



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 05:11 AM UTC

PDB ID : 5CW5 / pdb_00005cw5
Title : Structure of CfBRCC36-CfKIAA0157 complex (QSQ mutant)
Authors : Zeqiraj, E.
Deposited on : 2015-07-27
Resolution : 2.74 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

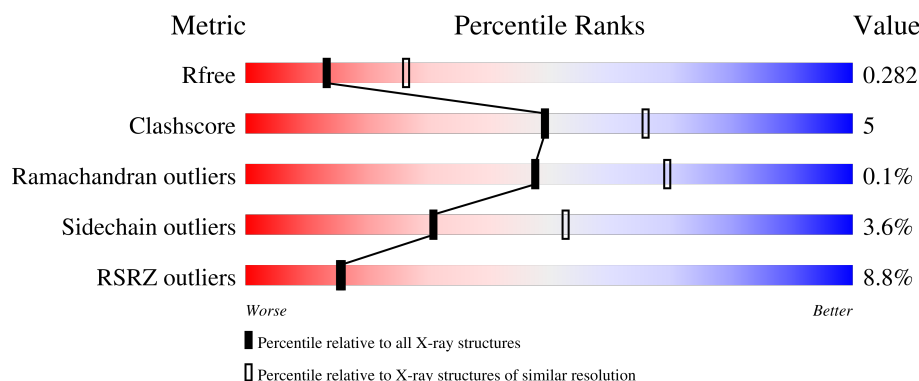
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.74 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}	180053	1819 (2.76-2.72)
Clashscore	190562	1866 (2.76-2.72)
Ramachandran outliers	187476	1830 (2.76-2.72)
Sidechain outliers	187428	1831 (2.76-2.72)
RSRZ outliers	180081	1819 (2.76-2.72)

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	255	8% 74% 11% 15%
1	C	255	6% 72% 12% 16%
2	B	289	6% 66% 12% • 21%
2	D	289	9% 69% 12% • 17%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 7019 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 BRCA1/BRCA2-containing complex subunit 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	217	Total	C	N	O	S	0	0	0
			1686	1063	293	320	10			
1	C	214	Total	C	N	O	S	0	0	0
			1671	1054	288	319	10			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP E2AXC7
A	0	ALA	-	expression tag	UNP E2AXC7
A	94	GLN	HIS	engineered mutation	UNP E2AXC7
A	96	GLN	HIS	engineered mutation	UNP E2AXC7
C	-1	GLY	-	expression tag	UNP E2AXC7
C	0	ALA	-	expression tag	UNP E2AXC7
C	94	GLN	HIS	engineered mutation	UNP E2AXC7
C	96	GLN	HIS	engineered mutation	UNP E2AXC7

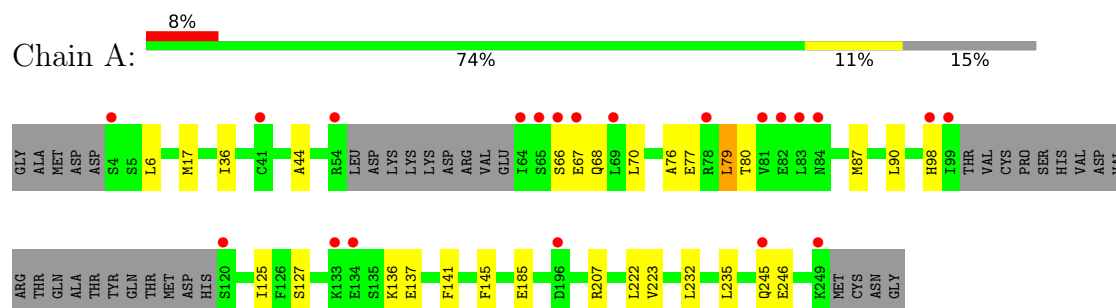
- Molecule 2 is a protein called Protein FAM175B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	229	Total	C	N	O	S	0	0	0
			1791	1143	310	329	9			
2	D	240	Total	C	N	O	S	0	0	0
			1871	1193	324	345	9			

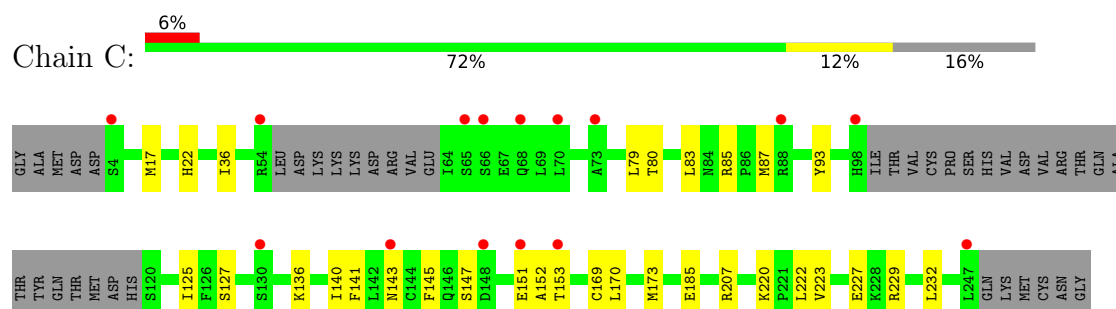
3 Residue-property plots [i](#)

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.

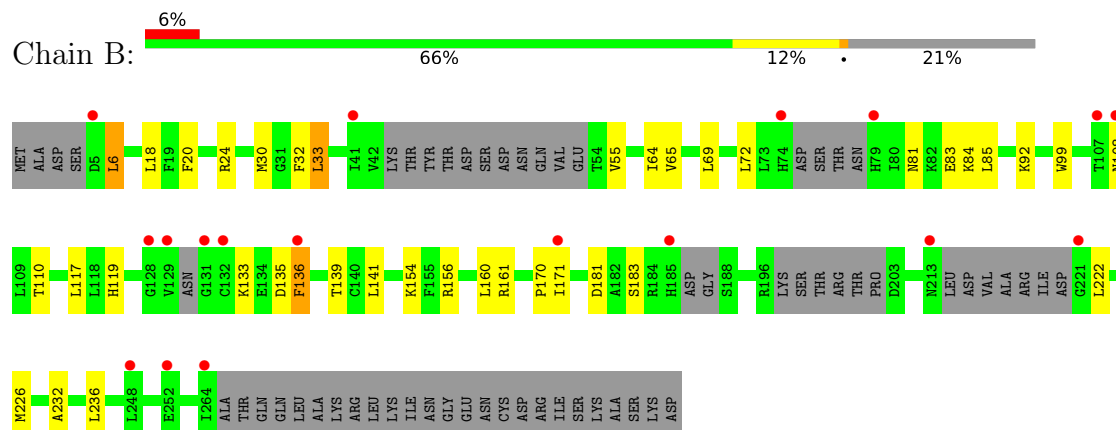
- Molecule 1: BRCA1/BRCA2-containing complex subunit 3



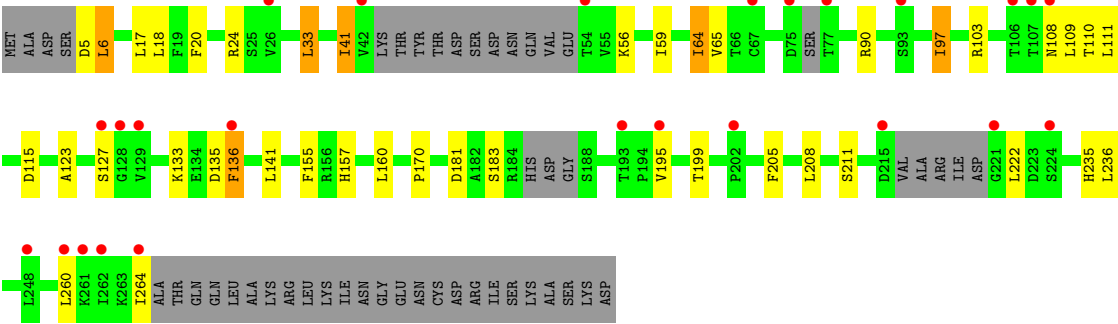
- Molecule 1: BRCA1/BRCA2-containing complex subunit 3



- Molecule 2: Protein FAM175B



- Molecule 2: Protein FAM175B



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	89.45Å 124.17Å 132.54Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.94 – 2.74 48.94 – 2.74	Depositor EDS
% Data completeness (in resolution range)	94.9 (48.94-2.74) 95.0 (48.94-2.74)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.16 (at 2.73Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.231 , 0.278 0.240 , 0.282	Depositor DCC
R_{free} test set	1610 reflections (4.27%)	wwPDB-VP
Wilson B-factor (Å ²)	59.9	Xtriage
Anisotropy	0.452	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 55.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	7019	wwPDB-VP
Average B, all atoms (Å ²)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 31.75 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.0513e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

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	0/1709	0.68	0/2313
1	C	0.25	0/1693	0.67	0/2289
2	B	0.25	0/1819	0.65	0/2449
2	D	0.25	0/1901	0.66	1/2562 (0.0%)
All	All	0.25	0/7122	0.67	1/9613 (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	90	ARG	CB-CA-C	-5.85	109.84	116.63

There are no chirality outliers.

There are no planarity outliers.

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	1686	0	1678	20	0
1	C	1671	0	1679	21	0
2	B	1791	0	1776	26	0
2	D	1871	0	1873	27	0
All	All	7019	0	7006	75	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 5.

All (75) 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:B:119:HIS:HD1	2:B:139:THR:HG1	1.28	0.80
1:A:127:SER:HB3	1:A:141:PHE:HB2	1.75	0.68
2:D:6:LEU:HD11	2:D:136:PHE:HB3	1.79	0.65
1:C:185:GLU:OE1	1:C:207:ARG:NH1	2.32	0.63
1:C:170:LEU:HD23	1:C:173:MET:HE3	1.83	0.61
1:A:222:LEU:HD23	2:B:236:LEU:HD21	1.83	0.59
1:C:222:LEU:HD23	2:D:236:LEU:HD21	1.85	0.59
1:C:80:THR:HG22	1:C:87:MET:H	1.68	0.58
1:A:185:GLU:OE1	1:A:207:ARG:NH1	2.37	0.57
1:C:229:ARG:HE	2:D:17:LEU:HD11	1.69	0.57
1:A:80:THR:HG22	1:A:87:MET:H	1.69	0.57
1:C:223:VAL:HG22	2:D:236:LEU:HD13	1.87	0.57
2:B:18:LEU:HD13	2:B:64:ILE:HG21	1.87	0.55
2:D:5:ASP:OD2	2:D:56:LYS:NZ	2.32	0.55
2:B:20:PHE:CZ	2:B:24:ARG:HD2	2.42	0.55
1:C:140:ILE:HB	2:D:155:PHE:HB2	1.88	0.55
2:D:18:LEU:HD13	2:D:64:ILE:HG21	1.88	0.54
1:C:136:LYS:HB2	2:D:170:PRO:HB2	1.90	0.54
1:A:207:ARG:NH2	2:B:226:MET:SD	2.81	0.54
2:B:33:LEU:HD12	2:B:64:ILE:HG22	1.89	0.53
1:C:127:SER:HB3	1:C:141:PHE:HB2	1.90	0.53
2:B:81:ASN:HB3	2:B:84:LYS:HB2	1.90	0.53
2:B:6:LEU:HD11	2:B:136:PHE:HB3	1.91	0.52
1:C:36:ILE:HG22	1:C:87:MET:HE3	1.91	0.52
2:B:154:LYS:HE2	2:B:156:ARG:HD2	1.91	0.51
1:A:77:GLU:O	1:A:80:THR:OG1	2.25	0.51
1:A:232:LEU:HD13	2:B:65:VAL:HB	1.93	0.51
1:A:137:GLU:OE1	2:B:156:ARG:NH2	2.44	0.51
2:B:161:ARG:HB3	2:B:171:ILE:HD11	1.94	0.50
1:C:83:LEU:HD13	1:C:85:ARG:HH21	1.76	0.50
2:B:119:HIS:ND1	2:B:139:THR:OG1	2.29	0.49
1:C:207:ARG:HE	2:D:222:LEU:HD21	1.78	0.48
1:A:66:SER:O	1:A:68:GLN:N	2.42	0.48
2:D:20:PHE:CZ	2:D:24:ARG:HD2	2.48	0.48
1:A:125:ILE:HG13	1:A:145:PHE:HE1	1.78	0.48
1:A:223:VAL:HG22	2:B:236:LEU:HD13	1.96	0.48
2:D:33:LEU:HD12	2:D:64:ILE:HG22	1.95	0.47
2:B:160:LEU:HD23	2:B:170:PRO:HA	1.95	0.47
2:D:59:ILE:HD11	2:D:136:PHE:HB2	1.96	0.47
2:B:181:ASP:OD2	2:B:183:SER:OG	2.28	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:17:MET:HB2	2:B:20:PHE:HB2	1.97	0.47
1:C:22:HIS:ND1	1:C:93:TYR:OH	2.35	0.47
2:D:160:LEU:HD23	2:D:170:PRO:HA	1.99	0.45
1:A:36:ILE:HG22	1:A:87:MET:HE3	1.98	0.45
2:D:123:ALA:O	2:D:127:SER:OG	2.27	0.45
1:A:76:ALA:O	1:A:80:THR:HG23	2.17	0.45
2:B:32:PHE:HA	2:B:99:TRP:HA	1.98	0.44
2:D:208:LEU:O	2:D:211:SER:OG	2.34	0.44
2:B:108:ASN:HD21	2:B:110:THR:HB	1.83	0.44
1:C:169:CYS:O	1:C:173:MET:HG2	2.18	0.44
1:A:136:LYS:HB2	2:B:170:PRO:HB2	2.00	0.44
2:D:181:ASP:OD2	2:D:183:SER:OG	2.29	0.43
1:A:207:ARG:HE	2:B:222:LEU:HD21	1.83	0.43
2:B:6:LEU:HD13	2:B:171:ILE:HD13	2.00	0.43
1:C:17:MET:HB2	2:D:20:PHE:HB2	2.01	0.43
2:D:41:ILE:HD13	2:D:195:VAL:HG21	2.00	0.42
1:A:235:LEU:HD22	2:B:92:LYS:HG3	2.02	0.42
1:C:232:LEU:HD13	2:D:65:VAL:HB	2.02	0.42
2:D:109:LEU:HD12	2:D:109:LEU:HA	1.91	0.42
1:A:79:LEU:HD12	1:A:79:LEU:HA	1.83	0.42
1:C:125:ILE:HG13	1:C:145:PHE:HE1	1.85	0.42
2:B:72:LEU:HD22	2:B:85:LEU:HA	2.01	0.41
2:D:111:LEU:HD23	2:D:111:LEU:HA	1.95	0.41
1:A:67:GLU:HA	1:A:70:LEU:HD23	2.03	0.41
1:C:170:LEU:HA	1:C:173:MET:HE3	2.02	0.41
1:C:227:GLU:OE2	2:D:235:HIS:NE2	2.51	0.41
2:D:103:ARG:HH22	2:D:115:ASP:CG	2.28	0.41
2:B:30:MET:HE3	2:B:69:LEU:HD13	2.02	0.41
2:B:232:ALA:O	2:B:236:LEU:HB2	2.21	0.41
1:C:220:LYS:HE3	2:D:205:PHE:HB3	2.01	0.41
2:D:97:ILE:H	2:D:97:ILE:HD13	1.86	0.41
1:A:44:ALA:HB1	1:A:90:LEU:HD13	2.03	0.40
2:D:141:LEU:O	2:D:157:HIS:HA	2.21	0.40
2:D:108:ASN:OD1	2:D:110:THR:OG1	2.37	0.40
1:C:147:SER:HB3	1:C:152:ALA:HB2	2.03	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	211/255 (83%)	205 (97%)	5 (2%)	1 (0%)	24	40
1	C	208/255 (82%)	205 (99%)	3 (1%)	0	100	100
2	B	215/289 (74%)	210 (98%)	5 (2%)	0	100	100
2	D	230/289 (80%)	228 (99%)	2 (1%)	0	100	100
All	All	864/1088 (79%)	848 (98%)	15 (2%)	1 (0%)	48	69

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	98	HIS

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	185/228 (81%)	181 (98%)	4 (2%)	45	65
1	C	186/228 (82%)	182 (98%)	4 (2%)	45	65
2	B	198/259 (76%)	189 (96%)	9 (4%)	24	44
2	D	208/259 (80%)	197 (95%)	11 (5%)	20	37
All	All	777/974 (80%)	749 (96%)	28 (4%)	31	53

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	LEU
1	A	79	LEU
1	A	245	GLN
1	A	246	GLU
2	B	6	LEU
2	B	33	LEU
2	B	55	VAL
2	B	83	GLU
2	B	117	LEU
2	B	133	LYS
2	B	135	ASP
2	B	136	PHE
2	B	141	LEU
1	C	79	LEU
1	C	143	ASN
1	C	151	GLU
1	C	153	THR
2	D	6	LEU
2	D	33	LEU
2	D	41	ILE
2	D	64	ILE
2	D	97	ILE
2	D	133	LYS
2	D	135	ASP
2	D	136	PHE
2	D	199	THR
2	D	260	LEU
2	D	264	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	239	HIS
2	B	176	ASN
1	C	21	GLN
2	D	58	HIS

5.3.3 RNA ⓘ

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 oligosaccharides 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	217/255 (85%)	0.68	21 (9%)	13 13	48, 65, 113, 160	0
1	C	214/255 (83%)	0.65	15 (7%)	22 22	45, 66, 110, 136	0
2	B	229/289 (79%)	0.69	18 (7%)	18 19	46, 68, 109, 130	0
2	D	240/289 (83%)	0.74	25 (10%)	11 11	45, 71, 110, 158	0
All	All	900/1088 (82%)	0.69	79 (8%)	15 16	45, 68, 111, 160	0

All (79) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	129	VAL	7.2
2	B	131	GLY	6.8
1	C	98	HIS	6.8
1	A	99	ILE	6.3
2	B	79	HIS	4.7
1	C	54	ARG	4.5
1	A	98	HIS	4.3
2	D	128	GLY	4.2
2	B	107	THR	4.2
2	D	75	ASP	4.1
2	B	74	HIS	4.0
1	A	54	ARG	3.6
2	D	264	ILE	3.5
2	D	136	PHE	3.4
1	C	247	LEU	3.4
2	D	129	VAL	3.4
2	D	261	LYS	3.3
1	A	69	LEU	3.3
2	B	108	ASN	3.3
1	C	88	ARG	3.2
2	B	132	CYS	3.1

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Mol	Chain	Res	Type	RSRZ
2	B	248	LEU	3.1
2	D	77	THR	3.1
1	C	73	ALA	3.1
1	C	66	SER	3.0
1	C	70	LEU	3.0
1	A	84	ASN	3.0
2	D	54	THR	3.0
1	A	249	LYS	2.9
2	D	108	ASN	2.9
2	B	264	ILE	2.9
2	D	106	THR	2.9
1	A	83	LEU	2.9
1	C	148	ASP	2.8
2	B	5	ASP	2.8
1	A	133	LYS	2.8
2	D	248	LEU	2.7
2	D	221	GLY	2.7
1	C	130	SER	2.6
1	C	4	SER	2.6
2	B	136	PHE	2.6
1	A	66	SER	2.5
1	C	65	SER	2.5
2	B	221	GLY	2.5
1	A	4	SER	2.5
2	D	195	VAL	2.5
1	A	64	ILE	2.5
2	D	202	PRO	2.5
2	D	262	ILE	2.4
2	D	127	SER	2.4
2	B	171	ILE	2.4
2	D	215	ASP	2.4
2	D	42	VAL	2.4
2	D	107	THR	2.4
2	B	213	ASN	2.3
1	A	82	GLU	2.3
2	B	185	HIS	2.3
1	C	151	GLU	2.3
1	A	65	SER	2.3
1	A	78	ARG	2.3
2	D	224	SER	2.3
1	C	143	ASN	2.2
1	A	81	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
2	D	93	SER	2.2
2	D	26	VAL	2.2
2	B	41	ILE	2.2
2	B	128	GLY	2.2
1	A	245	GLN	2.2
1	C	68	GLN	2.2
1	A	120	SER	2.1
2	D	67	CYS	2.1
1	A	196	ASP	2.1
1	A	67	GLU	2.1
1	A	134	GLU	2.1
1	C	153	THR	2.1
2	B	252	GLU	2.0
2	D	193	THR	2.0
1	A	41	CYS	2.0
2	D	260	LEU	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 oligosaccharides 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.