

## **Differentiation of umbilical cord blood-derived multilineage progenitor cells into respiratory epithelial cells**

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### **Background**

Umbilical cord blood (UCB) has been examined for the presence of stem cells capable of differentiating into cell types of all three embryonic layers (i.e. endo-, ecto- and mesoderm). The few groups reporting success have typically confirmed endodermal potential using hepatic differentiation. We report differentiation of human UCB-derived multipotent stem cells, termed multilineage progenitor cells (MLPC), into respiratory epithelial cells (i.e. type II alveolar cells).

### **Methods**

Using a cell separation medium (PrepaCyte-MLPC; BioE Inc.) and plastic adherence, MLPC were isolated from four of 16 UCB units (American Red Cross) and expanded. Cultures were grown to 80% confluence in mesenchymal stromal cell growth medium (MSCGM; Cambrex BioScience) prior to addition of small airway growth medium (SAGM; Cambrex BioScience), an airway maintenance medium. Following a 3–8-day culture, cells were characterized by light microscopy, transmission electron microscopy, immunofluorescence and reverse transcriptase (RT)-PCR.

### **Results**

MLPC were successfully differentiated into type II alveolar cells (four of four mixed lines; two of two clonal lines). Differentiated cells were characterized by epithelioid morphology with lamellar bodies. Both immunofluorescence and RT-PCR confirmed the presence of surfactant protein C, a protein highly specific for type II cells.

### **Discussion**

MLPC were isolated, expanded and then differentiated into respiratory epithelial cells using an off-the-shelf medium designed for maintenance of fully differentiated respiratory epithelial cells. To the best of our knowledge, this is the first time human non-embryonic multipotent stem cells have been differentiated into type II alveolar cells. Further studies to evaluate the possibilities for both research and therapeutic applications are necessary.

To purchase the full text of this study go to <http://www.tandf.no/cytotherapy>.