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Original article

Impact of laser (Nd:YVO4 Crystals,532nm) radiation on white blood cells

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Abstract

Lasers have been flexible to utilization in multiple fields, one of these significant applicability in varied ranges in medicine for the advancement of health. Various models of lasers have been developed and efforts have been performed to incorporate it based on the precarious impressions they pose. The current study analyzed whether the low-level energy laser can be induced the leukocytes cell number count in human whole blood in vitro.

Hundred five ml samples of healthy and not-healthy blood obtained respectively, then the samples were additionally divided into four groups with 25 samples each, the four groups received different energy density. Each sample was then subdivided into 2 parts with 2.5 ml each ; was to labour as a control and the other as a test.

In examining the influence of the laser on the count numbers influenced by human leukocytes , the (Nd: YVO4 Crystals-diode-pumped, λ=532nm) laser was applied, in the first experimental group, the laser energy density was 0.5J/cm^2 at exposure duration of 1Sec , 1.5J/cm^2 at exposure duration of 3Sec, 3J/cm^2 at exposure duration of 6Sec and 5J/cm^2 at exposure duration of 10Sec for the second, third and fourth experimental groups. The examinations were assessing specifically the counts of leukocytes were conducted in an automated hematology analyzer. The leukocytes count in all the experimental groups did not vary and almost remained unchanged even after irradiation of the blood samples with different exposure duration.

The laser radiation on the blood samples appeared to have no significant influence on the leucocytes count number. The finding showed that the effect of the irradiation on these cells was less, nonetheless, the statistical analysis of the mean of the leukocytes cell count number of all groups noted the increase wasn't significant ($p>0.05$) , this intimates the advantageous role of a laser on numerous varieties of leukocytes,

Laser irradiation (Nd: YVO4 crystals-diode-pumped, λ=532nm) significantly improved the rheological characteristic by the protection and safeguard of leucocytes count essentially, these outcomes confirmed that there was no changing in the hemolysis markers and serum bilirubin concentration, the immune cell element wasn't considerably influenced by this laser . This proposes the importance of low-energy laser's in its biomedical application for various conditions.

Key words: Laser, White Blood Cells, Hematology

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