

The **Phasefocus Liveocyte®** provides **non-toxic phenotypic screening for live cells**, enabling long-term time-lapse assays without the need for fluorescent labels. This is an important consideration for the screening of sensitive primary cells, and stem cells. Based on an imaging method known as **ptychography**, this label-free microscopy approach is particularly suitable for reporting cellular changes such as mitosis, apoptosis, and cell differentiation, for example.

The **Phasefocus Virtual Lens** provides an extremely versatile platform for **time-lapse label-free imaging**, with post-acquisition capabilities for the analysis of cell state and cell cycle.

Operation is **fully-automated**, but with options to **tailor data acquisition protocols** to suit user needs.

Key Features

- **Label-free and non-toxic:** use of low laser power, thereby allowing users to perform long-term time-lapse assays on sensitive primary and stem cells that previously were only practicable with immortalized cell lines due to the need for labelling.
- **Flexible fields of view without loss in resolution:** users can perform fully-automated high-resolution measurements on statistically significant numbers of cells, and over multiple fields of view, to produce flow cytometry-type measurements without removing cells from their culture medium.
- **Consistent outputs:** no photo-bleaching effects during measurements or inconsistencies due to label variability result in better reproducibility of measurements.
- **Simple experiment workflow:** users save time and reduce variability in results caused by complex experimental protocols associated with labelling, fixing and harvesting of cells.
- **Quantitative phase images:** direct measurements of morphological changes in cells such as volume, thickness or dry mass, which enables previously impossible assays such as contraction of primary smooth muscle cells.
- **Robust cell tracking:** Liveocyte can automatically follow multiple cells individually, through multiple cell divisions, and compare multiple generations of cells to their ancestors.

- **Multiplexed data** from analysis provide outputs equivalent to multiple assays without the need to repeat experiments, saving time and money.
- **Perfect focus:** post-acquisition auto-focussing means that users will never suffer from focal drift issues during a time-lapse experiment again.
- All cells in a time-lapse video may be analyzed **independently and simultaneously**.
- The cells in the field of view of a time-lapse series may be **colour-coded** reflecting different states/stages.

Applications

- **Cell count, confluence, and proliferation, at multiple time-points**, which allows simple yet robust cell population monitoring.
- **Toxicity, cell viability and apoptosis rate**, which provides the kinetics of the cytotoxic response rather than just a snapshot like many colorimetric endpoint assays.
- **Mitotic index vs time**, with measurements at multiple time-points which allow identification of changes in proliferation as a population evolves.
- **Morphology such as sphericity, nucleus-cytoplasm ratio**, which highlight changes in cell behaviour such as formation of neuronal processes.
- **Cell motility**, including scratch-wound assays, for robust measurement cell migration parameters.
- **Cell thickness, volume and dry mass.**