



Lung Lavage Solutions

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

Removal of accidentally aspirated solids or liquids from the lungs is especially difficult. Saline lavage reduces PaO₂, 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. Solids such as food, smoke, charcoal, mucus and dust, as well as most liquids are easily floated out of the most difficult locations.

Pending FDA approval, not currently
for sale in the United States



Advantages of Perfluorocarbon lavage solutions

- Intended Use:** Intended to aid in the removal of foreign material and tenacious bronchial secretions.
- Bioinert:** The molecules are too large to be metabolized. Minimally absorbed and eliminated by evaporation¹.
- 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 lavage⁶.



Liquivent®

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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 effects¹. PFC molecules are too large to be metabolized¹ and are therefore non-reactive in the respiratory or circulatory system. In addition, PFCs have very high vapor pressures³ 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 hours¹. In addition, PFC use in the lungs enhances surfactant phospholipid production⁴. Instillation of Perflubron into the lungs was found to actually diminish oxidative damage to injury prone tissues⁵. And when used with exogenous surfactant, PFC actually improved pulmonary gas exchange after meconium aspiration⁶.

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/Custom
PFD-20	20 ml syringe	Perfluorodecalin	Stock
PFD-50	50 ml syringe	Perfluorodecalin	Stock
PFD-125	125 ml screw top bottle	Perfluorodecalin	Custom
PFD-250	250 ml screw top bottle	Perfluorodecalin	Custom
PFD-500	500 ml screw top bottle	Perfluorodecalin	Custom
PFD-1000	1L screw top bottle	Perfluorodecalin	Custom

Liquivent: Radiopaque Perflubron

Product code	How supplied	Contains	Stock/Custom
PFB-20	20 ml syringe	Perflubron	Stock
PFB-50	50 ml syringe	Perflubron	Stock
PFB-125	125 ml screw top bottle	Perflubron	Custom
PFB-250	250 ml screw top bottle	Perflubron	Custom
PFB-500	500 ml screw top bottle	Perflubron	Custom
PFB-1000	1L screw top bottle	Perflubron	Custom

Indications

OriGen Liquivent solutions are indicated for lavage use in the lungs. Sterile, single use only.

Ordering Information:

Supplied sterile, pyrogen-free, individually packed. Custom sizes and configurations available. Orders shipped FOB Texas or Germany. To order contact the office nearest you. Pending FDA approval, not currently for sale in the United States

References

- 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.
- PFC Molecular weights > 480.
- Vapor pressure > 5.9 mbar @ 20°C.
- Steinhorn DM, Leach CL, Fuhrman BP, Holm BA. "Partial Liquid Ventilation Enhances Surfactant Phospholipid Production." Critical Care Med. 1996 Jul; 24(7):1252-6.
- Rotta AT, Gunnarsson B, Fuhrman BP, Wiryanan B, Hernan LJ, Steinhorn DM. "Perfluorooctyl bromide (perflubron) attenuates oxidative injury to biological and nonbiological systems." Pediatr Crit Care Med. 2003 Apr;4(2):233-8.
- 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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