The objective of this work is to combine insulin secreting cells (ISCs) and mesenchymal stem cells (MSCs) for use as a novel cell-therapy approach for wound healing. Current therapeutic approaches for chronic wounds often fail due to the pro-inflammatory and hyperglycemic wound environment. Insulin accelerates wound healing by promoting the recruitment of keratinocytes, endothelial cells and fibroblasts via the PI3-Akt pathway, while MSCs regulate inflammation and secrete pro-wound healing factors. When combined, MSCs have a protective effect on islet viability and increase their insulin secretion. To date, ours is the first cell therapy to combine islets or beta cells with MSCs to improve wound healing. Our preliminary data has shown that ISCs encapsulated within polyethylene glycol diacrylate (PEGDA) hydrogels improved wound healing in a diabetic mouse model of chronic wounds. We observed a trend of increased HaCaT migration across in vitro scratch wounds and Akt phosphorylation with increasing ISC densities and ISC:MSC coencapsulations compared to controls. p-AKT plays a pro-survival role which suggests that MSCs secrete factors that may be improving survival and/or insulin secretion of ISCs over time. This was confirmed by measuring TGF-β1 levels which is known to preserve and prolong survival of islets. VEGF release was not detected in MSC monolayers, but was in ISC:MSC hydrogels; MSC are known to secrete VEGF to promote islet vascularization. The long term goal of this proposal is to develop an off-the-shelf system that will deliver beta cells and MSCs to burns and chronic wounds in order to accelerate wound healing.