MICROCALORIMETRIC EVALUATION OF THE EFFECT OF GLUCOSE ON HUMAN PANCREATIC ISLETS MICROENCAPSULATED WITH BIODRITIN®

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Islet transplantation represents an important alternative for the treatment of type 1 diabetes but, unfortunately, it still requires intensive immunosuppressive therapy. Islet encapsulation/immunoisolation is an attractive alternative to avoid the immunosuppressants side effects. Here, we used microcalorimetry to evaluate the metabolic response of both “naked” and microencapsulated human pancreatic islets upon glucose stimulation. Human islets were isolated from harvested pancreata, cultured for 24-48h and subjected (or not) to microencapsulation with Biodritin®, a heteropolyssacharide composite of alginate and chondroitin sulfate. One thousand naked or microencapsulated islet-equivalents (IEQ) were transferred to a microcalorimeter and stimulated with either 2.8mM or 20mM glucose and the metabolic response was monitored for 1h. Naked islets released average heat values of 700.4±62 and 1331±182 µcal upon injection of 2.8mM and 20mM glucose, respectively. The glucose stimulation heat indexes for naked and microencapsulated islets were 1.5±0.25 and 2.6±0.1, respectively, in good correlation with insulin secretion indexes. Islets were highly viable after the calorimetric experiment, judging from the live/dead staining assay. These data demonstrate the applicability of ITC to investigate the effect of glucose on isolated human pancreatic islets and to assess vital islet functions prior to transplantation.

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