Applied Biophysics
Quantifying Cell Behavior

ECIS® for Real-time, Label-free Endothelial Cell Research

ECIS
Electric Cell-substrate Impedance Sensing

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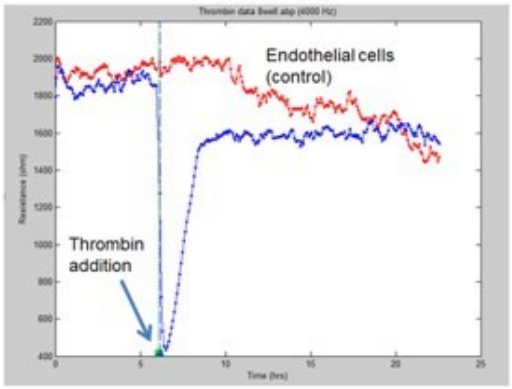
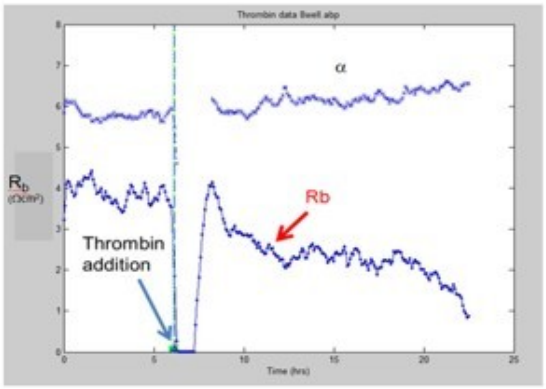
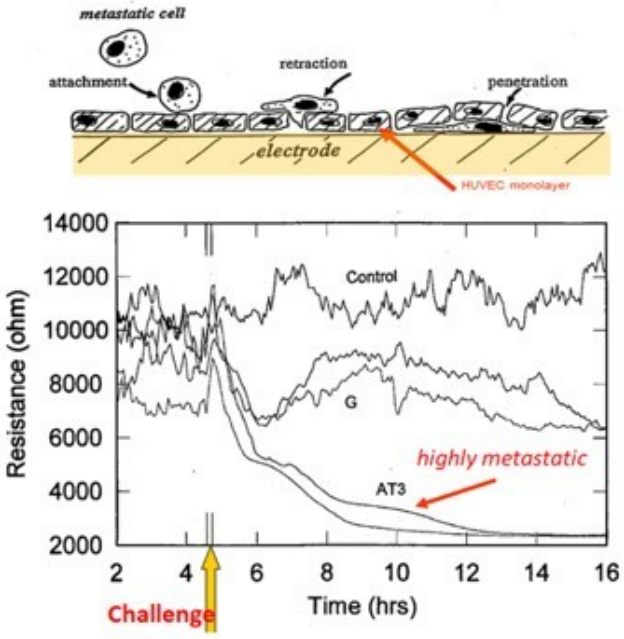
Barrier Function





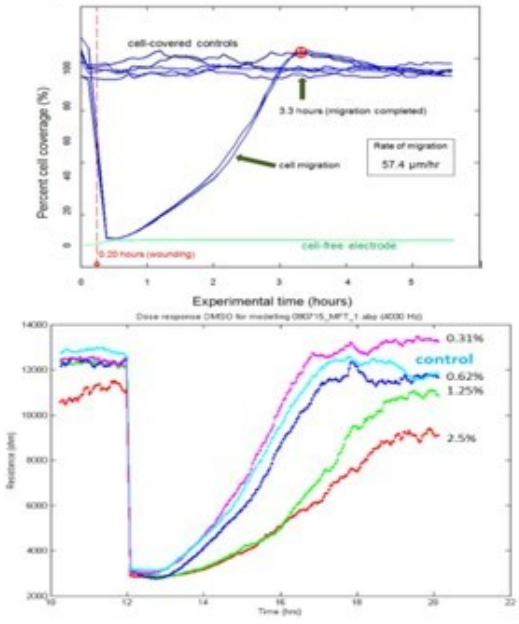
Epithelial and endothelial cells regulate the passage of molecules across cell layers. Disease, expecially vascular disease, occur when regulation is impaired. ECIS measurements are highly sensitive to changes in the barrier function and, with modeling, these changes can be further refined. ECIS has been used to demonstrate the effects of many regulating molecules incluing thrombin, VEGF, TNFalpha and sphingosine-1-phosphate.

Invasion



By quantifying cell behavior, ECIS can give new insight into how invasive cells cross endothelial and epithelial monolayers. Published examples include metastatic cells and leukocyte trans-endothelial migration as well as the migration of pathogenic organisms.

Cell Migration



Operating in an elevated field mode causing electroporation, a high electric field is appled for several seconds resulting in cell death. The ECIS wound is precisely defined, as it includes only those cells upon the electrode. Subsequent migration to "heal" the wound is detected electrically and returns a migration rate – all accomplished without opening the door of the cell incubator.