Biologic Multifunctional Nanoparticle for Multiple Myeloma Treatment

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Abstract

This proposal is designed to investigate the efficacy of high density lipoprotein (HDL) as a multifunctional nanoparticle and as a nanocarrier in Multiple Myeloma (MM) cells. HDL is a natural particle that showed effectiveness in carrying particles to other cells. The purpose of this proposal is to investigate the role of HDL in protecting the healthy cells from the cytotoxic effect of common cancer treatment (Doxorubicin) in multiple myeloma cells. In this proposal another common nanoparticle Doxorubicin conjugate will be served as a control along with free Doxorubicin. Stem cells will be harvested from patients with MM and cell culture will be performed. In order to eliminate the confounding variable, the VLA4-pep conjugate will be incorporated into the nanoparticle conjugate under investigation as well as the control. Different stem cell samples will be collected and will be treated with different independent variables. After treatment of MM cells with HDL-Dox-VLA4-pep, Chitosan-Dox-VLA4-pep and free Dox cellular uptake assays and Cytotoxicity assays will be performed using specific dye, Rhodamine 6G. Rhodamine 6G helps to observe live cells while performing live cell microscopy. Moreover, this proposal investigates the budgeting of the resources, material and equipment needed as well as the private and federal funding of this specific research. Specific aim of the author is indicated in the proposal and there is a thorough resolution about the ethical issues provided using IRB framework and consent form. This proposal provides the research question and hypothesis as well as a direction to future studies based on the authors experiences.