Immunotherapy for Multiple Myeloma Cell Lysis

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The purpose of this study is to optimize conditions for antibody-dependent cell-mediated cytotoxicity (ADCC) by natural killer (NK) cells to lyse multiple myeloma (MM) cells. The incidence of MM in the United States is 1 in 143, so curing this cancer is paramount. In this study, experiments were conducted in which NK cells, an antibody (Elotuzumab), and MM cells loaded with Calcein (fluorescent agent) were filled in well plates. The Calcein released upon cell lysis was quantitatively measured using fluorescence spectroscopy. The independent variables were antibody concentration and type of NK cell (pNEUK or Wis V). The objective was to determine which cell line would yield the greater cell lysis. The control for each experiment was MM and NK cells with no antibody. Constants included: incubation time of well plates and NK:MM cell ratio. It was hypothesized that pNEUK NK cells would yield greater cell lysis. The statistical analysis of the data was conducted using 2-way ANOVA test and multiple T-tests. The results show that pNEUK NK cells are better and more consistent than Wis V NK cells in achieving higher cell lysis. Future studies include changing the NK:MM cell ratio in order to ensure cell lysis does not exceed 100%. Using different cancer cells in conjunction with their corresponding antibody, and using more drug concentrations between 10 and 100 ng/mL to obtain a more gradual dose response are other future avenues.