

Title: Analysis of tissue properties along degradation for organ transplant assessment

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Abstract

There is a global shortage of organ transplants and patients are dying while waiting for transplantation. Yet, high rates of donated organs are discarded because doctors are unsure of the graft quality. Therefore, we are developing a novel assessment method to provide real time and objective information of the organ quality.

The aim of this work was to collect clinically relevant reference data on organ degradation to support the development of our own organ quality assessment method. Here we present tissue adenosine triphosphate (ATP) and lactate levels as well as electric bioimpedance data.

The degradation of porcine kidneys and livers was assessed over 72 h post-mortem by measuring ATP, lactate, and in-tissue bioimpedance. ATP levels in both kidney and liver samples decreased rapidly after organ procurement. Lactate levels showed a slight increasing trend after 2 h post-mortem but the differences were not statistically significant. In-tissue bioimpedance showed decreasing trend of impedance over time both in kidney cortex and liver tissue suggesting the breakage of cellular membrane structures and/or cell-cell junctions.

The results demonstrated that the expected tissue degradation took place during the static cold storage of organs. The results will be useful for the development of the method capable of detecting viable organs for transplantation.

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