Full wwPDB X-ray Structure Validation Report ⓘ

Jun 16, 2024 – 06:38 PM EDT

PDB ID	:	5NT1
Title	:	Complex of influenza A NS1 effector domain with TRIM25 coiled coil
Authors	:	Koliopoulos, M.G.; Rittinger, K.
Deposited on	:	2017-04-27
Resolution	:	2.82 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:

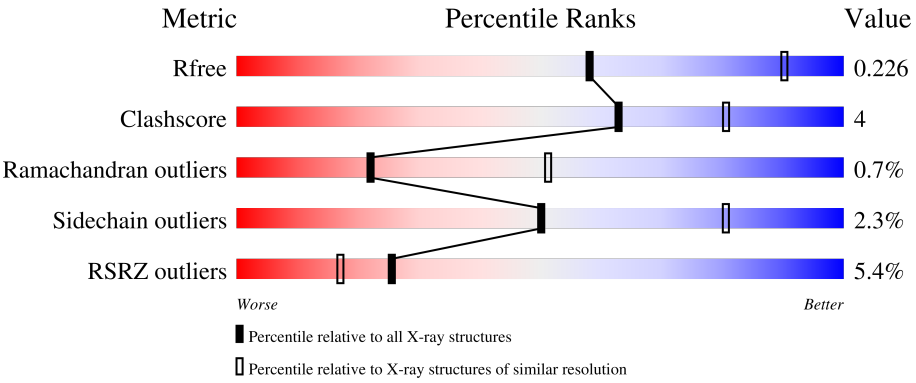
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.82 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	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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	193	8% 73% 15% 10%
1	E	193	7% 78% 10% 10%
1	I	193	8% 74% 15% 10%
2	B	154	% 69% 8% 22%
2	F	154	% 73% 5% 22%

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Mol	Chain	Length	Quality of chain
2	J	154	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7038 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 E3 ubiquitin/ISG15 ligase TRIM25.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	173	Total	C	N	O	S	0	0	0
			1401	869	250	278	4			
1	E	173	Total	C	N	O	S	0	0	0
			1401	869	250	278	4			
1	I	173	Total	C	N	O	S	0	0	0
			1399	868	250	277	4			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	187	GLY	-	expression tag	UNP Q14258
A	188	PRO	-	expression tag	UNP Q14258
A	189	GLY	-	expression tag	UNP Q14258
A	358	LEU	PRO	variant	UNP Q14258
E	187	GLY	-	expression tag	UNP Q14258
E	188	PRO	-	expression tag	UNP Q14258
E	189	GLY	-	expression tag	UNP Q14258
E	358	LEU	PRO	variant	UNP Q14258
I	187	GLY	-	expression tag	UNP Q14258
I	188	PRO	-	expression tag	UNP Q14258
I	189	GLY	-	expression tag	UNP Q14258
I	358	LEU	PRO	variant	UNP Q14258

- Molecule 2 is a protein called Non-structural protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	120	Total	C	N	O	S	0	0	0
			945	601	162	176	6			
2	F	120	Total	C	N	O	S	0	0	0
			945	601	162	176	6			
2	J	119	Total	C	N	O	S	0	0	0
			939	598	161	174	6			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	77	GLY	-	expression tag	UNP P03496
B	78	PRO	-	expression tag	UNP P03496
B	79	GLY	-	expression tag	UNP P03496
B	101	GLU	ASP	variant	UNP P03496
F	77	GLY	-	expression tag	UNP P03496
F	78	PRO	-	expression tag	UNP P03496
F	79	GLY	-	expression tag	UNP P03496
F	101	GLU	ASP	variant	UNP P03496
J	77	GLY	-	expression tag	UNP P03496
J	78	PRO	-	expression tag	UNP P03496
J	79	GLY	-	expression tag	UNP P03496
J	101	GLU	ASP	variant	UNP P03496

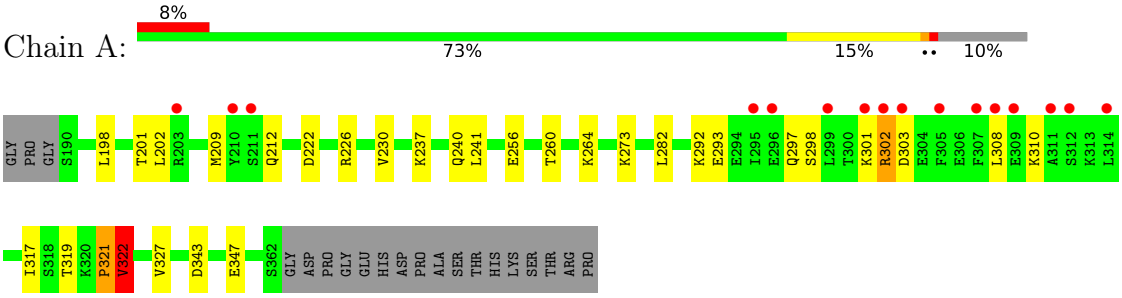
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O 1 1	0	0
3	E	1	Total O 1 1	0	0
3	I	2	Total O 2 2	0	0
3	J	4	Total O 4 4	0	0

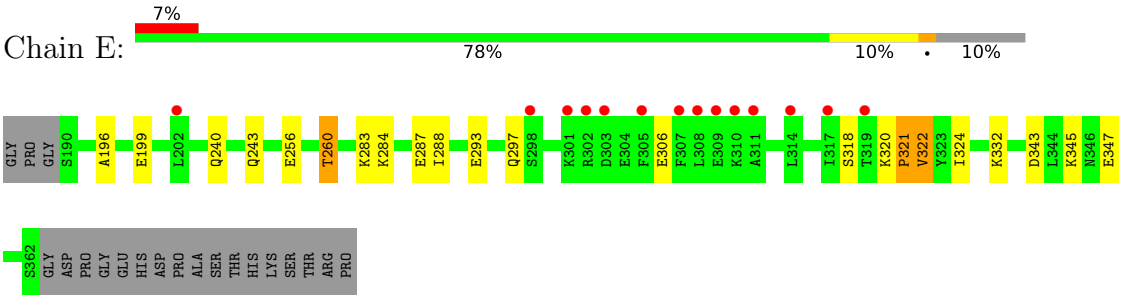
3 Residue-property plots (i)

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.

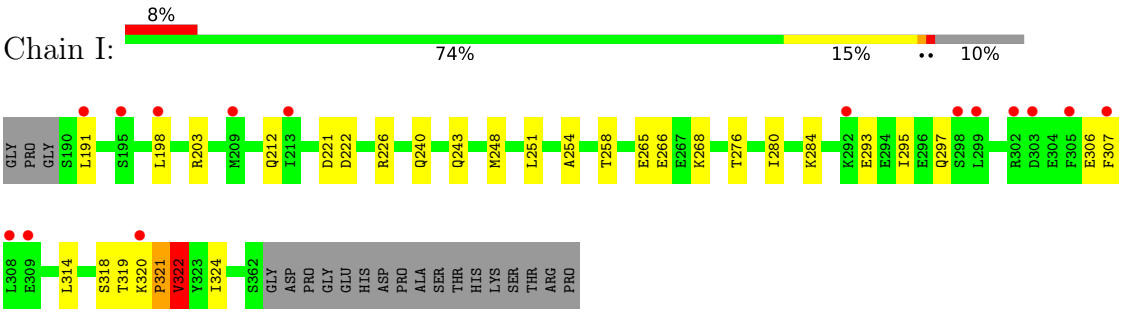
• Molecule 1: E3 ubiquitin/ISG15 ligase TRIM25



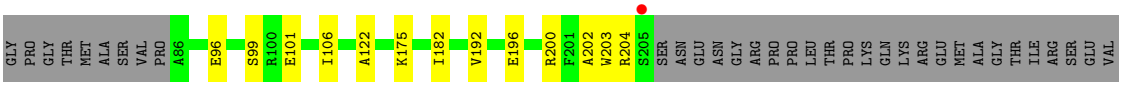
• Molecule 1: E3 ubiquitin/ISG15 ligase TRIM25



• Molecule 1: E3 ubiquitin/ISG15 ligase TRIM25

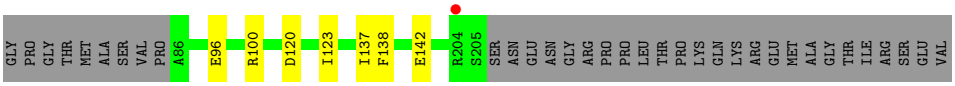


• Molecule 2: Non-structural protein 1



• Molecule 2: Non-structural protein 1

Chain F:



• Molecule 2: Non-structural protein 1

Chain J:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	131.38Å 225.23Å 146.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.69 – 2.82 48.68 – 2.82	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.69-2.82) 97.5 (48.68-2.82)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.61 (at 2.81Å)	Xtriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.195 , 0.224 0.196 , 0.226	Depositor DCC
R_{free} test set	2601 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å^2)	70.2	Xtriage
Anisotropy	0.203	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 47.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.399 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.407 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7038	wwPDB-VP
Average B, all atoms (Å^2)	82.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.67% of the height of the origin peak. No significant pseudotranslation is detected.*

[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	0.33	0/1413	0.50	0/1892
1	E	0.33	0/1413	0.49	0/1892
1	I	0.33	0/1411	0.51	0/1889
2	B	0.33	0/961	0.54	0/1301
2	F	0.32	0/961	0.54	0/1301
2	J	0.36	0/955	0.55	0/1293
All	All	0.33	0/7114	0.52	0/9568

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

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	1401	0	1450	15	0
1	E	1401	0	1450	12	0
1	I	1399	0	1446	17	0
2	B	945	0	964	7	0
2	F	945	0	964	4	0
2	J	939	0	959	7	0
3	A	1	0	0	0	0
3	E	1	0	0	0	0
3	I	2	0	0	1	0
3	J	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	7038	0	7233	61	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 (61) 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:E:256:GLU:O	1:E:260:THR:HG23	1.91	0.69
2:B:196:GLU:OE2	2:B:200:ARG:NH1	2.25	0.69
2:F:96:GLU:OE1	2:F:100:ARG:NE	2.29	0.65
1:A:256:GLU:O	1:A:260:THR:HG23	1.99	0.61
1:I:248:MET:HA	1:I:251:LEU:HD12	1.83	0.60
2:B:101:GLU:OE2	1:I:212:GLN:NE2	2.29	0.59
1:I:222:ASP:OD2	1:I:226:ARG:NH1	2.36	0.58
2:J:137:ILE:HG22	2:J:142:GLU:HB2	1.85	0.58
1:I:254:ALA:O	1:I:258:THR:HG23	2.04	0.56
2:F:120:ASP:HB3	2:F:123:ILE:HG12	1.90	0.53
2:B:203:TRP:O	2:B:204:ARG:NH1	2.42	0.53
1:I:284:LYS:NZ	1:I:319:THR:OG1	2.27	0.52
2:J:106:ILE:HG13	2:J:122:ALA:HB2	1.92	0.52
1:I:222:ASP:HB3	3:I:401:HOH:O	2.10	0.51
1:A:209:MET:HA	1:A:212:GLN:CD	2.31	0.51
1:I:240:GLN:O	1:I:243:GLN:HG2	2.11	0.51
2:B:175:LYS:HD3	2:B:202:ALA:O	2.11	0.50
2:F:137:ILE:HG22	2:F:142:GLU:HB2	1.92	0.50
1:E:240:GLN:O	1:E:243:GLN:HG2	2.11	0.49
1:E:306:GLU:OE1	1:E:306:GLU:N	2.36	0.49
1:E:196:ALA:HA	1:E:199:GLU:HB2	1.94	0.49
1:I:280:ILE:HD11	1:I:324:ILE:HD12	1.95	0.48
1:A:237:LYS:HE3	1:A:240:GLN:OE1	2.13	0.48
2:B:106:ILE:HG13	2:B:122:ALA:HB2	1.95	0.48
1:A:317:ILE:HG23	1:A:319:THR:HG23	1.96	0.48
2:J:120:ASP:HB3	2:J:123:ILE:HG12	1.96	0.48
2:F:137:ILE:HG12	2:F:138:PHE:CD2	2.50	0.47
1:I:276:THR:O	1:I:280:ILE:HG23	2.14	0.47
1:I:265:GLU:OE2	1:I:266:GLU:N	2.48	0.47
2:B:202:ALA:HB3	2:B:203:TRP:CE3	2.50	0.47
1:E:293:GLU:O	1:E:297:GLN:HG2	2.15	0.47
1:E:318:SER:HB2	1:E:320:LYS:HE3	1.96	0.47
1:A:321:PRO:O	1:A:322:VAL:HG12	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:321:PRO:HB2	1:A:322:VAL:H	1.58	0.46
2:B:182:ILE:HG12	2:B:192:VAL:HG11	1.96	0.46
1:A:293:GLU:O	1:A:297:GLN:HG2	2.16	0.45
1:I:318:SER:HB2	1:I:320:LYS:HE3	1.98	0.45
1:I:295:ILE:HG12	1:I:314:LEU:HD13	1.98	0.45
1:A:273:LYS:HD3	1:A:327:VAL:HG22	1.97	0.45
1:E:332:LYS:HA	1:E:332:LYS:HD3	1.80	0.44
1:A:343:ASP:O	1:A:347:GLU:HG2	2.17	0.44
1:E:283:LYS:HE3	1:E:287:GLU:OE2	2.18	0.44
1:I:293:GLU:O	1:I:297:GLN:HG2	2.16	0.44
2:J:137:ILE:HG13	2:J:138:PHE:CD2	2.53	0.44
1:E:345:LYS:HE2	1:E:345:LYS:HB3	1.79	0.44
1:E:284:LYS:O	1:E:288:ILE:HG12	2.18	0.44
2:J:140:ARG:NH1	2:J:204:ARG:HD2	2.33	0.44
1:A:308:LEU:HD12	1:A:308:LEU:H	1.83	0.43
1:I:306:GLU:OE1	1:I:306:GLU:N	2.35	0.43
2:J:92:ASP:HB3	2:J:131:LYS:HB3	2.01	0.43
1:A:209:MET:O	1:A:212:GLN:HG2	2.19	0.43
1:I:321:PRO:HB2	1:I:322:VAL:H	1.62	0.43
1:A:302:ARG:HG2	1:A:303:ASP:N	2.34	0.42
1:E:343:ASP:O	1:E:347:GLU:HG2	2.19	0.42
1:I:191:LEU:HD23	1:I:191:LEU:HA	1.88	0.42
2:J:123:ILE:HG13	2:J:157:VAL:HB	2.02	0.41
1:A:222:ASP:OD2	1:A:226:ARG:NH1	2.50	0.41
1:I:268:LYS:HD2	1:I:268:LYS:HA	1.86	0.41
1:A:198:LEU:O	1:A:202:LEU:HG	2.21	0.41
1:A:298:SER:OG	1:A:310:LYS:NZ	2.54	0.41
1:E:321:PRO:HB2	1:E:322:VAL:H	1.64	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	171/193 (89%)	167 (98%)	2 (1%)	2 (1%)	13 37
1	E	171/193 (89%)	165 (96%)	4 (2%)	2 (1%)	13 37
1	I	171/193 (89%)	165 (96%)	4 (2%)	2 (1%)	13 37
2	B	118/154 (77%)	116 (98%)	2 (2%)	0	100 100
2	F	118/154 (77%)	115 (98%)	3 (2%)	0	100 100
2	J	117/154 (76%)	112 (96%)	5 (4%)	0	100 100
All	All	866/1041 (83%)	840 (97%)	20 (2%)	6 (1%)	22 51

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	321	PRO
1	E	321	PRO
1	I	321	PRO
1	A	322	VAL
1	I	322	VAL
1	E	322	VAL

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	160/175 (91%)	151 (94%)	9 (6%)	21 49
1	E	160/175 (91%)	158 (99%)	2 (1%)	69 90
1	I	159/175 (91%)	154 (97%)	5 (3%)	40 72
2	B	104/132 (79%)	102 (98%)	2 (2%)	57 84
2	F	104/132 (79%)	104 (100%)	0	100 100
2	J	103/132 (78%)	103 (100%)	0	100 100
All	All	790/921 (86%)	772 (98%)	18 (2%)	50 80

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	201	THR
1	A	230	VAL
1	A	241	LEU
1	A	264	LYS
1	A	282	LEU
1	A	292	LYS
1	A	301	LYS
1	A	302	ARG
1	A	322	VAL
2	B	96	GLU
2	B	99	SER
1	E	260	THR
1	E	324	ILE
1	I	198	LEU
1	I	203	ARG
1	I	221	ASP
1	I	307	PHE
1	I	322	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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

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, 95^{th} 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	173/193 (89%)	0.66	16 (9%) 9 5	45, 73, 183, 250	0
1	E	173/193 (89%)	0.63	14 (8%) 12 6	44, 75, 180, 245	0
1	I	173/193 (89%)	0.58	15 (8%) 10 5	45, 77, 174, 222	0
2	B	120/154 (77%)	0.25	1 (0%) 86 82	41, 60, 97, 196	0
2	F	120/154 (77%)	0.20	1 (0%) 86 82	43, 59, 97, 215	0
2	J	119/154 (77%)	0.31	0 100 100	38, 59, 99, 152	0
All	All	878/1041 (84%)	0.47	47 (5%) 25 17	38, 66, 172, 250	0

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	309	GLU	8.5
1	I	309	GLU	6.1
1	A	308	LEU	5.6
1	I	305	PHE	5.4
1	A	305	PHE	5.2
1	I	308	LEU	5.2
1	A	307	PHE	5.2
1	I	302	ARG	5.0
1	A	314	LEU	4.9
1	E	317	ILE	4.9
1	A	309	GLU	4.6
1	E	305	PHE	4.4
1	A	312	SER	4.2
1	A	302	ARG	4.1
1	E	302	ARG	4.1
2	F	204	ARG	3.8
1	I	307	PHE	3.6
1	E	301	LYS	3.6
1	I	198	LEU	3.5

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Mol	Chain	Res	Type	RSRZ
1	E	319	THR	3.4
1	I	191	LEU	3.3
1	E	310	LYS	3.3
1	A	301	LYS	3.2
1	I	195	SER	3.2
1	A	303	ASP	3.0
1	E	314	LEU	3.0
1	I	303	ASP	2.9
1	E	298	SER	2.9
1	I	298	SER	2.7
2	B	205	SER	2.7
1	E	307	PHE	2.7
1	I	299	LEU	2.5
1	A	311	ALA	2.5
1	A	210	TYR	2.5
1	E	303	ASP	2.4
1	A	295	ILE	2.4
1	I	213	ILE	2.3
1	E	311	ALA	2.3
1	A	203	ARG	2.3
1	A	296	GLU	2.3
1	E	308	LEU	2.2
1	A	299	LEU	2.2
1	A	211	SER	2.2
1	E	202	LEU	2.1
1	I	209	MET	2.1
1	I	292	LYS	2.0
1	I	320	LYS	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 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.