

**Abstract Title:**

Targeted Investigation of Novel Mesenchymal Stem Cell Biomarkers of Bronchopulmonary Dysplasia in Prematurely Born Infants

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**Introduction:** Bronchopulmonary dysplasia (BPD) is a chronic disease of preterm infants caused by oxygen toxicity, inflammation, and ventilator use leading to arrested alveolar development. Current therapies lack effectiveness and cause undesirable side effects. Our work has shown mesenchymal stem cell conditioned-media to have protective effects in mouse BPD models. Analysis identified Osteopontin (Opn) and Macrophage colony stimulating factor 1 (Csf1) as key factors to suppress the TGF-B surge in the lungs, leading to protection against BPD. Our pilot study has shown it to be feasible to quantify Opn, Csf1, and TGF-B in the tracheal aspirate fluid (TAF) of preterm infants and generated standard curves. Our aim is to determine the association between Opn and Csf1 and BPD by quantifying these markers in the TAF of preterm infants.

**Methods:** Infants under 32 weeks gestational age intubated within 24 hours of life were enrolled into

the UCI IRB-approved study. Those with neuromuscular or congenital anomalies or pulmonary hemorrhage were excluded. The 1st TAF sample was obtained at intubation, before surfactant dosing. The 2nd was obtained at extubation or the 4th day if still intubated. Opn, Csf1, TGF-B, and IgA levels were analyzed using ELISA. IgA was used as control to correct for TAF volume. Infants were followed prospectively for outcomes data including the development of BPD.

**Results:** 21 infants were enrolled and TAF obtained. Subjects were similar in their maternal and neonatal characteristics. Half of the samples have been analyzed. Processing of the remaining samples and collection of outcomes data is ongoing. Standard curves were used from the pilot study. Approximately half of the subjects have developed BPD and demonstrated low baseline Csf1 levels and rising TGF-B levels post-ventilation. The subjects without BPD had stable Opn, Csf1, and TGF-B levels.

**Conclusion:** Levels of Opn, Csf1, and TGF-B are associated with BPD. Further data collection is underway to reach study power. Statistical analysis will follow completion of sample processing. Larger multi-center studies are needed to confirm this association, which will guide targeted therapy against BPD.