Plasma membrane calcium pump (PMCA) expression in a colon cancer cell line during differentiation

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The Plasma membrane calcium ATPase (PMCA) is an important calcium transporter in all cells and is responsible for maintaining low resting intracellular Ca^{2+} levels and removing Ca^{2+} after cellular stimuli. PMCA is encoded by 4 genes and alternative splicing produces an array of PMCA isoforms. Differentiation of colon cancer cell lines has previously been reported to be associated with alterations in calcium homeostasis and changes in expression of the sacro/endoplasmic reticulum calcium ATPase (SERCA). However, the role of PMCA has not yet been investigated. In these studies, changes in PMCA expression during differentiation of HT-29 colon cancer cells were accessed *via* two different mechanisms: sodium butyrate induced and post-confluency induced differentiation. The expression level of PMCA4 mRNA increased approximately four fold in 3 mM sodium butyrate induced differentiated cells as compared to undifferentiated HT-29 cells, whereas PMCA1 mRNA expression was not significantly increased ($p<0.05$). Dose and time dependent increases in the level of PMCA4 isoform was observed in sodium butyrate induced differentiated HT-29 cells. Similar changes in PMCA4 mRNA expression were also observed in post-confluence induced differentiation in HT-29 cells, with a significant increase in expression level detected as early as 7 days post confluency. These results indicate isoform specific changes in PMCA expression at mRNA and protein level, using real time RT-PCR and western blotting respectively. Future studies will investigate further if changes in PMCA levels can influence the sensitivity of colon cancer to differentiation inducers and the tumorigenicity of colon cancer cell lines.