Opportunity and Significance

One of the most dangerous forms of skin cancer is malignant melanoma [1-4]. Over 15,000 deaths are reported in the U.S. from this cancer every year, and the number of people diagnosed with malignant melanoma has been increasing every year [3-5]. Light exposure is key problem of interest for melanoma patients, as it can have an influence over the melanoma cells once the cancer has been diagnosed.

Technical Objectives

The purpose of this study was to evaluate that what range of wavelength can cause a significant change in growth of melanoma cells in vitro. Through using B16-F10 melanoma cells, the change in growth of these cells with light exposure at different wavelengths (405nm, 532nm, and 650nm) were evaluated, as well as compared to a control group.

Related Work and State of Practice

Current research examines the effect of LEDs and low level laser therapy (with wavelengths between 390 nm and 600 nm on melanoma cells in vitro [12,2,14,17]. Although numerous studies have been conducted, a definitive conclusion has not been reached regarding an exact exposure wavelength and time that has a significant impact on the growth of melanoma cells [5, 11, 17-19].

Technical Approach

A total of 24 experimental wells and 24 control wells (for a total of 2 well plates, respectively) were used for each wavelength of exposure. The control wells received no exposure to the laser. Both the experimental and control well plates were grown for 24 hours after seeding the cells before the experiment began. The methodology consisted of light exposure and cell counts every 3 hours.

Results

Future work is focused on determining the proper methodology to expose the cells to light for longer periods of time. It is proposed that exposure be able to be done for continuous periods of up to 48 hours. This was limited in this experiment due to the minimal duration that the laser would function before battery change was necessary.

Commercialization Plan & Partners

There were many hurdles in this experimental approach that need to be approached: inconsistent initial cell count, use of un-treated well plates, varied power measurements of lasers (continuous decline). Techniques that can be approached to address these hurdles are using treated well plates, longer exposure time within incubator, consistent lighting conditions when not exposed to laser, and use of an autonomous laser. One of the most important factors within this experiment is keeping conditions consistent between experiments, as the factors that can potentially lead to error need to be limited. Using these new attempted strategies, this can be attempted.

References