Application of high-pressure freezing and free substitution in electron microscope biological sample preparation

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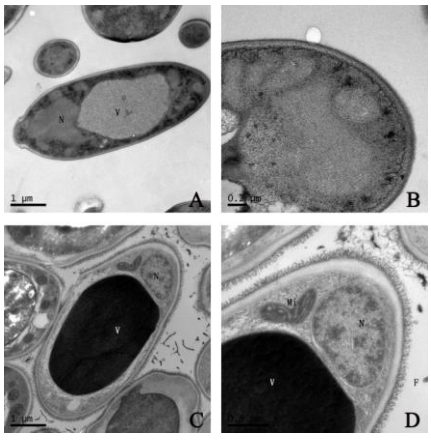
Core Facility for Cell biology at Institute of Biochemistry and Cell Biology (SIBCB) is dedicated to providing high quality technical supports and services in the areas of cell morphology analysis, flow cytometry and cell sorting to all research groups. Electron microscopy department mainly has TEM and SEM. Besides of providing TEM and SEM services, we also committed to develop new biological sample preparation methods to improve EM imaging quality and experimental repeatability.

The conventional chemical fixation method is easy to learn and widely used in the preparation of electron microscope biological samples, but there are still some defects. High pressure freezing (HPF) and freeze substitution (FS) techniques can be applied to thicker biological samples to preserve the ultrastructure of cells more realistically and improve the results of immune-electron microscopy. However, the success rate of HPF and FS technology is relatively low, so we established a set of sample preparation methods suitable for most biological samples with well-preserved ultrastructure and good repeatability (FIG 1, 2).



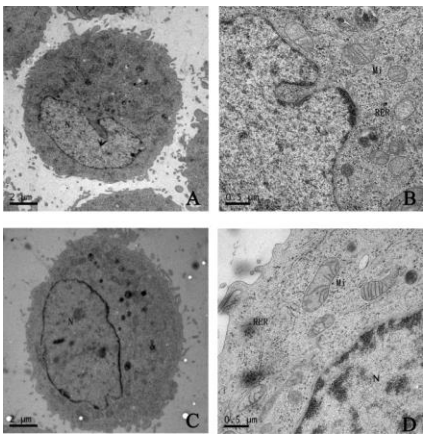


FIG1(Left): TEM images of yeast cell samples prepared by conventional methods (A,B) and by HPF/FS (C,D) ; FIG2 (Right): TEM images of suspended cell samples prepared by conventional methods (A,B) and by HPF/FS (C,D)