Using Delay Differential Equations to Model Dendritic Cell Therapies

Angela Gallegos, Loyola Marymount University

Dendritic cells are a promising immunotherapy tool when used to boost an individual's adaptive immune response to cancer. We develop a mathematical model using differential and delay-differential equations to describe the interactions between dendritic cells, effector cells and tumor cells. We account for the tra?cking of immune cells between lymphoid, blood, and tumor compartments. Our model mimics experimental results for both non-tumor and tumor data in mice. In addition, in silico experiments suggest more effective immunotherapy treatment protocols as well as certain biological parameters that might be adjusted in patients so that this treatment would be more beneficial to them.