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# Lifor Organ Preservation Solution Protects Pulmonary Microvasculature in a Rat Model of Ex Vivo Lung Perfusion and Transplantation

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## Session Information

**Date:** [Sunday, May 3, 2015](#)

**Session Time:** 5:30pm-6:30pm

**Session Name:** [Poster Session B: Cell Transplantation and Cell Therapies](#)

**Presentation Time:** 5:30pm-6:30pm

**Location:** Exhibit Hall E

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A. Ex Vivo Lung Perfusion (EVLP) has emerged as an innovative method for lung preservation.

Microvascular dysfunction and breakdown of endothelial barrier during EVLP are major hurdles in extending the use of this technology. However, only limited pre-clinical data is available on perfusate alternatives to preserve microvascular integrity. The main objective of this study was to establish a rat model to enable the systematic study of EVLP, and to identify organ perfusates to better preserve microvascular function.

B. Donor SD rat heart-lung grafts were preserved by a custom made EVLP system for 2 hours at 37°C.

40kd-Dextran added Krebs-Henseleit buffer (KHB-Dx), Steen solution, and Lifor organ preservation solution were tested as perfusates of EVLP (n=5 per group). The left lungs were then transplanted. Lungs transplanted after cold preservation served as control (Ctrl Tx; n=5). After 24 hours of transplant, PaO<sub>2</sub>, wet-to-dry (W/D) ratio of the grafts, and histology were evaluated. Non transplanted right lungs were evaluated by histology, TUNEL, and fluorescent-labelled dextran/lectin infusion staining of microvasculature. To confirm our observations, a tight junctional protein ZO-1 expression was compared between HUVECs incubated with those perfusates.

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C. All but one transplanted cases survived in any graft preservation strategy. PaO<sub>2</sub> was lower in KHB-Dx than Ctrl Tx (Ctrl Tx; 467.6±44.1, \*KHB-Dx; 274.0±54.7, Steen; 347.4±51.3, Lifor; 415.4±29.9, [mmHg] \*P<0.05). KHB-Dx and Steen treated lungs had larger W/D ratio (Ctrl Tx; 4.1±0.2, \*KHB-Dx; 5.2±0.3, \*Steen; 4.9±0.2, Lifor; 4.1±0.3, \*P<0.05). Apoptotic cell count in the donor right lungs were identical, but FITC-dextran leakage area of KHB-Dx was larger than Lifor and Ctrl Tx (Ctrl Tx; 1.5±0.3, \*KHB-Dx; 11.3±2.0, Steen; 10.8±2.6, Lifor; 3.1±0.8, [%]\*P<0.05). ZO-1 expression levels were lower in KHB-Dx and Steen incubated HUVECs than in EGM-2 control (EGM-2; 24.2±2.6, \*KHB-Dx; 5.1±1.7, \*Steen; 10.8±2.3, Lifor; 16.6±1.0, [%] \*P<0.05).

D. Our results indicate that Lifor perfusion during EVLP preserved microvascular integrity ex vivo, and resulted in better in vivo function post transplantation. Maintenance of ZO-1 expression provided a possible explanation for our findings.

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