

## Impedance spectroscopy

### Benefits Locsense Artemis

- ✓ stable positioning of electrodes
- ✓ reduced risk of cross contamination
- ✓ saves time and reduction of repetitive tasks
- ✓ compatible with the incubator



### What is impedance?

Impedance is a general term for resistance in case of an alternating current. Impedance spectroscopy is a non-invasive, label-free detection method that provides insight in the integrity and differentiation of 2D and 3D *in-vitro* cultures. The barrier integrity of these cultures is of interest for toxicity and efficacy studies in e.g. cosmetic and drug development applications.

### Operation of the Locsense Artemis impedance detector

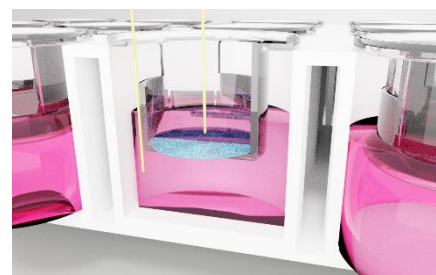
The Artemis TEER detector applies an alternating potential with a frequency varying from 10 Hz to 1 MHz across the cell culture of interest. The amplitude is limited to prevent cell damage. The effect of the cells on the passing AC (alternating current) is expressed in the returning signal as a reduction in amplitude and a shift in phase. By comparing the ingoing signal to the cells with the returning signal affected by the cells, the impedance of the cell culture is determined.

### Facts about impedance spectroscopy

- Impedance spectroscopy is non-destructive
- Impedance spectroscopy is sensitive to variations in temperature
- Precise and controlled positioning of the electrodes is essential for reliable results
- The Trans Endothelial/Epithelial Electrical Resistance (TEER) is extracted from the impedance spectrum

### Positioning impedance sensing electrodes

The sensing electrodes need to be submerged in a conductive medium, e.g. cell culture media, while effectively being separated by the support membrane including the cell culture. In practice transwell plates with inserts allow for the passage of one electrode to the bottom compartment while the second electrode is positioned in the top compartment.



*Position of the sensing electrodes*