

Neuronal myosins and enteric neuromuscular neurotransmission

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Myosins

- Contractile protein commonly present in muscle cells
 - Also present in non-muscle cells, including melanocytes and neurons

“Dilute” mice: Deficiency of myosin Va leads to lightening of coat color

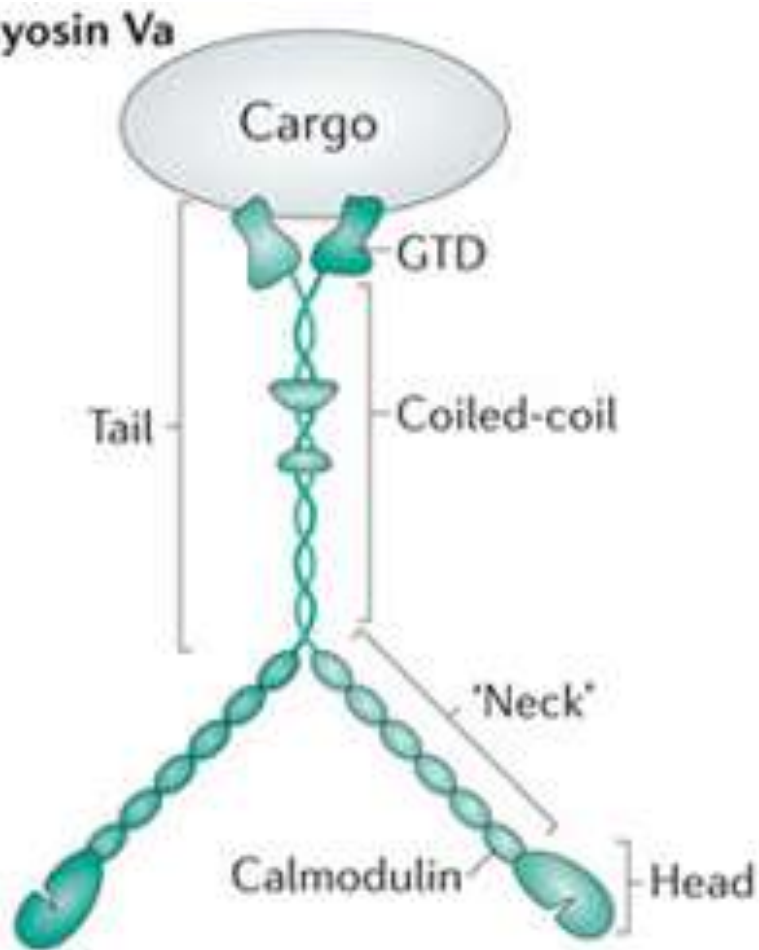
C57BL/6J



DBA/2J



Myosins have head & tail regions



Head : Actin binding

Tail: Cargo binding

Many different kinds of myosins

- 19 classes (1-19)
- >38 subclasses
- In neurons:
 - 10 classes (I, II, V, VI, VII, IX, X, XV, XVI, XVIII)
 - 23 subclasses
 - Demonstrated to be important: II (a, b, c), V (a, b, c), VI, VII

A class of myosin, myosin Va, is extensively distributed in central & peripheral nervous system

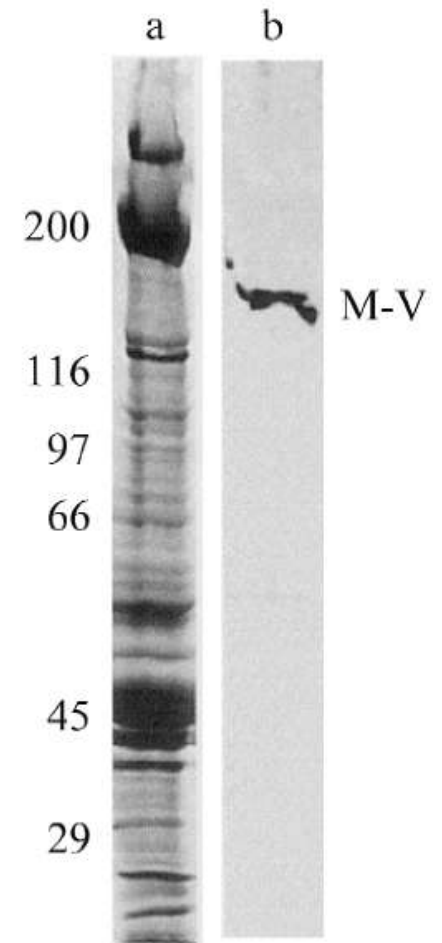
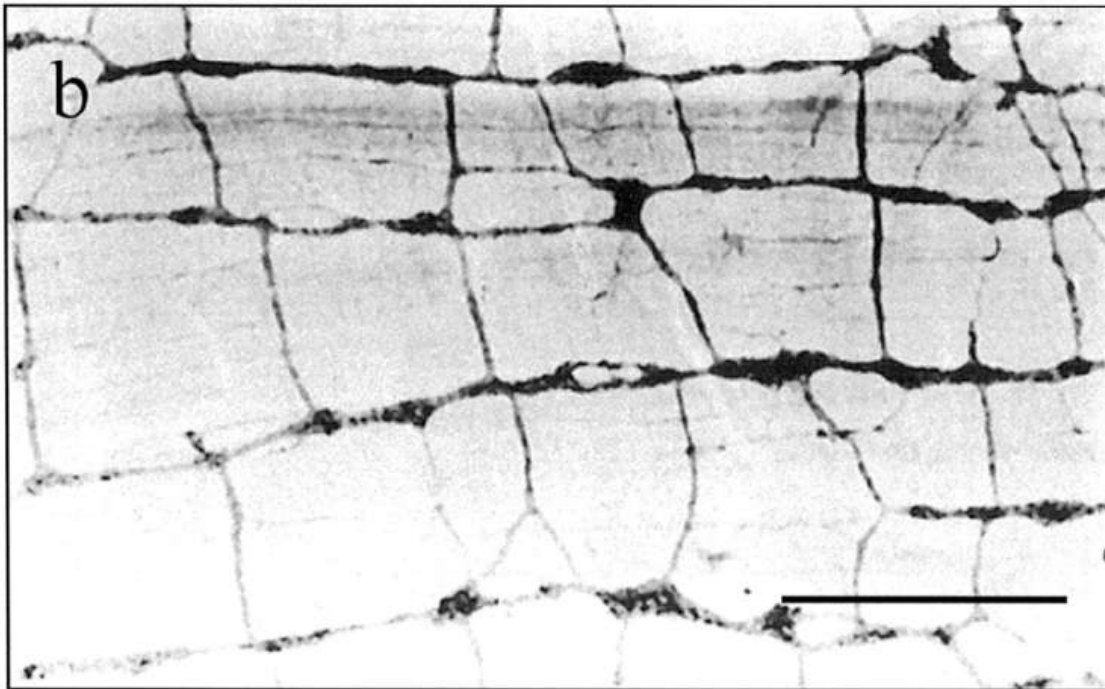
Processive motor: uninterrupted movement

Particularly involved in short-range transport of neurotransmitters in nerve terminals

Different myosins, including Myosin Va, involved in vesicular neurotransmission



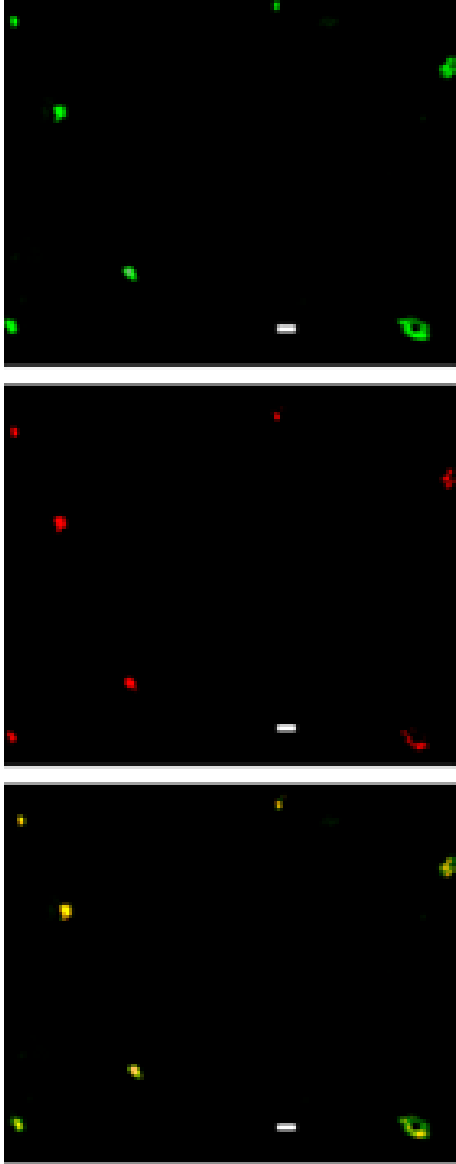
Myosin Va present in enteric nervous system



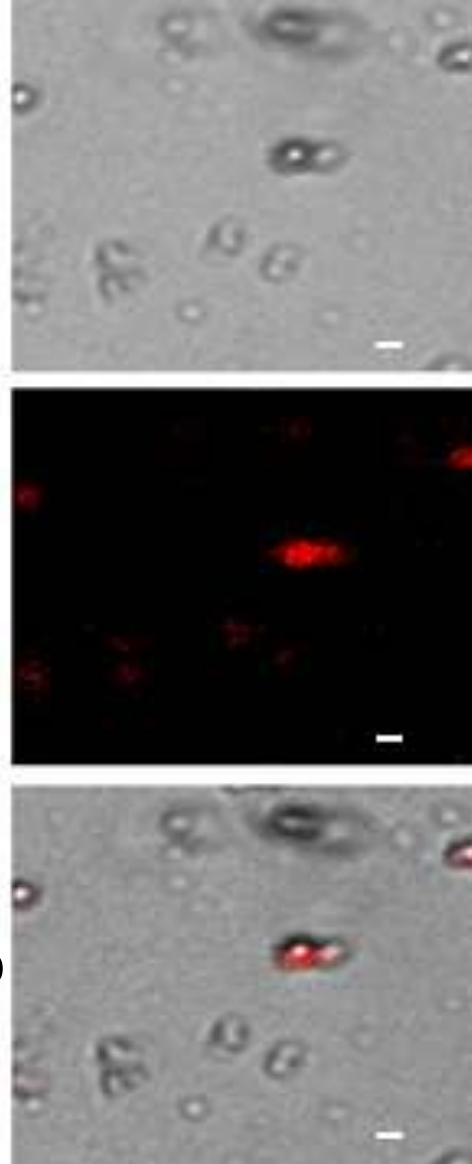
Drengk et al 2000

Myosin Va colocalizes with & binds SLC17A9 in enteric varicosities

Merged Myosin Va SLC17A9

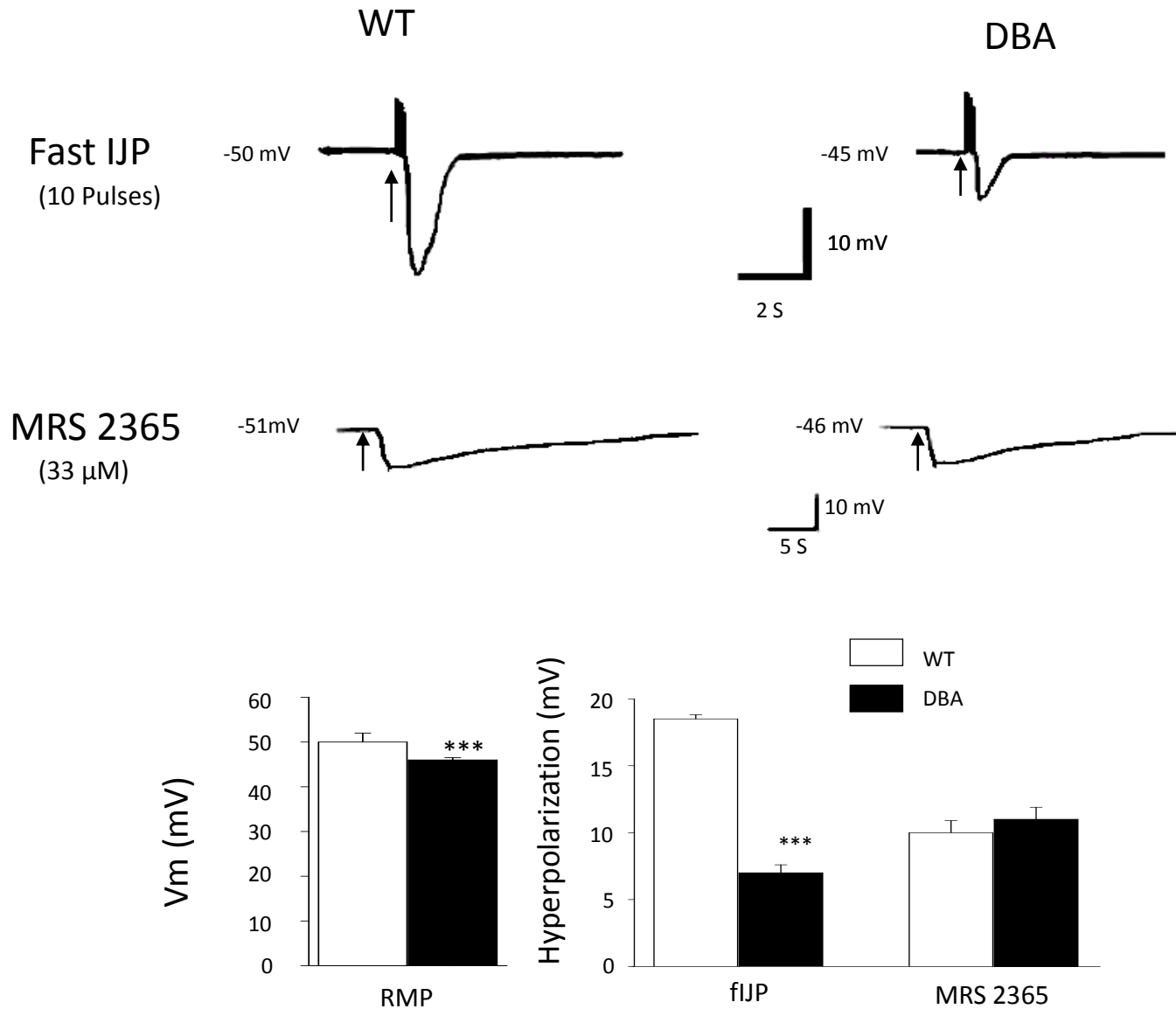


Merged In situ PLA DIC

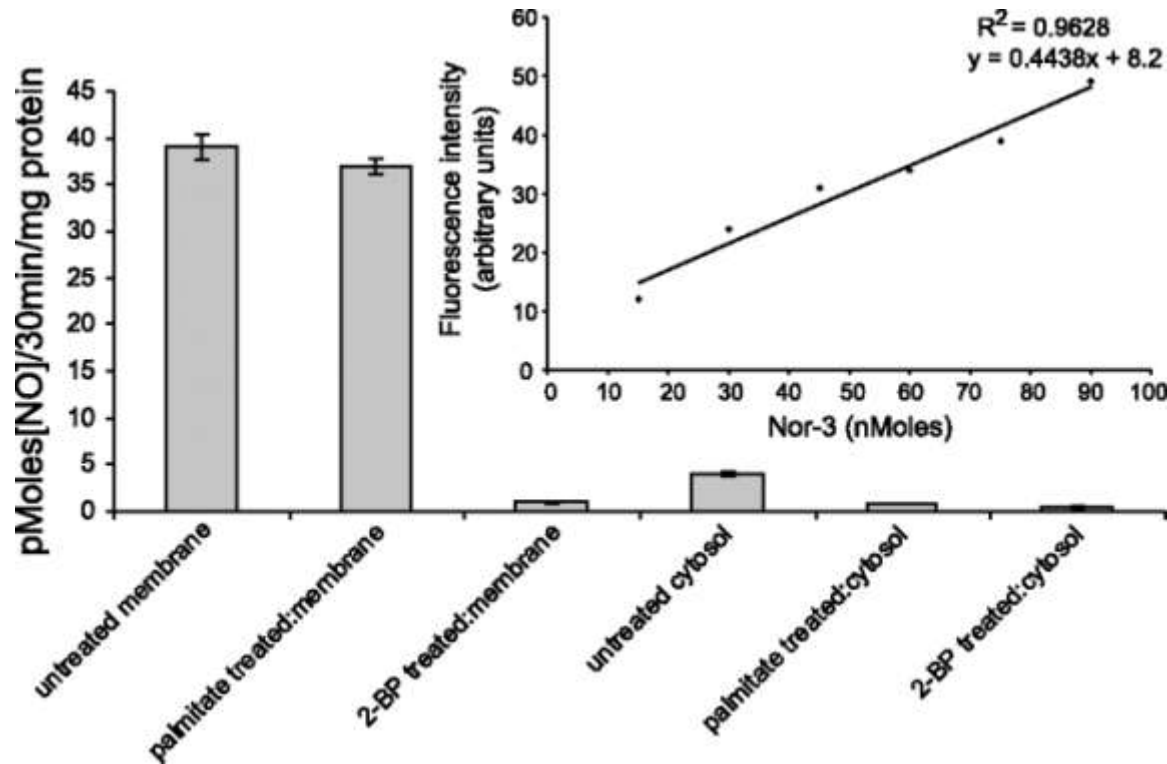


Chaudhury et al 2012

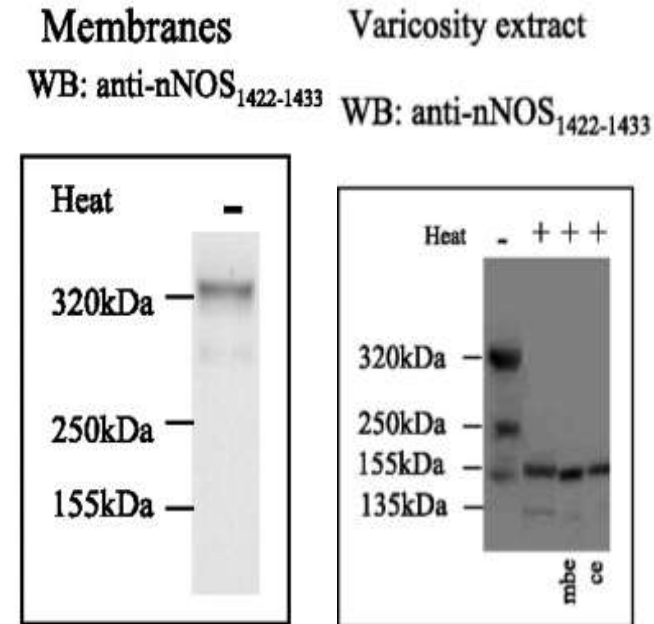
Purinergic Fast IJP reduced in DBA mice



Nonvesicular neurotransmitter nNOS α also requires membrane localization for activation

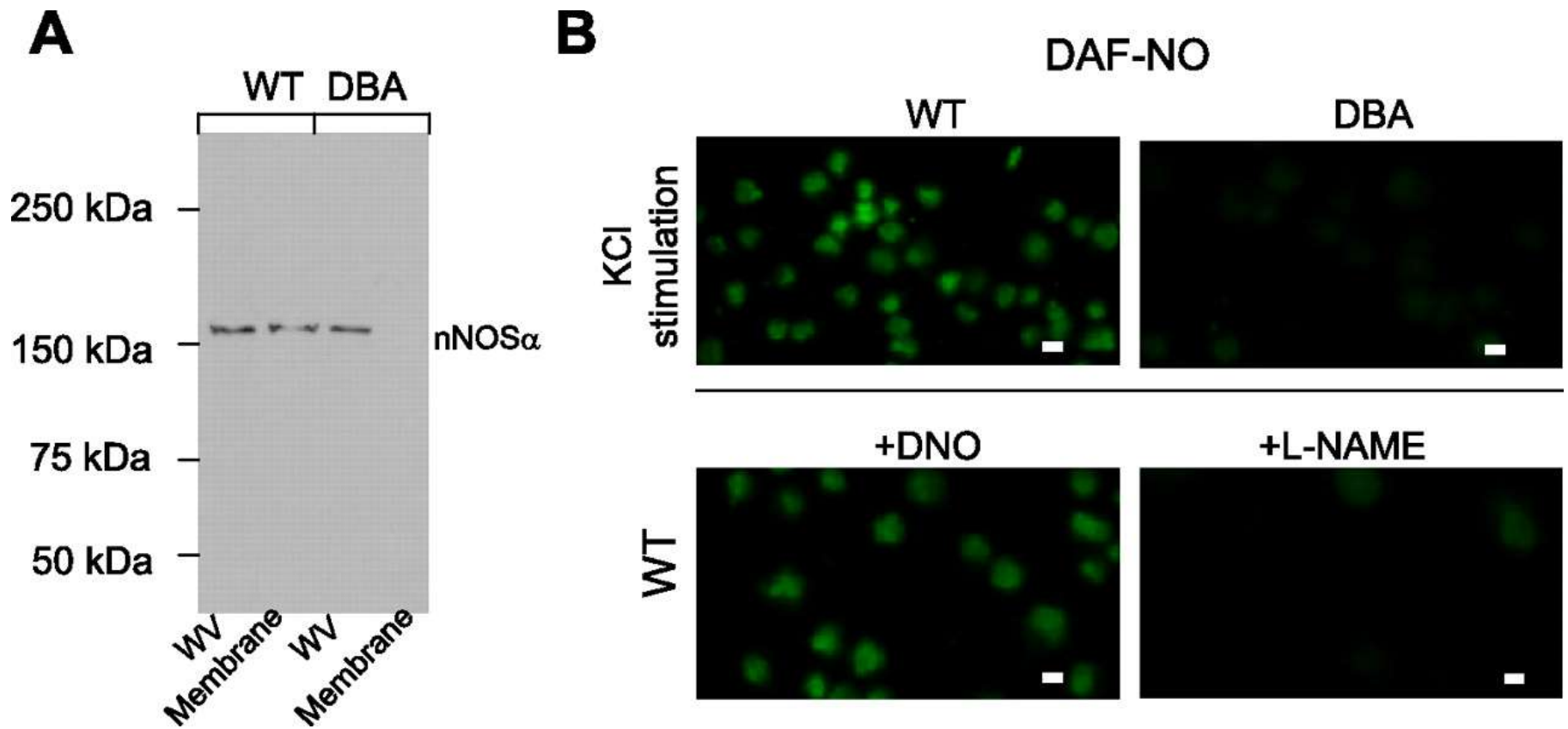


Chaudhury et al 2009

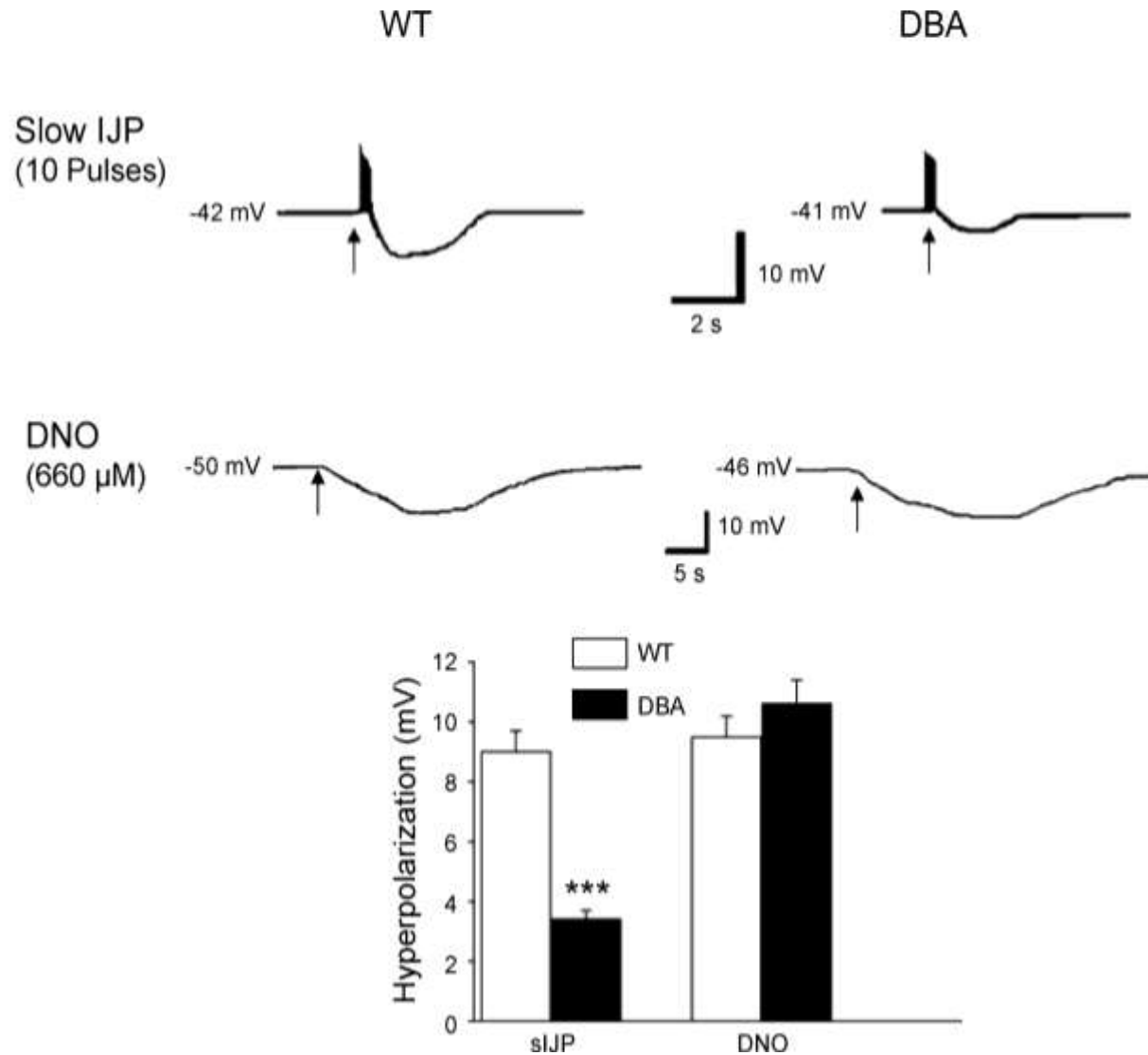


Chaudhury et al 2008

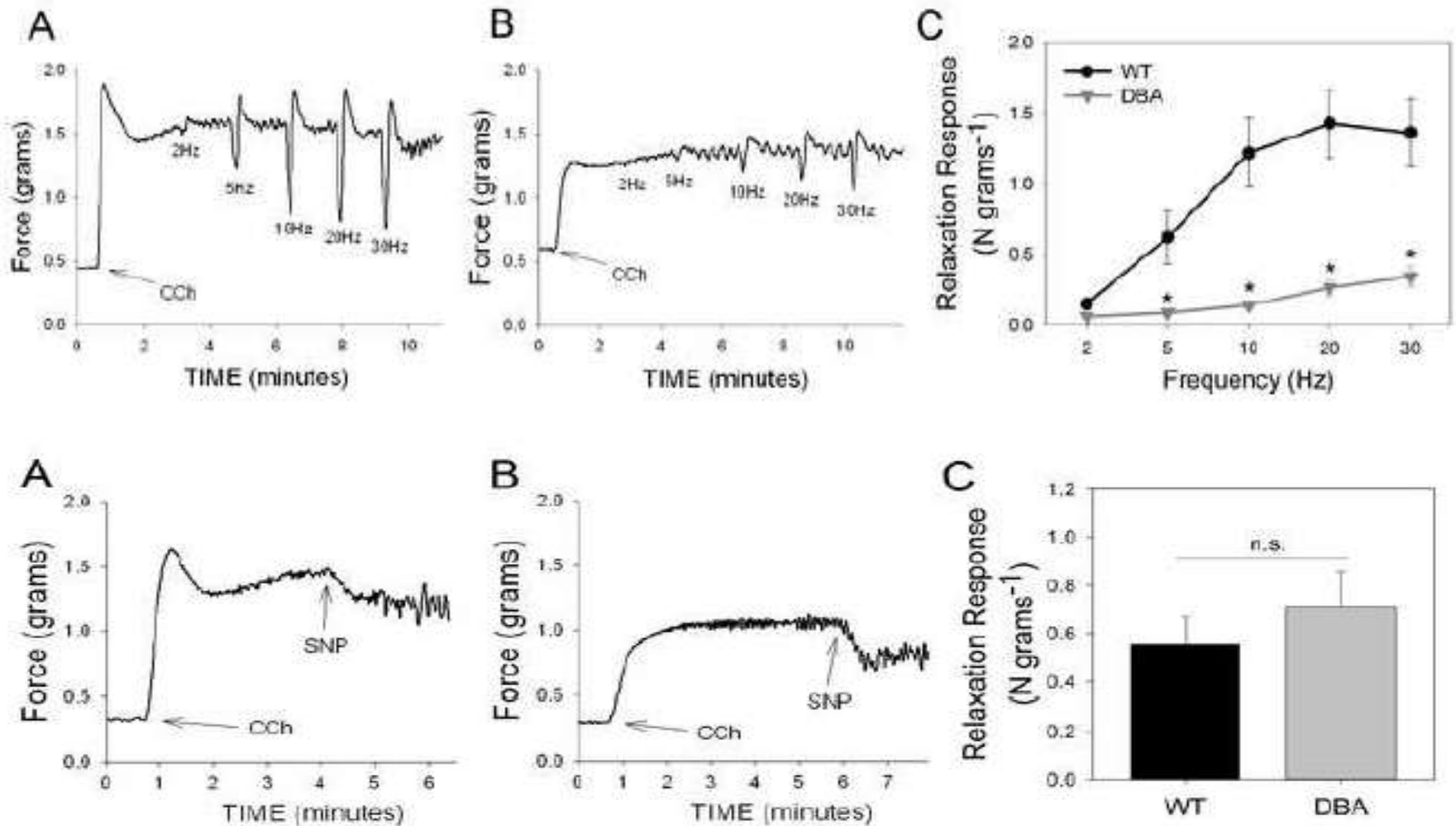
Myosin Va involved in transport of nNOS to varicosity membrane



Nitroergic Slow IJP reduced in DBA mice



Reduction of nitrergic relaxation in DBA fundus



Summary

Myosin Va plays role in both vesicular &
nonvesicular enteric neuromuscular
neurotransmission

Thank you