



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 14, 2023 – 02:19 AM JST

PDB ID : 5YVG
Title : Crystal structure of Karyopherin beta2 in complex with FUS(full length)
Authors : Yoshizawa, T.; Fung, H.Y.J.; Chook, Y.M.
Deposited on : 2017-11-25
Resolution : 4.05 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 : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

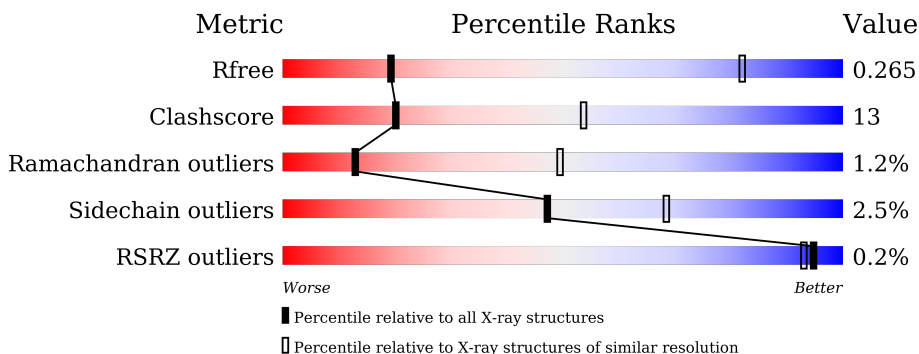
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.05 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	1127 (4.42-3.70)
Clashscore	141614	1033 (4.40-3.72)
Ramachandran outliers	138981	1145 (4.42-3.70)
Sidechain outliers	138945	1133 (4.42-3.70)
RSRZ outliers	127900	1005 (4.44-3.68)

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	868	
1	B	868	
2	X	528	
2	Y	528	

2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 12966 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 Transportin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	830	Total 6620	C 4248	N 1100	O 1220	S 52	0	0	0
1	B	764	Total 6057	C 3904	N 1001	O 1104	S 48	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP Q92973
A	0	SER	-	expression tag	UNP Q92973
A	361	GLY	-	linker	UNP Q92973
A	362	GLY	-	linker	UNP Q92973
A	363	SER	-	linker	UNP Q92973
A	364	GLY	-	linker	UNP Q92973
A	365	GLY	-	linker	UNP Q92973
A	366	SER	-	linker	UNP Q92973
A	367	GLY	-	linker	UNP Q92973
B	-1	GLY	-	expression tag	UNP Q92973
B	0	SER	-	expression tag	UNP Q92973
B	361	GLY	-	linker	UNP Q92973
B	362	GLY	-	linker	UNP Q92973
B	363	SER	-	linker	UNP Q92973
B	364	GLY	-	linker	UNP Q92973
B	365	GLY	-	linker	UNP Q92973
B	366	SER	-	linker	UNP Q92973
B	367	GLY	-	linker	UNP Q92973

- Molecule 2 is a protein called RNA-binding protein FUS.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	X	18	Total 159	C 91	N 37	O 30	S 1	0	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	Y	14	130	74	32	24	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

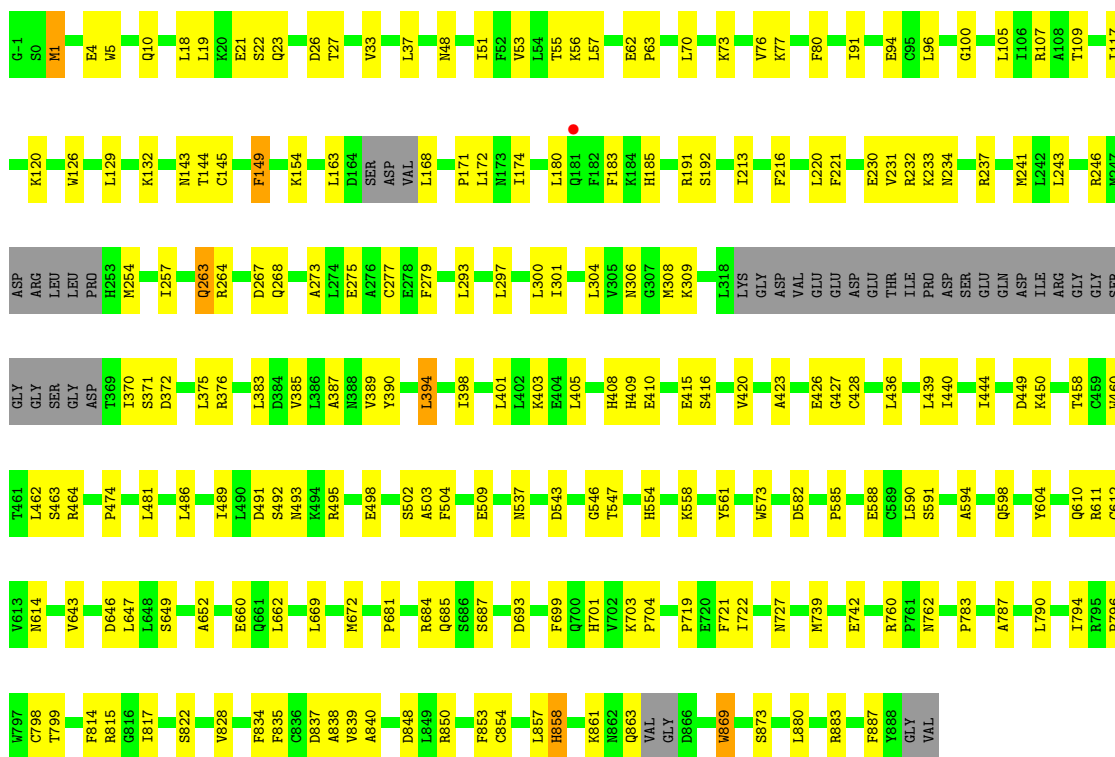
Chain	Residue	Modelled	Actual	Comment	Reference
X	-1	GLY	-	expression tag	UNP P35637
X	0	SER	-	expression tag	UNP P35637
Y	-1	GLY	-	expression tag	UNP P35637
Y	0	SER	-	expression tag	UNP P35637

3 Residue-property plots i

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.

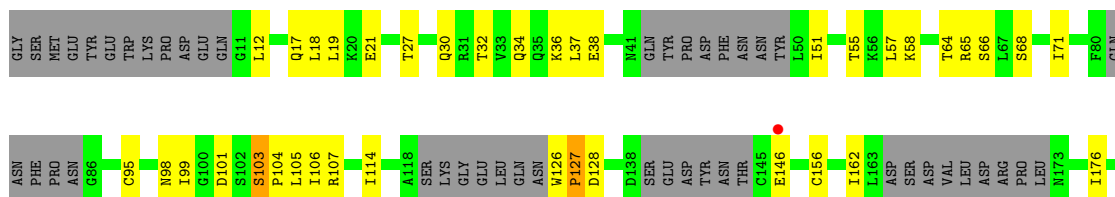
• Molecule 1: Transportin-1

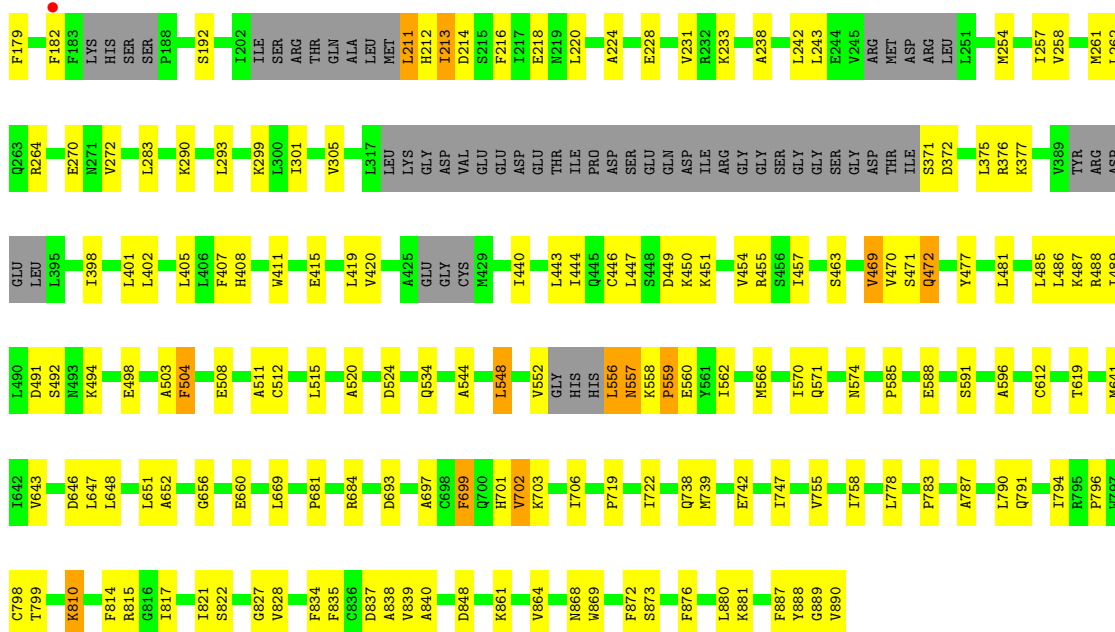
Chain A:  71% 24%



• Molecule 1: Transportin-1

Chain B:  65% 22% 12%

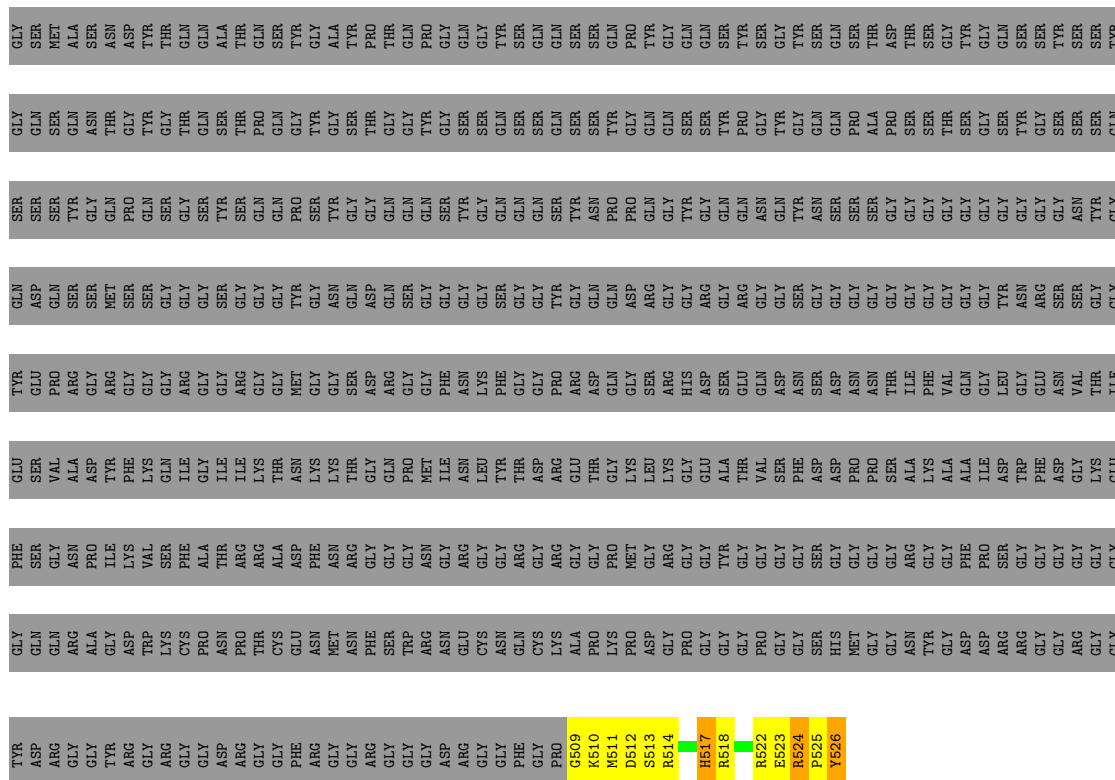




• Molecule 2: RNA-binding protein FUS

Chain X: ...

97%



• Molecule 2: RNA-binding protein FUS

Chain Y: ..

97%

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	108.22Å 145.01Å 108.68Å 90.00° 94.55° 90.00°	Depositor
Resolution (Å)	41.33 – 4.05 41.33 – 4.01	Depositor EDS
% Data completeness (in resolution range)	87.4 (41.33-4.05) 85.4 (41.33-4.01)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 4.00Å)	Xtrriage
Refinement program	phenix.refine 1.13_2998, PHENIX 1.13_2998	Depositor
R, R_{free}	0.251 , 0.260 0.262 , 0.265	Depositor DCC
R_{free} test set	1189 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	38.6	Xtrriage
Anisotropy	0.593	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , -6.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtrriage
Estimated twinning fraction	0.278 for l,-k,h	Xtrriage
Reported twinning fraction	0.360 for l,-k,h	Depositor
Outliers	0 of 23952 reflections	Xtrriage
F_o, F_c correlation	0.79	EDS
Total number of atoms	12966	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.87% 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	0.27	0/6760	0.42	0/9176
1	B	0.27	0/6174	0.43	0/8370
2	X	0.28	0/161	0.50	0/209
2	Y	0.23	0/132	0.38	0/172
All	All	0.27	0/13227	0.42	0/17927

There are no bond length outliers.

There are no bond angle outliers.

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	6620	0	6675	146	0
1	B	6057	0	6164	170	0
2	X	159	0	148	33	0
2	Y	130	0	119	7	0
All	All	12966	0	13106	327	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 13.

All (327) 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:103:SER:HB2	1:B:104:PRO:HD2	1.19	1.16
1:A:854:CYS:O	1:A:858:HIS:HB2	1.50	1.11
1:B:508:GLU:HG3	1:B:548:LEU:HD12	1.25	1.10
2:Y:516:GLU:O	2:Y:520:ASP:HB2	1.57	1.05
1:B:512:CYS:O	1:B:552:VAL:HG22	1.56	1.04
1:B:508:GLU:OE2	1:B:548:LEU:HD11	1.61	1.01
1:B:103:SER:HB2	1:B:104:PRO:CD	1.90	1.01
1:B:508:GLU:HG3	1:B:548:LEU:CD1	2.00	0.91
1:B:99:ILE:CD1	1:B:114:ILE:HD11	2.01	0.90
1:B:556:LEU:HD21	1:B:596:ALA:HB1	1.55	0.89
1:A:460:TRP:CH2	2:X:526:TYR:HB3	2.06	0.89
2:X:513:SER:O	2:X:517:HIS:HB2	1.73	0.89
1:B:556:LEU:HD11	1:B:596:ALA:CA	2.08	0.83
1:B:556:LEU:HD11	1:B:596:ALA:HA	1.60	0.82
1:B:511:ALA:CB	1:B:515:LEU:HD21	2.14	0.78
1:A:853:PHE:O	1:A:857:LEU:HB3	1.84	0.78
1:A:685:GLN:HE21	2:X:510:LYS:HE2	1.49	0.77
1:A:543:ASP:OD1	2:X:518:ARG:HB2	1.82	0.77
1:B:508:GLU:CG	1:B:548:LEU:HD12	2.11	0.77
1:B:415:GLU:HG2	1:B:457:ILE:HG21	1.64	0.77
1:B:99:ILE:CD1	1:B:114:ILE:CD1	2.63	0.76
1:B:105:LEU:HD12	1:B:105:LEU:O	1.86	0.74
1:A:464:ARG:NH2	2:X:526:TYR:CE1	2.55	0.74
1:B:511:ALA:HB1	1:B:515:LEU:HD21	1.69	0.73
1:B:99:ILE:HD12	1:B:114:ILE:HD11	1.70	0.73
1:A:145:CYS:O	1:A:149:PHE:HB2	1.88	0.73
1:B:377:LYS:HG3	2:Y:525:PRO:O	1.87	0.72
1:B:66:SER:OG	1:B:105:LEU:HD11	1.89	0.71
1:B:65:ARG:HE	1:B:106:ILE:HD11	1.55	0.71
1:A:458:THR:O	1:A:462:LEU:HB2	1.90	0.71
1:B:652:ALA:HB3	1:B:693:ASP:HB3	1.74	0.70
1:B:556:LEU:O	1:B:557:ASN:HB2	1.90	0.70
1:A:869:TRP:O	1:A:873:SER:HB2	1.92	0.69
1:B:376:ARG:NH2	1:B:415:GLU:OE2	2.24	0.69
1:A:460:TRP:CE2	2:X:524:ARG:HB2	2.28	0.68
2:X:510:LYS:O	2:X:512:ASP:N	2.27	0.68
1:A:495:ARG:HA	1:A:498:GLU:HG2	1.76	0.67
1:B:556:LEU:HD13	1:B:596:ALA:O	1.95	0.67
1:A:423:ALA:HA	2:X:526:TYR:CD2	2.30	0.66
1:B:103:SER:CB	1:B:104:PRO:CD	2.67	0.66
1:B:270:GLU:HG3	1:B:375:LEU:HD12	1.75	0.66
1:B:790:LEU:HD21	1:B:821:ILE:HG22	1.78	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:760:ARG:NH2	1:A:762:ASN:O	2.28	0.66
1:B:556:LEU:CD1	1:B:596:ALA:O	2.44	0.66
1:A:554:HIS:ND1	1:A:598:GLN:OE1	2.27	0.66
1:B:701:HIS:O	1:B:703:LYS:N	2.23	0.66
1:A:18:LEU:HD23	1:A:37:LEU:HD13	1.79	0.65
1:A:685:GLN:NE2	2:X:510:LYS:HE2	2.12	0.65
1:B:512:CYS:O	1:B:552:VAL:CG2	2.41	0.65
1:A:869:TRP:O	1:A:873:SER:CB	2.45	0.64
1:A:703:LYS:NZ	1:A:739:MET:SD	2.71	0.64
1:B:796:PRO:HA	1:B:799:THR:HB	1.80	0.64
1:A:213:ILE:HA	1:A:216:PHE:HB3	1.80	0.64
1:B:214:ASP:O	1:B:218:GLU:CB	2.46	0.64
1:B:224:ALA:O	1:B:264:ARG:NH2	2.30	0.64
1:B:398:ILE:HG13	1:B:401:LEU:HD13	1.80	0.63
1:B:559:PRO:O	1:B:560:GLU:OE2	2.17	0.63
1:A:853:PHE:O	1:A:857:LEU:CB	2.46	0.63
1:B:126:TRP:HB3	1:B:127:PRO:HD3	1.81	0.63
1:B:504:PHE:O	1:B:508:GLU:HG2	1.99	0.63
1:B:515:LEU:HD22	1:B:515:LEU:N	2.14	0.62
1:B:238:ALA:O	1:B:242:LEU:HB2	1.98	0.62
1:B:233:LYS:HB2	1:B:272:VAL:HG22	1.81	0.62
1:A:185:HIS:O	1:A:191:ARG:NH1	2.33	0.62
1:A:460:TRP:NE1	2:X:524:ARG:CB	2.63	0.61
1:A:460:TRP:NE1	2:X:524:ARG:HB2	2.15	0.61
1:A:293:LEU:HG	1:A:297:LEU:HD21	1.83	0.61
1:A:464:ARG:NH2	2:X:526:TYR:HE1	1.98	0.60
1:A:652:ALA:HB3	1:A:693:ASP:HB3	1.82	0.60
1:A:62:GLU:HB3	1:A:105:LEU:HD23	1.83	0.60
1:B:17:GLN:NE2	1:B:21:GLU:OE1	2.34	0.60
1:B:99:ILE:HG23	1:B:99:ILE:O	2.00	0.60
1:A:543:ASP:CG	2:X:518:ARG:HB2	2.22	0.60
1:A:588:GLU:O	1:A:591:SER:HB3	2.01	0.60
1:A:660:GLU:HG3	1:A:701:HIS:HE1	1.65	0.60
1:A:263:GLN:OE1	1:A:264:ARG:NH1	2.34	0.60
1:B:556:LEU:C	1:B:556:LEU:HD22	2.22	0.60
1:B:481:LEU:O	1:B:485:LEU:HB2	2.02	0.59
1:B:840:ALA:HB1	1:B:880:LEU:HD22	1.84	0.59
1:B:794:ILE:HG12	1:B:828:VAL:HG12	1.84	0.59
1:B:790:LEU:HD11	1:B:794:ILE:HD13	1.84	0.59
1:A:850:ARG:HH21	1:A:887:PHE:HE1	1.47	0.59
1:B:511:ALA:HB3	1:B:515:LEU:HD21	1.85	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:509:GLU:CD	2:X:522:ARG:HH12	2.05	0.59
1:B:214:ASP:O	1:B:218:GLU:HB2	2.03	0.58
1:B:755:VAL:HA	1:B:758:ILE:HG22	1.84	0.58
1:A:486:LEU:HD23	1:A:489:ILE:HD12	1.84	0.58
1:A:163:LEU:HB3	1:A:172:LEU:HD21	1.86	0.58
1:B:588:GLU:O	1:B:591:SER:HB3	2.04	0.57
1:A:21:GLU:HG3	1:A:33:VAL:HG21	1.87	0.57
1:B:103:SER:CB	1:B:104:PRO:HD2	2.11	0.57
1:B:508:GLU:CG	1:B:548:LEU:CD1	2.76	0.57
1:B:179:PHE:HA	1:B:182:PHE:CZ	2.38	0.57
1:B:556:LEU:O	1:B:557:ASN:CB	2.52	0.57
1:B:869:TRP:O	1:B:873:SER:HB3	2.05	0.57
1:A:390:TYR:HB2	1:A:394:LEU:HD23	1.88	0.56
1:A:681:PRO:HB3	1:A:721:PHE:HD2	1.70	0.56
1:A:55:THR:HG21	1:A:94:GLU:HB3	1.85	0.56
1:A:183:PHE:HZ	1:A:220:LEU:HA	1.70	0.56
1:A:376:ARG:NH2	1:A:415:GLU:OE2	2.38	0.56
1:A:739:MET:O	1:A:742:GLU:HB2	2.05	0.56
2:Y:516:GLU:O	2:Y:520:ASP:CB	2.42	0.56
1:A:436:LEU:HD23	1:A:439:LEU:HD12	1.87	0.56
1:A:610:GLN:O	1:A:614:ASN:ND2	2.27	0.56
1:B:864:VAL:HG13	1:B:868:ASN:HB2	1.87	0.56
1:B:508:GLU:OE1	1:B:515:LEU:HG	2.05	0.56
1:B:648:LEU:HD23	1:B:651:LEU:HD12	1.87	0.56
1:A:588:GLU:OE1	2:X:514:ARG:HB2	2.06	0.56
1:B:411:TRP:HB2	1:B:454:VAL:HG21	1.87	0.55
1:A:444:ILE:HD13	1:A:462:LEU:HD11	1.89	0.55
1:A:464:ARG:CZ	2:X:526:TYR:CE1	2.89	0.55
1:A:192:SER:O	1:A:234:ASN:ND2	2.39	0.55
1:A:273:ALA:HB3	1:A:375:LEU:HD11	1.89	0.55
1:B:95:CYS:O	1:B:98:ASN:OD1	2.24	0.55
1:A:76:VAL:HG11	1:A:117:ILE:HD13	1.87	0.55
1:B:449:ASP:OD1	1:B:450:LYS:N	2.40	0.55
1:B:570:ILE:O	1:B:574:ASN:ND2	2.31	0.55
1:B:556:LEU:HD11	1:B:596:ALA:CB	2.37	0.54
2:X:512:ASP:N	2:X:512:ASP:OD1	2.41	0.54
1:A:460:TRP:HH2	2:X:526:TYR:HB3	1.70	0.54
1:A:796:PRO:HA	1:A:799:THR:HB	1.88	0.54
1:B:508:GLU:CD	1:B:548:LEU:HD11	2.28	0.54
1:A:491:ASP:OD1	1:A:493:ASN:N	2.34	0.54
1:A:546:GLY:C	2:X:518:ARG:HH12	2.11	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:57:LEU:O	1:B:65:ARG:NH2	2.40	0.53
1:A:588:GLU:HG2	1:A:643:VAL:HG23	1.91	0.53
1:B:407:PHE:O	1:B:408:HIS:ND1	2.42	0.53
1:A:449:ASP:OD1	1:A:450:LYS:N	2.42	0.53
1:B:798:CYS:HB3	1:B:838:ALA:HB2	1.91	0.53
1:B:498:GLU:HG2	2:Y:523:GLU:HG2	1.90	0.53
1:A:267:ASP:OD1	1:A:268:GLN:N	2.41	0.53
1:B:95:CYS:HA	1:B:98:ASN:HD21	1.73	0.52
1:B:557:ASN:O	1:B:557:ASN:ND2	2.43	0.52
1:A:4:GLU:OE2	1:A:56:LYS:NZ	2.43	0.52
1:A:850:ARG:HD2	1:A:887:PHE:CE1	2.44	0.52
1:B:869:TRP:O	1:B:873:SER:CB	2.58	0.52
1:A:727:ASN:HD21	2:X:510:LYS:HA	1.75	0.52
1:B:612:CYS:SG	1:B:647:LEU:HD23	2.50	0.52
1:B:643:VAL:O	1:B:646:ASP:HB2	2.09	0.52
1:A:669:LEU:HA	1:A:672:MET:HE2	1.90	0.52
1:B:556:LEU:CD2	1:B:596:ALA:HB1	2.33	0.52
2:X:524:ARG:HD3	2:X:524:ARG:N	2.25	0.51
1:A:423:ALA:HA	2:X:526:TYR:HD2	1.71	0.51
1:B:876:PHE:HE1	1:B:881:LYS:HA	1.74	0.51
1:B:214:ASP:O	1:B:218:GLU:HB3	2.09	0.51
1:B:810:LYS:H	1:B:810:LYS:HD2	1.74	0.51
1:B:402:LEU:HD21	1:B:420:VAL:HG11	1.93	0.51
1:B:861:LYS:NZ	1:B:890:VAL:O	2.43	0.51
1:A:51:ILE:HG21	1:A:91:ILE:HD13	1.93	0.51
1:B:888:TYR:O	1:B:890:VAL:N	2.43	0.51
1:A:301:ILE:HG21	1:A:398:ILE:HG12	1.94	0.50
1:B:491:ASP:OD1	1:B:492:SER:N	2.44	0.50
1:A:426:GLU:HB3	2:X:526:TYR:OH	2.11	0.50
1:B:301:ILE:HG21	1:B:398:ILE:HG21	1.93	0.50
1:B:791:GLN:HG3	1:B:827:GLY:HA2	1.93	0.50
2:X:513:SER:O	2:X:517:HIS:CB	2.55	0.50
1:B:216:PHE:O	1:B:220:LEU:HB2	2.12	0.50
1:A:835:PHE:O	1:A:839:VAL:HG23	2.10	0.50
1:B:817:ILE:O	1:B:821:ILE:HG23	2.11	0.50
1:A:168:LEU:HB2	1:A:171:PRO:HG3	1.93	0.49
1:B:669:LEU:HD21	1:B:702:VAL:HA	1.94	0.49
1:B:99:ILE:HD13	1:B:114:ILE:HD11	1.91	0.49
1:B:262:LEU:HG	1:B:299:LYS:HE3	1.95	0.49
1:B:443:LEU:HA	1:B:446:CYS:HB2	1.94	0.49
1:B:556:LEU:HD21	1:B:596:ALA:CB	2.37	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:460:TRP:NE1	2:X:524:ARG:HB3	2.26	0.49
1:A:126:TRP:CH2	1:A:129:LEU:HD13	2.48	0.49
1:A:546:GLY:C	2:X:518:ARG:NH1	2.66	0.49
1:B:699:PHE:CD2	1:B:738:GLN:HB3	2.47	0.49
1:A:612:CYS:SG	1:A:647:LEU:HD23	2.53	0.49
1:A:684:ARG:HA	1:A:687:SER:HG	1.78	0.49
1:A:815:ARG:NH2	1:A:848:ASP:OD2	2.45	0.49
1:A:814:PHE:HA	1:A:817:ILE:HG22	1.94	0.48
1:A:26:ASP:OD1	1:A:27:THR:N	2.46	0.48
1:A:237:ARG:O	1:A:241:MET:HG2	2.13	0.48
1:A:23:GLN:NE2	1:A:63:PRO:O	2.46	0.48
1:B:257:ILE:O	1:B:261:MET:HB2	2.12	0.48
2:X:510:LYS:HD3	2:X:512:ASP:HB3	1.95	0.48
1:A:232:ARG:NH1	1:A:267:ASP:OD2	2.47	0.48
1:A:460:TRP:CH2	2:X:526:TYR:CB	2.89	0.48
1:A:573:TRP:CZ2	1:A:611:ARG:HD3	2.49	0.48
1:B:371:SER:OG	1:B:372:ASP:N	2.45	0.47
1:A:233:LYS:HG3	1:A:275:GLU:HG3	1.96	0.47
1:B:515:LEU:HB2	1:B:552:VAL:HG21	1.95	0.47
1:A:180:LEU:HA	1:A:183:PHE:HB2	1.97	0.47
1:A:297:LEU:O	1:A:300:LEU:N	2.47	0.47
1:B:681:PRO:HA	1:B:684:ARG:HE	1.79	0.47
1:B:703:LYS:O	1:B:706:ILE:HB	2.15	0.47
1:A:681:PRO:HB3	1:A:721:PHE:CD2	2.49	0.47
1:A:850:ARG:NH2	1:A:887:PHE:CD1	2.83	0.47
1:B:51:ILE:O	1:B:55:THR:HG22	2.15	0.47
1:B:487:LYS:HA	1:B:487:LYS:HD3	1.71	0.47
1:B:834:PHE:O	1:B:837:ASP:HB3	2.15	0.47
1:A:183:PHE:CZ	1:A:220:LEU:HA	2.48	0.47
1:A:558:LYS:HB2	1:A:561:TYR:CD2	2.50	0.47
1:A:590:LEU:O	1:A:594:ALA:N	2.40	0.47
1:A:850:ARG:HD2	1:A:887:PHE:HE1	1.79	0.47
1:A:403:LYS:HE3	1:A:403:LYS:HB2	1.77	0.46
1:B:66:SER:CB	1:B:105:LEU:HD11	2.45	0.46
1:B:258:VAL:O	1:B:262:LEU:CB	2.63	0.46
1:B:719:PRO:O	1:B:722:ILE:HG13	2.15	0.46
1:A:491:ASP:OD1	1:A:492:SER:N	2.48	0.46
1:A:646:ASP:O	1:A:649:SER:HB3	2.15	0.46
1:B:544:ALA:O	1:B:548:LEU:HB2	2.16	0.46
1:B:216:PHE:CZ	1:B:242:LEU:HD21	2.51	0.46
1:A:192:SER:OG	1:A:230:GLU:HB3	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:221:PHE:CE1	1:A:257:ILE:HD11	2.50	0.46
1:B:868:ASN:O	1:B:872:PHE:HB2	2.16	0.46
1:A:798:CYS:HB2	1:A:838:ALA:HB2	1.98	0.46
1:A:100:GLY:HA3	1:A:144:THR:HG22	1.98	0.46
1:B:835:PHE:O	1:B:839:VAL:HG23	2.16	0.46
1:B:494:LYS:NZ	1:B:534:GLN:OE1	2.49	0.46
1:B:211:LEU:HD13	1:B:211:LEU:HA	1.84	0.46
1:B:647:LEU:O	1:B:651:LEU:N	2.39	0.46
1:B:660:GLU:HG2	1:B:701:HIS:NE2	2.31	0.46
1:A:408:HIS:CE1	1:A:410:GLU:HB3	2.51	0.45
1:A:703:LYS:HB3	1:A:704:PRO:HD3	1.98	0.45
1:B:411:TRP:CE2	1:B:451:LYS:HG3	2.51	0.45
1:B:739:MET:O	1:B:742:GLU:HB2	2.16	0.45
1:B:65:ARG:NE	1:B:106:ILE:HD11	2.26	0.45
1:B:58:LYS:HA	1:B:65:ARG:NH2	2.31	0.45
1:B:562:ILE:HG23	1:B:566:MET:HG3	1.98	0.45
1:B:504:PHE:CZ	1:B:508:GLU:OE2	2.69	0.45
1:B:747:ILE:HD12	1:B:778:LEU:HD22	1.99	0.45
2:Y:522:ARG:HA	2:Y:522:ARG:HD3	1.35	0.45
1:B:556:LEU:HD11	1:B:596:ALA:HB1	1.99	0.45
1:A:370:ILE:HG23	1:A:371:SER:O	2.16	0.45
1:A:463:SER:HB3	1:A:503:ALA:HB1	1.99	0.45
1:B:65:ARG:HE	1:B:106:ILE:CD1	2.28	0.45
1:B:98:ASN:OD1	1:B:99:ILE:N	2.37	0.45
1:A:440:ILE:O	1:A:444:ILE:HG12	2.17	0.45
1:B:99:ILE:HD13	1:B:114:ILE:CD1	2.47	0.45
2:Y:517:HIS:O	2:Y:521:ARG:N	2.37	0.45
1:A:416:SER:O	1:A:420:VAL:HG23	2.17	0.45
1:B:30:GLN:O	1:B:34:GLN:HB2	2.17	0.45
1:A:96:LEU:HD21	1:A:132:LYS:HG2	1.99	0.44
1:A:192:SER:HB2	1:A:231:VAL:HG22	1.99	0.44
1:B:32:THR:O	1:B:36:LYS:HG2	2.16	0.44
1:B:873:SER:HA	1:B:876:PHE:CE2	2.52	0.44
1:B:463:SER:HB3	1:B:503:ALA:HB1	1.99	0.44
1:B:481:LEU:O	1:B:485:LEU:CB	2.65	0.44
1:A:401:LEU:O	1:A:405:LEU:HG	2.17	0.44
1:B:814:PHE:CZ	1:B:838:ALA:HB1	2.52	0.44
1:A:1:MET:H	1:A:1:MET:HG2	1.72	0.44
1:A:509:GLU:OE1	2:X:522:ARG:NH1	2.50	0.44
1:B:648:LEU:HA	1:B:651:LEU:HB2	2.00	0.44
1:A:794:ILE:HG12	1:A:828:VAL:HG12	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:656:GLY:HA2	1:B:697:ALA:HA	2.00	0.44
1:A:304:LEU:O	1:A:308:MET:HG3	2.18	0.43
1:B:27:THR:HA	1:B:30:GLN:HG2	2.01	0.43
1:A:53:VAL:HA	1:A:57:LEU:HB2	2.01	0.43
1:A:727:ASN:ND2	2:X:509:GLY:O	2.51	0.43
1:A:660:GLU:HG3	1:A:701:HIS:CE1	2.50	0.43
1:B:127:PRO:HB2	1:B:128:ASP:H	1.59	0.43
1:A:171:PRO:O	1:A:174:ILE:HG22	2.18	0.43
1:B:176:ILE:HA	1:B:179:PHE:HD2	1.83	0.43
1:B:471:SER:HB3	1:B:477:TYR:HE2	1.84	0.43
1:B:520:ALA:O	1:B:524:ASP:HB2	2.19	0.43
1:B:243:LEU:HD21	1:B:283:LEU:HB2	2.01	0.43
1:B:301:ILE:O	1:B:305:VAL:HG23	2.17	0.43
1:A:460:TRP:HH2	2:X:526:TYR:CB	2.31	0.43
1:A:662:LEU:HD23	1:A:662:LEU:HA	1.83	0.43
1:A:790:LEU:O	1:A:794:ILE:HB	2.18	0.43
1:A:834:PHE:O	1:A:837:ASP:HB3	2.18	0.43
1:B:504:PHE:CE1	1:B:508:GLU:OE2	2.72	0.43
1:A:18:LEU:O	1:A:22:SER:HB2	2.19	0.43
1:A:76:VAL:O	1:A:80:PHE:HB2	2.19	0.43
1:B:376:ARG:NE	1:B:419:LEU:HD22	2.33	0.43
2:Y:521:ARG:HA	2:Y:524:ARG:HH21	1.83	0.43
1:A:77:LYS:HA	1:A:120:LYS:HG2	2.00	0.43
1:A:883:ARG:O	1:A:887:PHE:CB	2.67	0.42
1:A:887:PHE:CD1	1:A:887:PHE:O	2.70	0.42
1:B:211:LEU:HB3	1:B:212:HIS:H	1.54	0.42
1:A:498:GLU:HB3	1:A:537:ASN:OD1	2.18	0.42
1:B:99:ILE:HD11	1:B:114:ILE:CD1	2.46	0.42
1:B:290:LYS:HE3	1:B:290:LYS:HB3	1.81	0.42
1:B:449:ASP:O	1:B:455:ARG:NE	2.38	0.42
1:B:783:PRO:O	1:B:787:ALA:HB2	2.19	0.42
1:B:556:LEU:C	1:B:556:LEU:CD2	2.86	0.42
1:A:273:ALA:O	1:A:277:CYS:HB2	2.19	0.42
1:B:472:GLN:N	1:B:472:GLN:OE1	2.52	0.42
1:A:154:LYS:HD2	1:A:154:LYS:HA	1.92	0.42
1:B:440:ILE:O	1:B:444:ILE:HG13	2.20	0.42
1:A:70:LEU:O	1:A:73:LYS:HB3	2.20	0.42
1:B:283:LEU:HD22	1:B:293:LEU:HD11	2.02	0.42
1:B:868:ASN:O	1:B:872:PHE:CB	2.67	0.42
1:A:371:SER:OG	1:A:372:ASP:N	2.52	0.42
1:A:783:PRO:O	1:A:787:ALA:HB2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:651:LEU:HD23	1:B:651:LEU:HA	1.91	0.42
1:A:19:LEU:HA	1:A:22:SER:HB3	2.01	0.42
1:A:53:VAL:HG22	1:A:57:LEU:HD12	2.02	0.42
1:B:447:LEU:HD13	1:B:488:ARG:NH1	2.34	0.42
1:A:306:ASN:O	1:A:309:LYS:NZ	2.48	0.41
1:A:383:LEU:HD23	1:A:423:ALA:HB3	2.02	0.41
1:A:840:ALA:HB1	1:A:880:LEU:HD22	2.01	0.41
1:A:387:ALA:HB1	1:A:427:GLY:HA3	2.03	0.41
1:A:848:ASP:N	1:A:848:ASP:OD1	2.53	0.41
1:B:486:LEU:HD23	1:B:489:ILE:HD12	2.02	0.41
1:B:815:ARG:NH1	1:B:848:ASP:OD2	2.53	0.41
1:A:547:THR:HG21	2:X:522:ARG:NH2	2.34	0.41
1:B:258:VAL:O	1:B:262:LEU:HB2	2.20	0.41
1:A:5:TRP:CH2	1:A:48:ASN:HB3	2.56	0.41
1:B:51:ILE:HD11	1:B:98:ASN:ND2	2.35	0.41
1:B:192:SER:HB2	1:B:231:VAL:HG22	2.01	0.41
1:B:405:LEU:HA	1:B:408:HIS:CD2	2.55	0.41
1:A:105:LEU:O	1:A:109:THR:HG22	2.21	0.41
1:B:107:ARG:HH12	1:B:146:GLU:HB2	1.84	0.41
1:B:494:LYS:HG2	1:B:534:GLN:HE22	1.85	0.41
1:B:848:ASP:OD1	1:B:848:ASP:N	2.53	0.41
1:A:582:ASP:O	1:A:585:PRO:HD2	2.20	0.41
1:B:469:VAL:C	1:B:471:SER:H	2.24	0.41
1:A:462:LEU:HD22	1:A:481:LEU:HD13	2.02	0.41
1:B:19:LEU:HB3	1:B:64:THR:HG23	2.03	0.41
1:A:385:VAL:O	1:A:389:VAL:HG23	2.21	0.41
1:A:719:PRO:O	1:A:722:ILE:HG12	2.21	0.41
1:A:107:ARG:NH1	1:A:143:ASN:OD1	2.54	0.40
1:A:243:LEU:HD22	1:A:279:PHE:CE1	2.56	0.40
1:A:502:SER:CB	2:X:523:GLU:H	2.34	0.40
1:B:18:LEU:HD13	1:B:37:LEU:HD22	2.01	0.40
1:B:512:CYS:O	1:B:515:LEU:HD23	2.20	0.40
1:B:34:GLN:O	1:B:38:GLU:HG3	2.22	0.40
1:B:515:LEU:N	1:B:515:LEU:CD2	2.83	0.40
1:B:68:SER:O	1:B:71:ILE:HG22	2.21	0.40
1:B:585:PRO:O	1:B:588:GLU:HB2	2.21	0.40
1:A:387:ALA:HA	1:A:394:LEU:HD21	2.03	0.40
1:B:301:ILE:HG21	1:B:398:ILE:HG12	2.03	0.40
1:B:619:THR:HG21	1:B:641:MET:HB2	2.04	0.40

There are no symmetry-related clashes.

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	820/868 (94%)	753 (92%)	64 (8%)	3 (0%)	34	71
1	B	738/868 (85%)	675 (92%)	50 (7%)	13 (2%)	8	41
2	X	16/528 (3%)	10 (62%)	4 (25%)	2 (12%)	0	5
2	Y	12/528 (2%)	9 (75%)	2 (17%)	1 (8%)	1	13
All	All	1586/2792 (57%)	1447 (91%)	120 (8%)	19 (1%)	13	49

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	470	VAL
1	B	557	ASN
2	X	511	MET
1	B	127	PRO
1	B	162	ILE
1	B	469	VAL
1	B	889	GLY
1	A	10	GLN
1	B	12	LEU
1	B	228	GLU
2	X	525	PRO
1	A	394	LEU
1	B	103	SER
2	Y	522	ARG
1	B	559	PRO
1	B	472	GLN
1	B	702	VAL
1	A	474	PRO
1	B	213	ILE

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	746/776 (96%)	731 (98%)	15 (2%)	55	73
1	B	683/776 (88%)	669 (98%)	14 (2%)	55	73
2	X	16/362 (4%)	13 (81%)	3 (19%)	1	10
2	Y	13/362 (4%)	8 (62%)	5 (38%)	0	0
All	All	1458/2276 (64%)	1421 (98%)	37 (2%)	47	68

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	149	PHE
1	A	246	ARG
1	A	254	MET
1	A	263	GLN
1	A	409	HIS
1	A	428	CYS
1	A	504	PHE
1	A	604	TYR
1	A	699	PHE
1	A	822	SER
1	A	858	HIS
1	A	861	LYS
1	A	863	GLN
1	A	869	TRP
1	B	101	ASP
1	B	156	CYS
1	B	211	LEU
1	B	213	ILE
1	B	254	MET
1	B	504	PHE
1	B	548	LEU
1	B	556	LEU
1	B	558	LYS

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Mol	Chain	Res	Type
1	B	571	GLN
1	B	699	PHE
1	B	810	LYS
1	B	822	SER
1	B	887	PHE
2	X	517	HIS
2	X	524	ARG
2	X	526	TYR
2	Y	514	ARG
2	Y	518	ARG
2	Y	520	ASP
2	Y	521	ARG
2	Y	522	ARG

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	234	ASN
1	A	685	GLN
1	A	701	HIS
1	A	727	ASN
1	B	296	HIS
1	B	557	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	830/868 (95%)	-0.37	1 (0%) 95 95	4, 33, 70, 97	0
1	B	764/868 (88%)	-0.21	2 (0%) 94 90	6, 59, 109, 137	0
2	X	18/528 (3%)	-0.31	0 100 100	14, 24, 32, 32	0
2	Y	14/528 (2%)	0.14	0 100 100	40, 59, 77, 78	0
All	All	1626/2792 (58%)	-0.29	3 (0%) 95 93	4, 38, 101, 137	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	146	GLU	2.4
1	A	181	GLN	2.3
1	B	182	PHE	2.2

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.