

## ARTIFICIAL LUNG: PROGRESS AND PROTOTYPES

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### Objective

To chronicle the development of the artificial lung from past to future.

### Study Design

Review.

### Methods

Review of literature data and personal experience in the ongoing development process of an artificial lung.

### Results

The author regards the paracorporeal artificial lung as a possible treatment for acute and chronic lung failure.

ECMO has not become an established method on adult respiratory failure because of high complication rates. Major problems are the high doses of heparine and the large cannulae necessary. Pumpless arterio-venous CO<sub>2</sub> removal solves many of the problems when used with ultra-low resistance, polymethylpentene membranes with low levels of anticoagulation. Intravenous oxygenation in vitro seemed promising, but in vivo tests have not repeated the successes.

The paracorporeal artificial lung is intended for chronic use in ambulatory patients with acute or chronic lung failure. A prototype for the treatment of a sheep model of lung failure has been developed and feasibility was proved. Survival rates with the device were higher than with conventional ventilation alone. A different surgical technique has to be developed for use in man. Long-term biocompatibility and hemodynamics are also problems that still wait for a solution. In an outlook into the future the author discusses engineered tissue as a possible option.

### Commentary

A very complete look into the past and present of lung replacement devices. iLA has addressed some of the problems mentioned but obviously additional steps in technology and medicine are necessary.

