Influence of Sub-Cellular Protein Localization on Cellular Growth Rate: A Potential Therapeutic Target for Combating Epileptogenesis

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Neurogenesis, the proliferation of neural cells in the brain, has been shown to correlate with higher rates of epileptogenesis (the progression of epilepsy in the brain). It has been shown that a proprietary protein (PP) plays a role in regulating the rate of cell proliferation. There are two isoforms of PP; PP-N is localized in the nucleus of the cell, and PP-C is localized in the cytoplasm of the cell. These two isoforms may affect cell proliferation through different mechanisms. This project investigated the effects of each isoform on cell proliferation. Cell proliferation was measured in three proprietary cell lines (PCL): a PCL-N cell line, a PCL-C cell line, and a control cell line which did not express either isoform (PCL-KO). Initial cell population projections were created using haemocytometry. Cell proliferation assays were used to measure cell proliferation at 24 hours, 48 hours, and 72 hours after initial plating. A 1-way ANOVA was used to determine the significance and p-value of the data. A significant increase in cell proliferation was found in PCL-C cells compared to the baseline PCL-KO cell line ($p=0.0017$) and compared to the PCL- N cell line ($p=0.0015$) at the 72 hour time point. However, the results comparing the increase in cell proliferation for the PCL-N vs. the PCL-KO cell line were inconclusive. The results of this study suggest that PP-C may play a role in regulating the rate of cell proliferation, and is thus a promising potential therapeutic target for combating epileptogenesis.

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