

SUPPLEMENTAL DATA

SUPPLEMENTAL TABLE 1

Summary of the effects of Rubisco small-subunit substitutions and the relationships of the substituted residues to the large subunit

The mutant substitutions are grouped according to their locations near the carboxyl-terminal bottom, middle, or amino-terminal top of large-subunit α -helix 8.

Substitution	Growth at 35 °C ^a	Effect on catalysis ^b	α C - C2-CABP distance (Å)	Large-subunit interactions ^c
Bottom region of large-subunit α -helix 8				
Y32A	inhibited	$\downarrow\Omega, \downarrow V_c, \downarrow K_o$	34.2	R431, N432
Middle region of large-subunit α -helix 8				
S16A	normal	minor	27.1	E234, R421, E425
L18A	inhibited	not determined	27.6	E425, A426, Q429, W451
P19A	normal	minor	31.2	W451
Top region of large-subunit α -helix 8				
E43A	inhibited	$\downarrow\Omega, \downarrow V_c, \uparrow K_c, \uparrow K_o$	28.5	R187
W73A	inhibited	$\downarrow V_c, \uparrow K_c, \uparrow K_o$	27.1	Y190
L78A	inhibited	$\downarrow V_c, \uparrow K_c, \uparrow K_o$	22.7	F13, W70, P410, G412
P79A	normal	$\downarrow V_c$	23.9	W70
F81A	inhibited	$\downarrow V_c, \uparrow K_c, \uparrow K_o$	24.6	A11, G12, W70, G73, L74
E92A	normal	minor	33.3	none

^a Summary of results from Fig. 2.

^b Summary of results from Tables 1 and 2.

^c Except for a Glu-43 to Arg-187 salt bridge, all interactions are by van der Waals contact.

SUPPLEMENTAL TABLE 2

Identities of large-subunit residues from representative species that are in contact with conserved small-subunit residues

The corresponding residues in the L2 Rubisco of *Rhodospirillum rubrum* (RR), which lacks small subunits, is included for comparison.

Species ^a	Large-subunit residues																	
	11	12	13	70	73	74	187	190	234	410	412	421	425	426	429	431	432	451
CR	A	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
SO	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
NT	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	K	R	N	W
AT	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
HA	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
PS	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
ZM	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
MP	V	G	F	W	G	L	R	Y	E	P	G	R	E	A	Q	R	N	W
SY	A	G	Y	W	L	L	R	Y	E	P	G	R	E	A	Q	R	N	W
AB	S	G	Y	W	L	L	R	Y	E	P	G	R	E	A	Q	R	N	W
AE	K	R	Y	W	R	L	R	Y	E	P	G	R	E	A	L	R	N	A
GP	S	R	Y	W	L	L	R	Y	E	P	G	R	E	A	L	R	N	T
RR	-	-	-	C	T	D	E	H	E	I	G	R	Q	A	D	V	P	-

^a Species abbreviations are: CR, *Chlamydomonas reinhardtii*; SO, *Spinacea oleracea*; NT, *Nicotiana tabacum*; AT, *Arabidopsis thaliana*; HA, *Helianthus annuus*; PS, *Pisum sativum*; ZM, *Zea mays*; MP, *Marchantia polymorpha*; SY, *Synechococcus*; AB, *Anabaena*; AE, *Alcaligenes eutrophus*; GP, *Galdieria partita*; RR, *Rhodospirillum rubrum*.