

A solution for optimal preservation of donor lungs

PERFADEX® is a lightly buffered 'extracellular', (low [K⁺]) colloid-based electrolyte preservation solution for rapid cooling, perfusion and storage of organs in connection with transplantation.

The composition of PERFADEX® has been specifically formulated to preserve the function and integrity of organs rich in endothelium, during flushing and cold ischemic storage, prior to transplantation and reperfusion.

The colloid component, Dextran 40 particularly protects the microvasculature against post-ischemic reperfusion injury, primarily by preventing pathological leukocyte-endothelial interaction.^{12, 13} It also prevents edema formation during preservation.^{14, 15, 20}

Numerous studies have shown that PERFADEX® enables safe preservation of lungs up to twelve hours depending upon the state of the organ during retrieval.^{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}

PERFADEX® was the first solution to be specifically cleared by the FDA for the preservation of human lung.

In the USA, the use of PERFADEX® for preservation of tissues and organs, other than lungs, has not been approved by the FDA.

Additives: Adjust to about pH 7.4 shortly before use by addition of 1 mmol THAM/TRIS (trometamol or tromethamine) per liter PERFADEX®. The solution should be kept chilled and used within 24 hours.

Shelf life: At least six months from date of shipment.

Intended use: Perfadex® solution for lung perfusion is indicated for the flushing, storage and transportation of isolated lungs after removal from the donor in preparation for eventual transplantation into a recipient.

The endothelium – a vulnerable tissue

The lung is primarily composed of endothelial cells which line the enormous surface area of the capillaries (equivalent to an entire tennis court) and a similar surface area of types I and II epithelial cells which line the alveoli and secrete surfactant respectively. The endothelium is the most vulnerable and plays a critical role for the structure and function of a normal vessel wall. Endothelial cells produce a variety of biologically active substances that control vascular permeability, vessel tone, coagulation, fibrinolysis and inflammatory responses. Some of these substances, such as proteins which seal the junctions between cells (adhesion molecules), are integral parts of the cell structure. Others, such as nitric oxide (NO), prostacycline, chemokines, or factors involved in coagulation and fibrinolysis, are produced and then released by the endothelial cells either lumenally or abuminally.¹⁶

Consequences of an injured endothelium:

Injured endothelium can induce platelet and leukocyte sticking which then triggers a number of inflammatory cascades including increased permeability of the capillary wall, which in turn increases tissue edema and the risk of Primary Graft Dysfunction (PGD). A well preserved endothelium is antithrombogenic, yet promotes platelet aggregation and coagulation if injured.^{17,18}

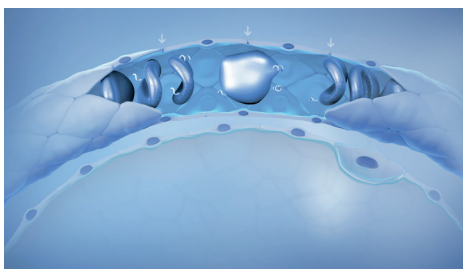
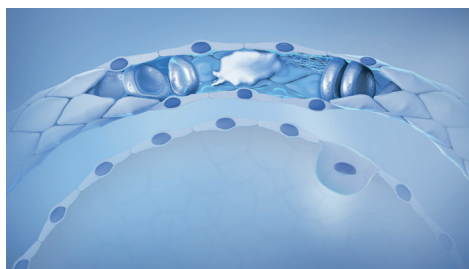
The importance of an intact endothelium:

Experimental and clinical evidence indicates that early ischemia-reperfusion injury to the endothelium, within the very first few hours of reperfusion, is a key trigger in initiating the cytokine cascades which eventually lead to PGD and subsequent graft failure often months or years later.¹⁸ This early injury can be prevented or mitigated by minimizing physical injury (manipulation) and storing the lungs in a protective solution under optimal temperature conditions.¹⁹

What causes damage to the endothelium?

A number of factors can injure the pulmonary endothelium during the manipulation and temporary storage involved in the harvesting of donor lungs;

- Traumatic manipulation during harvesting, evaluation and transplantation
- Excessive pressure
- Low temperature – particularly below 2°C
- Storage solution – e.g. intracellular type (high K+) solutions
- Prolonged cold ischemia
- Ischemia-reperfusion – free radical injury



Excess oncotic pressure retains water in capillaries and prevents loss into the extravascular (interstitial) space, thus preventing lung edema.

Supply information***:

Reference:	Packaging:
19001	8 x 1000 ml PVC bags with PERFADEX®
19002	2 x 2800 ml PVC bags with PERFADEX®
19100	10 x 1000 ml bags with PERFADEX®
19300	2 x 3000 ml bags with PERFADEX®
19101*	10 x 1000 ml bags with PERFADEX® 1 x 50 ml bottle with THAM**, 3.3 mmol/ml
19301*	2 x 3000 ml bags with PERFADEX® 1 x 50 ml bottle with THAM**, 3.3 mmol/ml

*REF number used in the USA including THAM** bottle
 **THAM is a biological buffer used to adjust pH of PERFADEX®
 ***2800 ml will be replaced by 3000 ml. Please contact XVIVO for availability on your market.

References

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