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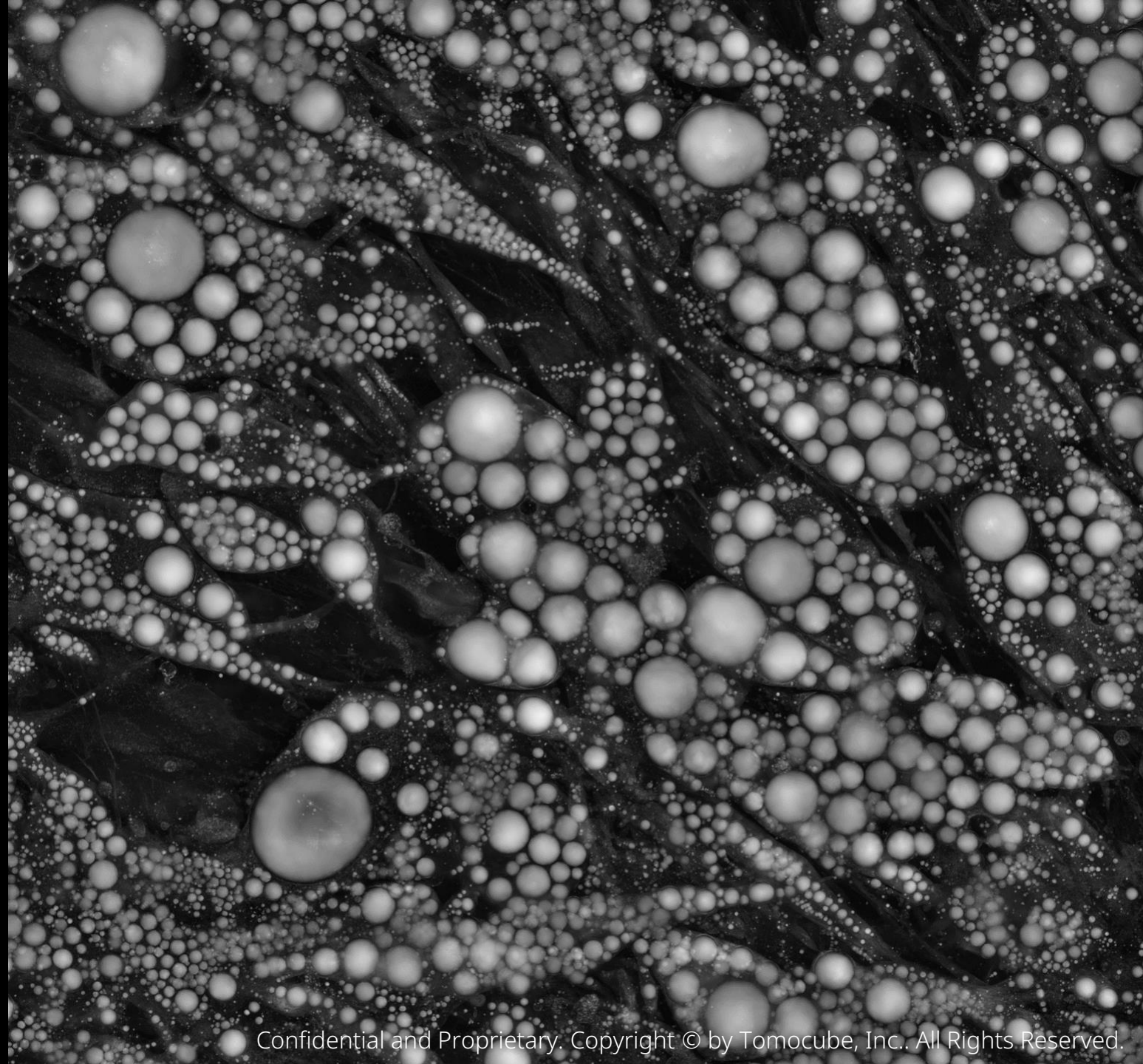
Tomocube Holotomography Application

Label-free 3D Live Lipid Droplet Imaging & Analysis

- Adipocyte differentiation
- Lipid droplet analysis
- Quantitative analysis of lipid droplets

Website:www.tomocube.com

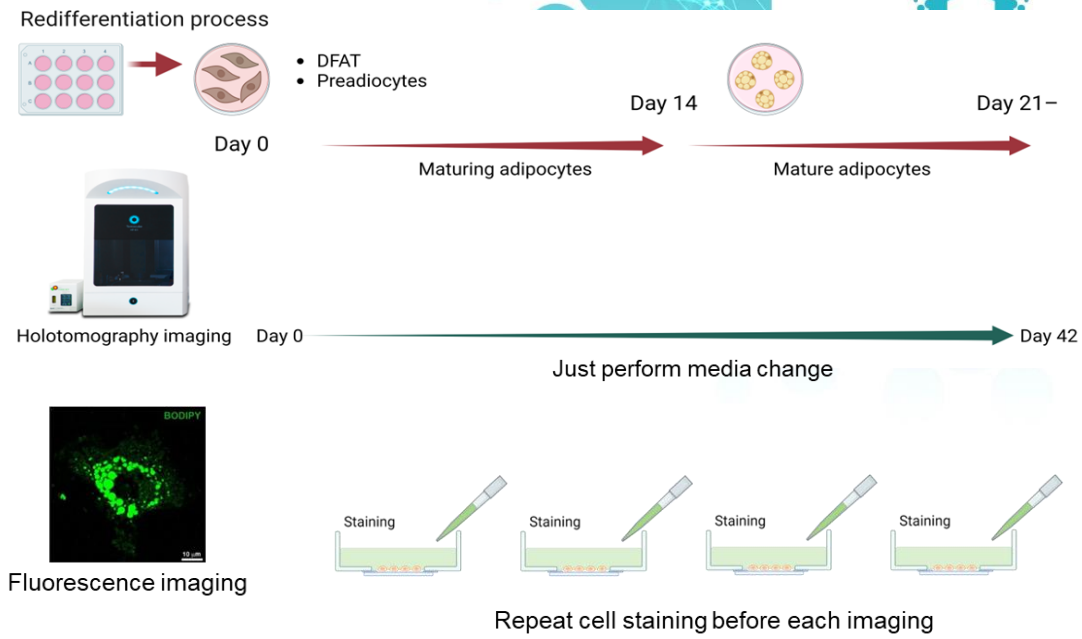
Contact: info@tomocube.com

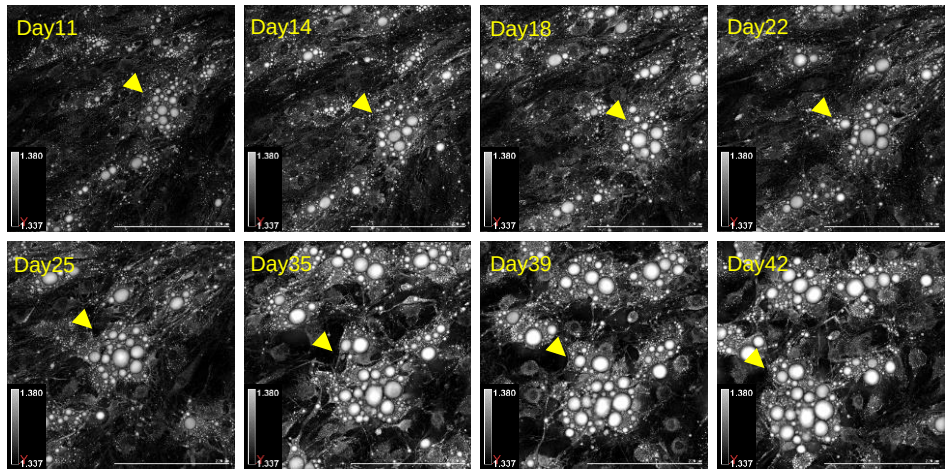


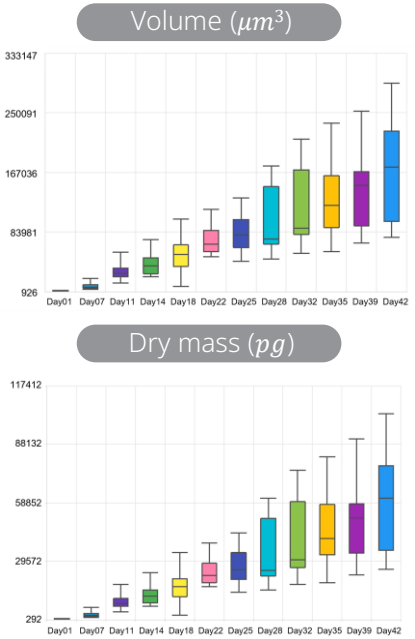
Adipocyte differentiation

Long-term observation (42 days) of the differentiation process of human adipocyte

- Adipogenesis process was observed for 42 days and segmented the lipid droplets without any label
  - Fluorescent staining for lipid droplets would require 12 rounds of staining over 42 days, which could harm cells and make it hard to find healthy cells.
- Quantification of lipid droplets in adipocytes
  - Average volume and dry mass of lipid droplets are gradually increased.







Unpublished data

Label-free imaging of lipid droplets

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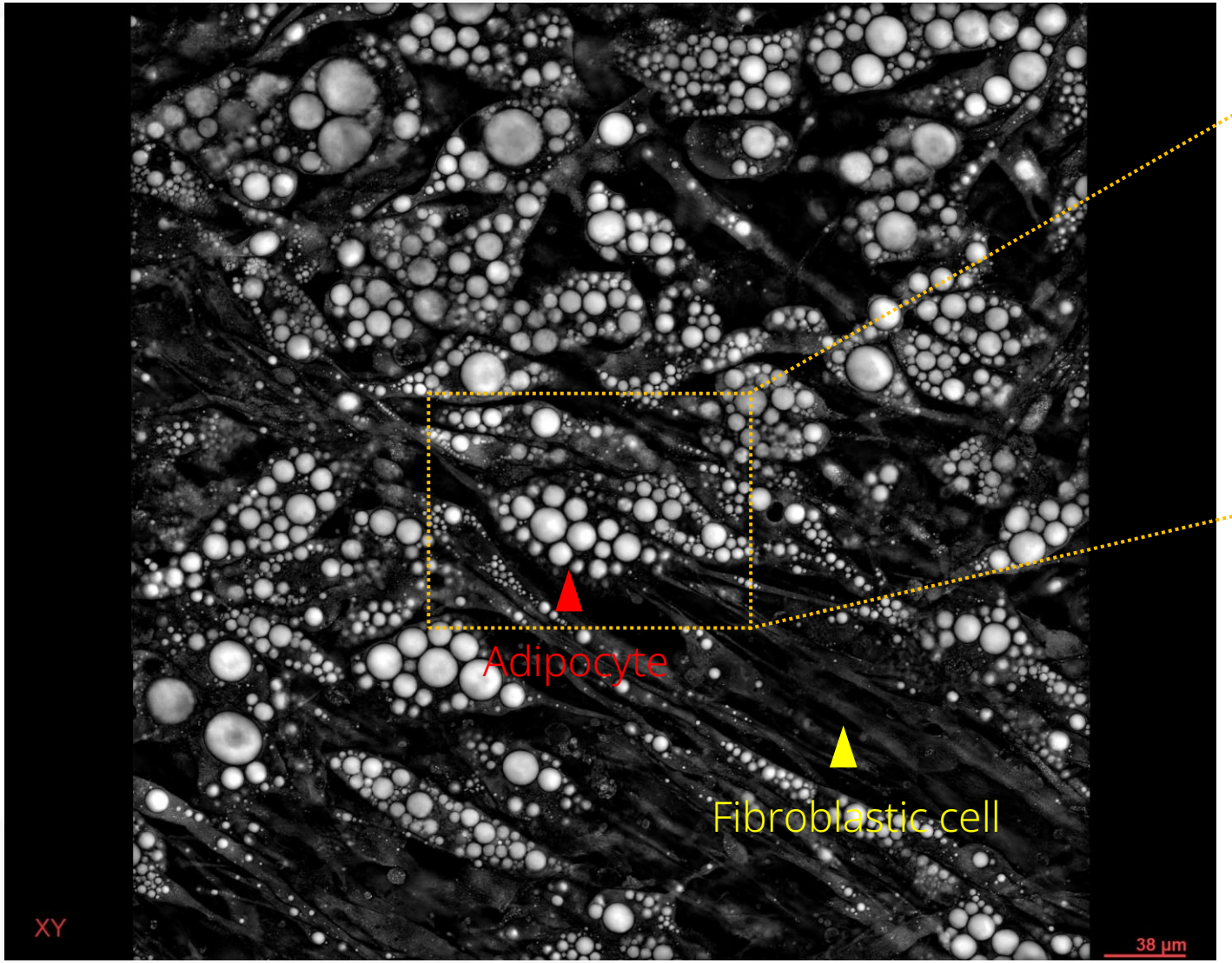
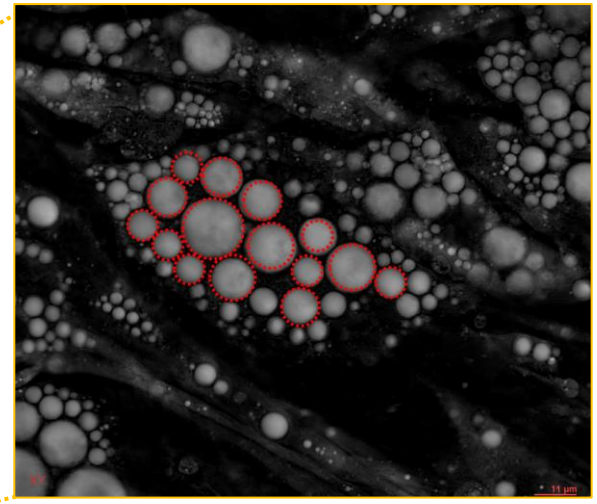
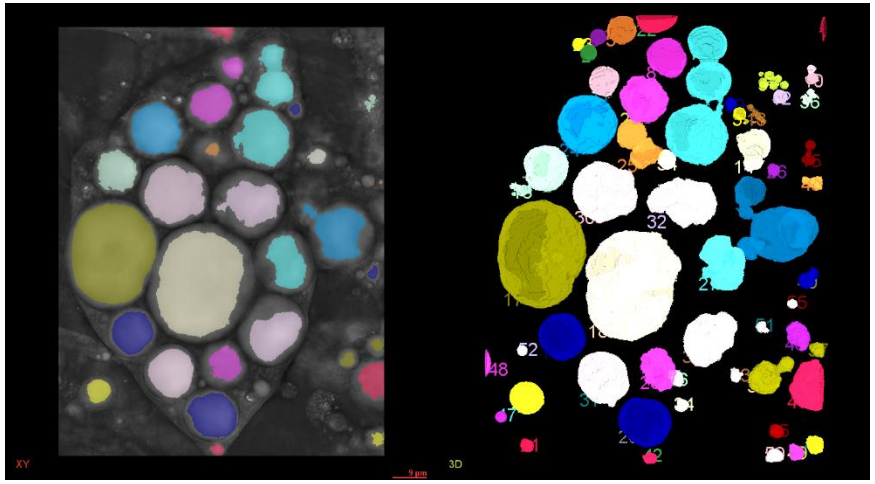


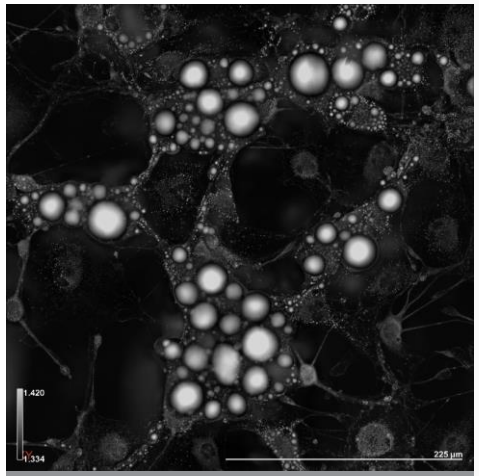


Refractive index(RI) - based organelle segmentation

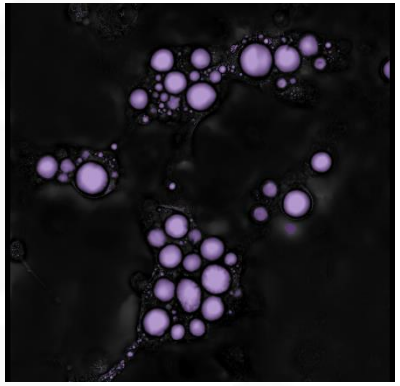


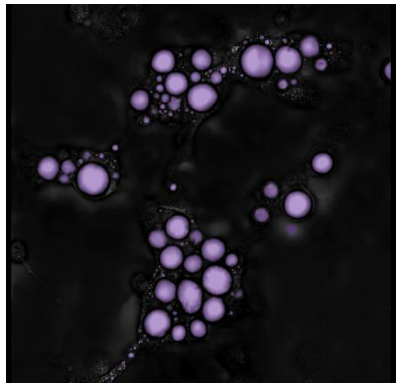
Lipid droplet (LD) segmentation by RI thresholding

TomoAnalysis: image analysis software for holotomography
RI: Refractive index



Holotomography image

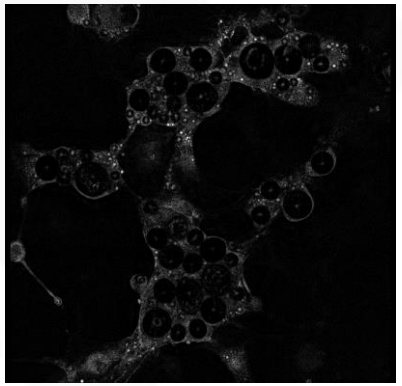


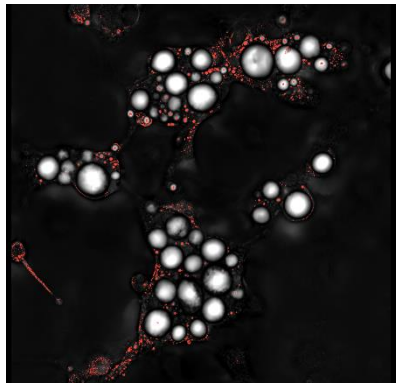


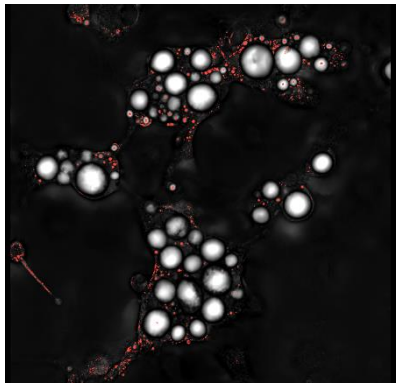
1 1st threshold with RI value → Opening (3D)

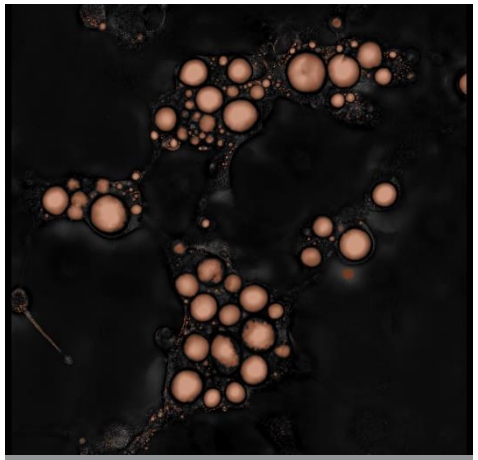
Analysis Pipeline

2 TopHat filter → 2nd threshold → Opening (3D)








Segmented masks of LDs

Quantitative analysis of lipid droplet biogenesis

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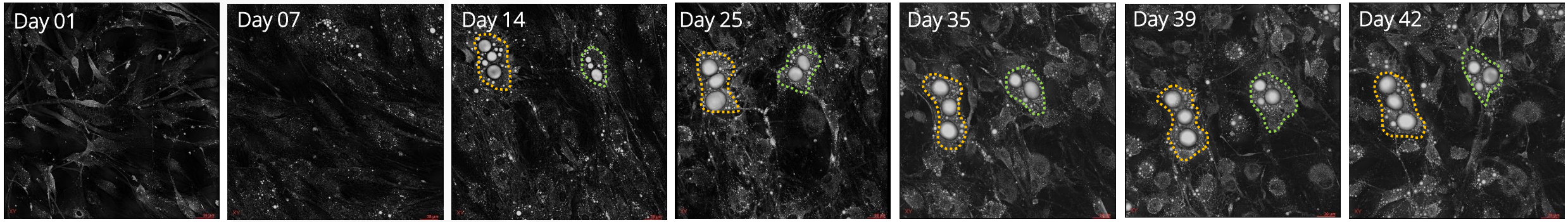
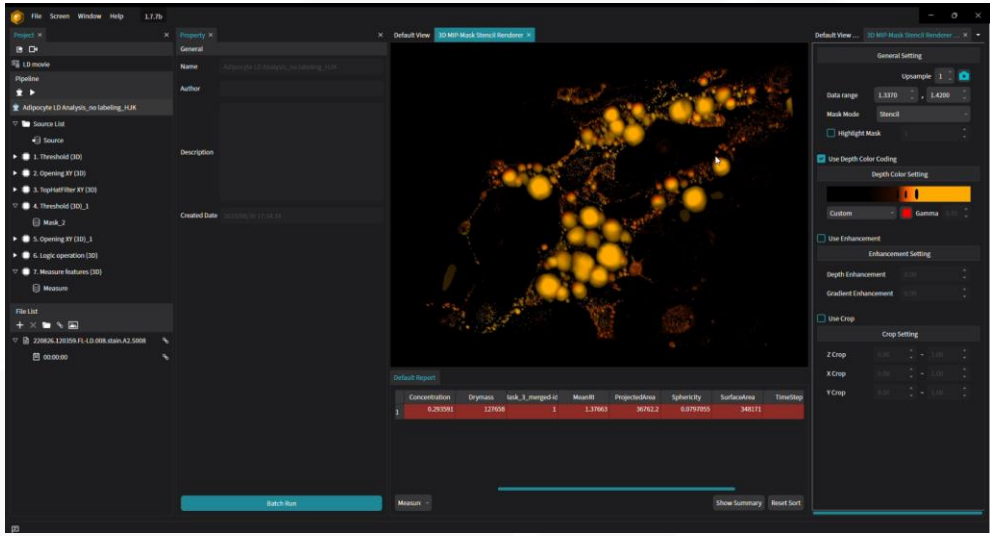
A. Adipocyte differentiation



B. Lipid droplet analysis



C. Quantification of LDs

Mean RI (Refractive index)	1.3766
Concentration ($pg/\mu m^3$)	0.2936
Volume (μm^3)	434815.00
Surface area (μm^2)	348170.80
Dry mass (pg)	127657.70

Impact of holotomography in bioscience

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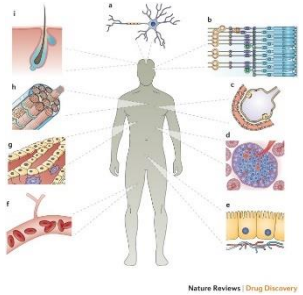
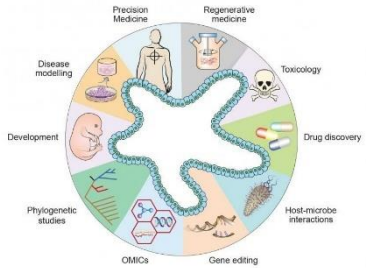
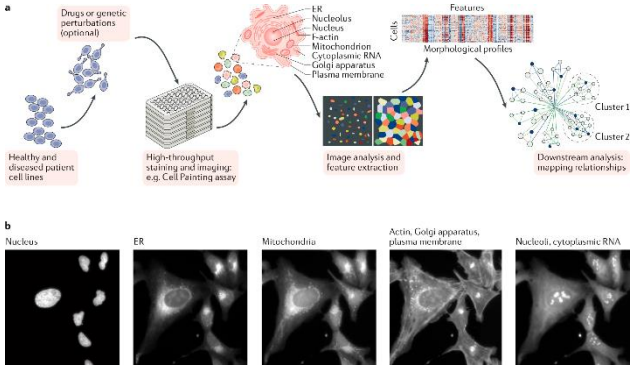
	Unmet Needs	Holotomography
Stem cell, Immune cell therapy	Label-free monitoring of cells to assess the quality	NO labeling, YES analysis
3D culture (organoid, spheroid, colony, etc.)	Long-term assessing of organoids for screening	3D live imaging + Quantitative analysis
High-resolution live cell imaging	3D subcellular structures for drug response	All-in-one monitoring of subcellular organelles







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Tomocube HT-X1 Holotomography

Tomocube HT-X1 Holotomography

Features

- 3D live cell imaging: no fixation, no labeling
- 3D monitoring subcellular organelles without markers
- Laser-based auto focus
- Vessel compatibility: dish, plate, microscopic slide
- Temperature, pH, humidity control
- 3D tile scan and stitching
- 3D fluorescence imaging (Ex 385/475/565/625)
- Quantitative analysis based on the refractive index

More Information

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