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# Resting membrane potential of the rat ventroposteriomedial thalamic neurons during postnatal development

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## Abstract

Resting membrane potential is a critical parameter determining tonic or bursting mode of the thalamic neurons function. Previous developmental studies using whole-cell recordings revealed strongly depolarized values ofthe resting membrane potential (near -50 mV) in the immature VPM and LGN thalamic neurons. Yet, whole-cell recordings are associated with an introduction of the shunting conductance via the gigaseal that may lead to neuronal depolarization in small neurons with high, in the gigaohm range, membrane resistance. Therefore, we have performed measurements of the resting potential of VPM neurons in slices obtained from neonatal rats of postnatal days P2-P7 using cell-attached recordings of NMDA channels as voltage sensors. Because the currents through NM DA channels reverse near 0 mV, we assumed that the resting membrane potential should equal the reversal potential of currents through NMDA channels in cell-attached recordings. Analysis of the current-voltage relationships of NMDA currents revealed that the resting membrane potential in the immature VPM neurons is around -74 mV and that it does not change during the first postnatal week. This suggests that VPM neurons may operate in the bursting mode during the early postnatal period and support the oscillatory activity (spindle-like bursts) in the developing thalamocortical networks.

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