

CELL & STEM CELL RESEARCH

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Induction of tolerance to allogeneic islet grafts using an immunomodulatory biomaterial

Type 1 diabetes (T1D) is a chronic autoimmune disease that impacts millions of people world-wide. Presently, there is no cure for T1D and treatment with exogenous insulin to manage diabetes is ineffective in controlling euglycemic in a substantial population of type 1 diabetics. Transplantation of pancreatic islets as a source of beta cells producing insulin has proven effective in improving metabolic control in type 1 diabetic individuals. However, graft rejection is a major limitation of clinical islet transplantation that is controlled by chronic immunosuppression. Systemic use of immunosuppression is associated with various adverse effects that compromise the life quality of graft recipients. We have been pursuing the development of targeted and localized immunomodulatory approaches as a safe and effective alternative to chronic immunosuppression. In particular, we developed biomaterials based on polyethylene glycol microparticles engineered with immunomodulatory ligands targeting islet destructive pathogenic T effector cells for physical elimination within the graft microenvironment. The application of this novel concept to the induction of tolerance to islet allografts as a cure for T1D will be discussed.

Biography

Haval Shirwan is Dr. Michael and Joan Hamilton Endowed Chair in Autoimmune Disease, Professor of Microbiology and Immunology, Director of Molecular Immunomodulation Program at the Institute for Cellular Therapeutics. He has conducted his graduate studies at the University of California in Santa Barbara, CA, and Post-doctoral studies at California Institute of Technology in Pasadena, CA. He has joined the University of Louisville in 1998 after holding academic appointments at various academic institutions in the United States. His research focuses on the modulation of immune system for the treatment of immune-based diseases with particular focus on type 1 diabetes, transplantation, and development of prophylactic and therapeutic vaccines against cancer and infectious diseases. He is an inventor on over a dozen of worldwide patents, Founder and CEO/CSO of FasCure Therapeutics, LLC, widely published, organized and lectured at numerous national/international conferences, served on study sections for various federal and non-profit funding agencies, and is on the Editorial Board of a number of scientific journals. He is member of several national and international societies and recipient of various awards.

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