

# A Novel Population of Stem Cells Derived from Peripheral Blood of ECMO Patient

Published date: March 12, 2012

## Technology description

### Technology Summary:

A novel population of stem cells has been isolated from the peripheral blood of patients on extracorporeal membrane oxygenation (ECMO). These cells have distinctive properties that may provide unique clinical benefits, specifically for lung and heart repair after injury.

### Background:

Experimental studies have demonstrated that bone marrow progenitor cells can be recruited to injured lungs through an unknown mechanism. This process occurs rarely in normal tissue. Extracorporeal membrane oxygenation (ECMO) is used for cardiorespiratory support of neonates with meconium aspiration, primary pulmonary hypertension, asphyxia or other pulmonary disease. The goal of ECMO is to allow time for intrinsic repair of lungs and heart; thus, patients on ECMO represent a clinical model for the most severe acute lung and/or heart injury.

Since blood can be recovered from discarded ECMO circuits, it is possible, using appropriate methodology, to determine whether stem cells or progenitor cells are mobilized into the circulation of patients undergoing ECMO for severe cardiac and/or respiratory failure.

### Technology Description:

An analysis of the blood from ECMO patients demonstrated mobilization of hematopoietic, mesenchymal and epithelial progenitors. The levels of colony-forming hematopoietic progenitors in ECMO blood was significantly higher than blood from patients in neonatal and pediatric intensive care units not placed on ECMO.

ECMO-derived mesenchymal cells have osteogenic, chondrogenic and adipogenic differentiation potential. ECMO samples gave rise to epithelial colonies that were CD45-negative and cytokeratin-positive, as expected for progenitor epithelial cells. Mesenchymal and epithelial progenitors were observed in ECMO samples but not in control samples.

This work leverages prior findings, previously reported in the literature, of host-graft chimerism with enhancement of host-derived cells being incorporated into donor tissues in areas of damage/

inflammation versus uninjured tissues, demonstrating that circulating cells can incorporate into injured tissues.

ECMO-derived progenitors, in particular mesenchymal progenitors, may have a functional advantage over progenitors obtained routinely from bone marrow. Dr. Bui has banked the progenitor cells obtained from ECMO and shown that they remain stable after several passages in culture. She is pursuing the characterization of these cells.

## Application area

Study of progenitor homing

Repair mechanisms to injury

## Advantages

The unique properties of these cells may lead to the use of these cells or secreted factors as therapeutic candidates for tissue repair

## Institution

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