

new era in treating patients with severe cardiorespiratory failure



<https://sum.edu.pl/en>

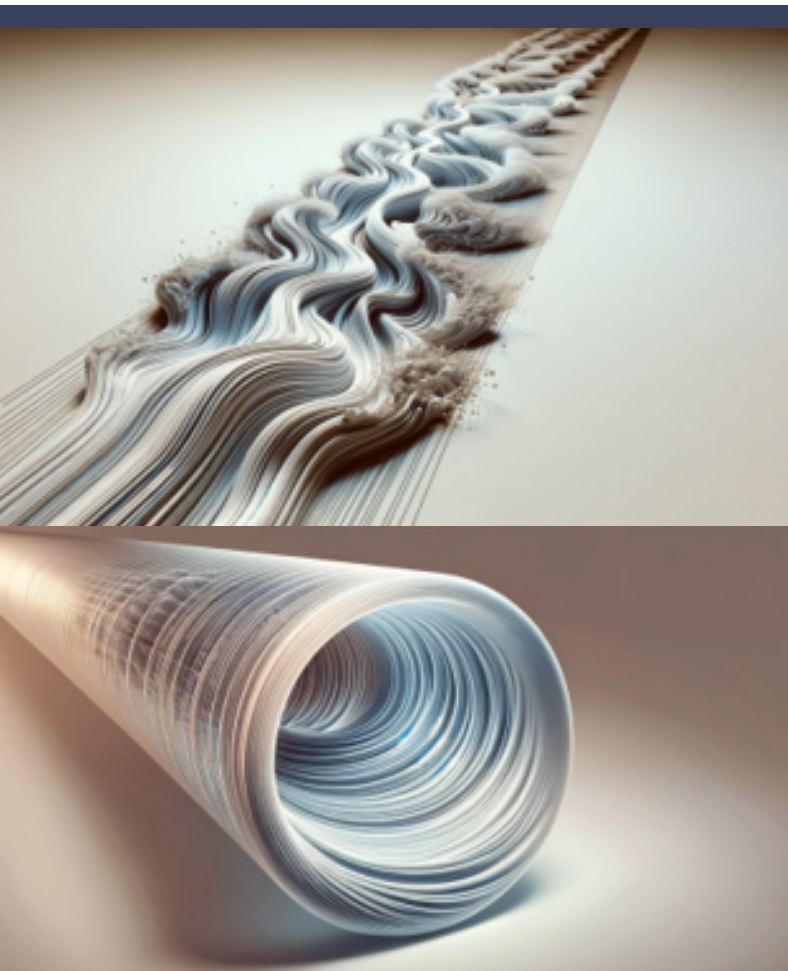
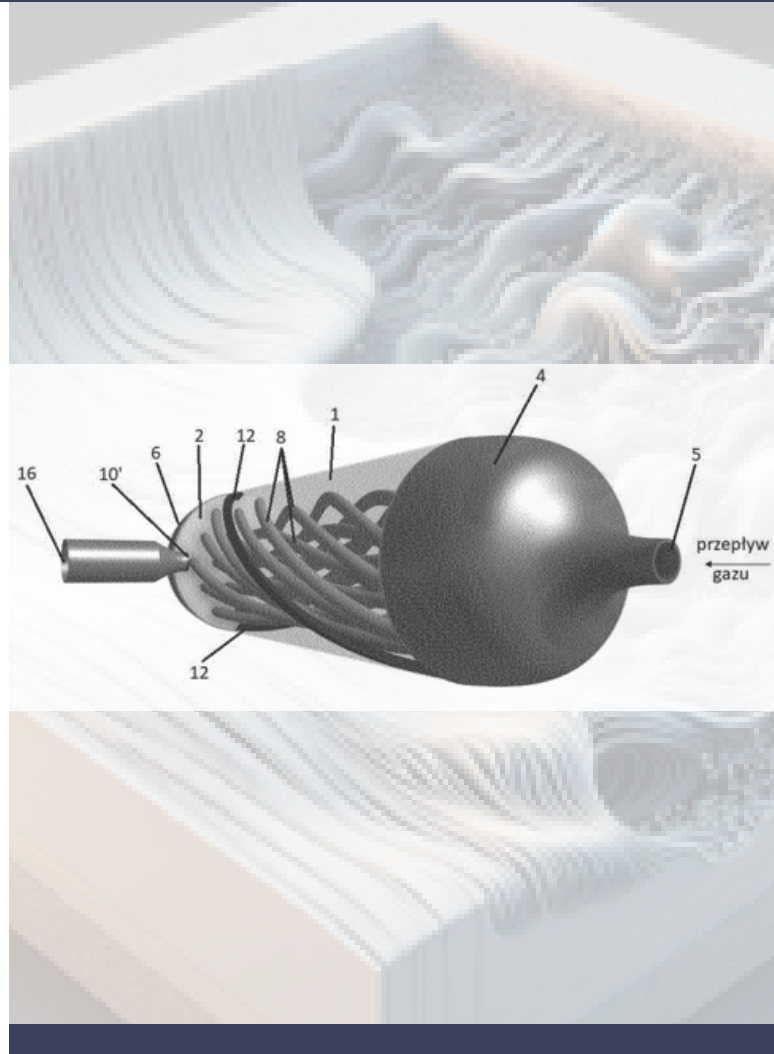


The oxygenator design focuses on capillary distribution, direction, and anchoring. The gas exchange chamber is longitudinal, with semi-permeable capillary bundles aligned parallel and twisted at 90 to 360 degrees, promoting laminar blood flow without spacers. Inlet and outlet openings ensure counter-flow blood and gas movement. A cooler reduces blood temperature by 2°C at the inlet, enhancing gas exchange and minimizing oxidative stress. Post-oxygenation, blood is reheated to physiological temperature. Parallel thrombus filters with a bypass allow filter replacement without stopping blood flow. Filters have 38 µm holes and are impregnated with an antithrombotic agent. This innovation aims to reduce oxygen partial pressure, lower thrombus risk, and enhance ECMO effectiveness and safety.

An Organic Membrane Material with Pore-Forming, Anti-Inflammatory, and Anticoagulant Properties and The Method of Obtaining It.

Ideal for blood oxygenator membranes. Developed using a polar solvent and acid in an inert gas atmosphere, the material includes 4-(diphenylamine) benzaldehyde and 1,3-indandione. The homogenized product is combined with albumin and heparin, argatroban, bivalirudin, or fondaparinux, which embed into its microstructure.

The membranes have 40-60% open pores, with the rest filled with the admixture, gradually releasing during ECMO use, enhancing gas exchange and blood oxygenation. Protected by Polish patent PL 240236 B1, an international patent application (PCT/IB2021/061016) has also been filed.



ADVANTAGE

- Pore formation - 40-60% open pores, increasing the gas exchange surface area.
- Gradual release of active substances - Heparin, argatroban, bivalirudin, or fondaparinux are gradually released, enhancing blood oxygenation efficiency.
- Gas semipermeability - Enhances membrane effectiveness in blood oxygenators.
- Durability and resistance - Pores are oriented along the flow path, preventing cracks and sharp edges.
- Variety of forms - Membranes can be produced as flat foil or hollow fiber tubes.

USE

- Blood oxygenators in ECMO devices - Used to improve gas exchange and blood oxygenation.
- Respiratory support systems - In the application of cardio in cardiac surgery procedures in extracorporeal circulation.
- Long-term supportive therapies - For patients with severe respiratory disorders.
- Medical equipment requiring biocompatibility and resistance to clots - Used in various medical devices where anticoagulant and anti-inflammatory properties are essential.

INTERNATIONAL WIPO PATENT

PCT/IB2021/061015, PCT/IB2021/061016, PCT/IB2021/061017

Work processed: 16 PL/EU/US applications

