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Non-Invasive Evaluation of Blastocyst Quality for Embryo Transfer

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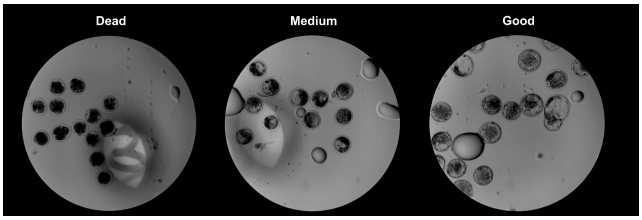
Summary

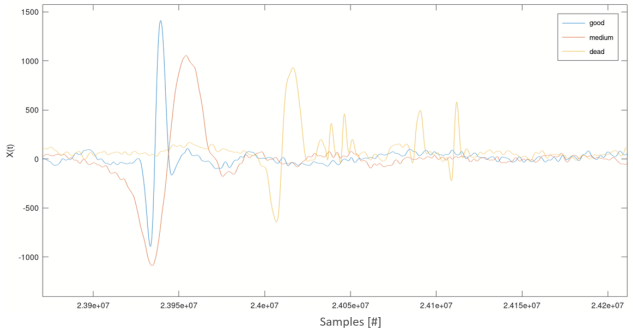
Electrical impedance spectroscopy is the foundational principle of operation for the Ravata Cell Selection Platform. As the health and quality of an embryo is reflected in the electrical permittivity and conductivity of its membrane and cytoplasm, respectively, electrical impedance and phase are used to non-invasively label and assess embryo health. Evaluation of graded bovine blastocysts demonstrates a statistically significant distinction between embryologist-graded good and medium quality cells with a p-value < 0.05 and easily distinguishing live from dead cells across all frequencies.

Methods and Results

Three embryologist graded experimental groups of embryos are injected into the microfluidic sensor: 1) Good Quality, 2) Questionable Quality, 3) Dead, as seen in the image below.



A pre-programmed tetrapolar (4-electrode) data acquisition routine defined by the electrical impedance spectroscopy (EIS) paradigm is performed by the Ravata Sensing Platform (RSP). Magnitude and phase for a given frequency and voltage were recorded. Over 200 embryos across all three grades were evaluated at three different frequencies.



Aggregated results across chips can be seen to the right, both unfiltered and filtered to eliminate outliers.

For more information contact Gurkern Sufi.