Prophages in magnetotactic bacterium *Magnetofaba australis* strain IT-1

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Magnetotactic bacteria (MTB) are aquatic microorganisms capable of synthesizing cytoplasmic iron rich magnetic nanocrystals surrounded by membrane, the so-called magnetosomes. The term "magnetotactic bacteria" has no taxonomic meaning; members of this group are present in different classes or phyla. Genomic and genetic studies have determined that MTB contain a common set of genes that are involved in magnetosome biomineralization. However, the mechanisms underlying the evolution of magnetotactic behavior (magnetotaxis) are largely unknown. Temperate bacteriophages has been associated with evolution of bacterial genomes because of their role in horizontal gene transfer. Cryptic (nonfunctional and unable to self-replicate) prophages participate in integration of new bacteriophages and other genetic elements in bacterial genomes. Genomic analysis of bacterial databases detected prophages in 60 to 70% of the genomes. Prophages might be one cause of horizontal gene transfer of the magnetosomes biomineralization genes in MTB. So far, prophages in MTB have been described only in one species, Magnetococcus marinus strain MC- 1. Complete or cryptic prophages in other MTB genomes may provide further evidence of bacteriophage participation in evolution of magnetotaxis. In addition, prophages play an important environmental role in food chain because of their ability to induce cell lysis by activation of the lytic cycle and in host fitness by promoting gene suppression. Therefore, the activation of lytic cycle in MTB could be responsible for population control and release of iron in the environment. Here, we analyzed prophages genes in the genome of the magnetotactic bacterium Magnetofaba australis strain IT- 1. Preliminary genomic analysis in PHAST software detected at least one intact prophage and six defective prophages. Phylogenetic analysis based on prophages genes is in progress. The self-replication capability of the intact prophage will be evaluated by induction with mitomycin C. Bacterial cultures will be adapted to grow in liquid medium to determine its growth curve to establish the log phase period for analysis. After lytic cycle induction, bacterial cultures will be analyzed by fluorescence microscopy and transmission electron microscopy to determine cell viability, morphological changes and structure of the viral particles.

Keywords: Magnetotactic bacteria, Magnetofaba australis strain IT-1, prophages

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