Stem Cells For STEM

Problem definition-

My project concerns induced pluripotent stem cells (iPSCs) and how they can be used to regenerate cardiomyocytes, which are one type of cell that makes up the heart. The function of cardiomyocytes is to make the heart contract. When injuries to the heart occur, such as myocardial infarction or dilated cardiomyopathy, it can result in the unregulated death of cardiomyocytes. As a result, the loss of cardiomyocytes can lead to heart failure. However, iSPCs are differentiated from adult somatic cells that have reprogrammed into an embryonic stem cell-like state (ESCs). Since their discovery in 2006, iSPCs have been looked into because of their ability of unlimited self-renewal and their ability to differentiate into any cell type. Additionally, human iPSCs have less of a risk of rejection in comparison to embryonic stem cells. However, no technology is currently available to safely replace these cells.

The plan for solving the problem computationally-

To further the understanding of these cells and their uses, I decided to design a machine learning model to predict the outcomes of IPSCs when introduced into the body. The model would be programmed in the Python language, using Jupyter Notebook.

The progress that has been made up to this time-

Up to this time, I have researched cases involving iPSCs when introduced into the body. I have looked into the outcomes of these cases, and the circumstances that may have affected them. Additionally, I have looked into the invention of these cells in murine species, and their advantages and constraints.

The results that are expected-

It is expected that the model will be able to obtain the constraints of a certain case involving a heart injury and predict whether iPSCs would benefit or harm a patient.

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