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Hannah L Callender* (hannah.l.callender@vanderbilt.edu). *Purinergic Receptor Signaling in the RAW 264.7 Macrophage: Modeling Species-Specific Diacylglycerol Dynamics Following Receptor Activation by Uridine 5'-Diphosphate.*

A mathematical description is given for the uridine 5'-diphosphate signaling pathway in the RAW 264.7 macrophage, a type of white blood cell that surrounds and kills microorganisms, removes dead cells, and stimulates the action of other immune system cells. A comprehensive single-cell mathematical model is developed which includes a system of nonlinear ordinary differential equations describing the major pathway components, with an emphasis on the production and degradation of diacylglycerol, a cellular second messenger molecule which plays an important role in initiating various changes in cell behavior, including cell activation, differentiation, proliferation and tumor promotion. Modeling techniques, challenges, and computational simulations will be presented. (Joint work with Mary Ann Horn, H. Alex Brown, Mark Byrne, Dianne DeCamp, and Paul Sternweis.) (Received September 25, 2006)