Photoreactor for Treatment of Jaundice

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Technology description

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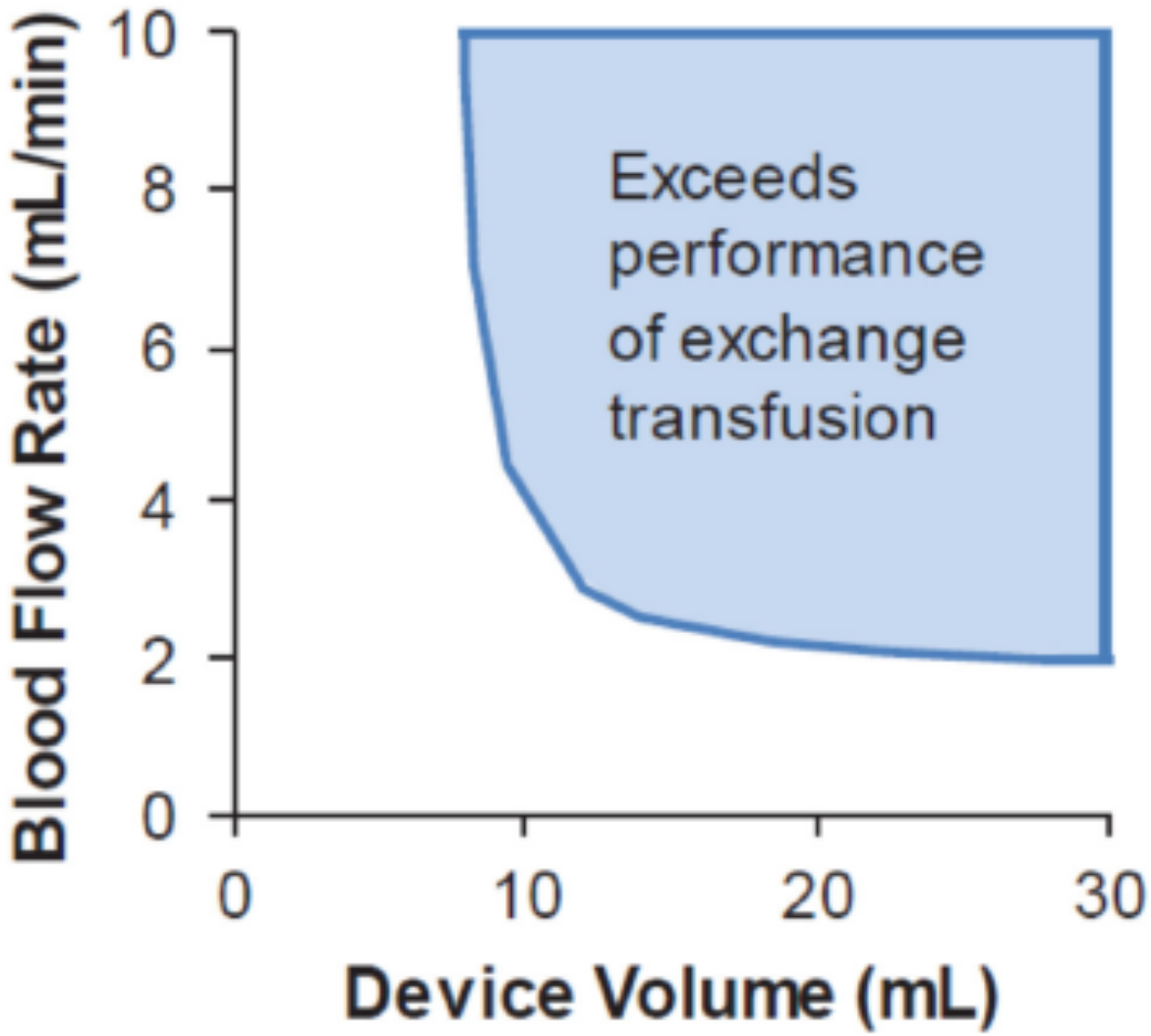
Oregon State University is seeking a licensee or research collaborator for development or commercialization of a microfluidic visible light photoreactor for the treatment of jaundice in neonatal patients. The device enables safe extracorporeal blood treatment, making it an excellent replacement for equally effective, yet risky, exchange transfusions while having a safety profile comparable to current phototherapy technologies. Designed components remove heat from the system, ensuring blood cell survival, and an LED light system reacts bilirubin to the nontoxic structural isomer lumirubin. Lumirubin is then naturally excreted in bile or urine. Constant flow of blood from the neonate, through the system, and back retains electrolyte balance and prevents hypo/hypervolemia. The device’ s volume is less than 10 mL, which renders it safe for use in infants, and the parallel architecture allows it to be scaled up for use in adults.

Background of Invention

Neonatal jaundice affects approximately 60% of newborns and is caused by high levels of bilirubin (BR) in the blood (hyperbilirubinemia). BR is a neurotoxin with high lipophilicity, enabling it to cross the blood-brain barrier and accumulate in the tissue of the central nervous system, which can lead to Acute Bilirubin Encephalopathy and kernicterus. These conditions cause motor function disorders, auditory dysfunction, seizures, and death. Current treatment for hyperbilirubinemia involves the use of phototherapy in which BR undergoes photoreaction to conformational and structural isomers that are more readily excreted from the body. This treatment is sufficient in most cases of mild jaundice



Application area

Jaundice
Sepsis

Advantages

Microfluidic design with low blood volume for treatment of neonates
Cooling system to ensure blood cell survival
Scalability for treatment of adult

Institution

Oregon State University

Inventors

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