Structures of Metal Centers in the Copper Chapperones of Cytochrome Oxidase Assembly

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Metal ions are transported within cells by specialized proteins that are known as metallochaparones. A number of copper chaperones have been suggested to be involved in copper ion delivery and insertion into cytochrome oxidase. We have used X-ray absorption spectroscopy to investigate the detailed metal coordination of several different copper chaperones, specifically Cox11, Cox17, Cox19 and Sco1. Previous work indicates that Cox17 is involved in transferring copper to both Cu_A site through Sco1 and Cu_B site through Cox11, while the function of Cox19 in the copper delivery pathway remains unknown. Earlier EXAFS results from our group suggest Cox17 forms a dimer when metal is bound forming a binuclear metal cluster containing two copper atoms. The results presented here indicate Cox19 contains a copper center that is similar but different to that of Cox17. These results will be discussed in the context of a planned systematic study on the structure property of the copper centers in these copper chaperones.