Stimul 1340
NEUROLAS

DEKA

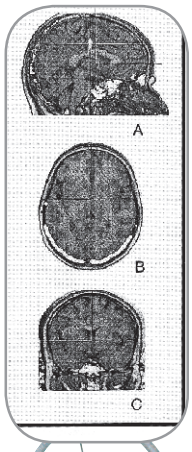
CO_2 LASER TECHNOLOGY FOR
stimulation OF LEPs
(Laser Evoked Potentials)

Stimul 1340

The introduction of laser stimulators in basic and clinical neurophysiology has revolutionized the approach to study pain in humans. Because large-diameter fibers have a lower electrical threshold than the small nerve fibers that convey pain sensations, electrical stimuli, even noxious, also excite large, non-nociceptive afferents, thus inhibiting nociceptive transmission or hindering nociceptive signals. Hence the need for a selective activation of nociceptors. Although several methods of heating the skin can activate selectively cutaneous nociceptors, the increase in skin temperature is too slow to generate a synchronous afferent volley that can be detected by non invasive methods. Because of the physical properties of laser radiation, a single laser pulse produce a selective heating in the most superficial skin layers (where the nociceptors lie), in a very short time (thus eliciting coherent afferent volleys). Therefore laser stimulators allow us to overcome all the difficulties, thus providing a unique tool for investigating the nociceptive system in humans. In a clinical setting, the main waves of the laser evoked potentials (LEPs) are readily recorded from the scalp through surface electrodes (figures 1, 2). Few trials (10-20) at low intensity (the subject feels a slight pinprick sensation) are sufficient to yield a stable average and to measure latency and amplitude. Laser EPs proved useful in all sorts of pain syndromes, including neuropathic pains secondary to peripheral neuropathy, myelopathy, brain infarction, as well as postherpetic neuralgia, trigeminal neuralgia, temporomandibular dysfunction, fibromyalgia, and headache. Almost 100 published studies have demonstrated that laser EP recording is the most reliable method of assessing the whole nociceptive pathway, from skin to cerebral cortex, in pain patients.

• Our CO_2 laser stimulator is a compact, practical and easy-to-use device which provides an easy and quick assessment of the nociceptive system. It is widely used in clinical neurophysiology for the assessment of patients with different clinical pains. […]

• The YAP laser has several advantages. The laser emission can be transmitted through long fiber-optics, allowing an easy stimulation of different body districts (eg oral mucosa, tongue) and to deliver a nociceptive stimulation in shielded rooms (eg MRI, MEG).



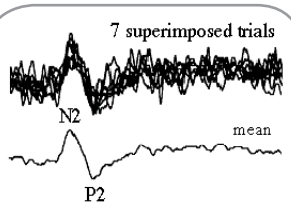


Figure 1. Laser stimulation of the hairy skin excites selectively type II A-delta nociceptors and evokes easily wide-amplitude brain responses (brain signals are recorded from the vertex, referred to the linked earlobes, bandpass 0.5-50 Hz).

Figure 2. Source analysis of the cerebral responses evoked by C fibre laser thermal stimulation (ultralate LEP). One dipole (A, in yellow) was located in the posterior part of the anterior cingulate cortex (pACC) and 2 dipoles (B and C, in red) were located in the opercular-insular cortex, bilaterally. Dipoles are overlaid on individual high-resolution magnetic resonance images. A: sagittal section through the cingular dipole; B and C: axial and coronal sections through 1 of the opercular-insular dipoles; the symmetrical dipole is visible too (Iannetti et al 2003).

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NEUROLAS

Neurolas is a CO_2 laser system used in neurophysiology for studying evoked potentials.

The stimulus generated by Neurolas excites the thermal-mechanical nociceptors provoking cerebral potentials and in this way allowing to detect the dysfunctions in the behaviour of the afferent fibres.

Neurolas offers the chance to adjust the amplitude and/or the duration of the stimulus as well as varying the energy density of the laser emission in an ongoing manner by acting on the stimulation area. Other advantages of this laser include the high repeatability of the impulses, the totally negligible trigger-pulse latency time (less than 20 μs).

Neurolas can be interfaced with any type of electromyographs. All operating and safety parameters are controlled by a microprocessor

The Neurolas articulated arm is an optical system which conveys CO_2 laser radiation. It is made up of five mirrors placed on rotating supports and ends with a handpiece containing the focusing lens (with zoom lens) and a Plexiglas spacer.
The mechanical accuracy of the articulated arm allows the CO_2 laser beam to travel inside and along its axis, irrespective of how the arm is oriented.
The field of action of the articulated arm covers a radius of approximately 70 cm and the transfer efficiency of power is greater than 85%.

Neurolas

Stimul 1340 NEUROLAS

CO_2 LASER TECHNOLOGY FOR stimulation OF LEPs (Laser Evoked Potentials)

TECHNICAL DATA

	Stimul1340	Neurolas
Laser type	ND:Yap	CO_2
Wavelenght	1340nm	1064nm
Peak Power	750W (Max.)	15W (Max.)
Pulse lenght	Up to 20ms	Up to 50ms
Pulse Energy	15J (Max.)	15J (Max.)
Spot	Up to 15mm	Up to 8mm
Transmissione System	550µm Optical fiber 10m Long	Articulated Arm
Aiming Beam	Diode Laser 1 Mw	Diode Laser 3 Mw
System Control	Microprocessor	Microprocessor
Power supply	230 Vac/7 A (max)/50 - 60 Hz	230 Vac/2 A (max)/50 - 60 Hz
Dimensions and Weight	68 cm (H), 23 cm (W), 65 cm (L), 40 kg	14 cm (H), 76 cm (W), 28 cm (L), 60 kg

Case Stimul

Trolley Neurolas

CE 0459

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DEKA The Code of Excellence

A spin-off of the El.En. Group, DEKA is a world-class leader in the design and manufacture of lasers and light sources for applications in the medical field. DEKA markets its devices in more than 80 countries throughout an extensive network of international distributors as well as direct offices in Italy, France, Germany, Japan and USA. Excellence is the hallmark of DEKA's experience and recognition garnered in the sphere of R&D in over thirty years of activity. Quality, innovation and technological excellence place DEKA and its products in a unique and distinguished position in the global arena. DEKA manufactures laser devices in compliance with the specifications of Directive 93/42/EC and its quality assurance system, certified by CE MED is in accordance with the ISO 9001 and ISO 13485 standards.

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