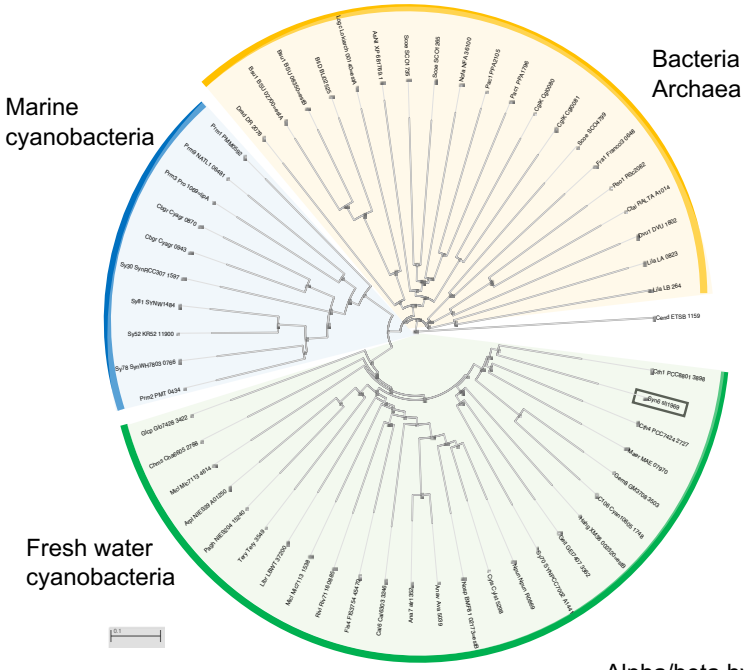
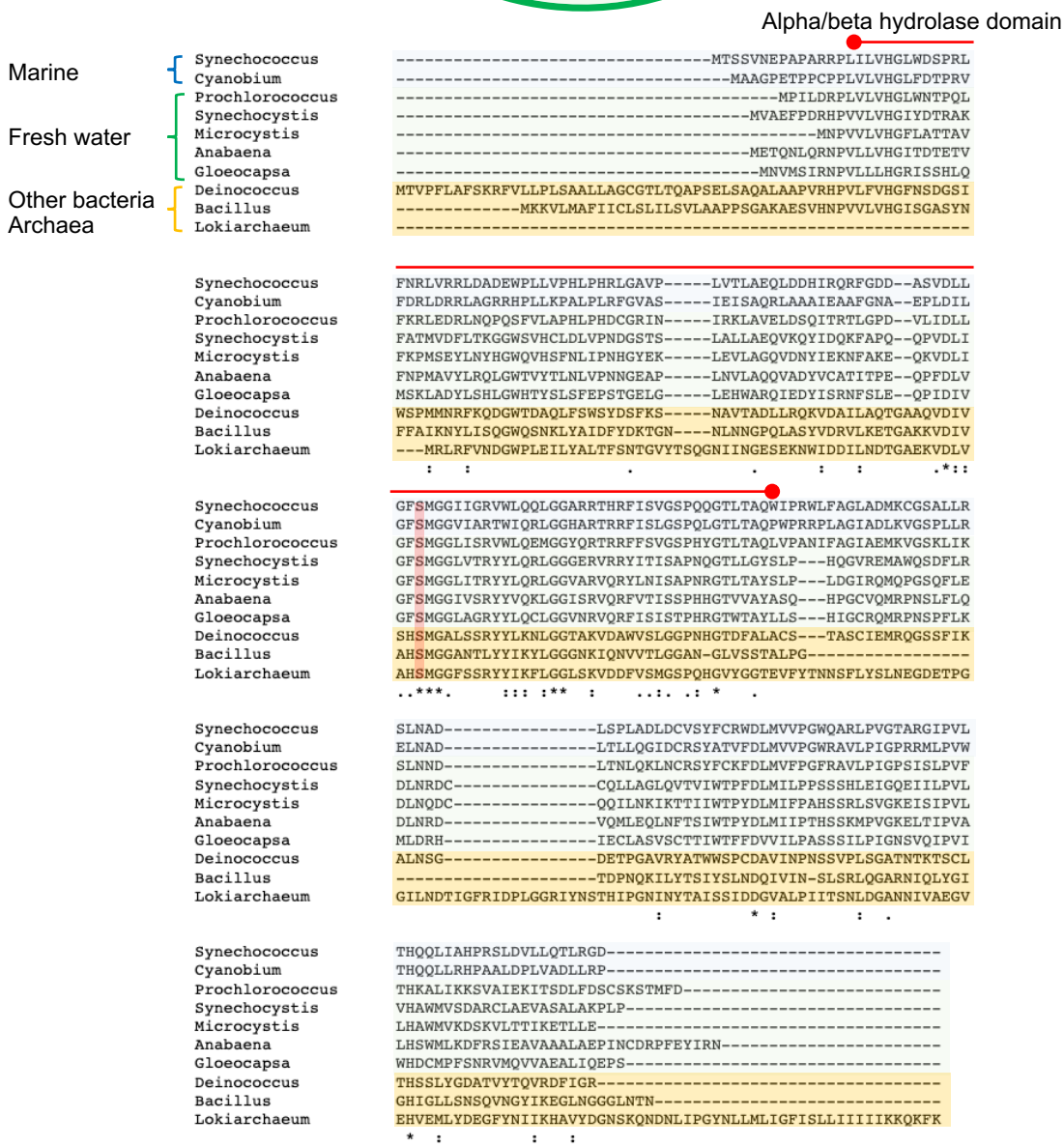
Supporting Fig. S1.

A

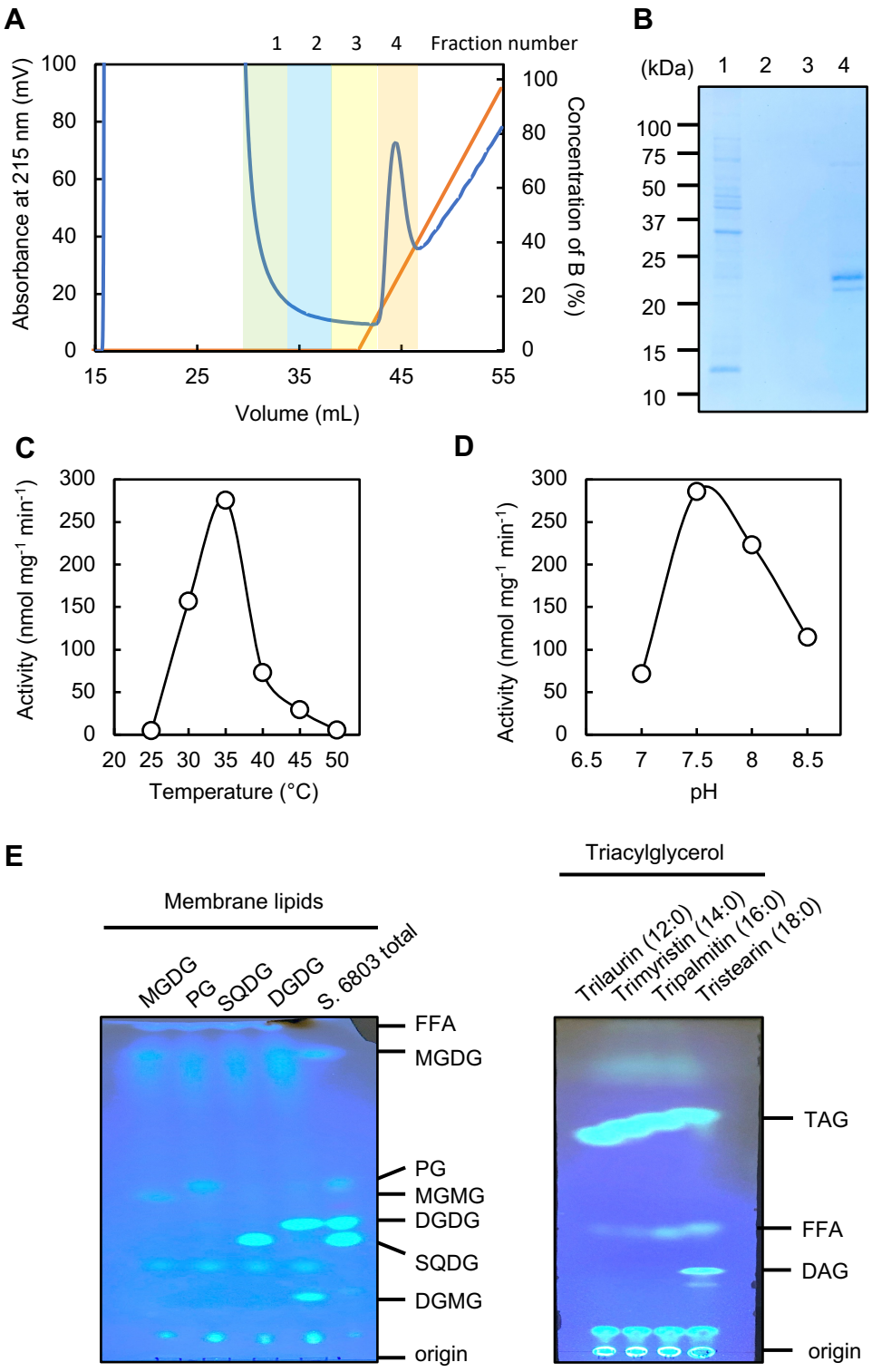


B



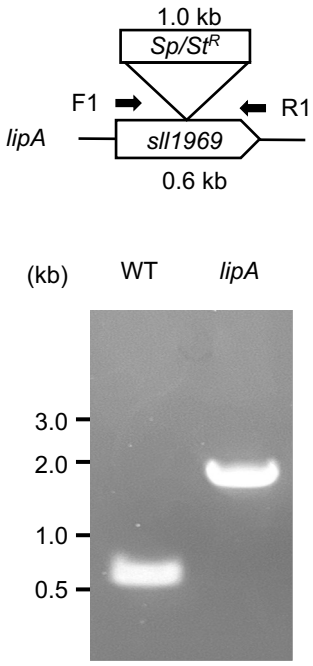
Supporting Fig. S1. Phylogenic analysis of LipA proteins. (A) Neighbor-joining tree of LipA proteins. Protein sequences were obtained from the Gclust server (http://gclust.c.u-tokyo.ac.jp/) established by Prof. Naoki Sato (The University of Tokyo). (B) Alignment of amino acid sequence of Sll1969 with those of homologues found in other cyanobacteria (Synechococcus; *Synechococcus* sp. WH 7803, Cyanobium; *Cyanobium gracile* PCC 6307, Prochlorococcus; *Prochlorococcus marinus* CCMP1375, Synechocystis; *Synechocystis* sp. PCC 6803, Microcystis; *Microcystis aeruginosa* NIES 843, Anabaena; *Anabaena* sp. PCC 7120, and Gloeocapsa; *Gloeocapsa* sp. PCC 7428), bacteria (Deinococcus; *Deinococcus radiodurans* R1 and Bacillus; *Bacillus subtilis* 168) and archaea (Lokiarchaeum; *Lokiarchaeum* sp. GC14 75).

Supporting Fig. S2.



Supporting Fig. S2. Purification and characterization of recombinant LipA protein with a 6 x His-tag expressed in *Escherichia* (*E.*) *coli* cells. (A) Total extracts from *E. coli* cells expressing recombinant LipA protein were used with the AKTA start purification system. Blue line indicates absorbance at 215 nm (values shown at left y-axis) and orange line indicates a gradient concentration of B (%) (values shown at right y-axis). Upper number indicates numbers for fractions taken and analyzed by SDS-PAGE (B). 0.4 mM p-phenyl stearate was used as a substrate for determination of temperature (C) and pH (D) dependencies of LipA activity. (E) Pictures of thin-layer chromatography (TLC) plates. After the reaction with LipA and each purified lipid, the reaction products were extracted and analyzed by TLC.

Supporting Fig. S3.



Supporting Fig. S3. Segregation of disrupted *sll1969* gene in *lipA* cells. The complete insertion of the spectinomycin/streptomycin-resistant gene cassette (*Sp/St*^{R}) into the middle of *sll1969* gene in all chromosomal copies of the genome was confirmed by PCR. Genomic DNA extracted from wild-type and *lipA* cells was used for PCR with a pair of primers shown in the upper picture as F1 and R1.