

Abstract

Combining *Drosophila* genetics, in situ whole cell patch clamp recordings and mathematical modeling, I am seeking the experimental proof for the theoretical consideration of O'Leary and Marder showing that ion channel degeneracy (different ion channels with functional overlap) renders neuronal excitability robust. The plentifulness of different ion channels in neuronal membranes determines the intrinsic excitability of a cell. Although the expression levels of the underlying ion channels are highly imprecisely regulated, slow type 1 input-output computation in DLM flight motoneurons MN1-5 for wingbeat power control is impressively robust to perturbations. I believe that ion channel degeneracy is a general underlying mechanism rendering neuronal excitability robust, not despite, but because of this noisy (imprecise) ion channel expression.

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