

Leibniz Universität Hannover



## **INNOVATIVE TECHNOLOGIES FOR THE FUTURE**

# Chemistry

**16671** Selective determination of the mRNA expression profile of single cells by an optogenetic switch (via the LOV domain) and subsequent single-cell sequencing

## Introduction / Abstract

Optogenetics as a new field of research in genetics analyses the effect of lasers on single cells.

#### Background

Selections of cells or tissues from a mixture of thousands of cell populations can be carried out after microscopic identification by known methods such as "Laser Capture Microdissection" by Palm.

#### Motivation

The identification of single cells from a mixture of thousands of cell populations is not yet possible.

## Innovation / Solution

The invention enables the selective determination of the mRNA expression profile of single cells by an optogenetic switch over a LOV domain and subsequent single-cell sequencing. The unambiguous assignment of the cells to be analysed in a cell culture dish is to be carried out using light of a defined wavelength. The mRNA of these cells should be made to transcribe, while neighbouring cells show no transcription and are therefore not relevant.

#### Benefits

- Microscopic identification of single relevant cells possible.
- Determination of the expression profile of specially labelled cells from a mixed cell population possible.
- Possibility to manipulate defined cells in the cell culture dish and subsequent sequencing of the mRNA of these cells.

#### Fields of application

The field of application of this invention can be classified as life science, biotechnology, medicine and pharmaceuticals. Specifically, it is a new technology, optogenetics, which combines methods from optics and genetics. Technology Readiness Level TRL 5

## Patent situation

Country: DE Code: 10 2018 216 872 A1 Status: pending

#### Service

License for commercial use / Cooperation possible

## Keywords

cell population, cells, expression, gene expression, genetics, identification, laser, light, lov, mrna, optical, photosensitive, profile, selective, sequencing, single cell, switch, transcription

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