

Sample Abstract

Characterization of *Pseudomonas aeruginosa ampG* involved in β -lactamase expression

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Background/Specific Aim: *Pseudomonas aeruginosa*, an ubiquitous Gram-negative opportunistic pathogen, is strongly associated with the morbidity and mortality among patients with cystic fibrosis. This is due to the development of antibiotic resistance and conversion to a mucoid phenotype. The mucoid phenotype is due to overproduction of alginate, as a result of mutations in *mucA* allele, encoding an anti-sigma factor. The failure of β -lactam antibiotic treatment appears to be mediated by de-repression of AmpC β -lactamase. The genes responsible for β -lactamase expression in *Enterobacteriaceae* are *ampC*, *ampR*, *ampD*, and *ampG*. *AmpC* encodes β -lactamase, *ampR* is a positive regulator, *ampD* is a negative regulator, and *ampG* is a permease. The AmpG permease is known to be involved in the regulation of *ampC* expression. The objective of this study is to ascertain the role of *P. aeruginosa* AmpG that shares 45% homology to *Escherichia coli* AmpG. **Methods:** *AmpG* deletion mutations were generated in the nonmucoid PAO1 and its isogenic mucoid variant, PDO300 (*mucA22*). The effect of this mutation on the growth rate was determined, as were the production of extracellular virulence factors and antibiotic sensitivity. **Results:** Compared to the parental strain, the PAO1 Δ *ampG* showed no changes, but PDO300 Δ *ampG*, continued to be Alg+, had a higher growth rate, produced elevated levels of pyocyanin, and increased LasA elastase and LasB staphylolytic elastase activities. However, both mutant derivatives did not show any significant alteration in β -lactam antibiotic sensitivity. This unexpected outcome led us to the discovery of another *ampG* homolog in PAO1 genome. This newly discovered *ampG* homolog in PAO1 genome shares 41% homology to *E. coli ampG*. We named the homologue *ampG-like*. **Conclusion:** Our results suggest that AmpG plays a role in the expression of virulence factors in the alginate overproducing strains. The antibiotic resistance of *P. aeruginosa*, especially to β -lactams, appears to be more complex and requires further investigation. Perhaps higher intrinsic resistance of *P. aeruginosa* can be attributed to the increase in the *ampG* copy number.

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