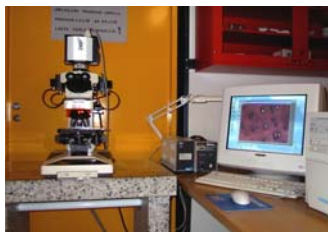


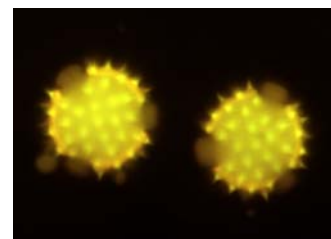
# BioMater Centre - Services of the Microscopic and Microanalysis Laboratory



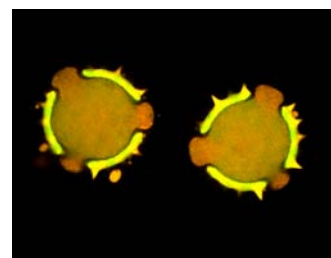
BioMater Center provides services for microscopic and microanalysis studies for departments in the university and also for other research institutes. The equipment in our laboratory include several light microscopes and electron microscopes as well as facilities for specimen preparation. The newest purchases include Fourier-transform infrared spectrometer (FTIR), imaging FTIR spectrometer (FTIRI) and dispersive Raman spectrometer which all are suitable for chemical analysis and imaging. Our most important facilities are described shortly in the following.



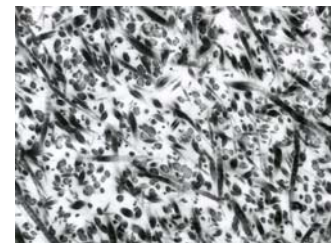
**Nikon Microphot FXA optical microscope** can be utilized for analysis and imaging of histological thin slices. The system is equipped with versatile optics and a CCD camera with image capturing software. The images are stored digitally. Maximum resolution of the equipment is about 300 nm. On the right, an image of stained pollen grains of a coltsfoot imaged with epifluorescence optics, magnification about 350x.



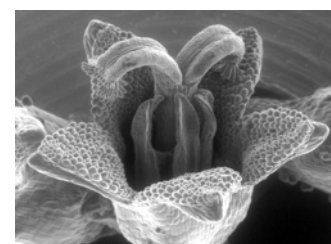
**Nikon Eclipse inverted microscope equipped with UltraVIEW confocal scanning system (PerkinElmer)** enables studies on both embedded tissue slices and also living cells. Reactions in the cells and motion of fluorescence-labelled agents in the cells can be studied with this technique. The images can be stored digitally and the highest resolution is about 300 nm. On the right, a confocal image (an optical section) of the same pollen grains as above with a magnification of about 350x.



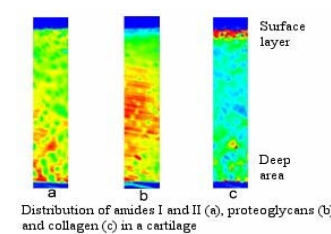
**JEOL JEM 1200-EX transmission electron microscope (TEM)** can be applied to analysing ultrathin sections (about 50 nm) prepared from tissue samples, or tiny particle-like objects such as viruses. Very high resolution (about 0.2 nm) and digitally stored images can be acquired by the equipment. On the right, there is a TEM image of intercellular space in a surface layer of a bovine joint cartilage. The image shows cross-sections of collagen fibres with a magnification of about 15000x.



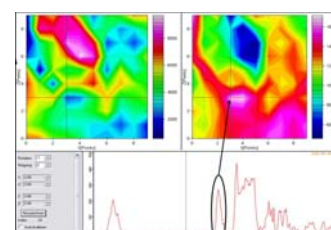
**Philips XL30 ESEM-TMP scanning electron microscope (ESEM)** is capable of imaging traditional dehydrated and metal-coated samples as well as uncoated water-containing samples with high resolution (about 3.5 nm). On the right, an image of an untreated flower head of a daisy with a magnification of about 30x. The ESEM system is equipped with an **energy dispersive X-ray spectrometer (EDS)** for identifying elemental composition of materials even on a small area (diameter 1  $\mu\text{m}$ ) with low concentration (order about 0.1%).



**Thermo Nicolet 8700 Fourier-transform infrared spectrometer (FTIR)** can be applied to identifying chemical compounds in the sample, whereas **PerkinElmer Spectrum Spotlight 300; imaging Fourier-transform infrared spectrometer (FTIRI)** (image on the left) can be utilized to locate the compounds. The image on the right shows distributions of some compounds in a transverse section of a cartilage sample (color code: blue = poor area, red = rich area). The mapping is obtained with the PerkinElmer FTIRI system.



**Bruker Optics SENTERRA R 200LX dispersive Raman spectrometer** complements chemical analysis with high spectral ( $< 3 \text{ cm}^{-1}$ ) and spatial ( $< 1 \mu\text{m}$ ) resolution. The system includes also an optical microscope. The Raman measurements can be acquired confocally with a fully computer controlled stage and large specimens or liquids can be measured via fiber optics. On the right, there is an image of distribution of chemical components in the cartilage.



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