1093-37-295 **Amitabha Bose*** (bose@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102, **Jorge Golowasch** (golowasch@njit.edu), Department of Biological Sciences, New Jersey Institute of Technology, Newark, NJ 07102, and **Farzan Nadim** (farzan@njit.edu), Department of Biological Sciences, New Jersey Institute of Technology, Newark, NJ 07102. *Role of linear and voltage-dependent ionic currents in the generation of slow wave oscillations.*

Neuronal oscillatory activity is generated by a combination of ionic currents that must include at least one inward regenerative current that brings the cell towards depolarized voltages and at least one outward current that repolarizes the cell. Such currents have traditionally been assumed to require voltage-dependence. Here we show that the inward regenerative current need not be voltage dependent. Instead, a linear current with negative conductance is sufficient to produce regenerative activity. Using simple conductance-based models, bifurcation and phase-plane analysis, we show how this linear current interacts with potassium and sag currents to produce stable slow wave oscillations. The model makes several predictions which are confirmed through experiments on neurons from the crab stomatogastric ganglion. (Received August 19, 2013)