http://www.emsdiasum.com/microscopy/products/sem_wet/lipid.aspx

QuantomiX Lipid Imaging That Counts

New opportunities for quantitative analysis in metabolic syndrome research

Imagine being able to produce meaningful images of lipids in cells and tissues. The possibilities are endless. QuantomiX WETSEM® technology enables powerful imaging and analysis of hydrated lipids in cells and tissues for fast and reliable quantification.

Monitor Lipid accumulation in Cells

By examing hydrated cell samples, you can set up cell-based assays that mimic metabolic processes that enable reliable mapping of cell differentiation. Your lipid accumulation cell assays do not have to be modified in any way.

EM scanning of hydrated fat cells and tissues for:

- Fast implementation with minimal preparation requirements
- Reliable, reproducible and quantifiable results
- High resolution imaging

Image Fat in Tissues:

Fat cell size distribution and lipid droplet examination in tissues have never been so clear and easy. Just apply the sample in the QX capsules and expand the horizons of obesity and diabetes research.

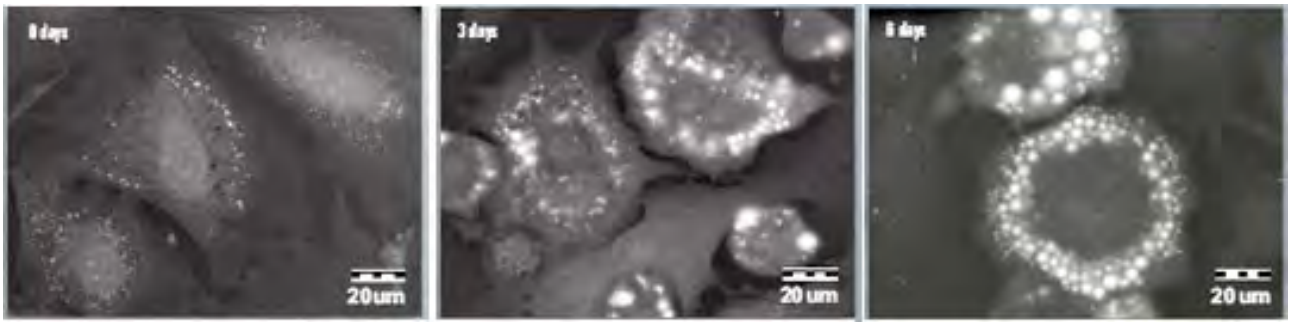


Figure1: Lipid accumulation in differentiating 3T3-L1 pre-adipocyte cell line (days in culture)

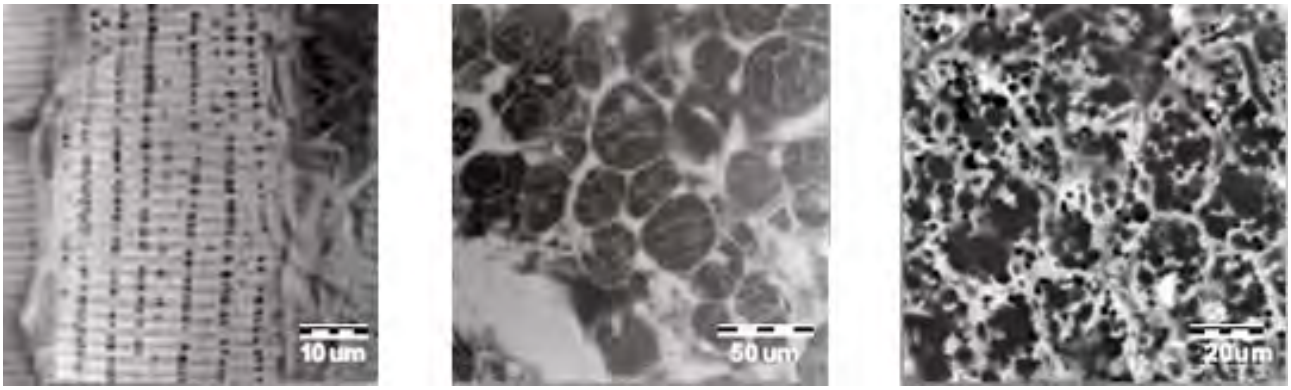


Figure 2 (a): Lipid droplets in rat skeletal muscle; (b) Lipids in porcine white asipose tissue; (c) Lipids in multilocular brown asipose tissue (with Prof. S. Cinti, Italy)

Electron microscopy - right from the cell culture dish

The QuantomiX QX capsule product line enables direct imaging of fully hydrated samples in conventional scanning electron microscopes (SEMs). Wet samples cam be examined, eliminating the need for arduous sample preparation, such as, critical point drying, coating, embedding, and sectioning. Simply place the tissue samples directly in the QX-capsule, or grow cells inside it, to achieve high-resolution imaging and analysis.

A new approach to cell and tissue imaging and analysis

QuantomiX WETSEM® technology leads to a better understanding of biomedical and metabolic processes, for more effective medical, chemical, biological and industrial research. An ultra-thin membrane completely isolates hydrated samples from the microscopes chamber's vacuum. This uniques receptacle permits electron microscopy of samples held in a liquid medium. By combining the functionality of a cell culture dish or tissue specimen holder with an electron transparent, vacuum-tight window, QX capsules enable high resolution imaging of fully hydrated samples of human, animal and plant cells, tissues and fluids, microbial cells and other types of fluids.

QuantomiX WETSEM® technology

- Eliminates timely sample preparation
- Acheive reliable, reproducible and quantifiable results
- Attain EM-level resolution for all types of hydrated samples

Product Information

Wet SEM™ capsules for scanning electron microscope imaging and EDS of fully-hydrated samples are available from the EMS Catalog. Please click here to view the WETSEM® Product Listings or click here to Request a WETSEM® Feasibility Study.

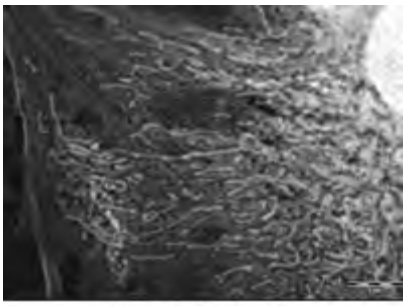


Fig 1: Mitochondria

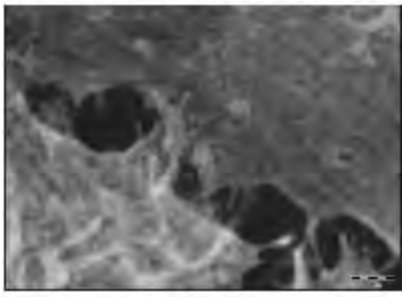


Fig 2: Hella Cells

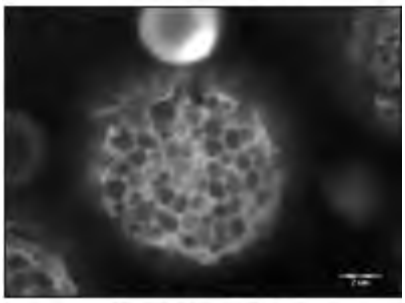


Fig 3: Mast Cells

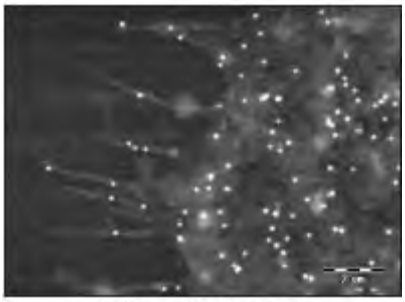


Fig 4: A431 Cells

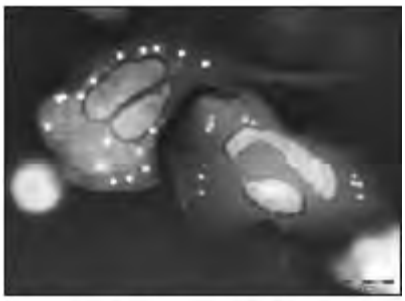


Fig 5: White Blood Cells

Imaging Wet Cells - Bridging The Gap Between Light and Electron Microscopy

WETSEM® Application

The need to dehydrate and prepare samples before imaging in an electron microscope has long been a serious limitation for cell biology research. Biological specimens are hydrated in their natural state, but current methods of imaging these specimens under high resolution require dehydration and extensive preparation. On the other hand, samples can be viewed in their native state in light microscopes, but those are limited to low resolution viewing. QuantomiX proprietary WETSEM® technology brings together the immediate viewing capabilities of light microscopes and the high resolution capacity of electron microscopy, and provides an ideal solution for high resolution imaging of fully wet cells.

Viewing Wet Samples in Their Native State with WETSEM® Technology

The solution offered by WETSEM® technology enables high-resolution imaging of samples without lengthy preparation and with no dehydration artifacts. The QX capsules, based on WETSEM® technology, are used for holding biological samples in the electron microscope. The samples are kept in a sealed, vacuumresistant capsule during the imaging process. This method has been used successfully for many types of biological samples, including nonadherent cells, and has enabled the collection of valuable information.

Fig 1. Mitochondria visualization in C2C12 cells that were fixed and stained with 2% PTA. Mitochondria are easily identified. Their pleomorphic forms and structural variations are clearly seen.

Fig 2. HeLa cells cultured in the QX capsule in growth medium, were fixed with paraformaldehyde and stained with uranyl acetate. Cell-cell contact between two neighboring cells as well as fillopodia are clearly visible. Clear marking of fine intracellular cytoskeletal structures is also seen.

Fig 3. Wet mast cells were fixed with 4% paraformaldhyde and 0.125% glutaraldehyde and stained with uranyl acetate. High resolution imaging with WETSEMTM enables visualization of individual secretory granules which appear as dark holes. Some granules show high electron density.

Dr. Y. Satoh, Dept. of Cell Biology and Functional Morphology, Iwate Medical University, School of medicine, Uchimaro, Japan.

Fig 4. Epidermal growth factor receptor (EGFR) labeling of A431 cell. Anti-EGFR antibodies were visualized with 40nm colloidal gold particles. Note the very precise visualization of individual gold beads on the cell surface.This application is suitable for a variety of intracellular and extracellular immunogold labeling.

Dr. J.Schlessinger, Dept. of Pharmacology, Yale University School of Medicine, New Heaven, CT.

Fig 5. Lipid bodies in human white blood cells. After separation, cells were plated on the QX Capsule membrane. Efficient attachment and spreading of the population of interest were achieved. Fixation and consequent uranyl acetate and osmium staining enhanced visualization of cellular organelles, and highlighted the lipid bodies.

QX Capsules – Empowering Imaging Capabilities

Advantages

- High resolution imaging of wet samples
- Visualization of intra- and extracellular structures
- Imaging of adherent and non-adherent cells
- Molecular immunolabeling
- Minimal sample preparation
- Artifact-free

Imaging Lipid Bodies in Fully Wet Cells and Tissues

WETSEM® Application

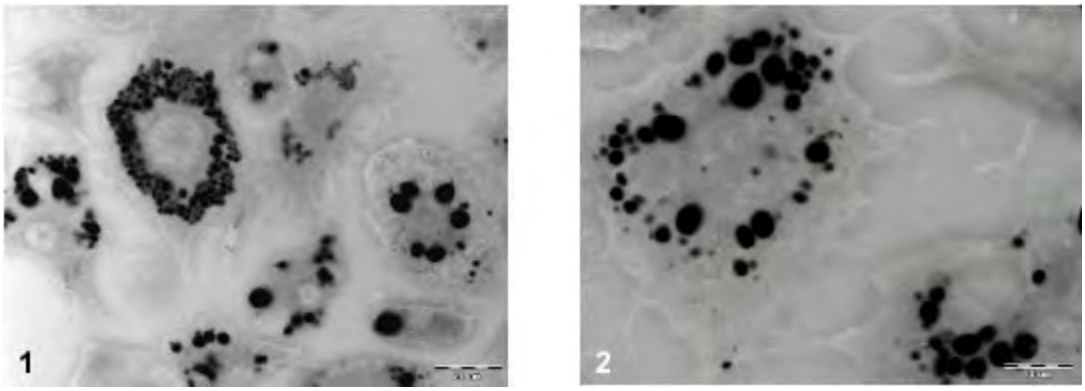
High resolution imaging of lipid bodies in biological samples is a known challenge. Preparation of tissue samples for microscopy examination typically wipes lipids off samples, making observation and interpretation of lipid bodies difficult. Lipids in cells are observed only indirectly, requiring special labeling.

This has led QuantomiX to develop the QX capsules, based on WETSEM® technology, designed for immediate and quantifiable high resolution lipid imaging.

The QX capsules present a new opportunity to overcome the limitations of current methods for a better assessment of lipids in cells and tissues.

Direct Lipid Visualization with WETSEM® Technology

The QX capsule, based on QuantomiX proprietary WETSEM® technology, enables direct imaging of lipids in fully hydrated samples using standard scanning electron microscopes. In the pictures below, lipid bodies are clearly visualized in the cellular cytoplasm of 3T3-L1 pre-adipocyte cells.

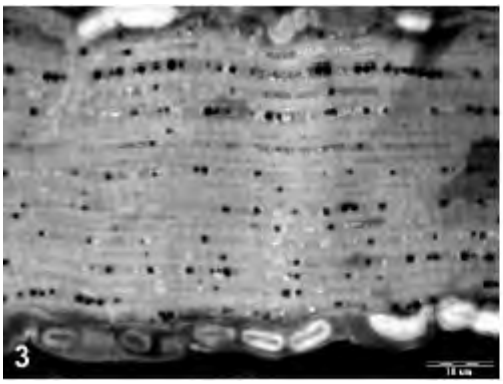


Firgures 1 and 2: Lipid body visualization in differentiating 3T3-L1 pre-adipocyte cells.

Lipid Research with QX Capsules

WETSEM® technology is particularly suitable for lipid visualization, resulting in high signal-to-noise ratio, tailored for lipid imaging. The sample, placed in a sealed capsule, is separated from the vacuum by a thin electron-transparent membrane, allowing imaging of wet, un-embedded cells and tissues.

The direct, immediate, and reliable visualization of lipids with QX capsules is a major step forward for lipid research.



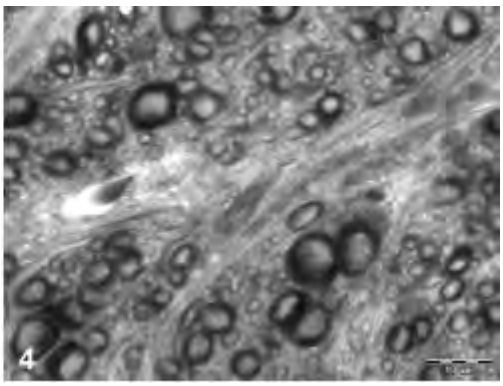
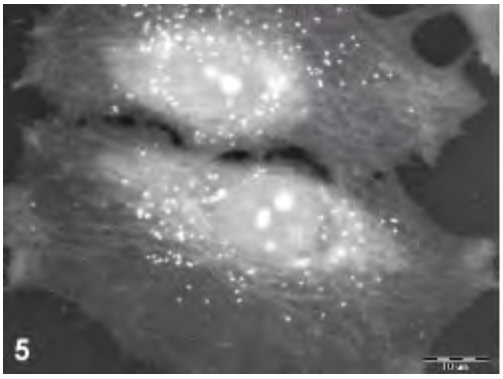


Figure 3: Intramyocellular lipids in diabetic skeletal muscle in rodent (unstained). In collaboration with Dr. N. Kaiser, Hadassah Medical school.

Figure 4: Cross-section of a mouse spinal cord. The myelin rings are shown in black (unstained). In collaboration with Teva Pharmaceuticals.



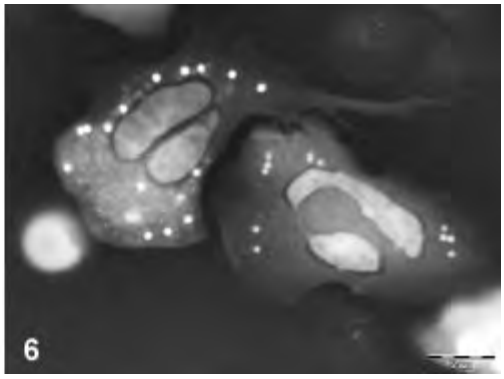


Figure 5: Lipid bodies in human polymorphonuclear cells of peripheral white blood cells (stained with Osmium tetroxide).

Figure 6: Lipid bodies in cultured HeLa cells (stained with Osmium tetroxide).

Benefits

- High-resolution imaging of wet samples
- Minimal sample preparation
- Quantifiable
- Artifact-free
- Optimal signal-to-noise ratio
- Lipid visualization

Product Information

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