

An Introduction to IncuCyte™ High Definition (HD) Imaging Mode

IncuCyte™ Product Note

Introduction

Standard inverted phase-contrast imaging in high density microplates is generally of very poor quality. The reason for this is that light which propagates from the annulus ring at the light source is refracted by the fluid meniscus common in microplates. The refraction of the incoming light by the curved meniscus causes an aberration which detracts from the ability of the objective conjugate ring to remove background light. The result is a poor contrast image.

HD Imaging is a proprietary imaging format developed by Essen specifically for IncuCyte in order to improve the performance of phase-contrast imaging in 96- and 384-well microplates.

Approach and Results

The details of how HD imaging works is proprietary. Suffice it to say however, that the technique uses a combination of both changes to the optical path and software analysis to provide an imaging technique which is insensitive to meniscus effects.

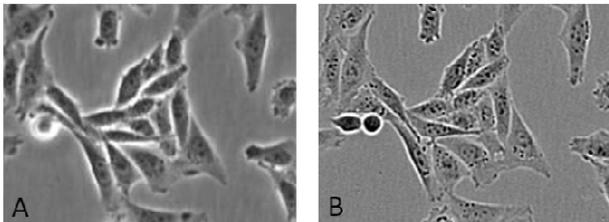


Figure 1. Standard Phase Contrast vs. Essen HD Imaging: Panel A shows images of cells in standard phase contrast from a T-flask. Panel B is the same cells and the corresponding IncuCyte HD image

HD imagery looks different than standard phase contrast imagery as shown in the accompanying images. HD tends to display less of a halo than standard phase contrast imaging. Another difference is that rounded-up cells appear dark, as opposed to bright. Lastly, HD imaging

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provides more intracellular granularity detail on most cell types. Figures 2 and 3 demonstrate comparisons between standard phase contrast imaging and HD imaging for both 96- and 384-well plates.

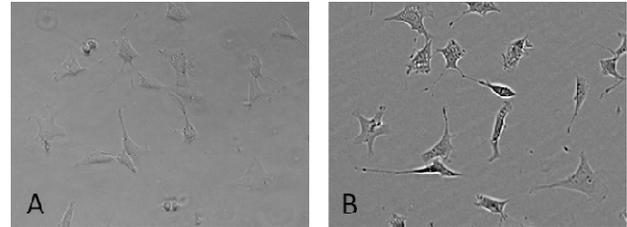


Figure 2. Standard Phase vs. HD in 96-Well Plates: Panel A shows images of cells in standard phase contrast 1.5 mm off the center of a well in a 96-well plate. Panel B is the same area of the well, imaged under HD a short time later. HD Imaging is insensitive to focus and illumination aberrations caused by fluid meniscus.

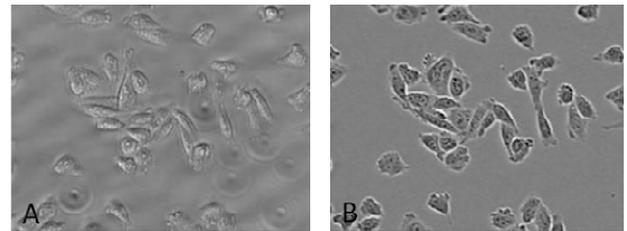


Figure 3. Standard Phase vs. HD in 384-Well Plates: Panel A shows images of cells using standard phase contrast in a 384-well plate. Panel B is the same cells and the corresponding IncuCyte HD image. Aberrations typically seen with phase imaging of plastic with standard phase are absent in the IncuCyte HD image.

Conclusion

HD enables high quality phase imaging in microplates. This capability provides morphological information not found with fluorescent-only imaging. This technique is useful for non-invasive quality control of plate-based cellular assays, as well as for running non-labeled proliferation and migration assays. Essen BioScience is developing microplate-based kinetic imaging assays based on this technology.

About the IncuCyte Live-Cell Imaging System

The Essen BioScience IncuCyte Live-Cell Imaging System is a compact automated microscope. IncuCyte resides inside your standard tissue culture incubator and is used for long term kinetic imaging. To request more information about the IncuCyte please visit us at www.essenbioscience.com.

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