

# BI E N G I N E E R I N G S E M I N A R

at 4 pm on August 16<sup>th</sup>, 2013 (Friday)

MRDG Seminar Hall, 1<sup>st</sup> floor, Biological Sciences Building

## Embryonic stem cells: An alternative model in developmental toxicology and safety pharmacology

**Rajarshi Pal**

Assistant Professor and Principal Investigator, Stem Cells and Drug Discovery Group  
Manipal Institute of Regenerative Medicine, Manipal University Campus, Bangalore

Embryonic stem (ES) cells undergo self-renewal and are pluripotent, i.e., they can give rise to all the types of specialised cells in the body. Scientific knowledge on ES cells is increasing rapidly, leading to opportunities for establishment of ES cell-based in vitro tests for drug discovery, preclinical safety pharmacology and toxicology. The main properties of ES cells making them useful for in vitro assays are that they have a normal diploid karyotype and can provide a large number of cells for high-throughput assays. Human ES cells additionally have the potential to provide solutions to problems related to interspecies differences and methods for screening for human polymorphisms, thus supporting robust human hazard identification and optimised drug discovery strategies. Importantly, ES cell based assays could be potential tools to reduce and perhaps replace animal experiments. Taken together, the greater availability of stem cell phenotypes as well as new detection technologies is heralding a new era of cell-based screening. This convergence offers unique opportunities to identify drug candidates for disorders at which few therapeutics are presently available. In this talk, I will describe ongoing research in the use of ES cells in toxicology and safety pharmacology, focusing on the major areas of progress, namely, embryotoxicology, cardiotoxicology and hepatotoxicology.

### About the speaker:

**Dr Rajarshi Pal** is currently appointed as an Assistant Professor and Principal Investigator of the 'Stem Cells and Drug Discovery Group' at Manipal Institute of Regenerative Medicine, Bangalore, India. Dr Pal started his scientific career as a 'Research Fellow' at the National Institute of Immunology, New Delhi working on mechanisms of apoptosis and cell death associated with toxin-induced male infertility. Then he moved on to serve the stem cell industry b/w 2003-2011 wherein he operated in different R&D roles at Reliance Life Sciences, Mumbai; Stempeutics Research, Bangalore and Kuala Lumpur, Malaysia. Dr Pal has been instrumental in designing pluripotent stem cell based assays, lead drug discovery programs employing novel cell culture systems and contributed to adult stem cell-based product development. In 2006, Dr Pal was named as 'Associate Fellow' at Centre for Stem Cell Biology, University of Sheffield, UK where he trained on genetic manipulation of ES cells. Recently, Dr Pal was awarded "Indo-US Research Fellowship Awards, 2013-14" by the Indo-US Science and Technology Fund. Last year he bagged the "ICMR International Fellowship for Young Biomedical Scientists 2012-13" by the Govt. of India and worked as a 'Visiting Scientist' at Monash Institute of Medical Research, Australia on disease-specific iPS cells. He has authored more than 30 publications in international peer reviewed journals of high repute; has 4 patents (including 3 international patents) to his credit and has contributed for 5 book chapters on various aspects of stem cell biology published by Nova, McGraw-Hill and Wiley-Blackwell publishers. He also sits on the Editorial Board of several journals like Stem Cell Studies, American Journal of Stem Cells, Journal of Biomarkers, Novel Biomarkers and Journal of Developmental Biology and Tissue Engineering.