

# The influences of two different hemopoietic supporting stromal cells on the differentiation of hemopoietic cells from human embryonic stem cells

Huiping Zhao<sup>1,2,\*</sup>, Haijun Zhao<sup>1,2,\*</sup>, Ge Lin<sup>1,2</sup>, Bin Luo<sup>1,2</sup>, Le Tang<sup>1,2</sup>, Di Zhou<sup>1,2</sup>, Tiancheng Liu<sup>1,2</sup>, Guang-Xiu Lu<sup>1,2</sup>

<sup>1</sup>Institute of Reproductive & Stem Cell Engineering, Central South University. <sup>2</sup>National Engineering & Research Center of Human Stem Cells, Changsha, Hunan, China

To observe the inductive efficiency of deriving hematopoietic cells from human embryonic stem (hES) cells cocultured with human fetal liver stromal cells or fetal bone marrow stromal cells. In order to investigate the mechanism of the different inductive efficiency of the two stromal cells, 2-DE maps of fetal liver stromal cells and fetal bone marrow stromal cells were established and partially differentially expressed proteins were identified. Firstly the day-5 embryonic bodies (5dEBs) were formed by the hES cells spontaneous differentiation. Then the 5dEBs cells were induced into hematopoietic stem cells by co-culture with fetal liver stromal cells or fetal bone marrow stromal cells for 10 days respectively. The effect of directly contact between fetal liver stromal cells and 5dEBs on the inductive efficiency was discussed. Using 2-DE technology, the total proteins of fetal liver stromal cells and fetal bone marrow stromal cells were separated and 2-DE maps were established. MALDITOF-TOF-MS was used to analyze partial differentially expressed protein spots and get peptide mass fingerprinting and MS/MS. Finally ExPASy database were used for protein identification. Compared with spontaneous differentiation of EBs, both stromal cells could induce hES into hematopoietic cells ( $P < 0.05$ ). 2-DE patterns of fetal bone marrow stromal cells and fetal liver stromal cells were obtained. Analyzed with PDQUEST software, 30 protein spots were detected in Gel image of fetal liver stromal cells, but not detected in Gel image of fetal bone marrow stromal cells. Using MALDI-TOF-TOF-MS, 26 protein spots were identified, highly expressed proteins in fetal liver stromal cells including proteins related to cell movement, adhesion and Serine-threonine kinase receptor-associated protein (STRAP) which inhibited TGF- $\beta$  signal transduction. Therefore the fetal liver stromal cells are more efficient to induce hES cells into hematopoietic cells than fetal bone marrow stromal cells. The results showed that cell movement, adhesion and STRAP may take part in inducing hES into hematopoietic cells.

**Keywords:** human embryonic stem cells, stromal cells, proteins

*Cell Research* (2008) 18:s122. doi: 10.1038/cr.2008.212; published online 4 August 2008

\*These two authors contributed equally to this work.

Correspondence: Guang-Xiu Lu

E-mail: huipingzhao@tom.com