

## DEVICES AND TEHNOLOGIES FOR THERAPY WITH BACTERICIDAL UV

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Lately there is an alarming spread of pathologies caused or assisted by bacteria or viruses resistant to pharmaceuticals. This increasingly insistent calls for the development of medical devices and technologies that would use other agents acting on pathogenic bacteria, for example, bactericidal radiation wavelength. The mechanism of DNA molecules modification consists in forming inside of thymine dimers by saturating the covalent connections between two neighboring bases under the action of photons [1].

From all the information, that we possess, is not apparent the necessity of coherence ultraviolet radiation in order to destroy the bacteria. This allows devices to use bactericidal radiation sources like mercury vapor tubes or LED. The main problem lies in introducing the flow of light in fiber optics that will guide you to the place undergoing radiation treatment.

A device for a procedure for preoperatively preparing patients with progressive drug-resistant fibero-cavernous tuberculosis also for the treatment of other diseases, as lungs and other organs is being developed. The device performed the process of treating infected cavities and contains: mercury tube ДРПН – 100, focusing system for selection of segment of the radiation spectral band 250-500 nm, optical guide with connectors and a puncture needle. Using the tube with high pressure mercury vapor as a radiation source allows to obtain the broadband photon radiation for treatment more efficient and for reducing the recovery time. It also provides a substantial simplification of the device and reducing its costs. The device was used to approve the method of treatment of infected cavities by means of endocavitary broadband irradiation. The experiments were performed in the laboratory of medical diagnostic and the one of microbiology at the Institute of Phthisiopneumology, virology and immunology at the Faculty for training doctors at the Medical University "Nicolae Testemitanu" researching the *in vitro* the influence of the wide band radiation on different bacterial strains. The radiation parameters had the following values: optical power at wavelength 254 nm - 1mW, and in range 280-500 nm - 15mW. In the experiments were used cultures of *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*. Effect of annihilation of bacteria colony is almost directly proportional to the duration of exposure and complete suppression occurs within 2–3 min.

In Hospital of Phthisiopneumology (Vorniceni) *in vitro* were irradiated 9 wild-type strains of *M. tuberculosis* isolated from patients with total resistance to first-line antibacterial preparations and reference strain H37RV. The time required for the irradiation to inhibit the growth of *M. tuberculosis* is safe for 30-40 seconds to 1cm<sup>2</sup> surface. The obtained results allow to propose UV photon irradiation method for clinical approval in order to stabilize the process and sanitation of the cavities in fibro – cavitary tuberculosis and particularly in complex therapy in preparation of the patient for surgery.

The influence of UV radiation on microorganisms of the oral cavity in rats was studied *in vivo*. It has been found to reduce the total number of microorganisms in the oral biofilm from 10<sup>7</sup> to over 10<sup>2</sup> (4 min). In the experimental groups was found to reduce the number of acidogenic microorganisms and increase saprophytes. At the end of the experiment, upon examining the jaws, it has been revealed that the number of caries cavities was reduced by 40% in the group of irradiated batches in comparison with the one of controls.