DEVICE FOR ELECTRICAL CHARACTERIZATION OF CELLULAR CONSTRUCTS

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Invention

The present invention relates to a device for the electrical characterization of cellular constructs, featured by electrodes solidly integrated within the culture chamber of the constructs. Using a culture chamber holder, the electrodes are stably interfaced to an external readout system by connectors.

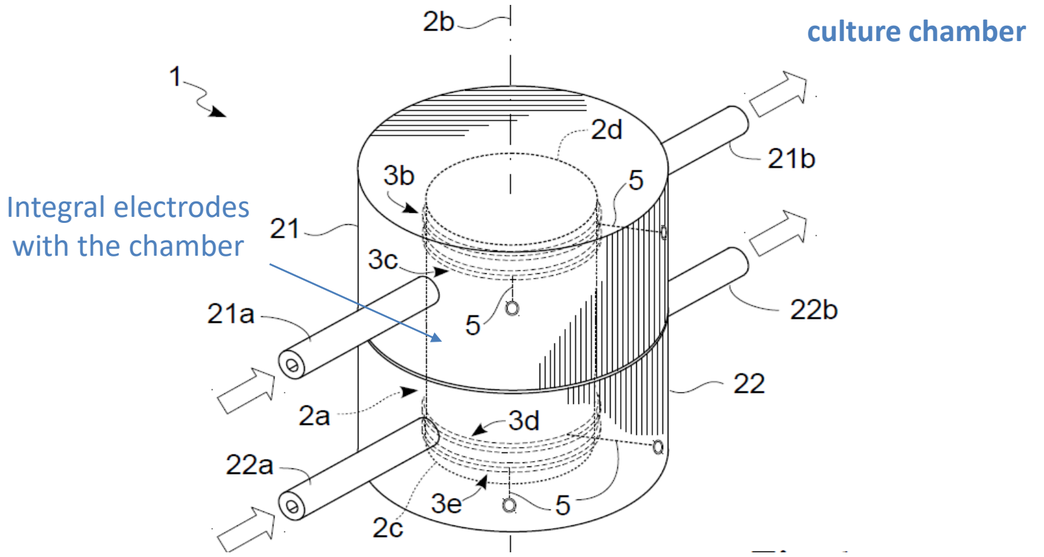
The purpose of the invention is to **electrically stimulate a cellular construct** so as to measure its electrical properties (resistance/impedance). In the case of biological barriers, such measurements are known as transepithelial/transendothelial electrical resistance or impedance (TEER/TEEI).

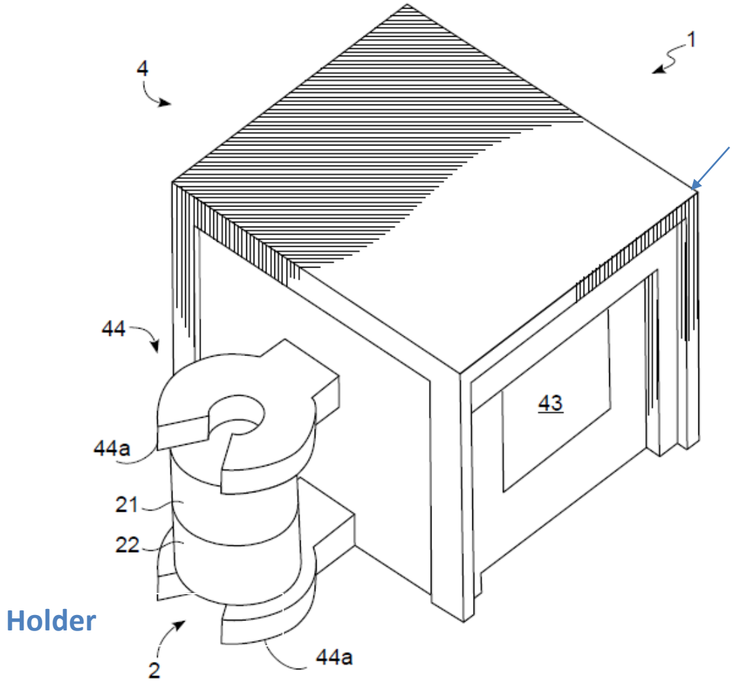
To date, such measurements are made by immersing needle-like electrodes inserted invasively into the culture chamber and placed in unsteady contact with the culture medium, causing localized concentration of the electric field lines. This can result in a highly noisy and inaccurate measurement, and alteration of the culture environment itself.

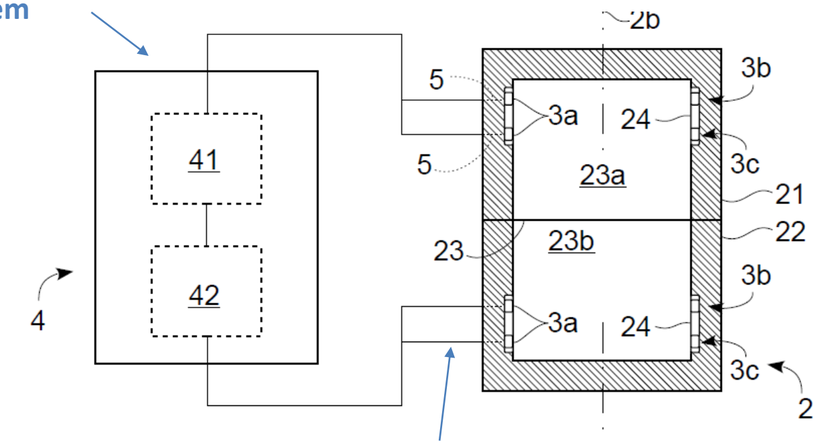
The advantages of the invention are thus:

- **less noisy measurements**, due to the stability of electrodes and connections
- **more precise measurements**, due to a uniform distribution of electric field lines
- possibility of **continuous monitoring of cell culture**.

Drawings & pictures







Stable connections between holder and electrodes

Industrial applications

The invention has wide use in ***in-vitro*** **technologies**, for studying human pathophysiology and testing drugs and interaction with toxic substances or pathogens, and regenerative medicine. In fact, monitoring cellular electrical properties is essential to verify the integrity of cell barriers or the replication of cells within a scaffold.

There are no commercially available solutions that allow **measurement within fluidic devices** (i.e., bioreactors), except as experimental time-points after disassembling the culture system.

Possible developments

To date, the technology has been developed and implemented as a prototype and tested in several laboratories (TRL4) for **impedance monitoring of cellular barriers**.

The research team is interested in collaborating with industrial partners, in order to increase the technology readiness, and to consider licensing or transferring the patent invention for commercialization by interested companies.

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