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## Cardiolipin Synthases Are Critical to Survive under High NaCl Concentration in *Staphylococcus aureus*

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### Summary

*Staphylococcus aureus* naturally inhabits on the nasal cavity of warm-blooded animals, but is also an opportunistic human pathogen. It is well known as a salt resistant bacterium, and can proliferate even under 10 ~ 15% NaCl concentration. Some studies in 1970's have described that its phospholipids, cardiolipin (CL) and phosphatidylglycerol (PG), are differentially accumulated depending on the growth conditions, such as the distinct growth phases and the salt concentration, implying the possible importance of the phospholipid dynamics in the stress tolerance. In this study, we aimed to clarify the significance of the CL dynamics in the survival under the high salt environment as well as the regulatory mechanism(s) of the CL synthesis.

Our analysis using *S. aureus* strain N315 indicated that the CL increased towards the stationary phase in line with the previous study. However, it was unexpected that it did not significantly increased under high salt condition. The disruption of two homologues of *B. subtilis* CL synthase genes diminished the CL synthesis. CL was not necessary for the growth irrespective to the salt concentrations, but was critical for the prolonged survival under high salinity and for the resistance against hypertonic shock. In addition, one of the *cls* genes was found to specifically work under high salinity, implying the possible distinct roles of the two *cls* genes in *S. aureus*.