W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

Oct 6, 2024 – 12:45 AM EDT

PDB ID	:	1XFX
Title	:	Crystal structure of anthrax edema factor (EF) in complex with calmodulin in the presence of 10 millimolar exogenously added calcium chloride
Authors	:	Shen, Y.; Zhukovskaya, N.L.; Guo, Q.; Florian, J.; Tang, W.J.
Deposited on	:	2004-09-15
Resolution	:	3.20 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

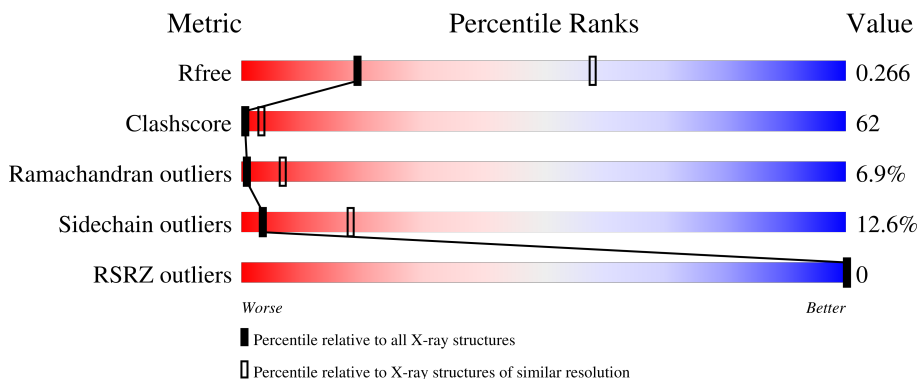|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1   Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
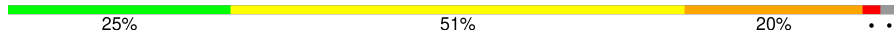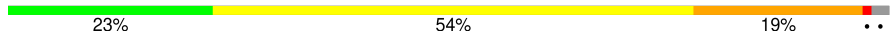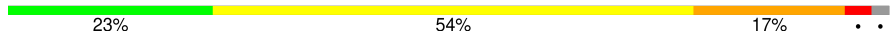
Metric	Percentile Ranks	Value
Rfree		0.266
Clashscore		62
Ramachandran outliers		6.9%
Sidechain outliers		12.6%
RSRZ outliers		0

Worse   *Better*

■ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1370 (3.20-3.20)
Clashscore	180529	1497 (3.20-3.20)
Ramachandran outliers	177936	1479 (3.20-3.20)
Sidechain outliers	177891	1478 (3.20-3.20)
RSRZ outliers	164620	1371 (3.20-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	777	29% 54% 10% • 5%
1	B	777	29% 54% 10% • 5%
1	C	777	29% 54% 10% • 5%
1	D	777	30% 53% 10% • 5%
1	E	777	29% 54% 10% • 5%

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Mol	Chain	Length	Quality of chain
1	F	777	29% 54% 10% 5%
2	O	149	24% 53% 20%
2	P	149	25% 51% 20%
2	Q	149	24% 53% 17%
2	R	149	23% 54% 19%
2	S	149	23% 54% 17%
2	T	149	23% 54% 18%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 42858 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Calmodulin-sensitive adenylate cyclase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			
1	B	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			
1	C	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			
1	D	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			
1	E	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			
1	F	735	Total	C	N	O	S	0	0	0
			5992	3828	995	1163	6			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	24	MET	-	initiating methionine	UNP P40136
A	25	HIS	-	expression tag	UNP P40136
A	26	HIS	-	expression tag	UNP P40136
A	27	HIS	-	expression tag	UNP P40136
A	28	HIS	-	expression tag	UNP P40136
A	29	HIS	-	expression tag	UNP P40136
A	30	HIS	-	expression tag	UNP P40136
A	31	ALA	-	cloning artifact	UNP P40136
A	32	ALA	-	cloning artifact	UNP P40136
B	24	MET	-	initiating methionine	UNP P40136
B	25	HIS	-	expression tag	UNP P40136
B	26	HIS	-	expression tag	UNP P40136
B	27	HIS	-	expression tag	UNP P40136
B	28	HIS	-	expression tag	UNP P40136
B	29	HIS	-	expression tag	UNP P40136
B	30	HIS	-	expression tag	UNP P40136
B	31	ALA	-	cloning artifact	UNP P40136

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Chain	Residue	Modelled	Actual	Comment	Reference
B	32	ALA	-	cloning artifact	UNP P40136
C	24	MET	-	initiating methionine	UNP P40136
C	25	HIS	-	expression tag	UNP P40136
C	26	HIS	-	expression tag	UNP P40136
C	27	HIS	-	expression tag	UNP P40136
C	28	HIS	-	expression tag	UNP P40136
C	29	HIS	-	expression tag	UNP P40136
C	30	HIS	-	expression tag	UNP P40136
C	31	ALA	-	cloning artifact	UNP P40136
C	32	ALA	-	cloning artifact	UNP P40136
D	24	MET	-	initiating methionine	UNP P40136
D	25	HIS	-	expression tag	UNP P40136
D	26	HIS	-	expression tag	UNP P40136
D	27	HIS	-	expression tag	UNP P40136
D	28	HIS	-	expression tag	UNP P40136
D	29	HIS	-	expression tag	UNP P40136
D	30	HIS	-	expression tag	UNP P40136
D	31	ALA	-	cloning artifact	UNP P40136
D	32	ALA	-	cloning artifact	UNP P40136
E	24	MET	-	initiating methionine	UNP P40136
E	25	HIS	-	expression tag	UNP P40136
E	26	HIS	-	expression tag	UNP P40136
E	27	HIS	-	expression tag	UNP P40136
E	28	HIS	-	expression tag	UNP P40136
E	29	HIS	-	expression tag	UNP P40136
E	30	HIS	-	expression tag	UNP P40136
E	31	ALA	-	cloning artifact	UNP P40136
E	32	ALA	-	cloning artifact	UNP P40136
F	24	MET	-	initiating methionine	UNP P40136
F	25	HIS	-	expression tag	UNP P40136
F	26	HIS	-	expression tag	UNP P40136
F	27	HIS	-	expression tag	UNP P40136
F	28	HIS	-	expression tag	UNP P40136
F	29	HIS	-	expression tag	UNP P40136
F	30	HIS	-	expression tag	UNP P40136
F	31	ALA	-	cloning artifact	UNP P40136
F	32	ALA	-	cloning artifact	UNP P40136

- Molecule 2 is a protein called Calmodulin 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
2	O	146	1146	702	186	249	9	0	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	P	146	Total	C	N	O	Se	0	0	0
			1146	702	186	249	9			
2	Q	146	Total	C	N	O	Se	0	0	0
			1146	702	186	249	9			
2	R	146	Total	C	N	O	Se	0	0	0
			1146	702	186	249	9			
2	S	146	Total	C	N	O	Se	0	0	0
			1146	702	186	249	9			
2	T	146	Total	C	N	O	Se	0	0	0
			1146	702	186	249	9			

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	0	MSE	MET	modified residue	UNP P62158
O	36	MSE	MET	modified residue	UNP P62158
O	51	MSE	MET	modified residue	UNP P62158
O	71	MSE	MET	modified residue	UNP P62158
O	72	MSE	MET	modified residue	UNP P62158
O	76	MSE	MET	modified residue	UNP P62158
O	109	MSE	MET	modified residue	UNP P62158
O	124	MSE	MET	modified residue	UNP P62158
O	144	MSE	MET	modified residue	UNP P62158
O	145	MSE	MET	modified residue	UNP P62158
P	0	MSE	MET	modified residue	UNP P62158
P	36	MSE	MET	modified residue	UNP P62158
P	51	MSE	MET	modified residue	UNP P62158
P	71	MSE	MET	modified residue	UNP P62158
P	72	MSE	MET	modified residue	UNP P62158
P	76	MSE	MET	modified residue	UNP P62158
P	109	MSE	MET	modified residue	UNP P62158
P	124	MSE	MET	modified residue	UNP P62158
P	144	MSE	MET	modified residue	UNP P62158
P	145	MSE	MET	modified residue	UNP P62158
Q	0	MSE	MET	modified residue	UNP P62158
Q	36	MSE	MET	modified residue	UNP P62158
Q	51	MSE	MET	modified residue	UNP P62158
Q	71	MSE	MET	modified residue	UNP P62158
Q	72	MSE	MET	modified residue	UNP P62158
Q	76	MSE	MET	modified residue	UNP P62158
Q	109	MSE	MET	modified residue	UNP P62158
Q	124	MSE	MET	modified residue	UNP P62158
Q	144	MSE	MET	modified residue	UNP P62158

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Chain	Residue	Modelled	Actual	Comment	Reference
Q	145	MSE	MET	modified residue	UNP P62158
R	0	MSE	MET	modified residue	UNP P62158
R	36	MSE	MET	modified residue	UNP P62158
R	51	MSE	MET	modified residue	UNP P62158
R	71	MSE	MET	modified residue	UNP P62158
R	72	MSE	MET	modified residue	UNP P62158
R	76	MSE	MET	modified residue	UNP P62158
R	109	MSE	MET	modified residue	UNP P62158
R	124	MSE	MET	modified residue	UNP P62158
R	144	MSE	MET	modified residue	UNP P62158
R	145	MSE	MET	modified residue	UNP P62158
S	0	MSE	MET	modified residue	UNP P62158
S	36	MSE	MET	modified residue	UNP P62158
S	51	MSE	MET	modified residue	UNP P62158
S	71	MSE	MET	modified residue	UNP P62158
S	72	MSE	MET	modified residue	UNP P62158
S	76	MSE	MET	modified residue	UNP P62158
S	109	MSE	MET	modified residue	UNP P62158
S	124	MSE	MET	modified residue	UNP P62158
S	144	MSE	MET	modified residue	UNP P62158
S	145	MSE	MET	modified residue	UNP P62158
T	0	MSE	MET	modified residue	UNP P62158
T	36	MSE	MET	modified residue	UNP P62158
T	51	MSE	MET	modified residue	UNP P62158
T	71	MSE	MET	modified residue	UNP P62158
T	72	MSE	MET	modified residue	UNP P62158
T	76	MSE	MET	modified residue	UNP P62158
T	109	MSE	MET	modified residue	UNP P62158
T	124	MSE	MET	modified residue	UNP P62158
T	144	MSE	MET	modified residue	UNP P62158
T	145	MSE	MET	modified residue	UNP P62158

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total 1	Mg 1	0	0
3	B	1	Total 1	Mg 1	0	0
3	C	1	Total 1	Mg 1	0	0
3	D	1	Total 1	Mg 1	0	0

WORLDWIDE
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	1	Total 1	Mg 1	0	0
3	F	1	Total 1	Mg 1	0	0

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	O	4	Total 4	Ca 4	0	0
4	P	4	Total 4	Ca 4	0	0
4	Q	4	Total 4	Ca 4	0	0
4	R	4	Total 4	Ca 4	0	0
4	S	4	Total 4	Ca 4	0	0
4	T	4	Total 4	Ca 4	0	0

3   Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second g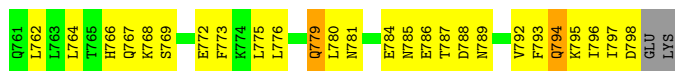raphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

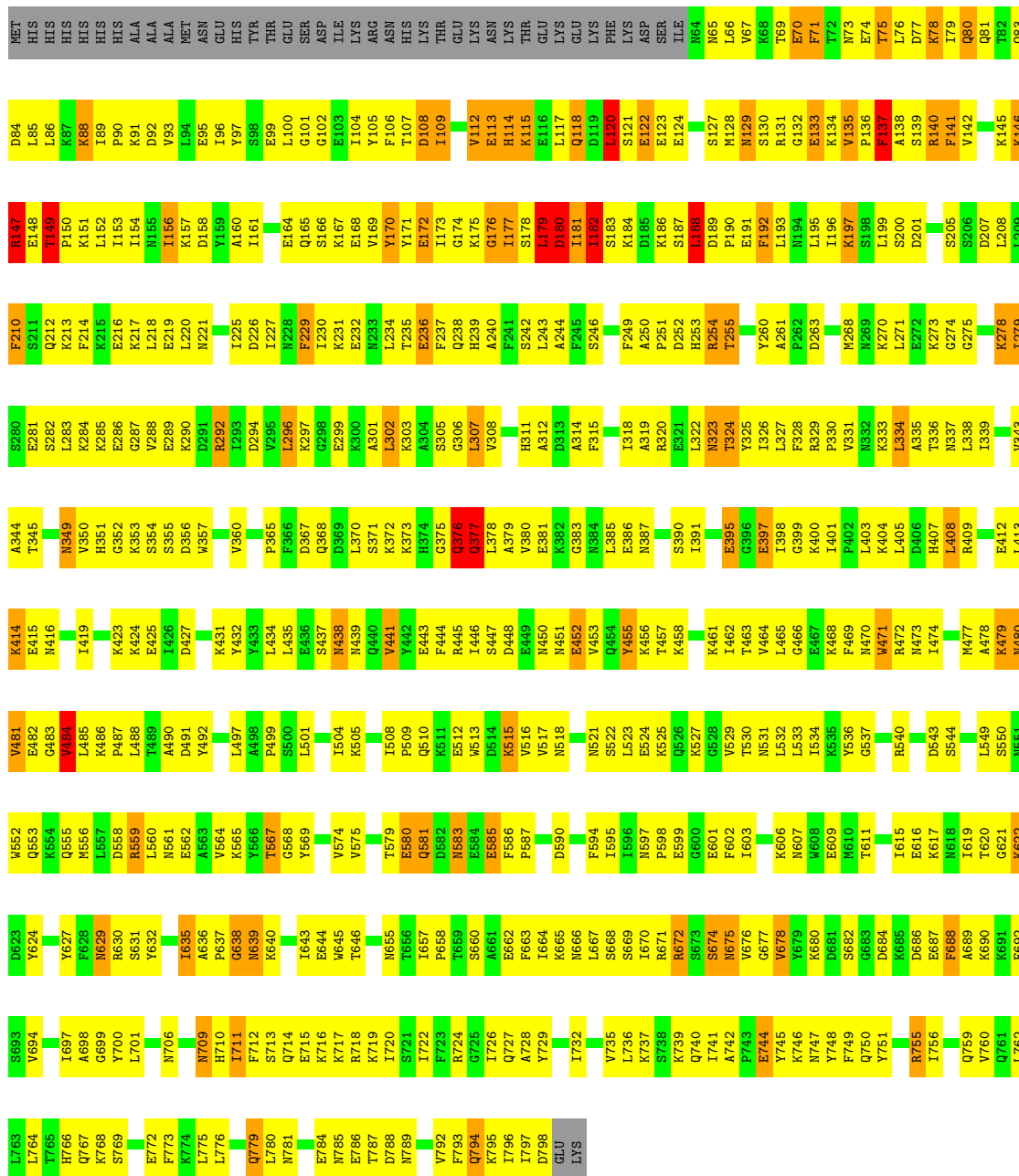• Molecule 1: Calmodulin-sensitive adenylate cyclase

Q761 L762 L763 L764 T765 H766 Q767 K768 S769 E772 F773 K774 L775 L776 Q779 L780 N781 E784 N785 E786 T787 D788 N789 V792 F793 Q794 K795 I796 I797 D798 GLU LYS
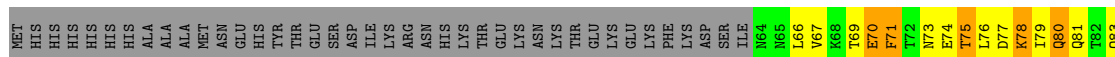
• Molecule 1: Calmodulin-sensitive adenylate cyclase

Chain B: 29%   54%   10%   • 5%

MET HIS HIS HIS HIS HIS HIS ALA ALA MET ASN GLU HIS TYR THR GLU SER ASP ILE LYS ARG ASN HIS LYS THR GLU LYS ASN LYS THR GLU LYS GLU LYS PHE LYS ASP SER ILE N64 N65 L66 V67 K68 T69 E70 F71 T72 N73 E74 T75 L76 D77 K78 I79 Q80 Q81 T82 Q83

D84 L85 L86 K87 K88 I89 P90 K91 D92 V93 L94 E95 I96 Y97 S98 E99 L100 G101 G102 E103 I104 Y105 F106 T107 D108 I109 V112 E113 H114 K115 E116 L117 Q118 D119 L120 S121 E122 E123 E124 S127 M128 N129 S130 R131 G132 E133 K134 V135 P136 F137 A138 S139 R140 F141 V142 K145 K146

R147 E148 T149 P150 K151 L152 I153 I154 N455 K157 D158 Y159 A160 I161 E164 Q165 S166 K167 E168 V169 Y170 Y171 E172 I173 G174 K175 G176 I177 S178 L179 D180 I181 I182 S183 K184 D185 K186 S187 L188 D189 P190 E191 F192 L193 N194 L195 I196 K197 S198 L199 S200 D201 S205 S206 D207 L208 L209

F210 S211 Q212 K213 F214 K215 E216 K217 L218 E219 L220 N221 I225 D226 I227 N228 F229 I230 K231 E232 N233 L234 T235 E236 F237 Q238 H239 A240 F241 S242 L243 A244 F245 S246 F249 A250 P251 D252 H253 R254 T255 Y260 A261 P262 D263 M268 N269 K270 L271 E272 K273 G274 G275 K278 I279

S280 E281 S282 L283 K284 K285 E286 G287 V288 E289 K290 D291 R292 I293 D294 V295 L296 K297 G298 E299 K300 A301 L302 K303 A304 S305 G306 L307 V308 H311 A312 D313 A314 F315 I318 A319 R320 E321 L322 N323 T324 Y325 I326 L327 F328 R329 P330 V331 N332 K333 L334 A335 T336 N337 L338 I339 V343

A344 T345 N349 V350 H351 G352 K353 S354 S355 D356 W357 V360 P365 F366 D367 Q368 D369 L370 S371 K372 K373 H374 G375 Q376 Q377 L378 A379 V380 E381 G382 G383 N384 L385 E386 N387 S390 I391 E395 G396 E397 I398 G399 K400 I401 P402 L403 K404 L405 D406 H407 L408 R409 E412 L413

K414 E415 N416 I419 K423 K424 E425 I426 D427 K431 Y432 Y433 L434 L435 E436 S437 N438 N439 Q440 V441 Y442 E443 F444 R445 I446 S447 D448 E449 N450 N451 E452 V453 Q454 Y455 K456 T457 K458 K461 I462 T463 V464 L465 G466 E467 K468 N470 W471 R472 N473 I474 M477 A478 K479 N480

V481 E482 G483 V484 L485 K486 P487 L488 T489 A490 D491 Y492 L497 A498 P499 S500 L501 I504 K505 I508 P509 Q510 K511 E512 W513 D514 K515 V516 V517 N518 N521 S522 L523 E524 K525 Q526 K527 G528 V529 T530 N531 L532 L533 I534 K535 Y536 G537 R540 D543 S544 L549 S550 N551

W552 Q553 K554 Q555 M556 L557 D558 R559 L560 N561 E562 A563 V564 K565 Y566 T567 G568 Y569 V574 V575 T579 E580 Q581 D582 N583 E584 E585 F586 P587 D590 F594 I595 I596 N597 P598 E599 G600 E601 F602 I603 K606 N607 W608 E609 M610 T611 I615 E616 K617 N618 I619 T620 G621 K622

D623 Y624 Y627 F628 N629 R630 S631 Y632 I635 A636 P637 G638 N639 K640 I643 E644 W645 T646 N655 T656 I657 P658 T659 S660 A661 E662 F663 I664 K665 N666 L667 S668 S669 I670 R671 R672 S673 S674 N675 V676 G677 V678 Y679 K680 D681 S682 G683 D684 K685 D686 E687 F688 A689 K690 K691 E692

S693 V694 I697 A698 G699 Y700 L701 N706 N709 H710 I711 F712 S713 Q714 E715 K716 K717 R718 K719 I720 S721 I722 F723 R724 G725 I726 Q727 A728 Y729 I732 V735 L736 K737 S738 K739 Q740 I741 A742 P743 E744 Y745 K746 N747 Y748 F749 Q750 Y751 R755 I756 Q759 Q760 L761 L762

L763 L764 T765 H766 Q767 K768 S769 E772 F773 K774 L775 L776 Q779 L780 N781 E784 N785 E786 T787 D788 N789 V792 F793 Q794 K795 I796 I797 D798 GLU LYS

• Molecule 1: Calmodulin-sensitive adenylate cyclase

Chain C: 29%   54%   10%   • 5%

MET HIS HIS HIS HIS HIS HIS ALA ALA MET ASN GLU HIS TYR THR GLU SER ASP ILE LYS ARG ASN HIS LYS THR GLU LYS ASN LYS THR GLU LYS GLU LYS PHE LYS ASP SER ILE N64 N65 L66 V67 K68 T69 E70 F71 T72 N73 E74 T75 L76 D77 K78 I79 Q80 Q81 T82 Q83

• Molecule 1: Calmodulin-sensitive adenylate cyclase

Chain D:

• Molecule 1: Calmodulin-sensitive adenylate cyclase

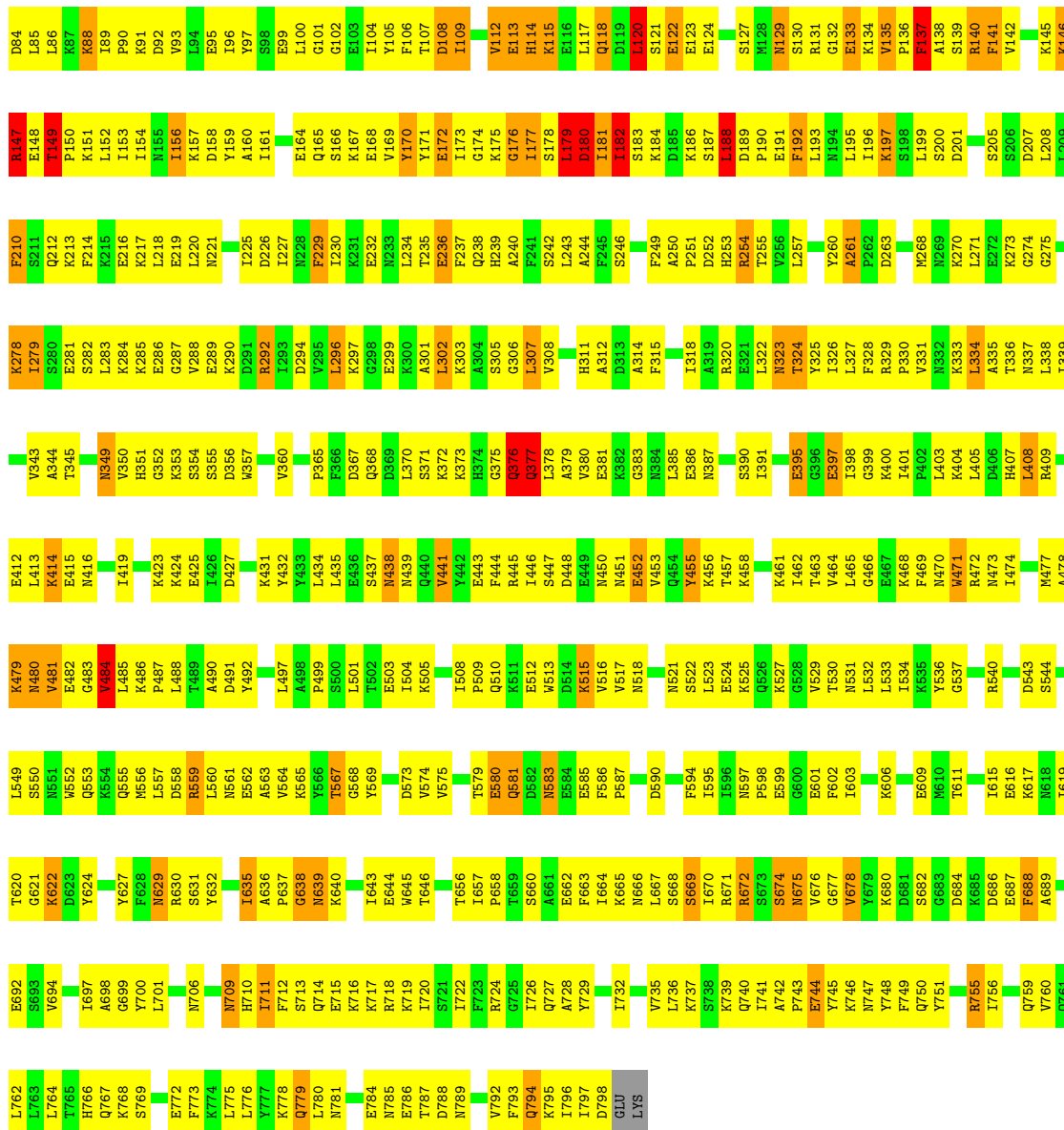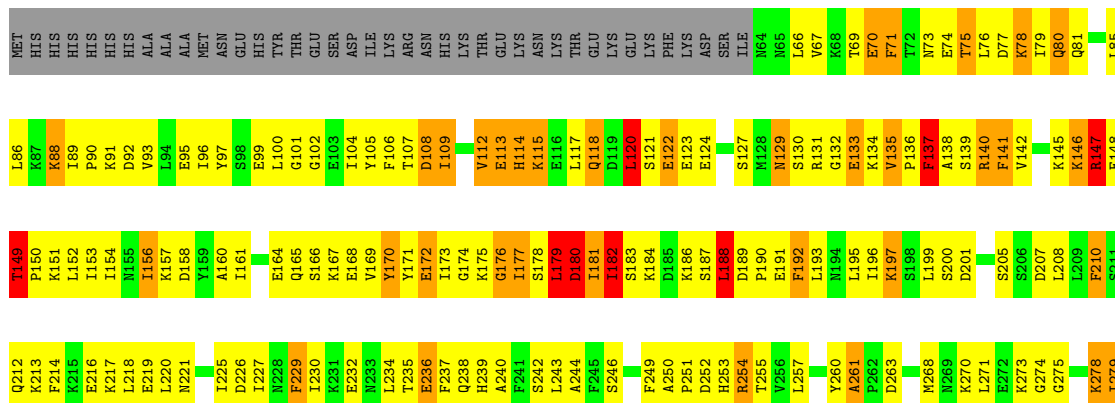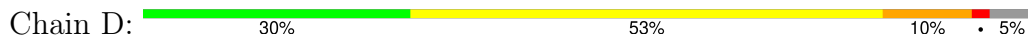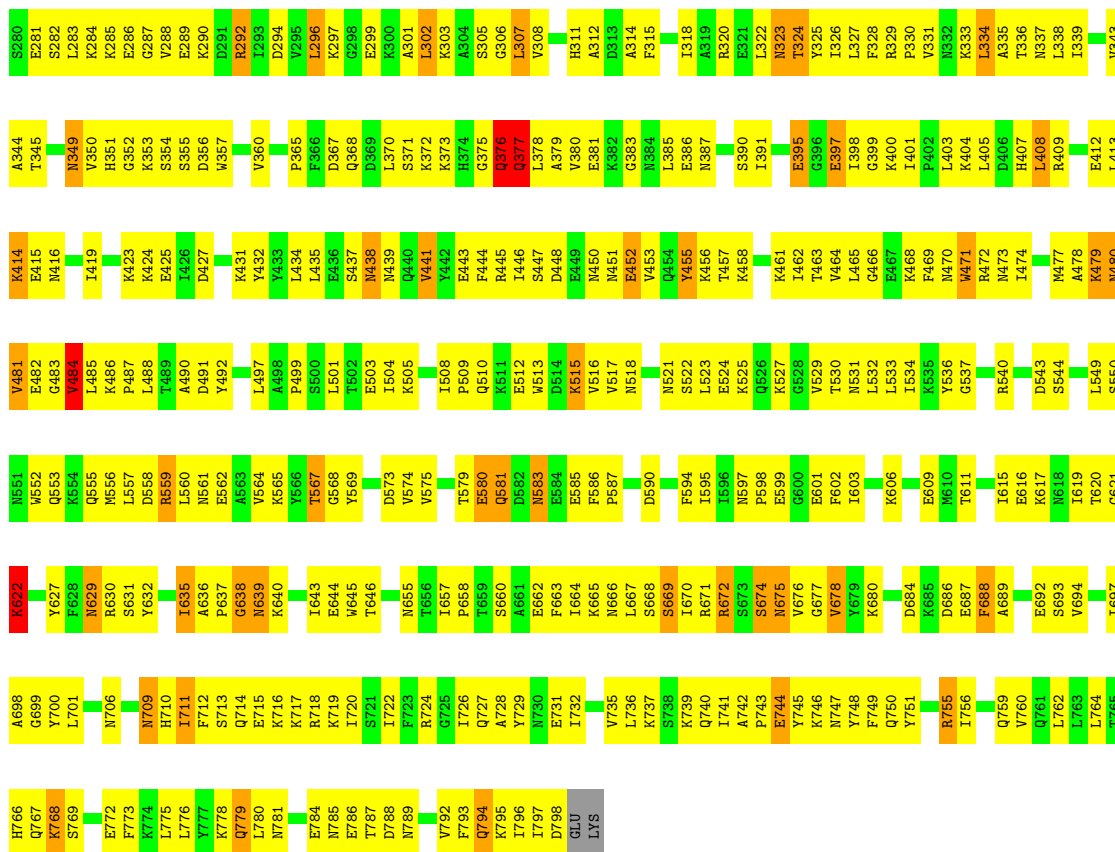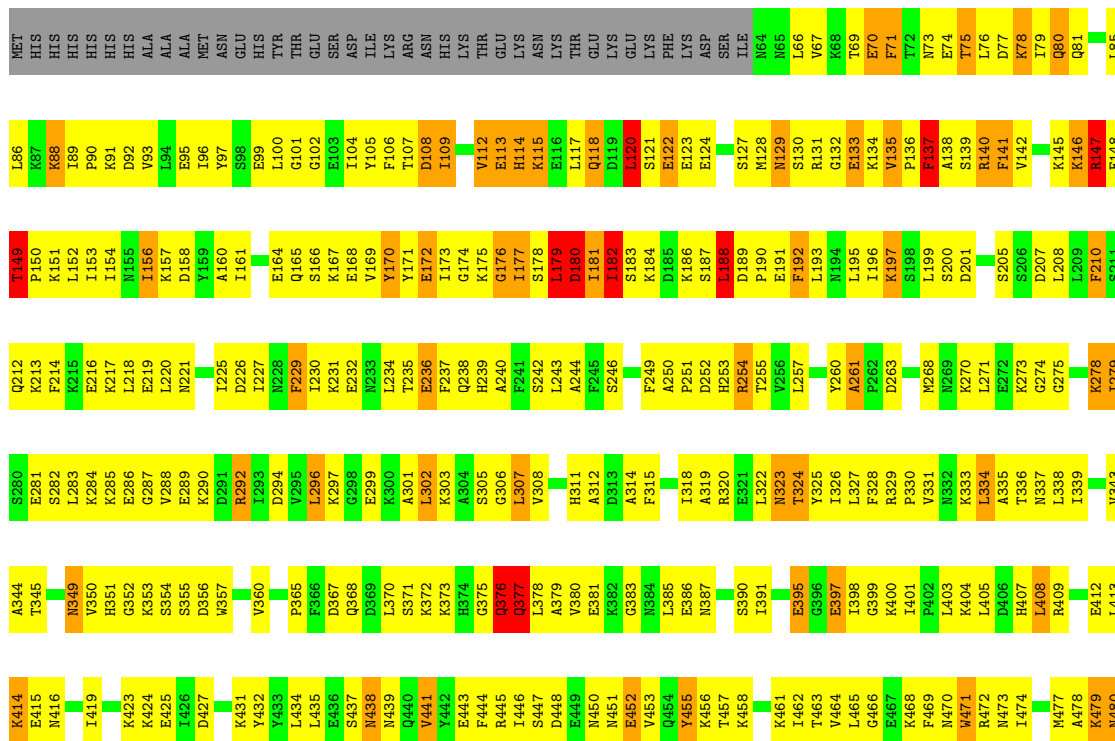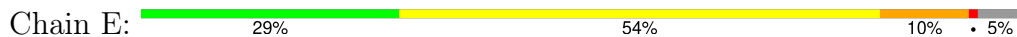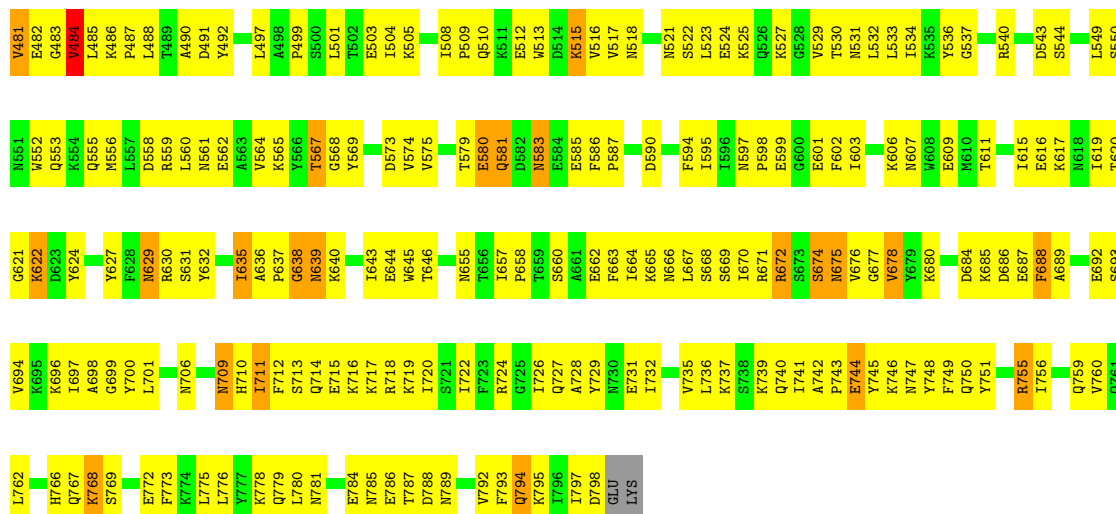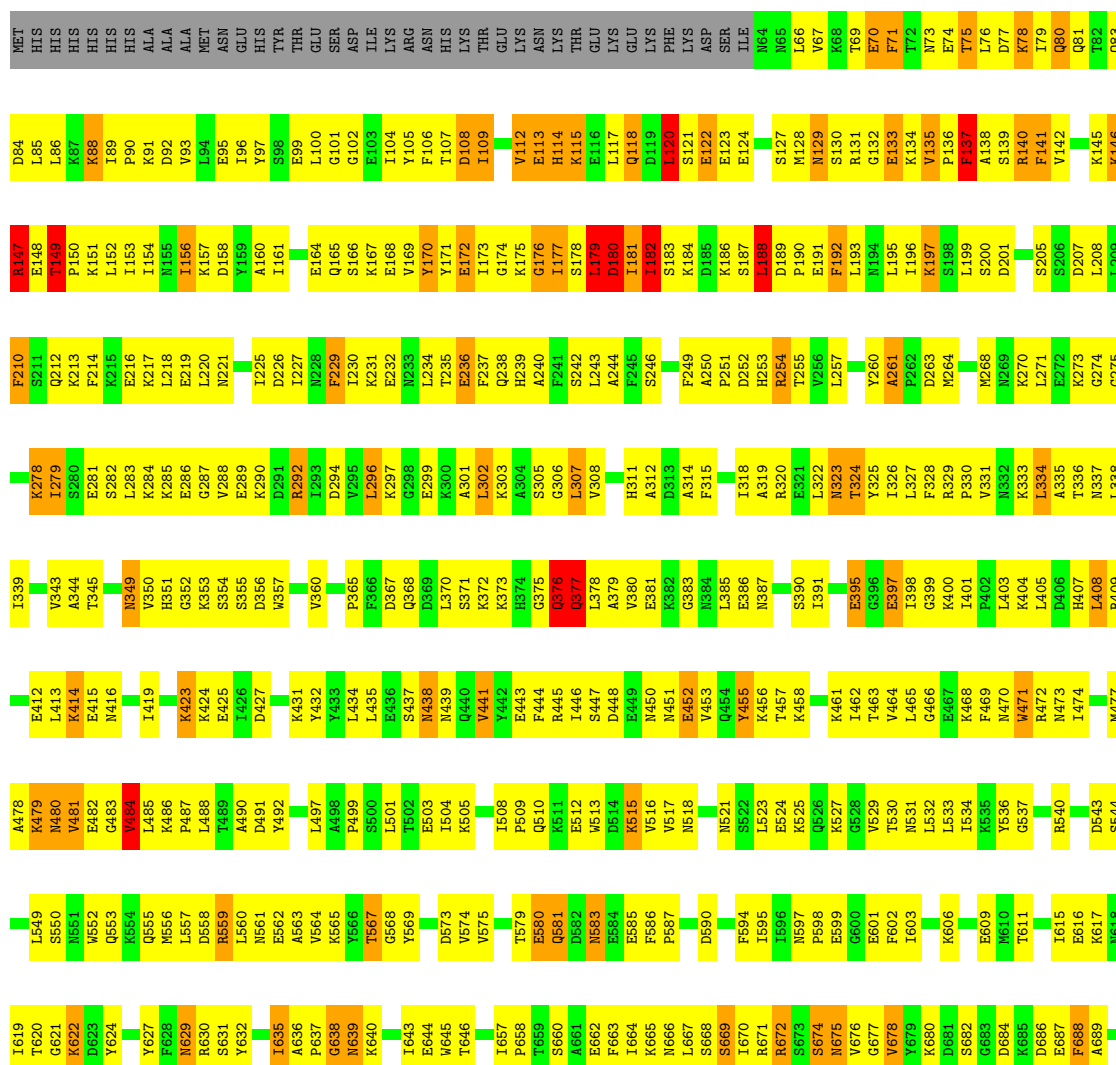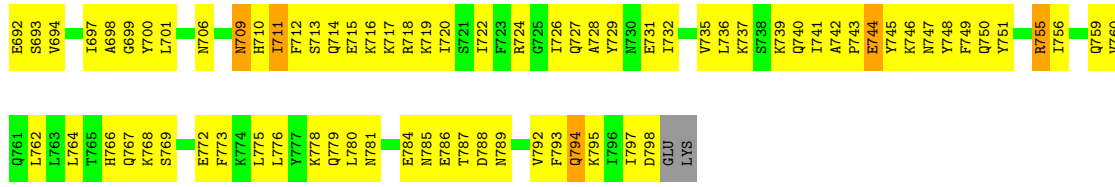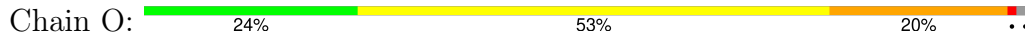Chain E:

• Molecule 1: Calmodulin-sensitive adenylate cyclase

Chain F:

E692 S693 V694 I697 A698 G699 Y700 L701 N706 N709 H710 I711 F712 S713 Q714 E715 K716 K717 R718 K719 I720 S721 I722 F723 R724 G725 I726 Q727 A728 Y729 N730 E731 I732 V735 L736 K737 S738 K739 Q740 I741 A742 P743 E744 Y745 K746 N747 Y748 F749 Q750 Y751 R755 I756 Q759 V760

Q761 L762 L763 L764 T765 H766 Q767 K768 S769 E772 F773 K774 L775 L776 Y777 K778 Q779 L780 N781 E784 N785 E786 T787 D788 N789 V792 F793 Q794 K795 I796 I797 D798 GLU LYS

• Molecule 2: Calmodulin 2

Chain O:

24%   53%   20%   ••

MSE ALA ASP Q3 L4 T5 E6 E7 Q8 I9 F12 K13 E14 A15 F16 S17 L18 F19 D20 K21 D22 G23 D24 G25 T26 I27 T28 T29 K30 E31 L32 V35 M36 R37 S38 L39 G40 Q41 N42 P43 T44 E45 A46 E47 L48 Q49 D50 M51 I52 N53 E54 V55 D56 A57 D58 G59 N60 G61

T62 I63 D64 F65 P66 E67 F68 L69 T70 M71 M72 A73 R74 K75 M76 K77 D78 T79 D80 S81 E82 E83 E87 A88 V91 F92 D93 K94 N97 G98 Y99 I100 S101 A102 A103 E104 L105 R106 M109 T110 N111 L112 G113 E114 K115 L116 T117 D118 E119 E120 V121 D122 Q123 M124 I125 R126

E127 A128 D129 I130 D133 G134 Q135 V136 N137 Y138 E139 E140 F141 V142 M145 T146 A147 K148

• Molecule 2: Calmodulin 2

Chain P:

25%   51%   20%   ••

MSE ALA ASP Q3 L4 T5 E6 E7 Q8 I9 F12 K13 E14 A15 F16 S17 L18 F19 D20 K21 D22 G23 D24 G25 T26 I27 T28 T29 K30 E31 L32 V35 M36 R37 Q41 N42 P43 T44 E45 A46 E47 L48 Q49 D50 M51 I52 N53 E54 V55 D56 A57 D58 G59 N60 G61 T62 I63

D64 F65 P66 E67 F68 L69 T70 M71 M72 A73 R74 K75 M76 K77 D78 T79 D80 S81 E82 E83 E87 A88 V91 F92 D93 K94 N97 G98 Y99 I100 S101 A102 A103 E104 L105 R106 M109 T110 N111 L112 G113 E114 K115 L116 T117 D118 E119 E120 V121 D122 Q123 M124 I125 R126 E127 A128

D129 I130 D133 G134 Q135 V136 N137 Y138 E139 E140 F141 V142 M145 T146 A147 K148

• Molecule 2: Calmodulin 2

Chain Q:

24%   53%   17%   ••

MSE ALA ASP Q3 L4 T5 E6 E7 Q8 I9 F12 K13 E14 A15 F16 S17 L18 F19 D20 K21 D22 G23 D24 G25 T26 I27 T28 T29 K30 E31 L32 V35 M36 R37 S38 L39 G40 Q41 N42 P43 T44 E45 A46 E47 L48 Q49 D50 M51 I52 N53 E54 V55 D56 A57 D58 G59 N60 G61

T62 I63 D64 F65 P66 E67 F68 L69 T70 M71 M72 A73 R74 K75 M76 K77 D78 T79 D80 S81 E82 E83 E87 A88 V91 F92 D93 K94 N97 G98 Y99 I100 S101 A102 A103 E104 L105 R106 M109 T110 N111 L112 G113 E114 K115 L116 T117 D118 E119 E120 V121 D122 Q123 M124 I125 R126

E127 A128 D129 I130 D133 G134 Q135 V136 N137 Y138 E139 E140 F141 V142 M145 T146 A147 K148

• Molecule 2: Calmodulin 2
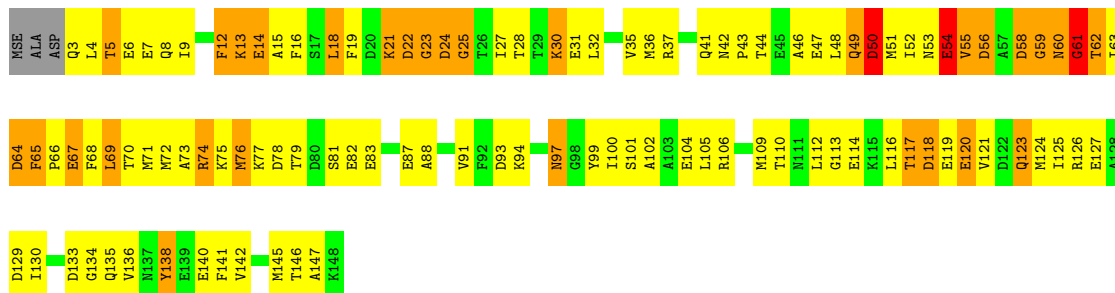
Chain R:

23%   54%   19%   ••
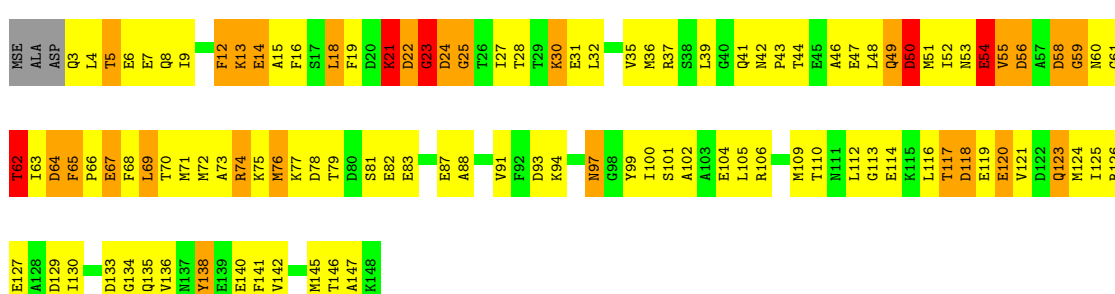
• Molecule 2: Calmodulin 2

Chain S:

• Molecule 2: Calmodulin 2

Chain T:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	318.30Å 183.76Å 141.52Å 90.00° 90.02° 90.00°	Depositor
Resolution (Å)	17.45 – 3.20 17.45 – 3.20	Depositor EDS
% Data completeness (in resolution range)	96.1 (17.45-3.20) 96.1 (17.45-3.20)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	0.03	Depositor
$< I/\sigma(I) >$ [1]	2.44 (at 3.21Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.262 , 0.278 0.251 , 0.266	Depositor DCC
R_{free} test set	6479 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	97.1	Xtriage
Anisotropy	0.049	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.23 , 82.1	EDS
L-test for twinning [2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.479 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.480 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.478 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.480 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.479 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	42858	wwPDB-VP
Average B, all atoms (Å^2)	87.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.64% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: CA, MG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	A	0.58	1/6104 (0.0%)	0.81	13/8208 (0.2%)
1	B	0.58	1/6104 (0.0%)	0.81	13/8208 (0.2%)
1	C	0.57	1/6104 (0.0%)	0.81	13/8208 (0.2%)
1	D	0.58	1/6104 (0.0%)	0.81	13/8208 (0.2%)
1	E	0.57	1/6104 (0.0%)	0.81	13/8208 (0.2%)
1	F	0.57	1/6104 (0.0%)	0.81	12/8208 (0.1%)
2	O	0.66	1/1149 (0.1%)	0.86	2/1526 (0.1%)
2	P	0.69	2/1149 (0.2%)	0.88	4/1526 (0.3%)
2	Q	0.64	1/1149 (0.1%)	0.86	4/1526 (0.3%)
2	R	0.66	1/1149 (0.1%)	0.86	4/1526 (0.3%)
2	S	0.65	1/1149 (0.1%)	0.86	3/1526 (0.2%)
2	T	0.67	2/1149 (0.2%)	0.86	3/1526 (0.2%)
All	All	0.59	14/43518 (0.0%)	0.82	97/58404 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
1	D	0	1
1	E	0	1
1	F	0	1
2	O	0	1
2	P	0	3
2	Q	0	3
2	R	0	3
2	S	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
2	T	0	3
All	All	0	22

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	P	61	GLY	C-O	7.82	1.36	1.23
2	S	62	THR	CB-CG2	6.71	1.74	1.52
2	R	62	THR	CB-CG2	6.62	1.74	1.52
2	T	62	THR	CB-CG2	6.50	1.73	1.52
2	O	62	THR	CB-CG2	6.42	1.73	1.52

The worst 5 of 97 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	188	LEU	N-CA-C	-11.99	78.63	111.00
1	F	188	LEU	N-CA-C	-11.96	78.71	111.00
1	A	188	LEU	N-CA-C	-11.95	78.73	111.00
1	C	188	LEU	N-CA-C	-11.95	78.75	111.00
1	D	188	LEU	N-CA-C	-11.94	78.75	111.00

There are no chirality outliers.

5 of 22 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	170	TYR	Sidechain
1	B	170	TYR	Sidechain
1	C	170	TYR	Sidechain
1	D	170	TYR	Sidechain
1	E	170	TYR	Sidechain

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5992	0	6010	720	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	5992	0	6010	721	1
1	C	5992	0	6010	724	1
1	D	5992	0	6010	718	0
1	E	5992	0	6010	708	0
1	F	5992	0	6010	715	1
2	O	1146	0	1071	180	0
2	P	1146	0	1071	182	0
2	Q	1146	0	1071	184	0
2	R	1146	0	1071	185	0
2	S	1146	0	1071	192	0
2	T	1146	0	1071	183	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	O	4	0	0	0	0
4	P	4	0	0	0	0
4	Q	4	0	0	0	0
4	R	4	0	0	0	0
4	S	4	0	0	0	0
4	T	4	0	0	0	0
All	All	42858	0	42486	5285	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 62.

The worst 5 of 5285 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:S:62:THR:CB	2:S:62:THR:CG2	1.74	1.60
1:B:179:LEU:O	1:B:183:SER:HB2	1.21	1.35
1:A:179:LEU:O	1:A:183:SER:HB2	1.21	1.35
1:E:179:LEU:O	1:E:183:SER:HB2	1.21	1.32
1:D:179:LEU:O	1:D:183:SER:HB2	1.20	1.32

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:682:SER:O	1:B:682:SER:O[2_555]	2.16	0.04
1:C:682:SER:O	1:F:682:SER:O[4_556]	2.18	0.02

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	733/777 (94%)	526 (72%)	161 (22%)	46 (6%)	1	8
1	B	733/777 (94%)	525 (72%)	159 (22%)	49 (7%)	1	7
1	C	733/777 (94%)	526 (72%)	159 (22%)	48 (6%)	1	8
1	D	733/777 (94%)	523 (71%)	162 (22%)	48 (6%)	1	8
1	E	733/777 (94%)	522 (71%)	164 (22%)	47 (6%)	1	8
1	F	733/777 (94%)	526 (72%)	158 (22%)	49 (7%)	1	7
2	O	144/149 (97%)	110 (76%)	21 (15%)	13 (9%)	0	3
2	P	144/149 (97%)	108 (75%)	22 (15%)	14 (10%)	0	3
2	Q	144/149 (97%)	109 (76%)	23 (16%)	12 (8%)	0	4
2	R	144/149 (97%)	108 (75%)	24 (17%)	12 (8%)	0	4
2	S	144/149 (97%)	109 (76%)	23 (16%)	12 (8%)	0	4
2	T	144/149 (97%)	110 (76%)	22 (15%)	12 (8%)	0	4
All	All	5262/5556 (95%)	3802 (72%)	1098 (21%)	362 (7%)	1	7

5 of 362 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	75	THR
1	A	80	GLN
1	A	135	VAL
1	A	137	PHE
1	A	180	ASP

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	664/705 (94%)	585 (88%)	79 (12%)	4	19
1	B	664/705 (94%)	585 (88%)	79 (12%)	4	19
1	C	664/705 (94%)	585 (88%)	79 (12%)	4	19
1	D	664/705 (94%)	584 (88%)	80 (12%)	4	19
1	E	664/705 (94%)	585 (88%)	79 (12%)	4	19
1	F	664/705 (94%)	585 (88%)	79 (12%)	4	19
2	O	123/117 (105%)	103 (84%)	20 (16%)	2	9
2	P	123/117 (105%)	104 (85%)	19 (15%)	2	11
2	Q	123/117 (105%)	103 (84%)	20 (16%)	2	9
2	R	123/117 (105%)	104 (85%)	19 (15%)	2	11
2	S	123/117 (105%)	103 (84%)	20 (16%)	2	9
2	T	123/117 (105%)	103 (84%)	20 (16%)	2	9
All	All	4722/4932 (96%)	4129 (87%)	593 (13%)	3	18

5 of 593 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	646	THR
2	T	5	THR
2	O	13	LYS
1	F	644	GLU
2	Q	49	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 229 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	387	ASN
2	R	49	GLN
1	E	165	GLN
2	Q	111	ASN

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Mol	Chain	Res	Type
1	F	655	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 30 ligands modelled in this entry, 30 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	735/777 (94%)	-1.39	0	100	100	34, 87, 140, 151	0
1	B	735/777 (94%)	-1.40	0	100	100	35, 87, 141, 153	0
1	C	735/777 (94%)	-1.41	0	100	100	34, 87, 141, 153	0
1	D	735/777 (94%)	-1.40	0	100	100	35, 87, 140, 152	0
1	E	735/777 (94%)	-1.41	0	100	100	34, 87, 140, 153	0
1	F	735/777 (94%)	-1.40	0	100	100	34, 87, 140, 153	0
2	O	137/149 (91%)	-1.49	0	100	100	27, 74, 124, 135	0
2	P	137/149 (91%)	-1.54	0	100	100	28, 74, 124, 135	0
2	Q	137/149 (91%)	-1.53	0	100	100	29, 74, 124, 135	0
2	R	137/149 (91%)	-1.50	0	100	100	28, 74, 125, 135	0
2	S	137/149 (91%)	-1.48	0	100	100	29, 74, 125, 135	0
2	T	137/149 (91%)	-1.52	0	100	100	29, 73, 124, 135	0
All	All	5232/5556 (94%)	-1.42	0	100	100	27, 83, 140, 153	0

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

WORLDWIDE
wwPDB
PROTEIN DATA BANK

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MG	E	904	1/1	0.98	0.03	23,23,23,23	0
4	CA	R	708	1/1	0.98	0.07	85,85,85,85	0
4	CA	S	710	1/1	0.98	0.06	87,87,87,87	0
4	CA	T	712	1/1	0.98	0.06	85,85,85,85	0
4	CA	O	702	1/1	0.99	0.02	84,84,84,84	0
4	CA	P	703	1/1	0.99	0.01	88,88,88,88	0
4	CA	P	803	1/1	0.99	0.02	36,36,36,36	0
4	CA	Q	705	1/1	0.99	0.02	86,86,86,86	0
4	CA	Q	706	1/1	0.99	0.03	84,84,84,84	0
4	CA	R	707	1/1	0.99	0.02	85,85,85,85	0
3	MG	B	901	1/1	0.99	0.02	28,28,28,28	0
4	CA	S	709	1/1	0.99	0.02	83,83,83,83	0
3	MG	F	905	1/1	0.99	0.03	22,22,22,22	0
4	CA	T	711	1/1	0.99	0.02	84,84,84,84	0
4	CA	O	701	1/1	0.99	0.03	83,83,83,83	0
4	CA	O	801	1/1	1.00	0.01	36,36,36,36	0
4	CA	Q	805	1/1	1.00	0.02	38,38,38,38	0
4	CA	Q	806	1/1	1.00	0.01	46,46,46,46	0
4	CA	O	802	1/1	1.00	0.01	44,44,44,44	0
3	MG	C	902	1/1	1.00	0.01	23,23,23,23	0
4	CA	R	807	1/1	1.00	0.01	38,38,38,38	0
4	CA	R	808	1/1	1.00	0.01	44,44,44,44	0
4	CA	P	704	1/1	1.00	0.02	82,82,82,82	0
3	MG	D	903	1/1	1.00	0.01	27,27,27,27	0
4	CA	S	809	1/1	1.00	0.01	37,37,37,37	0
4	CA	S	810	1/1	1.00	0.01	44,44,44,44	0
4	CA	P	804	1/1	1.00	0.02	46,46,46,46	0
3	MG	A	900	1/1	1.00	0.02	28,28,28,28	0
4	CA	T	811	1/1	1.00	0.01	43,43,43,43	0
4	CA	T	812	1/1	1.00	0.01	48,48,48,48	0

6.5 Other polymers ⓘ

There are no such residues in this entry.