

Supplementary Table 1. Cyanophycin metabolism, arginine catabolism, and arginine and aspartate transport genes in cyanobacteria.

The cyanobacteria included in the phylogenetic analysis of Shih *et al.* (2013) were used as test strains. The indicated *Anabaena* genes were used as query in BLAST analysis, which was completed by analysis using as query the corresponding *Synechocystis* genes (except *cphA2*, *natF* and *natH*, not present in this organism). The presence of a gene in a strain is indicated by a check mark (✓). Every strain containing *cphA1* contains *cphB1*, normally in an operon; † indicates that the clustering of the two genes is not conserved. For *cphA2*, ¶ indicates the presence of a *cphB2* gene in the neighbourhood of *cphA2* as shown in Fig. 1.

Clade/Strain	Gene							
	<i>cphB1</i> <i>cphA1</i>	<i>cphA2</i>	<i>iadC</i>	<i>agrE</i>	<i>putA</i>	<i>bgtB</i>	<i>natF</i>	<i>natH</i>
<b>Clade A</b>								
<i>Trichodesmium erythraeum</i> IMS101	✓		✓	✓	✓		✓	✓
<i>Lyngbya</i> sp. PCC 8106	✓†		✓	✓	✓		✓	✓
<i>Arthrospira platensis</i> Paraca	✓		✓	✓	✓		✓	✓
<i>Arthrospira platensis</i> NIES-39	✓		✓	✓	✓		✓	✓
<i>Arthrospira</i> sp. PCC 8005	✓		✓	✓	✓		✓	✓
<i>Arthrospira maxima</i> CS-328	✓		✓	✓	✓		✓	✓
<i>Oscillatoria nigro-viridis</i> PCC 7112	✓	✓¶	✓	✓	✓		✓	✓
<i>Microcoleus vaginatus</i> FGP-2	✓	✓¶	✓	✓	✓		✓	✓
<i>Oscillatoria</i> sp. PCC 6506	✓	✓¶	✓	✓	✓		✓	✓
<i>Kamptonema formosum</i> PCC 6407	✓	✓¶	✓	✓	✓		✓	✓
<i>Oscillatoria</i> sp. PCC 10802	✓	✓	✓	✓	✓			
<i>Oscillatoria acuminata</i> PCC 6304	✓		✓	✓	✓		✓	✓
<b>Clade B1</b>								
<i>Fischerella</i> sp. PCC 9605	✓	✓¶	✓	✓	✓	✓		
<i>Fischerella</i> sp. PCC 9431	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Fischerella</i> sp. PCC 9339	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Fischerella</i> sp. JSC-11	✓		✓	✓	✓	✓	✓	✓
<i>Chlorogloeopsis</i> sp. PCC 7702	✓	✓¶	✓	✓	✓	✓		
<i>Mastigocladopsis repens</i> PCC 10914	✓	✓¶	✓	✓	✓	✓		
<i>Calothrix</i> sp. PCC 7103	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Calothrix</i> sp. PCC 6303	✓		✓	✓	✓		✓	✓
<i>Nostoc</i> sp. PCC 7524	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Anabaena</i> sp. PCC 7120	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Anabaena variabilis</i> ATCC 29413	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Nostoc</i> sp. PCC 7107	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Cylindrospermum stagnale</i> PCC 7417	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Anabaena cylindrica</i> PCC 7122	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Anabaena</i> sp. PCC 7108	✓		✓	✓	✓		✓	✓
<i>Raphidiopsis brookii</i> D9	✓		✓	✓	✓		✓	✓
<i>Cylindrospermopsis raciborskii</i> CS-505	✓	✓	✓	✓	✓		✓	✓
' <i>Nostoc azollae</i> ' 0708	✓	✓	✓	✓	✓	✓	✓	✓
<i>Nodularia spumigena</i> CCY9414	✓	✓	✓	✓	✓		✓	✓
<i>Calothrix</i> sp. PCC 7507	✓	✓	✓	✓	✓	✓	✓	✓
<i>Microchaete</i> PCC 7126	✓	✓	✓	✓	✓	✓	✓	✓
<i>Nostoc punctiforme</i> PCC 73102	✓	✓¶	✓	✓	✓	✓		
<i>Scytomena hofmanni</i> UTEX 2349	✓	✓¶	✓	✓	✓			
<i>Rivularia</i> sp. PCC 7116	✓		✓	✓	✓		✓	✓
<i>Synechocystis</i> sp. PCC 7509	✓	✓¶	✓	✓	✓	✓		
<i>Gloeocapsa</i> sp. PCC 7428	✓	✓¶	✓	✓	✓	✓	✓	✓
<i>Chroococciopsis thermalis</i> PCC 7203	✓	✓¶	✓	✓	✓	✓	✓	✓
<b>Clade B2</b>								
<i>Halothece</i> sp. PCC 7418								
<i>Spirulina subsalsa</i> PCC 9445	✓		✓	✓	✓		✓	✓
<i>Spirulina major</i> PCC 6313	✓		✓	✓	✓		✓	✓
<i>Atelocyanobacterium thalassa</i> UCYN-A								
<i>Cyanothece</i> sp. CCY0110	✓	✓¶	✓	✓	✓		✓	✓
<i>Cyanothece</i> sp. ATCC 51472	✓		✓	✓	✓		✓	✓



	<i>cphB1</i> <i>cphA1</i>	<i>cphA2</i>	<i>iadC</i>	<i>agrE</i>	<i>putA</i>	<i>bgtB</i>	<i>natF</i>	<i>natH</i>
<b>Clade C</b>								
<i>Prochlorothrix hollandica</i> PCC 9006	✓		✓	✓	✓		✓	✓
<b>Clade C2</b>								
<i>Synechococcus elongatus</i> PCC 7942							✓	✓
<i>Synechococcus elongatus</i> PCC 6301							✓	✓
<b>Clade C3</b>								
<i>Leptolyngbya</i> sp. PCC 6406							✓	✓
<i>Nodosilinea nodulosa</i> PCC 7104	✓†		✓	✓	✓	✓	✓	✓
<i>Synechococcus</i> sp PCC 7335	✓		✓	✓	✓		✓	✓
<i>Leptolyngbya</i> sp. PCC 7375	✓		✓	✓	✓		✓	✓
<b>Clade D</b>								
<i>Geitlerinema</i> sp. PCC 7407	✓		✓	✓	✓		✓	✓
<i>Leptolyngbya</i> sp. PCC 6306	✓	✓¶	✓	✓	✓	✓		
<b>Clade E</b>								
<i>Thermosynechococcus elongatus</i> BP-1	✓		✓	✓	✓			
<i>Synechococcus</i> sp. PCC 6312	✓		✓	✓	✓	✓	✓	✓
<i>Cyanothece</i> sp. PCC 7425	✓	✓	✓	✓	✓		✓	✓
<i>Acaryochloris marina</i> MBIC11017					✓		✓	✓
<i>Acaryochloris</i> sp. CCME5410							✓	✓
<b>Clade F</b>								
<i>Synechococcus</i> sp. PCC 7502	✓†		✓	✓	✓		✓	✓
<i>Pseudanabaena</i> sp. PCC 6802	✓†		✓	✓	✓		✓	✓
<i>Pseudanabaena</i> sp. PCC 7429	✓†		✓	✓	✓		✓	✓
<i>Pseudanabaena</i> sp. PCC 7367	✓†		✓	✓	✓	✓	✓	✓
<b>Clade G</b>								
<i>Synechococcus</i> sp. JA-3-3AB							✓	✓
<i>Synechococcus</i> sp. JA-2-3B'a(2-13)	✓†	✓	✓	✓	✓		✓	✓
<i>Synechococcus</i> sp. PCC 7336				✓	✓	✓	✓	✓
<b>Deeply divergent</b>								
<i>Gloeobacter violaceus</i> PCC 7421	✓†		✓	✓	✓			
<b>Recently discovered</b>								
<i>Gloeomargarita lithophora</i> D10	✓		✓	✓	✓			
<i>Gloeobacter kilauensis</i> JS1	✓†		✓	✓	✓			
<i>Richelia intracellularis</i> HH01	✓		✓				✓	✓