

**Probing Cytoskeletal Changes in Neuronal Stem Cells due to Glucose Dysregulation**

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In this thesis, we focus on the effects glucose dysregulation has on both  $\hat{A}$ – undifferentiated neuroblastoma cells, as well as on cells that have differentiated into neuronal phenotype in vitro. More specifically, we focus on the cytoskeletal changes they undergo due to higher, and also fluctuating glucose concentrations in their immediate surroundings.

We begin with a brief introduction to glucose dysregulation as a consequence of diabetes, and the external manifestations of the same. Next, we define diabetic neuropathy (DN) at the cellular as well as at the systems levels. We discuss existing literature detailing clinical and experimental reports that establish links between glucose fluctuation and neuronal damage on the cellular level, and between impaired glucose tolerance and sensory neuropathy on the systems level. Post that, we limit the scope of this project to studying the cellular manifestations of DN alone.

Within this too, we focus solely on the mechanical changes happening within the cell.

With the scope of the report defined, we move on to the procedure for cell culture and the experimental setups used to study any identifiable changes in (i) morphology, (ii) contractility, (iii) stiffness, and (iv) molecular distribution of active myosin assemblies within the cells, and to relate them to the overarching theme of probing how excessive glucose in the immediate environment affects cellular cytoskeleton in neuronal cells.