

Optical-Electronic Systems for New Photomedical Technologies

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Abstract - In this paper new developments of the optical-electronic systems of the directed non-coherent radiation are offered for various branches of medicine are given.

Keywords - photomedical technologies, stimulation

I. INTRODUCTION

Modern medical technologies which are based on the medically-diagnostic action of optical radiation and used in the so-called photomedicine often name photomedical technologies [1, 2]. Lately photomedical technologies become more popular in medical practice, however the newest from them require the foresight of the stimulation modes of irradiation and increased informing during a medical process. Stimulated modes, in particular, with frequencies of photostimuls, corresponding to the spatio-temporal processes in biomedical objects, due to the guided dynamics of radiation and bioresonance effects caused by it, can considerably promote efficiency of medical processes, foremost, substantially to abbreviate them. The increase of informing about motion of medical processes, especially, through continuous control of changes of indexes of biomedical objects during the session of photomedical technology, enables to the doctor to conduct a session in the interactive mode, what to provide the operative corrections of parameters of radiation and correction of further medical strategy.

II. PROPOSES

Taking into account an urgent requirement in such technologies for many medical industries, foremost, for hematology, ONT, dermatology and surgery, for the decision of problem new developments of the optical-electronic systems (OES) of the directed non-coherent radiation are offered. Due to application of new optronic methods and facilities, on the basis of modern radian's with thermal, bit-plasma and semiconductor radiate bodies and photoreceivers, the offered systems allowed to create on stimulate modes of irradiation with the programmatic guided dynamics of descriptions and continuous non-destructive control of medical session after the analysis of changes of parameters during his action on them. Such analysis can be carried out on the basis of comparison of optical descriptions of blood, bloodfull organs, healthy and staggered fabrics and others like that, due to differences in a reflection and key-in by them test light streams.

For a management spatial distribution of irradiation on a surface in a range a 1,5...2 mm is reasonable choice and it is worked out OES on the basis of a bit-plasma radiate body of high-pressure with a reflective surface, with the management of radiation the dynamic changes of current of $I = 1... 2,1$ A of the source of magnetic-field by tension of $H = 34.63$ mTl.

Recommendations are got for creation of dynamic radiation on the basis of matrices of light emitted diodes by power from 10 mW to hundred mW, by the corners of radiation 30-60°, by sizes a 3-5 mm and by safe at medical requirements working currents (less than 1 mA) and voltage (less than 10 V). On the basis of the conformities to law reduced by us at the repeated changes of spectrums of absorption in the areas of 420-480 nm and 500-600 nm (5-60%), spatial distributions of light transmission (30-70%) and color temperature of test streams (5-15%) the new are offered method and device of evaluation of efficiency of medical session. During realization of it in the stimulation mode with frequencies 1-10 Hertz on visual receptors or with programmable sequence of photostimulation on the surface of pathological organ it is possible to arrive at the considerable improvement of medically-diagnostic processes. By means of the impulsive stimulate programs in surgical coagulators it is possible a management to attain the increase of efficiency of temperature action. Got experimental distributions of temperature inplane area of irradiation for the sizes of reflector a 50 mm allow to get of high temperature area a 1,5-3.0 mm which coincide with expected after a mathematical model.

III. CONCLUSION

In this paper the new proposes on developments of the optical-electronic systems for medical aeries: hematology, ONT, dermatology and surgery are given. These systems create an object on the surface of biomedical software controlled spatial, spectral and temperature distributions of optical radiation of wavelength range and provide a continuous flow control medical processes based on changes in optical characteristics of irradiated objects.

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