Chitosan Gelatin Microspheres: Using Fluorescein as an Indicator for the Delivery of Drugs into CEM, HeLa, and HEK 293 Cells

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The purpose of this project is to evaluate whether or not chitosan microspheres are able to successfully deliver drugs into different human cell lines (CEM, HeLa, HEK 293 cells). The indication of the delivery will be seen by the presence of green fluorescein dye instead of the use of actual drugs. Testing this apparatus will challenge its biomedical and pharmaceutical abilities and its relation to cancer research such as gene and chemotherapy. Two types of chitosan mixtures will be utilized: high molecular weight and low molecular weight. The chitosan microspheres are made using chitosan originating from Agaricus bisporus and crustacean shells. The process of creating and testing this project consists of the use of overnight mixing, extra virgin olive oil, hot/cold temperature bathes, the method of coacervation, several acetone/isopropyl washes, freeze drying, several incubations and analysis using the spectrophotometry and a scanning electron microscope. An ANOVA statistical analysis test was used to test the significance of the data. The p-values for the mixed, pure and control resulted in the following: 0.231, 0.003 and 0.000. Based on the ANOVA test, the data for the pure and control are significant which support the hypothesis of the project. Overall, the chitosan microspheres have yielded results proving that it is able to transfer drugs into cells. This method can be an alternate, efficient, inexpensive, and harmless way to treat cancer patients and reduce the use of chemotherapy.

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