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COMMENTARY

Making a Case: Nanofabrication Techniques in Encapsulated Cell Therapy for People with Diabetes

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Abstract

A nanoporous immunoisolative case/capsule that encases/encapsulates insulin-secreting cells vastly expands the source of therapeutic cells available for grafting in people with diabetes, including cells from animal sources, stem cells, and genetically engineered cells. These encapsulated cellular grafts potentially provide an endogenous, renewable, and long-term source of insulin without the need for pharmacological immunosuppression.

Micro- and nanofabrication techniques used principally in the semiconductor industry can play a positive role in encapsulated cell therapy. Many of these techniques do not have direct applicability in cell encapsulation, but can be leveraged to develop processes suitable for this application. This commentary highlights the salient features of an effective cell encapsulation system, enumerates limitations of existing encapsulation schemes, and touches upon progress in key areas of encapsulation technology; one example of how micro- and nanofabrication technology may be used to develop a more effective platform for cell encapsulation is presented. This commentary urges further exploration and expansion of techniques used traditionally in electronics and optics for cell-based therapy in people with diabetes.

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