

**Technology**

Micro-machined artificial lung with similar size to human lungs

Inventor

Joseph Potkay, Ph.D.
Louis Stokes Cleveland VA Medical Center

Key Features

- Designed to maximize gas transfer
- Made from biocompatible and hemocompatible material
- Micro-machining results in a device size similar to human lung
- Increased portability allows patients to maintain a more regular lifestyle

Stage of Development

Conceptual stage

Field

- Medical device
- Artificial lung
 - Respiratory
 - Transplantation

Patent Status

Patent application has been filed

Contact

Jeffrey Moore, Ph.D.
Technology Transfer Program
Department of Veterans Affairs
Office of Research & Development (12TT)
810 Vermont Avenue, NW
Washington, DC 20420
Phone: 202-701-7628
Fax: 202-254-0460
E-mail:
<mailto:jeffrey.moore@va.gov>

A High-Efficiency, Micro-Machined Artificial Lung (VA Reference No. 07-134)

Novel concept and method for producing an artificial lung with similar features and function of a human lung

Technology

The Department of Veterans Affairs has developed a concept and method for producing an artificial lung with feature sizes that are, for the first time, similar in scale to those in the human lung, resulting in a device with greater performance than current clinically-utilized devices.

Description

The "MicroLung" or μ Lung concept utilizes a series of blood channels and gas (air or oxygen) channels; a thin membrane separates the two channel types. Oxygen from the gas channels diffuses through the membrane into the blood and carbon dioxide diffuses out of the blood across the membrane and into the gas channels. Designed to maximize gas transfer, the channel heights are on the order of the dimensions of the components in blood and its diffusion membrane thickness is minimized utilizing micro-machining and micro-molding techniques.

Competitive Advantage

The performance of current artificial lung technologies is still significantly lower than that of their natural counterpart. The human lung provides for a maximum gas exchange rate for both O₂ and CO₂ of 2-6 L/min. In contrast, current artificial lungs are only capable of a maximum gas exchange rate of 250-400 mL/min, limiting their use to the short-term respiratory support for patients at rest.

This invention:

- Utilizes micromachining techniques, pumps and heaters further minimizing the total size of the system.
- Can be manufactured utilizing a variety of micro-machining and micro-molding techniques.
- Allows patients to maintain a more regular lifestyle so as to promote more ideal conditions for patients in line for a transplant.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).