1051-65-197 **Jianzhong Su*** (su@uta.edu), Department of Mathematics, University of Texas at Arlington, Arlington, TX 76019, and **Humberto Perez Gonzales**, **Michail Todorov**, **Hristo Kojouharov** and **Liping Tang**. *A mathematical model for foreign body reactions.* Preliminary report.

The foreign body reactions are commonly referred to the network of immune and inflammatory reactions of human or animals to foreign objects placed in tissues. They are basic biological processes, and are also highly relevant to bioengineering applications in implants, as fibrotic tissue formations surrounding medical implants have been found to substantially reduce the effectiveness of devices. Despite of intensive research on determining the mechanisms governing such complex responses, few mechanistic mathematical models have been developed to study such foreign body reactions. This study focuses on a kinetics-based predictive tool in order to analyze outcomes of multiple interactive complex reactions of various cells/proteins and biochemical processes and to understand transient behavior during the entire period (up to several months). A computational model in two spatial dimensions is constructed to investigate the time dynamics as well as spatial variation of foreign body reaction kinetics. The simulation results have been consistent with experimental data and the model can facilitate quantitative insights for study of foreign body reaction process in general. (Received August 25, 2009)