1077-VG-1722 **Jared Barber***, 301 Thackeray Hall, University of Pittsburgh, Pittsburgh, PA 15260, and **Mark Tronzo**, **Gilles Clermont**, **Yoram Vodovotz** and **Ivan Yotov**. *A three-dimensional mathematical and computational model of necrotizing enterocolitis.* Preliminary report.

Necrotizing enterocolitis is a severe inflammatory disease in premature infants that is characterized by injured regions in the intestinal wall. The disease affects 7-10% of all very low birth weight premature infants and is associated with high mortality and morbidity rates. The dynamics of the disease depend upon a complex interplay between the immune system, intestinal bacteria, and cells lining the intestine. We use a three-dimensional computational model to examine this complex interplay and its dependence on the spatial structure of the intestine. The model consists of a system of transient partial differential equations that are solved numerically using cell-centered finite differences and an explicit Euler method. The model is used to track the evolution of an initial injured area of prescribed size and shape in the intestinal wall. The model produces pathophysiologically realistic results; decreasing the initial severity of the injury and introducing breast feeding to the system lead to healthier simulations. In addition, changing the initial shape of the injured area can significantly alter the overall outcome of a simulation. This finding suggests that the spatial details associated with an injury may be important in assessing the outcome for a given NEC patient. (Received September 20, 2011)