

Research services for in vitro characterisation of toxicological compounds

MicroDiscovery GmbH together with its partners BioTeSys GmbH and Scienion AG has developed a novel method for the assessment of chemicals in human metabolism. In contrast to traditional approaches based on animal testing with its high costs and its limited significance for humans, the new and well proved method is based on human cell cultures treated with the chemicals to be tested, microarray analysis of the RNA extracted from the cells and consecutive data analysis with newly developed algorithms. A fundamental feature making the method unique is the combination of liver and nerve cells in a single assay which models the naturally occurring metabolism of chemicals in humans in an unprecedented way.

Data readout can be performed at different levels of analysis:

Acquisition

The acquisition of cytotoxicity data for selected well characterised reference compounds is the first level of analysis.

Gene Detection

The second level is the detection of differentially regulated genes in the cell assay with specific microarrays after treatment with the toxicological compounds to be tested.

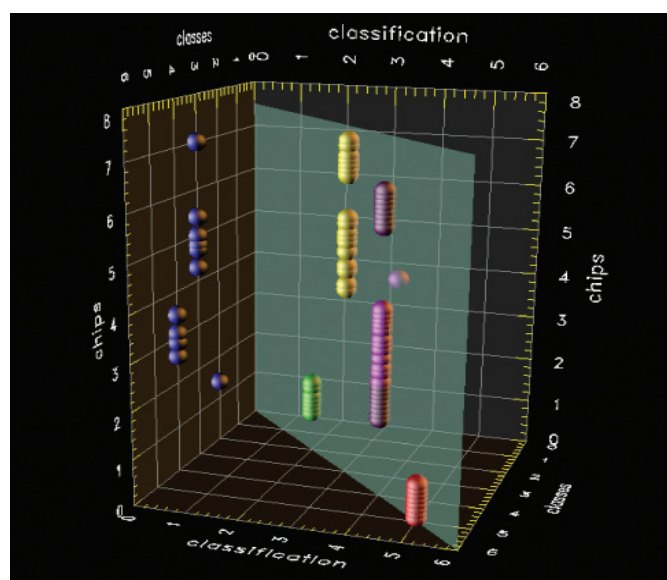
Profile Matching

Similarities between the gene expression pattern caused by the test compounds compared to known reference compounds are identified. The comparison is based on gene expression patterns and classifies the compound to be analysed as: "has similar effect on cell function as the reference compound".

Substance Classification

The new substances are assigned to classes defined according to the expression pattern.

Below, a classification plot of 11 different toxicological compounds is shown. Clearly, four classes with similar expression patterns are discernable. The algorithm is tailored specifically to this classification task and is able to detect new classes. The new method leads to a significant reduction in the number of misclassifications compared to conventional methods.



Classification of toxicological compounds

Data analysis and development of algorithms where carried out by MicroDiscovery. We offer you a fast and cost effective way for reliable compound characterisation. Our novel cell line and microarray based assay will provide you the following information:

- Cytotoxicity data
- Efficiency data
- Differentially expressed genes of interest (are postulated or expected functions real?)
- Affiliation to the expected group of function
- Affiliation to a new group of functional compounds
- Applicability for unexpected fields of application