

Predictive Selection of Embryo Fertilization for Preclinical Mouse Models

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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 development status. Evaluation of developing zygotes demonstrated a statistically significant k-clustering of oocyte and zygote groups as demonstrated through the selection and culture of identified zygotes. Development of such technology for commercial use is credited to partnership with the Jackson Laboratory and their pursuit of cutting edge R&D.

Methods and Results

20 B6N mice were fertilized and their clutches harvested by the University of California of Davis Mouse Biology Program in accordance with Institutional Animal Care and Use Committee (IACUC) standards and regulation. Harvested cells were washed, incubated and processed through the Ravata Cell Selection Platform. Cells were labelled and incubated to determine fertilization status. **Figure 1** to the right demonstrates the selection accuracy based on principles applied in the technology and consumables developed by Ravata Solutions.

A pre-programmed tetrapolar (4-electrode) data acquisition routine defined by the electrical impedance spectroscopy (EIS) paradigm is performed by the Ravata Cell Selection Platform (RCSP). Magnitude and phase for a given frequency and voltage were recorded with the subsequent real and imaginary vectors being calculated and graphed. Over 100 cells were processed across 5 chips. **Figure 2** demonstrates the k means clustering accuracy of the data to observed results. Each measurement contains 52 “features” of interest which can be further used to differentiate developing embryos based on metabolic properties.

The capability of this technology enables enhancement of industrial efficiency through reinforcement of existing manual operations with predictive automation developed by Ravata.

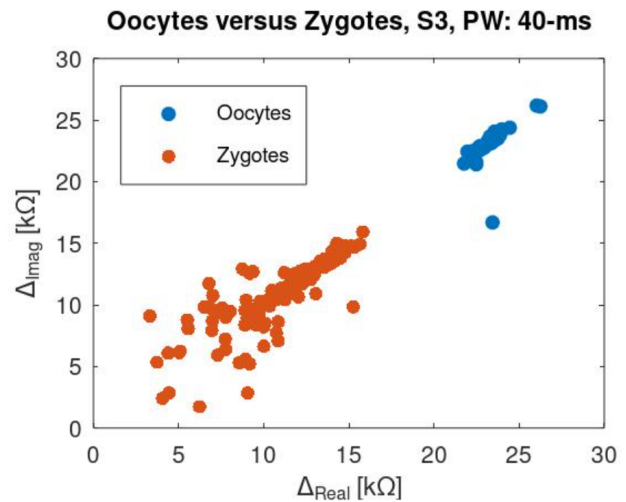


Figure 1

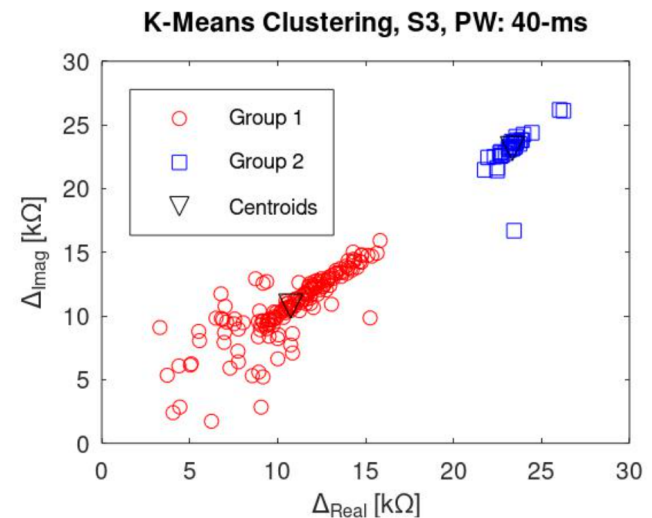


Figure 2