A new system for organ transport: PerTravel

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Background

Up to day, in static cold storage (SCS), the organ is flushed through with a preservation solution, and kept in this solution in plastic bags, with organ direct exposure to ice temperature, without direct monitoring of temperature near the organ, the need of ice recharging for long transport duration and bringing about risk of freezing the organ if ice is too cold. The aim of the PerTravel project is the realization of an innovative medical device for the transport of biological material, specifically organs, cells and tissues, aimed at ensuring the safety of the organ.

Methods

The PerTravel should be designed to transport kidneys, pancreas, liver, heart and biological samples. The primary container of an already existing system for organ ex vivo preservation, the PerLife system, will be used as the primary organ container. By this way it will be possible to have a device directly compatible with an organ perfusion system. Then, the primary container will be placed inside the isothermal compartment. The maintenance of the temperature will be guaranteed through PCM that will allow a temperature-controlled transport between 2 and 6 C°. The container dedicated to biological samples and documents will be a separate solution to the organ compartment, here the test tubes will be placed, and fixed by means of a foam rubber device. PerTravel's cloud will be needed to provide a state-of-the-art tracking and monitoring system. It is useful for the acquisition and visualization of the most decisive parameters in the process of transport of biological material, as internal, external temperature and inertial sensor, that warn users in case of any impact that could damage the organ. Here a database will be created with all the reports of the missions carried out, enabling the complete traceability of the process that could be consulted by all the institutions involved in the transplant management.

Results

Up to day, an initial prototype has been produced to assess the feasibility and maintenance of isothermal conditions using the chosen solution. Development of the first device and the dedicated disposable system is in progress.

Conclusions

PerTravel proposes to guarantee better quality and safety in the transport of organs through improved management, logistics and real-time control of the fundamental parameters for the well-being of the organ and the consequent success of the transplant.