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**Hannah L. Callender** and **Mary Ann Horn\***, Department of Mathematics, 1326 Stevenson Center, Nashville, TN 37240. *Mathematical Modeling of Cellular Signaling: Lipid Signaling Kinetics*. Preliminary report.

Our goal is the construction of a comprehensive mathematical model for the uridine 5'-diphosphate (UDP) signaling pathway in the RAW 264.7 macrophage, a type of white blood cell. This mathematical model incorporates modules for: (i) the ligand interaction with the P2Y6 receptor, the putative mode of action for UDP; (ii) the subsequent G-protein cascade; (iii) the activation of effector enzymes including phospholipase C (PLC), diacylglycerol kinase (DGK), and several forms of phosphatidylinositol kinase (PI4K, PI5K). In addition, small molecule dynamics for  $\text{Ca}^{2+}$ , IP3, and PIPn are either modeled or used as functional inputs to provide a comprehensive description of the signaling dynamics. Our model focuses on diacylglycerol (DAG) and phosphatidic acid (PA), and lipidomic technology is utilized to measure the formation and fate of these important lipid second messengers. Modeling techniques, challenges, and computational simulations will be presented. (Received February 19, 2006)