Magnetic Resonance Imaging of Encapsulated Islets to Treat Diabetes

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Type I diabetes is characterized by the autoimmune destruction of the insulin-producing pancreatic beta cells found in the islets of Langerhans.

Current treatments include daily insulin injections or islet transplantations from donors.

Allogeneic cells however are typically attacked and rejected by the patient’s immune system.

Encapsulating islets in an alginate polymer bead creates a barrier between the islets and components of the immune system (such as immune cells and antibodies) while allowing oxygen and nutrient transfer, as well as insulin release, and thus reducing or even eliminating the need for immunosuppressant drugs.

Encapsulating gadolinium oxide nanoparticles localizes the beads during in vivo studies using MRI technology.

Quantify the relationship between the MRI signal strength and the nanoparticle concentration.

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