Type 1 diabetes is an autoimmune disease that is characterized by the loss of insulin-producing pancreatic β-cells leading to glycemic lability. Current treatments, such as islet cell replacement, have seen relative success but are limited by the need for immunosuppression. We will test the effectiveness of PEC-Direct™ and PEC-Encap™ devices in non-human primates, rhesus macaques (Macaca mulatta). We hypothesize that PEC-Encap™ is a better option for patients. Encapsulated devices are able to protect the PEC-01α,β cells and therefore can be used in immunocompetent patients, unlike PEC-Direct™ which allows direct vascularization to the PEC-01α,β cells. We will be loading PEC-01α,β cells in the two types of devices for implantation. Two PEC-Direct™ devices will be surgically implanted under the skin of 10 rhesus macaque monkeys during an outpatient procedure. These 10 monkeys will be given immunosuppressants. The PEC-Encap™ devices are also surgically implanted under the skin of 10 different immunocompetent rhesus macaques monkeys. Post-implantation evaluation will be done by measuring blood glucose level and human C-peptide serum in each experimental group. Blood glucose level will be measured using a portable glucometer whereas human C-peptide serum will be measured using GSIS assay method. GSIS analysis is expected to reveal an increase in C-peptide levels after oral administration as well as a decrease in fluctuating blood glucose. This would indicate ongoing insulin synthesis in the body as a result of PEC-01α,β cells maturation, demonstrating successful integration and operation of the product in treating T1D symptoms in the subject.

Themes:

Check (highlight) the most applicable theme according to the abstract.

<table>
<thead>
<tr>
<th>Innovation and Technology</th>
<th>Health and Wellness</th>
<th>Culture and Society</th>
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Comments:

Commented [A1]: What are these devices?
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Commented [A3]: and how does this make them unsuitable for immunocompetent patients?
Commented [A4]: What is this? What does it allow you to quantify?
Commented [A5]: Technical/jargon (what is this?)