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Positions:

Professor, Departments of Medicine (Division of Gastroenterology and Liver Diseases) and of Genetics Albert Einstein College of Medicine.

Research interests:

Our research interests are focused on gene and cell-based therapies of inherited liver-based disorders, such as Crigler-Najjar syndrome type 1 (jaundice due to UGT1A1 deficiency), alpha-1 antitrypsin deficiency and primary hyperoxaluria (alanine:glyoxylate aminotransferase deficiency). In a clinical study, we demonstrated that transplantation of normal allogeneic hepatocytes in patients with Crigler-Najjar syndrome type 1 reduced serum bilirubin levels significantly. Recently, using a mouse model of alpha-1 antitrypsin disease (the "Z-Z" form), we have shown that when host hepatocytes are under stress because of an inherited metabolic disorder, transplanted wildtype hepatocytes competitively repopulate the liver. As the scarcity of donor primary hepatocytes is a major hurdle to broader clinical application of hepatocyte transplantation, we have generated induced pluripotent stem cells (iPSCs) from normal subjects and individuals with inherited liver-based disorders and have differentiated these cells to hepatocytes. Transplantation of hepatocytes derived from normal human iPSCs into UGT1A1-deficient Gunn rats resulted in reduction of serum bilirubin levels. Our ongoing research is aimed at generation of cellular models of inherited liver diseases by differentiating patient-specific iPSCs into hepatocytes. iPSCs derived from individual patients are being corrected by homologous recombination and then differentiated into hepatocytes for potential application in ex vivo gene therapy mediated by autologous hepatocytes, which may circumvent the need for immunosuppression.

Current grant funding:

C026440 New York Stem Cell Administration NYSTEM (J. Roy-Chowdhury)	09/01/2010–08/31/2013 Liver repopulation with hepatocytes derived from induced pluripotential cells for treatment of alpha-1 antirypsin disease
5 P30 DK41296 (Shafritz) NIH/NIDDK	06/01/2009–05/31/2014 Liver Pathobiology and Gene Therapy Research Center Core: Core II: Cell Culture & Genetic Engineering Core

Five recent publications:

1. Salido E, Xiao L, Lu Y, Wang X, Santana A, Roy-Chowdhury N, Torres A, Shapiro L, Roy-Chowdhury J. Alanine-glyoxylate aminotransferase deficient mice, a model for primary hyperoxaluria that responds to adenoviral gene transfer. ***Proc. Natl. Acad. Sci. (USA)*** 103:18249–54, 2006, Epub 2006 Nov 16.
2. Jiang J, Salido EC, Guha C, Wang X, Moitra R, Liu L, Roy-Chowdhury J, Roy-Chowdhury N. Correction of hyperoxaluria by liver repopulation with hepatocytes in a mouse model of primary hyperoxaluria type-1. ***Transplantation*** 2008, 85:1253–60.
3. Basma H, Soto-Gutiérrez A, Yannam GR, Liu L, Ito R, Yamamoto T, Ellis E, Carson SD, Sato S, Chen Y, Muirhead D, Navarro-Álvarez N, Wong R, Roy-Chowdhury J, Platt JL, Mercer DF, Miller JD, Strom SC, Kobayashi N, Fox IJ. Differentiation and transplantation of human embryonic stem cell-derived hepatocytes. ***Gastroenterology*** 2009, 136:990–9.
4. Wang X, Sarkar DP, Mani P, Steer CJ, Chen Y, Guha C, Chandrasekhar V, Chaudhuri A, Roy-Chowdhury N, Kren BT, Roy-Chowdhury J. Long-term reduction of jaundice in Gunn rats by non-viral liver-targeted delivery of Sleeping Beauty transposon. ***Hepatology*** 2009, 50:815–24.
5. Ding J, Yannam GR, Roy-Chowdhury N, Hidvegi T, Basma H, Rennard SI, Wong RJ, Avsar Y, Guha C, Perlmutter DH, Fox IJ, Roy-Chowdhury J. Spontaneous hepatic repopulation in transgenic mice expressing mutant human alpha 1-anti-trypsin by wildtype donor hepatocytes. ***J. Clin. Invest.*** 2011, 121(5):1930–4. PubMed PMID 21505264.