1070-92-156 **Ryan Elizabeth Prendergast*** (repren11@holycross.edu), 1 College Street, Box 2247, Worcester, MA 01610. *Determining the Rate Constant Matrix for a Two Compartment Pharmacokinetic Model.* Preliminary report.

When a drug enters the body, it undergoes a series of kinetic events, including absorption, distribution, metabolism, and elimination. Collectively, the study of these actions is known as pharmacokinetics. These actions occur in different compartments of the body, with the drug traveling through the bloodstream into different organs. The main purpose of our research is to develop a reliable method of estimating the rates at which drugs move from bloodstream to organ, or in our case tumor, and vice versa. In order to determine the most effective method, we developed a "simple" two-compartment model, one compartment representing the blood pool and the other being the tumor. We began with a predetermined rate constant matrix and found its eigenvalues and eigenvectors. Using these eigenvalues and eigenvectors, we created linear combinations of exponential functions to simulate bio-tracer mass data contained in each compartment. We then used various methods to estimate the rate constant matrix, utilizing linear regression and non-linear fitting coupled with spectral. Our goal was to determine the most reliable method, and subsequently to expand our findings to a multi-compartmental model, and ultimately apply our method to real data. (Received February 08, 2011)