

## **Atmospheric SEM and some applications on biological specimens**

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The scanning electron microscopes (Air-SEM) operated in ambient condition has been developed recently and was mainly used in industry field. We checked potential application of Air-SEM for the analysis of biological tissue such as rat brain, kidney, human tooth, and bones. The hard tissues prepared by grinding method and frozen sections and observed with Air-SEM, which showed basic cytoarchitecture of bone and tissue without heavy metal stain. The kidney prepared according to routine SEM method showed comparable images taken FE-SEM. As a result, sharpness was lower than that of FE-SEM, but foot processing of podocyte was observed at high magnification. Air-SEM observation of TEM sections of the kidney sample revealed glomerular basement membrane or podocyte was observed, as seen on an optical microscope. The neuronal structures such as soma, dendrites, axons and synapses were clearly observed under the Air-SEM (STEM), which was comparable to conventional TEM image. The correlative light and electron microscopic (CLEM) observation of the zebrafish embryo based on fluorescence microscope and Air-SEM (STEM) showed a potential tool for CLEM research in the future.

The quality of these images needs more improvement to be used routinely in biomedical researches. It could be a strong potential research tools in recent future, especially in correlated light microscopy and electron microscopy researches.