Diabetes model derived from embryonic and pluripotent stem cells

Diabetes is a serious condition affecting over 25 million people in the US alone. An additional 75 million are “pre-diabetic”. Recently, stem cells have been developed as a potential tool to combat diabetes by enabling sophisticated analysis of the molecular physiology of the insulin-producing beta cells, and, ultimately, as a means of cell-based therapy. However, despite the promising potential of stem cells in these regards, methods for generation of fully competent beta cells are lacking. This technology describes a method to generate induced pluripotent stem cells (iPSC) from human subjects with diabetes mutations as well as a protocol to generate insulin-producing cells from human embryonic stem cells (hESC) and iPSC. This model uses patient’s skin cells, allowing personalized and accurate screening of treatments while also providing a platform for studying cellular effects of specific genes on the physiology of insulin-producing cells.

Diabetes stem cell models for insulin producing beta cells enable accurate analysis of therapeutic treatments.

This technology enables generating insulin-producing cells directly from a patient. In addition, it provides a more relevant and closely-related model of the disease as cells are derived directly from a patient of interest. Potential treatments can be screened against patients with specific mutations and genotypes, in a personalized medicine approach. The technique can also be used to vet small molecules and other agents as therapeutic approaches to diabetes.

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Applications:
- Method for generating beta cells for diagnostic and therapeutic applications.
- Efficient and reliable platform for studying cellular effects of diabetes mutations from the patient carrying the disease.
- In vitro testing platform for diabetes treatments.
- Protocols could be modified to derive other cell lines (i.e. hepatic, adipocyte, muscle, etc).

Advantages:
- Enables generation of therapeutic cells from directly from a patient.
• Provides a closely related model of the disease as the generated cells are derived directly from the patients themselves.
• Patients with rare disease mutations of diabetes may benefit from this technology because the efficacy of potential treatments may be tested first using this technology before being applied directly.

**Patent Information:**
Patent Pending

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**Related Publications:**

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