



## Lung Lavage Solutions

**Radiopaque and Radiolucent Perfluorocarbon solutions for lung lavage.**

Removal of accidentally aspirated debris or liquids from the lungs is especially difficult. Saline lavage reduces PaO<sub>2</sub>, removes surfactant, can elicit a cough reflex, and is not very effective in removing debris from the lungs. Liquivent lavage overcomes all of those disadvantages (see reverse for reference).

Perfluorocarbon (PFC) liquids are water-clear, very dense, low-viscosity liquids which are immiscible with both water and lipids. Due to their great density, they easily penetrate to the lowest levels in the lung, and their density displaces most solids and liquids, causing those to float to the top of the meniscus where they are easily removed. Foreign matter and most liquids are easily floated out of the most difficult locations.

For research use only in the United States



### Advantages of Perfluorocarbon lavage solutions

- Intended Use:** Indicated to be used as an aid in removing debris, secretions and foreign matter from the lungs and bronchial system.
- Bioinert:** The molecules are too large to be metabolized. Minimally absorbed and eliminated by evaporation<sup>1</sup>.
- Effective:** Works by buoyancy: low viscosity.
- Hydrophobic:** Does not mix with water, inhaled liquids or solids.
- Buoyancy:** Most liquids and solids float on top of PFCs, making removal easier.
- Respiratory:** Does not block oxygen transfer during lavage<sup>6</sup>.



# Liquivent® Lung Lavage Solutions

## Technical Information

Perfluorocarbons (PFCs) have been extensively studied in both the lungs and circulation. PFCs are bioinert, minimally absorbed, and have no deleterious histological cellular or biochemical effects<sup>1</sup>. PFC molecules are too large to be metabolized<sup>1</sup> and are therefore non-reactive in the respiratory or circulatory system. In addition, PFCs have very high vapor pressures<sup>3</sup> and evaporate quickly. Clinical studies have shown that Perfluorocarbons are eliminated from the lungs primarily by evaporation, with radiographic clearance of most of the PFCs by 48 hours<sup>1</sup>. In addition, PFC use in the lungs enhances surfactant phospholipid production<sup>4</sup>. Instillation of Perflubron into the lungs was found to actually diminish oxidative damage to injury prone tissues<sup>5</sup>. And when used with exogenous surfactant, PFC actually improved pulmonary gas exchange after meconium aspiration<sup>6</sup>.

OriGen supplies two Pharmaceutical Grade perfluorocarbon compounds: PFB (Perflubron), which is radiopaque (opaque on x-ray), and PFD (Perfluorodecalin) which is radiolucent.

### Liquivent-D: Radiolucent Perfluorodecalin

Product code	How supplied	Contains	Stock/Non-Stock
PFD-20	20 ml syringe	Perfluorodecalin	Stock
PFD-50	50 ml syringe	Perfluorodecalin	Stock
PFD-125	125 ml screw top bottle	Perfluorodecalin	Non-Stock
PFD-250	250 ml screw top bottle	Perfluorodecalin	Non-Stock

### Liquivent: Radiopaque Perflubron

Product code	How supplied	Contains	Stock/Non-Stock
PFB-20	20 ml syringe	Perflubron	Stock
PFB-50	50 ml syringe	Perflubron	Stock
PFB-125	125 ml screw top bottle	Perflubron	Non-Stock
PFB-250	250 ml screw top bottle	Perflubron	Non-Stock

# OriGen

BIOMEDICAL

## Indications

Indicated to be used as an aid in removing debris, secretions and foreign matter from the lungs and bronchial system.

## Ordering Information:

Supplied sterile, non-pyrogenic, individually packed. Orders shipped FOB Texas or Germany. To order contact the office nearest you. For research use only in the United States

## References

1. Reickert C, Pranikoff T, Overbeck M, Kazerooni E, Massey K, Bartlett R, Hirschl R. "The Pulmonary And Systemic Distribution And Elimination Of Perflubron From Adult Patients Treated With Partial Liquid Ventilation" Chest. 2001 Feb; 119(2):515-522.
2. PFC Molecular weights > 480.
3. Vapor pressure > 5.9 mbar @ 20°C.
4. Steinhorn DM, Leach CL, Fuhrman BP, Holm BA. "Partial Liquid Ventilation Enhances Surfactant Phospholipid Production." Critical Care Med. 1996 Jul; 24(7):1252-6.
5. Rotta AT, Gunnarsson B, Fuhrman BP, Wiryanan B, Hernan LJ, Steinhorn DM. "Perfluoroctyl bromide (perflubron) attenuates oxidative injury to biological and nonbiological systems." Pediatr Crit Care Med. 2003 Apr;4(2):233-8.
6. Schlösser R, L, Veldman A, Fischer D, Funk B, Brand J, von Loewenich V. "Comparison of Effects of Perflubron and Surfactant Lung Lavage on Pulmonary Gas Exchange in a Piglet Model of Meconium Aspiration." Biol Neonate. 2002 Feb; 81:126-131.

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