REPLY: We thank Dr. Rattay (2014) for commenting on our work (Boinagrov et al. 2012) and exploring the nature of the stimulation upper limit in a multi-compartmental model of the retinal ganglion cell (RGC), and confirming the sodium current reversal as a mechanism of this effect under certain conditions. We are aware of the fact that stimulation threshold in the axonal hillock is lower than in the cell soma due to higher concentration of the sodium ion channels in that area. We have demonstrated previously that transverse cellular polarization and associated stimulation in spherical and cylindrical geometry have similar characteristics (Boinagrov et al. 2010), and therefore, stimulation upper threshold can be described using the same model, just with higher concentration of the sodium channels. On the other hand, suppression of the propagating action potential (AP) in the hyperpolarized soma is indeed beyond the single-compartment model, and was not considered in our study. As we state in the DISCUSSION, the main distinction between the roles of the sodium current reversal on depolarized membrane and the anodal surround block is that the sodium current reversal is responsible for prevention of the action potential generation in the first place, while hyperpolarization of the other compartments in the cell might prevent its propagation there. It would be interesting to check whether there are (and what are the ranges of) experimental conditions where AP is generated in axonal hillock and propagates into its axon, but is not detected in the cell soma. This can be done, for example, using electrophysiological imaging on high-density multielectrode arrays (Litke et al. 2004). An alternative way to discriminate between these phenomena is to stimulate RGCs with anodic pulses: there should still be the sodium outflow with strong stimuli, but no anodal surround block.

GRANTS
This work was supported in part by National Eye Institute Grant R01-EY-018608, Stanford University Bio-X Research Grant, and Air Force Office of Scientific Research Grant FA9550-10-1-0503.

DISCLOSURES
No conflicts of interest, financial or otherwise, are declared by the author(s).

REFERENCES