

Electron microscopy and Tomography studies of *Caenorhabditis elegans* mitochondrial respiratory complexes during anoxic conditions

Moa Carlsson¹, Johanna Höög¹, Changchun Cheng², Julia Morud Lekholm¹ and Richard Neutze¹

¹University of Gothenburg, ²Umeå University

The mitochondrial respiratory chain consists of a series of multisubunit protein complexes that couple electron transfer to proton pumping and thereby drive ATP synthesis. In the inner membrane of the mitochondria, the protein complexes form higher-order structures known as respirasomes. Under aerobic conditions, molecular oxygen functions as the terminal electron acceptor during mitochondrial respiration.

The nematode *Caenorhabditis elegans* has evolved an alternative electron transport that supports ATP generation during hypoxia or anoxia. This anaerobic respiratory chain employs rhodoquinone (RQ) instead of ubiquinone (UQ) as the principal lipid-soluble electron carrier. Here, fumarate is used as the terminal electron acceptor rather than oxygen. As a result, key components of the aerobic electron transport chain are bypassed.

In this project, the structure of the respirasome of *C. elegans* will be studied through cryo-electron microscopy and cryo-tomography. Specifically, to reveal any structural changes to the respiratory supercomplex that may occur once the organism experiences anoxia.