

Combinatorial Chemistry & High Throughput Screening

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The Digital Holographic Microscopy (DHM) technology and experimental workflow Plate preparation. Compounds to be screened and cells plated in 96 or 384 wells imaging assay plates are incubated for the time defined by the experimental screening conditions. Living or fixed cells are then imaged using the automated DHM instrument. **Image acquisition.** First, a hologram (magnifying glass highlights the interference fringes) is recorded out of focus by a digital camera on a DHM T1001 system equipped with a motorized stage for automated multi-well plate experiments. Legend: M, mirror, BS, beam splitter, BE, beam expander, MO, microscope objective, C, condenser. The hologram is then reconstructed using appropriate algorithms to form an in-focus quantitative phase image. Phase contrast in DHM is provided by the optical path length (OPL) variations in the specimen. For cell biology experiments, the measured optical path difference (OPD) is related to the thickness d and mean intracellular refractive index n_c of the cultured cells, as well as to n_m , the refractive index of the surrounding medium. **Image analysis** is performed on the quantitative phase images using either the global image for cell population analysis or individual cells. Illustration courtesy of Dr. Benjamin Rappaz *et al.*, from the Biomolecular Screening Facility (BSF), Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland.