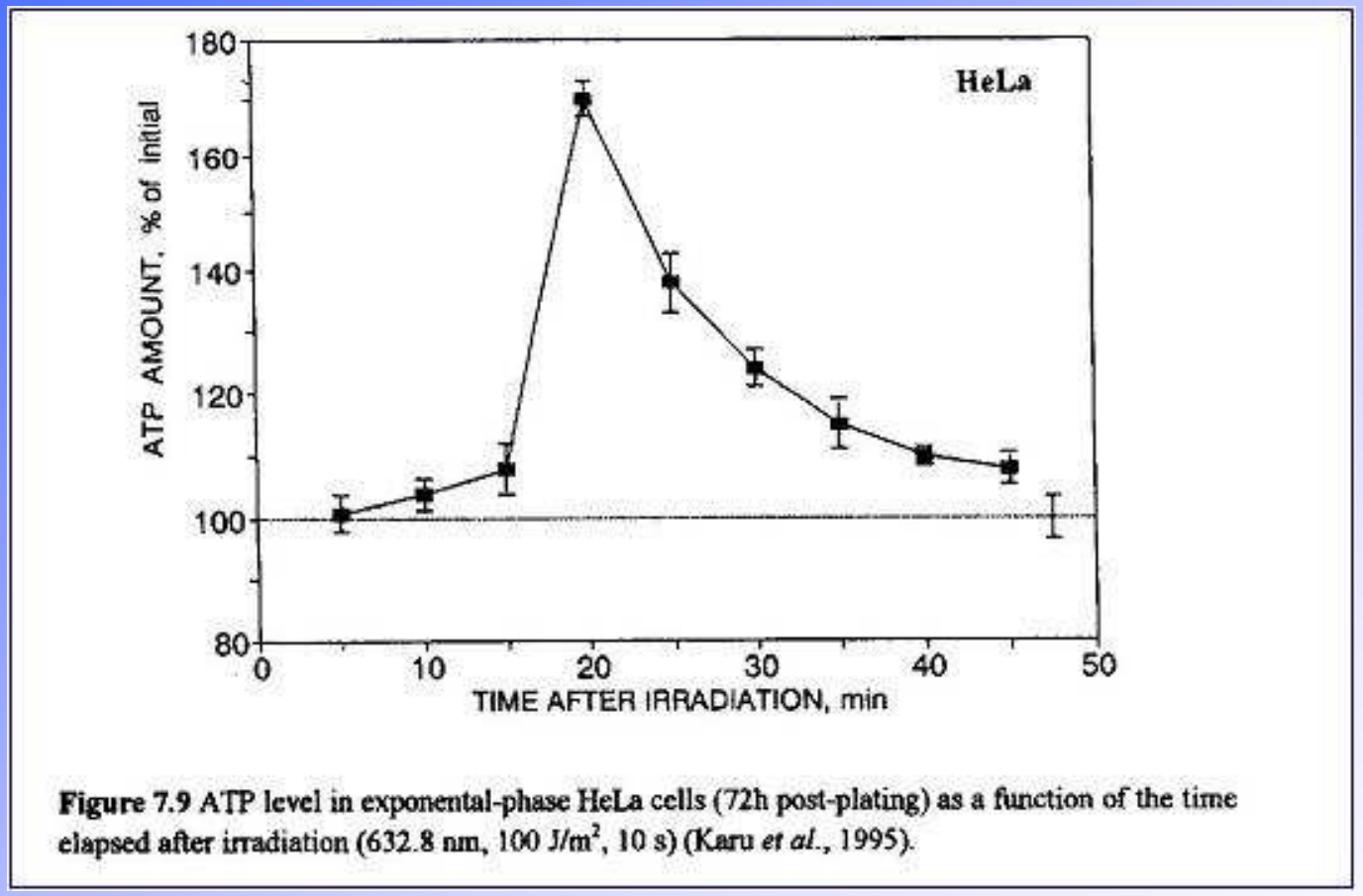
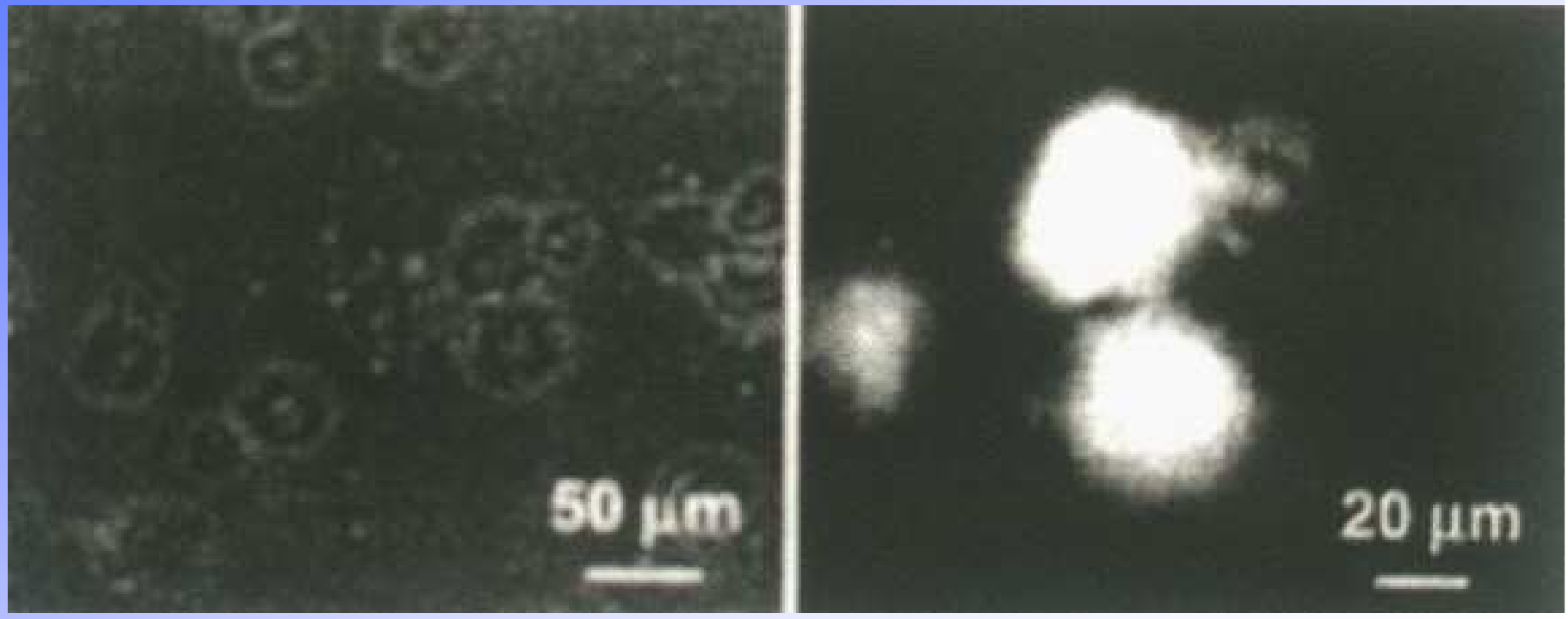


Figure 7.9 ATP level in exponental-phase HeLa cells (72h post-plating) as a function of the time elapsed after irradiation (632.8 nm, 100 J/m^2, 10 s) (Karu *et al.*, 1995).

ATP-Increase under laser irradiation (632 nm, red light) of a HeLa cell-culture

Immunological effects of iv-Laser

Activation of macrophages in fluorescent light



Immunological effects of iv-Laser

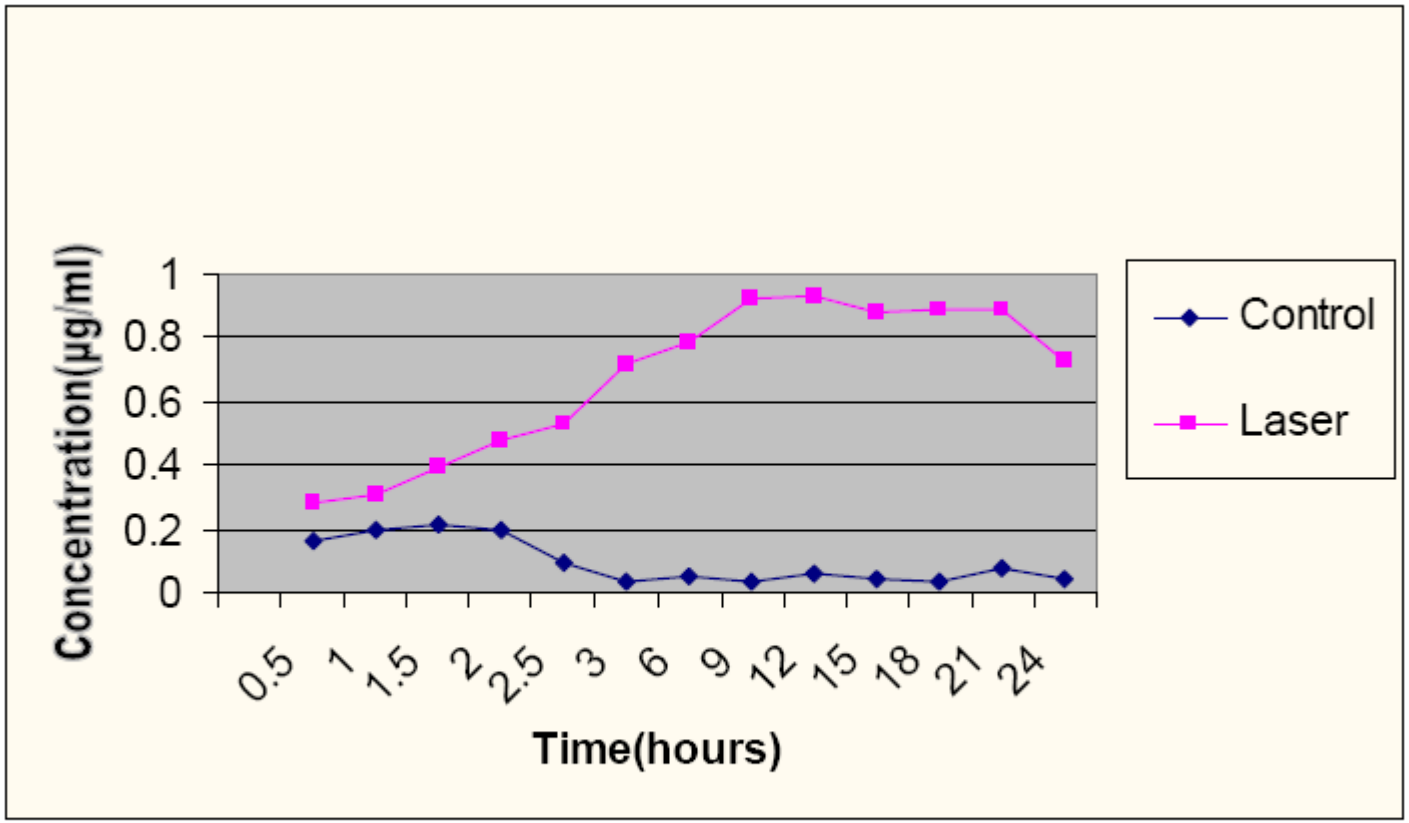


Figure (1) Concentration / Time relationship of IgM of both groups

Mouayed A. Hasan et al., Estimation of IgM & IgG values in the serum after intravenous irradiation of blood with diode laser

Immunological effects of iv-Laser

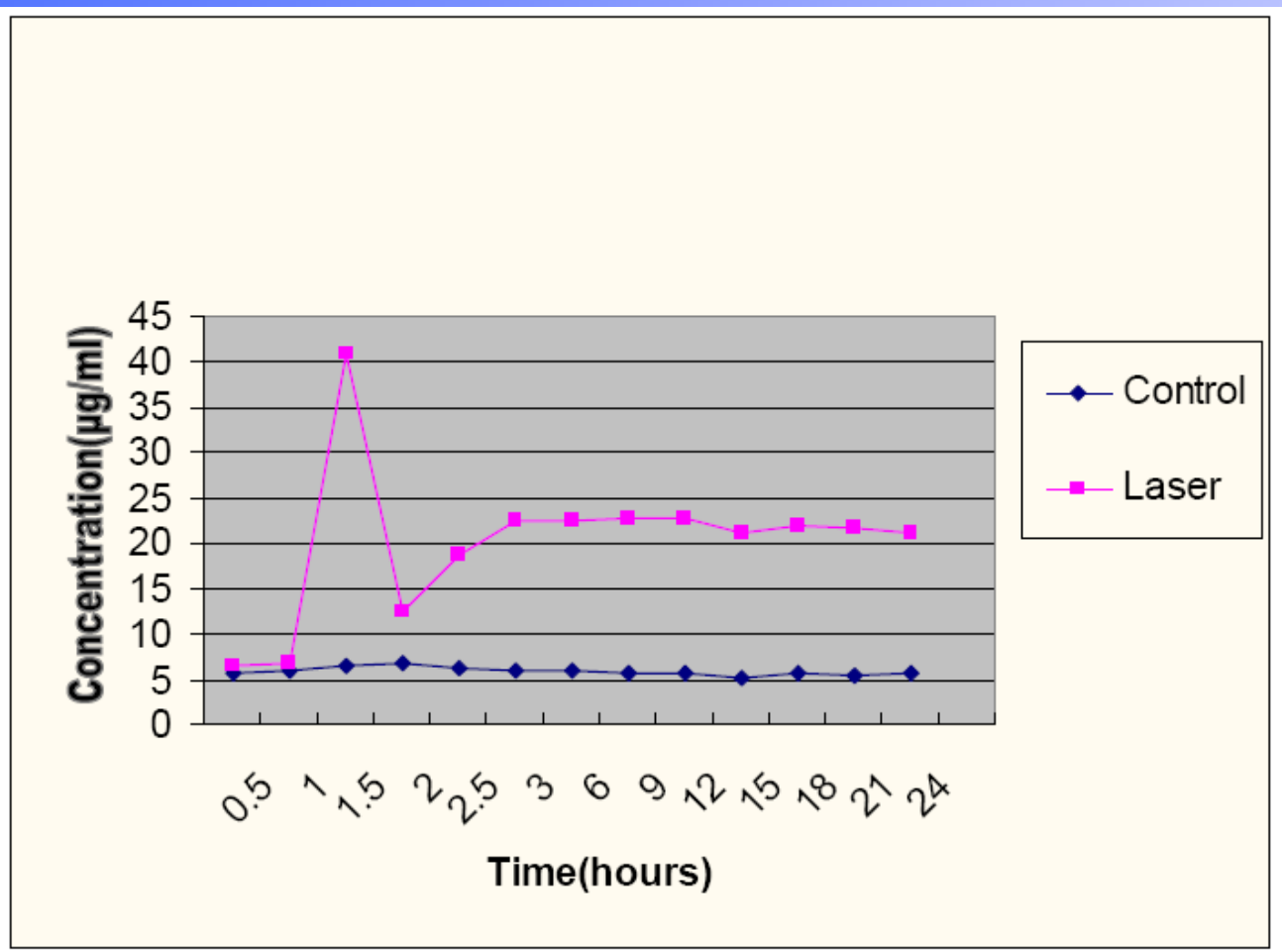
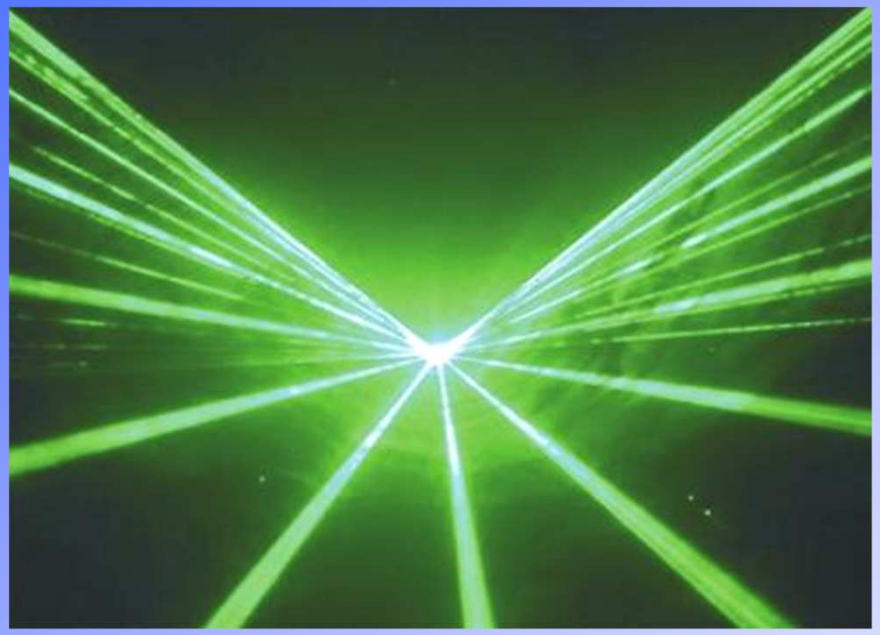
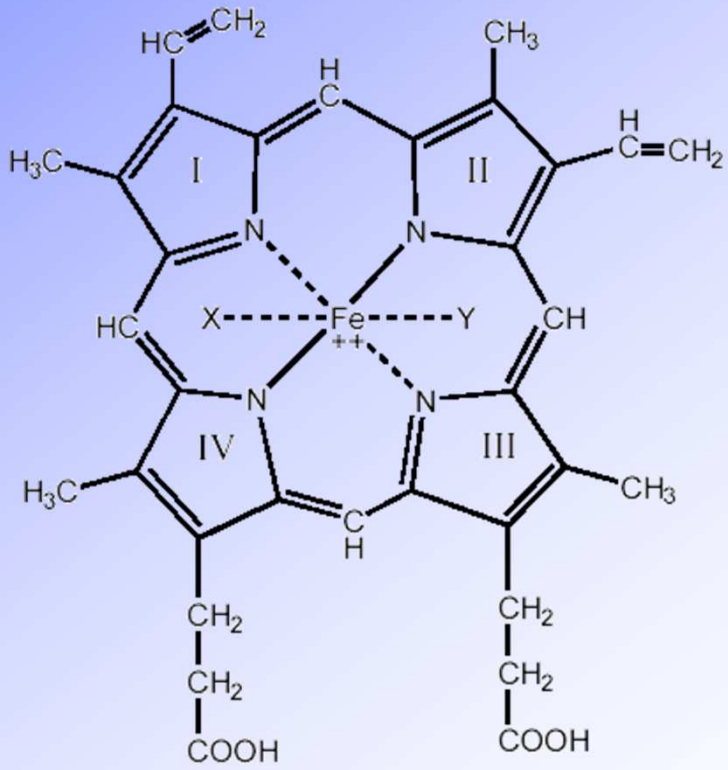


Figure (2) Concentration / Time relationship of IgG of both groups

Mouayed A. Hasan et al., Estimation of IgM & IgG values in the serum after intravenous irradiation of blood with diode laser

Effects of green laser light





Green laserlight binds to haemoglobin

Effects of the green Laser on mitochondria

Gen Physiol Biophys. 2005 Jun;24(2):209-20.

Mitochondrial alterations induced by 532 nm laser irradiation.

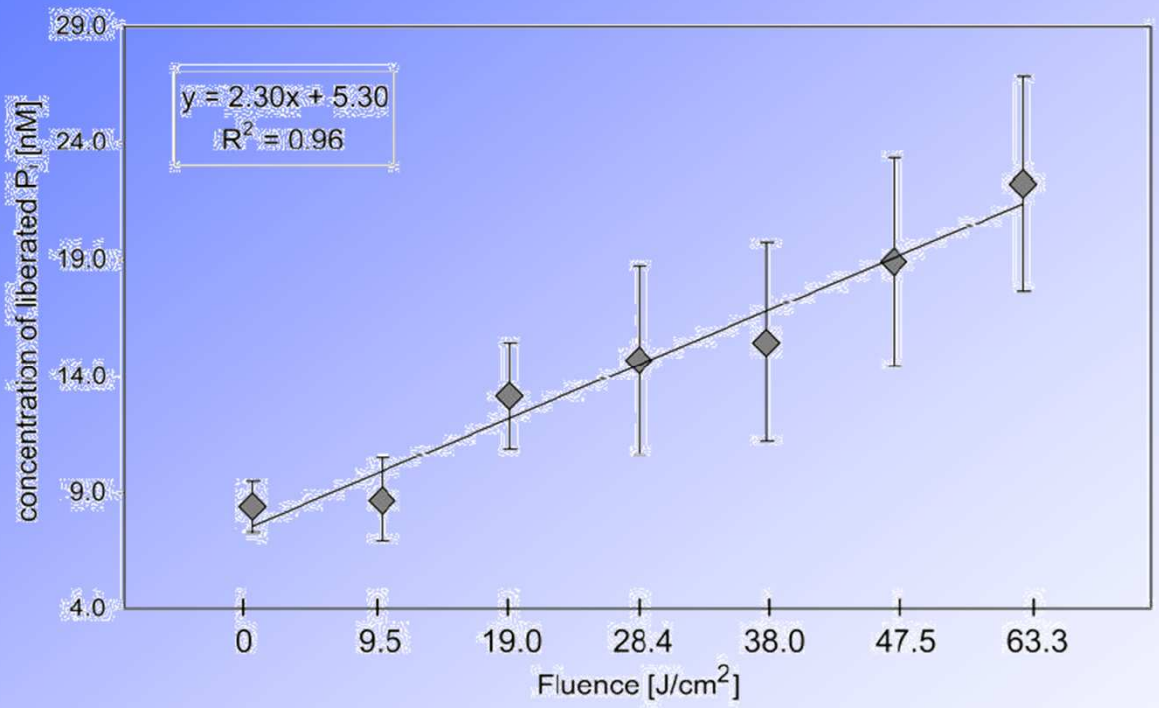
Kassak P, Przygodzki T, Habodaszova D, Bryszewska M, Sikurova L.

Division of Biomedical Physics, Faculty of Mathematics, Physics and Informatics, Comenius University, Mlynska Dolina F1, 842 48 Bratislava 4, Slovakia.

Another MTT assay was used for isolated mitochondria suspensions in order to examine the effect of green laser irradiation on stimulation of processes related to oxidative phosphorylation. It revealed *31.3%*-increase in MTT assay products in irradiated mitochondria as compared to controls

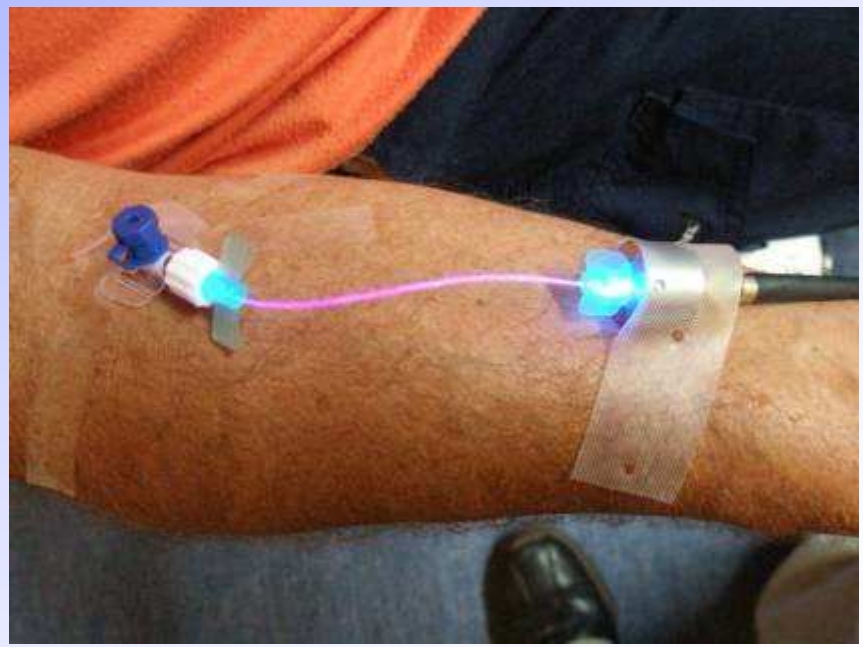
Green laserlight increases the production of ATP in the irradiated mitochondria for more than 30%.

Stimulation of sodium-potassium-ATP-ase of human erythrocytes with green laser irradiation

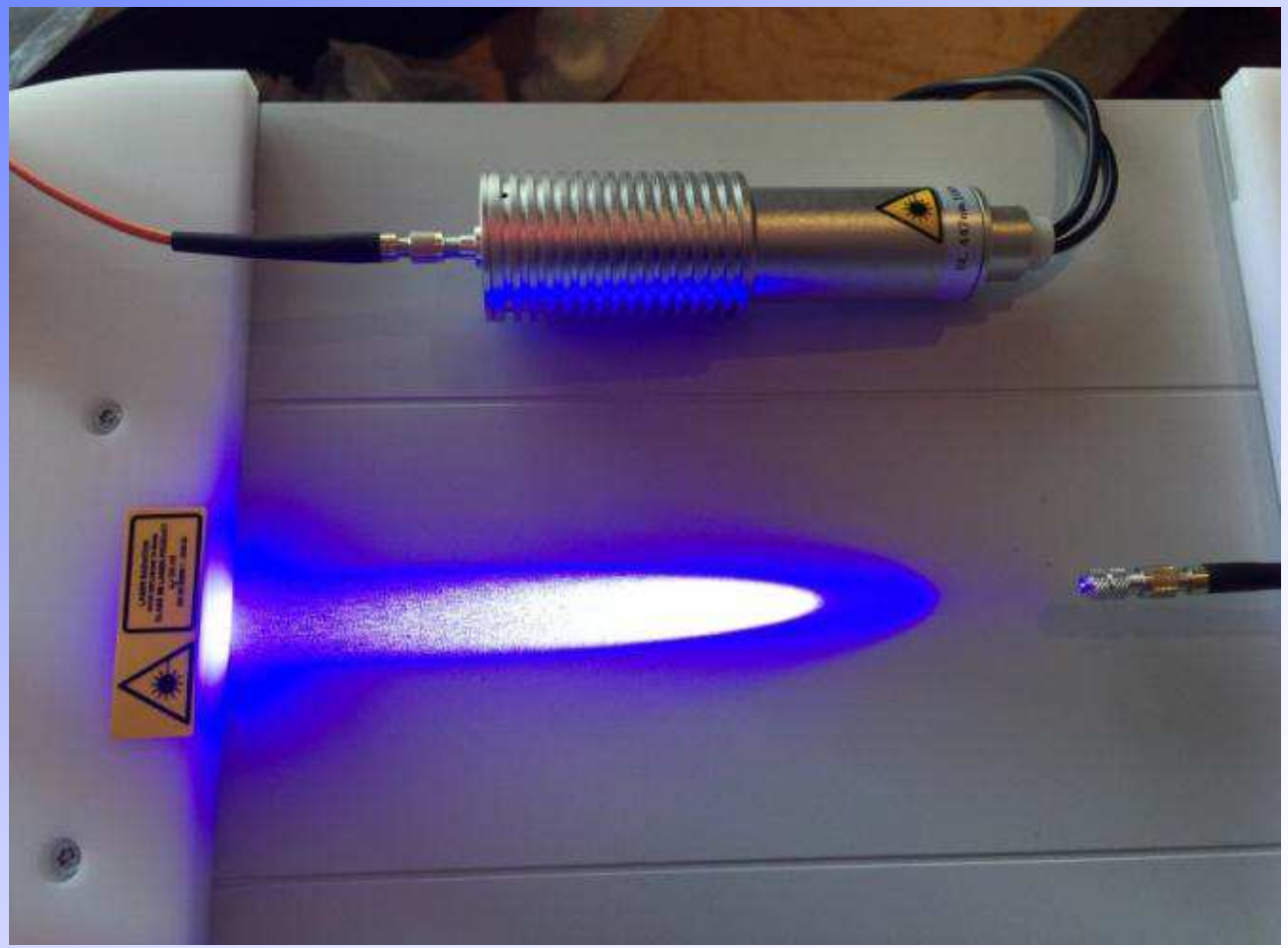


Kassak et al, Univ. Bratislava und Lodz, die Reaktion der Na + / K + - ATPase menschlicher Erythrozyten zu grünem Laserlicht Behandlung; Phys. Res. 5 / 2005

Application of blue laser light

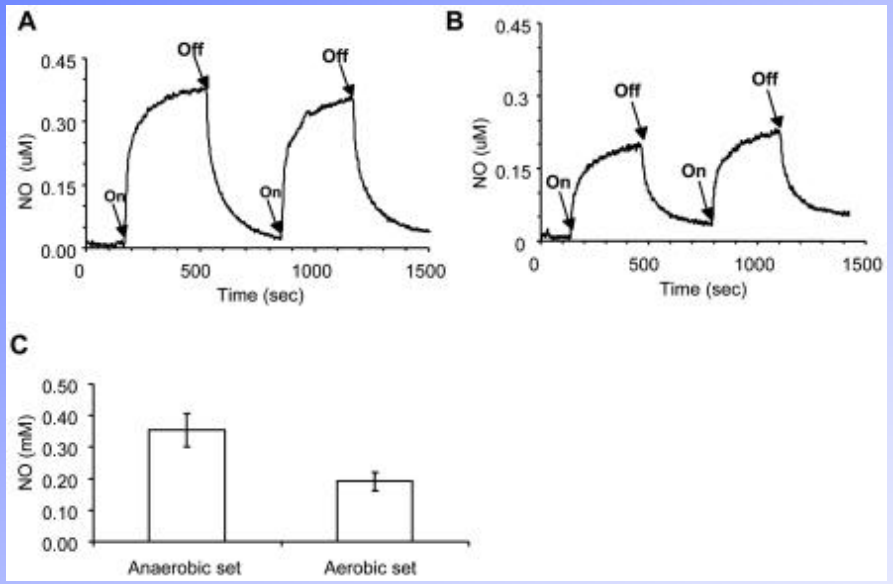


The new 447nm Blue Laser



The blue Laser

Irradiation with blue laser leads to increase of the release of nitric oxid (NO) from haemoglobin

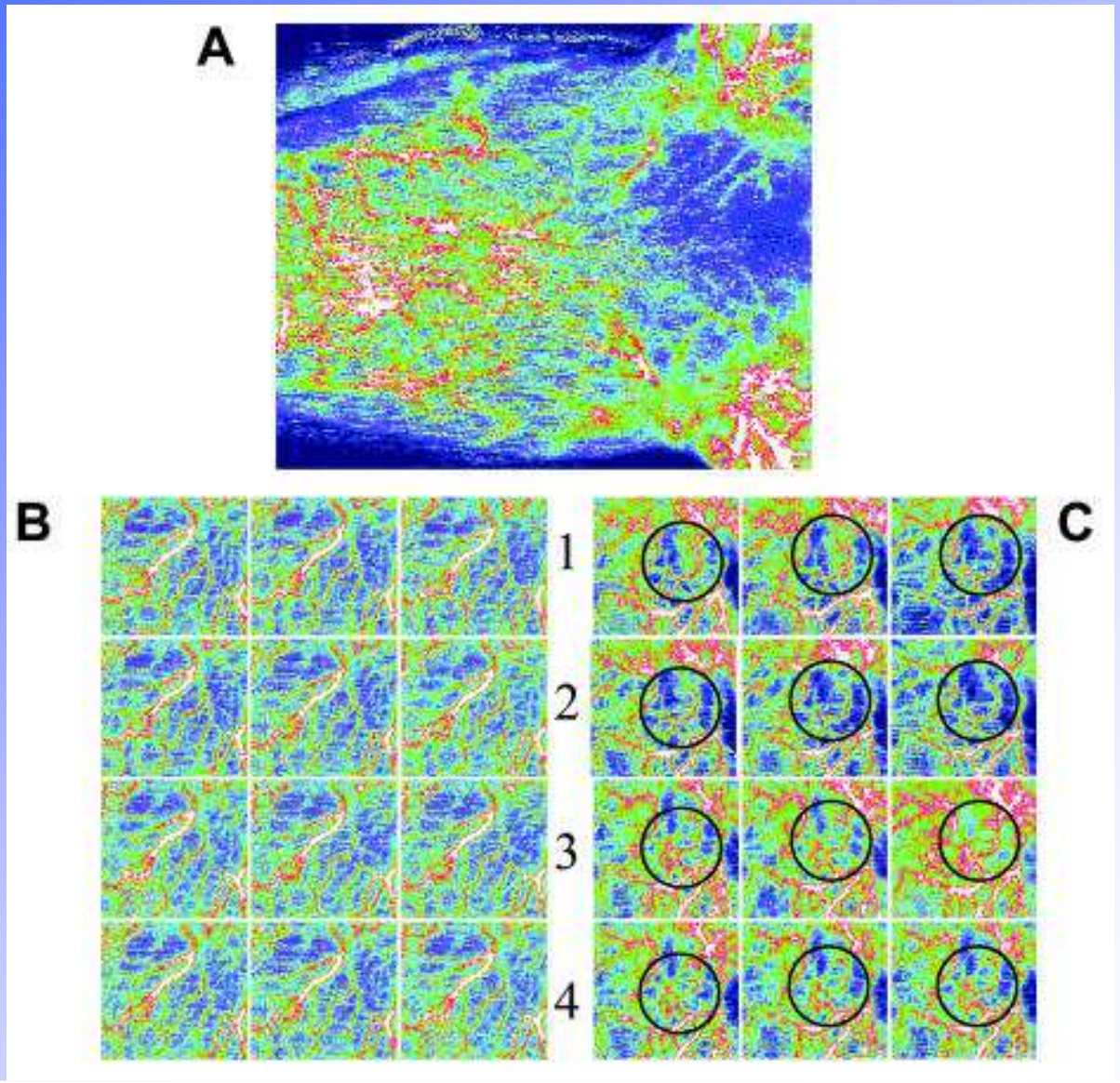


Kinetics of NO release and reabsorption triggered by He-Cd laser (40 mW) irradiation in erythrocytes enriched with NO-Hb.

(A) Anaerobic irradiation; (B) Aerobic irradiation; (C) Difference in NO concentration in solution due to switching the laser ON and OFF.

Mittermayr et al., Ludwig Boltzmann Institut Wien in Zusammenarbeit mit der Russian State Medical University in Moskau
Mol Med. 2007 Jan-Feb; 13 (1-2): 22-29

Blue laser increases nitric oxide (NO)



Therapeutic Strategies

Released Nitric Oxide(NO)

causes vasodilation and activates guanylate cyclase (GC), increasing cyclic guanine monophosphate (cGMP) levels, which stimulates stem cell proliferation/differentiation

Blue laser increases nitric oxide (NO)

- Emerging evidence suggests that increasing nitric oxide (NO) bioavailability or endothelial NO synthase (eNOS) activity activates telomerase and delays endothelial cell senescence.

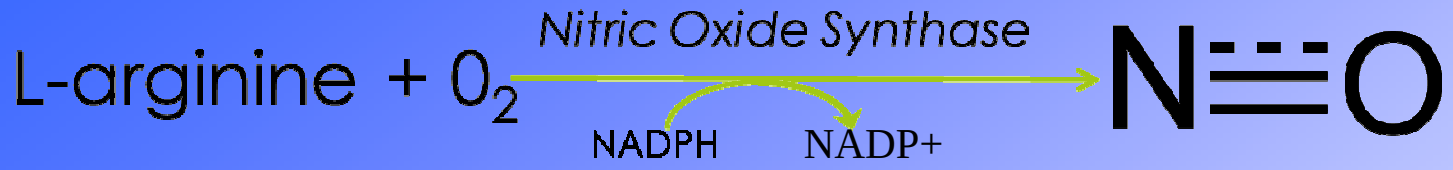
J Cell Sci. 2006 Jul 15;119(Pt 14):2855-62.

Blue laser increases nitric oxide (NO)

- J Cell Sci. 2006 Jul 15;119(Pt 14):2855-62.

  Nitric oxide and mitochondrial biogenesis.

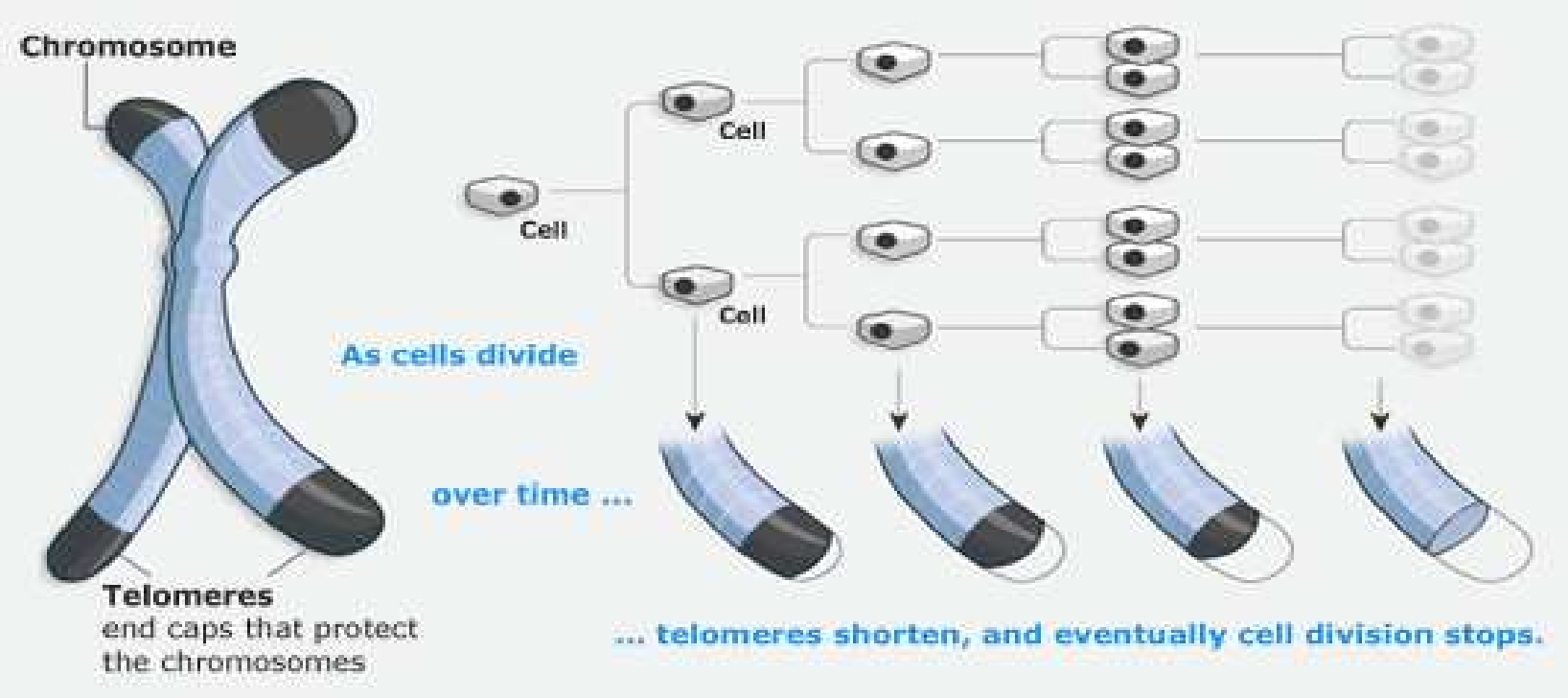
Chronic, smaller increases in NO levels stimulate mitochondrial biogenesis in diverse cell types



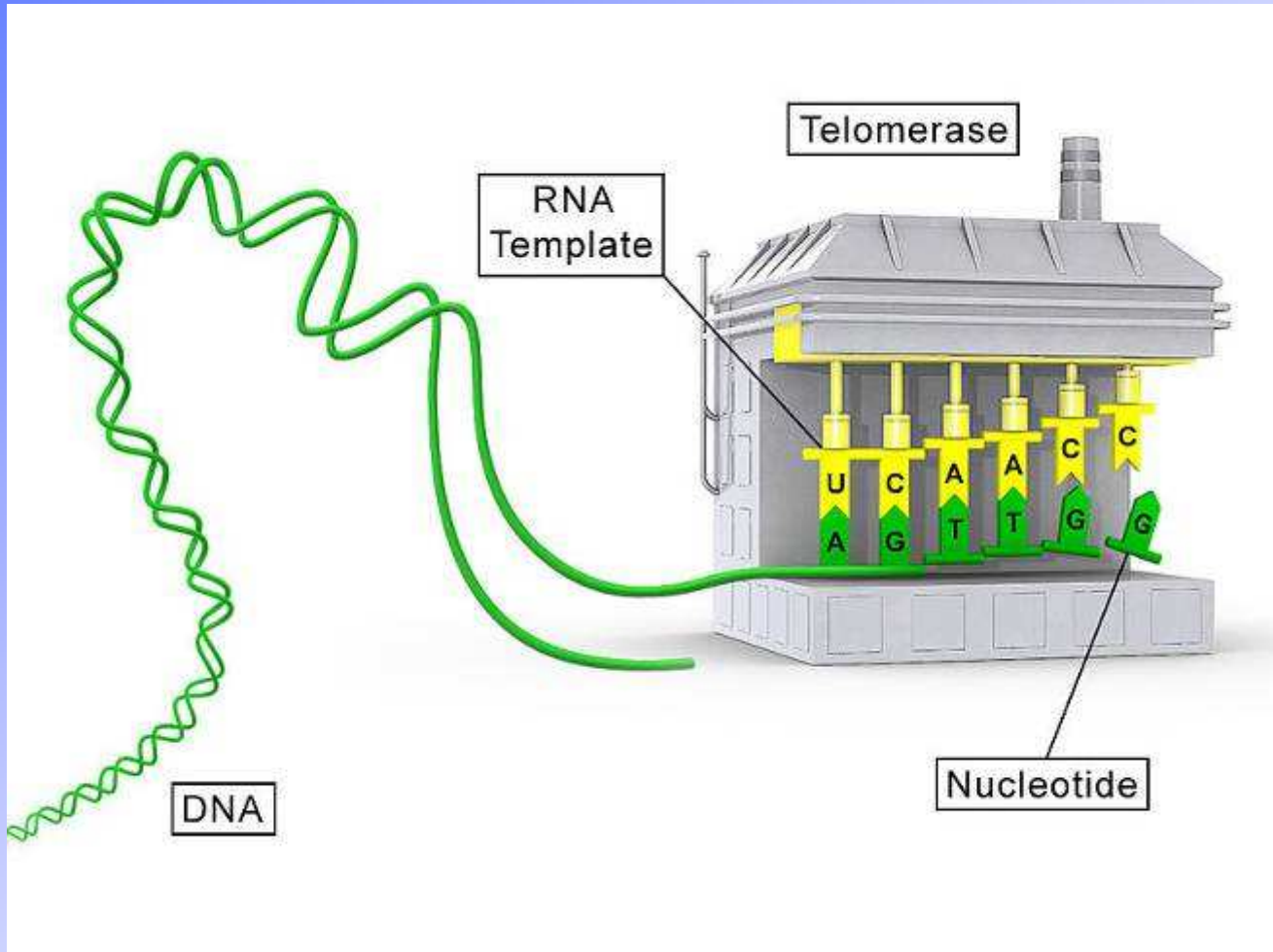
Nitric Oxide Mechanism Of Actions

1. **Now known to be a growth, immune, and neuromodulator, as well as a stimulator of stem cell proliferation and it has a critical roles in analgesia, vasodilation and angiogenesis through c-GMP pathway.**
2. **Also it has anti-cancer, anti-inflammatory and anti-microbial activities by reacting with ROS and generating cytotoxic Peroxynitrite .**
3. **Nitroglycerin , L-arginine and other NO donors are widely prescribed medications**

Effects on Telomeres



Effects on Telomeres



Effects on Telomeres

Nitric Oxide Activates Telomerase and Delays Endothelial Cell Senescence

Mariuca Vasa, Kristin Breitschopf, Andreas M. Zeiher, Stefanie Dimmeler

The repeated addition of the NO donor S-nitroso-penicillamine significantly reduced EC senescence and delayed age-dependent inhibition of telomerase activity, whereas inhibition of endogenous NO synthesis had an adverse effect. Taken together, our results demonstrate that telomerase inactivation precedes EC aging. NO prevents age-related downregulation of telomerase activity and delays EC senescence.


Nitric Oxide
Increases energy production
Increases blood flow to vital organs
Boosts exercise perform-ance & endurance
Manages diabetes by regulating insulin
Prevents diabetic complica-tions
Lowers blood pressure & LDL (bad) cholesterol
Reverses atheroscler otic plaque formation
Reverses kidney disease/ failure
Improves sexual perform-ance
Offsets damage from tobacco use
Enhances memory & cognitive function
Anti-ageing effects

The Blue laser

Mikrocirculation problems in

- Macroangiopathy, Microangiopathy
- Diabetes mellitus
- coronary heart disease
- Fat metabolism disturbances
- Hypertension
- Kidney failure
- Old humans
- After transplantations

NO is in the view of today the main physiolocical regulator of the microcirculation and is infuencing the cGMP-metabolism.

In the blood NO is not free but will bind immediately to haemoglobin.

Der HbNO-complex is photosensitive and reacts on laser irradiation.

Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

The intravenous laser blood irradiation

General effects:

- Improvement of the general performance

- Improved Sleep

- Positive effect on depression

- improvement of the immune system

Typical diseases to treat with laser blood irradiation

- Diabetes mellitus
- Chronic liver diseases
- Lipometabolism disorders
- Chronic pain syndromes
- Rheumatoid Arthritis
- Polyneuropathy
- Chronic inflammatory diseases
- Cancer (photodynamic therapy)
- Fibromyalgia
- Hypertension
- Tinnitus
- Macula degeneration
- Multiple Sclerosis
- Chronic fatigue syndrome
- allergies and eczemas

Laserclinic Dr. med. Dipl. chem.
Michael Weber, Germany

The blue laser in ENT

Patient, 45 y., acute hearing loss, medication without effect

Improvement ca. 50 % after 4 sessions

First yellow laser worldwide:

- after the development of red, infrared, green and blue lasers, yellow was the last missing prismatic color
- yellow additionally stimulates the mitochondrial respiratory chain at complex III (cytochromes)
- yellow has an detoxifying effect
- yellow has an anti- depressive effect
- The yellow laser stimulates the strongest natural photosensitizer – Hypericin out of St. Johns wort – and is therefore the most efficient laser in photodynamic cancer therapy.

Diabetes

Used by permission of the Czech Society for the Use of Laser in Medicine, www.laserpartner.org

Ambulatory Application of Combined Laser Therapy in Patients with Diabetes Mellitus and Dyslipidemia

Laser Partner, 17.5.2002
T.V. Kovalyova, Out-Patient Department of the 2-nd Municipal Clinical Hospital, Izhevsk, Russia
e-mail: laser@udm.ru

Abstract

This study sought to evaluate the dynamics of lipid metabolism in blood plasma and clinical efficiency of combined laser therapy (CLT) in patients with diabetes mellitus.

Studies

The effect of intravenous laser on metabolism and diabetes

Die Dynamik des Lipidprofils (mmol/l bei Patienten mit Diabetes mellitus ($M \pm m$)

Zeitliche Einleitung der Untersuchung	Patientengruppen	TG (0,40 - 1,53)	TC (3,9 - 5,2)	LDL-c (3,0 - 4,5)	HDL-c (1,5 - 3,3)	AR (2,5 - 3,5)	LDL/HDL-c ratio (up to 5,0)
Zu Beginn	I	2,11 ± 0,12	7,92 ± 0,44	7,80 ± 0,43	0,91 ± 0,05	7,70 ± 0,43	8,57 ± 0,48
	II (I)	2,14 ± 0,10	8,20 ± 0,38	7,87 ± 0,37	0,99 ± 0,04	7,28 ± 0,27	7,94 ± 0,30
Nach der Therapie	II (2)	2,51 ± 0,11	7,98 ± 0,37	7,90 ± 0,37	1,14 ± 0,05	6,00 ± 0,23	6,92 ± 0,26
Während 3 Wochen	II (3)	1,69 ± 0,07	5,31 ± 0,25	6,63 ± 0,31	1,42 ± 0,06	2,73 ± 0,10	4,66 ± 0,18
	I	2,10 ± 0,12	7,91 ± 0,44	7,79 ± 0,44	0,92 ± 0,05	7,59 ± 0,42	8,46 ± 0,47
Veränderung Zeitbezug	(?)	**1,3**	**1,54**	**1,2**	**1,4 (?)**	**3,3**	**2,0**
	p (1 - 2)	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05
	p (2 - 3)	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05
	p (1 - 3)	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05	> 0,05
Während 3 Monaten:	II	1,72 ± 0,08	5,42 ± 0,25	6,21 ± 0,29	1,61 ± 0,07	2,37 ± 0,09	3,85 ± 0,18
Vor der Therapie	II	1,51 ± 0,07	5,27 ± 0,24	5,42 ± 0,25	1,67 ± 0,07	2,15 ± 0,10	3,24 ± 0,15
während 3 Wochen	I	2,12 ± 0,12	7,94 ± 0,44	7,84 ± 0,44	7,90 ± 0,05	7,82 ± 0,44	8,71 ± 0,49
Während 6 Monaten:	II	1,62 ± 0,07	6,01 ± 0,28	5,82 ± 0,27	1,39 ± 0,06	3,30 ± 0,15	4,18 ± 0,19
Vor der Therapie	II	1,54 ± 0,07	5,28 ± 0,24	5,70 ± 0,26	1,42 ± 0,06	2,70 ± 0,12	4,00 ± 0,18
während 3 Wochen	i	2,12 ± 0,12	7,89 ± 0,44	7,80 ± 0,44	0,91 ± 0,05	7,67 ± 0,43	8,57± 0,48

I= Kontrollgruppe (n=22) ohne CLT- Behandlung

II= Hauptgruppe (n=37) mit Behandlung

Blutzuckerwerte ($M \pm m$)

Beobachtungsperioden	Patientengruppen	Glukose, mmol/I	
		NIDDM	IDDM
Zu Beginn	I	14,43 ± 0,86	9,97 ± 1,02
Nach der Therapie	II (1)	14,21 ± 0,85	10,46 ± 1,46
	II (2)	11,27 ± 0,67	11,82 ± 1,65
Während 3 Wochen	II (3)	6,01 ± 0,35	7,45 ± 1,04
	I	14,32 ± 0,86	10,12 ± 1,04
	p (1-2)	> 0,05	> 0,05
	p (2-3)	< 0,05	< 0,05
	p (1-3)	< 0,05	< 0,05
Während 3 Monaten:	II	7,98 ± 0,47	6,38 ± 0,89
Vor der Therapie	II	6,03 ± 0,36	5,72 ± 0,79
während 3 Wochen	I	14,41 ± 0,86	10,24 ± 1,05
In 6 Monaten:	II	6,81 ± 0,40	5,89 ± 0,82
Vor der Therapie	II	6,02 ± 0,36	5,54 ± 0,77
während 3 Wochen	i	14,37 ± 0,86	10,31 ± 1,06

I= Kontrollgruppe (n=30) ohne CLT- Behandlung

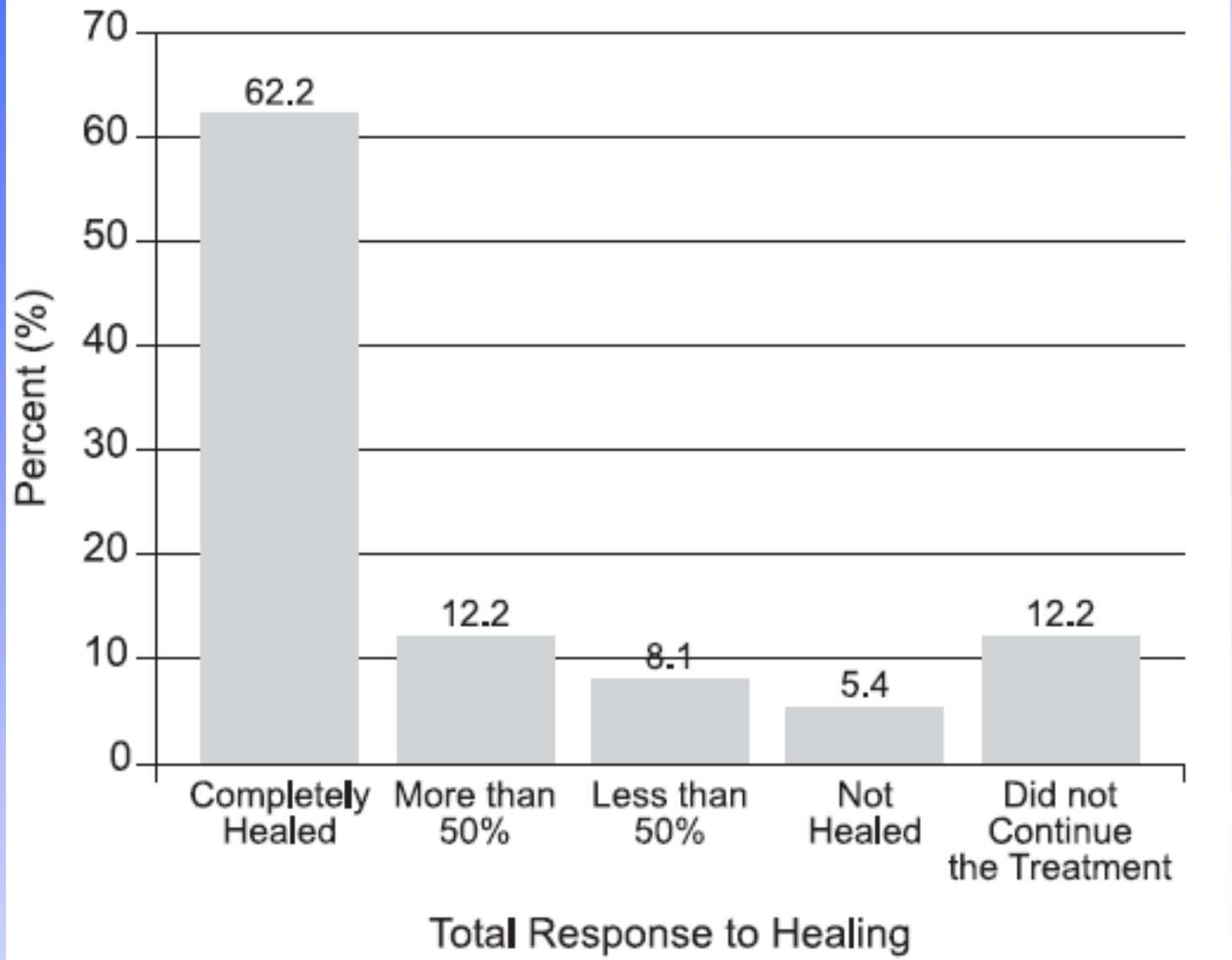
II= Hauptgruppe (n=37) mit Behandlung

Evaluating the Efficiency of Low Level Laser Therapy (LLLT) in Combination With Intravenous Laser Therapy (IVL) on Diabetic Foot Ulcer, Added to Conventional Therapy

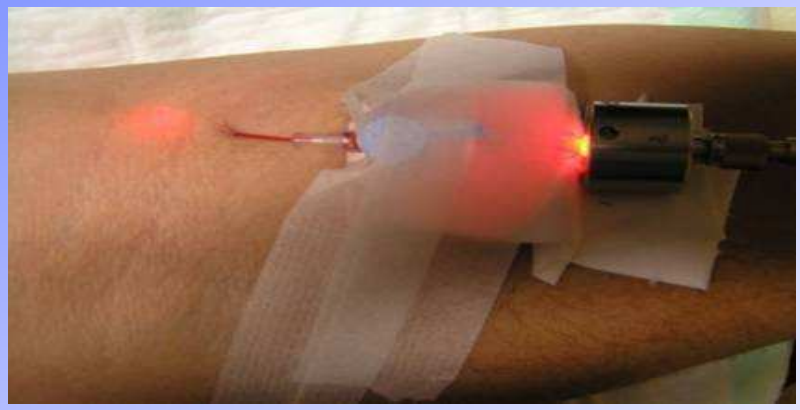
Soheila Mokmeli MD1, Mahrokh Daemi MD2, Zahra Ayatollahzadeh Shirazi MD1
Fatemah Ayatollahzadeh Shirazi PhD3, Mitra Hajizadeh MD4

1Department of Medical Laser, Milad Hospital, Social Security Organization, Tehran, Iran
2Department of Surgery, Sina Hospital,Tehran University of Medical Sciences, Tehran, Iran

The total response to healing (*Diagram 2*)



Diabetes mellitus, metabolic syndrome



New Diabetes study 2008
(Dr. Andreas Wirz, Basel, Switzerland)

- **Protocol**: 100 diabetic patients were treated with 10 sessions red and green lasers intravenously with the new insuline frequency of 3023 Hz
- **Results**: positive effects in 75 %

  Reduction of HbA1c of 1,5 %

(this study was presented at the international congress for acupuncture in Davos, Switzerland, February 2008, will be published soon)

The Hypoglycemic Effect of Intravenous Laser Therapy in Diabetic Mellitus Type 2 Patients; A Systematic Review and Meta-analyses

Kazemikhoo N1, 2, Ansari F2 and Nilforoushzadeh2
1 1Skin Diseases and Leshmaniasis Research Center, Isfahan University of Medical Sciences, Isfahan, Iran 2 Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran
12/2015

Studies

R. Chen, 2000 (Chen, Chen, Xie, Chen, & Zhang, 2000) 10 67.3 93.3
He-Ne laser extravacular irradiation therapy instrument, O—4Omw, 632.8nm, 60 min
197.1±73.8 106.2±540

T.V. Kovalyova, 2002 (Kovalyava, 2002) 27 57.3 13
ILBI intravenously 2 mW,l =0,63 mm 405-nm 15-30 min
259.74±15.48 255.78±15.3

N. KazemiKhoo, 2013 (N Kazemi Khoo et al., 2013) 9 60.63 55
ILBI intravenously 1.5 mW, continuous, 405-nm 30 min
190±17 165±20

Summary

The result of this meta-analysis suggests that Intravenous laser therapy decreases blood glucose level in diabetic type 2 patients significantly.
Immediately after ILIB blood glucose decreases 14 mgr/dlit. It seems that laser irradiation may have an effect on arginine and increase nitric oxide (NO) production.

Arginine affects the release of hormone like glucagon, insulin, prolactin, adrenal catecholamins and growth hormone [9]. It decreases tissue hypoxia, stimulates oxygenation and normalizes tissue metabolism [10

INTRAVENOUS LASER BLOOD IRRADIATION IN SPORTS MEDICINE

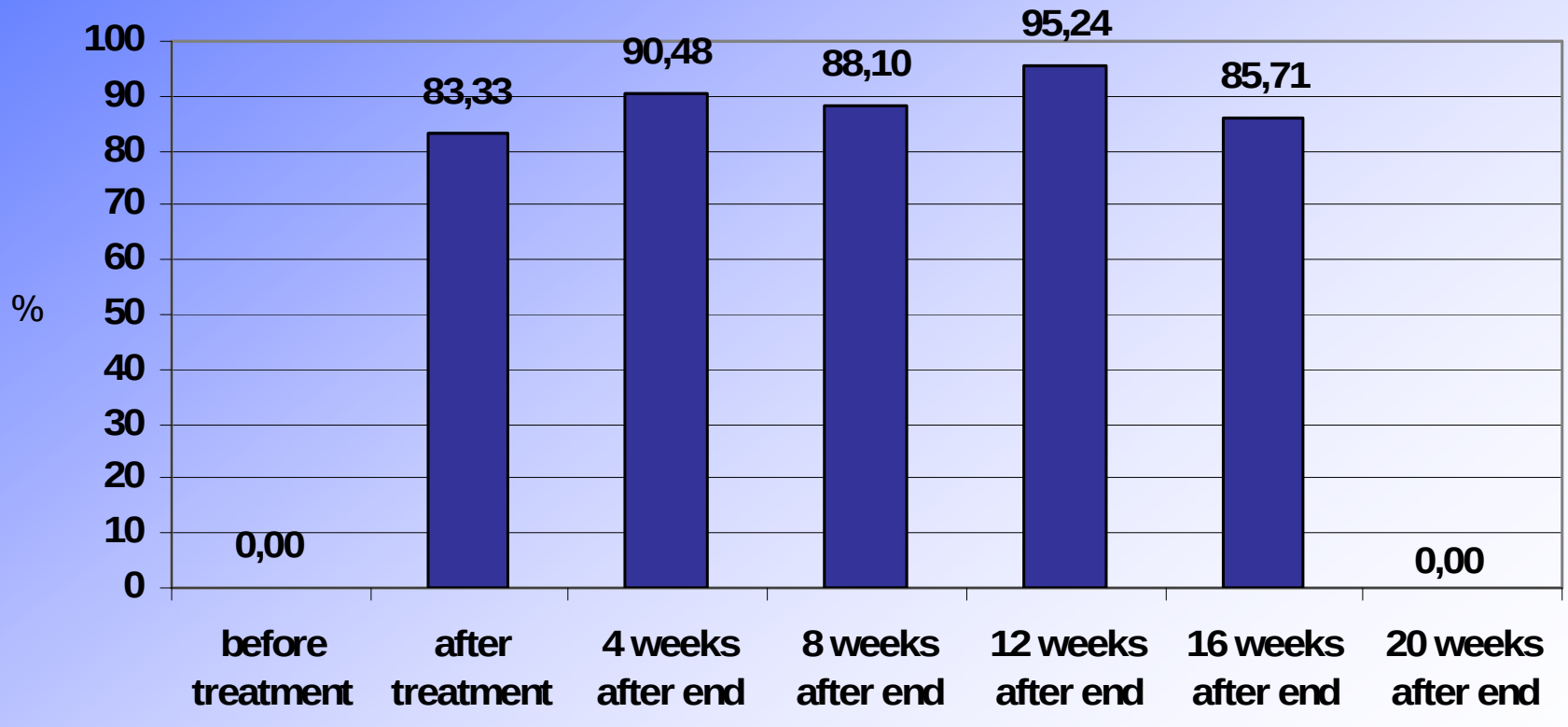
Dr. Med. Francesco Raggi,
Dr. Med. Giuseppe Vallesi
Terni, Italy

MEDICALFUTURE

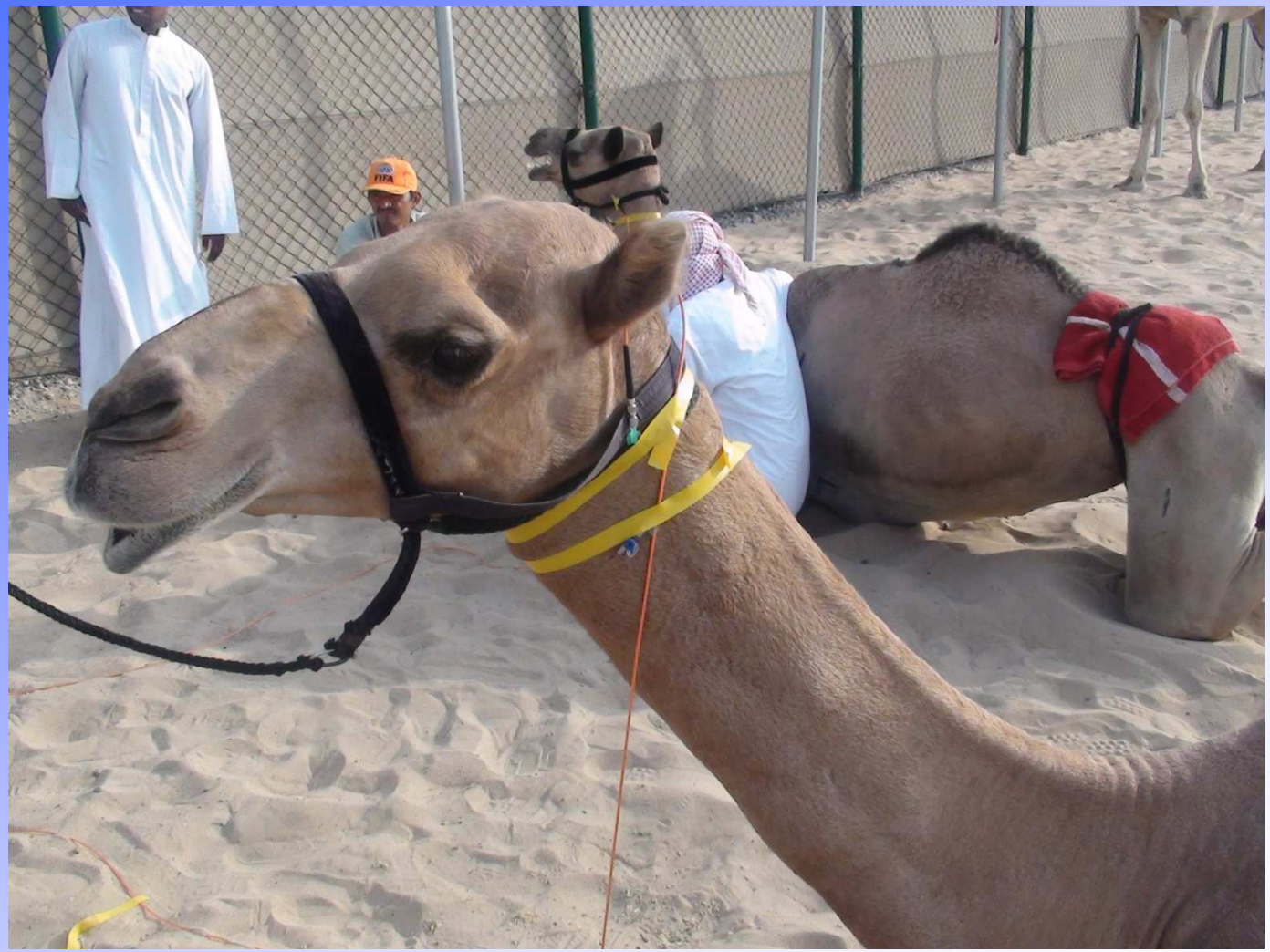
Results

Endurance tests:

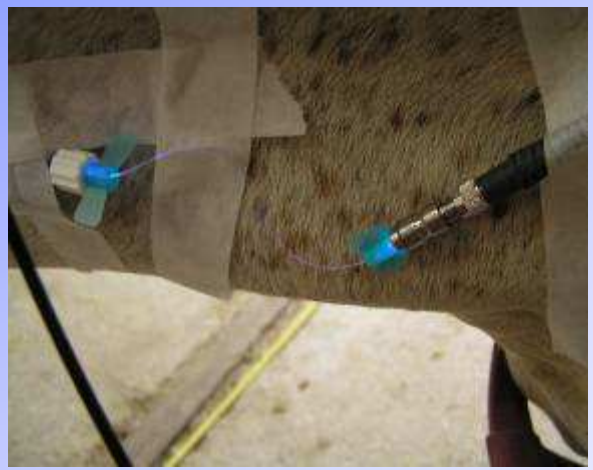
Cord Jumping time % variation (mean)



Race camels in Dubai

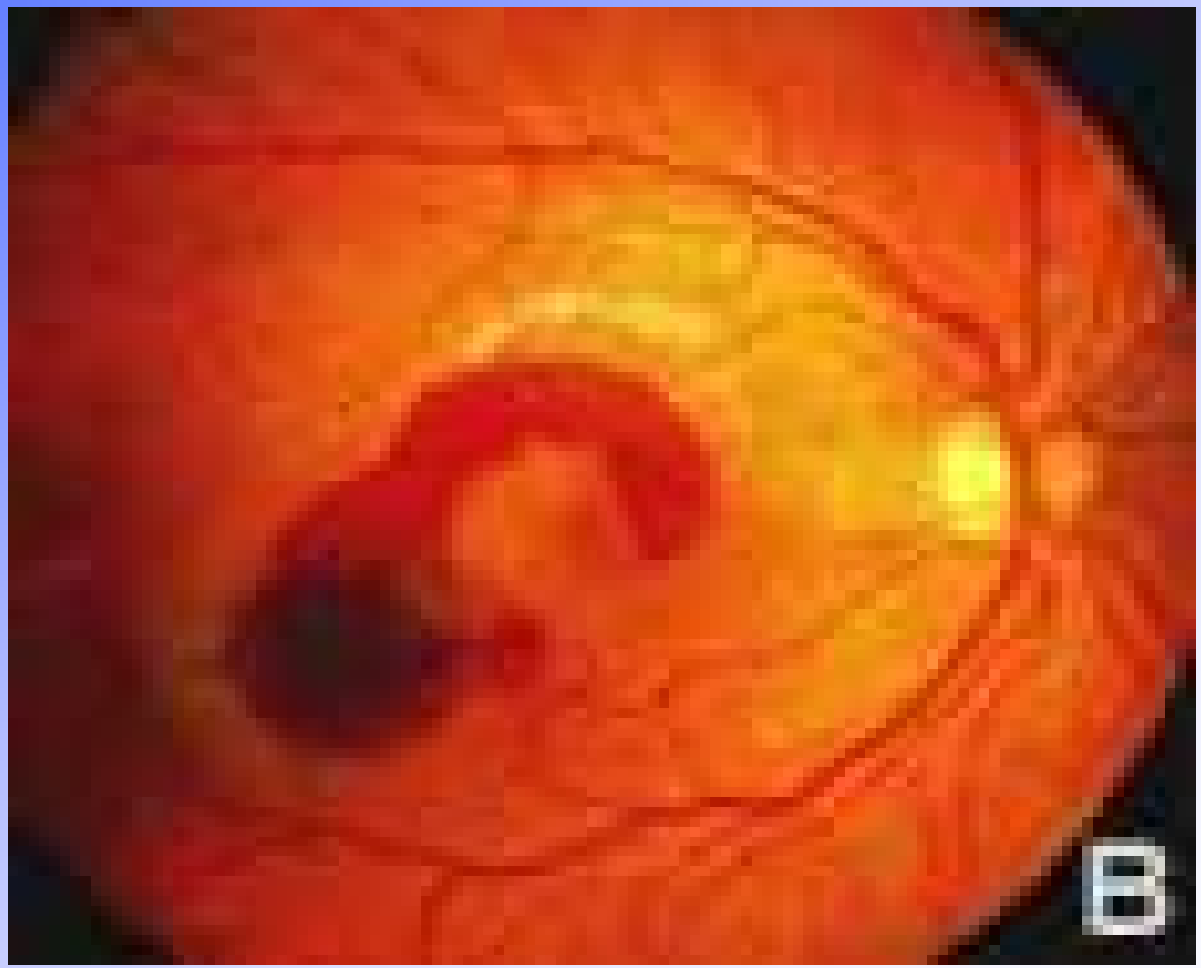


Race horses

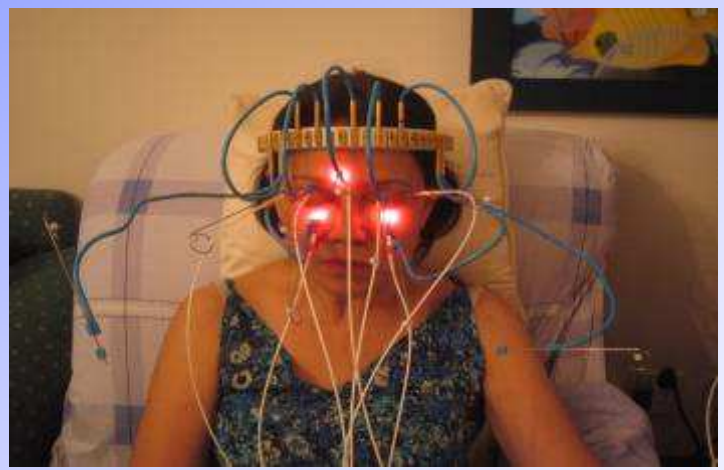


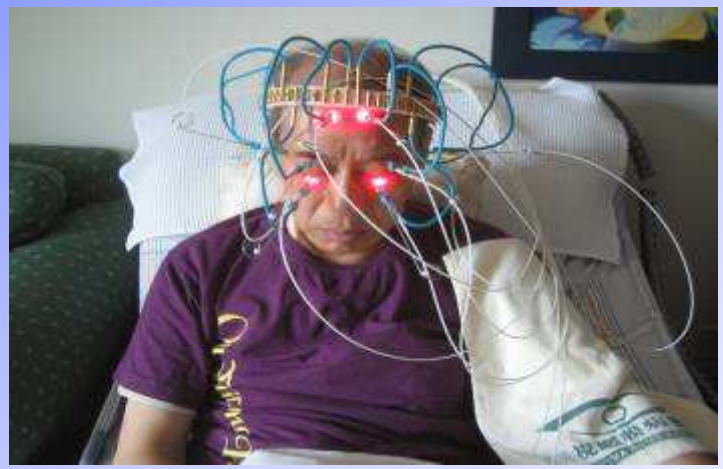
Sheik Nasser, Prince of Bahrain

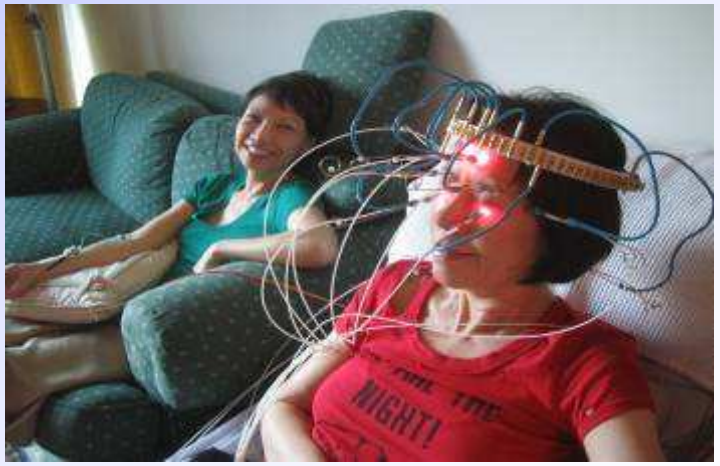
Macular degeneration



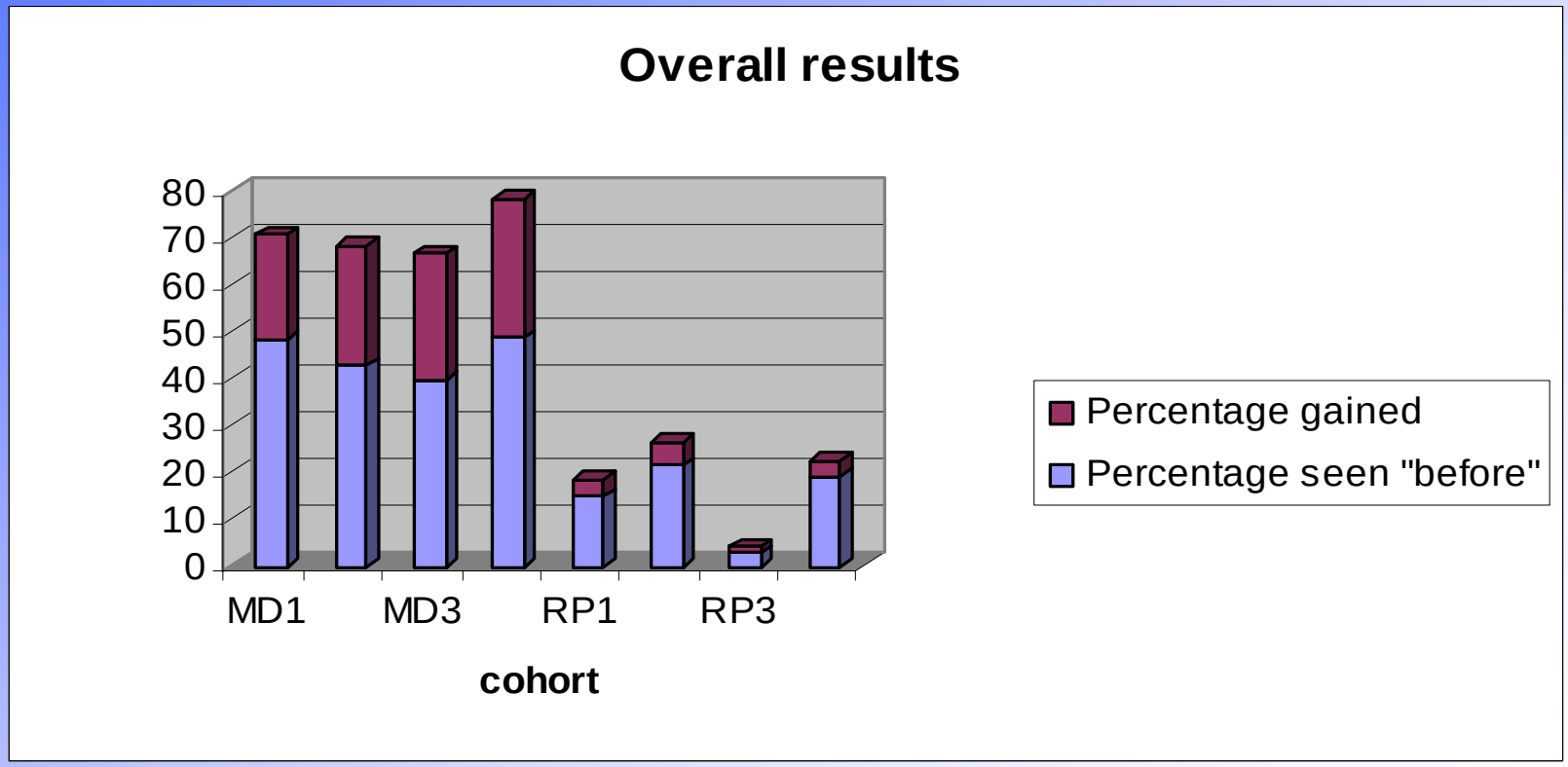
Application in macular degeneration



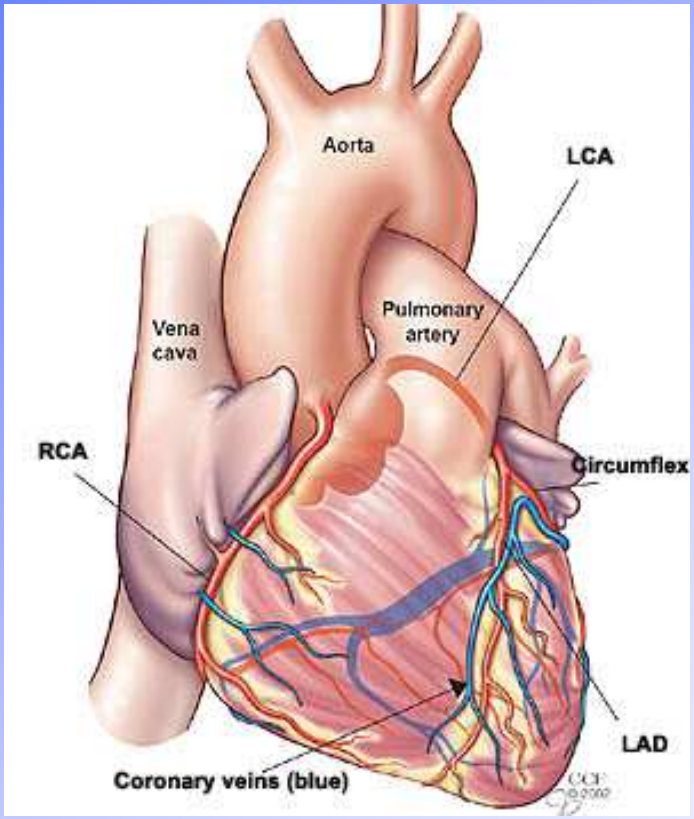


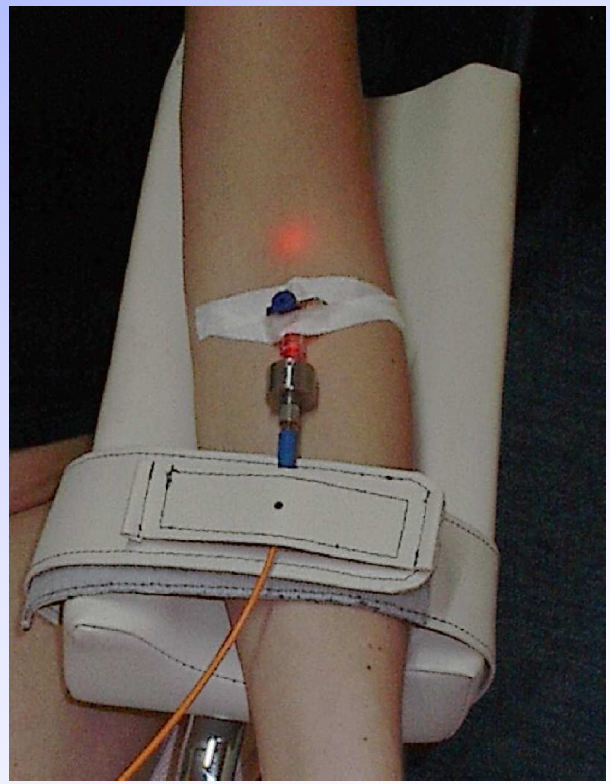


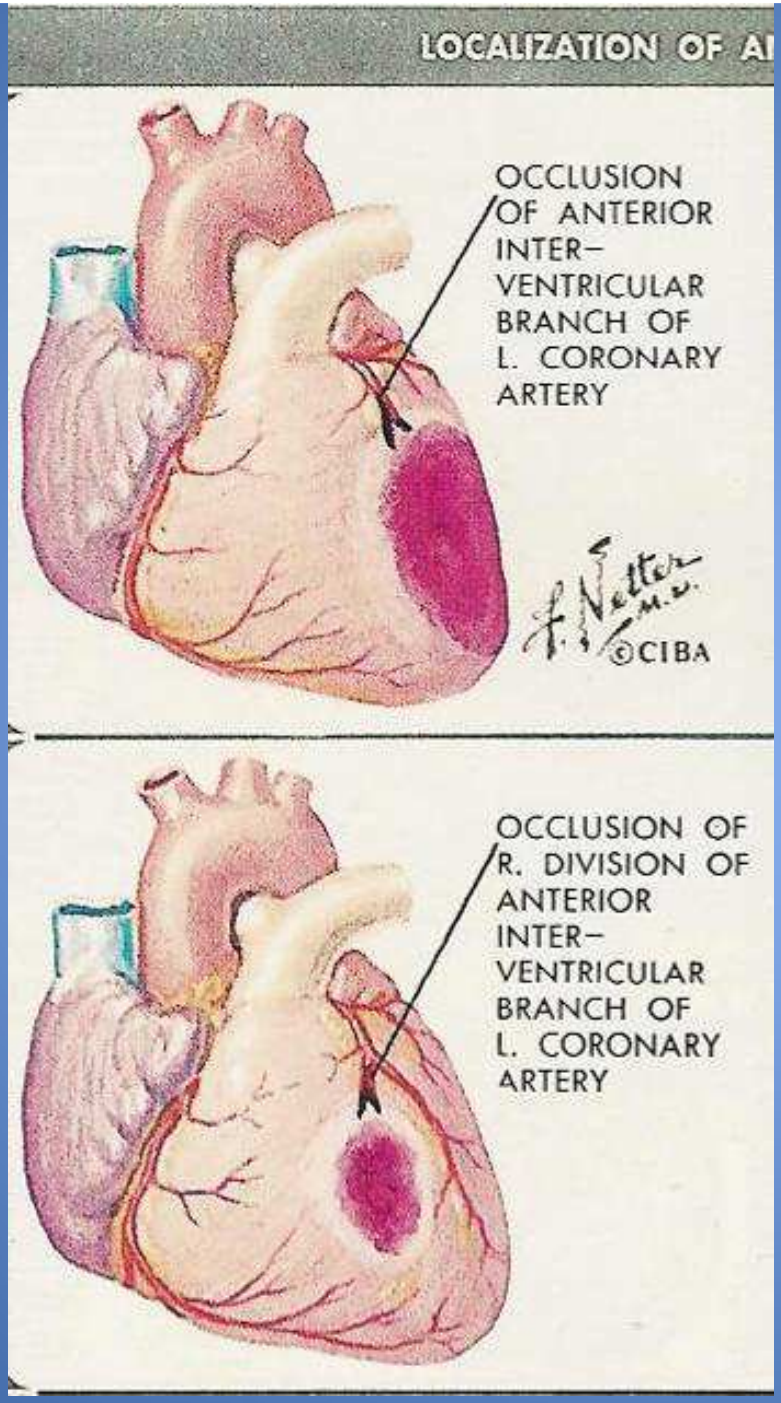
Results


Overall results
80
70
60
50
40
30
20
10
0
MD1
MD3
RP1
RP3
cohort
Percentage gained
Percentage seen "before"

Application in cardiology and angiology







Before Lasertherapy

After Lasertherapy

Study about the efficacy of laser therapy on patients with coronary heart disease

F. Noohi, MD. FACC , M. Javdani, MD*, M. kiavar, MD
Shaheed Rajaei Cardiovascular Medical & Research Center. IRAN
University of Medical Science, Tehran, IRAN, Nov.2008

16th Congress of

Iranian Heart Association

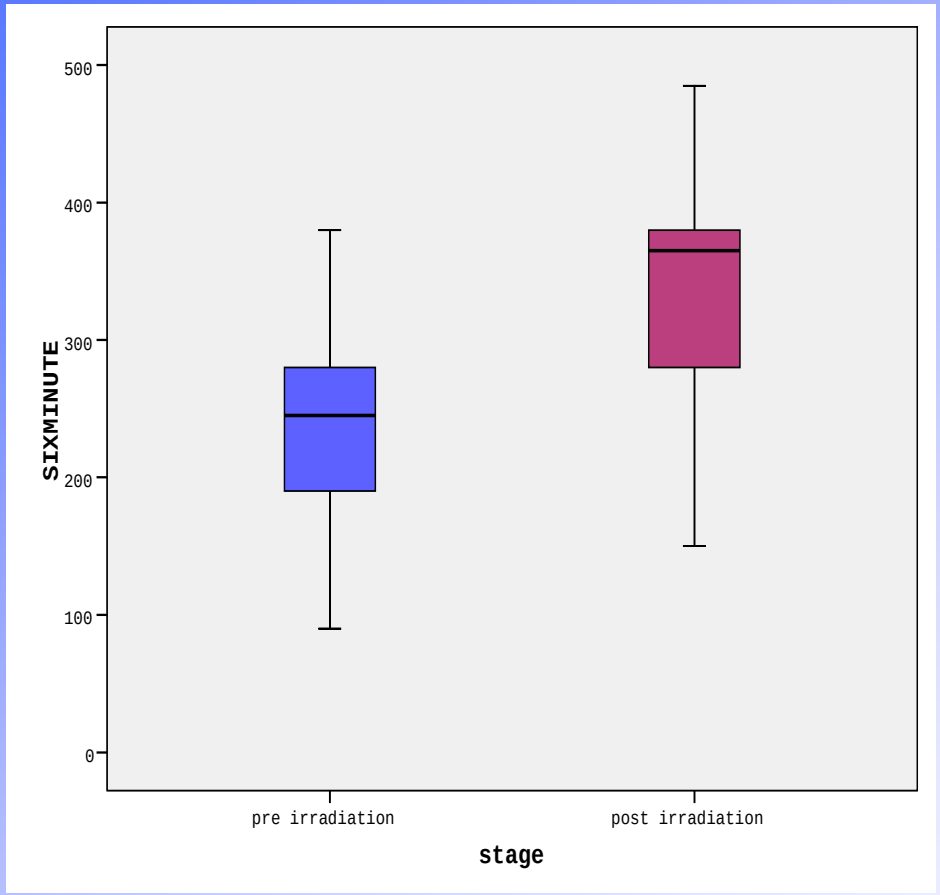
In Collaboration with

American College of Cardiology

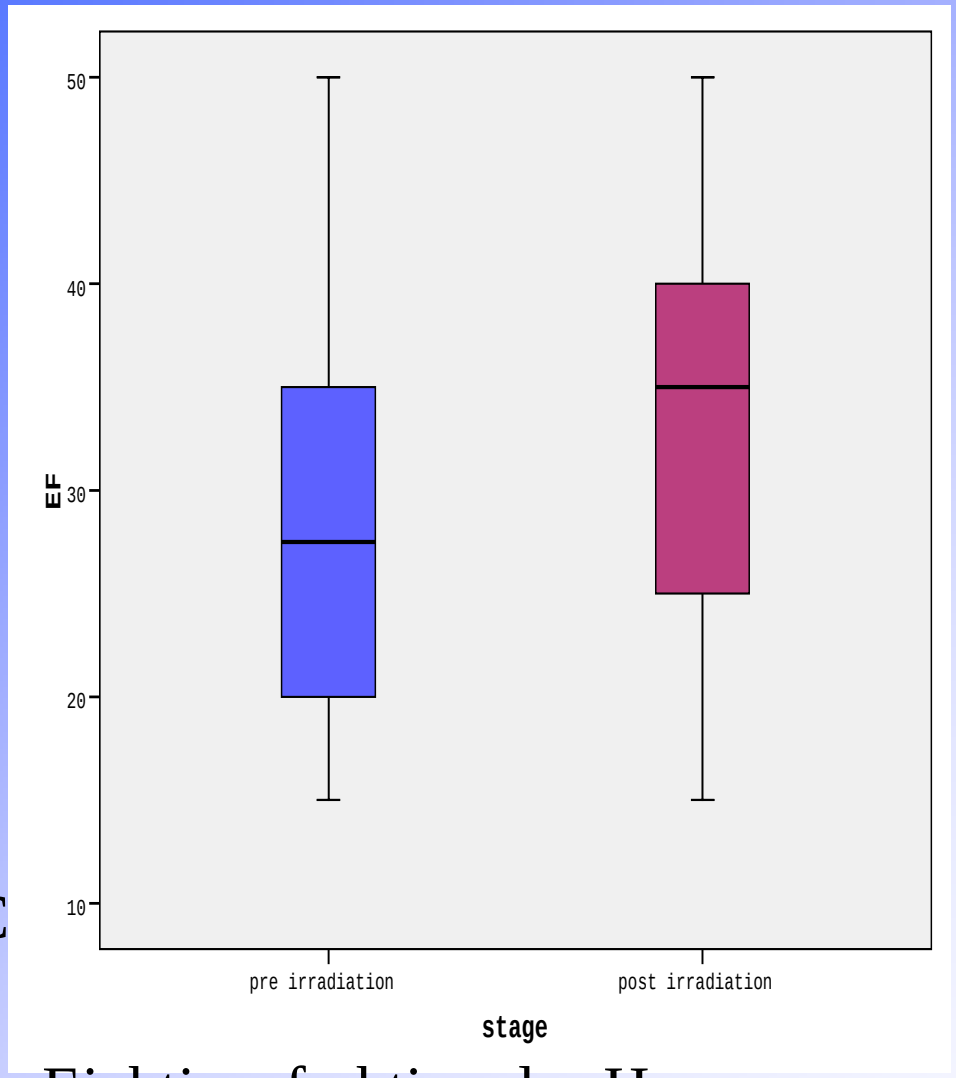
Nov. 18-21 , 2008

Aban 28- Azar 1 , 1387

B

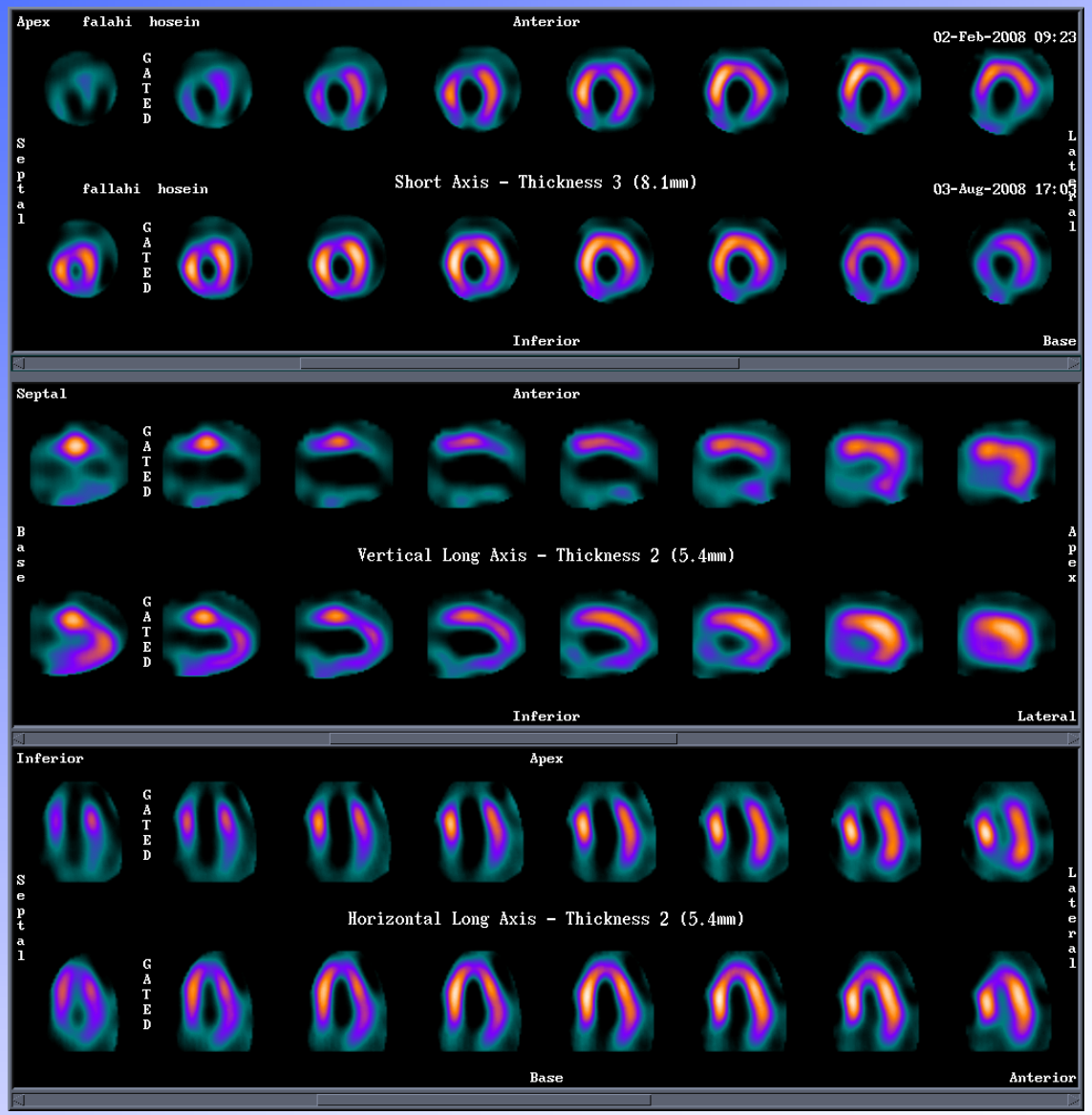


6 Minuten Lauftest



C

Ejektionsfraktion des Herzens


Apex
falahi hosein
Anterior
02-Feb-2008 09:23
GATED
Septal
Lateral
Short Axis - Thickness 3 (8.1mm)
fallahi hosein
03-Aug-2008 17:05
GATED
Inferior
Base
Septal
Anterior
GATED
Base
Vertical Long Axis - Thickness 2 (5.4mm)
Apex
GATED
Inferior
Lateral
Inferior
Apex
GATED
Septal
Horizontal Long Axis - Thickness 2 (5.4mm)
Lateral
GATED
Base
Anterior

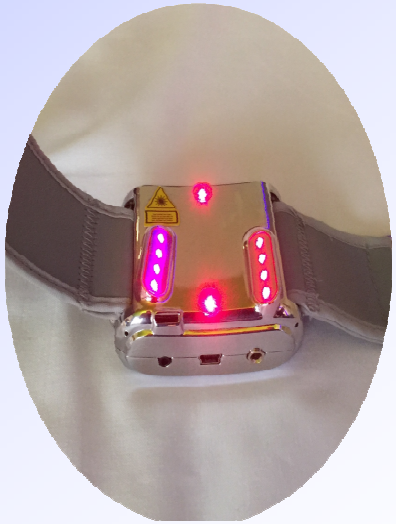
Regenerative effects of intravenous laser therapy

- There is strong evidence that the regenerative effects of intravenous laser therapy are induced by stimulation of the body‘s own stem cells released from the bone marrow in the blood stream

The new laser watch

The Laser watch

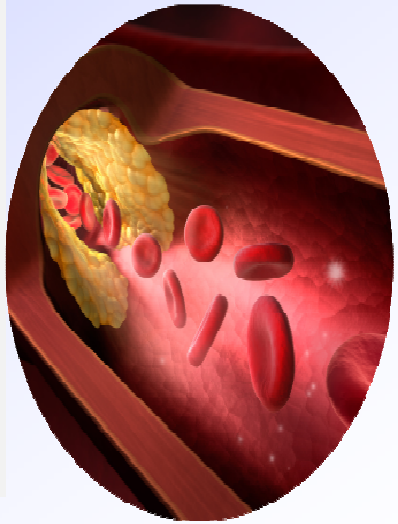
- 3-in-1: Acupuncture, local pain therapy external blood irradiation
- 18 Laser diodes
- wavelength 650nm
- power 5mW each



Effects

- Laser light activates different enzymes and removes bad lipoproteins from the blood
- Increases oxygen supply in the blood
- Enhances the metabolism and lipoperoxidation
- Decreases the amount of Cholesterol in the blood vessels

Treatment of metabolic problems, microcirculation disturbances, cardioprotective, cerebroprotective, protection against heart attacks and stroke, protection against diabetes



Effects

- Red laser light reduces pain and inflammation has regenerative effects
- Opens up microcirculation , better deformibility of red blood
- Stimulation of mitochondria
- Stimulation of ATP synthesis
- Stabilisation of cell membranes

Effects

- Direct stimulation of acupuncture points
- Sedation of nerves and heart rhythm
- Muscle sedation
- Increase of melatonin release

Eigene Studienergebisse:

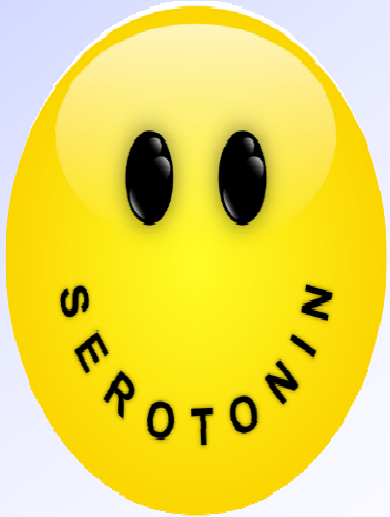
Significant increase of Melatonin (30-100 %)

(Dr. Weber in A 380 from Bangkok to Frankfurt)

Effects

Increase of serotonin

Effect against depression



First study Prof. Litscher 12/2015

From laser research Zeitschrift für Akupunktur & Aurikulomedizin
Magazine for acupuncture and auricular medicine
5th October 2015
Daniela Litscher und Gerhard Litscher

LASER WATCH – SIMULTANEOUS LASER ACUPUNCTURE AND LASER BLOOD IRRADIATION AT THE WRIST

Research unit for Complementary and Integrative Laser Medicine, Research unit for Biomedical Technology in Anaesthesia and Intensive Care TCM Forschungszentrum (Research centre) Graz, Medizinische Universität Graz (Medical University of Graz), 8036 Graz, Austria

From laser research

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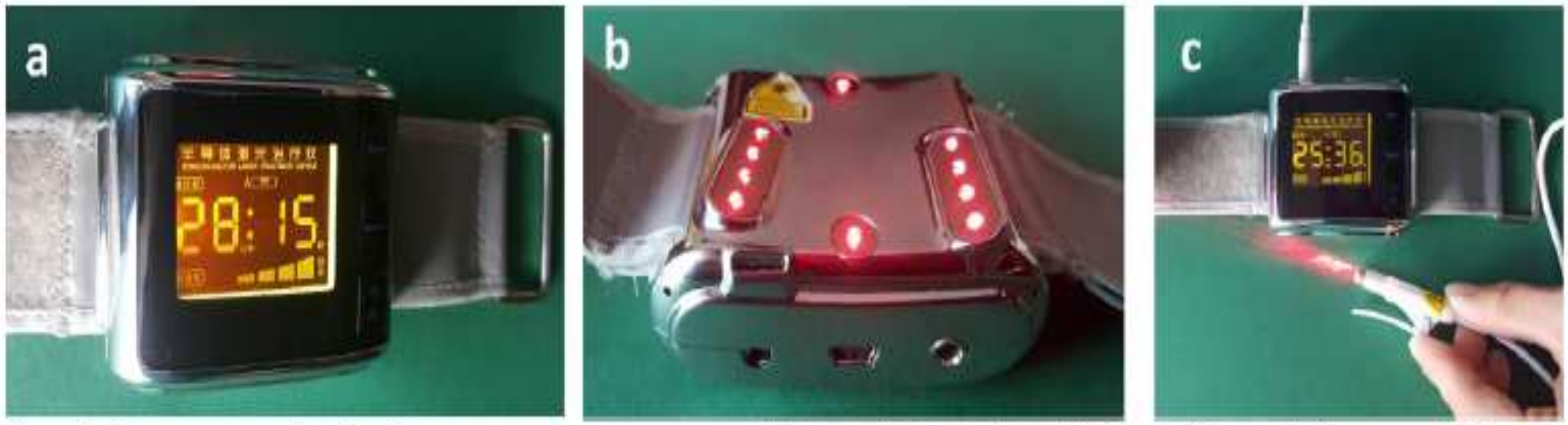
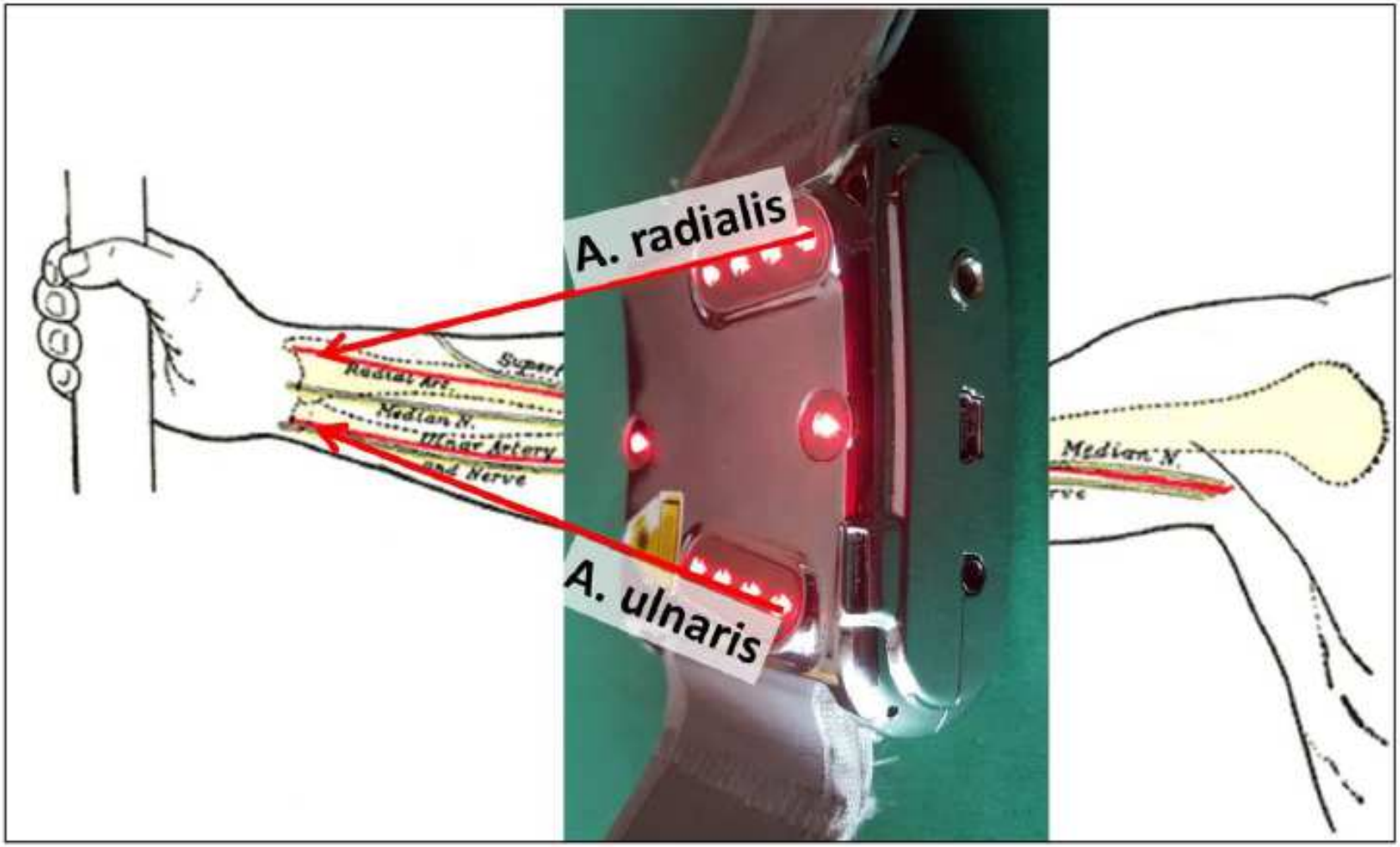


Fig. 1: Laser watch for laser acupuncture and laser blood irradiation (front (a), rear (b) and view with nasal adapter (c)).



ig. 2: Laser blood irradiation with the laser watch

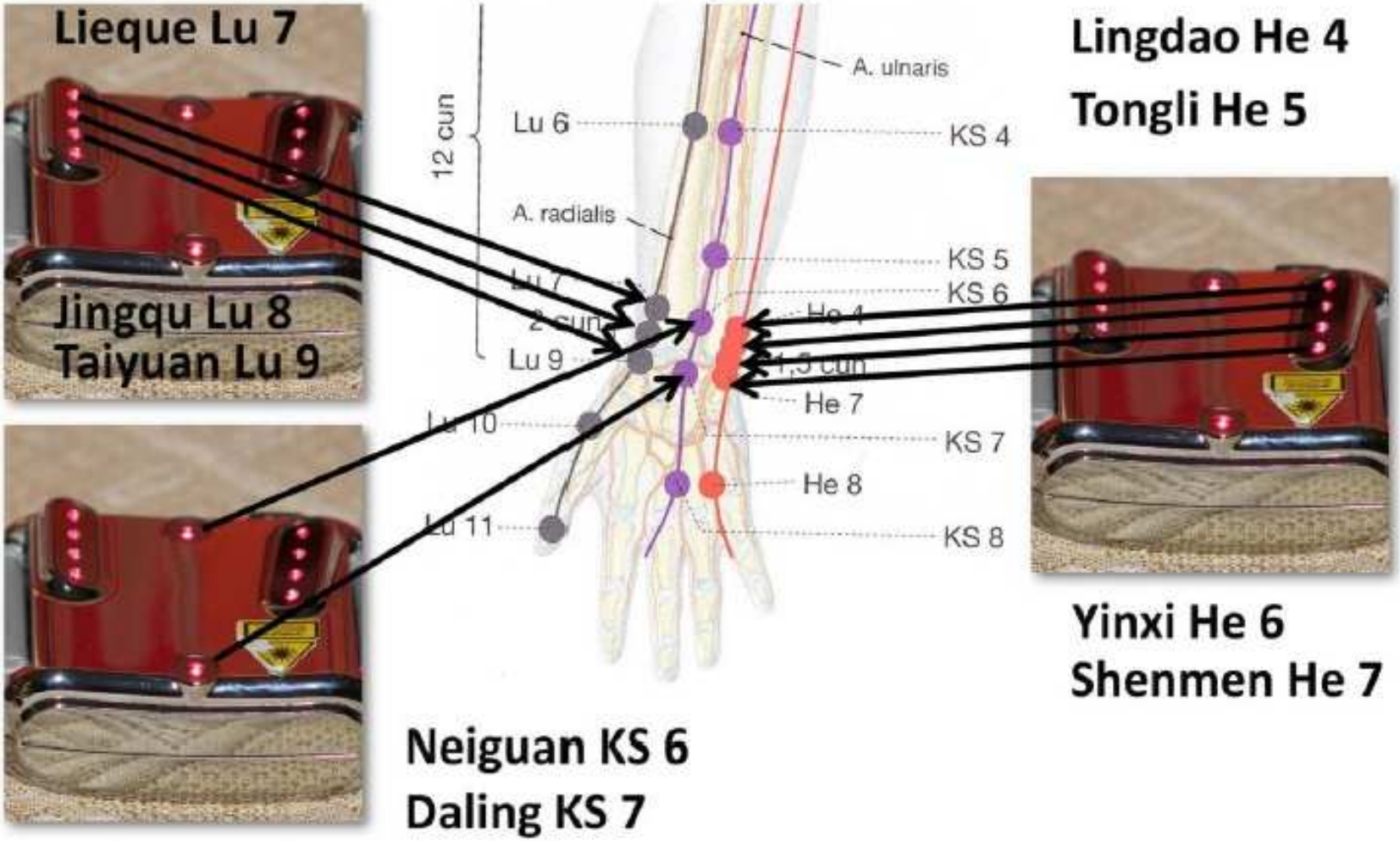


Fig. 3: Acupuncture points which are stimulated through the laser watch (mod. from [5]).

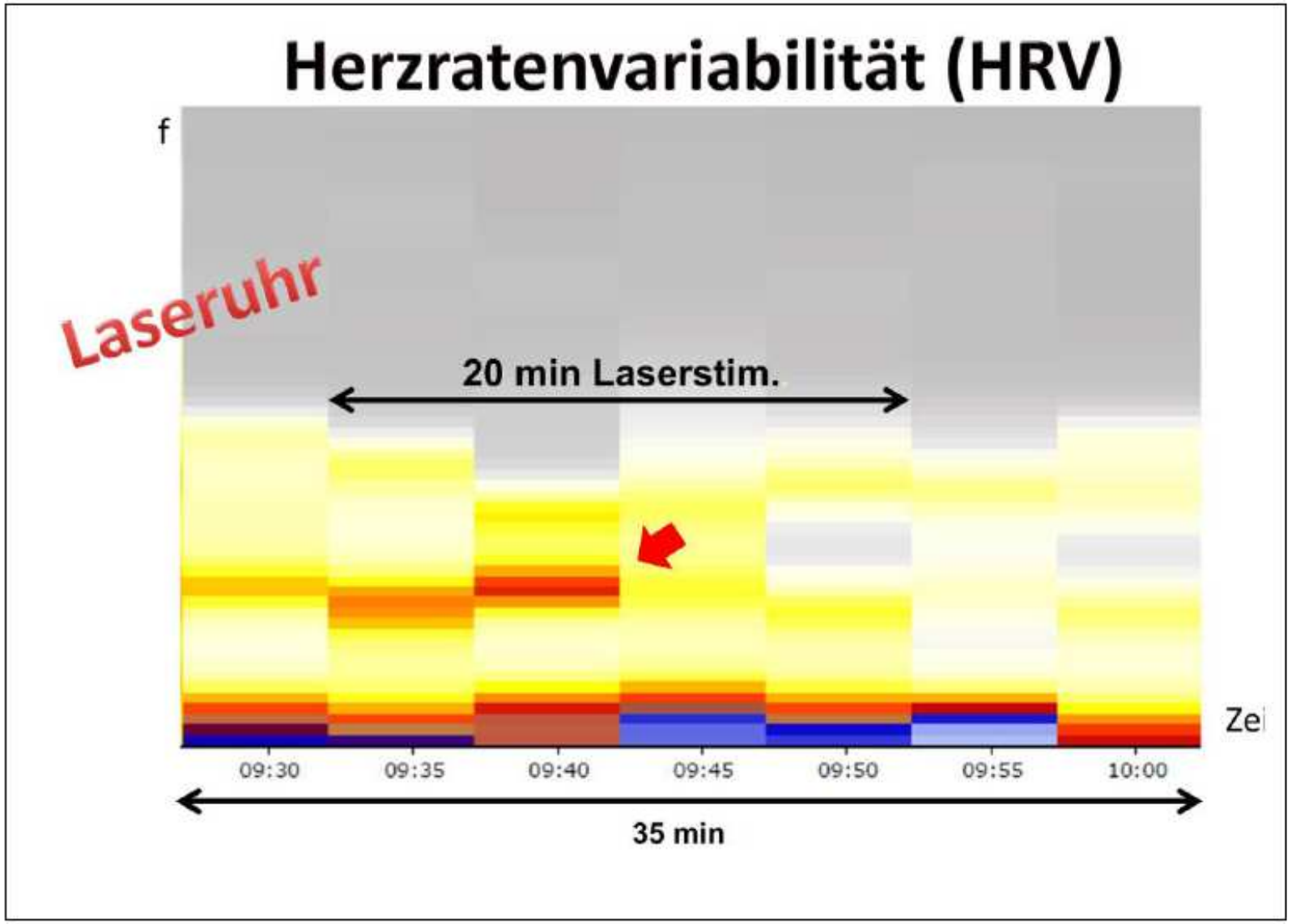


Diagram:

Heart Rate Variability (HRV)

Laser watch

20 minute laser stimulation

Time

Laseruhr

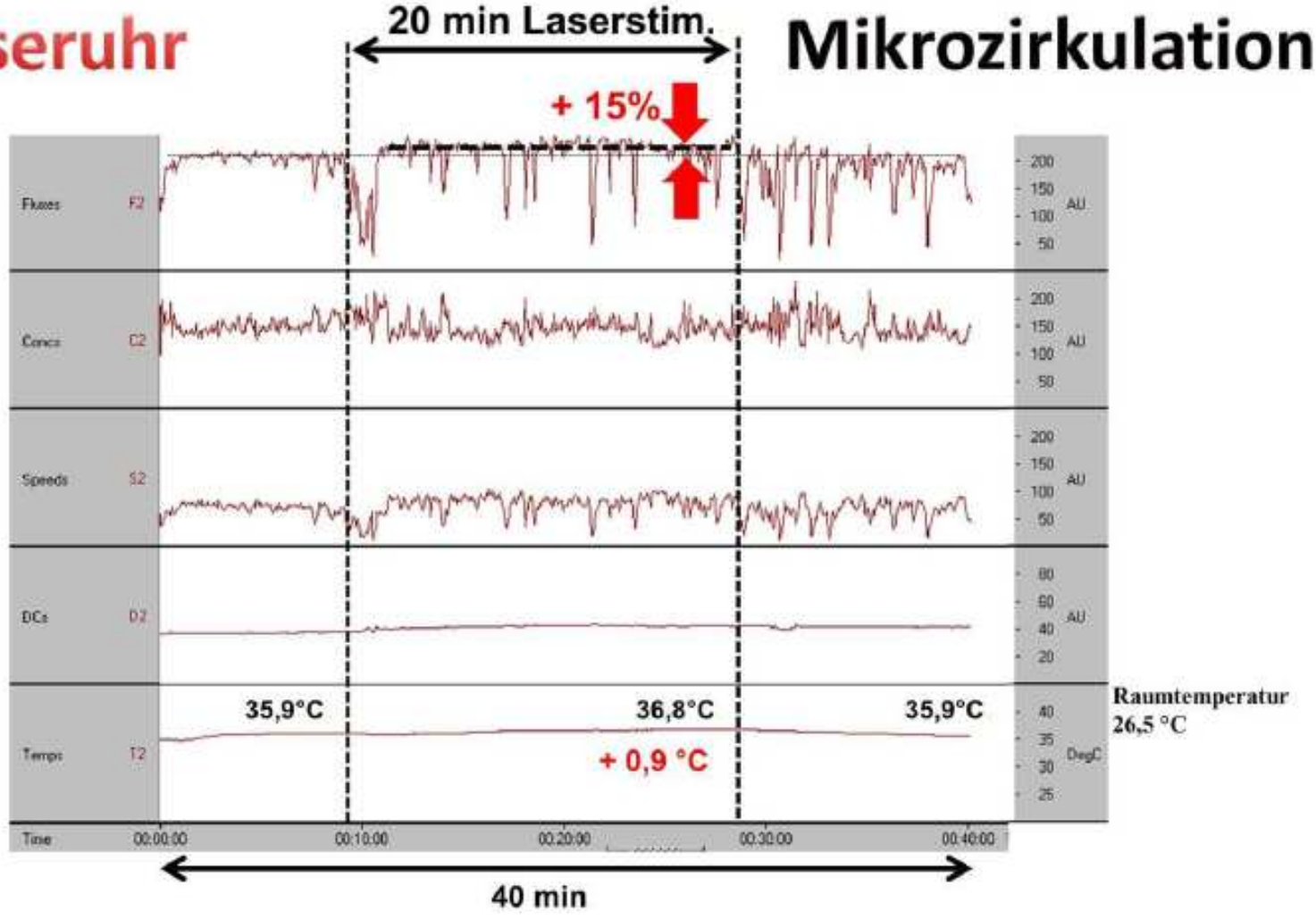


Diagram:

Laser watch 20 minute laser stimulation Microcirculation

Room temperature

UltraCur +

Curcumin:
Strong antioxidant
with anti-inflammatory and
pain-reducing effects

Highly concentrated curcumin with a 15,000-fold bioavailability

Due to a special protein binding the full potential of this unique medicinal plant can be realized for the first time!

One capsule UltraCur+ has the efficacy of 120g of curcumin.

In relation to conventional curcumin this corresponds to a 15,000-fold bioavailability.

New option for tumor therapy and -prävention

Water soluble Sodium-Copper Chlorophyllin

Is stimulated with 650 nm red laser

Chlorophyllin

- Studies in both animals and humans demonstrate chlorophyllin’s ability to bind to carcinogens and remove them from the body.
- Chlorophyllin Protects Against Environmental Carcinogens

Chlorophyllin

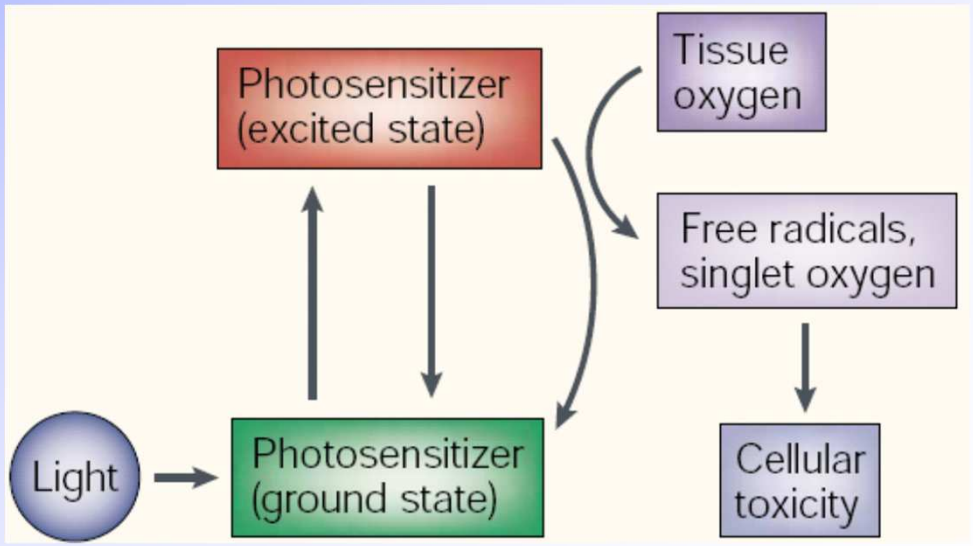
- Recent research suggests that the remarkable photosensitizing properties of chlorophyllin make it a low-cost option for this novel therapy.
- Stimulation with new laser watch ís the perfect follow-up home therapy for the patients.

Photodynamic therapy: new ways of cancer with lasers and photosensitizers

Introduction:
Process of Photodynamic Therapy

- 2 individually non-toxic components brought together to cause harmful effects on cells and tissues

  - Photosensitizing agent
  - Light of specific wavelength



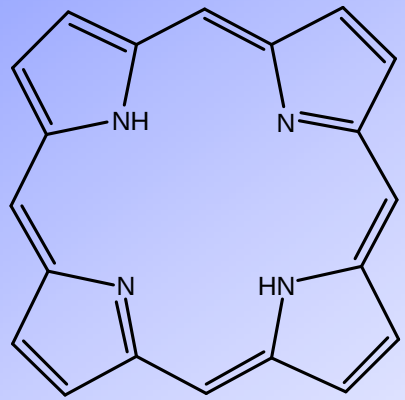
Nature **2003**, *3*, 380.

Traditional Photosensitizers

- Haematoporphyrins, HpD

  - Derivatives of Haem

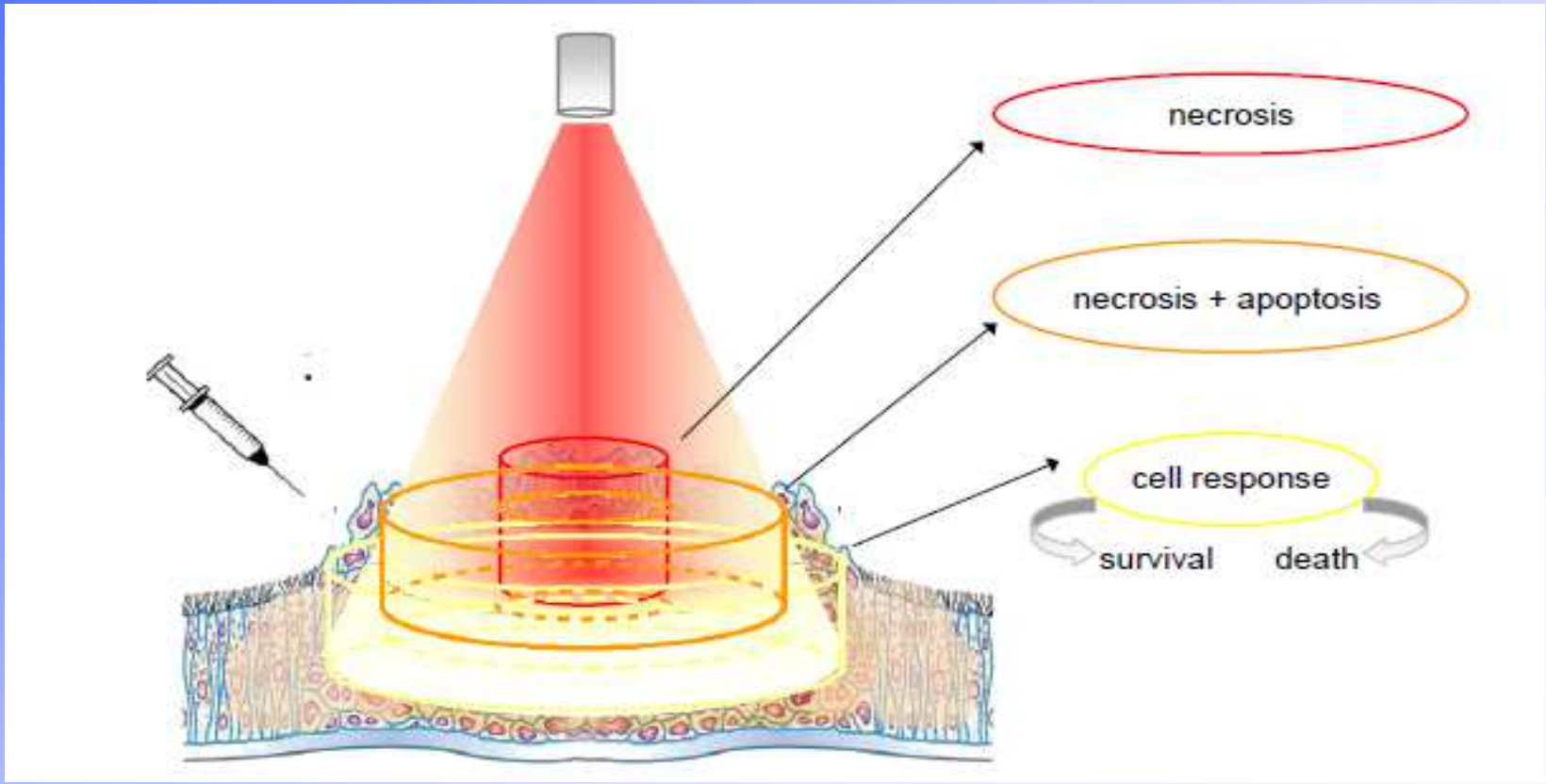
  (Photofrine and others)



- Chlorines
  - Derivatives of Chlorophyll

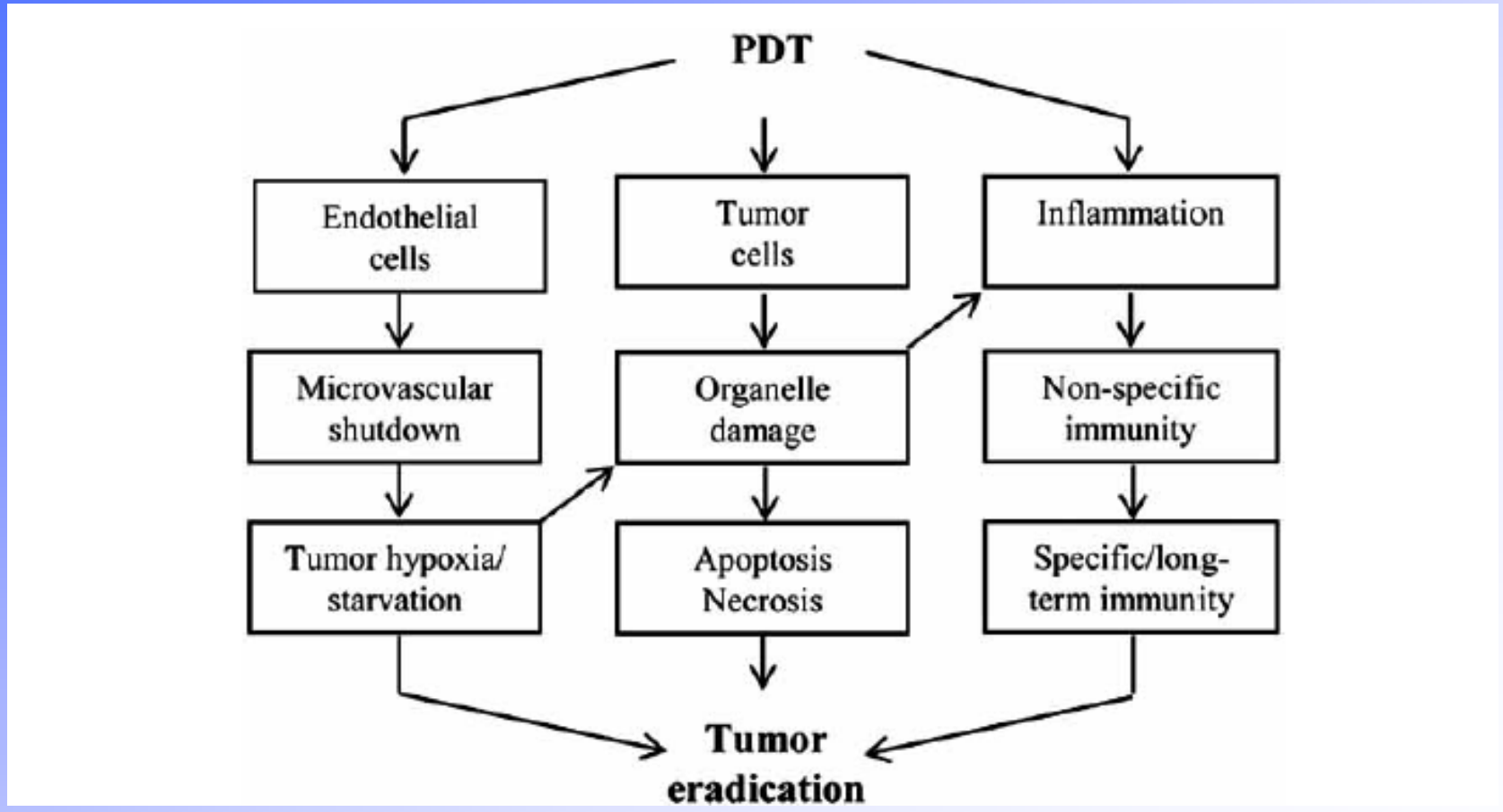
- Porphycenes
  - Synthetic Porphyrines

The photodymamic reaction



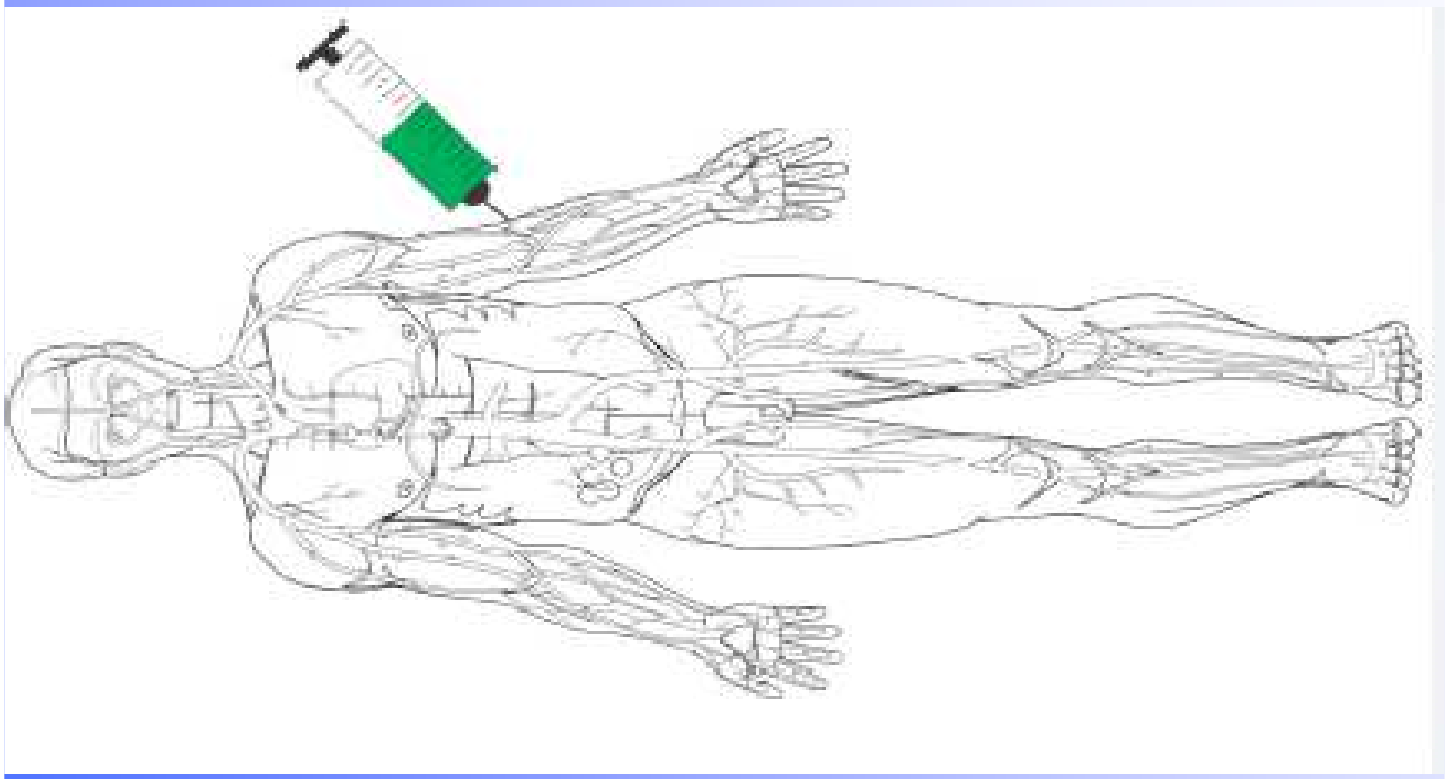
Light distribution and cellular response during PDT

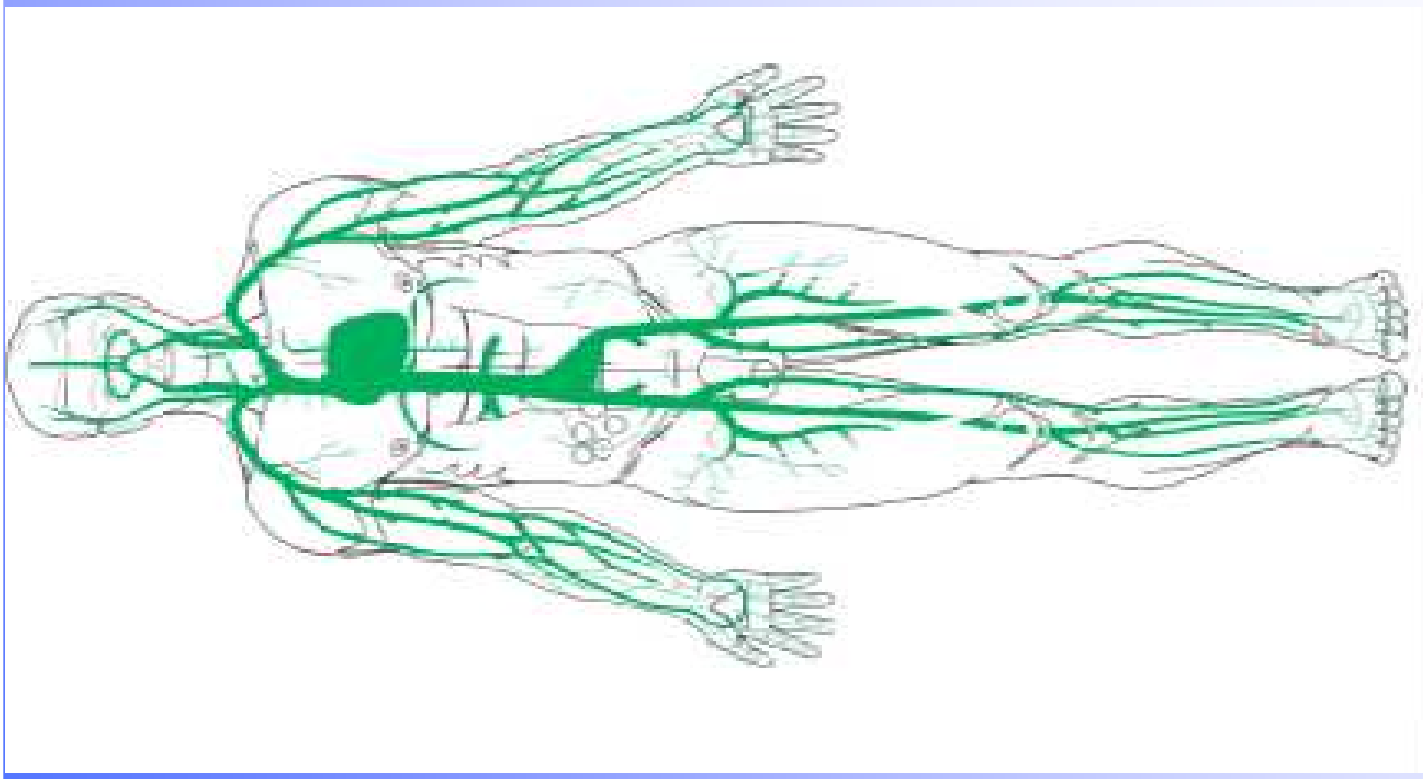
Mechanisms of PDT



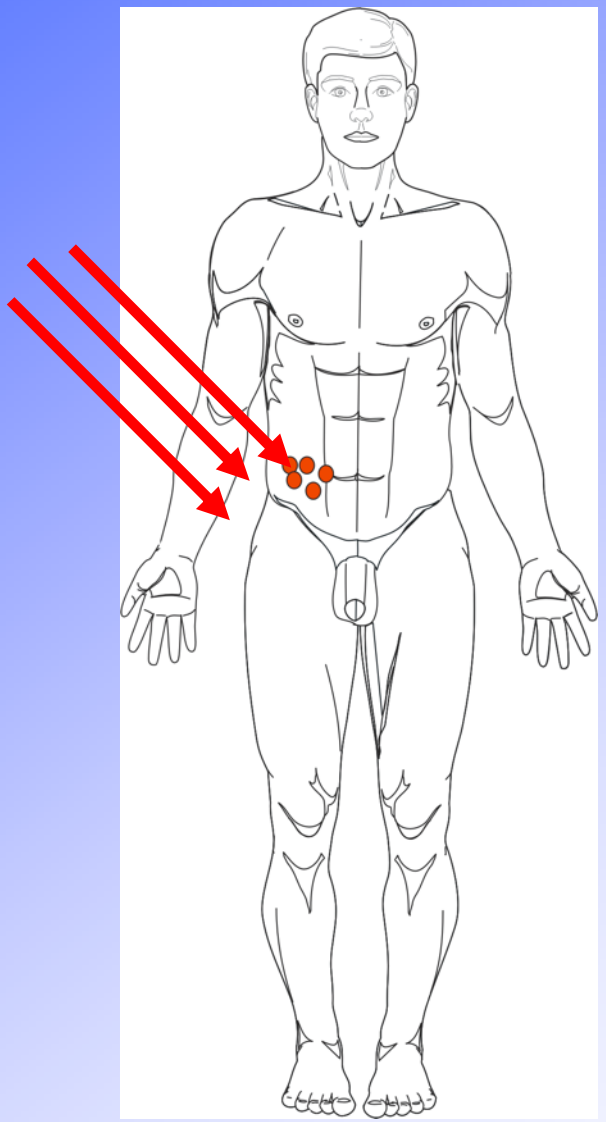
Photodynamic Therapy
New natural derived Photosensitizers

- Chlorin E6 (Red 660 nm)
- Hypericin (Yellow 589 nm)
- Curcumin (Blue 447 nm)
- Riboflavin (Blue 447 nm)





1 – 15 min

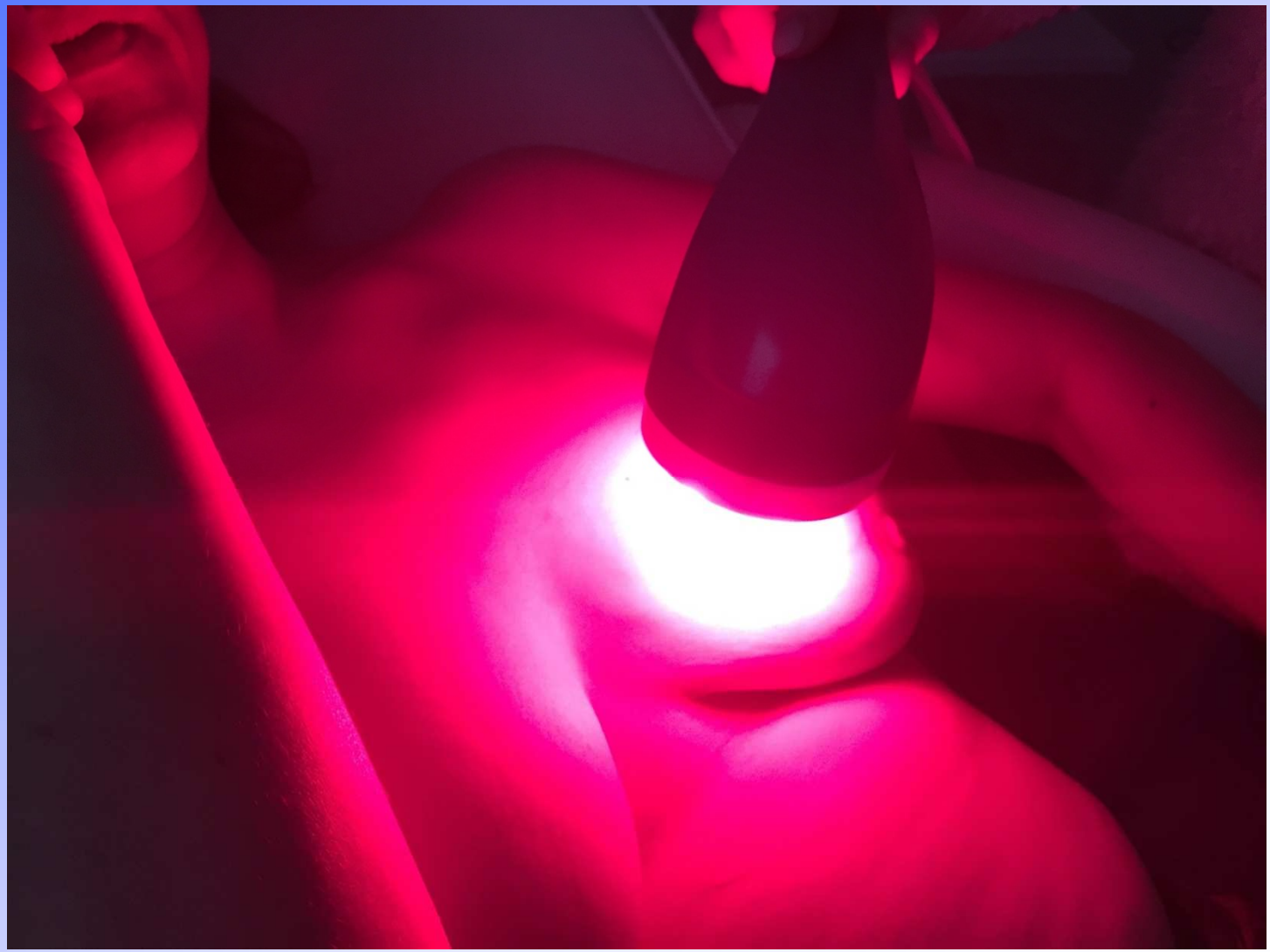


PDT

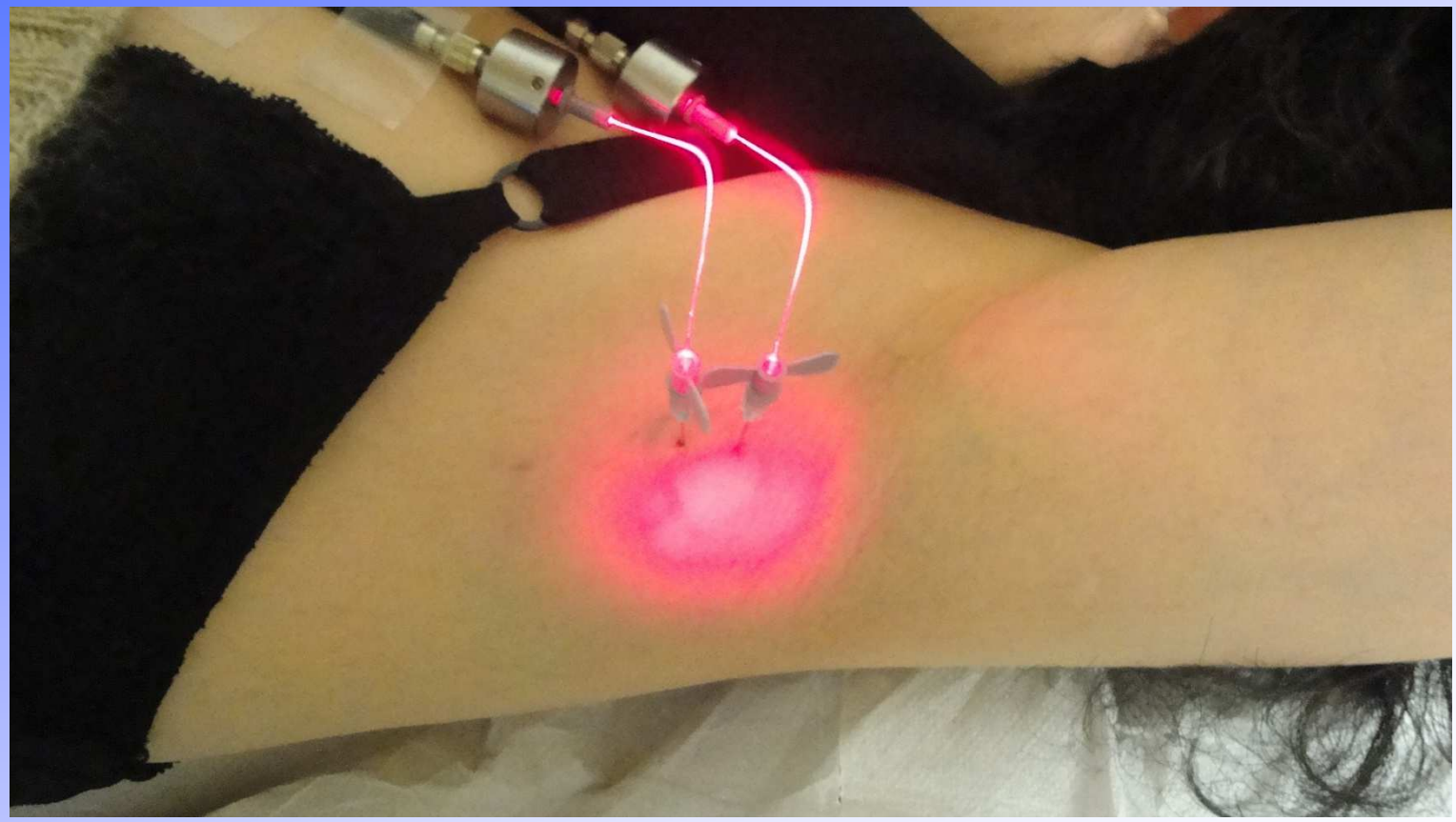
Generation of singlet oxygen

APOCARE PHARMA GMBH

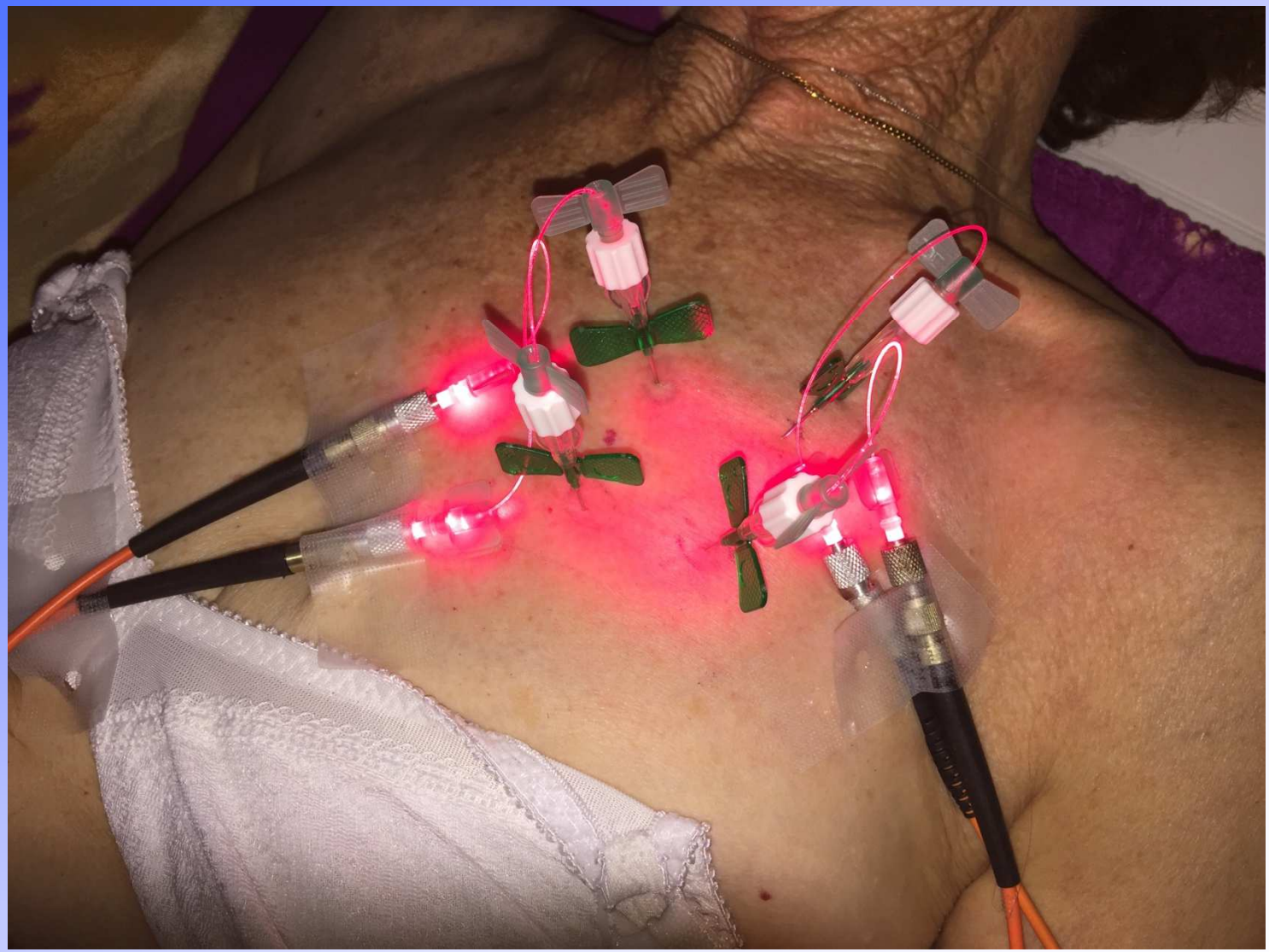
Potential overdoseing



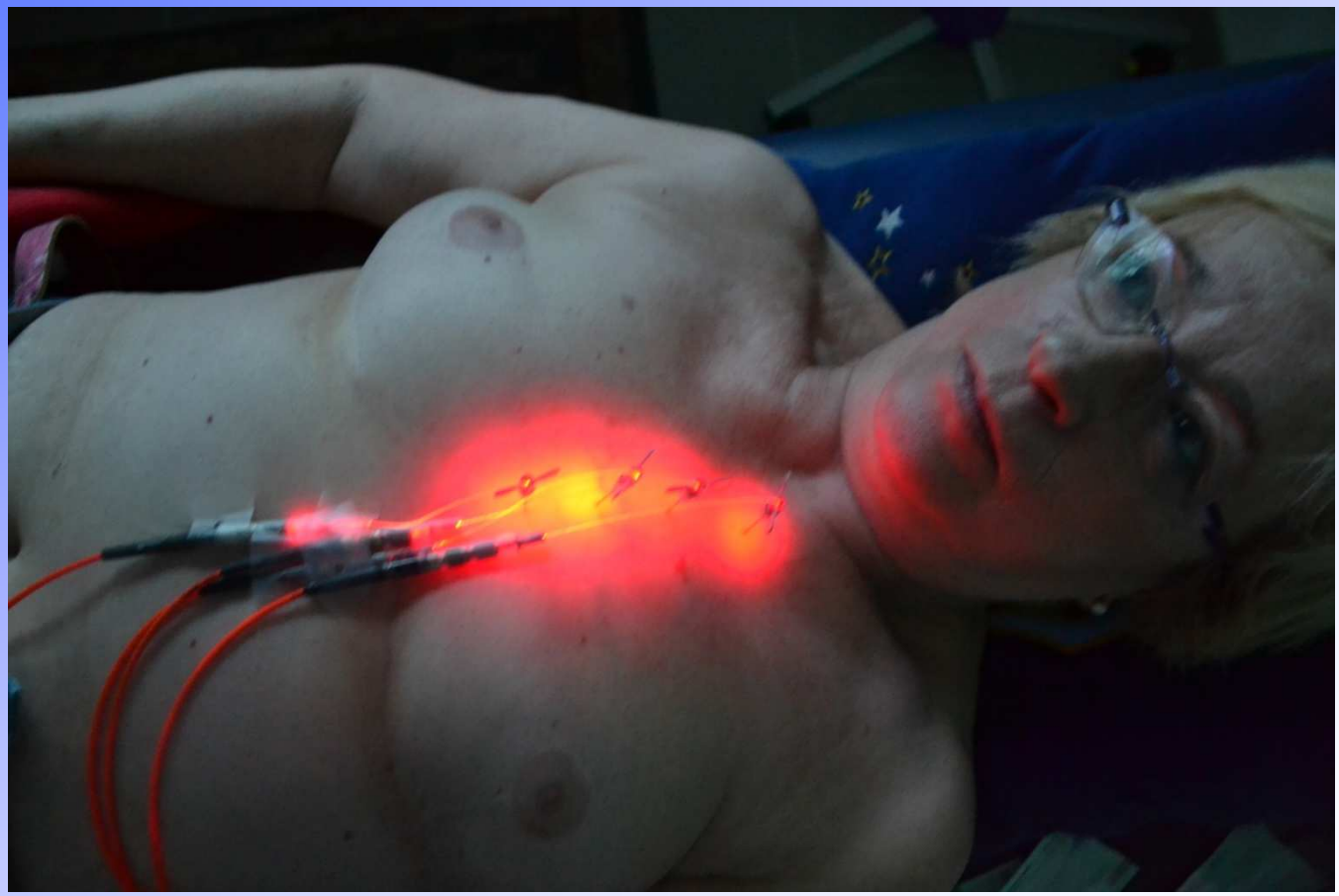
Interstitial PDT of lymph metastases



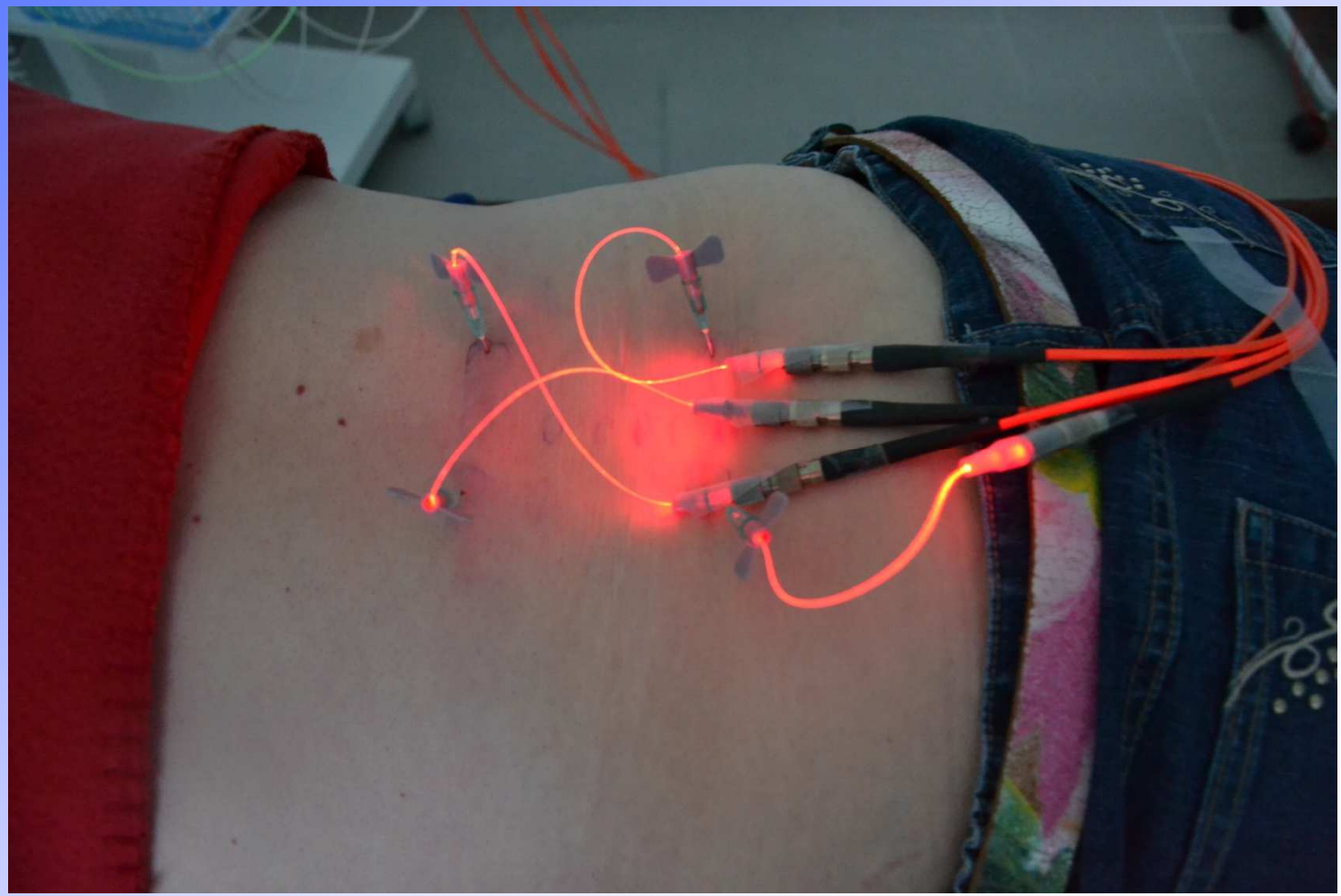
Lung cancer



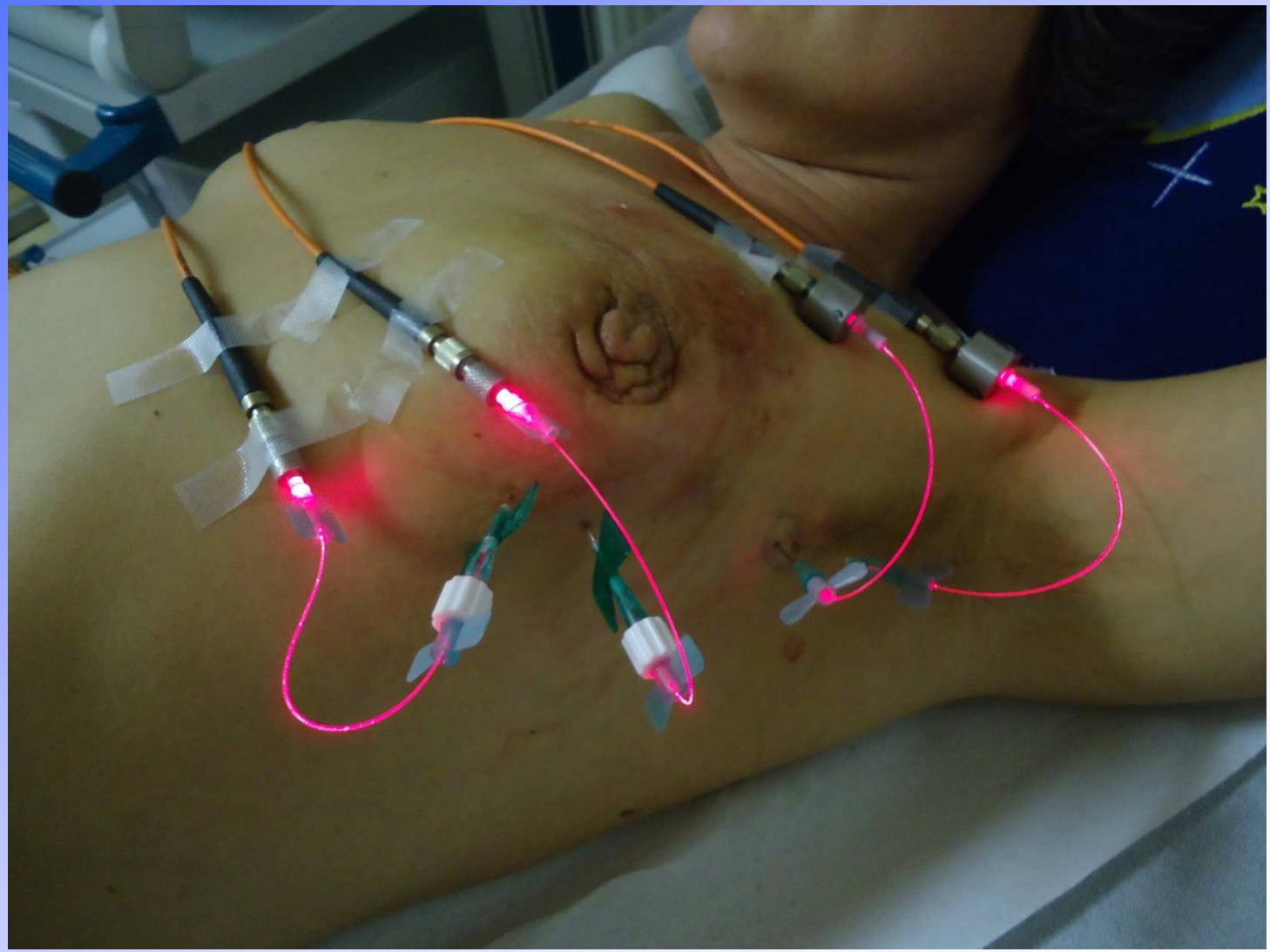
Interstitial PDT of breast cancer with mediastinal metastases



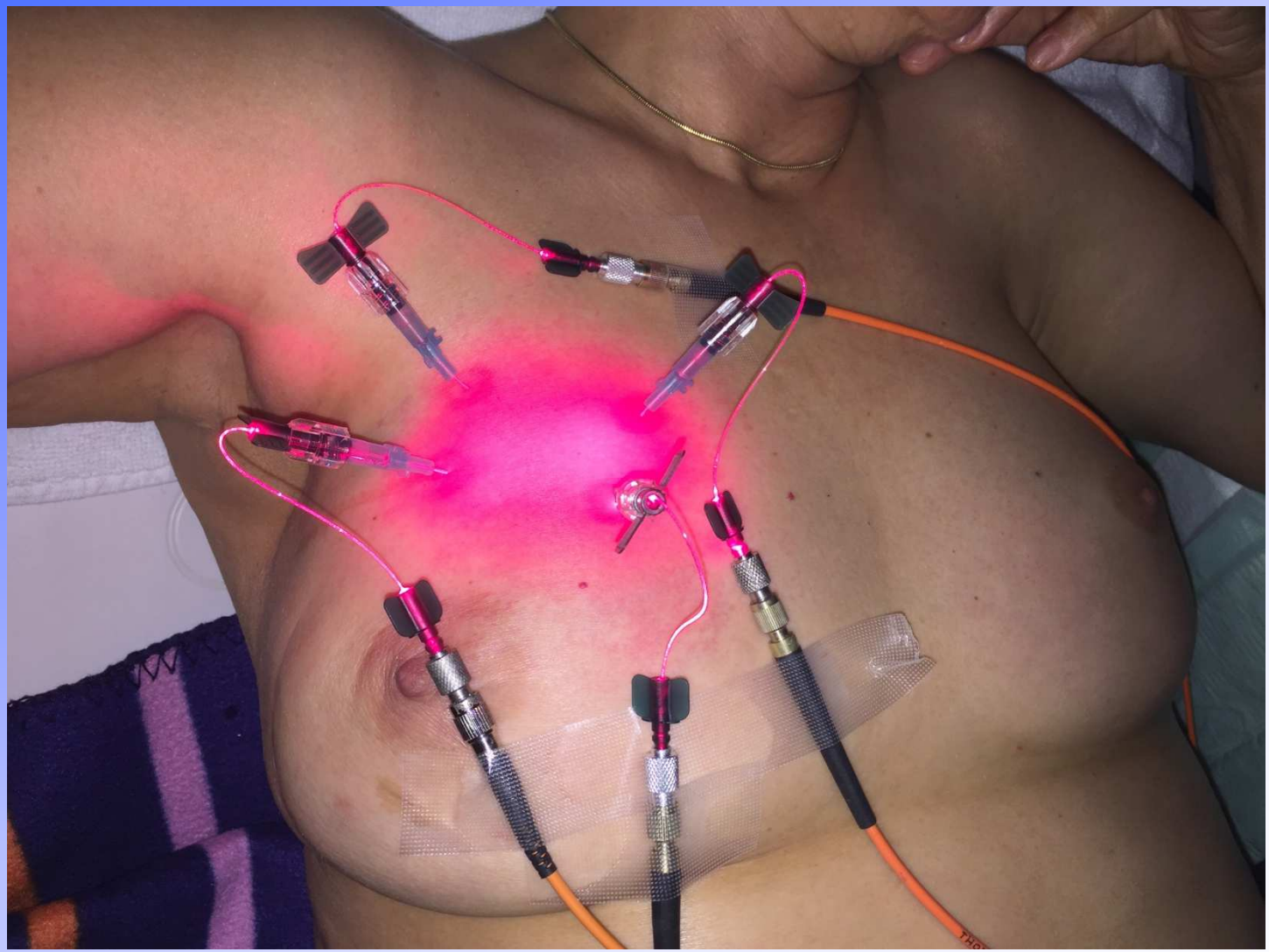
Interstitial PDT of breast cancer with spinal metastases



Interstitial PDT of breast cancer



Interstitial PDT of breast cancer



Chronic lymphatic leukemia

See you on ISLA international conference June 12th and 13th in Germany, thank you

www.isla-laser.org