

Label free, live cell imaging with quantitative measurement allows accurate 3D measurement of cell morphology, cellular interactions, and cellular kinetics

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Holotomography (HT) allows for the imaging of cells and cellular organelles in 3D without the use of intrusive dyes or labelling. This novel technique prevents the perturbation of the cell physiology or morphology which in turn provides a true picture of the cell and its functionality.

HT utilises the intrinsic properties of light as it travels through small objects where the light is refracted and retarded. These small changes can be detected and measured such that the refractive index of small voxels within a given volume can be measured. By applying false colour to different bands of refractive index, the structure of the cell can be highlighted in 3D. Subcellular compartments can then be segmented, and their refractive index used to calculate the amount of material present in the cellular and sub cellular structures.

Because the amount of light used is so low HT has no phototoxic effects, unlike Fluorescence microscopy where firstly you label and then you irradiate the sample with strong light. With HT cells can be observed in their native state for long periods of time, allowing observations of changes in morphology, as well as providing quantitative data of the dry mass of cells and their internal structures therefore allowing kinetic studies to be conducted.

Latest instruments also provide the option for correlative HT with 3D Fluorescence as well as imaging in a variety of vessels and multi well plates, allowing for large volumes of data to be captured for statistical analysis.

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