

OFFICIAL ABSTRACT and CERTIFICATION

Examining the Effects of Membrane Stress and Defects in the Lipoprotein Processing of *Acinetobacter baylyi* Δlnt

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Prevalence of antibiotic resistant bacteria has increased drastically over the last decade, rapidly becoming a serious public health threat for Americans. Each year in the U.S., at least 2 million people contract an antibiotic-resistant infection. Alternative antibiotic targets in the cell are required to aid this issue. Generally, antibiotics attack the cellular membrane of invading bacteria. Lipoprotein trafficking systems in bacteria could serve as a new potential target of attack. It has been shown that *Acinetobacter baylyi* is one of the few bacteria that can survive the removal of Lnt. Lnt is an enzyme that 's used to attach the third acyl-chain so that the lipoprotein can be recognized. The cell 's survival without Lnt is a rare event, suggesting a novel lipoprotein trafficking system where lipoproteins at the cell membrane are diacylated instead of tri-acetylated. When Lnt is deleted from *A.baylyi*, modification of lipoproteins is impaired, outer membrane permeability is increased, and normal cellular morphology is altered. It is understood that if the Lnt gene is taken away, the cell uses a different protein trafficking system. Suppressor mutations were isolated in *A.baylyi* Δlnt. A suppressor mutation is a second mutation that masks the phenotypic effects of an earlier mutation. In this situation, a suppressor mutation accounts for the absence of the Lnt gene. In this study, isolated suppressors were morphologically analyzed. The data found in this experiment implies that the suppressors found are able to survive as well as WT when exposed to certain antibiotics.

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