Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 08:57 pm BST

PDB ID	:	2WO5
Title	:	Structure of wild type E. coli N-acetylneuraminic acid lyase in space group P21 crystal form I
Authors	:	Campeotto, I.; Bolt, A.H.; Harman, T.A.; Trinh, C.H.; Dennis, C.A.; Phillips, S.E.V.; Pearson, A.R.; Nelson, A.; Berry, A.
Deposited on	:	2009-07-21
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 following versions of software and data (see references ①) were used in the production of this report:

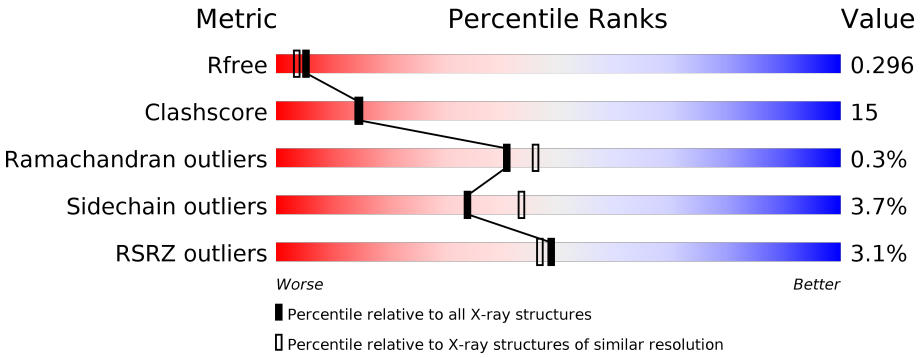
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.20 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}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (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 on 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	304	8% 66% 31%
1	B	304	2% 60% 34%
1	C	304	% 66% 30%
1	D	304	% 69% 26%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9335 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 N-ACETYLNEURAMINATE LYASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	299	Total	C	N	O	S	0	3	0
			2329	1483	397	438	11			
1	B	293	Total	C	N	O	S	0	4	0
			2285	1459	384	431	11			
1	C	295	Total	C	N	O	S	0	0	0
			2279	1452	386	431	10			
1	D	294	Total	C	N	O	S	0	1	0
			2273	1450	382	430	11			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	MET	-	expression tag	UNP P0A6L4
A	-5	GLU	-	expression tag	UNP P0A6L4
A	-4	HIS	-	expression tag	UNP P0A6L4
A	-3	HIS	-	expression tag	UNP P0A6L4
A	-2	HIS	-	expression tag	UNP P0A6L4
A	-1	HIS	-	expression tag	UNP P0A6L4
A	0	HIS	-	expression tag	UNP P0A6L4
A	1	HIS	-	expression tag	UNP P0A6L4
B	-6	MET	-	expression tag	UNP P0A6L4
B	-5	GLU	-	expression tag	UNP P0A6L4
B	-4	HIS	-	expression tag	UNP P0A6L4
B	-3	HIS	-	expression tag	UNP P0A6L4
B	-2	HIS	-	expression tag	UNP P0A6L4
B	-1	HIS	-	expression tag	UNP P0A6L4
B	0	HIS	-	expression tag	UNP P0A6L4
B	1	HIS	-	expression tag	UNP P0A6L4
C	-6	MET	-	expression tag	UNP P0A6L4
C	-5	GLU	-	expression tag	UNP P0A6L4
C	-4	HIS	-	expression tag	UNP P0A6L4
C	-3	HIS	-	expression tag	UNP P0A6L4
C	-2	HIS	-	expression tag	UNP P0A6L4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-1	HIS	-	expression tag	UNP P0A6L4
C	0	HIS	-	expression tag	UNP P0A6L4
C	1	HIS	-	expression tag	UNP P0A6L4
D	-6	MET	-	expression tag	UNP P0A6L4
D	-5	GLU	-	expression tag	UNP P0A6L4
D	-4	HIS	-	expression tag	UNP P0A6L4
D	-3	HIS	-	expression tag	UNP P0A6L4
D	-2	HIS	-	expression tag	UNP P0A6L4
D	-1	HIS	-	expression tag	UNP P0A6L4
D	0	HIS	-	expression tag	UNP P0A6L4
D	1	HIS	-	expression tag	UNP P0A6L4

- Molecule 2 is water.

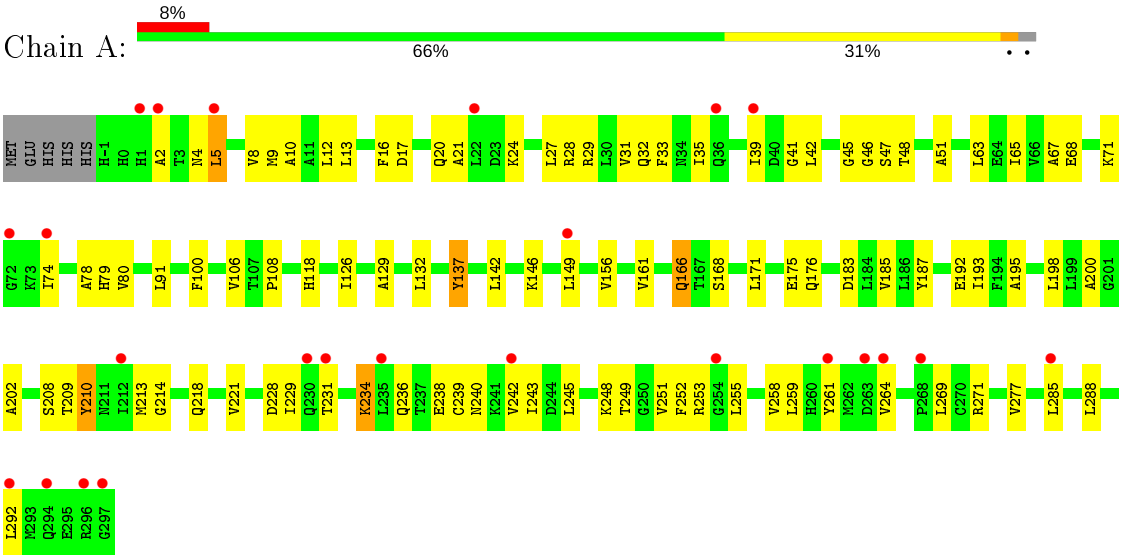
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	35	Total O 35 35	0	0
2	B	40	Total O 40 40	0	0
2	C	53	Total O 53 53	0	0
2	D	41	Total O 41 41	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.

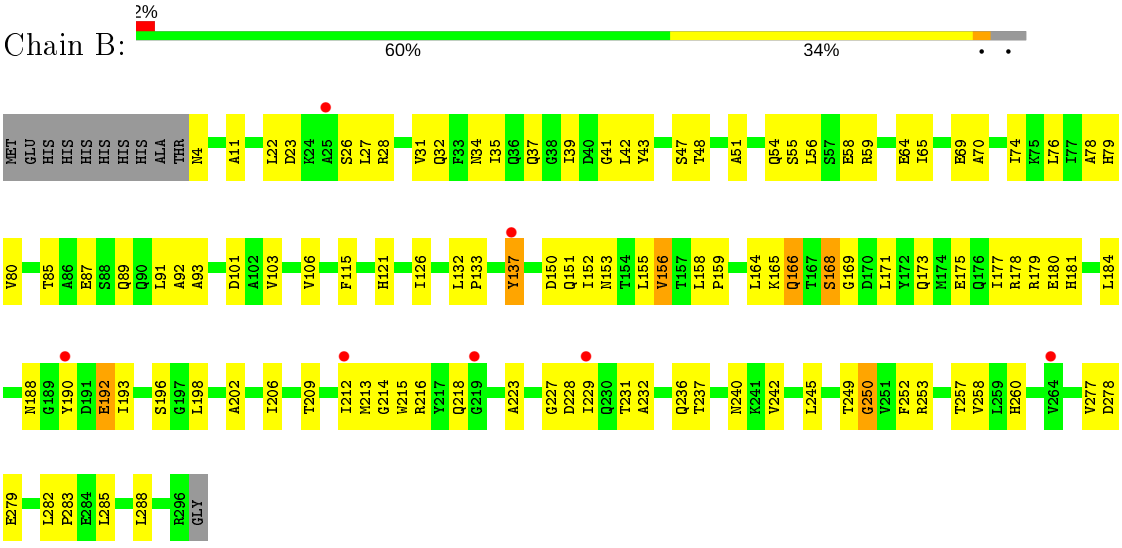
- Molecule 1: N-ACETYLNEURAMINATE LYASE

Chain A:



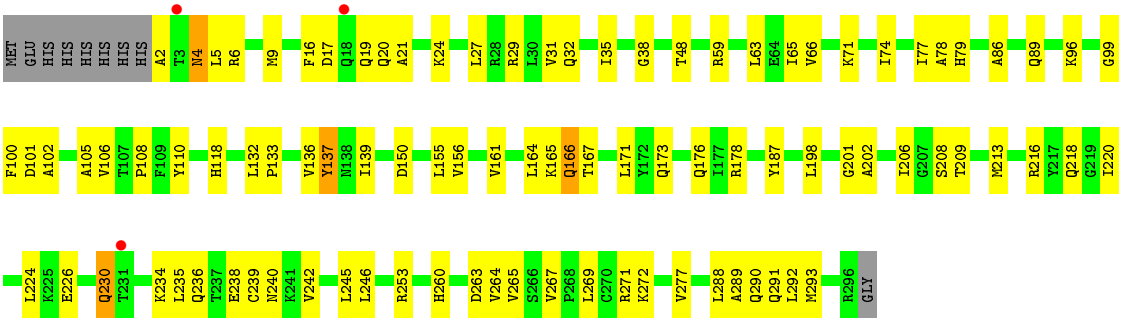
- Molecule 1: N-ACETYLNEURAMINATE LYASE

Chain B:



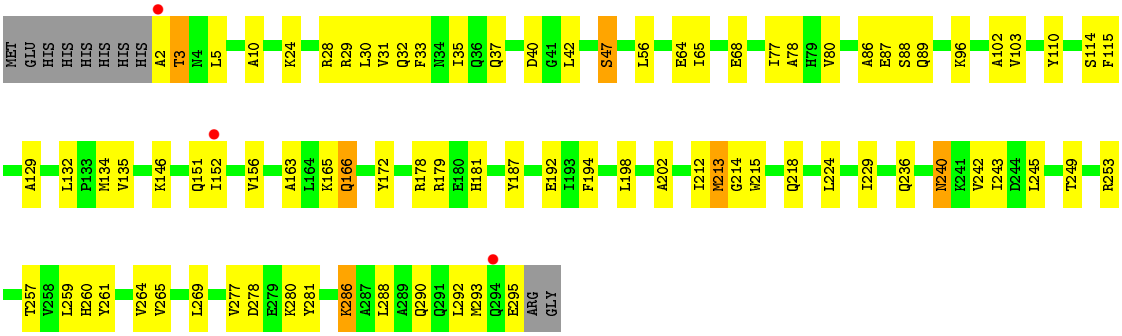
- Molecule 1: N-ACETYLNEURAMINATE LYASE

Chain C:



- Molecule 1: N-ACETYLNEURAMINATE LYASE

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	54.80Å 142.17Å 84.18Å 90.00° 109.01° 90.00°	Depositor
Resolution (Å)	71.09 – 2.20 69.45 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.8 (71.09-2.20) 99.8 (69.45-2.20)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.19 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.5.0097	Depositor
R, R_{free}	0.211 , 0.272 0.245 , 0.296	Depositor DCC
R_{free} test set	3089 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	33.4	Xtriage
Anisotropy	0.074	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 46.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.079 for h,-k,-h-l	Xtriage
Reported twinning fraction	0.628 for H,K,L 0.372 for -H,-K,H+L	Depositor
Outliers	0 of 61658 reflections	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	9335	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.10% 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	0.62	0/2381	0.71	0/3222
1	B	0.66	2/2337 (0.1%)	0.76	1/3162 (0.0%)
1	C	0.69	0/2319	0.79	0/3139
1	D	0.65	1/2316 (0.0%)	0.74	0/3135
All	All	0.65	3/9353 (0.0%)	0.75	1/12658 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	47	SER	CB-OG	-6.87	1.33	1.42
1	B	192	GLU	CD-OE1	-5.37	1.19	1.25
1	B	192	GLU	CD-OE2	-5.32	1.19	1.25

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	250	GLY	N-CA-C	-5.20	100.09	113.10

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	2329	0	2348	70	0
1	B	2285	0	2317	89	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	2279	0	2300	73	0
1	D	2273	0	2296	61	0
2	A	35	0	0	2	0
2	B	40	0	0	1	0
2	C	53	0	0	0	0
2	D	41	0	0	1	0
All	All	9335	0	9261	284	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 15.

All (284) 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:168:SER:CA	1:B:190:TYR:HE2	1.68	1.06
1:B:168:SER:C	1:B:190:TYR:HE2	1.58	1.05
1:B:168:SER:C	1:B:190:TYR:CE2	2.36	0.98
1:C:20:GLN:HE22	1:C:272:LYS:H	1.12	0.92
1:C:79:HIS:HE1	1:C:106:VAL:H	1.18	0.91
1:A:251:VAL:O	1:A:255:LEU:HD12	1.70	0.90
1:C:166:GLN:HE21	1:C:166:GLN:HA	1.36	0.88
1:B:169:GLY:N	1:B:190:TYR:CE2	2.43	0.86
1:B:168:SER:CA	1:B:190:TYR:CE2	2.58	0.86
1:B:188:ASN:ND2	1:B:190:TYR:O	2.13	0.81
1:C:108:PRO:HD2	1:C:118:HIS:CD2	2.17	0.79
1:D:10:ALA:HB3	1:D:42:LEU:HD23	1.65	0.79
1:A:8:VAL:HG12	1:A:39:ILE:HD11	1.65	0.78
1:D:2:ALA:HB1	1:D:5:LEU:HD12	1.67	0.74
1:A:8:VAL:HG12	1:A:39:ILE:CD1	2.17	0.74
1:B:209:THR:O	1:B:212:ILE:HG12	1.87	0.74
1:C:20:GLN:HE22	1:C:272:LYS:N	1.86	0.74
1:C:20:GLN:NE2	1:C:272:LYS:H	1.85	0.74
1:B:32:GLN:NE2	1:B:32:GLN:HA	2.02	0.73
1:B:237:THR:HG22	1:D:179:ARG:HD3	1.71	0.73
1:A:218[A]:GLN:OE1	1:A:218[A]:GLN:HA	1.89	0.72
1:C:108:PRO:HD2	1:C:118:HIS:HD2	1.53	0.71
1:B:159:PRO:O	2:B:2025:HOH:O	2.06	0.71
1:C:230:GLN:H	1:C:230:GLN:HE21	1.37	0.71
1:C:289:ALA:O	1:C:293:MET:HG3	1.90	0.71
1:B:70:ALA:HB3	1:B:76:LEU:HD11	1.72	0.70
1:C:48:THR:HG21	1:C:208:SER:HB3	1.74	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:242:VAL:O	1:B:245:LEU:N	2.26	0.69
1:D:178:ARG:NH1	1:D:181:HIS:O	2.27	0.68
1:A:171:LEU:HD12	1:C:171:LEU:HD12	1.74	0.67
1:C:79:HIS:CE1	1:C:106:VAL:H	2.08	0.67
1:C:86:ALA:HA	1:C:89:GLN:HE21	1.58	0.67
1:D:236:GLN:HE21	1:D:240:ASN:ND2	1.92	0.66
1:A:156:VAL:HA	1:A:161:VAL:HG11	1.77	0.66
1:B:245:LEU:O	1:B:249:THR:HG23	1.96	0.65
1:A:229:ILE:HD12	1:C:224:LEU:O	1.96	0.65
1:C:139:ILE:HG23	1:C:139:ILE:O	1.97	0.65
1:A:10:ALA:HB3	1:A:42:LEU:HD22	1.78	0.65
1:C:173:GLN:HA	1:C:176:GLN:HE21	1.62	0.65
1:C:253:ARG:HG3	1:C:277:VAL:HG22	1.78	0.65
1:B:28:ARG:NH1	1:B:69:GLU:OE2	2.28	0.64
1:D:24:LYS:HD3	1:D:65:ILE:HD11	1.79	0.64
1:C:136:VAL:HG12	1:C:164:LEU:HD13	1.80	0.63
1:D:10:ALA:HB3	1:D:42:LEU:CD2	2.29	0.63
1:B:168:SER:N	1:B:190:TYR:HE2	1.96	0.62
1:D:135:VAL:HG22	1:D:163:ALA:HB3	1.80	0.62
1:A:45:GLY:O	1:A:79:HIS:HD2	1.83	0.62
1:C:267:VAL:HG11	1:C:269:LEU:HD12	1.80	0.62
1:C:230:GLN:H	1:C:230:GLN:NE2	1.99	0.61
1:A:35:ILE:HG22	1:A:74:ILE:HD13	1.83	0.61
1:B:168:SER:N	1:B:190:TYR:CE2	2.69	0.60
1:D:28:ARG:O	1:D:32:GLN:HG2	2.01	0.60
1:B:85:THR:O	1:B:89:GLN:HG3	2.01	0.60
1:C:32:GLN:HA	1:C:35:ILE:HD12	1.84	0.60
1:C:136:VAL:HG12	1:C:164:LEU:CD1	2.32	0.59
1:C:27:LEU:HD23	1:C:65:ILE:HD12	1.83	0.59
1:A:27:LEU:O	1:A:31:VAL:HG23	2.03	0.59
1:C:213:MET:HE3	1:C:239:CYS:HA	1.85	0.59
1:A:17:ASP:OD2	1:A:21:ALA:HB3	2.03	0.59
1:A:29:ARG:HB3	1:A:264:VAL:HG13	1.85	0.59
1:B:150:ASP:HA	1:B:153:ASN:HD22	1.68	0.58
1:B:31:VAL:HG11	1:B:69:GLU:HB2	1.86	0.58
1:B:11:ALA:HA	1:B:43:TYR:HB3	1.86	0.58
1:C:48:THR:CG2	1:C:208:SER:HB3	2.33	0.58
1:D:253:ARG:HG3	1:D:277:VAL:CG2	2.33	0.58
1:A:192:GLU:HG2	1:A:193:ILE:HG23	1.86	0.58
1:C:216:ARG:O	1:C:220:ILE:HG13	2.03	0.58
1:D:213[B]:MET:CE	1:D:242:VAL:HG11	2.34	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:198:LEU:HD23	1:A:202:ALA:HB3	1.86	0.57
1:D:166:GLN:HA	1:D:166:GLN:HE21	1.68	0.57
1:A:71:LYS:O	2:A:2010:HOH:O	2.18	0.57
1:B:190:TYR:HB2	1:B:193:ILE:HG12	1.87	0.57
1:A:31:VAL:O	1:A:35:ILE:HG23	2.05	0.57
1:B:166:GLN:HA	1:B:166:GLN:HE21	1.70	0.57
1:D:253:ARG:HG3	1:D:277:VAL:HG23	1.86	0.57
1:A:198:LEU:HA	1:A:202:ALA:HB3	1.87	0.56
1:A:234:LYS:O	1:A:238:GLU:HG2	2.06	0.56
1:A:195:ALA:N	1:A:236:GLN:OE1	2.21	0.56
1:D:115:PHE:CE1	1:D:151:GLN:HB3	2.41	0.56
1:D:245:LEU:HD23	1:D:288:LEU:HD22	1.88	0.56
1:B:152:ILE:O	1:B:156:VAL:HG13	2.06	0.55
1:A:41:GLY:O	1:A:42:LEU:HD23	2.06	0.55
1:A:79:HIS:HE1	1:A:106:VAL:H	1.54	0.55
1:C:178:ARG:NE	1:C:201:GLY:O	2.39	0.55
1:B:156:VAL:HG12	1:B:164:LEU:HD13	1.87	0.55
1:A:142:LEU:HD22	1:D:110:TYR:O	2.07	0.55
1:C:96:LYS:HD3	1:C:132:LEU:CD1	2.37	0.54
1:C:19:GLN:O	1:C:20:GLN:HB2	2.07	0.54
1:C:27:LEU:HD23	1:C:65:ILE:CD1	2.36	0.54
1:C:106:VAL:HA	1:C:137:TYR:HB3	1.89	0.54
1:B:178:ARG:NH1	1:B:184:LEU:O	2.33	0.54
1:B:85:THR:OG1	1:B:121:HIS:ND1	2.31	0.53
1:B:26:SER:O	1:B:27:LEU:C	2.45	0.53
1:A:288:LEU:HG	1:A:292:LEU:HD12	1.90	0.53
1:C:290:GLN:HA	1:C:293:MET:HE2	1.91	0.53
1:B:56:LEU:HD11	1:B:87:GLU:HG2	1.89	0.53
1:C:20:GLN:NE2	1:C:271:ARG:HA	2.24	0.53
1:C:96:LYS:HD3	1:C:132:LEU:HD11	1.89	0.53
1:A:166:GLN:HA	1:A:166:GLN:HE21	1.73	0.52
1:B:168:SER:HA	1:B:190:TYR:CE2	2.41	0.52
1:D:212:ILE:O	1:D:292:LEU:HD13	2.10	0.52
1:A:65:ILE:O	1:A:65:ILE:CG2	2.57	0.52
1:C:136:VAL:CG1	1:C:164:LEU:HD13	2.38	0.52
1:D:64:GLU:O	1:D:68:GLU:HG3	2.09	0.52
1:A:192:GLU:HA	1:A:240:ASN:HD21	1.74	0.52
1:A:65:ILE:O	1:A:65:ILE:HG22	2.10	0.52
1:B:32:GLN:HE21	1:B:32:GLN:HA	1.71	0.52
1:A:240:ASN:HA	1:A:243:ILE:HB	1.90	0.51
1:B:253:ARG:HG3	1:B:277:VAL:HG22	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:194:PHE:CE2	1:D:198:LEU:HD11	2.45	0.51
1:A:24:LYS:O	1:A:28:ARG:HG3	2.10	0.51
1:B:165:LYS:HG3	1:B:206:ILE:HD12	1.92	0.51
1:B:4:ASN:N	1:B:4:ASN:OD1	2.43	0.51
1:C:165:LYS:HA	1:C:187:TYR:HB2	1.93	0.51
1:D:86:ALA:HA	1:D:89:GLN:HB2	1.93	0.51
1:A:251:VAL:O	1:A:255:LEU:CD1	2.54	0.51
1:A:108:PRO:HD2	1:A:118:HIS:CD2	2.46	0.50
1:C:38:GLY:O	1:C:218:GLN:NE2	2.38	0.50
1:C:230:GLN:N	1:C:230:GLN:NE2	2.58	0.50
1:A:192:GLU:HA	1:A:240:ASN:ND2	2.27	0.50
1:B:223:ALA:HB1	1:B:228:ASP:O	2.12	0.50
1:A:149:LEU:HD13	1:A:176:GLN:NE2	2.26	0.50
1:B:155:LEU:HD23	1:B:158:LEU:HD11	1.92	0.50
1:D:249:THR:HG22	1:D:281:TYR:CG	2.47	0.50
1:C:48:THR:HG21	1:C:208:SER:CB	2.39	0.50
1:B:236:GLN:HE21	1:B:240:ASN:ND2	2.10	0.50
1:B:171:LEU:HD21	1:B:193:ILE:HD12	1.94	0.50
1:D:80:VAL:O	1:D:88:SER:HA	2.11	0.49
1:A:2:ALA:O	1:A:185:VAL:HG21	2.12	0.49
1:D:192:GLU:HB3	1:D:243:ILE:HD13	1.94	0.49
1:A:213[A]:MET:HE1	1:A:239:CYS:HA	1.93	0.49
1:B:288:LEU:O	1:B:288:LEU:HD12	2.13	0.49
1:B:192:GLU:HG3	1:D:172:TYR:CG	2.47	0.49
1:D:253:ARG:CG	1:D:277:VAL:HG23	2.43	0.49
1:A:67:ALA:O	1:A:68:GLU:C	2.51	0.49
1:D:77:ILE:HG23	1:D:102:ALA:HB3	1.94	0.49
1:C:78:ALA:HB2	1:C:100:PHE:CD2	2.48	0.48
1:A:213[B]:MET:CE	1:A:239:CYS:HA	2.43	0.48
1:A:253:ARG:HG3	1:A:277:VAL:HG22	1.94	0.48
1:C:165:LYS:HE3	1:C:206:ILE:HB	1.94	0.48
1:B:173:GLN:O	1:B:177:ILE:HG13	2.13	0.48
1:B:34:ASN:CB	1:B:42:LEU:HD21	2.43	0.48
1:C:77:ILE:HG12	1:C:102:ALA:HB3	1.94	0.48
1:B:101:ASP:O	1:B:133:PRO:HD2	2.14	0.48
1:B:237:THR:CG2	1:D:179:ARG:HD3	2.40	0.48
1:D:29:ARG:HD2	1:D:264:VAL:O	2.14	0.48
1:A:12:LEU:HD13	1:A:42:LEU:HD13	1.94	0.48
1:A:13:LEU:HD23	1:A:48:THR:HG22	1.94	0.48
1:A:228:ASP:OD2	1:A:231:THR:HG22	2.13	0.48
1:B:278:ASP:OD1	1:B:279:GLU:N	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:42:LEU:CD1	1:B:74:ILE:HD11	2.43	0.48
1:A:78:ALA:HB2	1:A:100:PHE:CD2	2.49	0.48
1:A:10:ALA:HB3	1:A:42:LEU:CD2	2.43	0.47
1:C:290:GLN:O	1:C:291:GLN:C	2.53	0.47
1:D:192:GLU:HA	1:D:240:ASN:HD21	1.79	0.47
1:B:249:THR:OG1	1:B:250:GLY:O	2.29	0.47
1:D:236:GLN:HE21	1:D:240:ASN:HD21	1.62	0.47
1:B:32:GLN:NE2	1:B:32:GLN:CA	2.71	0.47
1:C:31:VAL:HG21	1:C:66:VAL:HG22	1.97	0.47
1:D:165:LYS:HA	1:D:187:TYR:HB2	1.97	0.47
1:B:79:HIS:HE1	1:B:106:VAL:H	1.61	0.47
1:A:45:GLY:O	1:A:51:ALA:HB2	2.15	0.47
1:A:48:THR:HG21	1:A:208:SER:CB	2.45	0.47
1:C:17:ASP:OD2	1:C:21:ALA:HB3	2.14	0.47
1:B:236:GLN:HE21	1:B:240:ASN:HD21	1.61	0.47
1:D:213[B]:MET:HE1	1:D:242:VAL:HG11	1.97	0.47
1:A:126:ILE:O	1:A:129:ALA:HB3	2.15	0.47
1:C:267:VAL:CG1	1:C:269:LEU:HD12	2.44	0.47
1:D:261:TYR:CD2	1:D:286:LYS:HA	2.50	0.47
1:B:78:ALA:O	1:B:103:VAL:HA	2.15	0.46
1:D:198:LEU:HD23	1:D:202:ALA:O	2.16	0.46
1:A:137:TYR:C	1:A:137:TYR:CD1	2.89	0.46
1:B:22[B]:LEU:HD23	1:B:23:ASP:N	2.29	0.46
1:A:258:VAL:HG12	1:A:259:LEU:N	2.30	0.46
1:C:166:GLN:CA	1:C:166:GLN:HE21	2.13	0.46
1:B:180:GLU:HG3	1:B:181:HIS:CE1	2.51	0.46
1:D:31:VAL:O	1:D:35:ILE:HG13	2.16	0.46
1:A:258:VAL:O	1:A:261:TYR:N	2.44	0.46
1:B:258:VAL:HG23	1:B:285:LEU:CD2	2.45	0.45
1:B:42:LEU:HD12	1:B:74:ILE:HD11	1.98	0.45
1:D:277:VAL:CG1	1:D:278:ASP:N	2.78	0.45
1:A:12:LEU:HD13	1:A:42:LEU:CD1	2.47	0.45
1:A:80:VAL:HB	1:A:91:LEU:HB2	1.97	0.45
1:B:137:TYR:C	1:B:137:TYR:CD1	2.90	0.45
1:B:175:GLU:OE1	1:B:179:ARG:NH2	2.49	0.45
1:B:79:HIS:CE1	1:B:106:VAL:H	2.34	0.45
1:D:56:LEU:HD11	1:D:87:GLU:HG2	1.97	0.45
1:B:80:VAL:HB	1:B:91:LEU:HB2	1.97	0.45
1:C:79:HIS:CE1	1:C:105:ALA:HA	2.52	0.45
1:A:146:LYS:NZ	2:A:2020:HOH:O	2.42	0.45
1:C:9:MET:O	1:C:206:ILE:HA	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:245:LEU:HD13	1:A:248:LYS:NZ	2.32	0.45
1:B:229:ILE:HD11	1:D:224:LEU:HD22	1.99	0.45
1:B:55:SER:OG	1:B:58:GLU:HG3	2.16	0.45
1:B:48:THR:HA	1:B:252:PHE:CZ	2.52	0.45
1:B:35:ILE:HG12	1:B:74:ILE:HD13	1.99	0.45
1:C:236:GLN:HE21	1:C:240:ASN:HD21	1.66	0.44
1:A:48:THR:HA	1:A:252:PHE:CE1	2.53	0.44
1:A:4:ASN:OD1	1:A:5:LEU:N	2.50	0.44
1:A:231:THR:HA	1:A:234:LYS:HB2	2.00	0.44
1:B:213:MET:HB2	1:B:216:ARG:HB2	1.99	0.44
1:B:59:ARG:CZ	1:B:91:LEU:CD1	2.95	0.44
1:B:80:VAL:HG11	1:B:92:ALA:HA	1.99	0.44
1:B:215:TRP:HA	1:B:218:GLN:HB2	2.00	0.44
1:C:155:LEU:O	1:C:161:VAL:HG21	2.17	0.44
1:C:178:ARG:HG2	1:C:201:GLY:HA3	1.99	0.44
1:C:235:LEU:O	1:C:238:GLU:N	2.51	0.44
1:D:129:ALA:O	1:D:132:LEU:HD13	2.18	0.44
1:D:78:ALA:O	1:D:80:VAL:HG13	2.17	0.44
1:B:92:ALA:O	1:B:93:ALA:C	2.55	0.44
1:D:213[A]:MET:HA	1:D:215:TRP:CZ3	2.52	0.44
1:A:5:LEU:HB3	1:A:187:TYR:OH	2.18	0.44
1:A:20:GLN:OE1	1:A:271:ARG:HA	2.17	0.44
1:B:37:GLN:NE2	1:B:214:GLY:H	2.15	0.44
1:B:70:ALA:HB1	1:B:76:LEU:HD21	1.99	0.44
1:C:156:VAL:HA	1:C:161:VAL:HG11	2.00	0.44
1:C:198:LEU:HD23	1:C:202:ALA:O	2.17	0.44
1:C:16:PHE:HA	1:C:21:ALA:O	2.18	0.44
1:C:260:HIS:HA	1:C:265:VAL:O	2.18	0.44
1:B:227:GLY:HA2	1:D:229:ILE:HD12	2.00	0.44
1:D:269:LEU:HA	1:D:269:LEU:HD23	1.78	0.44
1:C:59:ARG:O	1:C:63:LEU:HG	2.18	0.43
1:D:260:HIS:HD2	1:D:265:VAL:O	2.00	0.43
1:B:171:LEU:CD1	1:B:196:SER:HB3	2.48	0.43
1:B:27:LEU:HD23	1:B:65:ILE:HG21	1.99	0.43
1:C:2:ALA:HB1	1:C:5:LEU:HD12	2.00	0.43
1:C:101:ASP:O	1:C:133:PRO:HD2	2.18	0.43
1:A:242:VAL:HG13	1:A:288:LEU:HD21	2.00	0.43
1:D:33:PHE:O	1:D:37:GLN:HB2	2.19	0.43
1:B:192:GLU:HG3	1:D:172:TYR:CD2	2.54	0.43
1:A:32:GLN:O	1:A:33:PHE:C	2.56	0.43
1:C:139:ILE:HD12	1:C:167:THR:HG21	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:96:LYS:HD3	1:D:132:LEU:HD13	1.99	0.43
1:B:64:GLU:O	1:B:65:ILE:C	2.57	0.43
1:B:35:ILE:CG1	1:B:74:ILE:HD13	2.49	0.43
1:D:2:ALA:HB1	1:D:5:LEU:CD1	2.41	0.43
1:B:258:VAL:HG23	1:B:285:LEU:HD23	2.01	0.43
1:C:235:LEU:O	1:C:236:GLN:C	2.57	0.43
1:C:292:LEU:HD23	1:C:292:LEU:HA	1.86	0.43
1:D:87:GLU:OE1	2:D:2016:HOH:O	2.22	0.43
1:B:257:THR:O	1:B:260:HIS:HB3	2.19	0.42
1:C:4:ASN:OD1	1:C:4:ASN:N	2.47	0.42
1:D:242:VAL:HG13	1:D:288:LEU:HD21	2.01	0.42
1:D:40:ASP:CG	1:D:218:GLN:HE22	2.22	0.42
1:A:210:TYR:CD1	1:A:210:TYR:N	2.87	0.42
1:B:164:LEU:HD23	1:B:166:GLN:HB2	2.02	0.42
1:D:152:ILE:O	1:D:156:VAL:HG13	2.19	0.42
1:C:29:ARG:HB3	1:C:264:VAL:HG13	2.00	0.42
1:A:46:GLY:HA2	1:A:79:HIS:CD2	2.54	0.42
1:B:156:VAL:CG1	1:B:164:LEU:HD13	2.50	0.42
1:D:236:GLN:NE2	1:D:240:ASN:HD21	2.17	0.42
1:A:209:THR:HG21	1:A:243:ILE:HG12	2.02	0.42
1:A:249:THR:HG21	1:A:285:LEU:HD21	2.01	0.42
1:C:213:MET:O	1:C:213:MET:CG	2.68	0.42
1:B:231:THR:O	1:B:232:ALA:C	2.57	0.42
1:C:242:VAL:HG22	1:C:288:LEU:HD11	2.02	0.42
1:A:16:PHE:HA	1:A:21:ALA:O	2.19	0.42
1:A:175:GLU:HA	1:A:200:ALA:O	2.19	0.42
1:B:39:ILE:HG23	1:B:41:GLY:H	1.84	0.41
1:D:37:GLN:NE2	1:D:214:GLY:H	2.17	0.41
1:B:115:PHE:CE1	1:B:151:GLN:HB3	2.55	0.41
1:C:139:ILE:CD1	1:C:167:THR:HG21	2.49	0.41
1:C:71:LYS:HE3	1:C:99:GLY:HA3	2.03	0.41
1:D:257:THR:O	1:D:260:HIS:HB3	2.20	0.41
1:B:51:ALA:HA	1:B:54:GLN:HE21	1.86	0.41
1:D:215:TRP:CZ2	1:D:292:LEU:HD22	2.55	0.41
1:B:282:LEU:N	1:B:283:PRO:CD	2.84	0.41
1:D:103:VAL:O	1:D:134:MET:HA	2.21	0.41
1:A:63:LEU:HD22	1:A:100:PHE:CZ	2.56	0.41
1:D:290:GLN:HA	1:D:293:MET:CE	2.51	0.41
1:C:245:LEU:O	1:C:245:LEU:HD12	2.21	0.41
1:C:253:ARG:CG	1:C:277:VAL:HG22	2.50	0.41
1:D:198:LEU:HA	1:D:202:ALA:O	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:24:LYS:HD3	1:C:65:ILE:HD11	2.03	0.41
1:B:171:LEU:HD21	1:B:193:ILE:CD1	2.52	0.40
1:B:198:LEU:HA	1:B:202:ALA:O	2.20	0.40
1:D:30:LEU:HD13	1:D:259:LEU:HD13	2.03	0.40
1:D:96:LYS:HD2	1:D:132:LEU:HD11	2.03	0.40
1:A:198:LEU:HD11	1:A:221:VAL:HG22	2.03	0.40
1:C:209:THR:HG22	1:C:246:LEU:CD1	2.52	0.40
1:B:257:THR:O	1:B:260:HIS:N	2.54	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	300/304 (99%)	270 (90%)	29 (10%)	1 (0%)	41	46
1	B	295/304 (97%)	269 (91%)	26 (9%)	0	100	100
1	C	293/304 (96%)	276 (94%)	16 (6%)	1 (0%)	41	46
1	D	293/304 (96%)	271 (92%)	19 (6%)	3 (1%)	15	14
All	All	1181/1216 (97%)	1086 (92%)	90 (8%)	5 (0%)	41	37

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	3	THR
1	A	5	LEU
1	C	110	TYR
1	D	213[A]	MET
1	D	213[B]	MET

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	249/251 (99%)	238 (96%)	11 (4%)	28	35
1	B	246/251 (98%)	239 (97%)	7 (3%)	43	56
1	C	243/251 (97%)	233 (96%)	10 (4%)	30	39
1	D	243/251 (97%)	234 (96%)	9 (4%)	34	43
All	All	981/1004 (98%)	944 (96%)	37 (4%)	34	42

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

Mol	Chain	Res	Type
1	A	9	MET
1	A	47	SER
1	A	132	LEU
1	A	137	TYR
1	A	166	GLN
1	A	168	SER
1	A	183[A]	ASP
1	A	183[B]	ASP
1	A	210	TYR
1	A	234	LYS
1	A	269	LEU
1	B	47	SER
1	B	126	ILE
1	B	132	LEU
1	B	137	TYR
1	B	156	VAL
1	B	166	GLN
1	B	168	SER
1	C	4	ASN
1	C	6	ARG
1	C	74	ILE
1	C	137	TYR
1	C	150	ASP
1	C	166	GLN

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Mol	Chain	Res	Type
1	C	226	GLU
1	C	230	GLN
1	C	234	LYS
1	C	263	ASP
1	D	3	THR
1	D	47	SER
1	D	114	SER
1	D	146	LYS
1	D	166	GLN
1	D	240	ASN
1	D	280	LYS
1	D	286	LYS
1	D	295	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	36	GLN
1	A	79	HIS
1	A	138	ASN
1	A	166	GLN
1	A	176	GLN
1	A	181	HIS
1	A	240	ASN
1	A	260	HIS
1	B	4	ASN
1	B	32	GLN
1	B	36	GLN
1	B	54	GLN
1	B	61	GLN
1	B	79	HIS
1	B	138	ASN
1	B	153	ASN
1	B	166	GLN
1	B	181	HIS
1	B	240	ASN
1	C	20	GLN
1	C	79	HIS
1	C	89	GLN
1	C	118	HIS
1	C	138	ASN
1	C	166	GLN

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Mol	Chain	Res	Type
1	C	176	GLN
1	C	181	HIS
1	C	230	GLN
1	C	240	ASN
1	C	260	HIS
1	D	37	GLN
1	D	79	HIS
1	D	138	ASN
1	D	153	ASN
1	D	166	GLN
1	D	176	GLN
1	D	181	HIS
1	D	240	ASN
1	D	260	HIS

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 carbohydrates 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, 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	299/304 (98%)	0.50	24 (8%)	12	11	17, 36, 51, 61	0
1	B	293/304 (96%)	0.32	7 (2%)	59	56	19, 33, 45, 52	0
1	C	295/304 (97%)	0.10	3 (1%)	82	81	14, 31, 43, 54	0
1	D	294/304 (96%)	0.10	3 (1%)	82	81	15, 30, 43, 49	0
All	All	1181/1216 (97%)	0.26	37 (3%)	49	47	14, 32, 47, 61	0

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	ALA	7.9
1	B	190	TYR	4.8
1	A	230	GLN	4.0
1	A	296	ARG	3.6
1	A	264	VAL	3.5
1	B	219	GLY	3.5
1	A	242	VAL	3.5
1	D	2	ALA	3.4
1	A	292	LEU	3.3
1	A	212	ILE	3.3
1	A	268	PRO	3.2
1	A	1	HIS	3.1
1	A	297	GLY	3.1
1	A	235	LEU	3.1
1	B	212	ILE	2.7
1	A	294	GLN	2.6
1	A	231	THR	2.5
1	C	3	THR	2.5
1	A	36	GLN	2.5
1	A	22	LEU	2.5
1	A	72	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	263	ASP	2.5
1	C	231	THR	2.4
1	A	254	GLY	2.4
1	B	264	VAL	2.3
1	A	39	ILE	2.3
1	B	229	ILE	2.3
1	A	149	LEU	2.3
1	A	285	LEU	2.3
1	A	74	ILE	2.2
1	A	261	TYR	2.1
1	A	5	LEU	2.1
1	B	25	ALA	2.1
1	D	152	ILE	2.1
1	C	18	GLN	2.1
1	B	137	TYR	2.1
1	D	294	GLN	2.1

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 carbohydrates 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.