

Electron Microscopy of "The Green Yeast"

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Recent studies currently underway include EM microscopy on high pressure frozen (HPF) *Chlamydomonas reinhardtii*, which is providing new insights into the 3D organisation of the light-capturing machinery and may yield valuable information on the functional interaction that occurs between mitochondria and chloroplasts.

Often called the "green yeast", *Chlamydomonas* is the model organism for plant molecular biologists, it is also our model system for H₂ production which are based around experiments on mutants that produce 10 times more H₂ than the wild type *Chlamydomonas*. [1].

Chlamydomonas, a model eukaryotic photosynthetic organism at ~30 to 40 micrometers in diameter, lends itself as an excellent object for ultrastructural studies and further 3D reconstruction. Our aim is to show a 3D resolution structural model for *in situ* photoreceptors and associated organelles at a target resolution better <10nm resolution.

Such cellular 3D reconstructions will provide a framework into which to model higher resolution structures of proteins and macromolecular assemblies determined by single particle analysis and crystallography. Information gained from these HPF, freeze substituted or vitrified sections may lead to a reconstruction of the whole organism and identification of ultrastructural features never previously reported.

[1] O. Kruse et al., Jour. Biol. Chem. (2005) 280, 34170

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Figure 1a. Cryo sectioning chamber with trimmed block, diamond knife. Figure 1b. Cryosections on a high mesh grid. The chamber is at -160 deg C.

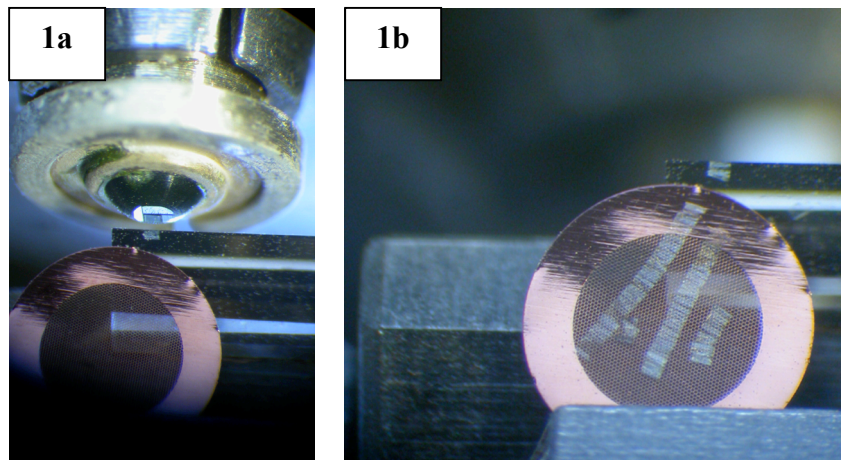


Figure 2a. Low magnification image (4,300X) cryosection of the algal cell pellet frozen in 20% dextran.

Figure 2b. A region showing two cells containing starch granules (S), thylakoid grana (T), mitochondria (M) and cell membrane (C).

