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Title: At the higher end of High Content Screening: The MIAS HTS imaging device

Abstract:
In today's machine vision, analysis of image content is often based on traditional intensity threshold images. In contrast, the human brain uses many complex features like intensity, geometry and colour to create human vision. We have developed a novel image acquisition and analysis platform that is based on the principles of human vision. The resulting Microscopic Image Analysis System (MIAS) is an automated reader developed for high content screening in HTS.

The particular advantages of MIAS are 'viable' illumination, its robust performance in assays with extremely low light yield and its powerfull analysis framework:..
1) MIAS can robustly focus at high speed and will capture fluorescence or bright field images over a broad resolution range, from either live or fixed and stained objects.
2) High speed fluorescent readout can be achieved on samples with signals invisible to the human eye. Combined with powerful image analysis, this feature facilitates to run screening campaigns cheaper (with less label) and to visualize less abundant proteins at physiologically relevant expression levels (sensitivity).
3) The 'viable' low-light illumination conditions used in MIAS, with little or no photobleaching or photo-toxicity, allow for multiple kinetic readings while optimizing assay development and in hit validation.
4) The rapid application development concept of MIAS enables a broad range of powerful image analysis applications, including subcellular protein localization, gene activation/silencing, neurite outgrowth, tissue morphology or histology, small organisms.

In conclusion, MIAS is a novel powerful non-invasive reader for automated image acquisition and analysis, based on the concepts of human vision. Its simple operation and robustness at a high level of automation allow for high throughput screening, resolving morphology of multi-cellular structures down to protein localization in the cell.