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HEK293/ACE2 cells' response to severe acute respiratory syndrome coronavirus-2 infection and low-level-laser therapy under microscopy

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### **Abstract**

Low-level laser therapy (LLLT) is a method of exposing cells or tissue to low levels of red and near-infrared light that has a high success rate for the treatment of various ailments. LLLT has been used to treat various diseases, including wounds, spinal cord injuries, and symptoms of viral conditions like blisters caused by the Herpes Simplex Virus. The aims of the study are to investigate the effect of laser irradiation on SARS-CoV-2 infected cells and on uninfected cells using a scanning electron microscope (SEM) and transmission electron microscopy (TEM) as analysis tools. SEM was used to determine the morphological differences caused by laser irradiation on SARS-CoV-2 infected HEK293/ACE2 cells as well as non-irradiated SARS-CoV-2 infected ones. In addition, the results obtained were compared to irradiated and non-irradiated uninfected cells. To further evaluate the effect of irradiation and SARS-CoV-2, the transmission electron microscope (TEM) was used to investigate the changes in the interior of the aforementioned cells. In preparation for SEM and TEM, HEK293/ACE2 cells were infected with SARS-CoV-2 and irradiated with a 640nm laser at different fluences. Following irradiation, the cells were then fixed and mounted. The data obtained using different magnifications in SEM, revealed differences in the occurrence of surface projections and shape of SARS-CoV-2 infected and uninfected cells, and in TEM they display clear difference in the interior structure of both SARS-CoV-2 infected and uninfected HEK29/ACE2 cells irradiated.