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Oberleitner, Maximilian

# Label-free and Multi-parametric Monitoring of Cell-based Assays with Substrate-embedded Sensors

- **Doctoral thesis nominated as an outstanding PhD thesis by the University of Regensburg, Germany**
- **Describes novel sensors for obtaining dynamic cell response information**
- **Applies a variety of analytical methodology for multi-parametric monitoring of cell-based assays**

This thesis describes novel substrate embedded physical sensors that can be used to monitor different types of cell-based assays non-invasively and label-free. The sensors described provide integrative information of the cells under study with an adaptable time resolution (ranging from milliseconds to days). This information about the dynamic cell response to chemical, physical or biological stimuli defines a new paradigm in fundamental biomedical research. The author, Maximilian Oberleitner, describes approaches in which the cells are directly grown on different sensor surfaces (gold-film electrodes, shear wave resonators or dye-doped polymer films). This approach, with the reacting cells in particularly close proximity and contact with the sensor surface, is key to a remarkable sensitivity, opening the way for a variety of new applications. This thesis not only introduces the fundamentals of each approach, but it also describes in great detail the design principles and elucidates the boundary conditions of the new sensors.

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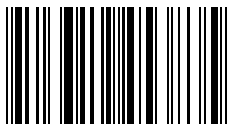
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