

From Eye to Insight

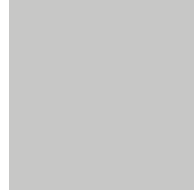
*Leica*  
MICROSYSTEMS

A breakthrough in sample preparation yield,  
simplicity and speed in high end cryo coating

## LEICA EM ACE900

Freeze Fracture System



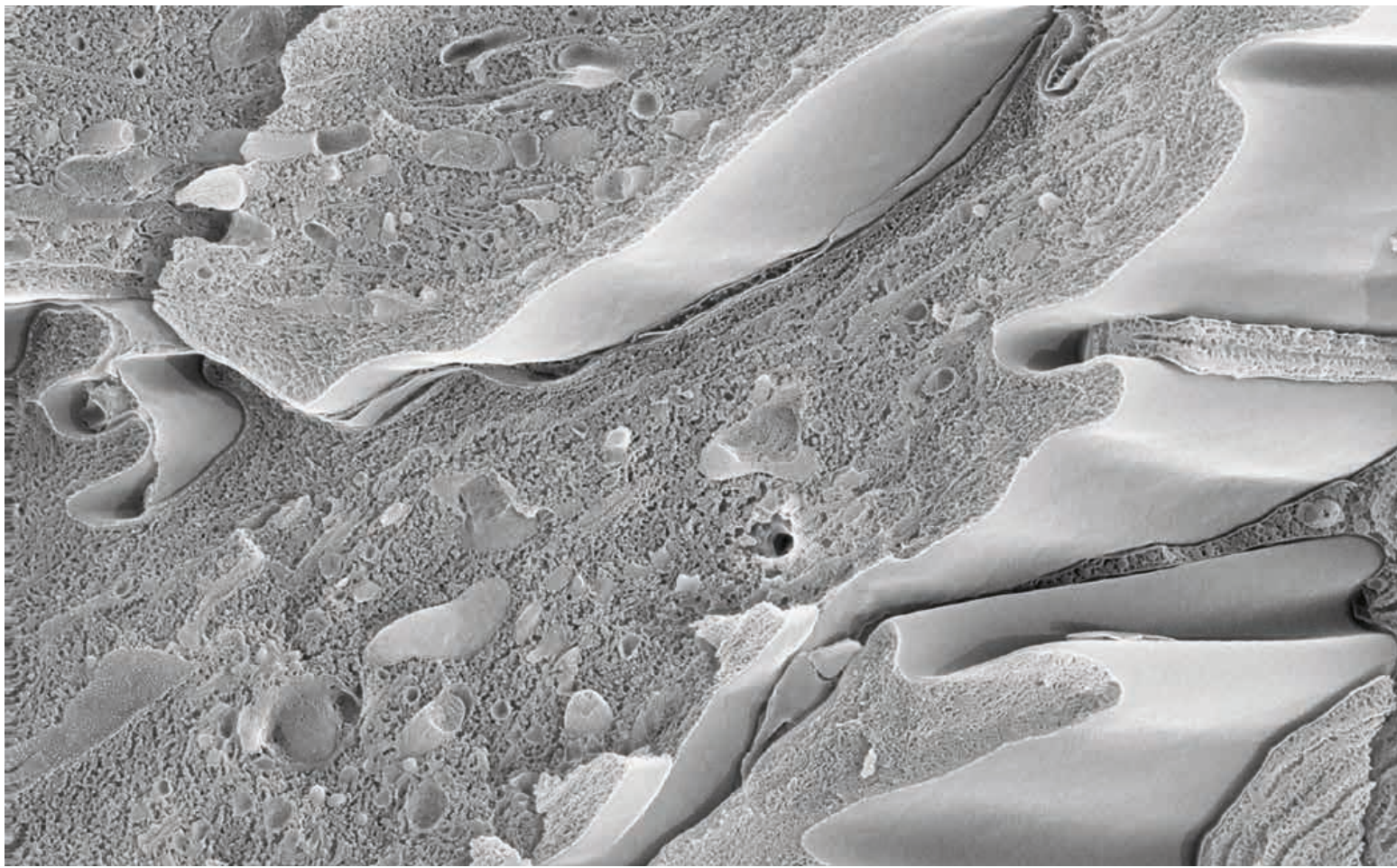


# LEICA EM ACE900

## FULLY AUTOMATED FREEZE FRACTURE SYSTEM

The new Leica freeze fracture instrument has a redesigned cooling concept, microtome, shielding, e-beams load locks, and offers a connection to the EM VCT500 cryo transfer system for protection of the samples during the complete cryo SEM working process. Embedded in a modern user-interface there are no more barriers to operate.





## WHY FREEZE FRACTURE AND FREEZE ETCHING?

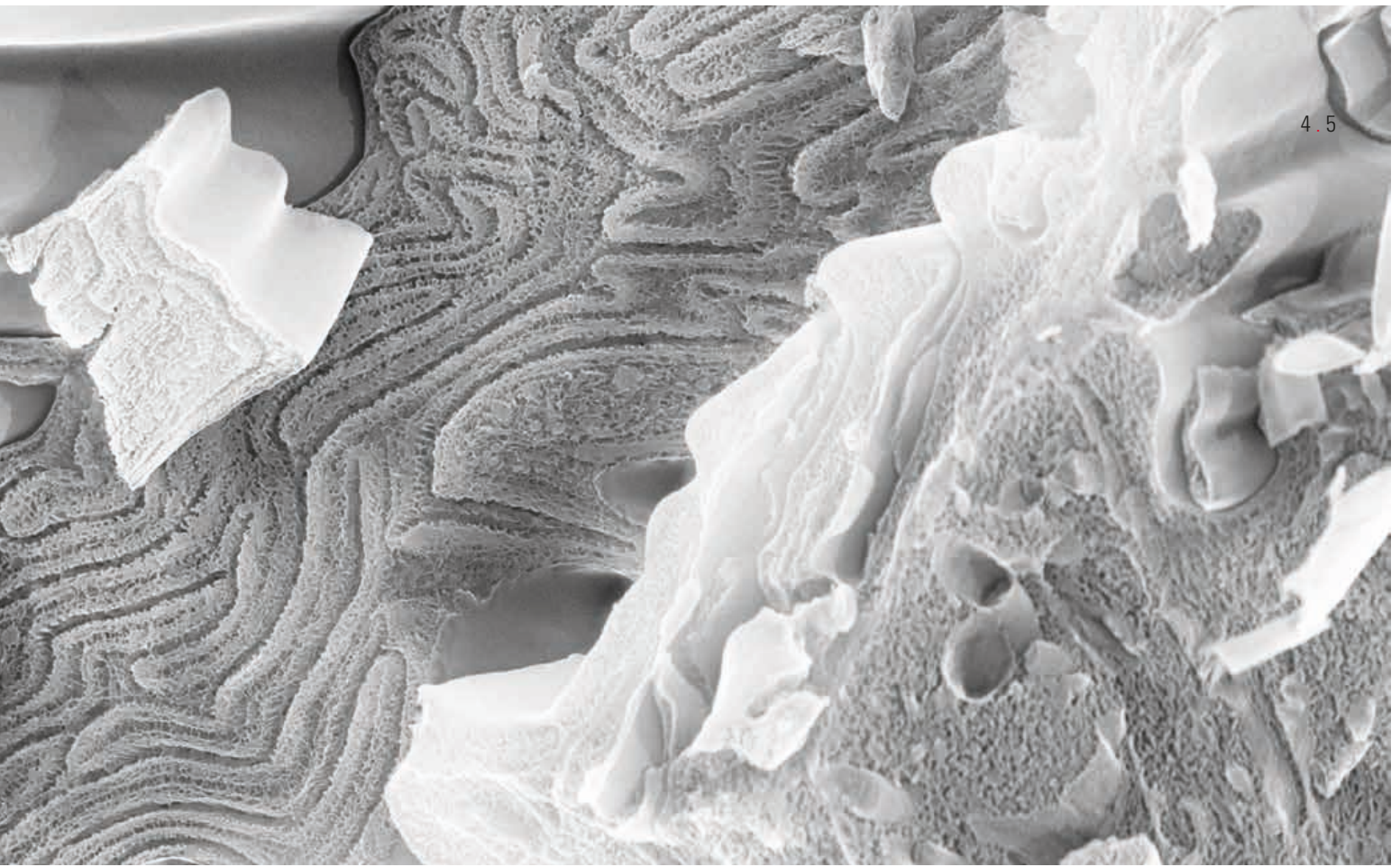
Freeze fracture describes the technique of breaking a frozen specimen to reveal internal structures. Freeze etching is the sublimation of surface ice under vacuum to reveal details of the fractured face that were originally hidden.

A metal / carbon mix enables the sample to be imaged in an SEM (block-face) or TEM (replica). It is used to investigate for instance cell organelles, membranes, layers and emulsions. The technique is traditionally used for biological applications but started to develop significantly in physics and material science.

Freeze fracture electron microscopy, particularly freeze replica immunolabeling (FRIL), has provided new insights into the roles of membrane proteins in dynamic cellular processes.

Learn more  
about the technique





## WHY LEICA EM ACE900?

The Leica EM ACE900 is a high-end sample preparation system for freeze fracturing, freeze etching and high resolution cryo coating. This instrument is easy and intuitive to use. To achieve highest sample protection sample transfer, large cryo-shields, and the sample shutter are optimized.

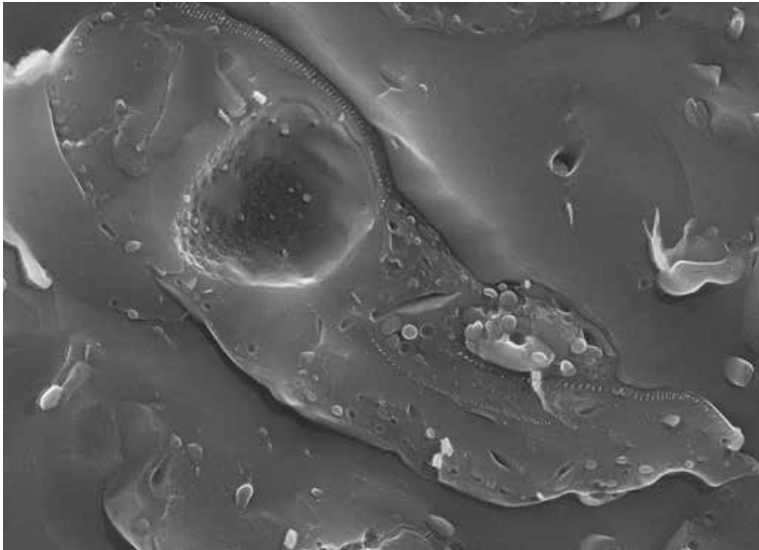
Users obtain best results because the instrument stays always in high vacuum. This is provided by a load lock system, a knife transfer, and gate valves for each e-beam source. The perfect combination of automation and optional manual operation makes the preparation process highly reproducible and flexible. Versatility, speed, and yield of your sample preparation is incomparable.

### OBTAIN NEW INSIGHTS IN

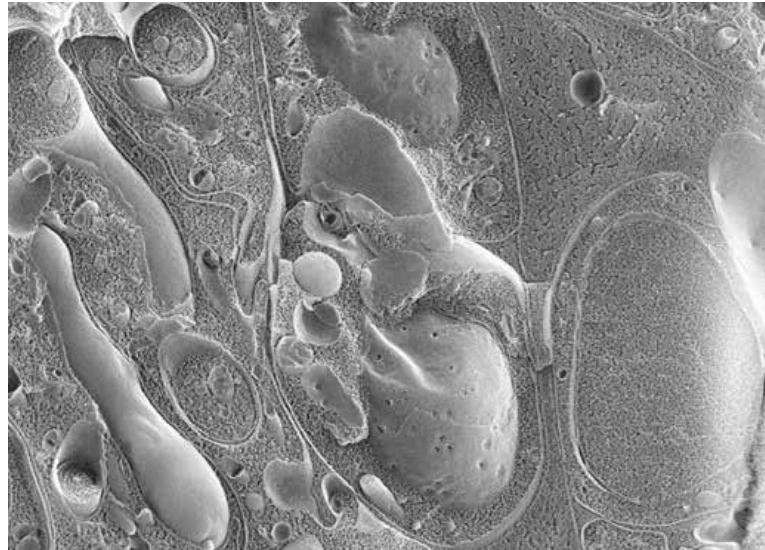
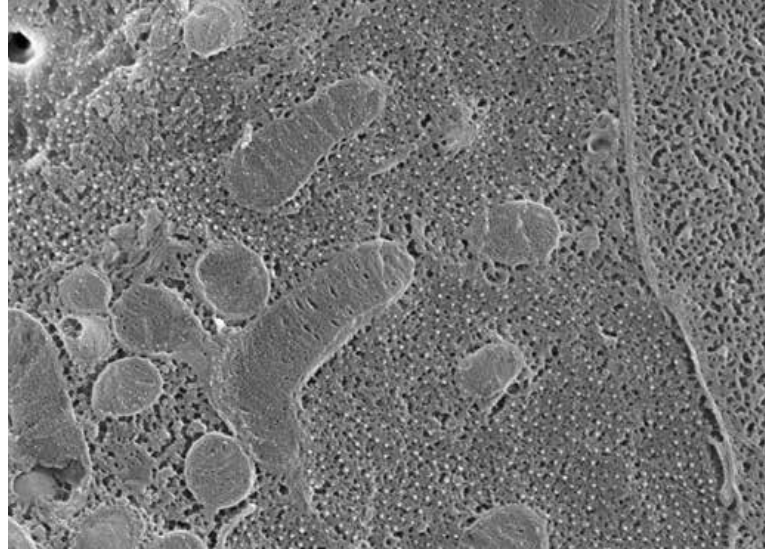
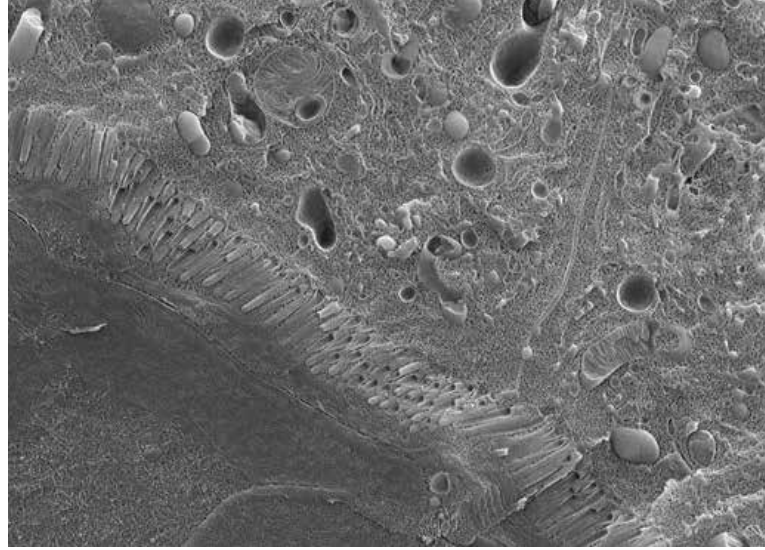
- > **Biology:**  
membranes, bacteria,  
cell organelles, proteins
- > **Industry:**  
cosmetic products, food, drugs
- > **Material research:**  
emulsions, polymers,  
boundary layers,  
Nano-structures, liquid crystals

# APPLICATION IMAGES

Giardia lamblia



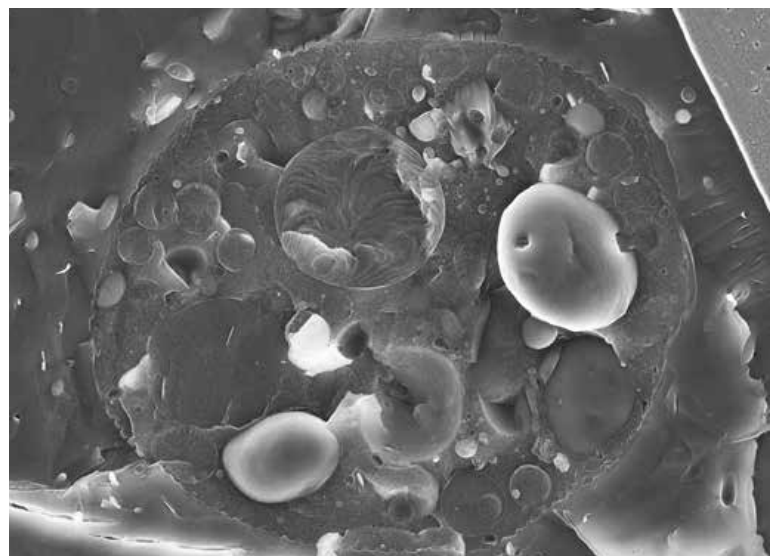
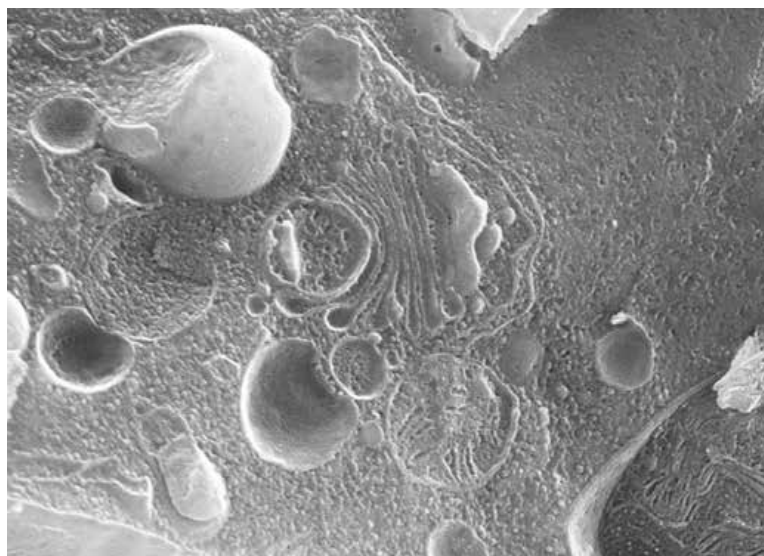
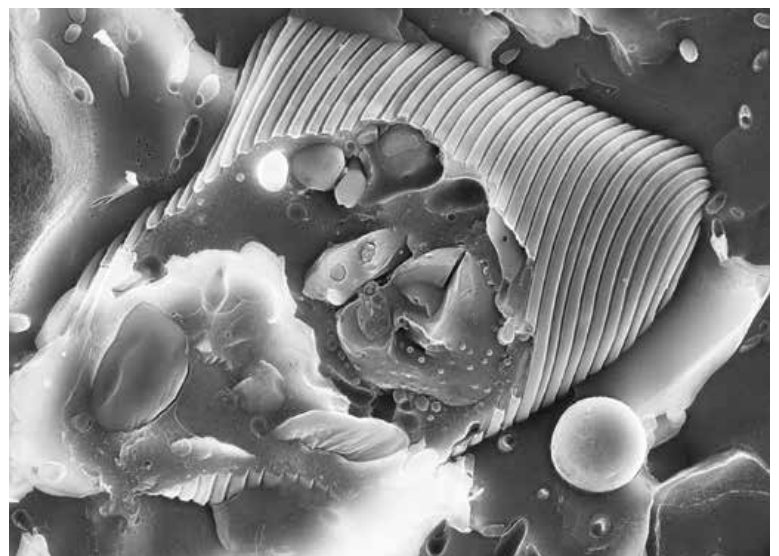
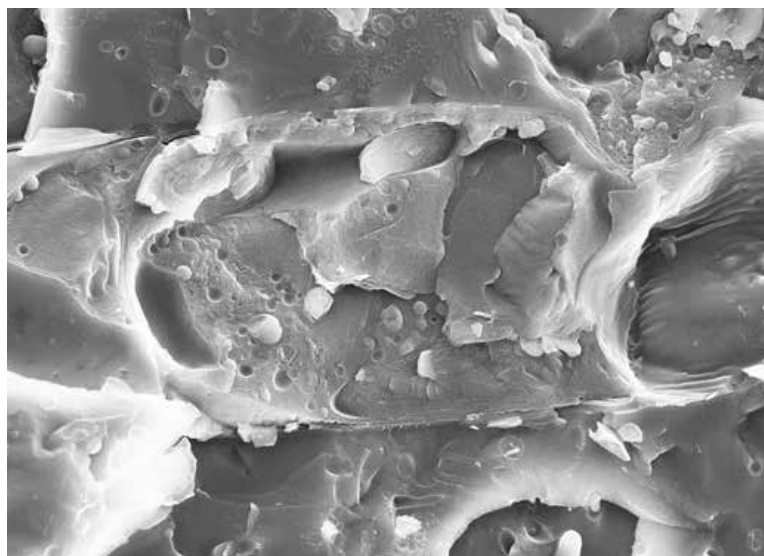
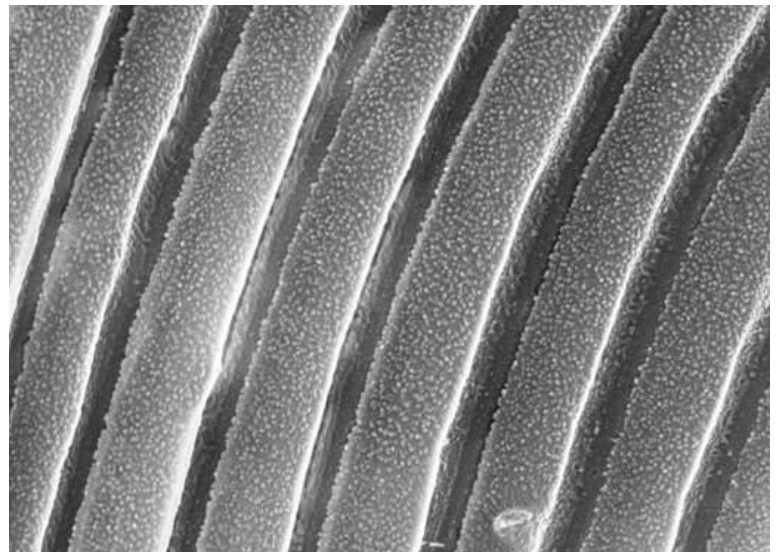
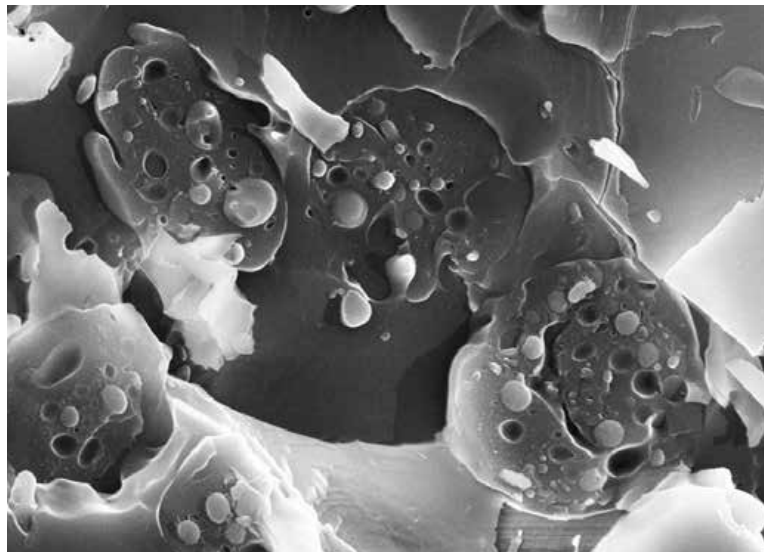
Drosophila larva



Human platelets (first)

Stigeoclonium tenue (second and third)

*Euglena gracilis* Klebs





## DISCOVER LEICA EM ACE900 UNIQUE FEATURES

- ▶ Accurate fracturing with a 3-axis movable cryo-knife and the possibility to exchange it via load lock
- ▶ High protection from water contamination due to large, closed cryo shield and automated cryo cooled sample shutter
- ▶ High vacuum is crucial to keep the sample contamination free and achieve fine grained coating for highest resolution and stable replicas
- ▶ E-beam coating of different materials gives the finest possible structures of coated materials
- ▶ Bench top instrument saves space and guarantees a comfortable operation
- ▶ Programmable and fully automated operation via touch screen interface enables easy and safe performance for different users
- ▶ Leica EM VCT500 transfer imbeds the Leica EM ACE900 into the cryo SEM workflow





## PERFECT CONDITIONS

- > Vacuum is kept at all times
- > Load locks for sample, microtome, and e-beams



## INTEGRATED THICKNESS MEASUREMENT

- > Stabilize coating before starting the process
- > Controlled and accurate layer thickness



## REPRODUCIBLE PROCESSES

- > Programmable operation
- > Accurate monitoring and controlling of the sample temperature during the complete freeze etching process



## PRECISE SAMPLE MANIPULATION

- > Fresh blade for each cut avoids contamination
- > Exchangeable and 3-axis movable knife
- > Accurate feed 0.2 micrometer steps



## FOCUS ON YOUR SAMPLE

- > Easy operation without distraction for inexperienced and advanced users alike
- > Automated instrument with touch screen interface, monitoring, and logging functions



## CONNECTIVITY

### Dock the vacuum cryo transfer unit Leica EM VCT500 to Leica EM ACE900

An EM VCT500 dock is directly attached to the EM ACE900. Via the EM VCT500 shuttle specimens are transferred in and out of the sample preparation instrument to be perfectly preserved for the final examination in a cryo SEM. In this way the fractured block face of a frozen sample is imaged at highest resolution. It takes only a short time to take a native sample through the complete workflow to analysis.

## PREPARATION WORKFLOW



TEM



Leica EM ICE High Pressure Freezer

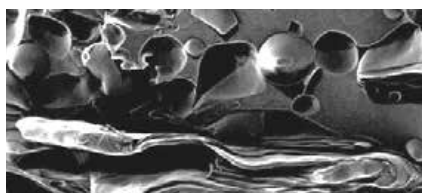


Leica EM VCM loading station with  
Leica EM VCT500 Cryo transfer system



Leica EM ACE900 Freeze Fracture System

Cryo-SEM

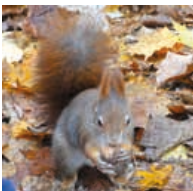


Leica EM VCT500 Cryo transfer system



## ENVIRONMENTAL IMPACT

- > LN<sub>2</sub> consumption during cooling down has been reduced by approx. 85% in comparison to previous instruments.
- > LN<sub>2</sub> consumption for cryo work per hour has been reduced by approx. 60% in comparison to previous instruments.
- > Time for cooling down to operation has been reduced by approx. 35% in comparison to previous instruments.
- > The instrument is smaller, that means: less environmental impact of packaging, shipping and less cost for the customer.
- > The instrument comes from a development and production site in which the environmental management system DIN EN ISO 14001 has been implemented.





ISO 9001:2008  
ISO 14001:2004

No.00805/0  
No.02783/0

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