

Isolation of *Magnetospirillum magneticum* AMB-1 Mutants Defective in Bacterial Magnetic Particle Synthesis by Transposon Mutagenesis

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Abstract

Nonmagnetic mutants of *Magnetospirillum magneticum* AMB-1 were recovered following mini-Tn5 transposon mutagenesis. Transconjugants with kanamycin resistance were obtained at a frequency of 2.7×10^{-7} per recipient. Of 3327 transconjugants, 62 were defective for bacterial magnetic particle (BMP) synthesis. The frequency of independent transposition events for nonmagnetic mutants was about 1.4% in transconjugants. Further analysis of DNA sequences flanking transposon by inverted polymerase chain reaction allowed isolation of at least 10 genes or DNA sequences involved in BMP synthesis in *M. magneticum* AMB-1.

Index Entries: Transposon mutagenesis; mini-Tn5; *Magnetospirillum magneticum* AMB-1; inverse polymerase chain reaction; bacterial magnetic particles; sequence analysis.

Introduction

Magnetic bacteria are a diverse group of Gram-negative prokaryotes and synthesize membrane-bound intracellular particles of either magnetite (Fe_3O_4) or greigite (Fe_3S_4) that are aligned in chains of 10–30 along the length of the cell. Formation of bacterial magnetic particles (BMPs) is achieved by a biomineralization process regulated at the genetic level. Accumulation of iron and the deposition of specific particle sizes occur within membrane vesicles at specific locations in the cell (1). Studies on

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