

Core facility Cellular Imaging: Electron Microscopy Centre Amsterdam

Techniques: SEM



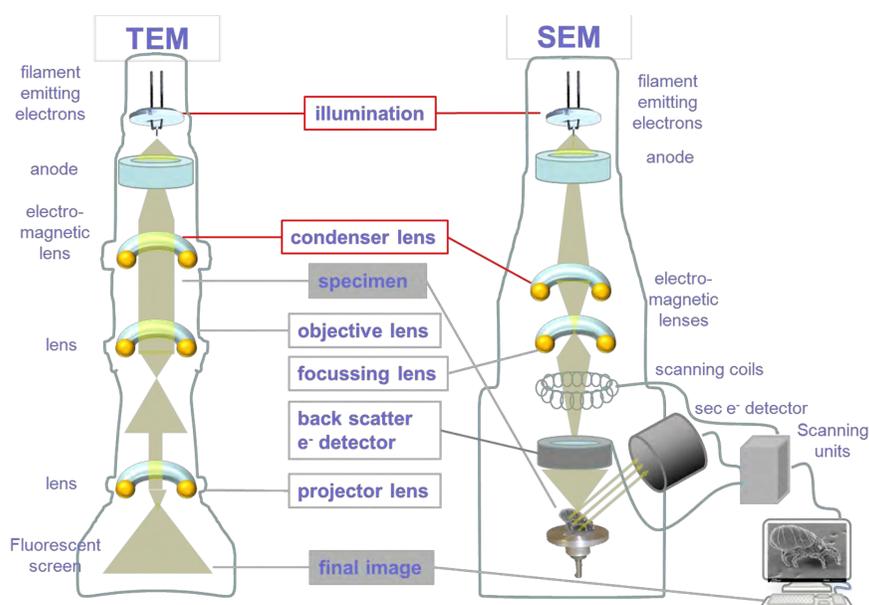
core facility
Cellular Imaging



Introduction technique:

Field Emission Scanning Electron Microscopy is an analytical technique used in biological and material science to investigate surface structures and their properties. The electron beam that hits the specimen at the bottom of the microscope generates secondary and backscatter electrons. These electrons are detected by various detectors which are selective for these secondary or backscattered electrons.

The microscope is equipped with a high resolution in-lens detector, a SE detector and a backscatter detector.



Sample preparation:

Biological material has to be fixed, dehydrated and dried. The sample is mounted to a metal stub and to avoid charging the sample has to be coated with a thin conductive layer of gold.

Applications:

SEM is a technique that is very broadly applied, it allows the surface analysis of :

- Cell cultures (any adherent cell)
- Tissue surfaces (bone, skin, hair, epithelium, tumours)
- Materials (stents, implants, crystals)
- Intact insects or other small animals

Limitations:

SEM analysis is limited to surface analysis
Sample size is limited to 10 cm, height 5 cm
Sample must be stable in vacuum
Resolution in biological samples 1- 2 nm

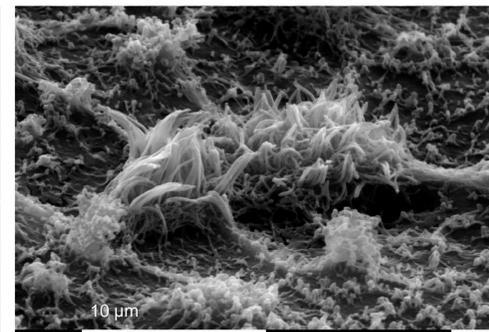
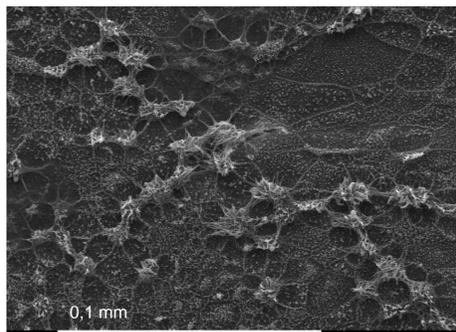
Benefits:

Minimal sample preparation.
Acquisition images is rapid.
Depth of field, great topographical detail.

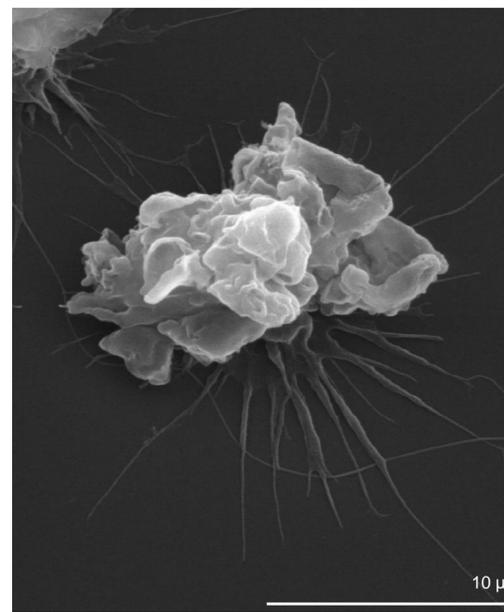
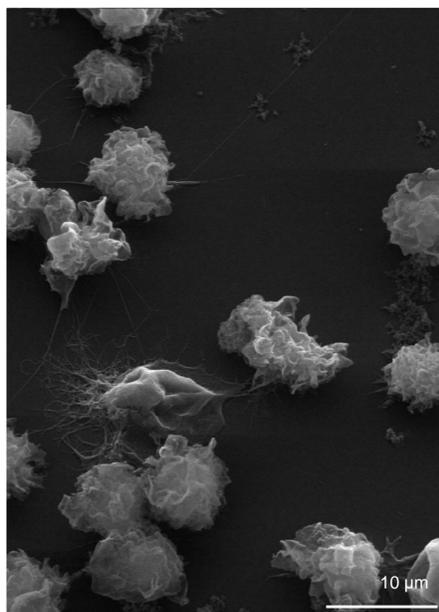
Needed:

EM-grade aldehyde fixed material

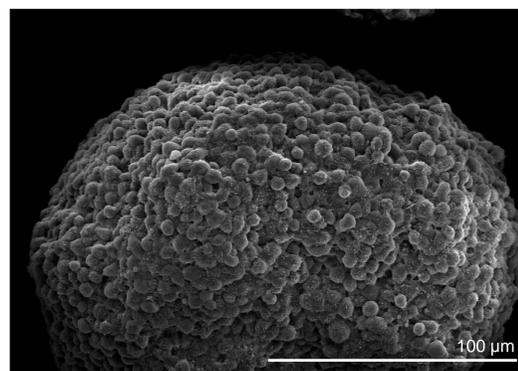
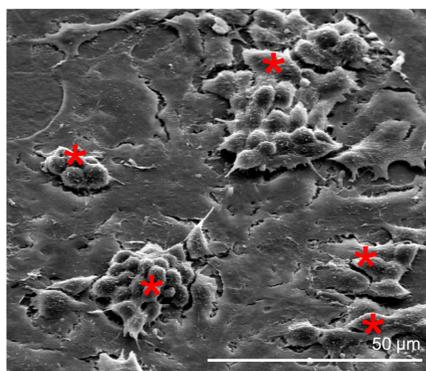
Example of results:



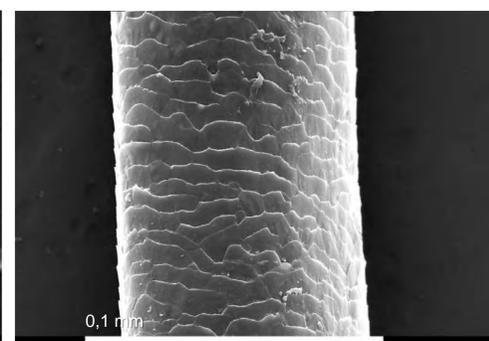
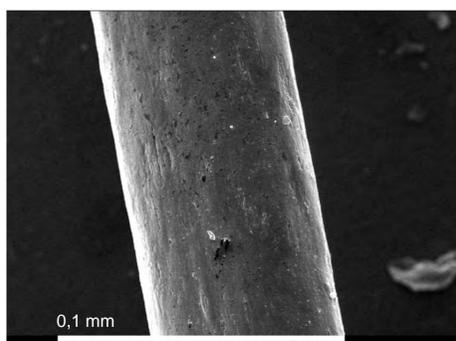
Epithelial cells (Rienk Jeeninga)



CD1a positive Dendritic Cells in different stages of differentiation



Small lung cell carcinoma cells grow as flat, adherent cells until converted to non-adherent malignant state (*), rapidly replicating into metastatic spheres (sample Ekaterina Semenova NKI)



SEM analysis of human hairs, normally layered (right) but some have un-layered hair (left).

Contact :

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