



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 06:25 PM GMT

PDB ID : 1AQC
Title : X11 PTB DOMAIN-10MER PEPTIDE COMPLEX
Authors : Lee, C.-H.; Zhang, Z.; Kuriyan, J.
Deposited on : 1997-07-28
Resolution : 2.30 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

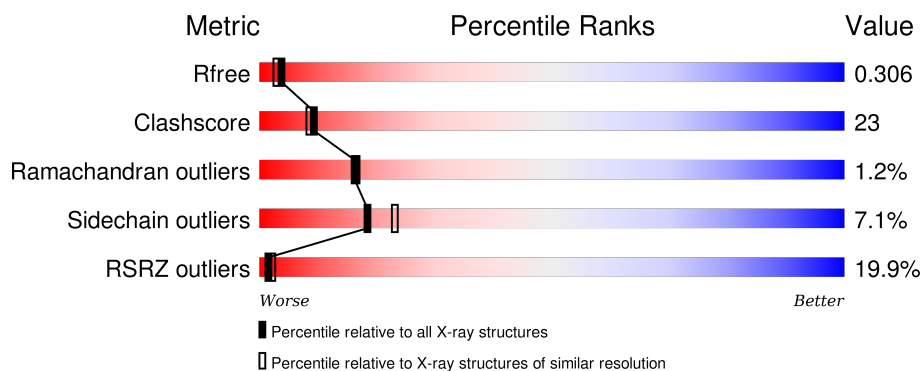
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	91344	3852 (2.30-2.30)
Clashscore	102246	4452 (2.30-2.30)
Ramachandran outliers	100387	4410 (2.30-2.30)
Sidechain outliers	100360	4409 (2.30-2.30)
RSRZ outliers	91569	3857 (2.30-2.30)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	172	<div> <div>16%</div> <div>41%</div> <div>32%</div> <div>•</div> <div>24%</div> </div>
1	B	172	<div> <div>13%</div> <div>38%</div> <div>30%</div> <div>••</div> <div>29%</div> </div>
2	C	10	<div> <div>10%</div> <div>60%</div> <div>20%</div> <div>20%</div> </div>
2	D	10	<div> <div>10%</div> <div>70%</div> <div>30%</div> </div>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2351 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 X11.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	130	Total	C	N	O	S	Se	0	0	0
			1016	642	174	190	1	9			
1	B	122	Total	C	N	O	S	Se	0	0	0
			944	599	166	171	1	7			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	354	MSE	MET	CONFLICT	UNP Q02410
A	355	MSE	MET	CONFLICT	UNP Q02410
A	366	MSE	MET	CONFLICT	UNP Q02410
A	385	MSE	MET	CONFLICT	UNP Q02410
A	408	MSE	MET	CONFLICT	UNP Q02410
A	409	MSE	MET	CONFLICT	UNP Q02410
A	429	MSE	MET	CONFLICT	UNP Q02410
A	458	MSE	MET	CONFLICT	UNP Q02410
B	354	MSE	MET	CONFLICT	UNP Q02410
B	355	MSE	MET	CONFLICT	UNP Q02410
B	366	MSE	MET	CONFLICT	UNP Q02410
B	385	MSE	MET	CONFLICT	UNP Q02410
B	408	MSE	MET	CONFLICT	UNP Q02410
B	409	MSE	MET	CONFLICT	UNP Q02410
B	429	MSE	MET	CONFLICT	UNP Q02410
B	458	MSE	MET	CONFLICT	UNP Q02410

- Molecule 2 is a protein called PEPTIDE.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	10	Total	C	N	O	0	0	0
			90	62	12	16			
2	D	10	Total	C	N	O	0	0	0
			86	59	11	16			

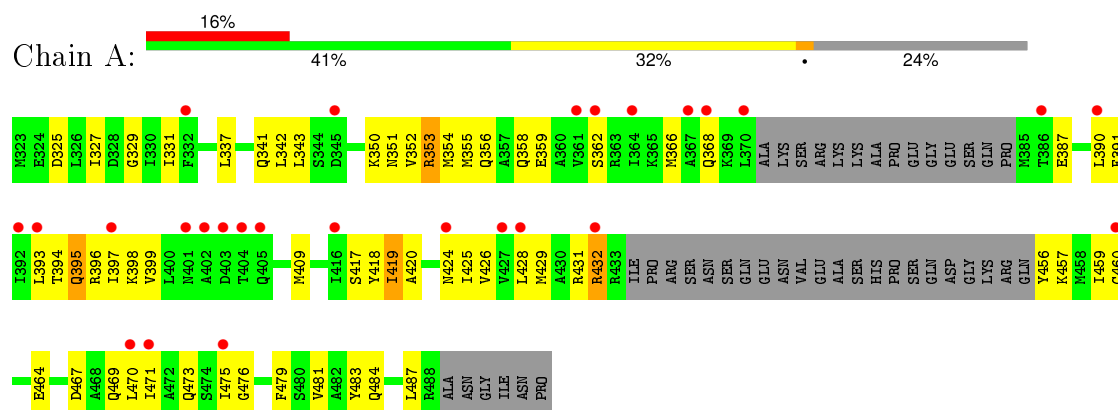
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	102	Total 102	O 102	0	0
3	B	92	Total 92	O 92	0	0
3	C	4	Total 4	O 4	0	0
3	D	17	Total 17	O 17	0	0

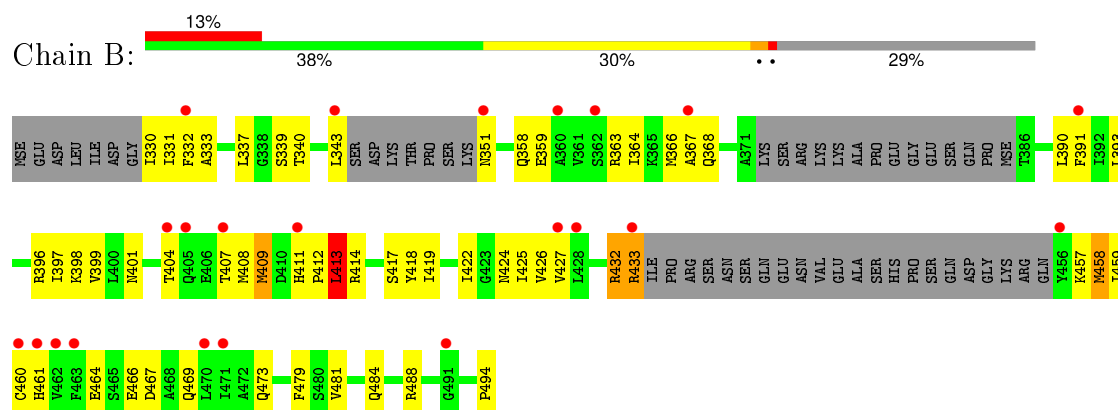
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

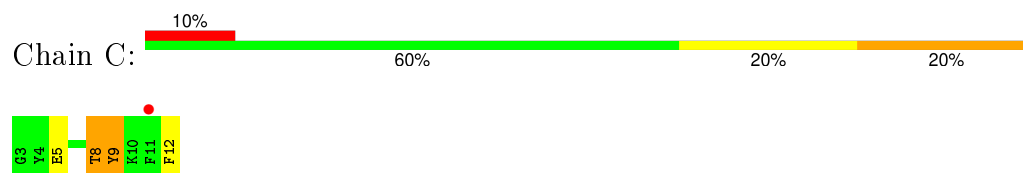
• Molecule 1: X11



• Molecule 1: X11



• Molecule 2: PEPTIDE



• Molecule 2: PEPTIDE





4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	74.40 Å 74.40 Å 157.10 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	6.00 – 2.30 28.08 – 2.30	Depositor EDS
% Data completeness (in resolution range)	69.0 (6.00-2.30) 90.9 (28.08-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.92 (at 2.31 Å)	Xtriage
Refinement program	X-PLOR 3.8	Depositor
R, R_{free}	0.210 , 0.303 0.222 , 0.306	Depositor DCC
R_{free} test set	1285 reflections (6.94%)	DCC
Wilson B-factor (Å ²)	37.1	Xtriage
Anisotropy	0.109	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 60.9	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 18523 reflections	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	2351	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.13% 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, 0.375 respectively for untwinned datasets, and 0.333, 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	0.66	0/1019	0.78	0/1358
1	B	0.67	1/944 (0.1%)	0.77	1/1256 (0.1%)
2	C	0.65	0/94	0.74	0/126
2	D	0.67	0/90	0.59	0/122
All	All	0.67	1/2147 (0.0%)	0.77	1/2862 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	458	MSE	CG-SE	-5.15	1.77	1.95

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	494	PRO	N-CA-CB	5.09	109.41	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	1016	0	1020	50	0
1	B	944	0	959	50	0
2	C	90	0	77	4	0
2	D	86	0	66	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	102	0	0	5	0
3	B	92	0	0	9	0
3	C	4	0	0	0	0
3	D	17	0	0	0	0
All	All	2351	0	2122	97	0

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 23.

All (97) 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:B:359:GLU:O	1:B:363:ARG:HG2	1.83	0.78
1:B:391:PHE:CZ	1:B:393:LEU:HD22	2.22	0.74
2:C:8:THR:HG22	2:C:12:PHE:HE2	1.55	0.72
1:B:391:PHE:HZ	1:B:393:LEU:HD22	1.54	0.71
1:A:393:LEU:HG	1:A:395:GLN:H	1.56	0.69
1:B:399:VAL:HG11	1:B:409:MSE:HE3	1.75	0.68
1:A:391:PHE:HB3	1:A:398:LYS:HB2	1.78	0.65
1:B:396:ARG:O	1:B:397:ILE:HD13	1.96	0.65
1:A:354:MSE:O	1:A:358:GLN:HG3	1.98	0.63
1:B:399:VAL:HB	1:B:409:MSE:HG2	1.81	0.62
1:A:399:VAL:HB	1:A:409:MSE:HB2	1.82	0.62
1:A:353:ARG:HG2	1:A:418:TYR:CD1	2.35	0.61
1:B:390:LEU:N	1:B:390:LEU:HD12	2.14	0.61
1:A:352:VAL:O	1:A:356:GLN:HG3	1.99	0.61
1:B:368:GLN:HG2	3:B:31:HOH:O	1.99	0.61
1:B:408:MSE:SE	1:B:409:MSE:HE2	2.51	0.60
1:A:366:MSE:HE1	1:B:333:ALA:HB2	1.83	0.60
1:A:393:LEU:HD23	1:A:396:ARG:O	2.00	0.60
1:B:466:GLU:HG3	3:B:114:HOH:O	2.03	0.58
1:B:419:ILE:HD12	1:B:427:VAL:O	2.04	0.58
1:A:397:ILE:HG21	1:A:428:LEU:HD21	1.86	0.58
1:A:431:ARG:O	1:A:432:ARG:HB2	2.03	0.57
2:C:8:THR:HG22	2:C:12:PHE:CE2	2.36	0.56
1:A:394:THR:HG21	1:A:481:VAL:HG11	1.86	0.56
1:A:393:LEU:HD21	1:A:396:ARG:HG2	1.87	0.56
1:A:362:SER:OG	1:B:330:ILE:HG23	2.04	0.56
1:A:483:TYR:O	1:A:487:LEU:HG	2.05	0.56
1:A:329:GLY:HA2	1:A:393:LEU:HB3	1.88	0.56
1:A:456:TYR:N	3:A:190:HOH:O	2.39	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:343:LEU:HA	1:A:456:TYR:O	2.07	0.55
1:B:457:LYS:HB2	3:B:178:HOH:O	2.08	0.54
1:A:419:ILE:HD13	1:A:420:ALA:N	2.22	0.54
1:B:364:ILE:O	1:B:367:ALA:HB3	2.08	0.54
1:A:419:ILE:HG13	1:A:475:ILE:HD12	1.91	0.53
1:A:459:ILE:HD12	1:A:459:ILE:N	2.23	0.53
1:B:432:ARG:HD2	1:B:457:LYS:HB3	1.91	0.53
1:A:354:MSE:HG3	3:A:108:HOH:O	2.08	0.53
1:B:417:SER:HB3	2:D:9:TYR:CG	2.44	0.53
1:B:467:ASP:HB2	3:B:149:HOH:O	2.09	0.53
1:B:433:ARG:HH11	1:B:459:ILE:HG21	1.74	0.53
1:B:484:GLN:O	1:B:488:ARG:HG2	2.09	0.52
1:B:401:ASN:HB3	1:B:404:THR:OG1	2.10	0.52
1:B:433:ARG:NH1	1:B:459:ILE:HG21	2.24	0.51
1:B:469:GLN:HB2	3:B:51:HOH:O	2.10	0.51
1:B:473:GLN:NE2	3:B:54:HOH:O	2.42	0.51
1:A:469:GLN:O	1:A:473:GLN:HG2	2.11	0.50
1:B:408:MSE:SE	1:B:409:MSE:CE	3.10	0.50
1:A:337:LEU:HD11	1:A:464:GLU:HB2	1.93	0.50
1:B:433:ARG:NH1	1:B:459:ILE:HD13	2.28	0.49
1:A:355:MSE:SE	1:B:481:VAL:HG21	2.62	0.49
1:B:340:THR:HG23	1:B:364:ILE:CD1	2.43	0.48
1:A:417:SER:HB3	2:C:9:TYR:CD2	2.48	0.48
1:A:337:LEU:HD22	1:A:368:GLN:HE22	1.79	0.48
1:A:353:ARG:HH21	1:A:429:MSE:SE	2.47	0.48
1:A:419:ILE:HD11	1:A:426:VAL:HG13	1.96	0.47
1:B:433:ARG:HH22	1:B:461:HIS:CE1	2.32	0.47
1:B:339:SER:HA	1:B:460:CYS:O	2.15	0.47
1:A:350:LYS:HG3	1:A:351:ASN:N	2.30	0.46
1:A:431:ARG:HG2	1:A:432:ARG:N	2.31	0.45
1:B:432:ARG:N	1:B:457:LYS:O	2.50	0.45
1:B:351:ASN:N	3:B:19:HOH:O	2.48	0.45
1:A:342:LEU:CD2	1:A:460:CYS:SG	3.05	0.45
1:B:408:MSE:CG	1:B:409:MSE:HE2	2.46	0.44
1:A:418:TYR:CE2	1:A:420:ALA:HB2	2.52	0.44
1:A:342:LEU:HD21	1:A:460:CYS:SG	2.58	0.44
1:A:387:GLU:HB3	3:A:57:HOH:O	2.17	0.44
1:B:391:PHE:CE1	1:B:393:LEU:HB2	2.53	0.44
1:A:419:ILE:HG13	1:A:475:ILE:CD1	2.47	0.44
1:B:414:ARG:HG2	3:B:8:HOH:O	2.17	0.44
1:A:325:ASP:OD1	1:A:327:ILE:HB	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:476:GLY:O	1:A:479:PHE:HB2	2.17	0.43
1:A:398:LYS:HA	1:A:409:MSE:O	2.19	0.43
1:A:353:ARG:HG2	1:A:418:TYR:CG	2.54	0.43
1:B:331:ILE:HA	1:B:390:LEU:O	2.18	0.43
1:B:337:LEU:HD11	1:B:464:GLU:HB2	2.01	0.42
1:A:353:ARG:NH2	1:A:429:MSE:SE	3.03	0.42
1:A:359:GLU:HA	1:B:330:ILE:HG12	2.01	0.42
1:B:413:LEU:HD11	1:B:479:PHE:HD1	1.84	0.42
1:A:424:ASN:ND2	3:A:13:HOH:O	2.51	0.42
1:A:362:SER:OG	1:B:332:PHE:CZ	2.69	0.42
1:B:393:LEU:HD12	3:B:39:HOH:O	2.20	0.42
1:B:399:VAL:CG1	1:B:409:MSE:HE3	2.46	0.42
1:A:331:ILE:HA	1:A:390:LEU:O	2.19	0.41
1:B:425:ILE:HG22	1:B:426:VAL:N	2.34	0.41
1:B:418:TYR:OH	2:D:3:GLY:HA3	2.20	0.41
1:B:479:PHE:CE2	2:D:6:ASN:HB2	2.56	0.41
1:A:353:ARG:HD3	2:C:5:GLU:OE1	2.19	0.41
1:A:342:LEU:O	1:A:457:LYS:HA	2.21	0.41
1:B:408:MSE:HB3	1:B:409:MSE:HE2	2.03	0.41
1:A:467:ASP:O	1:A:471:ILE:HG13	2.21	0.41
1:B:396:ARG:HA	1:B:413:LEU:H	1.85	0.41
1:A:425:ILE:HD11	3:A:212:HOH:O	2.21	0.41
1:A:390:LEU:HD12	1:A:471:ILE:HD13	2.03	0.40
1:B:398:LYS:HE2	1:B:407:THR:OG1	2.22	0.40
1:B:411:HIS:HA	1:B:412:PRO:HD3	1.92	0.40
1:B:391:PHE:CE1	1:B:393:LEU:HD22	2.56	0.40
1:A:341:GLN:OE1	1:A:457:LYS:HE2	2.22	0.40

There are no symmetry-related clashes.

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	124/172 (72%)	118 (95%)	5 (4%)	1 (1%)	24	27
1	B	114/172 (66%)	106 (93%)	6 (5%)	2 (2%)	11	9
2	C	8/10 (80%)	6 (75%)	2 (25%)	0	100	100
2	D	8/10 (80%)	8 (100%)	0	0	100	100
All	All	254/364 (70%)	238 (94%)	13 (5%)	3 (1%)	16	16

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	432	ARG
1	B	413	LEU
1	B	432	ARG

5.3.2 Protein sidechains ⓘ

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	109/140 (78%)	104 (95%)	5 (5%)	33	44
1	B	99/140 (71%)	90 (91%)	9 (9%)	12	13
2	C	9/9 (100%)	7 (78%)	2 (22%)	1	1
2	D	8/9 (89%)	8 (100%)	0	100	100
All	All	225/298 (76%)	209 (93%)	16 (7%)	18	23

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	353	ARG
1	A	395	GLN
1	A	419	ILE
1	A	470	LEU
1	A	484	GLN
2	C	8	THR
2	C	9	TYR
1	B	343	LEU

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Mol	Chain	Res	Type
1	B	358	GLN
1	B	366	MSE
1	B	409	MSE
1	B	413	LEU
1	B	422	ILE
1	B	424	ASN
1	B	433	ARG
1	B	458	MSE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	335	ASN
1	A	368	GLN
1	A	395	GLN
1	A	424	ASN
1	A	469	GLN
1	A	477	GLN
1	B	351	ASN
1	B	473	GLN

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 carbohydrates 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	121/172 (70%)	1.11	27 (22%)  	16, 32, 56, 69	0
1	B	115/172 (66%)	1.19	22 (19%)  	20, 35, 53, 74	0
2	C	10/10 (100%)	0.84	1 (10%)  	23, 30, 48, 53	0
2	D	10/10 (100%)	0.70	1 (10%)  	23, 35, 51, 53	0
All	All	256/364 (70%)	1.12	51 (19%)  	16, 33, 55, 74	0

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	370	LEU	6.8
1	A	403	ASP	6.5
1	B	460	CYS	4.4
1	A	386	THR	4.4
1	A	404	THR	3.7
1	A	390	LEU	3.6
1	A	397	ILE	3.6
1	B	343	LEU	3.5
1	A	402	ALA	3.4
1	A	392	ILE	3.4
2	C	11	PHE	3.4
1	A	362	SER	3.4
1	B	391	PHE	3.3
1	B	427	VAL	3.3
1	B	462	VAL	3.2
1	A	332	PHE	3.1
1	B	456	TYR	3.1
1	B	428	LEU	3.0
1	B	433	ARG	2.9
1	B	405	GLN	2.8
1	A	471	ILE	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	368	GLN	2.7
1	B	404	THR	2.7
1	A	427	VAL	2.7
1	A	460	CYS	2.7
1	A	432	ARG	2.7
1	B	471	ILE	2.6
1	A	428	LEU	2.5
1	A	361	VAL	2.5
1	B	463	PHE	2.5
1	A	405	GLN	2.5
1	B	470	LEU	2.5
1	A	401	ASN	2.5
1	B	491	GLY	2.4
1	A	345	ASP	2.3
1	A	424	ASN	2.3
1	B	351	ASN	2.3
1	A	393	LEU	2.3
1	B	360	ALA	2.2
1	A	416	ILE	2.2
1	A	367	ALA	2.2
1	B	411	HIS	2.1
1	B	407	THR	2.1
1	A	364	ILE	2.1
1	A	470	LEU	2.1
1	B	362	SER	2.1
1	B	367	ALA	2.1
1	A	475	ILE	2.1
1	B	461	HIS	2.0
1	B	332	PHE	2.0
2	D	12	PHE	2.0

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 carbohydrates 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.