**Arrhythmic Effects of Chronic Pentamidine in Human Cardiac Stem Cell Electrophysiology**

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**Introduction**

It is known that some clinical conditions with proarrhythmic effects exist these whole through a chronic reduction in cardiac electrical activity. Pentamidine is a pentamic aldehyde used in the treatment of Pneumocystis carinii pneumonia in the acquired immunodeficiency syndrome and has been investigated in H9C2 cardiomyocytes and listed as being potentially proarrhythmic. This study will evaluate the proarrhythmic potential of pentamidine in human cardiac ESCs in vitro. The results of this study will be used to inform the development of safer treatment options for the treatment of Pneumocystis carinii pneumonia.

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**Methods**

Adult human ESCs (hESC-Derived Cardiomyocytes) were isolated from cardiac tissue of an adult human neonate cell line. Cells were passaged into 24-well plates in media and cultured in a 35 mm Petri dish with minimal media changes. The cells were exposed to various concentrations of pentamidine for 24 h. To examine the effect of pentamidine on EDs, the cells were exposed to pentamidine for 24 h and then exposed to 30nM E4031 in the presence of pentamidine.

**Results**

- **Figure 1:** Cells that show shortening in cardiac action potential duration in the presence of 50µM pentamidine compared to control. The duration of the action potential was measured over the resting membrane potential.

- **Figure 2:** Sustained prolongation of ventricular action potential duration in the presence of 50µM pentamidine.

- **Figure 3:** Shows that the ventricular action potential duration is significantly prolonged in the presence of 50µM pentamidine compared to control.

- **Figure 4:** Cardiac cell spontaneous beating rate in 50µM pentamidine concentration.

- **Figure 5:** Shows the relationship between the ventricular action potential duration and the concentration of pentamidine. The action potential duration increases with increasing concentration of pentamidine.

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**Conclusions**

- **Figure 6:** The ventricular action potential duration is significantly prolonged in the presence of 50µM pentamidine compared to control.

- **Figure 7:** Cardiac cell spontaneous beating rate in 50µM pentamidine concentration.

- **Figure 8:** Shows that the ventricular action potential duration is significantly prolonged in the presence of 50µM pentamidine compared to control.

- **Figure 9:** Shows the relationship between the ventricular action potential duration and the concentration of pentamidine. The action potential duration increases with increasing concentration of pentamidine.

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**Bibliography**