

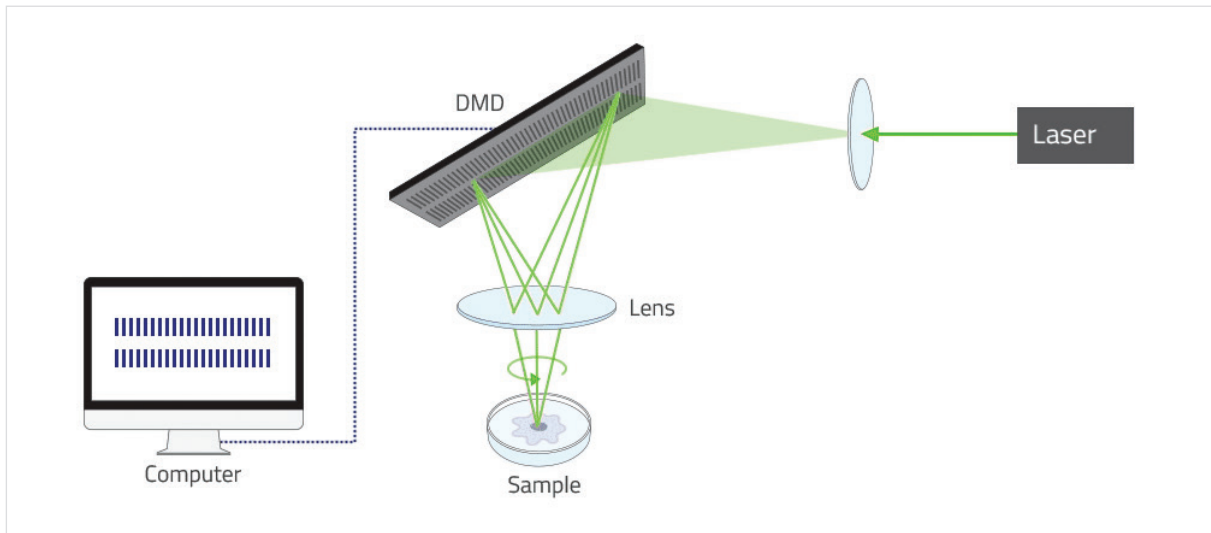
A grayscale electron microscopy image of a cell, showing various organelles and numerous bright, punctate spots (likely gold particles or fluorescent markers) distributed throughout the cytoplasm and nucleus. The text is overlaid on the right side of the image.

Tomocube Holotomography

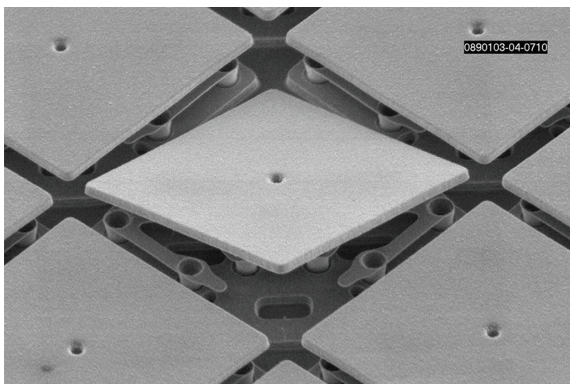
HT-1H/HT-2H/HT-X1

Holotomography (HT) is optically analogous to X-ray CT

Refractive index (RI) is an intrinsic optical parameter that describes the speed of light passing through a specific material. Light passing through a cell is slower than light passing through the surrounding medium. Analogous to X-ray CT (computed tomography), HT uses a laser beam to measure 3D RI distribution of cells. The system measures multiple 2D holograms of a sample in various illumination angles, from which a 3D RI tomogram is reconstructed via an inverse scattering algorithm. Tomocube presents unprecedentedly precise laser beam control, powered by Texas Instruments™ digital micromirror device (DMD) technology.



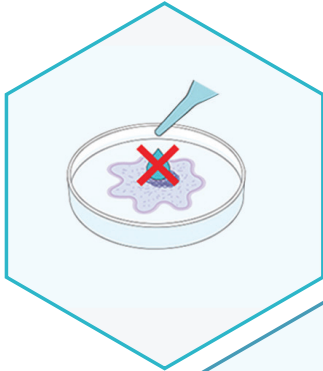
Digital Micromirror Device (DMD)



Texas Instruments™

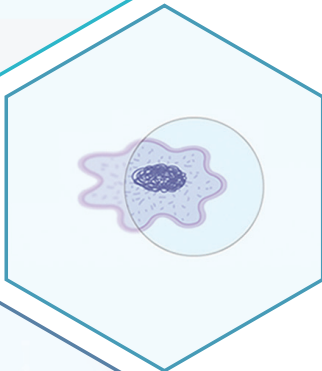
The DMD consists of several hundred thousand micromirrors arranged in a rectangular array. Each individual mirror can be rapidly tilted electronically to create a mirror pattern which can rotate the beam through 360° around the optical axis at a desired angle.

Advantage of Holotomography



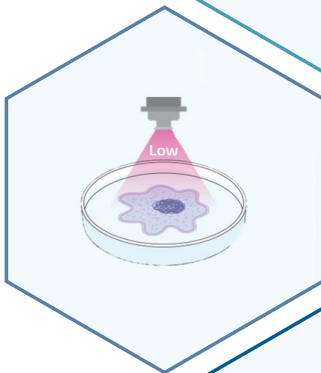
No labeling

RI distributions of cells are utilized as an intrinsic imaging contrast. No labeling, fixation, staining, or transfection is required for high-resolution imaging of cells.



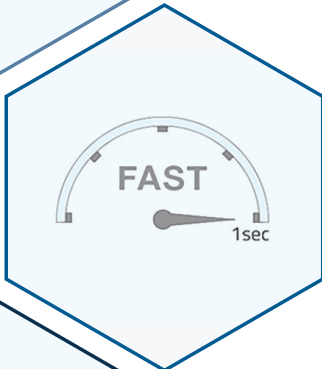
High resolution

Exploiting synthetic aperture effects during tomographic reconstruction, the lateral resolution is 110 nm (HT-1H, HT-2H) or 156 nm (HT-X1).



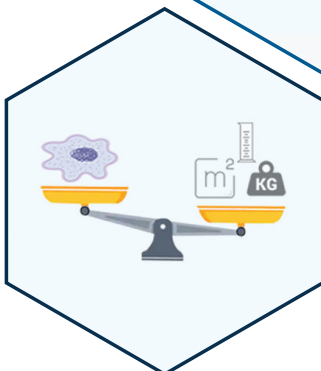
Low phototoxicity

The principle of HT is based on the inverse of light diffraction. Because of negligible light absorption, there is almost no phototoxicity.



Fast imaging

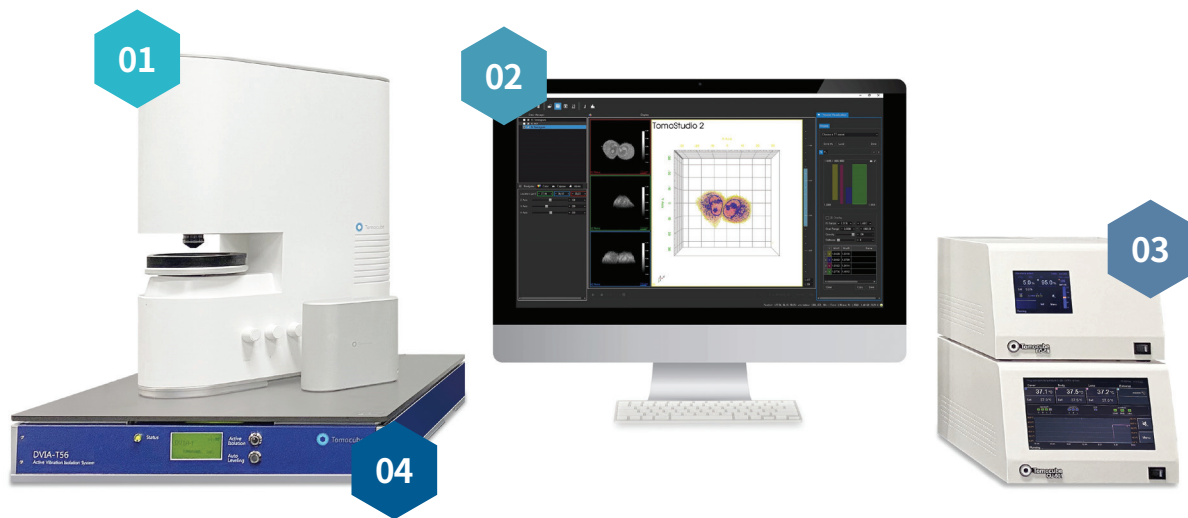
Three dimensional imaging can be acquired in 0.4 seconds (HT-1H, HT-2H) or 6.5 seconds (HT-X1).



Quantification

The RI value can be directly translated into the molecular concentration. By multiplying with the measured volume information, dry mass information can also be retrieved.

HT-1H / HT-2H



- 01 Microscope** 3D Holographic microscope
- 02 TomoStudio™** Operating software
- 03 TomoChamber** Temperature, gas, and humidity controller
- 04 TomoPlate** Active anti-vibration plate

Specifications

Model		HT-1H	HT-2H
Objective lens		60x NA 1.2 (water immersion)	
Light source		532 nm diode laser	
Resolution (optical/ reconstructed)	Lateral resolution	110 nm / 110 nm	
	Axial resolution	356 nm / 220 nm	
Fluorescence		N/A	385/475/570 nm LED
Field of view		80 μ m x 80 μ m	
Depth of field		40 μ m	
Size (W x D x H)		180 x 445 x 500 mm	
Weight		29 kg / 63 lbs	
Power		100-240 V, 50/60 Hz, 1.5 A, 100 W	
Temperature / Humidity		20-28 $^{\circ}$ C / 35-85%, non-condensing	

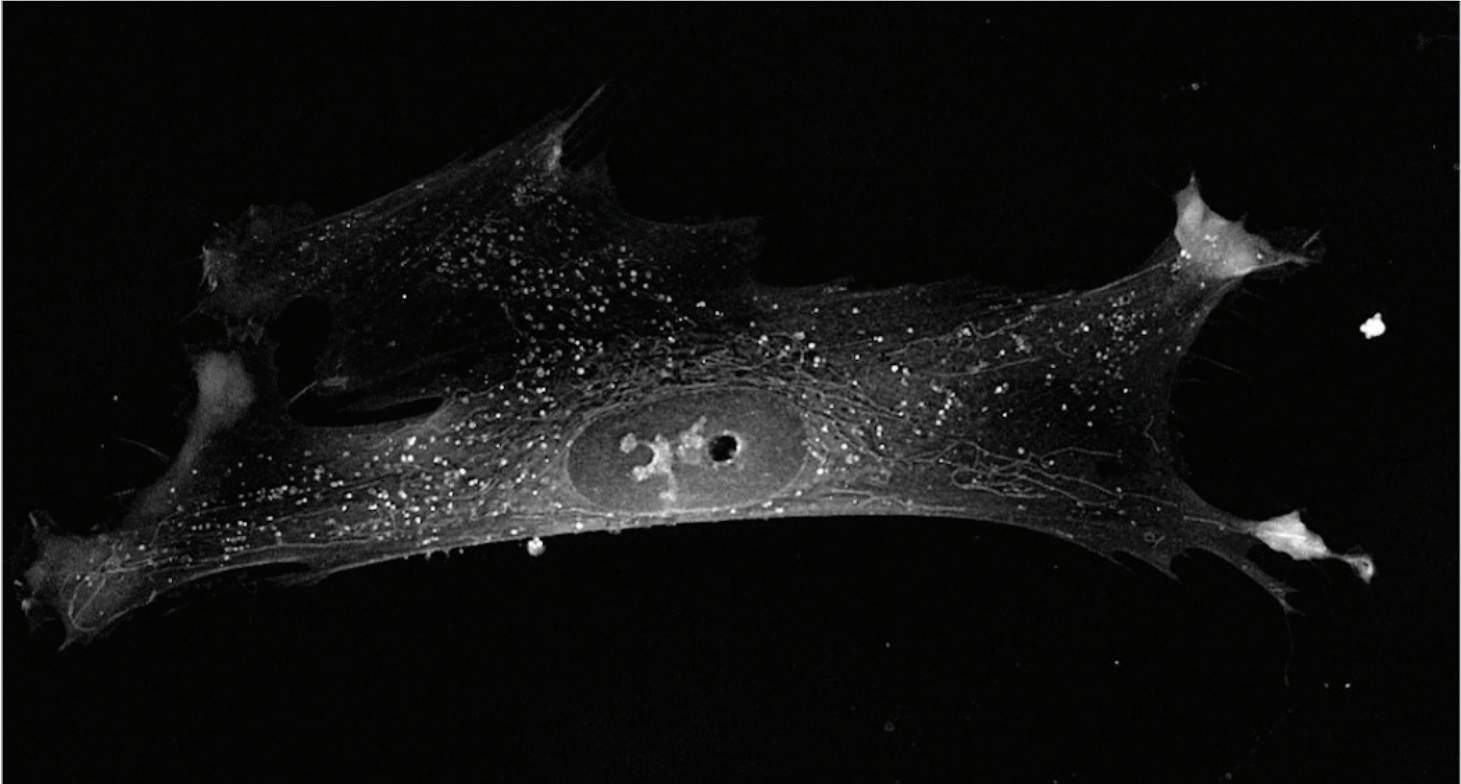


- 01 Microscope** Tomocube HT-X1 holotomography system and fluorescence light engine
- 02 TomoStudio X** Operating software
- 03 Environmental controller** Temperature and gas controller

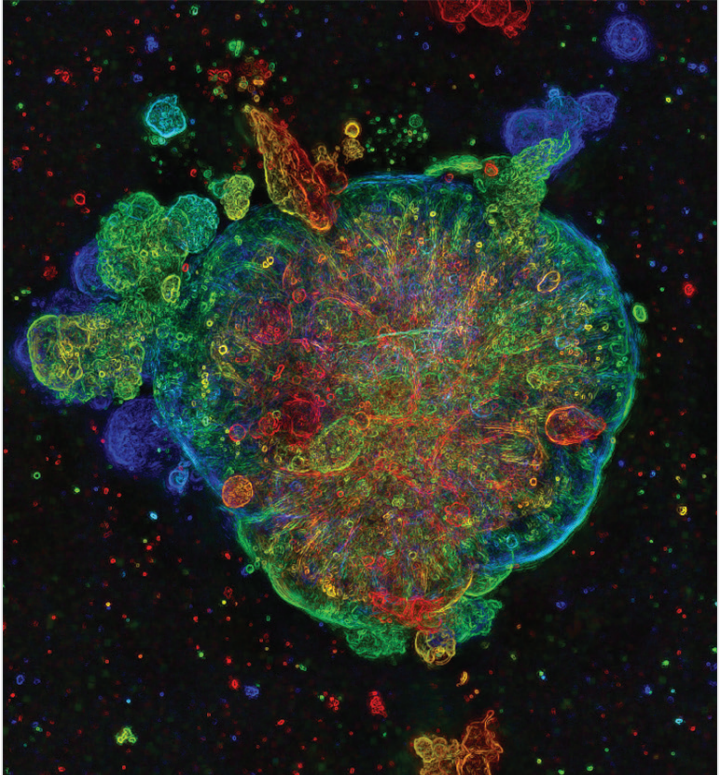
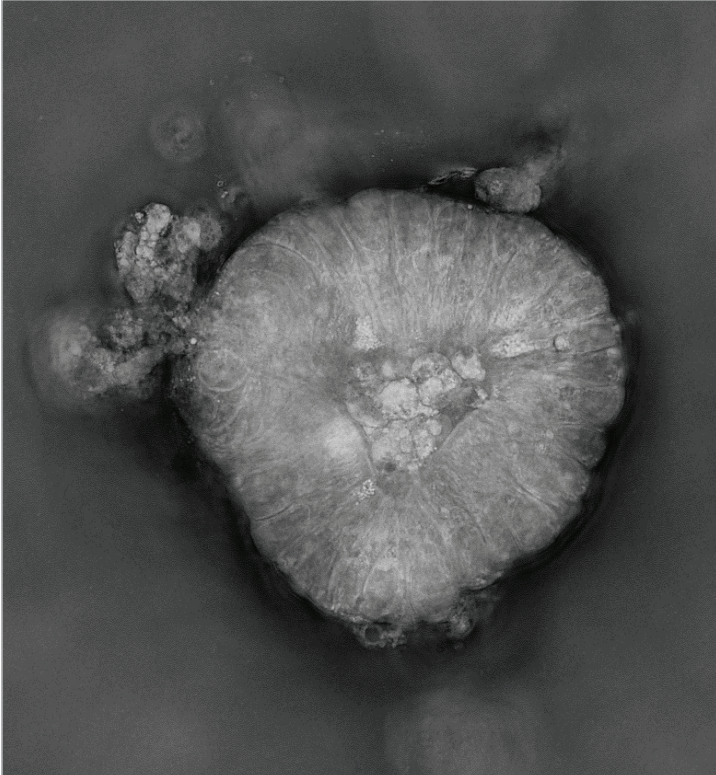
Specifications

Model		HT-X1
Objective lens		40x NA 0.95 (air)
Light source		450 nm LED
Resolution (Dish/6/12/24 well)	Lateral resolution	156/161/179/205 nm
	Axial resolution	1069/1211/1387/1695 nm
Fluorescence	Excitation/bandwidth	378/52, 474/27, 554/23, 635/18 nm
Field of view		218 μ m x 165 μ m
Depth of field		Max. 146 μ m
Size (W x D x H)		565 x 732 x 921 mm
Weight		90 kg / 198 lbs
Power		100-240 V, 50/60 Hz, 5-3 A, 400 W
Temperature / Humidity		20-28 $^{\circ}$ C / 35-85%, non-condensing

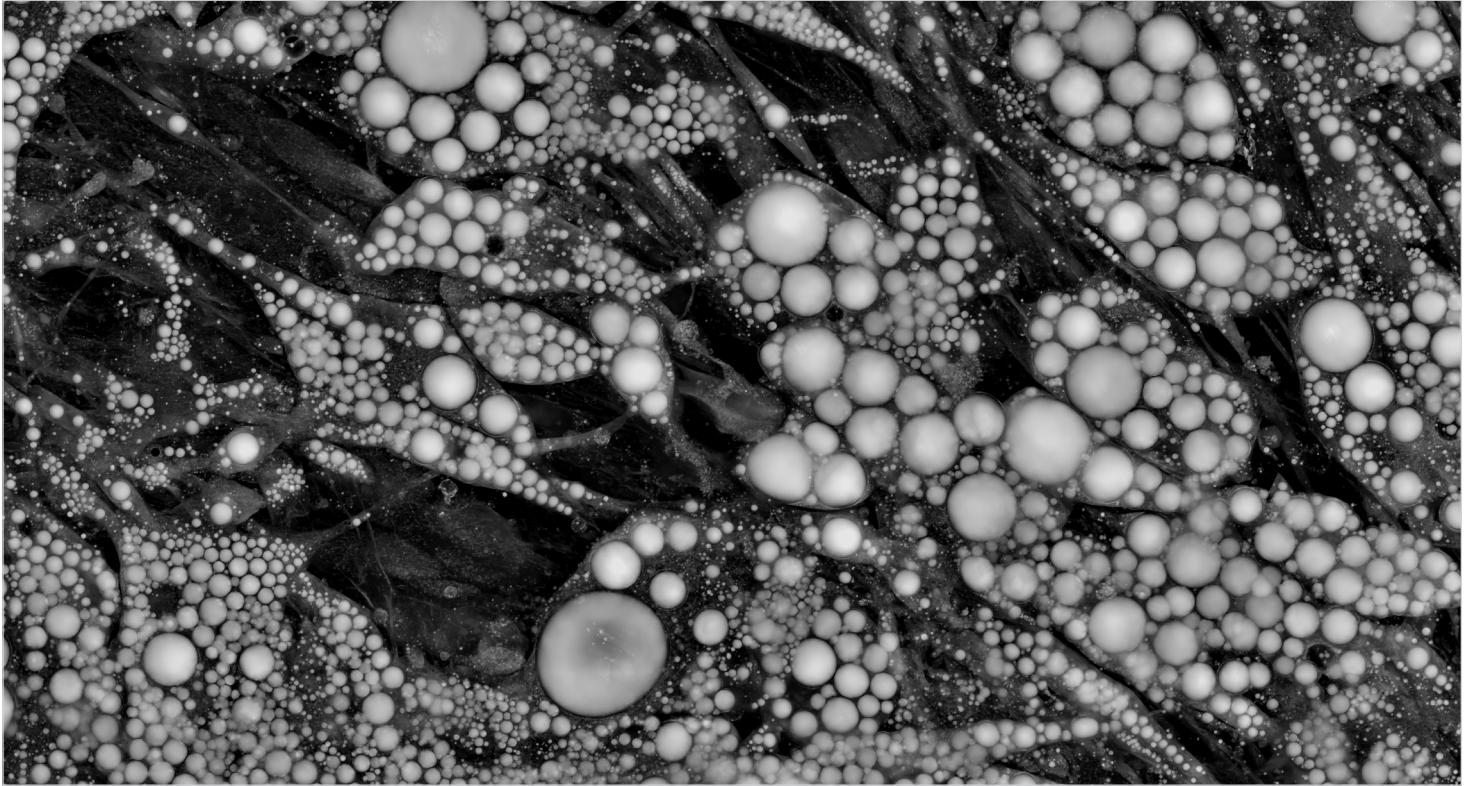
IMAGE GALLERY



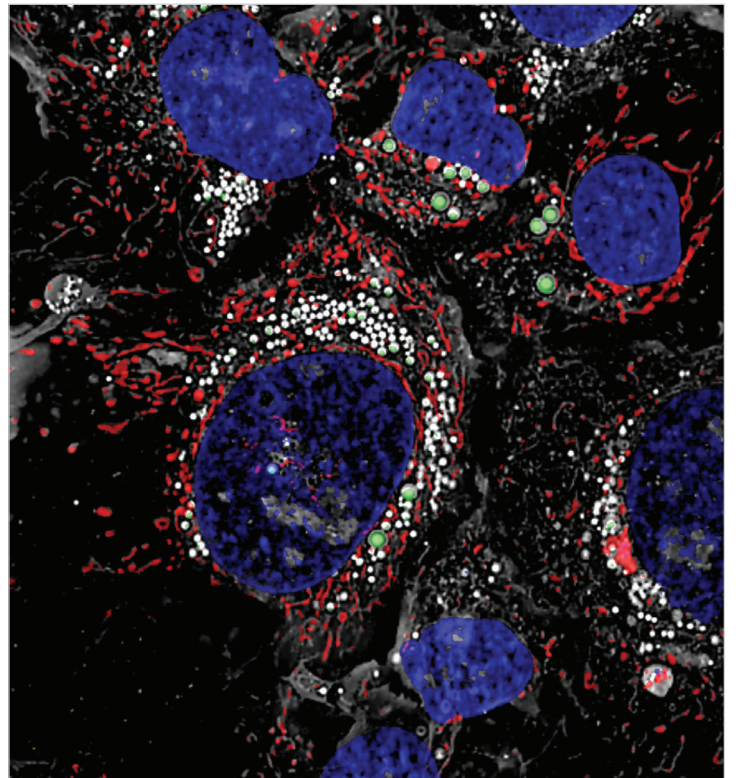
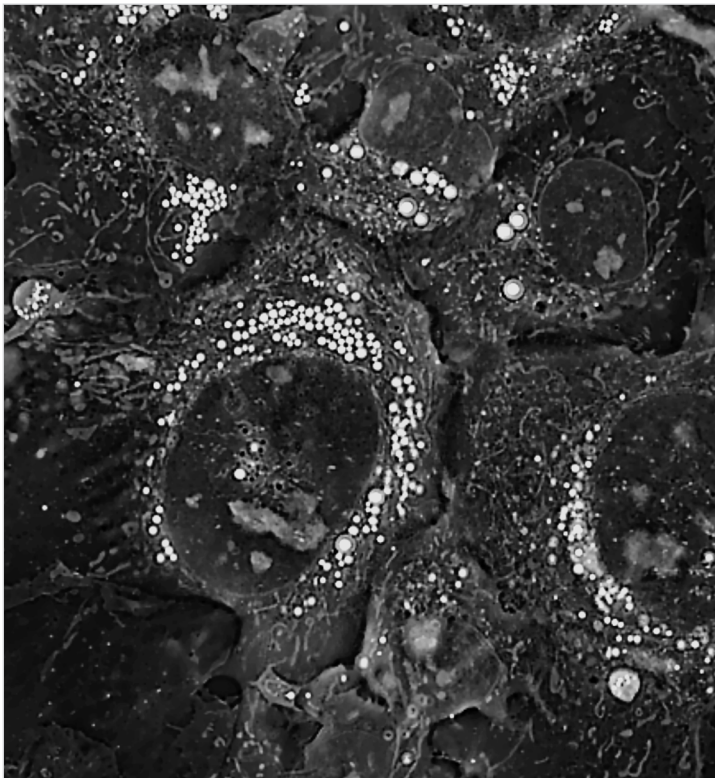
Human foreskin fibroblast



Mouse small intestinal organoid
Holotomography (left). Color-coded projection of gradient (right).



Human adipocyte



Human liver cancer cell
Holotomography (left). Correlative fluorescence: nuclei, lipid droplets, mitochondria (right).

Tomocube, Inc.



4th Floor, 155, Sinseong-ro,
Yuseong-gu, Daejeon, 34109, Republic of Korea

Tel +82-42-863-1100

info@tomocube.com

www.tomocube.com

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