

Novel method for generating monohormonal pancreatic β -cells

Invention Summary

The inventors have disclosed a new method for differentiating human pluripotent cells to monohormonal cells secreting insulin for the treatment of diabetes.

Technology Overview

Over 463 million adults are living with diabetes worldwide, costing the United States alone 760 billion dollars in 2019. These numbers are projected to rise to 700 million worldwide, with no cure currently on the market. Current methods to treat Type I, Type II, and neonatal diabetes include insulin injections and drugs to lower blood sugar, or increasing the effectiveness of insulin. With the rising cost of insulin and the prevalence rising, diabetes is proving more fatal and costly in the United States and around the globe.

The inventors have discovered a new approach that could be useful in treating diabetes. They have developed a method to efficiently derive late stage pancreatic progenitor cells (PP2), which develop into hormonal pancreatic β -cells and generate almost entirely-homogenous populations of monohormonal pancreatic β -cells. These monohormonal β -cells only secrete insulin, but not glucagon, somatostatin or ghrelin. The platform can also be used to screen and identify drug candidates to treat the broad range of human patients who suffer from diabetes. The inventors found a specific drug, Galunisertib, which can rescue mutant GLIS3-associated β -cell death.

Potential Applications

- Transplant of monohormonal cells into the pancreas of diabetes patients to secrete insulin.
- Drug screening platform to identify candidates to treat diabetes.

Advantages

- Monohormonal β -cell transplant would have the ability to cure the disease, compared to current treatments which solely supplement insulin and insulin production.
- The invention allows almost homogenous preparations of monohormonal cells compared to previous differentiation methods.

Publications

- [Amin S. et al.](#), Discovery of a drug candidate for GLIS3-associated diabetes. *Nature Communications*, 2018.
- [PCT Application](#): Use of glis3 for preparing functional pancreatic beta-cells (WO2007135563A3)

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Patents:
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