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Gene expression and functional L-type calcium channel regulation

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L-type voltage-gated calcium channels are important regulators of the intracellular calcium level, which mediates many physiological/pathological processes in multiple cell types. Extensive studies have described the pharmacological properties and regulatory mechanisms of the $Ca_v1.2$ encoding L-type channels. The functional channel expression is controlled by multiple levels, including gene regulation, protein trafficking and membrane targeting. The gene expression of the channel subunits can be a rate-limiting mechanism for functional channel level. We have tested this possibility in a model by which calcium currents through voltage-gated calcium channels were differentially regulated by pharmacological tools. We found that the relative gene expression level, determined by real-time PCR analysis, of L-type calcium channel subunits did not reflect with the current density of the channels, indicating that post-transcriptional mechanisms may play a major role in determining functional L-type channel expression level. (This study was funded by the Heart and Stroke Foundation of Ontario to ZPF: T5866)