Docket #: S23-258

Mobile Thermoelectric Cooler for Organ Transport (MoTEC)

Stanford inventors have developed a mobile thermoelectric device designed to preserve organs during transit by maintaining 10°C (+/-1°C) for over 6 hours. Transplants are often life-saving treatments and with a limited organ supply optimizing preservation during transit is crucial for enhancing access and health outcomes. The current standard for donor organ preservation involves a sterile ice-filled cooler ranging between 2-4°C. While a low temperature is necessary to slow tissue deterioration, recent studies indicate that such low temperatures might also increase the risk of freeze-related injury, limiting the organ's transplant viability. A storage temperature closer to 10°C could offer better preservation, but no existing portable system can maintain this range for an extended period.

MoTEC, a thermoelectric cooler designed to keep a donor organ at a stable 10°C (+/-1°C) while in transit, aims to address this challenge. The solution consists of a two-compartment system with an outer recirculating water cooling unit and an inner organ storage chamber. The system offers temperature control and wireless monitoring through continuous feedback-regulated cooling via custom-designed pumps and sensors. MoTEC is powered by an external battery, allowing for up to 4 hours of standalone operation, with the flexibility for longer use when connected to a power source. Following each transport, the system can be sterilized and reused, resulting in both a smaller spatial footprint and lower costs.

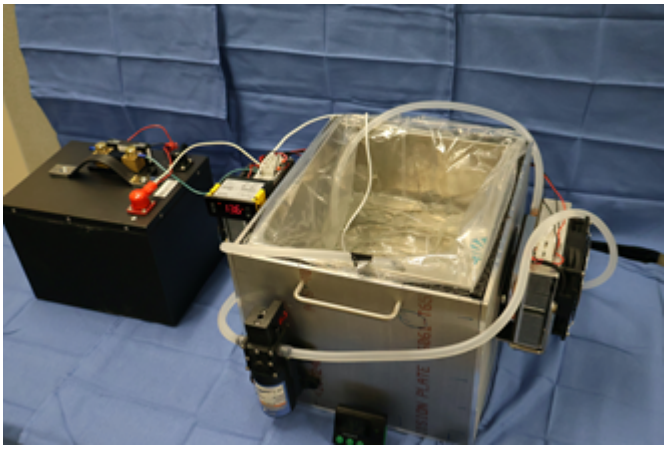

Figure Caption: An image of the current working prototype of the thermoelectric cooler shows the battery that enables temperature control (left) and the enclosure for organ storage during transit (right).

Applications

- Lung organ preservation during transit
- Heart organ preservation during transit
- Kidney organ preservation during transit
- Liver organ preservation during transit

Advantages

- Lower probability of temperature-driven ischemic injury: optimal temperature maintenance during transit
- Greater temperature control: continuous feedback-regulated cooling via integrated pump and sensors
- Greater data availability: wireless temperature and power source monitoring
- Greater cost savings: reusable design

Innovators

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