Pannexin 1 (PANX1) is a channel protein that regulates neuronal development

PANX1 forms regulated doorways, called ‘channels’, within cell membranes
- Allows anions, such as chloride and ATP, to pass through [1]
- PANX1 also interacts with the cell cytoskeleton [2]

PANX1 regulates neuronal development
- PANX1 is highly expressed in neural precursor cells, and its expression decreases as these cells specialize [3,4]
- PANX1 expression decreases dramatically in the mouse cerebral cortex across the first four post-natal weeks [5,6], and is largely restricted to neurons [unpublished data]
- PANX1 plays a key role in the stabilization of nerve cell connections (synapses) [5,6]

How does PANX1 expression change across neuronal development?
- Primary cortical neuron-astrocyte cultures are an easily-manipulated model to study the cellular and molecular mechanisms underlying neuronal development
- We therefore propose to use primary cortical neuron-astrocyte cultures to study the expression of PANX1 across neuronal development

Quantifying PANX1 levels with SDS-PAGE and Western blot
- SDS-PAGE separates complex mixtures of proteins based on molecular weight [7]
- Western blotting uses antibodies to identify specific proteins, and provides a readout of protein ‘intensity’ from a set of samples [7,8]
- Measuring the resulting signal intensities gives a semi-quantitative (relative) readout of protein levels between samples when compared to a total protein stain, or loading control signal (stably-expressed protein)

Preliminary: PANX1 decreases across neuronal development
- Preliminary data indicate PANX1 expression decreases as primary neural cultures and synapses (PSD-95) mature
- However, further replicates are needed to confirm these findings

Learning Outcomes
- Gained knowledge of primary neural cultures, neuronal development, and SDS-PAGE/Western blot techniques
- Experienced how a scientific research lab operates
- Began developing skills in reading scientific literature
- Increased competency in important transferrable skills including workplace etiquette, effective communication techniques, and reading comprehension

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References