Development of automatic image analysis methods for high-throughput and high-content screening

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Stellingen

Behorende bij het proefschrift

Development of automatic image analysis methods for high-throughput and high-content screening

1.   Identifying distinct phenotypic classes of cell population and quantifying phenotypic features at the subpopulation level is important for characterizing cellular phenotypic responses to biologically active compounds (This thesis).

2.   Measuring the full spectrum of phenotypic information from microscope images benefits detecting subtle phenotypic changes of cell populations, enables applicability for different cell types under a wide variety of conditions, and enables system-level studies of the full range of phenotype characteristics (This thesis).

3.   Phenotype pattern recognition based on multi-parametric profiles of 4T1 cells reveals that phenotypic responses are specific to the biological activity (This thesis).

4.   It should be beared in mind that different imaging modalities and resolutions would generate different quantification results and therefore may lead to a different conclusion (This thesis).

5.   Cell-to-cell differences are always present to some degree in any cell population, and the ensemble behaviors of a population may not represent the behaviors of any individual cell (Altschuler & Wu, Cell, 2010).

6.   Measuring a large number of features, even features undetectable by eye, has proven useful for screening as well as cytological/cytometric profiling, which can group similar genes or reveal a drug's mechanism of action (Carpenter et al., Genome Biology, 2006).

7.   Image processing can be used to make automatic microscopes not only high-throughput but also intelligent (Pepperkok & Ellenberg, Nature Reviews Molecular Cell Biology, 2006).

8.   The discipline of cellomics can be described as the first step toward understanding how the output of the foundational "omics" technologies, i.e., genomics, proteomics, and metabolomics, function in a living environment (Giuliano et al., Methods Enzymol, 2006).

9.   The most frustrating thing in science is that you have a good result but you are not good at "selling" it.

10.   Discussion not only helps to generate new ideas, but also helps to release your stress.

11.   If you only know the advantage of an algorithm, you know when to use it; if you also know the disadvantage of this algorithm, you can improve it!

12.   Efficiency is intelligent laziness.

<div align="right">Zi Di, Leiden, 21 October 2013</div>