W O R L D W I D E
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P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

Oct 10, 2023 – 02:45 AM EDT

PDB ID	:	7TE6
Title	:	Crystal structure of GluN1b-2B ATD complexed to Fab5 anti-GluN2B antibody
Authors	:	Regan, M.; Tajima, N.; Furukawa, H.
Deposited on	:	2022-01-04
Resolution	:	4.55 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) symbol.

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

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

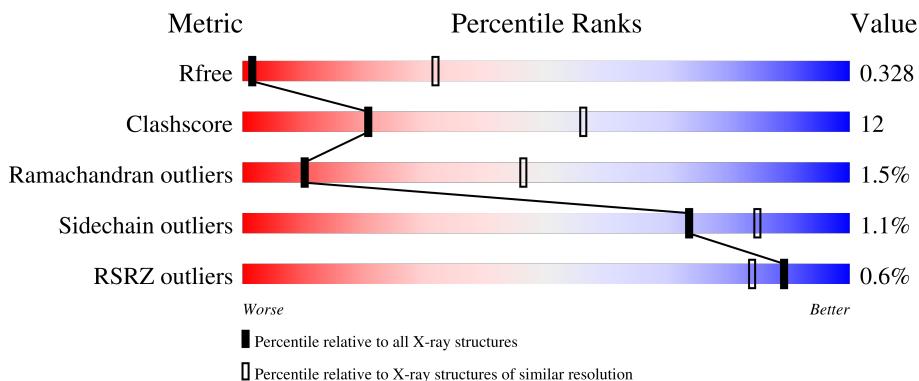|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 4.55 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.
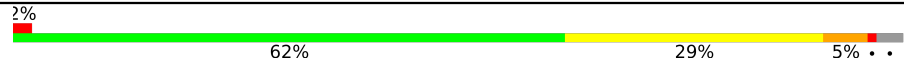
Metric	Percentile Ranks	Value
Rfree		0.328
Clashscore		12
Ramachandran outliers		1.5%
Sidechain outliers		1.1%
RSRZ outliers		0.6%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1060 (5.30-3.80)
Clashscore	141614	1128 (5.30-3.80)
Ramachandran outliers	138981	1072 (5.30-3.80)
Sidechain outliers	138945	1053 (5.30-3.80)
RSRZ outliers	127900	1101 (5.30-3.70)

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 <=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	383	70% 19% • 10%
1	E	383	.% 68% 21% •• 10%
2	B	364	.% 69% 20% • 10%
2	F	364	64% 23% • 10%
3	C	221	67% 27% • • •

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Mol	Chain	Length	Quality of chain
3	G	221	2% 62% 29% 5%
4	D	215	75% 25%
4	H	215	72% 27%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 17193 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 Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	346	Total 2714	C 1729	N 472	O 502	S 11	0	0	0
1	E	345	Total 2706	C 1725	N 470	O 500	S 11	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	61	GLN	ASN	conflict	UNP A0A1L8F5J9
A	371	GLN	ASN	conflict	UNP A0A1L8F5J9
E	61	GLN	ASN	conflict	UNP A0A1L8F5J9
E	371	GLN	ASN	conflict	UNP A0A1L8F5J9

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	329	Total 2584	C 1653	N 407	O 510	S 14	0	0	0
2	F	327	Total 2571	C 1645	N 404	O 508	S 14	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	348	ASP	ASN	conflict	UNP Q00960
F	348	ASP	ASN	conflict	UNP Q00960

- Molecule 3 is a protein called Fab5 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	215	Total 1633	C 1030	N 269	O 325	S 9	0	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	G	214	Total 1629	C 1028	N 268	O 324	S 9	0	0	0

- Molecule 4 is a protein called Fab5 light chain.

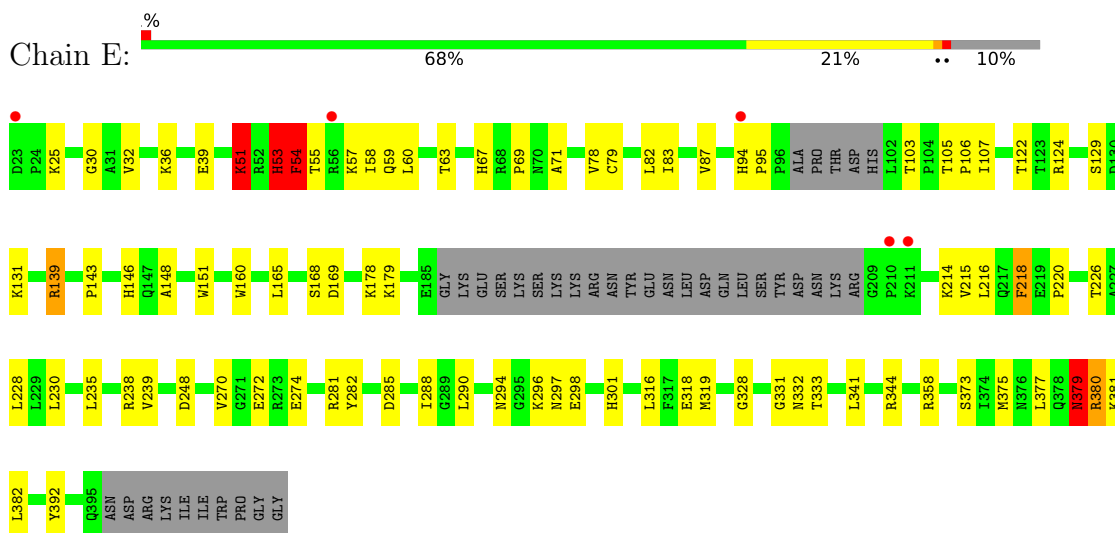| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	215	Total 1678	C 1046	N 287	O 339	S 6	0	0	0
4	H	215	Total 1678	C 1046	N 287	O 339	S 6	0	0	0

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.
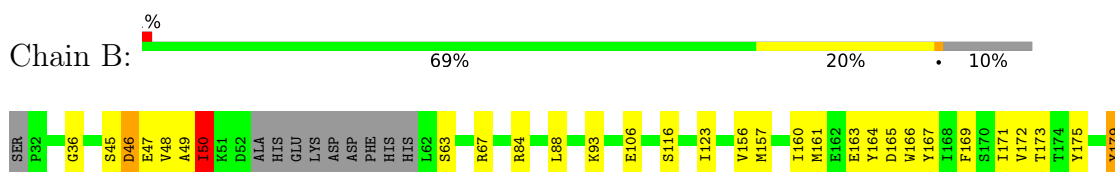
- Molecule 1: Glutamate receptor ionotropic, NMDA 1
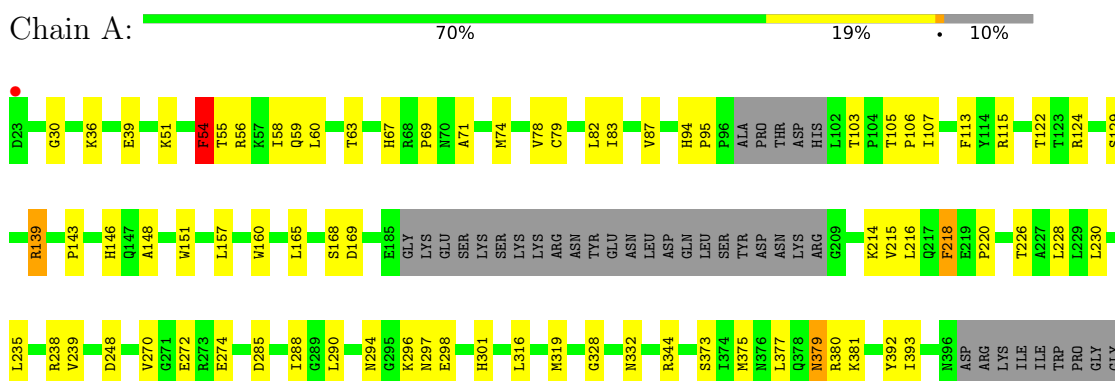
Chain A:

- Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain E:

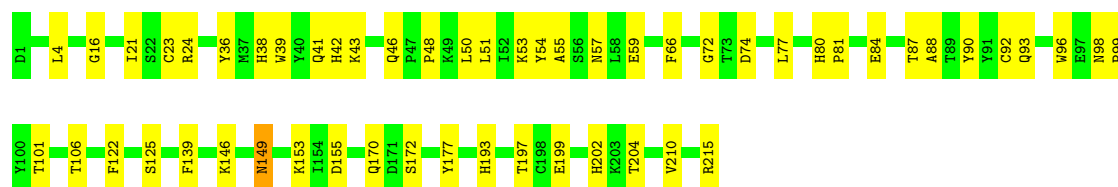- Molecule 2: Glutamate receptor ionotropic, NMDA 2B

Chain B:

● Molecule 2: Glutamate receptor ionotropic, NMDA 2B

Chain F:

● Molecule 3: Fab5 heavy chain

Chain C:

● Molecule 3: Fab5 heavy chain

Chain G:

● Molecule 4: Fab5 light chain

Chain D:

75%   25%

D1 L4 G16 I21 S22 C23 R24 Y36 M37 H38 W39 Y40 Q41 H42 K43 Q46 P47 P48 K49 L50 L51 I52 K53 Y54 A55 S56 N57 L58 E59 F66 G72 T73 D74 L77 H80 P81 E84 T87 A88 T89 Y90 Y91 C92 Q93 W96 E97 N98 P99

Y100 T101 T106 F122 S125 F139 K146 N149 K153 I154 D155 Q170 D171 S172 Y177 H193 T197 C198 E199 H202 K203 T204 V210 R215

• Molecule 4: Fab5 light chain

Chain H:

72%   27%   •

D1 L4 L15 G16 I21 S22 C23 Y34 S35 Y36 M37 H38 W39 Y40 Q41 H42 K43 P44 G45 Q46 P47 P48 K49 L50 L51 I52 K53 Y54 A55 S56 N57 L58 E59 F66 S71 G72 T73 D74 F75 H80 P81 T87 A88 T89 Y90 Y91 C92 Q93 P99 Y100 T101

F102 T106 P123 L129 P145 K146 D147 I148 N149 K153 I154 D155 W167 Q170 Y177 K187 E191 R192 H193 T197 C198 E199 H202 K203 T204 V210 R215
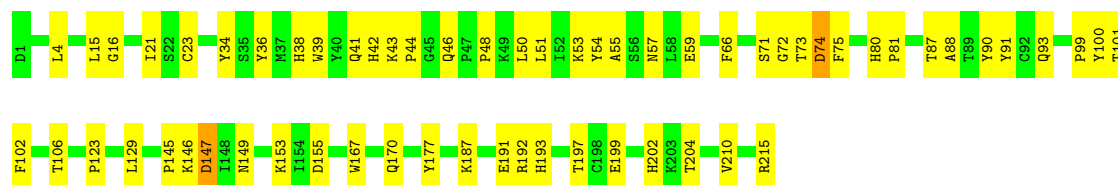
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	124.92Å 124.92Å 407.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.98 – 4.55 34.65 – 4.55	Depositor EDS
% Data completeness (in resolution range)	93.3 (24.98-4.55) 93.4 (34.65-4.55)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.90 (at 4.62Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.282 , 0.324 0.284 , 0.328	Depositor DCC
R_{free} test set	920 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	76.6	Xtriage
Anisotropy	0.154	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.27 , 46.4	EDS
L-test for twinning[2]	$< |L| > = 0.44, < L^2 > = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.79	EDS
Total number of atoms	17193	wwPDB-VP
Average B, all atoms (Å^2)	83.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.49% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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	0.35	1/2768 (0.0%)	0.54	1/3751 (0.0%)
1	E	0.39	0/2760	0.61	4/3740 (0.1%)
2	B	0.33	0/2635	0.59	2/3576 (0.1%)
2	F	0.45	2/2622 (0.1%)	0.67	4/3560 (0.1%)
3	C	0.43	1/1672 (0.1%)	0.70	3/2280 (0.1%)
3	G	0.54	2/1668 (0.1%)	0.76	5/2275 (0.2%)
4	D	0.37	1/1721 (0.1%)	0.60	0/2340
4	H	0.38	1/1721 (0.1%)	0.62	0/2340
All	All	0.40	8/17567 (0.0%)	0.63	19/23862 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	E	0	4
2	B	0	3
2	F	0	3
3	C	0	5
3	G	0	5
4	H	0	2
All	All	0	24

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	G	194	TRP	CB-CG	13.31	1.74	1.50
2	F	47	GLU	CB-CG	7.79	1.67	1.52
2	F	47	GLU	CG-CD	6.73	1.62	1.51
3	C	194	TRP	CB-CG	-6.29	1.39	1.50
3	G	160	TRP	CB-CG	-6.15	1.39	1.50

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	392	TYR	CA-CB-CG	8.12	128.83	113.40
1	E	53	HIS	C-N-CA	-7.53	102.89	121.70
2	F	47	GLU	C-N-CA	6.94	139.05	121.70
2	B	349	LEU	CA-CB-CG	-6.67	99.95	115.30
2	F	349	LEU	CA-CB-CG	-6.67	99.97	115.30

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	51	LYS	Mainchain
1	A	54	PHE	Mainchain
2	B	252	TYR	Peptide
2	B	46	ASP	Mainchain
2	B	50	ILE	Mainchain

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	2714	0	2744	49	1
1	E	2706	0	2738	57	1
2	B	2584	0	2551	52	0
2	F	2571	0	2535	76	2
3	C	1633	0	1595	50	0
3	G	1629	0	1592	88	0
4	D	1678	0	1600	37	0
4	H	1678	0	1600	46	0
All	All	17193	0	16955	419	2

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 12.

The worst 5 of 419 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)
3:G:161:ASN:HD22	3:G:165:LEU:HD12	1.27	0.97
3:G:198:THR:HG21	3:G:215:LYS:HE3	1.46	0.97
1:E:381:LYS:HG2	1:E:382:LEU:H	1.29	0.96
3:G:219:ARG:H	3:G:220:ASP:HA	1.36	0.90
2:F:294:ARG:NE	2:F:345:GLU:OE2	2.08	0.84

All (2) 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)
1:A:36:LYS:NZ	2:F:102:ASP:O[7_455]	2.19	0.01
1:E:51:LYS:NZ	2:F:276:GLY:O[6_564]	2.19	0.01

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	340/383 (89%)	324 (95%)	14 (4%)	2 (1%)	25	65
1	E	339/383 (88%)	314 (93%)	21 (6%)	4 (1%)	13	50
2	B	323/364 (89%)	297 (92%)	22 (7%)	4 (1%)	13	50
2	F	321/364 (88%)	292 (91%)	21 (6%)	8 (2%)	5	35
3	C	211/221 (96%)	193 (92%)	14 (7%)	4 (2%)	8	40
3	G	210/221 (95%)	191 (91%)	14 (7%)	5 (2%)	6	36
4	D	213/215 (99%)	201 (94%)	10 (5%)	2 (1%)	17	56
4	H	213/215 (99%)	200 (94%)	10 (5%)	3 (1%)	11	47
All	All	2170/2366 (92%)	2012 (93%)	126 (6%)	32 (2%)	10	46

5 of 32 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	99	ARG
3	C	218	PRO
3	C	220	ASP
2	F	49	ALA
2	F	165	ASP

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	296/329 (90%)	292 (99%)	4 (1%)	67	81
1	E	295/329 (90%)	290 (98%)	5 (2%)	60	78
2	B	293/327 (90%)	292 (100%)	1 (0%)	92	95
2	F	292/327 (89%)	290 (99%)	2 (1%)	84	90
3	C	188/192 (98%)	186 (99%)	2 (1%)	73	85
3	G	188/192 (98%)	184 (98%)	4 (2%)	53	72
4	D	190/190 (100%)	188 (99%)	2 (1%)	73	85
4	H	190/190 (100%)	188 (99%)	2 (1%)	73	85
All	All	1932/2076 (93%)	1910 (99%)	22 (1%)	73	85

5 of 22 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	62	LEU
3	G	34	MET
3	G	32	TYR
3	G	104	PHE
3	C	201	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	G	74	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	346/383 (90%)	-0.31	1 (0%)	94	90	45, 78, 108, 142	0
1	E	345/383 (90%)	-0.10	5 (1%)	75	66	57, 91, 123, 158	0
2	B	329/364 (90%)	-0.34	2 (0%)	89	84	39, 61, 97, 128	0
2	F	327/364 (89%)	-0.11	1 (0%)	94	90	58, 90, 123, 167	0
3	C	215/221 (97%)	-0.12	0	100	100	54, 85, 141, 179	0
3	G	214/221 (96%)	0.05	4 (1%)	66	58	54, 83, 150, 202	0
4	D	215/215 (100%)	-0.30	0	100	100	39, 77, 114, 129	0
4	H	215/215 (100%)	-0.10	0	100	100	50, 78, 103, 123	0
All	All	2206/2366 (93%)	-0.18	13 (0%)	89	84	39, 82, 121, 202	0

The worst 5 of 13 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	378	LYS	3.9
3	G	164	SER	3.6
1	E	56	ARG	3.1
1	E	211	LYS	3.1
1	A	23	ASP	2.8

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 monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.