Simulating Diabetic Peripheral Neuropathy: A Cellular Model for Nerve Degeneration Studies

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The purpose of this experiment was to design a cell model using a rat pheochromocytoma (PC12) cell to simulate Diabetic Peripheral Neuropathy (DPN). It was proposed that the higher the level of glucose, the lower the metabolic activity and the viability percent, as well as that in the presence of nerve growth factor (NGF), the cells would grow dendrites to simulate that of a real nerve cell. The student exposed the cells to concentrations of glucose that included 25 mM, 50 mM, 100 mM, and 200 mM. Cells that had been exposed to a 25 or 50 mM concentration of glucose and untreated cells were exposed to a 100 ng/mL dose of NGF to measure dendrite outgrowth and density of the cells. According to the data that was collected, it was shown that the higher the concentration of glucose, the lower the metabolic activity and viability of the cell. It was also shown that NGF does cause the cells to take on similarities to neuron cells, as shown by the presence of dendrites and neurites in the samples. In conclusion, the data that was collected shows that PC12 cells are a viable option for cell models used to test how a dose of NGF would affect a cell exposed to glucose in a simulation of DPN, which sets up the ability to test new treatments to be tested in an in vitro model.

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