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Using selective withdrawal to encapsulate pancreatic islets for immunoisolation JASON WYMAN, SEDA KIZILEL, RYAN SKARBEK, XIANGYANG ZHAO, MATTHEW CONNORS, SHANNON DILLMORE, University of Chicago, WILLIAM MURPHY, University of Wisconsin, MILAN MRKSICH, MARC GARFINKEL, SIDNEY NAGEL, University of Chicago — We apply selective-withdrawal for encapsulating insulin-producing pancreatic islets within thin poly(ethylene glycol) (PEG) coats. Islets placed in an aqueous PEG solution are drawn into the selective-withdrawal spout which then breaks up, leaving the islets surrounded by a thin, 20μm, polymer coat. These coats, whose thickness is independent of the size of the encapsulated islet, are photo-crosslinked to form hydrogel capsules. We can apply multiple coats of varying chemical composition. These coats provide a semi-permeable membrane which allows the islets to respond to changes in glucose concentration by producing insulin in a manner similar to that of unencapsulated islets. Furthermore, the hydrogel capsules exclude large molecules the size of the smallest antibodies. Our results suggest that this microencapsulation technique may be useful for the transplantation of islets for treatment of Type I diabetes.

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