



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 09:52 AM UTC

PDB ID : 4LWO / pdb_00004lwo
Title : Crystal structure of PRMT6
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Deposited on : 2013-07-28
Resolution : 2.20 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

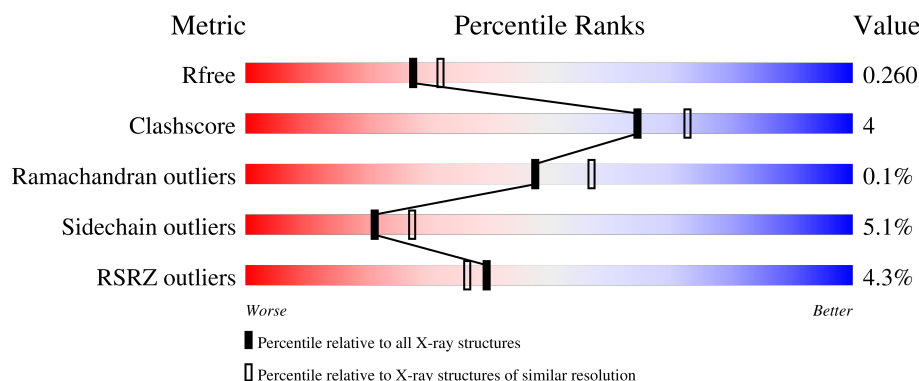
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (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	368	2% 84% 7% • 7%
1	B	368	2% 81% 10% • 7%
1	E	368	8% 80% 11% • 7%
1	G	368	4% 82% 10% • 7%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10531 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 Arginine N-methyltransferase, putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	341	Total	C	N	O	S	0	2	0
			2625	1685	443	485	12			
1	A	341	Total	C	N	O	S	0	0	0
			2613	1674	440	488	11			
1	E	341	Total	C	N	O	S	0	0	0
			2573	1652	433	477	11			
1	G	342	Total	C	N	O	S	0	1	0
			2560	1643	430	476	11			

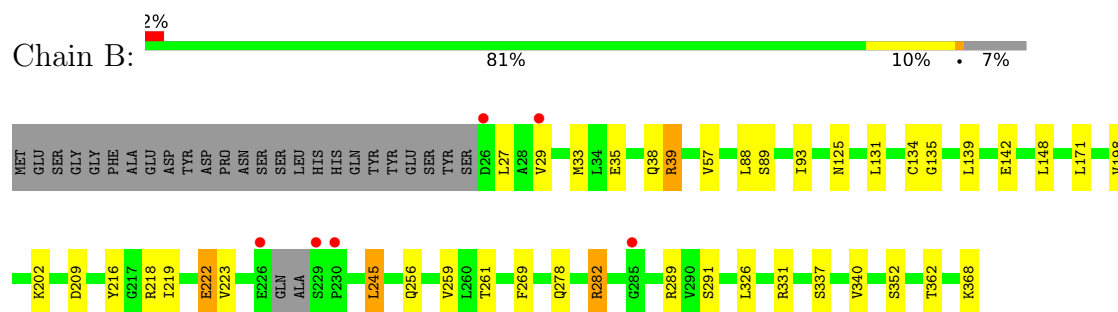
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	52	Total	O	0	0
			52	52		
2	A	59	Total	O	0	0
			59	59		
2	E	25	Total	O	0	0
			25	25		
2	G	24	Total	O	0	0
			24	24		

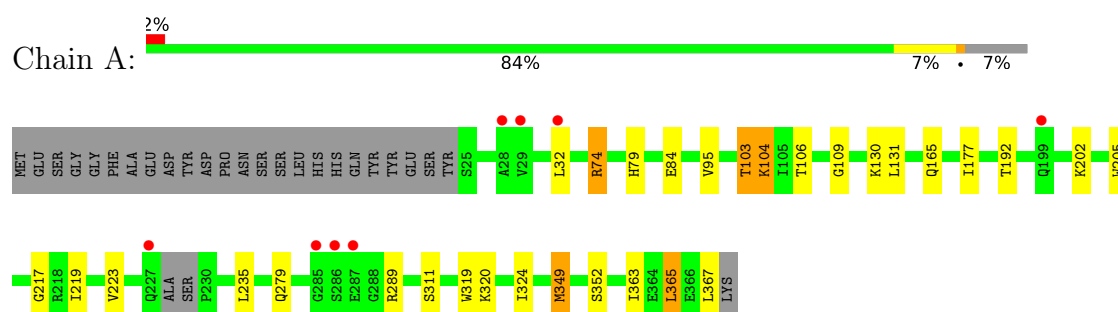
3 Residue-property plots [i](#)

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.

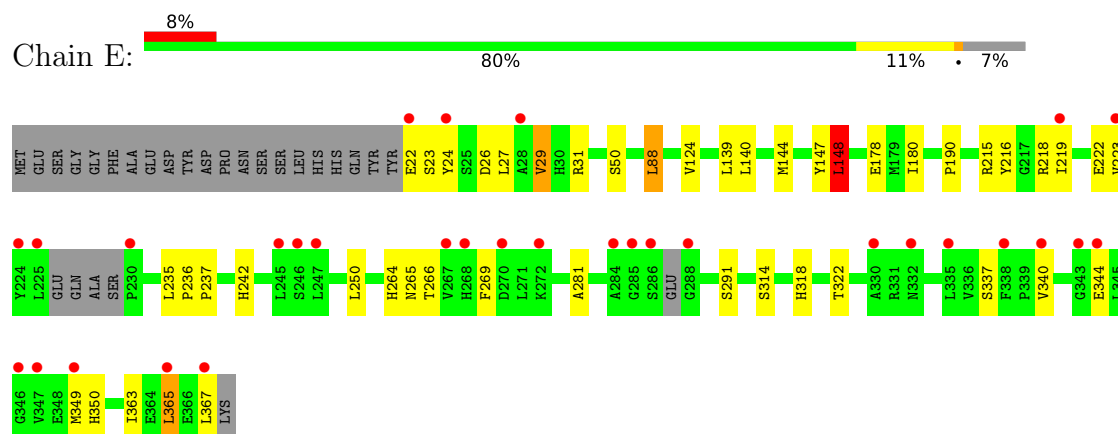
- Molecule 1: Arginine N-methyltransferase, putative



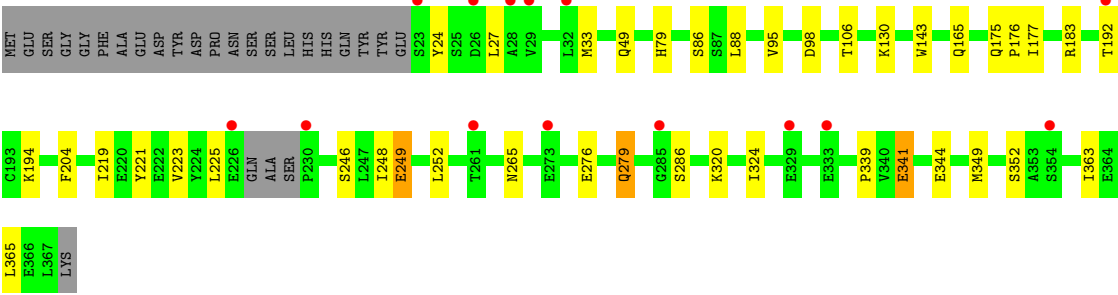
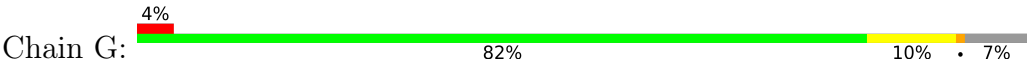
- Molecule 1: Arginine N-methyltransferase, putative



- Molecule 1: Arginine N-methyltransferase, putative



- Molecule 1: Arginine N-methyltransferase, putative



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	73.90Å 143.26Å 75.60Å 90.00° 96.67° 90.00°	Depositor
Resolution (Å)	44.03 – 2.20 44.03 – 2.20	Depositor EDS
% Data completeness (in resolution range)	97.9 (44.03-2.20) 97.9 (44.03-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.20 (at 2.20Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.202 , 0.249 (Not available) , 0.260	Depositor DCC
R_{free} test set	3869 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	34.3	Xtriage
Anisotropy	0.212	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 35.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.033 for l,-k,h	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	10531	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.31% 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	0.61	2/2671 (0.1%)	0.82	0/3631
1	B	0.57	1/2683 (0.0%)	0.84	2/3646 (0.1%)
1	E	0.57	1/2630 (0.0%)	0.83	1/3579 (0.0%)
1	G	0.45	0/2618	0.81	1/3566 (0.0%)
All	All	0.55	4/10602 (0.0%)	0.82	4/14422 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	320	LYS	C-O	-6.62	1.18	1.24
1	A	319	TRP	C-O	-6.09	1.16	1.24
1	E	148	LEU	C-O	-5.18	1.17	1.24
1	B	148	LEU	C-N	-5.05	1.24	1.33

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	148	LEU	N-CA-C	5.75	123.05	110.80
1	B	148	LEU	CB-CA-C	-5.57	99.33	110.42
1	E	148	LEU	CB-CA-C	-5.51	99.45	110.42
1	G	320	LYS	CB-CA-C	-5.29	110.46	116.54

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	2613	0	2517	14	0
1	B	2625	0	2550	25	0
1	E	2573	0	2457	25	0
1	G	2560	0	2417	23	0
2	A	59	0	0	1	0
2	B	52	0	0	0	0
2	E	25	0	0	0	0
2	G	24	0	0	1	0
All	All	10531	0	9941	80	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 4.

All (80) 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:33:MET:HG2	1:B:39:ARG:HH22	1.34	0.92
1:B:33:MET:HG2	1:B:39:ARG:NH2	1.97	0.79
1:A:79:HIS:NE2	1:A:106:THR:HG23	1.98	0.78
1:B:27:LEU:HG	1:B:88:LEU:HD21	1.74	0.70
1:E:147:TYR:HD1	1:E:322:THR:HG21	1.58	0.69
1:B:326:LEU:O	1:B:331:ARG:NH1	2.26	0.68
1:B:278:GLN:OE1	1:B:282:ARG:NH1	2.26	0.68
1:A:165:GLN:HE21	1:A:177:ILE:H	1.47	0.62
1:G:183:ARG:NH1	1:G:249[B]:GLU:OE2	2.33	0.61
1:A:103:THR:HG22	1:A:104:LYS:HG2	1.83	0.59
1:E:281:ALA:HB1	1:E:340:VAL:HG13	1.85	0.58
1:G:79:HIS:NE2	1:G:106:THR:HG23	2.19	0.58
1:B:289:ARG:NH1	1:B:337:SER:OG	2.36	0.58
1:E:219:ILE:O	1:E:223:VAL:HG22	2.03	0.58
1:G:192:THR:HG22	1:G:194:LYS:H	1.69	0.58
1:G:106:THR:HG21	1:G:130:LYS:NZ	2.19	0.57
1:B:39:ARG:HH21	1:B:39:ARG:CB	2.19	0.55
1:B:39:ARG:HH21	1:B:39:ARG:HB3	1.71	0.55
1:B:219:ILE:O	1:B:223:VAL:HG22	2.06	0.55
1:B:39:ARG:NH2	1:B:142:GLU:OE2	2.41	0.54
1:G:221:TYR:CZ	1:G:225:LEU:HD11	2.42	0.54
1:G:192:THR:HG23	2:G:419:HOH:O	2.07	0.53
1:A:106:THR:HG21	1:A:130:LYS:NZ	2.23	0.53
1:E:190:PRO:HD2	1:E:242:HIS:HB3	1.91	0.53
1:G:165:GLN:HE21	1:G:177:ILE:H	1.58	0.51
1:E:140:LEU:HD23	1:E:180:ILE:HB	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:269:PHE:O	1:E:344:GLU:HA	2.10	0.51
1:E:291:SER:HA	1:E:337:SER:HA	1.93	0.51
1:A:165:GLN:NE2	2:A:416:HOH:O	2.42	0.51
1:E:50:SER:OG	1:E:178:GLU:OE1	2.23	0.50
1:E:215:ARG:O	1:E:219:ILE:HG12	2.11	0.50
1:E:26:ASP:O	1:E:29:VAL:HG13	2.12	0.50
1:E:24:TYR:CB	1:G:223:VAL:HG11	2.43	0.49
1:E:218:ARG:O	1:E:222:GLU:HG2	2.12	0.49
1:A:324:ILE:HG21	1:A:365:LEU:HD12	1.95	0.49
1:B:198:VAL:HA	1:B:202:LYS:HB3	1.96	0.48
1:G:143:TRP:CZ2	1:G:252:LEU:HD21	2.49	0.47
1:E:26:ASP:O	1:E:29:VAL:CG1	2.62	0.47
1:E:31:ARG:HG3	1:G:204:PHE:CZ	2.51	0.46
1:B:256:GLN:O	1:B:259:VAL:HG22	2.16	0.45
1:B:282:ARG:HD3	1:B:282:ARG:HA	1.65	0.45
1:B:245:LEU:HD22	1:B:269:PHE:CD1	2.50	0.45
1:B:278:GLN:HB3	1:B:282:ARG:HH11	1.82	0.45
1:B:57:VAL:HB	1:B:135:GLY:O	2.17	0.45
1:A:106:THR:HG21	1:A:130:LYS:HZ2	1.82	0.45
1:B:216:TYR:CZ	1:A:95:VAL:HG21	2.52	0.45
1:A:219:ILE:O	1:A:223:VAL:HG12	2.16	0.45
1:G:106:THR:HG21	1:G:130:LYS:HZ3	1.80	0.45
1:E:147:TYR:CD1	1:E:322:THR:HG21	2.45	0.44
1:E:22:GLU:C	1:E:24:TYR:H	2.25	0.44
1:B:218:ARG:O	1:B:222:GLU:HB2	2.18	0.44
1:G:219:ILE:O	1:G:223:VAL:HG12	2.18	0.44
1:B:39:ARG:HH21	1:B:39:ARG:CG	2.31	0.43
1:G:27:LEU:HD23	1:G:27:LEU:HA	1.82	0.43
1:G:324:ILE:HD11	1:G:363:ILE:HD12	2.00	0.43
1:A:349:MET:HB3	1:A:349:MET:HE2	1.56	0.43
1:E:27:LEU:HD23	1:E:27:LEU:HA	1.79	0.43
1:G:276:GLU:O	1:G:279:GLN:HB2	2.18	0.42
1:E:265:ASN:OD1	1:E:266:THR:N	2.51	0.42
1:G:86:SER:OG	1:G:88:LEU:HB2	2.19	0.42
1:E:215:ARG:HH21	1:G:98:ASP:CG	2.26	0.42
1:G:175:GLN:HA	1:G:176:PRO:HD3	1.91	0.42
1:E:349:MET:HE3	1:E:365:LEU:HD12	2.01	0.42
1:E:264:HIS:HB3	1:E:350:HIS:CE1	2.55	0.42
1:E:223:VAL:HG21	1:G:24:TYR:CB	2.49	0.42
1:B:89:SER:O	1:B:93:ILE:HG13	2.19	0.42
1:B:131:LEU:HD13	1:B:171:LEU:HD11	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:205:TRP:CD1	1:A:217:GLY:HA2	2.56	0.41
1:G:349:MET:HE3	1:G:349:MET:HB2	1.97	0.41
1:B:209:ASP:O	1:A:74:ARG:NH2	2.40	0.41
1:A:349:MET:HE3	1:A:363:ILE:HG23	2.03	0.41
1:B:291:SER:HA	1:B:337:SER:HA	2.03	0.41
1:E:88:LEU:HD23	1:E:88:LEU:HA	1.84	0.41
1:G:88:LEU:HD23	1:G:88:LEU:HA	1.94	0.41
1:E:216:TYR:CE2	1:G:95:VAL:HG21	2.56	0.41
1:B:57:VAL:HG23	1:B:134[B]:CYS:SG	2.61	0.41
1:G:339:PRO:HB2	1:G:341:GLU:OE2	2.21	0.41
1:B:219:ILE:HD13	1:B:219:ILE:HA	1.91	0.40
1:A:84:GLU:O	1:A:109:GLY:HA2	2.22	0.40
1:E:236:PRO:HA	1:E:237:PRO:HD2	1.93	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	337/368 (92%)	328 (97%)	9 (3%)	0	100	100
1	B	339/368 (92%)	331 (98%)	8 (2%)	0	100	100
1	E	335/368 (91%)	323 (96%)	10 (3%)	2 (1%)	21	23
1	G	339/368 (92%)	329 (97%)	10 (3%)	0	100	100
All	All	1350/1472 (92%)	1311 (97%)	37 (3%)	2 (0%)	48	57

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	23	SER
1	E	148	LEU

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	272/317 (86%)	257 (94%)	15 (6%)	19	24
1	B	275/317 (87%)	261 (95%)	14 (5%)	21	27
1	E	263/317 (83%)	250 (95%)	13 (5%)	22	29
1	G	258/317 (81%)	245 (95%)	13 (5%)	22	28
All	All	1068/1268 (84%)	1013 (95%)	55 (5%)	21	27

All (55) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	29	VAL
1	B	35	GLU
1	B	38	GLN
1	B	39	ARG
1	B	125	ASN
1	B	139	LEU
1	B	222	GLU
1	B	245	LEU
1	B	261	THR
1	B	282	ARG
1	B	340	VAL
1	B	352	SER
1	B	362	THR
1	B	368	LYS
1	A	32	LEU
1	A	74	ARG
1	A	103	THR
1	A	104	LYS
1	A	131	LEU
1	A	192	THR
1	A	202	LYS
1	A	235	LEU
1	A	279	GLN
1	A	289	ARG

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Mol	Chain	Res	Type
1	A	311	SER
1	A	349	MET
1	A	352	SER
1	A	365	LEU
1	A	367	LEU
1	E	29	VAL
1	E	88	LEU
1	E	124	VAL
1	E	139	LEU
1	E	144	MET
1	E	148	LEU
1	E	235	LEU
1	E	250	LEU
1	E	314	SER
1	E	318	HIS
1	E	363	ILE
1	E	365	LEU
1	E	367	LEU
1	G	33	MET
1	G	49	GLN
1	G	246	SER
1	G	248	ILE
1	G	249[A]	GLU
1	G	249[B]	GLU
1	G	265	ASN
1	G	279	GLN
1	G	286	SER
1	G	341	GLU
1	G	344	GLU
1	G	352	SER
1	G	365	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	92	GLN
1	B	306	HIS
1	B	350	HIS
1	A	38	GLN
1	A	165	GLN
1	A	199	GLN
1	A	268	HIS

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Mol	Chain	Res	Type
1	A	279	GLN
1	E	30	HIS
1	G	30	HIS
1	G	165	GLN
1	G	332	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 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	341/368 (92%)	-0.04	8 (2%) 61 58	19, 31, 50, 70	0
1	B	341/368 (92%)	-0.09	6 (1%) 67 64	15, 30, 46, 61	2 (0%)
1	E	341/368 (92%)	0.62	31 (9%) 15 12	24, 42, 68, 81	0
1	G	342/368 (92%)	0.43	14 (4%) 41 38	21, 42, 59, 69	1 (0%)
All	All	1365/1472 (92%)	0.23	59 (4%) 40 36	15, 36, 60, 81	3 (0%)

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	226	GLU	5.1
1	E	288	GLY	4.9
1	A	29	VAL	4.5
1	G	226	GLU	4.5
1	E	344	GLU	4.4
1	B	229	SER	4.2
1	B	29	VAL	3.7
1	E	230	PRO	3.6
1	G	28	ALA	3.6
1	E	270	ASP	3.5
1	G	26	ASP	3.5
1	A	286	SER	3.4
1	E	335	LEU	3.3
1	G	32	LEU	3.3
1	G	29	VAL	3.2
1	G	230	PRO	3.2
1	A	285	GLY	3.2
1	E	343	GLY	3.1
1	B	230	PRO	3.1
1	G	273	GLU	3.0
1	E	286	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	E	28	ALA	3.0
1	E	24	TYR	2.9
1	E	338	PHE	2.9
1	A	32	LEU	2.8
1	E	330	ALA	2.8
1	G	285	GLY	2.8
1	E	225	LEU	2.8
1	G	329	GLU	2.7
1	E	272	LYS	2.7
1	E	267	VAL	2.7
1	E	246	SER	2.7
1	E	349	MET	2.7
1	E	223	VAL	2.7
1	E	340	VAL	2.7
1	E	268	HIS	2.6
1	E	285	GLY	2.6
1	G	333	GLU	2.6
1	E	219	ILE	2.5
1	B	26	ASP	2.5
1	G	261	THR	2.4
1	E	245	LEU	2.4
1	E	367	LEU	2.4
1	E	332	ASN	2.3
1	E	347	VAL	2.3
1	E	224	TYR	2.2
1	E	346	GLY	2.2
1	E	22	GLU	2.2
1	E	365	LEU	2.2
1	A	227	GLN	2.1
1	B	285	GLY	2.1
1	A	28	ALA	2.1
1	G	192	THR	2.1
1	A	287	GLU	2.1
1	G	23	SER	2.1
1	A	199	GLN	2.1
1	E	247	LEU	2.0
1	G	354	SER	2.0
1	E	284	ALA	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 [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.