CHANDAN GUHA, M.B.B.S., Ph.D.

Positions:

Professor and Vice Chair, Department of Radiation Oncology
Professor, Department of Pathology, Albert Einstein College of Medicine

Research interests:

Project I - Stem cell-based therapies for acute radiation syndrome, (supported by NIAID 1U19AI091175 for RadStem Center for Medical Countermeasures against Radiation and 1RC2A1087612 ARRA funding). Stem cell–based therapies are being developed to protect critical tissues affected by acute radiation exposure within days after a radiation event has occurred. This approach is based on strong preliminary evidence that bone marrow–derived and/or adipose-derived stromal/stem cell transplantation is an effective measure to mitigate radiation injury. The ultimate goal of this research is to identify the factors and signals elaborated by the stromal cells (endothelial, mesenchymal and macrophages) in the tissue stem cell niche that mediate the regeneration of the irradiated gastrointestinal, hematopoietic, pulmonary or cutaneous system. Critical targets for radiomitigation that have been identified include R-spondin1-induced Wnt activation and TLR9 activation. Small molecular agents that activate these pathways are being developed for both radiomitigation and radioprotection of critical organs during chemo-radiation therapy in the clinic.

Project II – Preparative radiation for hepatocyte transplantation (supported by NIDDK 1R01 DK064670 and NCI R21/R33 CA121051). The long-term objective of this project is to design a safe and effective preparative regimen of liver irradiation for the engraftment and repopulation of transplanted donor hepatocytes and induced pluripotent stem cell (iPSC)-derived hepatocyte-like cells. We are developing strategies to (i) enhance the engraftment and extent of hepatic repopulation of donor liver progenitor/stem cells and hepatocytes, (ii) develop 31P-MR spectroscopy (MRS) as a noninvasive imaging method to monitor hepatic energy metabolism and creatine kinase-transduced liver cells, and (iii) generate iPSC from a patient's fibroblast, dental pulp and blood followed by differentiation into hepatocyte and mesenchymal cells. A clinical trial of hepatocyte transplantation in patients with metabolic liver diseases has been initiated based upon our experiments at the University of Pittsburgh by Dr. Ira Fox.

Current grant funding:

U19 AI091175 (Guha) NIAID/NIH	08/01/2010 – 07/31/2015 Stem cell-based therapies for mitigation of acute radiation syndrome
R01 EB009040 (Guha) NIH/NIBIB	09/30/2008 – 08/31/2013 HIFU-enhanced tumor vaccines
R33 CA121051 (Guha) NIH/NCI	04/20/10 – 06/30/13 MR spectroscopy to evaluate liver repopulation by transplanted hepatocytes

Five recent publications:

1. Saha S, Bhanja P, Liu L, et al. TLR9 agonist protects mice from radiation-induced gastrointestinal syndrome. ***PLoS. One.*** 2012, 7:e29357.
2. Saha S, Bhanja P, Kabarriti R, Liu L, Alfieri AA, Guha C. Bone marrow stromal cell transplantation mitigates radiation-induced gastrointestinal syndrome in mice. ***PLoS. One.*** 2011, 6:e24072.
3. Ding J, Yannam GR, Roy-Chowdhury N, et al. Spontaneous hepatic repopulation in transgenic mice expressing mutant human alpha1-antitrypsin by wild-type donor hepatocytes. ***J. Clin. Invest.*** 2011, 121:1930–4.
4. Yamanouchi K, Zhou H, Roy-Chowdhury N, et al. Hepatic irradiation augments engraftment of donor cells following hepatocyte transplantation. ***Hepatology*** 2009, 49:258–67.
5. Bhanja P, Saha S, Kabarriti R, et al. Protective role of R-spondin1, an intestinal stem cell growth factor, against radiation-induced gastrointestinal syndrome in mice. ***PLoS One*** 2009, 4:e8014.