**Poster**

# Discovery of a novel iron-copper-sulfur cluster in a glucose-methanol-choline (GMC) oxidoreductase

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Metal-inorganic clusters represent a highly varied class of cofactors, ranging from simple two-iron- two-sulfur clusters to highly complicated structures containing more than one metal such as the nitrogenase iron-molybdenum cofactor. As such, they convey a multitude of abilities to the proteins binding them, ranging from simple electron transfer to catalyzing complicated reactions.

Here we present a new iron-copper-sulfur cluster identified in a member of the glucose-methanol- choline (Gmc) oxidoreductase family from a methanotrophic bacterium. Members of this enzyme family utilize a flavin cofactor for catalysis, sometimes combining it with an iron-sulfur cluster for electron transfer. The crystal structure of the novel Gmc enzyme indeed contains a flavin (covalently bound to a histidine) as expected, but the 1.8 Å resolution electron density for the iron sulfur cluster could not be explained by any known [Fe,S]-cluster geometry.

X-ray fluorescence data and anomalous difference density maps calculated from data collected above and below various elemental absorption edges showed that the cluster displays an unprecedented chemical structure consisting of 4 iron atoms, 4 sulfur atoms, a copper ion and an additional sulfur provided by a methionine residue. This novel cluster and its geometry will be discussed in terms of its possible roles in the oxidoreductase activity displayed by Gmc.