ABSTRACT

TITLE:	Conservation of Alternative Splicing Events of the Brain Protein Piccolo Across Evolutionarily Diverse Species
AUTHOR(S):	Fountain, David
PRESENTED AT:	2015 Undergraduate Research and Creative Activities Symposium, Fort Lewis College

ABSTRACT: Rapid and efficient communication between neurons of the brain occurs at specialized cellular structures called synapses. An important molecular component of synapses is the protein piccolo. Piccolo is a large (>550 kDa) multi-domain protein and a member of the family of proteins involved in the organization and assembly of a critical structure of the synapse. Alternative splicing is the process of gene rearrangement in which exons are rearranged to form different variations of the parent gene in order to conserve genomic space and increase protein diversity. Following mRNA transcription, piccolo is post-transcriptionally modified by alternative splicing to generate multiple splice variants.. The post-transcriptional modifications that are found in both mammalian and teleost piccolo (PCLO) produces two primary splice variants through a cryptic splice junction. Here, we investigate the conservation of alternative splicing events between orthologous genes of two evolutionarily distant species, mouse and zebrafish. Using RT-PCR, we provide evidence for the existence and quantification two primary splice variants that are generated from zebrafish and mice. In addition, we also identified a minor 27-nucleotide (NT) splice variant of zebrafish PCLO that is also present in mouse and has been shown to be functionally significant by altering calcium affinity of the C2A domain. These results demonstrate that these alternative spicing events have been conserved over evolutionary time dating some 350 million years between teleost PCLO paralogs and mammalian PCLO. Furthermore, the similarities in genomic structure and splicing isoforms between zebrafish and mouse PCLO support the use of zebrafish as a relevant model for studying the neuronal function of piccolo.