



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 23, 2022 – 04:10 pm BST

PDB ID : 7Q83
Title : Crystal structure of *S. cerevisiae* Sso2 in complex with the pleckstrin homology domain of Sec3
Authors : Zhang, Y.; Dong, G.
Deposited on : 2021-11-09
Resolution : 2.19 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at <http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.30
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.30

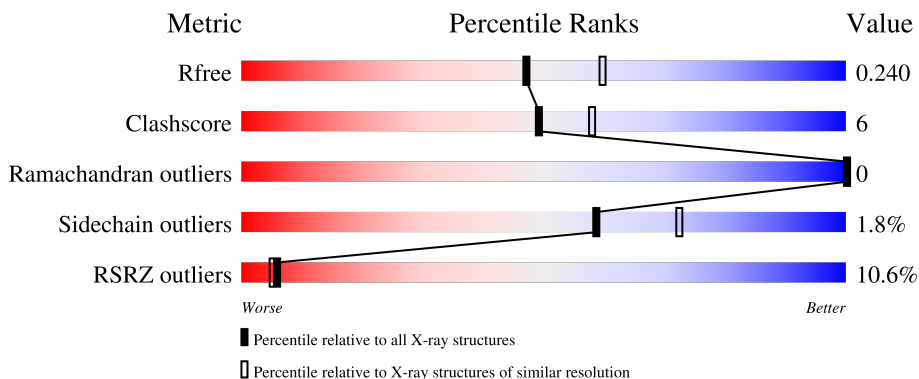
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.19 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 $\leq 5\%$. 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	250	 4% (poor fit), 61% (0 outliers), 8% (1 outlier), 30% (not modelled)
1	C	250	 4% (poor fit), 62% (0 outliers), 8% (1 outlier), 30% (not modelled)
2	B	274	 10% (poor fit), 47% (0 outliers), 8% (1 outlier), 45% (not modelled)
2	D	274	 8% (poor fit), 48% (0 outliers), 9% (1 outlier), 43% (not modelled)

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 5837 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 Exocyst complex component SEC3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	175	1451	925	254	269	3	0	0	0
1	C	175	1451	925	254	269	3	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	71	GLN	-	expression tag	UNP P33332
A	72	GLY	-	expression tag	UNP P33332
A	73	HIS	-	expression tag	UNP P33332
A	74	MET	-	expression tag	UNP P33332
C	71	GLN	-	expression tag	UNP P33332
C	72	GLY	-	expression tag	UNP P33332
C	73	HIS	-	expression tag	UNP P33332
C	74	MET	-	expression tag	UNP P33332

- Molecule 2 is a protein called Protein SSO2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	152	1249	770	218	256	5	0	0	0
2	D	156	1268	780	222	261	5	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	GLY	-	expression tag	UNP P39926
B	-2	SER	-	expression tag	UNP P39926
B	-1	HIS	-	expression tag	UNP P39926
B	0	MET	-	expression tag	UNP P39926

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Chain	Residue	Modelled	Actual	Comment	Reference
B	31	TYR	SER	conflict	UNP P39926
B	32	GLU	ASP	conflict	UNP P39926
D	-3	GLY	-	expression tag	UNP P39926
D	-2	SER	-	expression tag	UNP P39926
D	-1	HIS	-	expression tag	UNP P39926
D	0	MET	-	expression tag	UNP P39926
D	31	TYR	SER	conflict	UNP P39926
D	32	GLU	ASP	conflict	UNP P39926

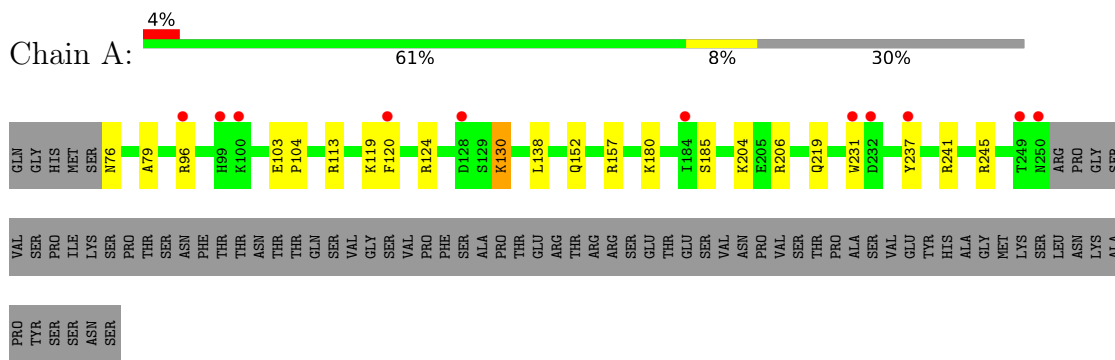
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	116	Total O 116 116	0	0
3	B	71	Total O 71 71	0	0
3	C	142	Total O 142 142	0	0
3	D	89	Total O 89 89	0	0

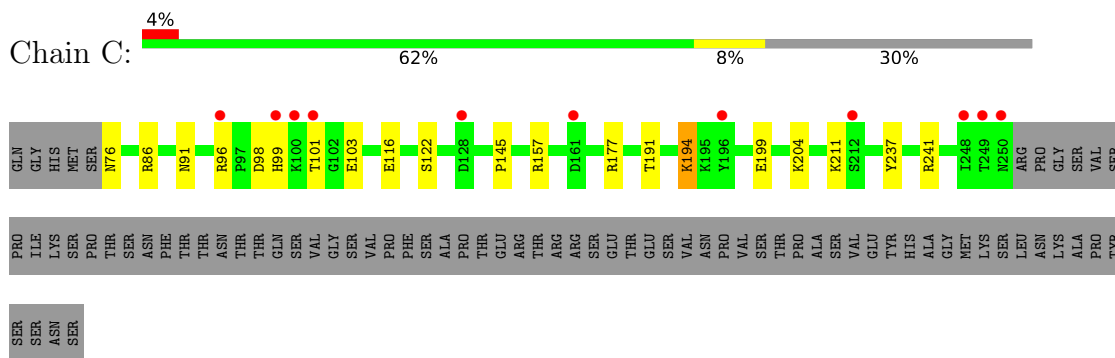
3 Residue-property plots

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 graphic 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.

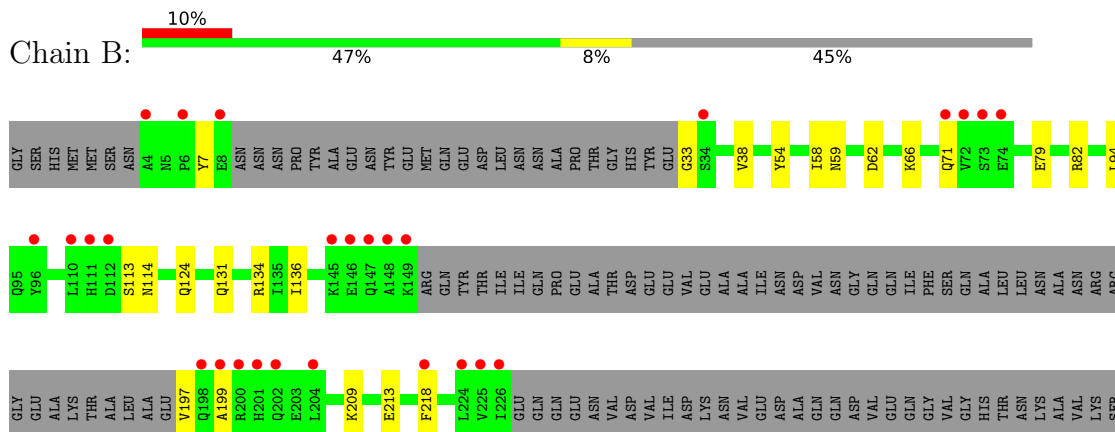
- Molecule 1: Exocyst complex component SEC3



- Molecule 1: Exocyst complex component SEC3



- Molecule 2: Protein SSO2



ALA
ARG
LYS
LYS
ALA
ARG
LYS
ASN
LYS
ILE
ARG
CYS

• Molecule 2: Protein SSO2



GLY	SER	HIS	MET	MET	SER	ASN	ALA	ASN	Y7	E8	H9	N10	A14	GLU	ASN	TYS	TYS	GLU	MET	GLN	GLU	ASP	LEU	ASN	ASN	ALA	LYS	PRO	THR	GLY	HIS	TYS	GLU	G33	S34	D35	R53	I57	I58	N59	Q60	H61	D62	A63	Q64	H65	K66	L69	T70	Q71	V72	S73	E74	E75	Q76	E77
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M78	R82	D93	L94	H111	D112	S113	M114	Q124	Q131	R134	I135	I136	Y140	S144	K145	E146	Q147	A148	LYS	ARG	GLN	PRO	THR	THR	GLY	THR	THR	ILE	ILE	ASP	GLN	PRO	PRO	GLU	ALA	THR	ASP	GLU	GLU	VAL	GLU	VAL	GLU	ALA	ALA	D62	GLU	VAL	GLU	GLN	GLY	VAL	HIS	THR	ASN	ASN	GLN	GLN	ALA	ILE	PHE	SER	GLN	ALA	LEU
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LEU	ASN	ALA	ASN	ARG	GLY	GLU	ALA	LYS	THR	ALA	LEU	ALA	E196	V197	Q198	A199	R200	H201	F218	I226	GLU	GLN	GLN	GLU	ASN	VAL	VAL	VAL	ILE	ILE	ASP	LYS	ASN	VAL	GLU	ASP	ALA	ALA	GLN	GLN	ASP	VAL	GLU	GLN	GLY	VAL	HIS	THR	ASN	LYS	ALA	VAL	LYS	SER	ALA	ARG	LYS
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ALA
ARG
LYS
ASN
LYS
ILE
ARG
CYS

4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	50.96Å 58.40Å 83.29Å 104.28° 98.49° 113.20°	Depositor
Resolution (Å)	19.95 – 2.19 45.19 – 2.19	Depositor EDS
% Data completeness (in resolution range)	96.2 (19.95-2.19) 96.2 (45.19-2.19)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.35 (at 2.20Å)	Xtrriage
Refinement program	PHENIX 1.19.1_4122+SVN, PHENIX 1.19.1_4122+SVN	Depositor
R, R_{free}	0.197 , 0.239 0.199 , 0.240	Depositor DCC
R_{free} test set	2011 reflections (4.95%)	wwPDB-VI
Wilson B-factor (Å ²)	31.2	Xtrriage
Anisotropy	0.026	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.016 for -h,-k,h+k+l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5837	wwPDB-VI
Average B, all atoms (Å ²)	40.0	wwPDB-VI

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.56% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.26	0/1484	0.51	0/2005
1	C	0.26	0/1484	0.50	0/2005
2	B	0.24	0/1260	0.40	0/1688
2	D	0.24	0/1279	0.44	1/1716 (0.1%)
All	All	0.25	0/5507	0.47	1/7414 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	6	PRO	N-CA-CB	5.88	110.35	103.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	1451	0	1453	19	0
1	C	1451	0	1453	17	0
2	B	1249	0	1215	15	0
2	D	1268	0	1216	17	0
3	A	116	0	0	7	0
3	B	71	0	0	5	1
3	C	142	0	0	7	1
3	D	89	0	0	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	5837	0	5337	63	1

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 6.

All (63) 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)
1:A:76:ASN:N	3:A:401:HOH:O	1.83	1.09
1:C:199:GLU:OE2	3:C:401:HOH:O	1.90	0.89
1:C:116:GLU:OE2	3:C:402:HOH:O	1.90	0.88
1:C:241:ARG:NH2	3:C:403:HOH:O	2.08	0.84
1:A:152:GLN:NE2	3:A:403:HOH:O	2.08	0.82
1:C:204:LYS:NZ	3:C:406:HOH:O	2.18	0.77
1:C:177:ARG:NH2	3:C:405:HOH:O	2.16	0.76
1:A:245:ARG:NH1	3:A:402:HOH:O	2.03	0.76
1:A:96:ARG:NH2	3:A:405:HOH:O	2.17	0.75
1:A:124:ARG:O	3:A:404:HOH:O	2.14	0.65
1:C:145:PRO:O	3:C:404:HOH:O	2.15	0.65
2:B:197:VAL:HG13	2:B:199:ALA:H	1.64	0.63
2:B:71:GLN:OE1	3:B:301:HOH:O	2.16	0.61
2:D:69:LEU:O	3:D:301:HOH:O	2.16	0.59
1:C:76:ASN:HA	3:C:508:HOH:O	2.03	0.58
1:C:98:ASP:OD1	1:C:99:HIS:N	2.35	0.58
2:B:131:GLN:OE1	2:B:134:ARG:NH1	2.33	0.58
2:D:124:GLN:NE2	3:D:306:HOH:O	2.31	0.58
1:A:219:GLN:HB2	3:B:304:HOH:O	2.04	0.56
1:C:211:LYS:NZ	1:C:237:TYR:OH	2.39	0.55
1:A:113:ARG:HG2	1:A:138:LEU:HD22	1.88	0.54
1:C:237:TYR:CD1	2:D:218:PHE:HZ	2.26	0.54
1:C:86:ARG:HH12	2:D:10:ASN:HB3	1.73	0.53
2:D:140:TYR:O	2:D:144:SER:OG	2.25	0.52
2:B:62:ASP:HB2	2:B:136:ILE:HD13	1.92	0.51
2:D:74:GLU:OE1	3:D:302:HOH:O	2.19	0.51
1:A:119:LYS:HD3	1:A:120:PHE:CZ	2.46	0.50
2:B:54:TYR:CZ	2:B:58:ILE:HD11	2.47	0.49
1:A:206:ARG:NE	3:A:408:HOH:O	2.28	0.49
1:C:237:TYR:HD1	2:D:218:PHE:HZ	1.60	0.48
2:D:82:ARG:HD2	3:D:303:HOH:O	2.13	0.48
2:D:131:GLN:OE1	2:D:134:ARG:NH1	2.44	0.48
1:A:245:ARG:NH2	3:A:416:HOH:O	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:57:ILE:HD12	2:D:94:LEU:HD12	1.97	0.47
2:B:124:GLN:NE2	3:B:308:HOH:O	2.44	0.47
2:B:62:ASP:OD2	2:B:66:LYS:NZ	2.45	0.47
2:B:79:GLU:HA	2:B:82:ARG:HH11	1.80	0.46
1:C:101:THR:HG22	1:C:103:GLU:H	1.79	0.46
1:C:98:ASP:HB3	1:C:101:THR:O	2.15	0.46
1:A:237:TYR:HD2	2:B:218:PHE:HZ	1.63	0.46
1:A:103:GLU:HG3	1:A:104:PRO:HD2	1.97	0.46
1:C:122:SER:OG	1:C:194:LYS:NZ	2.48	0.46
2:B:134:ARG:NH2	3:B:304:HOH:O	2.30	0.46
1:C:177:ARG:HB3	1:C:191:THR:HB	1.99	0.45
2:B:209:LYS:O	2:B:213:GLU:HG3	2.17	0.45
1:A:96:ARG:HD2	1:A:96:ARG:HA	1.72	0.44
2:D:60:GLN:O	2:D:64:GLN:HG3	2.18	0.44
2:D:76:GLN:NE2	3:D:305:HOH:O	2.30	0.44
1:A:180:LYS:HD3	1:A:231:TRP:CZ3	2.53	0.44
2:D:53:ARG:HD3	3:D:380:HOH:O	2.18	0.43
1:A:113:ARG:HG2	1:A:138:LEU:CD2	2.48	0.43
2:D:70:THR:HA	3:D:301:HOH:O	2.19	0.43
1:C:91:ASN:O	1:C:96:ARG:NH1	2.52	0.42
1:A:79:ALA:HB2	2:B:7:TYR:O	2.18	0.42
2:B:59:ASN:HA	3:B:350:HOH:O	2.20	0.42
2:D:66:LYS:O	2:D:70:THR:HG23	2.20	0.42
1:A:204:LYS:HE2	1:A:204:LYS:HB2	1.83	0.41
1:A:180:LYS:HD2	1:A:206:ARG:NH2	2.35	0.41
2:B:94:LEU:HD23	2:B:94:LEU:HA	1.81	0.41
1:A:130:LYS:HD2	1:A:130:LYS:HA	1.80	0.40
2:B:33:GLY:HA2	2:B:38:VAL:HG12	2.04	0.40
2:D:59:ASN:ND2	3:D:315:HOH:O	2.54	0.40
2:D:62:ASP:HB2	2:D:136:ILE:HD13	2.02	0.40

All (1) 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)
3:B:367:HOH:O	3:C:523:HOH:O[1_666]	2.17	0.03

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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	173/250 (69%)	168 (97%)	5 (3%)	0	100	100
1	C	173/250 (69%)	167 (96%)	6 (4%)	0	100	100
2	B	146/274 (53%)	144 (99%)	2 (1%)	0	100	100
2	D	150/274 (55%)	149 (99%)	1 (1%)	0	100	100
All	All	642/1048 (61%)	628 (98%)	14 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	163/230 (71%)	159 (98%)	4 (2%)	47	60
1	C	163/230 (71%)	161 (99%)	2 (1%)	71	83
2	B	138/240 (58%)	136 (99%)	2 (1%)	67	80
2	D	138/240 (58%)	135 (98%)	3 (2%)	52	65
All	All	602/940 (64%)	591 (98%)	11 (2%)	59	72

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	130	LYS
1	A	157	ARG

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Mol	Chain	Res	Type
1	A	185	SER
1	A	241	ARG
2	B	113	SER
2	B	114	ASN
1	C	157	ARG
1	C	194	LYS
2	D	93	ASP
2	D	111	HIS
2	D	198	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	106	ASN
1	A	152	GLN
1	A	171	GLN
2	B	114	ASN
1	C	146	ASN
2	D	59	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

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(Å ²)	Q<0.9
1	A	175/250 (70%)	0.60	11 (6%) 20 19	23, 35, 58, 86	0
1	C	175/250 (70%)	0.76	11 (6%) 20 19	21, 33, 53, 84	0
2	B	152/274 (55%)	1.13	27 (17%) 1 1	25, 41, 77, 107	0
2	D	156/274 (56%)	0.97	21 (13%) 3 2	25, 38, 86, 117	0
All	All	658/1048 (62%)	0.85	70 (10%) 6 5	21, 36, 73, 117	0

All (70) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	224	LEU	8.2
2	B	226	ILE	7.9
2	B	4	ALA	6.8
2	B	72	VAL	6.4
2	D	8	GLU	6.4
2	B	111	HIS	6.0
2	B	73	SER	6.0
2	D	72	VAL	5.1
2	D	73	SER	5.0
2	B	147	GLN	4.8
2	D	148	ALA	4.6
2	B	199	ALA	4.5
2	B	198	GLN	4.4
1	C	100	LYS	4.2
2	B	146	GLU	4.1
2	B	148	ALA	4.1
2	B	225	VAL	4.0
1	C	250	ASN	3.9
2	D	113	SER	3.6
2	D	114	ASN	3.6
2	D	200	ARG	3.6

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Mol	Chain	Res	Type	RSRZ
2	D	9	ASN	3.5
2	D	112	ASP	3.4
1	C	99	HIS	3.3
2	D	34	SER	3.3
2	B	74	GLU	3.3
2	D	146	GLU	3.3
2	B	201	HIS	3.3
2	D	198	GLN	3.2
2	B	112	ASP	3.2
1	A	250	ASN	3.2
2	B	96	TYR	3.2
2	D	197	VAL	3.1
2	D	201	HIS	3.1
2	D	35	ASP	2.9
2	B	71	GLN	2.9
1	A	249	THR	2.9
2	B	149	LYS	2.8
2	B	200	ARG	2.7
1	A	100	LYS	2.7
1	C	101	THR	2.6
1	C	249	THR	2.6
1	C	248	ILE	2.6
1	A	232	ASP	2.6
2	D	111	HIS	2.6
2	D	7	TYR	2.6
2	B	8	GLU	2.5
2	B	34	SER	2.5
2	B	110	LEU	2.5
1	A	184	ILE	2.4
2	B	204	LEU	2.4
1	A	99	HIS	2.4
2	D	136	ILE	2.4
2	D	74	GLU	2.4
1	A	120	PHE	2.3
2	D	33	GLY	2.3
1	C	196	TYR	2.2
2	B	145	LYS	2.2
1	A	231	TRP	2.2
1	C	161	ASP	2.2
1	C	96	ARG	2.1
2	B	218	PHE	2.1
2	D	78	MET	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	128	ASP	2.1
2	B	202	GLN	2.1
1	A	96	ARG	2.0
1	A	128	ASP	2.0
2	B	6	PRO	2.0
1	A	237	TYR	2.0
1	C	212	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.