Supporting Information

A cytosolic copper storage protein provides a second level of copper tolerance in *Streptomyces lividans*

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RESULTS

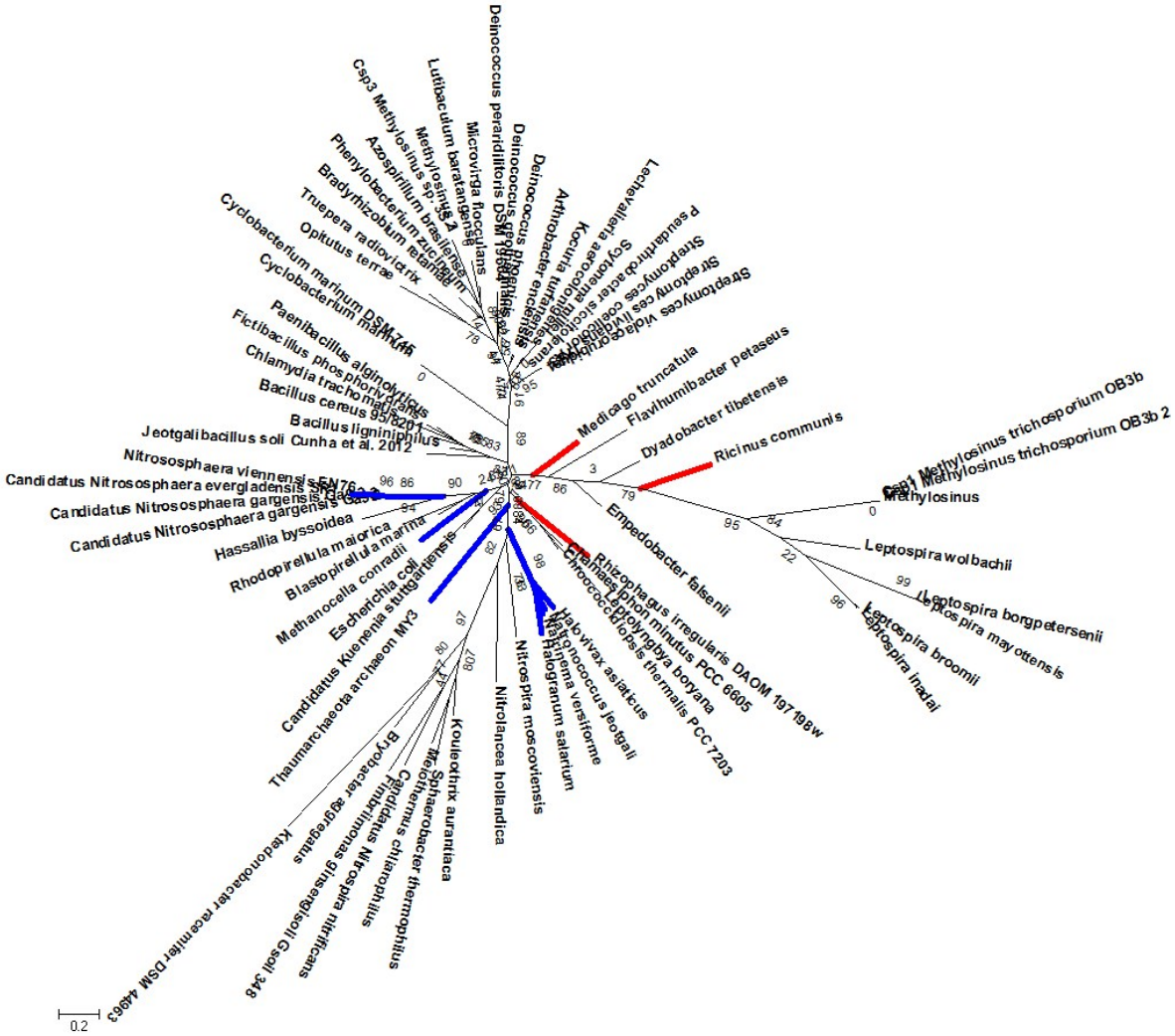

Figure S1: Phylogenetic tree of the *ccsp* gene. Domain Bacteria branches in black, Archaea in blue, Eukaryota in red. Node values indicate local statistical support calculated by SH test.

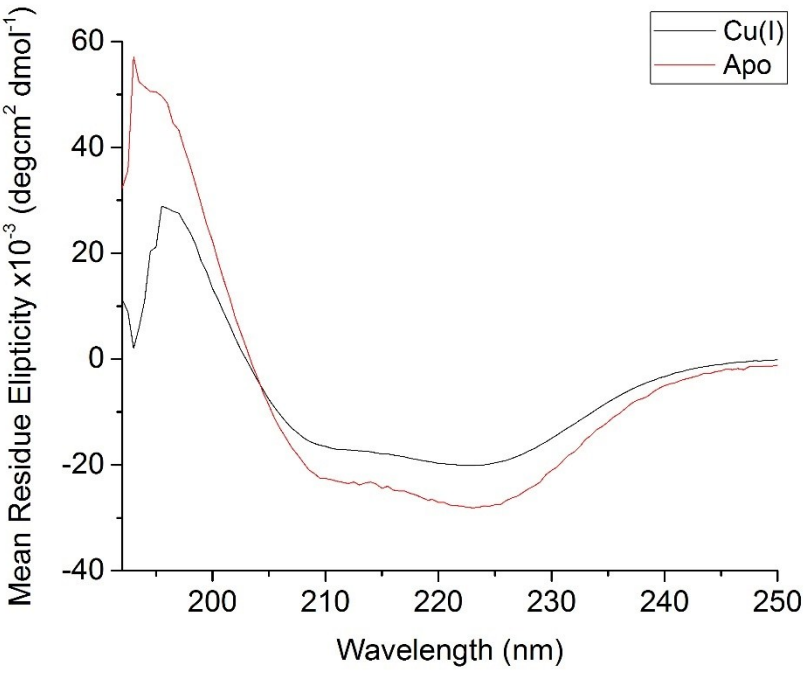

Figure S2: Far UV-CD spectra of Apo- (3 μM) and Cu^{+}-loaded Ccsp (2 μM) at pH 7.5 and 20 ^{o}C.

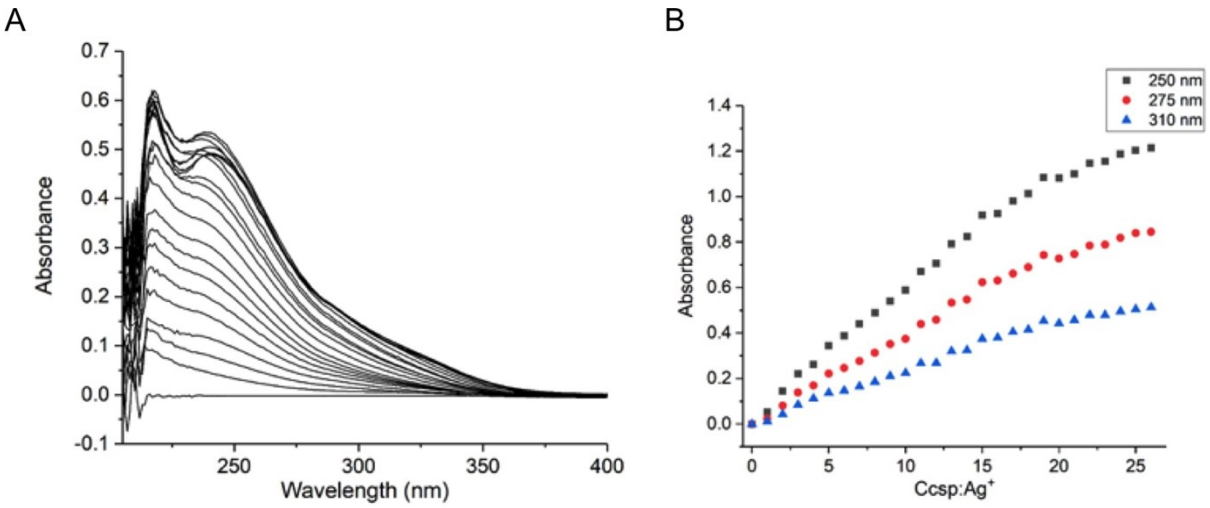

Fig S3: Ag^+ ion binding to CcsP. A) UV-vis difference spectrum upon titration of Ag^+ ions to Ccsp (4 μM) showing the appearance of (Cys)Sγ→Ag^+ LMCT bands. B) Plots of absorbance at selected wavelengths taken from (A) versus the Ag^+:Ccsp concentration ratio.

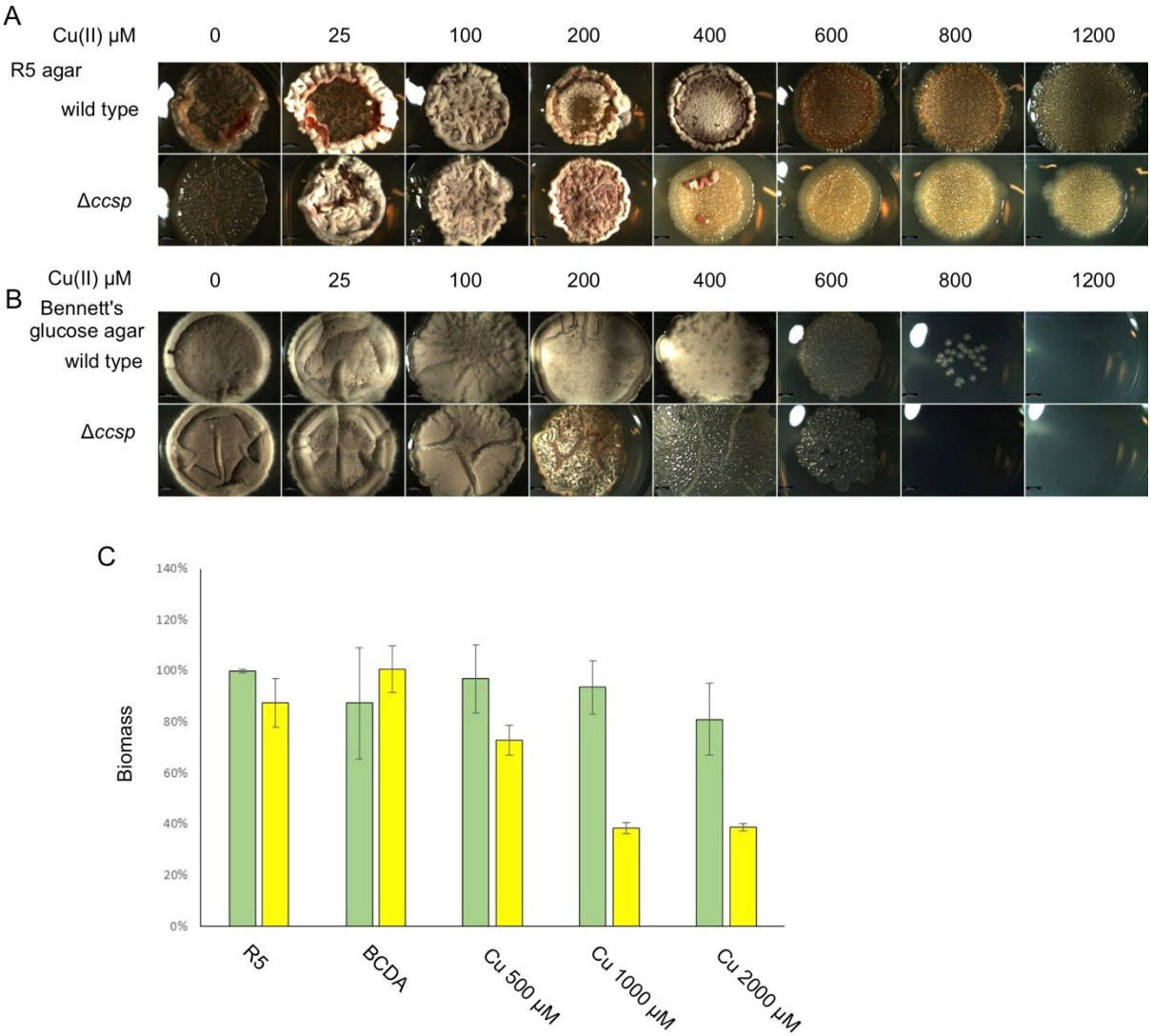

Figure S4: The effect of Ccsp on the growth and development of *S. lividans* at 30 °C. Cu tolerance after 6 days growth of the wild type parent strain and the Δ*ccsp* mutant strain on R5 agar media A) and Bennett's glucose media B). Cu(II) concentrations as indicated. All images are the same magnification with a scale bar of 2 mm. C) Biomass production after 32 h in liquid R5 cultures for the wild type (green) and the Δ*ccsp* mutant strain (yellow) in the presence of the Cu chelator BCDA and various concentrations of Cu(II) citrate. The dry weight biomass of the wild type strain was set at 100 %.

Table S1: Taxonomic distribution of the ccsp gene in the Tree of Life.

	ccsp
BACTERIA	
Acidobacteria	1
Aquificae	
Caldiserica	
Chrysiogenetes	
Deferribacteres	
Dictyoglomi	
Elusimicrobia	
FCB group	5
Fusobacteria	
Nitrospinae/Tectomicrobia group	
Nitrospirae	4
Proteobacteria (purple bacteria)	5
PVC group	5
Rhodothermaeota	
Spirochaetes	5
Synergistetes	
Terrabacteria group	5
Thermodesulfobacteria	
Thermotogae	
Terrabacteria group	
Actinobacteria	5
Armatimonadetes	1
Chloroflexi (green non-sulfur bacteria)	4
Cyanobacteria/Melainabacteria group	5
Deinococcus-Thermus	5
Firmicutes (Gram-positive bacteria)	5
Tenericutes	
ARCHAEA	
DPANN group	
Euryarchaeota	5
TACK group	5
EUKARYOTA	
Alveolata (alveolates)	
Amoebozoa	
Apusozoa	
Breviatea	
Centroheliozoa (centrohelids)	
Cryptophyta (cryptomonads)	
Euglenozoa	
Fornicata	

Glaucocystophyceae (glaucocystophytes)	
Haptophyceae (coccolithophorids)	
Heterolobosea	
Jakobida	
Katablepharidophyta	
Malawimonadidae	
Opisthokonta	1
Oxymonadida (oxymonads)	
Parabasalia (parabasalids)	
Rhizaria	
Rhodophyta (red algae)	
Stramenopiles (heterokonts)	
Viridiplantae (green plants)	2