Novel QD-Conjugated DRD2/HER Antineoplastic Therapy

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This research project seeks to analyze the characterization of the Human Epidermal Growth Factor Receptor (HER2) and the Dopamine Receptor D2 (DRD2) that is overexpressed in cancer cells. This has been shown by studies that indicate there is elevated DRD2 and HER2 expression in malignant cells compared with normal cells, in addition to elevated expression coinciding progression of the tumor growth. Epigallocatechin gallate and oleocanthal as well as thioridazine and chlorprothixene hydrochloride were used as inhibitors to suppress the overexpression of these receptors and the proliferation of cancerous cells, respectively. Cadmium selenide quantum dots were synthesized and conjugated with the two treatments mentioned, and fluorescence spectroscopy studies were conducted. An MTT and cell proliferation assay was used to analyze the health and metabolism of the cells. The ImageJ processing application was used to determine MTT color intensity and results showed that the application of oleocanthal to the melanoma cells caused roughly a 90% reduction in the number of live melanoma cells. Thioridazine caused roughly a 46% reduction in the melanoma cells as well. The ANOVA test analyses confirm the significance of the data with a p-value less than 0.005, and further RNA extraction and purification was carried out to isolate the protein from the cells for an RNA gel electrophoresis.

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