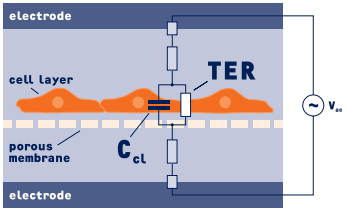
cellZscope

How are your cells today?
Find out with the new automated cell monitoring device.

The cellZscope is a new device for measuring the transepithelial or transendothelial electrical impedance of cell layers under physiological conditions. It is computer-controlled and allows automated, long-term monitoring experiments with up to 24 different cell cultures simultaneously.

An epithelial cell layer cultured on a permeable membrane forms the interface between two medium-filled compartments while an AC voltage is applied across the electrodes. The transepithelial electrical resistance (TER) and capacitance (C_{cl}) of the cell layer is measured by recording the frequency-dependent impedance (Z) and using an electrical equivalent circuit to analyze the data. The cellZscope is easy to operate and provides the ohmic resistance (TER) and capacitance (C_{cl}) as convenient readout parameters.



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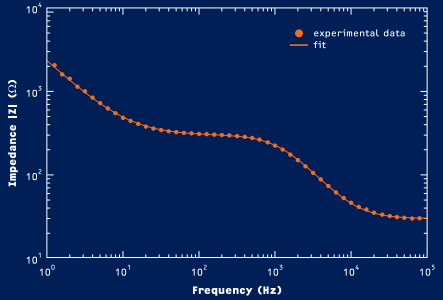
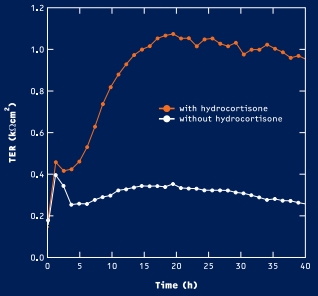
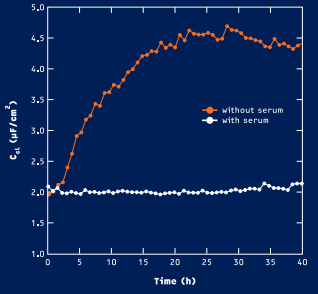


Typical frequency-dependence of the electrical impedance (Z) of an epithelial or endothelial cell layer: the fit curve is based on equivalent circuit modeling. The cellZscope software performs full automatic data analysis and provides the user with cell-related parameters such as the transepithelial electrical resistance (TER) and capacitance (C_{cl}).



Time-resolved monitoring of the transepithelial electrical resistance (TER) of primary cultured endothelial cells derived from porcine brain microvessels, incubated in serum-free medium supplemented with hydrocortisone (orange curve) and without hydrocortisone (white curve): the experimental data reveal that the TER of the confluent cell layer increases with time in the presence of hydrocortisone. This effect is attributed to a pronounced barrier strengthening of the cerebral endothelial cells.



Time-resolved monitoring of the capacitance (C_{cl}) of primary cultured epithelial cells derived from porcine choroid plexus, incubated in serum-free medium (orange curve) and in serum-containing medium (white curve): choroid plexus epithelial cells develop longer and more densely packed microvilli on their apical surface when incubated in a serum-free medium. This differentiation process leads to an increase of the capacitance of the confluent cell layer and can thus be followed noninvasively in situ.

graphs adapted from Wegener et al., BioTechniques 37, 590 (2004)

For further information on the new cellZscope simply send an email with your contact details to **cellzscope@nanoanalytics.com.**

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