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Expanding the Diversity of Sheath Forming Iron Oxidizing Bacteria; *Leptothrix mechoopdaensis* BB-3 & BB-4

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Iron oxidizing bacteria including those in the *Leptothrix* genus drive iron cycling by converting Fe(II) into solid iron oxides. These bacteria template iron oxides on a tubular extracellular polysaccharide sheath, that form extensive mats in freshwater systems. Isolated *Leptothrix* sp. oxidize iron but do not contain the canonical iron oxidizing genes found in other iron oxidizing bacteria (ie. *Gallionella*, *Siteroxidans*, *Leptothrix ochrachea*). It is unclear which genes and pathways the isolated *Leptothrix* strains use. To address the gaps in the currency knowledge we first isolated new strains of *Leptothrix* sp. (*L. mechoopdaensis* BB-3 & BB-4), compared the genomes, identified possible iron oxidizing cytochromes, and measured growth and metal oxidation over time. We found that the isolates have sheaths, metals oxidation on plates, and are closely related to *L. mobiles* and *L. cholodnii*. *L. mechoopdaensis* BB-3 & BB-4 lack the multi-cytochrome oxidase (MCO) *mofA* but have a fused cytochrome porin protein *cyc2*. This is in contrast to *L. cholodnii* SP6 which has a *mofA* but lacks a *cyc2*. The presence of divergent iron oxidation genes and varied growth within the *Leptothrix* genus suggests greater metabolic diversity than previously recognized.