1046-92-438 **Anita T Layton*** (alayton@math.duke.edu), Department of Mathematics, Duke University, Box 90320, Durham, NC 27708. *Tubuloglomerular Feedback Signal Transduction in a Compliant Thick Ascending Limb.*

We previously used a mathematical model of the thick ascending limb (TAL) to investigate nonlinearities in the tubuloglomerular feedback (TGF) loop. That model, which represents the TAL as a rigid tube, predicts that TGF signal transduction by the TAL is a generator of nonlinearities: if a sinusoidal oscillation is added to constant intratubular fluid flow, the time required for an element of tubular fluid to traverse the TAL, as a function of time, is oscillatory but nonsinusoidal. As a consequence, NaCl concentration in tubular fluid alongside the macula densa will be nonsinusoidal and thus contain harmonics of the original sinusoidal frequency. To address the concern that a more realistic model of the TAL would damp the harmonics, we have conducted new studies in a model TAL that has compliant walls and thus a tubular radius that depends on transmural pressure. These studies predict that compliant TAL walls do not damp, but instead intensify, the harmonics. In mathematical models, the impact of these harmonics on TGF-regulated SNGFR depends on the model formulation of the TGF response. We show by means of examples from the literature that the transmission of harmonics in TAL tubular fluid NaCl concentration to SNGFR depends critically on model assumptions. (Received September 02, 2008)