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 cells, which are beta cell aggregations that mimic the basic function of beta cells. Central necrosis of pseudo-islet cells due to the shortage of the oxygen and nutrient transportation has been an obstacle to introduce this solution for the patient with T1DM. This study aims to overcome this issue by removing the central area of the pseudo-islet sand replacing it with the cell-friendly alginate hydrogel “gelatin beads” type B (GBs), which is characterized by providing a high diffusion rate, and capable to function 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, shape of GBs and the cross-linkage time. Increased in viability and morphology is seen in the 30μm 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. Alexafluor 568 conjugated was used as a secondary antibody in the fluorescence test to examine the drug releasing capability of the GBs. 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.

Biography
Khalid M Alwsaidi is currently a medical student at the college of Medicine, Imam Muhammad Bin Saud Islamic University and he has completed a laboratory-based research summer programme at Keele University, Manchester, UK.

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