NEW DEVICE AND TECHNOLOGY FOR ANTIMICROBIAL PHOTOTHERAPY

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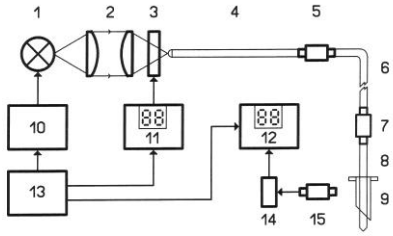
One of the most difficult issues in modern medicine is the combat against infectious diseases. At the same time the problem of the increasing resistance of the infected microorganisms against the most up-to-date antibacterial preparations (the chemotherapy problem), is becoming more pressing [1]. From what is known, mercuric lamps have a very strong sterilization action, the character of their radiation not being coherent. Important is, firstly, the wavelength of the photon (i.e. energy), intensity and duration of irradiation.

Because of this we developed a device for phototherapy with ultraviolet C radiation of the human cavities populated with colonies of unspecific or/and tuberculosis microflora. As UV radiation source serves arc discharge tube with high pressure mercury vapor. The wide band radiation in addition to the pronounced bacteriostatic effect, exercises a stimulating action on microcirculatory process in the irradiated area, resulting in more efficient treatment and reducing the period of healing the patient.

The device for treating the infected cavities, using wide band photon irradiation method consists of: tube of mercuric steam 1, quartz condenser 2, the shutter 3, the spectral radiation selecting device 4, optical connector 5, optical guide 6, optical connector 7, the distal segment of the optical guide 8, punction needle 9, power supply unit 13, which through the power stabilizer 10 supplies tube 1, timer-dozer 11 (which drives the shutter 3) and measuring device of the radiation power injected into the optical guide 12, photoreceptor 14 assembled with the optical connector 15 [2]. Block diagram of the phototherapy device and photo of developed device are prezinted on the pictures bellow.



The radiation parameters have had the following values: optical power at wavelength 254 nm - 1mW, and in range 280-500 nm - 15mW.

In the experiments were used cultures *Escherichia coli* and *Candida albicans* (Laboratory of medical diagnostic at the Institute of Phthisiopneumology and Laboratory of microbiology virology and immunology of State Medical and Pharmaceutical University "Nicolae Testemițanu"), Mycobacterium tuberculosis (Phthisiopneumology Hospital, Vorniceni). The experimental studies on biofilm samples from children and remodeling of the dental caries in rats has taken place in the vivarium of State Medical and Pharmaceutical University "Nicolae Testemițanu". The detalied rezultes of studies are prezented in [3-5].

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[3] Iu. Nica, L Pogorelischii, E. Maximov, V. Cebotari, C. Iavorschi, V. Bologa, V. Nahaba, E. Țîmbalari. Photon irradiation device for antimicrobial therapy. Proceedings: International Conference on Nanotechnologies and Biomedical Engineering ICNBME-2011, Chisinau, 7-8 july 2011. pp.294 -296

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[5] A. Spinei, Iu. Nica. Evaluating the effectiveness of UV irradiation on the oral cavity in rats. Proceedings of 2nd International Conference on Nanotechnologies and Biomedical Engineering , April 18-20 th, 2013, Chisinau, pp.522 – 523