

The utilization of focused ion beam technology on biomedical samples

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Focused Ion Beam (FIB) is an instrument that uses highly charged gallium ions to mill samples of minutes sizes to expose its internal structure for surface observation with the scanning electron microscope. The FIB had been used extensively in the semi-conductor industry, defect analysis, circuit modification, mask repair and making TEM samples. Recently, FIB has been used as ultra microtome for the sectioning of biological and biomedical materials [1]. However, the images obtained was not as reliable. Therefore, work was undertaken to refine the FIB technique with the use of Argon gas to clean the surface of the milled samples to produce unobstructed image of the internal structures of *Saccharomyces cerevisiae* and *Staphylococcus aureus*. This reveals its internal structures including the cell wall and cell membranes. This is then followed by cleaning of the milled surface with Argon at the final stages (10 nm). The samples as observed with the FE-TEM at 120 kV reveal cell organelle and vacuoles.(Fig1,2,3 & 4). In conclusion, further research to refine the preparation method for biological/biomedical materials using TFIB are necessary for the advancement of nanobiotechnology.

References

[1] H.L. Hing, C. Burkhardt, P. Gnauck, S. Sally, H. Gelderbloms, Y. Muranaka, M.A. Kaswandi, A.H.A. Aziz & A.Z. Sahalan (2007) *Microscopy Today* 15.



Fig 1: Milled section
S. cerevisiae TAA1

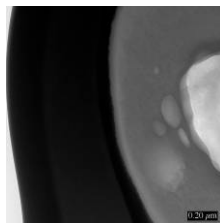


Fig 2: TEM of milled
S. cerevisiae

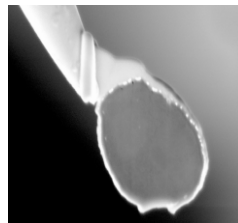


Fig 3: FIB milled surface
of yeast

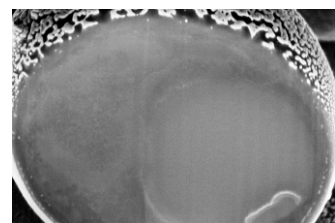


Fig 4: SEM of FIB milled yeast