International Conference & Exihibition on
Analytical and Bioanalytical Techniques 2010
ANANBIOANAL - 2010
Pharmaceutical R & D Summit
doi:10.4172/2155-9872.1000022

Human Embryonic Stem Cell Based High Throughput Screening Platform: A Biomarkers Based Approach for Predicting Human Developmental Toxicity

Kaushik Dilip Deb

Khoday Stem Cell Research and Medical Centre, Khoday India Ltd., Bangalore, India

It is becoming increasingly imperative to asses the teratogenecity of new chemical entities (NCEs) and drugs before they enter the market. Ethical limitation inhibit such studies in pregnant women. The current study attempts to create a 3-Dimentional in vitro platform that mimics human peri-implantation embryonic development using embryoid bodies (EBs) derived from human embryonic stem cells (hESCs). A layer of human endometrial cell line (CRL4003) was coated on layers of extracellular matrix proteins eg; fibronectin and collagen on low melting agarose (0.5%), to create a bio-mimetic platform similar to the implantation site. A time course study on EBs was done over a period of 20 days, to understand the induction of germ lineages. The expression profile of the ectoderm, endoderm, mesoderm and trophectoderm lineage markers, such as beta III-tubulin, GATA4, BMP2, Brachury hANP, cTnT, ABCG2, GATA2, BMP4, HAND1 and beta-hCG, were studied, by SQ and QRT-PCR and immunofluorescence. The lineage composition of smooth surfaced EBs (SSEBs) at day-6 closely resembled the human peri-implantation blastocyst. Inhibition in the induction of any of the lineages caused by exposure to a NCE was confirmed by lack of biomarker expression and by loss of the ability of the SSEBs to functionally differentiate into particular lineages. Using proven embryotoxic componds we demonstrated that the model closely mimiced peri-impantation development and was sensitive even at very low doses. This model is adoptable to a 96 well plate format for high through put screening of NCEs.