

International Conference on
Emerging Cell Therapies

October 1-3, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Differentiation of CD34+ cells using small activating RNA targeting the islet β -cell transcriptional factor MafA

Nagy A. Habib Imperial College London, UK

Upon functional loss of insulin producing islet β -cells, some diabetic patients become dependent on life-long insulin supplementation therapy. Bioengineering surrogate insulin producing cells is an alternative replacement strategy. We have developed a novel cell culture methodology using RNA oligonucleotides to differentiate adult human hematopoietic CD34+ cells into insulin secreting cells. By transfecting RNA to increase transcript levels of the master regulator of insulin biosynthesis, v-maf musculoaponeurotic fibrosarcoma oncogene homolog A (MafA), several pancreatic endodermal genes were upregulated during the differentiation procedure. These included Pancreatic and duodenal homeobox gene-1 (PDX1), Neurogenin 3, NeuroD, and NK6 homeobox 1 (NKx6.1). Differentiated CD34+ cells also expressed glucokinase, Glucagon-like peptide-1 (GLP1), Sulfonylurea receptor-1 (SUR1) and phogrin - all essential for glucose sensitivity and insulin secretion. The differentiated cells appropriately processed c-peptide and insulin in response to increasing glucose stimulation as shown by enzyme-linked immunosorbent assay (ELISA), fluorescence activated cell-sorting (FACS) analysis, Western blotting and immunofluorescence staining. We provide a new approach to exploit human CD34+ cells that may be useful in developing insulin producing surrogate cells for treating diabetes.

Biography

Nagy Habib, Professor of Hepatobiliary Surgery at Imperial College London is a translational researcher who pioneered the first clinical trial in the use of adenovirus and plasmid for the treatment of liver cancer, and the use of plasmid gene therapy in hydrodynamic gene delivery. He was also the first to publish from the West a clinical trial on the use of adult bone marrow-derived stem cells for the treatment of patients with liver insufficiency. He has published on the evolution of molecular biology of tumours (oncogene, tumour suppressor gene, epigenetic modification), gene therapy, stem cell therapy, saRNA and RNA aptamers.

nagy.habib@imperial.ac.uk