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Xiaochuan Hu* (xiaochuan.hu@ttu.edu), Texas Tech University, Department of Mathematics and Statistics, and **Sophia R.-J. Jang**, Texas Tech University, Department of Mathematics and Statistics. *Dynamics of tumor-CD4⁺-cytokine-host cells interactions with treatments*

Historically, CD4+ T cells have been assumed to have only a helper role by activating CD8+ T cells to kill cancer cells. Recent experiments have shown, however, that CD4+ T cells actually play a more direct role in tumor eradication even in the absence of CD8+ T cells by using the cytokines and chemokines that they produced. In this talk, we introduce several mathematical models of interactions between tumor cells, CD4+ T cells, cytokines and host cells to investigate the role of CD4+ T cells on tumor regression. We apply immunotherapies with either CD4+ T cells or cytokines to study their effectiveness. It is concluded that doses of treatments along with initial tumor sizes are critical in determining the fate of a tumor. Tumor cells can be eliminated completely if doses of treatments by cytokines are large. The treatments are in general more effective if the tumor size is smaller. Bistability is observed in all models with or without the treatment strategies, which indicates that tumor cells can be successfully controlled by a carefully derived treatment strategy. (Received September 16, 2016)