1020-92-128　　　　**Paula Grajdeanu*** (`pgrajdeanu@mbi.osu.edu`), MBI/Ohio State University, 231 18th Avenue, Columbus, OH 43210. *Applied mathematics and renal physiology.*

We use a generalized mathematical model of rat thick ascending limb (TAL) of the loop of Henle to investigate the impact of variable TAL inner radius and variable NaCl transport rate on the tubuloglomerular feedback (TGF)-mediated oscillations. An analytic bifurcation analysis of the TGF minimal model with TAL backleak provides fundamental insight into how oscillatory states depend on the physiological parameters of the model. Several attempts has been made to formulate mathematical models of the TGF system that is able to reproduce both the regular oscillations (in normotensive rats), and the irregular fluctuations (in spontaneously hypertensive rats). However, in most cases the models have been successful in describing the regular oscillations, but have failed to reproduce the irregular fluctuations (but by coupling of two nephorns). We hypothise that, irregular oscillations in hypertensive rats are attributable, at least in part, to the tubule's spatial inhomogeneities (Received August 23, 2006)