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## Elucidation of the functional role of oligopeptide transporters in bacterial virulence

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The oligopeptide transporter (OPT) family is a relatively poorly characterized family of peptide/modified peptide transporters found in archebacteria, bacteria, fungi and plants. Plant and yeast OPTs were shown to transport tetra- and pentapeptides as well as the modified peptide glutathione. Our database analysis of sequenced bacterial genomes indicated that OPT proteins are encoded in the genomes of important human pathogens such as Pseudomonas aeruginosa, Mycobacterium tuberculosis, Neisseria meningitidis, and Haemophilus influenzae. However, functional analysis of this family of peptide transporters, especially their possible function in bacterial pathogenesis, is lacking. We obtained three P. aeruginosa strains harboring transposon insertions in the PA3934 locus, the gene predicted to encode the putative orthologous OPT protein (OptA) in P. aeruginosa PA01. Two of the optA mutant strains have in-frame fusion between PaOptA and the PhoA protein encoded within the transposon. Expression of OptA-PhoA is induced by the addition of 20 mM arginine, whereas the expression of OptA-PhoA is not affected by iron availability. The lack of iron-regulated expression of optA would indicate that it is unlikely involved in iron nutrition in P. aeruginosa. We also found that 20 mM arginine and 0.4% peptone enhanced biofilm formation by wild type PA01 strain. However, enhanced biofilm formation by arginine was not observed in the optA mutant strains. Addition of 20 mM lysine had no effect on biofilm formation. We also determined the possible function of OptA in the ability of P. aeruginosa to produce pyocyanin. We found that the optA mutant strains produced higher amounts of pyocyanin than the wild type strain. The presence or absence of arginine in the growth medium had no effect on pyocyanin production. Taken together, these results indicate that OptA is important for biofilm formation by P. aeruginosa in response to arginine and peptides, but is unlikely involved in pyocyanin production.