

**FESTEL CAPITAL**

Dr. Gunter Festel  
Schuermattstr. 1, CH-6331 Huenenberg  
Phone +41 41 780 1643  
Mobile +41 796 527 112  
Email [gunter.festel@festel.com](mailto:gunter.festel@festel.com)



## Membrane Multi-Sensor Array Instrument

### Summary

The membrane-based instrument with biocompatible and optionally hydroxyapatite surface is used for online simultaneous measurement of multiple vital parameters in cell and tissue cultures. The instrument can make direct multiparametric online measurements of important vital parameters and supports adherent cells of all types. The cells/samples have no influence on the sensors during measurement and the cell culture unit is completely autoclavable.

Industrial partners are sought for various possible commercialisation options.

### Background

FESTEL CAPITAL is supporting a German university to commercialise an innovative multi-sensor array instrument for online measurements in cell and tissue cultures.

### Description

The online-measurement of vital physiological parameters like pH, glucose, oxygen and CO<sub>2</sub> in cell or tissue cultures is important both in research and quality control in tissue engineering, especially for the bottom layers of 3D-constructs, which receive least nutrition. With advancing sensor technology, biosensors and even multiparametric sensor arrays can be provided for the direct measurement of these data. However, the sensor surface is seldom biocompatible, suffers from protein/cell contact, can rarely be steam-sterilised and must in all cases be recalibrated after at least two days. In the combined multi-sensor array instrument, equipped with sensors for pH, conductivity, glucose, oxygen and, after further development, CO<sub>2</sub> and lactate, the measurement chamber is separated from the sensor field by a biocompatible nanoporous membrane supporting adherent cells (Pat. pending). The sensor unit can be detached for multiple measurements and recalibration. The cell culture unit can be realised as standard multiwell-plate, or adapted to specific requirements. In a specific

variation, the membrane consists of osteoconductive hydroxyapatite, for the use in bone and cartilage studies and monitoring in tissue engineering.

## **Application areas**

- Cell and tissue culture monitoring
- Drug-research
- Analysis of liquid samples
- Long-term monitoring of cultures
- Environmental research
- Bone/cartilage cultures
- Osteoclast studies direct on membrane
- Epithelial studies
- Bacterial, plant and fungi cultures
- Suitable for studies in arthritis, osteoarthritis, rheumatism, general infection and osteoporosis research
- Supports adherent cells

## **Advantages**

Advantages this technology offers include the following:

- Direct multiparametric online measurement of important vital parameters
- Supports adherent cells of all types, specific functionalisation possible
- Measurement from below: important for monitoring cell viability in the lower layers of 3D-constructs and tissues, and for studies on asymmetric tissues like epithelia
- Use of exact and reliable electrochemical technology, allowing permanent recalibration to enable long-term measurement (up to several months)
- Cell culture unit completely autoclavable (separately from sensor unit)
- Sterile barrier (200-300 nm pore size) between sample chamber and sensor field
- No influence of cells / sample on sensors during measurement

## **Investment Opportunity**

The aim of FESTEL CAPITAL is to commercialise this innovative multi-sensor array instrument. In the search for industrial partners, out-licensing as a commercialisation option is possible. Detailed information can be provided after the signing of a confidentiality agreement.

## **Disclaimer**

FESTEL CAPITAL has prepared this document to the best of FESTEL CAPITAL's knowledge and belief based on all available information. FESTEL CAPITAL takes no warranty for the accuracy and completeness of this information. Therefore, all liability for costs or damage resulting from information and conclusions in this document is excluded.

## **About FESTEL CAPITAL**

FESTEL CAPITAL is an advisory and investment firm focusing on the commercialisation of technologies in the areas of energy, environment, health, materials and nutrition.

CONTACT: Dr. Gunter Festel, Schuermattstrasse 1, CH-6331 Huenenberg/Zug, Phone +41 41 780 1643, Mobile +41 796 527 112, E-Mail [gunter.festel@festel.com](mailto:gunter.festel@festel.com).