

INFLUENCE OF LASER RADIATION ON A MAN

Doctor of Science in Technical Sciences and Technology,
General director of the Center of Scientific Engineering and
Social Activities "Trymas" V. Makukhin (Russia, Moscow). Tel./fax (095)
949-90-78

Influence of laser radiation on biological objects becomes apparent in the following effects: thermal, impact, light pressure and electrostriction, formation of intratissue poisons and also nonlinear optical effects.

Occurrence of each of listed effects depends on parameters of laser radiation and its energy characteristics. Under the influence of laser radiation on human organism pathologic changes of health and welfare were noted. Experiments indicated functional disturbances in central nervous activity, that become apparent in heightened nervousness, change of brain axis etc. Occurrences of vegetative-vascular disfunction, cardiovascular disorders were recorded which becomes apparent in an instability of blood pressure, increased perspiration, pulse retardation. Examined patients complained of fatiguability, troubled slumber, eye-bulb colics. We cite data on changes of red and white corpuscles presented by total decrease of cell blood elements (erythrocytes and leucocytes). Erythrocytes have an ability for absorption of laser radiation over a wide range of optical spectrum. These changes and subjective sensations disappeared after taking prophylactic measures.

With irradiation of biological objects often it is difficult to separate one effect from the other and so it is necessary to evaluate a simultaneous influence of some factors, taking into account, that in every concrete case a specific weight of separate factors is different. Laser radiation, influencing on an organ or tissue, causes undesirable changes in functioning organs of breathing and digestion, cardiovascular and endocrine systems. The clinical symptoms can have a steady and strongly marked character as a result of laser radiation influence on the nervous and other systems of the human organism. These changes can act within some hours. Laser devices can cause temporary invalidity of personnel. They can be used as a nonlethal weapon (NLW).

Main aspects of the report are:

- using laser radiation with different intensity and frequency;
- change of a man state in process of laser radiation influence;
- levels of laser radiation influence and biological effects in human organism;
- a man sensations in process of laser radiation influence;
- maximum permissible levels of laser radiation;
- system specifications for laser NLW.

KEY WORDS: laser radiation influence, biological effect, pathologic change, maximum permissible level, specification, laser nonlethal weapon.