

AUTOMATIC ANALYSIS OF MICRO-PATTERNS IN THE LIVE CELL PLASMA MEMBRANE

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Abstract: Recently, several groups have introduced techniques to align membrane proteins into specific patterns within the plasma membrane of live cells [1], [2]. Imposing a regular micropattern yields improved sensitivity, as interactions are measured at multiple positions. The redistribution schemes of fluorescence intensity can be exploited for characterization of the interaction between fluorescently-labeled prey proteins (Lck) and micropatterned baits (CD4), [3].

As a quantitative, automated interpretation and comparison of the modifying micropatterns over an extended image data set is required, a micropattern analysis and evaluation software was developed. The program contains the following functionalities:

Image preprocessing (background correction, ROI extraction), *Figure 1a*; Image registration according to rotation and shift of the BSA stamp, *Figure 1b*; Gridding based on projections and Radon transform, *Figure 1c*; Feature extraction / Feature evaluation; 2D histogram based pattern similarity estimation, *Figure 1d*.

Further, based on the extracted features an open machine learning software (WEKA [4]) for an automatic validation of the degree of co-patterning was applied.

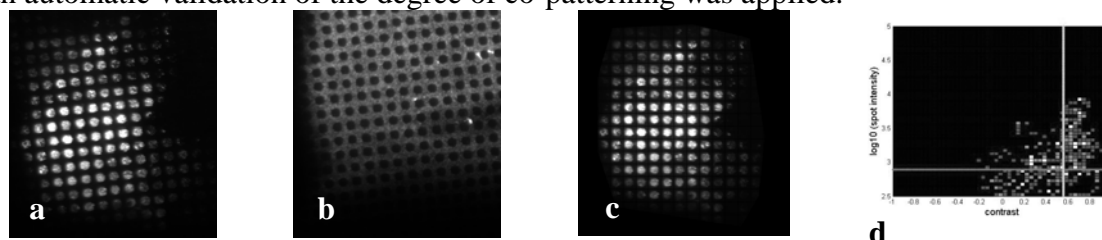


Figure 1: *a* Imaged cellular micropattern of cytochalasin for contrast adjustment, *b* BSA-grid for control and registration, *c* gridded and aligned micropattern structure, *d* 2D histogram distribution: contrast vs. mean intensity

References:

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