1106-VG-1638 **Brendan C. Fry*** (bfry@math.duke.edu). *Effect of structural organization of the kidney medulla on oxygen transport: A mathematical model.*

A theoretical model is presented to analyze the impact on oxygen distribution of the heterogeneous organization of the rat kidney medulla revealed in anatomical studies. Model PDEs are based on active and passive transmural transport processes, as well as conservation of water and solutes (NaCl, urea, O_2, HbO_2, Hb), and are solved to steady state. Results of the model suggest that the structural organization of the renal medulla produces marked axial and radial tissue PO_2 gradients. In addition, the heterogeneous structure preserves oxygen delivery deep into the kidney, but significantly increases the likelihood of O_2-limiting tissue injury. (Received September 14, 2014)