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Improving the viability of pseudo-islet for efficient insulin production

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A novel solution for Type 1 Diabetes Mellitus (T1DM) is the formation of pseudo-islet cell. Which are beta cells aggregations that mimic the basic function of beta cells. Central necrosis of pseudo-islet cell due to the lacking the oxygen and nutrient transportation has been an obstacle to introduce this solution for T1DM. This study aims to overcome this problem by removing the central area and replacing it with the cell-friendly alginate hydrogel gelatin Beads type B (GBs), which characterized by providing a high diffusion rate and capable to functions as a drug carrier. In order to maximize the diffusion rate and avoid the dissolution of the beads in the water solution, it is important to control the right size and shape of GBs and the cross-linking time. Increased viability and morphology are seen in the 30 μm GBs cross-linked for six hours. The rat pancreatic β cell line BRIN-BD11 cells were grown in RPMI 1640 media and showed similar morphology to the native human islet cells after the GBs incorporation. Alexa Fluor 568 conjugated used as a secondary antibody in the fluorescence test to examine the drug releasing capability of the GBs. The beads with secondary antibody displayed more fluorescence from these without. The effect of the anti-inflammatory cytokine IL-10 on pseudo-islets can be determinant using dose response which reveals the best response at 10 ng/ml concentration. Improving our understanding of the methods used to remodel pseudo-islets should widen the gaze of possible strategies obtainable for developing de novo islets for therapeutic applications.

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