

The effect of MLS laser radiation on cell lipid membrane

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Abstract

Introduction. Authors of numerous publications have proved the therapeutic effect of laser irradiation on biological material, but the mechanisms at cellular and subcellular level are not yet well understood.

Objective. The aim of this study was to assess the effect of laser radiation emitted by the MLS M1 system (Multiwave Locked System) at two wavelengths (808 nm continuous and 905 nm pulsed) on the stability and fluidity of liposomes with a lipid composition similar to that of human erythrocyte membrane or made of phosphatidylcholine.

Materials and method. Liposomes were exposed to low-energy laser radiation at surface densities 195 mW/cm² (frequency 1,000 Hz) and 230 mW/cm² (frequency 2,000 Hz). Different doses of radiation energy in the range 0–15 J were applied. The surface energy density was within the range 0.46 – 4.9 J/cm².

Results. The fluidity and stability of liposomes subjected to such irradiation changed depending on the parameters of radiation used.

Conclusions. Since MLS M1 laser radiation, depending on the parameters used, affects fluidity and stability of liposomes with the lipid content similar to erythrocyte membrane, it may also cause structural and functional changes in cell membranes.

Key words

liposomes, laser irradiation, laser therapy, MLS M1 system