Qizhi Tang, PhD, a Diabetes Center faculty member and Associate Professor of Surgery, is focused on improving islet transplantation, a minimally invasive procedure that has the potential to cure type 1 diabetes. Tremendous progress has been made in the past two decades to transform this treatment from an experimental concept to a clinical reality. However, two main obstacles preclude the wider application of this treatment to patients with type 1 diabetes — the need for long-term immunosuppression and the shortage of transplantable islets.

The Tang Lab is moving forward in tackling both of these challenges. Recent progress may be found below.

- As much as 50 to 90% of transplanted islets die within the first week after transplant due to peri-transplant stress. Optimizing islet survival during the peri-transplant period is crucial to the success of islet transplantation. In July of 2012, Dr. Gaetano Faleo in Tang lab was awarded a postdoctoral fellowship by the Larry Hillblom Foundation to study the impact of geometric configuration of the transplanted islets on their function and survival. The goal of this project is to design an optimally configured implantable cradle for islets to minimize peri-transplant stress and maximize long-term outcome of islet transplantation.

- The immune system has built-in mechanisms to restrain immune activation thus prevent damages to healthy tissues. Regulatory T cells represent one of such essential mechanisms to keep the immune system in check. Dr. Karim Lee, a postdoctoral fellow in the Tang lab, is testing conditions that can harness the function of regulatory T cells to prevent islet transplant rejection. In mouse models, she is able to induce long-term islet graft survival without immunosuppression in over 70% of the recipients. Her research finding is now guiding the design of clinical trials using regulatory T cells to induce transplantation tolerance in human patients.

- The Tang lab has developed GMP-compliant manufacturing procedures to enable clinical use of regulatory T cells in transplant patients. The regulatory T cells we
manufacture are designed to target anti-graft responses to maximize their efficacy in controlling transplant rejection while minimizing suppression of immune responses to infections. As a first step toward clinical application, we have recently secured two NIH grants to conduct clinical trials in liver transplant patients with the goal of inducing transplant tolerance and eliminating the need for long-term immunosuppression. The trials will begin in 2013. Successful implementation of these clinical trials will pave the way to apply regulatory T cell therapy to islet and pancreas transplantation in the future.

For information on current UCSF clinical research involving islet transplantation, email islettransplant@ucsfmedctr.org [1].

Source URL: https://diabetes.ucsf.edu/news/islet-transplantation-research-progress

Links
[1] mailto:islettransplant@ucsfmedctr.org