REGIONAL CENTRE FOR BIOTECHNOLOGY

Journal Club

"A single localized dose of enzyme-responsive hydrogel improves long-term survival of a vascularized composite allograft"

Science Translational Medicine 2014, 6 (249): 1-10

Manish Singh, PhD

Wednesday, 27th Aug 2014, 4.00 PM

ATPC Seminar room

Abstract

Currently, systemic immunosuppression is used in vascularized composite allotransplantation (VCA). This treatment has considerable side effects and reduces the quality of life of VCA recipients. We loaded the immunosuppressive drug tacrolimus into a self-assembled hydrogel, which releases the drug in response to proteolytic enzymes that are overexpressed during inflammation. A one-time local injection of the tacrolimus-laden hydrogel significantly prolonged graft survival in a Brown Norway–to–Lewis rat hindlimb transplantation model, leading to a median graft survival of >100 days compared to 33.5 days in tacrolimus only–treated recipients. Control groups with no treatment or hydrogel only showed a graft survival of 11 days. Histopathological evaluation, including anti-graft antibodies and complement C3, revealed significantly reduced immune responses in the tacrolimus-hydrogel group compared with tacrolimus only. In conclusion, a single-dose local injection of an enzyme-responsive tacrolimushydrogel is capable of preventing VCA rejection for >100 days in a rat model and may offer a new approach for immunosuppression in VCA.