HOMOLOGY BETWEEN TURTLE AND MAMMALIAN CORTEX SUGGESTS A RE-EVALUATION OF THE ROLE OF LAYER 1. P.A. Rhodes$^{1,2,*}$ and R. Llinás$^2$. $^1$MRB, NIDDK, NIH, Bethesda, MD 20814; $^2$Dept. Physiology and Neuroscience, NYU Medical School, New York, NY 10016.

The complexities of mammalian 6-layered neocortex make elucidation of its basic functions a daunting challenge. One seeks a model system which reflects some of its fundamental neural operations but with a sufficiently simple set of elements to admit comprehensive understanding of its function, a foundation on which to build a subsequent analysis of neocortex. We offer here an analysis supporting the conjecture that the cortex of the turtle *pseudomys scripta* provides a suitable model system. Principal cell dendritic morphology, intrinsic firing properties, spine form, density, and distribution, cortical feedforward inhibitory physiology, ACh and NE innervation, laminar organization of corticocortical association, and many other features are common between turtle and mammalian neocortex, as well as with piriform cortex and dentate gyrus. One implication of the proposed homology concerns the nature of layer 1 input. In turtle cortex layer 1, a primitive feature common to all cortices, conveys the feedforward relay, both from sensory thalamus and the corticocortical feedforward projection (Desan 1984). In mammalian piriform cortex and dentate, layer 1 also conveys the feedforward relay of sensory information. In mammalian neocortex layer 1, which conveys inputs from higher to lower cortical areas, has heretofore been considered a secondary projection, modulating rather than driving cortical activity. The analogy with turtle cortex suggests neocortical layer 1, which appears to be quite effective in triggering layer 5 cell firing (Cauller and Connors 1992; Rhodes and Llinás 1999), may be a direct driver of cortical activity, with a role analogous to sensory input. Supported by Grant NS13742.