DEVICE FOR PHOTODYNAMIC THERAPY

S. Zavrajnyi *, Iu. Nica
Insitute of Electronic Engineering and Nanotechnology, Chishinau,Republic of Moldova
*E-mail: tehmed@nano.asm.md

One method of treatment of tumour, infectious and certain skin diseases is PDT. It is based on the use of photosensitizers, that selectively accumulate in cancerous tissues and has a toxic effect on tumor cells when exposed to light of a certain wavelength. During PDT damaged cancer and no damage to healthy tissue. Upon irradiation through the skin therapeutic effect is achieved in the surface tissue to a depth of up to 3 ... 4 cm. For the treatment of cancers of internal organs, PDT light supplied to the tumor by endoscopy or puncture.

Another option is to destroy the tumor by destroying local overheating without thermal overvoltage healthy tissue. When heating the tumor over 43-44^{o}C observed the death of tumor cells while preserving healthy tissue because of their greater thermal stability up to 50^{o}C. Local heating of the tissue is provided by photosensitizers that selectively accumulate in pathogenic outbreak and translate the absorbed energy of incident electromagnetic radiation into heat. Application of infrared 800nm ... 1300nm, for which there are windows of transparency in the tissues of the body, in combination with non-toxic nanomaterials, such as nanoporous silicon, can influence the foci of disease at a depth of up to 10 ... 12 cm without the use of endoscopy.

To implement thermal variant PDT designed device consisting of a monochromatic emitter with a wavelength of 808nm and output power up to 4W. The radiating element in this case is a laser diode. Radiation is delivered to the therapeutic area through a flexible fiber with a collimator at the end. The apparatus comprises a system for cooling the laser and the provisional autocalibration. Microcontroller manages all devices. Data on the selected mode of procedure, the power and the prescribed dose / exposure time entered by the operator via the keyboard and displayed on the LCD. Radiation modes: continuous, pulse, pulse pack. [1,2].

Fig.1 shows: a block diagram of the device for PDT (left) and appearance (right).

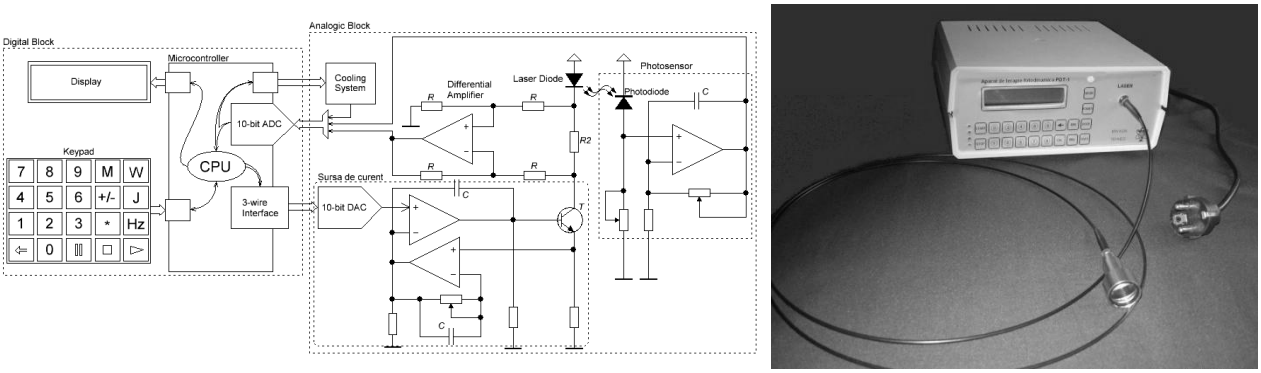

Fig.1

[1] Iu. Nica, S. Zavrajnîi, A. Gritzco, Iu. Tiron, D. Eshanu, V. Musteatza, A. Stalbe Installation for local hyperthermia in crossed laser fluxes. *Proceedings of International Conference on Nanotechnologies and Biomedical Engineering, (ICNBME-2011) Chisinau, Republic of Moldova, July 7-8, 2011*, **ISBN 978-9975-66-239-0**, pp. 266 – 270.

[2] Iu. Nica, S. Zavrajnîi, A. Gritzco, Iu. Tiron, V. Musteatza, A. Stalbe. Dispozitiv şi procedură de hipertermie locală în ţesut biologic. *Proceedins of The 4th International Conference on Telecomunications, Electronics and Informatics, May 12 – 20, Chişinău, 2012*, **Vol. II**, Pag. 331 – 339.