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Regeneration of acellular porcine kidneys with human fetal kidney precursor cells

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The present study investigated regeneration of acellular porcine kidneys with isolated and well characterized human fetal kidney precursor cells (hFKPC). Putative stem cell markers were identified in human fetal and adult kidneys sections as well as hFKPC. Porcine kidneys (n=6) were decellularized, cut into 1mm pieces, cultured with hFKPC for 2 weeks, characterized by histology and qPCR. We found that porcine kidneys were successfully decellularized showing no nuclei but presence of ECM proteins collagen, elastin, fibronectin, laminin and glycosaminoglycans. Recellularization with hFKPC showed cell attachment, infiltration and growth on surface of ECM resembling a kidney tissue. The characterization of recellularized kidneys showed increased expression of key kidney developmental transcription factors SIX2, EYA1, CITED1, LHX1, SALL1,

WT1; stem cell markers DLK-1, CD133; kidney glomeruli specific marker podocin; and proliferation marker PCNA. Characterization of fetal kidney sections and cultured hFKPC identified known stem cells markers SIX2, DLK-1 and CD133. We also report that ephrin receptors EphA6, EphA7 and EphB3 are expressed in fetal kidneys. Based on the constitutive expression of EphA7 in mesenchyme of fetal kidneys as well as co-expression with DLK-1 in capsule, and absence of expression in adult kidneys, we postulate EphA7 as a potential marker with role in regenerating kidneys. Thus, we suggest expanded hFKPC as an ideal cell source for future acellular whole kidney regeneration to use in drug testing or for clinical transplantation in patients with end stage renal failure.

Biography

Vijay Kumar Kuna has completed his MSc at the age of 24 from University of Skovde, Sweden and will complete PhD studies from University of Gothenburg, Sweden by September 2018. During his thesis, he supervised 5 Master thesis projects and participated, gave oral and poster presentations in 5 International conferences. He published 10 papers in reputed International peer reviewed journals and has served in peer reviewing of several International publications. He received 100,000 SEK in 2014 from Gelin's Fond for his research and 20,000 SEK in 2015 from Shalgrenska Hospital for presentation at the World Transplant Congress.

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