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The Structure of the Metal Transporter Tp34 and its Affinity for Divalent Metal Ions GREGORY KNUTSEN, University of Dallas, RANJIT DEKA, CHAD BRAUTIGAM, DIANA TOMCHICK, MISCHA MACHIUS, MICHAEL NORGARD, UT Southwestern Medical Center, STRUCTURAL BIOLOGY LAB OF UT SOUTHWESTERN MEDICAL CENTER COLLABORATION, NORGARD LAB AT UT SOUTHWESTERN MEDICAL CENTER COLLABORATION — Tp34 is periplasmic membrane protein of the nonculitvatable spirochete *Treponema pallidum*, the pathogen of syphillis. It was proposed that Tp34 is a divalent metal transporter, but the identity of the preferred metal ion(s) was unclear. In this study we investigated the ability of divalent metal ions to induce rTp34 dimerization using hydrodynamic techniques and determine the crystal structure of metal bound forms. Using analytical ultracentrifugation sedimentation velocity experiments, we determined that cobalt is superior to nickel at inducing the dimerization of rTp34. rTp34 was crystallized and selected crystals were incubated at a pH 7.5 with $CuSO_4$ and $NiSO_4$. Diffraction experiments were conducted and the processed electron density maps showed that copper was bound to the major metal binding site as well as to three additional minor binding sites. By contrast nickel was only bound to the major metal binding site in one monomer and to three additional minor sites. These results along with previous findings support evidence of Tp34 being involved with metal transport and/or iron utilization.

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