



## novalung

### Extrapulmonary Solutions for Lung Failure

*XENiOS novalung is the first to offer a complete product family of state-of-the-art solutions for minimally invasive treatment of acute and chronic lung failure without mechanical ventilation and without the need for patient sedation and immobilization.*

#### What are Key Opinion Leaders saying about novalung solutions for treating acute and chronic lung failure?



**Thomas Bein, MD**  
University of Regensburg Medical Center

"Novalung's lung support therapies can be dosed as required in order to individualize to a patient's specific needs, which is a very significant clinical benefit."

**Invasive Mechanical Ventilation (IMV)** failure to prevent IMV-induced pneumonia, structural lung damage, and breathing-muscle atrophy. Consequently, XENiOS novalung is the first to offer **the full gamut of minimally invasive, extrapulmonary lung support for a broad panorama of patients and indications.**

is a method to assist or replace spontaneous breathing. Invasive mechanical ventilation is indicated when the patient's spontaneous ventilation (breathing) is inadequate to maintain life. Mechanical ventilation is termed "invasive" if it involves any instrument penetrating through the mouth (such as an endotracheal tube), through which air (or another gas mix) is pushed into the trachea with positive pressure. This act is unnatural because the diaphragm normally draws air into the lungs with negative pressure.

Extrapulmonary gas exchange has successfully established itself in recent years, alongside highly invasive and 60-years-old invasive mechanical ventilation, and is now a clinically accepted, lung-protective procedure. **A complete spectrum of new extrapulmonary therapeutic strategies** is available only from novalung that can either **support** IMV to reduce the invasiveness of IMV or aid in weaning from IMV, or **replace** IMV for the treatment of acute and chronic lung

Innovative XENiOS novalung products enable therapies for lung failure that are adapted to specific indications and patients. The duration and intensity of extrapulmonary lung support can be selected and adapted based on individual needs. CO<sub>2</sub> removal requires lower blood flows compared to oxygenation. **XENiOS novalung products provide extrapulmonary blood flow as high as necessary and as low as possible.**

XENiOS novalung has continuously advanced its technologies to develop iLA (interventional Lung Therapy) as an alternative to invasive mechanical ventilation, and as such has spawned a paradigm shift in the treatment of acute and chronic lung failure.

#### Invasive Mechanical Ventilation (IMV)

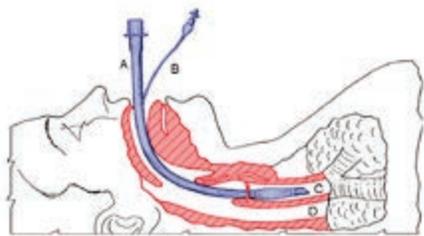


Diagram of an endotracheal tube used in mechanical ventilation. The tube is inserted into the trachea in order to provide air to the lungs. A) Endotracheal tube, which sits in the trachea. B) Inflatable Cuff, which facilitates the inflation of the balloon at the end of the tube to allow it to sit securely in the airway. The balloon can also be deflated via this cuff upon extubation. C) Trachea. D) Esophagus. (Source: Wikipedia)

NOTE: Novalung is CE-marked for sale in Europe.

#### novalung Therapies Provide Fundamental Advantages Vs. Standard Therapies

There are critical issues with conventional lung and heart support. Standard therapies (1) require an immobile, passive patient, which increases risk of morbidity and mortality; (2) cause ventilator-induced lung injury and pneumonia; (3) produce 'tap-water'-like flow instead of desired continuous flow from their pumps; and (4) cause long-term complications related to sedation and ventilation. Conversely, the benefits of novalung's minimally invasive therapies include (1) an awake, mobile, self-actuated patient that supports improved outcomes; (2) no ventilator-associated lung injury or pneumonia; (3) a physiologic natural pulse to protect the heart; and (4) cost savings via shorter ICU stays.

