Full wwPDB X-ray Structure Validation Report (i)

Nov 3, 2025 – 12:11 PM JST

PDB ID	:	9VGL / pdb_00009vgl
Title	:	Ancestral L-tryptophan synthase beta-subunit 1
Authors	:	Ohata, M.; Fujita, S.; Uchida, K.; Kobayashi, S.; Chisuga, T.; Nakano, S.
Deposited on	:	2025-06-14
Resolution	:	1.70 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 (i) 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 (1)) were used in the production of this report:

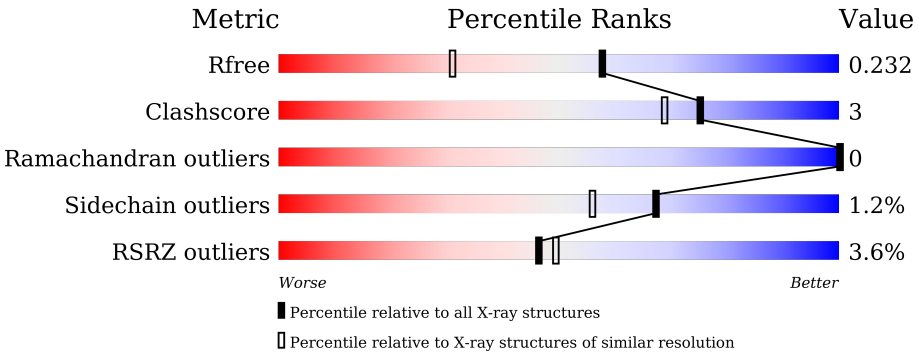
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

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 1.70 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}	164625	5161 (1.70-1.70)
Clashscore	180529	5671 (1.70-1.70)
Ramachandran outliers	177936	5594 (1.70-1.70)
Sidechain outliers	177891	5594 (1.70-1.70)
RSRZ outliers	164620	5159 (1.70-1.70)

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	397	2% 90% 7%
1	B	397	4% 89% 8%
1	C	397	2% 90% 7%
1	D	397	7% 88% 9%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 12605 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 Ancestral L-tryptophan synthase beta-subunit 1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	391	Total	C	N	O	P	S	0	0	0
			3042	1914	521	586	1	20			
1	D	390	Total	C	N	O	P	S	0	0	0
			3033	1908	519	585	1	20			
1	C	386	Total	C	N	O	P	S	0	0	0
			3000	1889	514	576	1	20			
1	B	389	Total	C	N	O	P	S	0	1	0
			3032	1906	518	587	1	20			

- Molecule 2 is water.

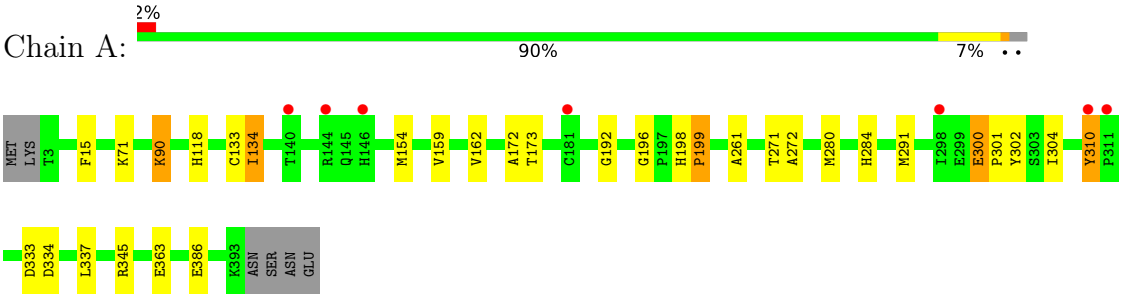
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	128	Total	O	0	0
			128	128		
2	D	88	Total	O	0	0
			88	88		
2	C	167	Total	O	0	0
			167	167		
2	B	115	Total	O	0	0
			115	115		

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.

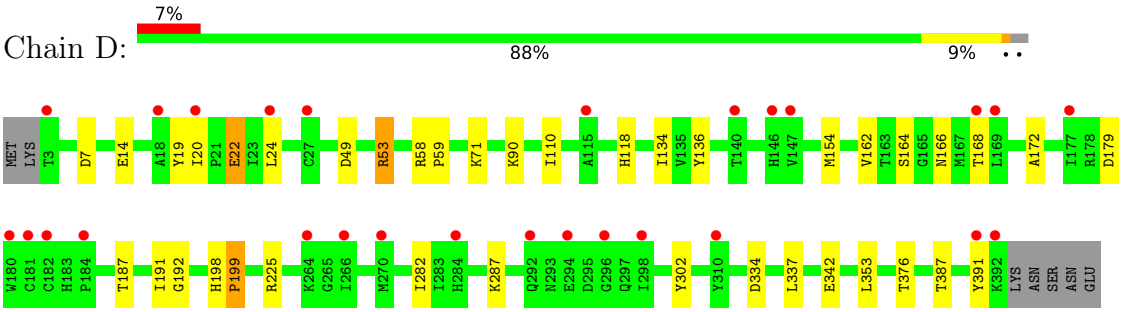
• Molecule 1: Ancestral L-tryptophan synthase beta-subunit 1

Chain A:



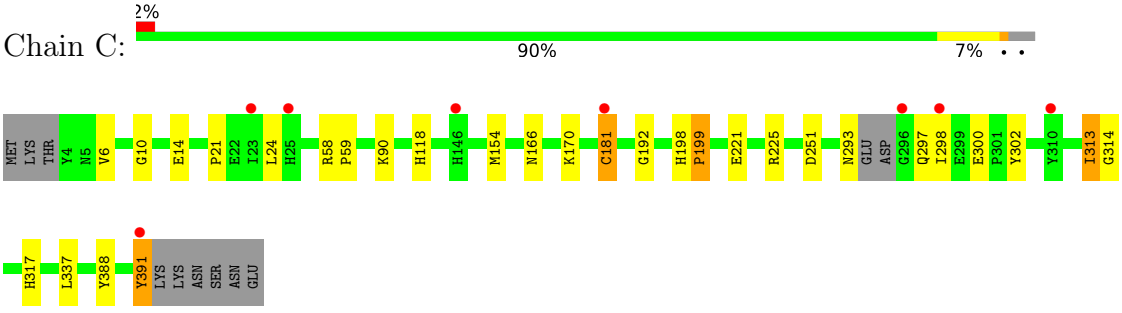
• Molecule 1: Ancestral L-tryptophan synthase beta-subunit 1

Chain D:



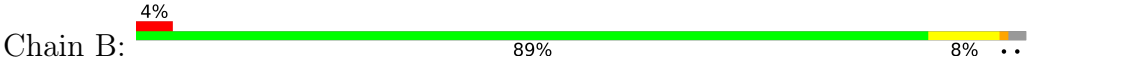
• Molecule 1: Ancestral L-tryptophan synthase beta-subunit 1

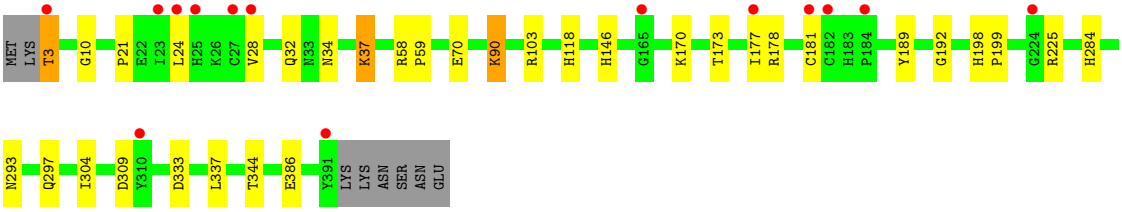
Chain C:



• Molecule 1: Ancestral L-tryptophan synthase beta-subunit 1

Chain B:




MET LYS T3 G10 P21 E22 I23 L24 H25 K26 C27 V28 Q32 N33 N34 K37 R58 P59 E70 K90 R103 H118 H146 G165 K170 T173 I177 R178 C181 C182 H183 P184 Y189 G192 H198 P199 G224 R225 H284
N293 Q297 I304 D309 Y310 D333 L337 T344 E386 Y391 LYS LYS ASN SER ASN GLU

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	80.53Å 91.66Å 105.18Å 90.00° 105.27° 90.00°	Depositor
Resolution (Å)	47.21 – 1.70 47.21 – 1.70	Depositor EDS
% Data completeness (in resolution range)	99.1 (47.21-1.70) 99.2 (47.21-1.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.06 (at 1.70Å)	Xtriage
Refinement program	REFMAC 5.8.0419	Depositor
R, R_{free}	0.190 , 0.225 0.199 , 0.232	Depositor DCC
R_{free} test set	7877 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å^2)	21.0	Xtriage
Anisotropy	0.043	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 26.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	12605	wwPDB-VP
Average B, all atoms (Å^2)	26.0	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 71.72 % 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 2.4986e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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

Bond lengths and bond angles in the following residue types are not validated in this section: LLP

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	0/3071	1.11	6/4148 (0.1%)
1	B	0.62	0/3061	1.10	5/4137 (0.1%)
1	C	0.65	0/3028	1.13	7/4090 (0.2%)
1	D	0.63	0/3062	1.13	4/4137 (0.1%)
All	All	0.63	0/12222	1.12	22/16512 (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	B	0	1
1	C	0	1
1	D	0	2
All	All	0	4

There are no bond length outliers.

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	391	TYR	N-CA-CB	-6.90	98.77	110.50
1	A	300	GLU	CB-CA-C	6.58	116.68	110.17
1	A	333	ASP	CA-CB-CG	6.32	118.92	112.60
1	B	386	GLU	CB-CG-CD	6.23	123.19	112.60
1	A	310	TYR	CB-CA-C	6.13	117.20	108.68
1	B	333	ASP	CA-CB-CG	5.89	118.49	112.60
1	D	334	ASP	CA-CB-CG	5.89	118.49	112.60
1	C	391	TYR	CB-CA-C	5.84	121.20	110.10
1	B	284	HIS	CA-CB-CG	-5.79	108.01	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	181	CYS	CB-CA-C	-5.68	101.31	110.74
1	A	334	ASP	CA-CB-CG	5.40	118.00	112.60
1	D	7	ASP	CA-CB-CG	5.39	117.99	112.60
1	D	376	THR	CA-CB-OG1	-5.37	101.55	109.60
1	B	309	ASP	CA-CB-CG	5.31	117.91	112.60
1	D	187	THR	CA-CB-OG1	-5.28	101.68	109.60
1	C	251	ASP	CA-CB-CG	5.27	117.87	112.60
1	C	221	GLU	CB-CA-C	-5.25	101.92	110.85
1	A	386	GLU	CB-CG-CD	5.24	121.51	112.60
1	C	221	GLU	N-CA-CB	5.20	117.86	110.16
1	C	317	HIS	CA-CB-CG	-5.15	108.65	113.80
1	B	3	THR	CA-CB-OG1	-5.05	102.03	109.60
1	A	386	GLU	CB-CA-C	5.02	119.38	110.85

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	225	ARG	Sidechain
1	C	225	ARG	Sidechain
1	D	225	ARG	Sidechain
1	D	53	ARG	Sidechain

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	3042	0	3033	20	0
1	B	3032	0	3010	22	0
1	C	3000	0	2989	13	0
1	D	3033	0	3019	18	0
2	A	128	0	0	4	0
2	B	115	0	0	4	0
2	C	167	0	0	0	0
2	D	88	0	0	1	0
All	All	12605	0	12051	71	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 3.

All (71) 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:C:166:ASN:HD21	1:C:300:GLU:CD	2.01	0.68
1:B:24:LEU:HG	1:B:181:CYS:SG	2.32	0.68
1:A:133:CYS:C	1:A:134:ILE:HD12	2.21	0.65
1:A:90:LLP:H4'1	2:A:499:HOH:O	1.97	0.65
1:A:345:ARG:HD3	2:A:433:HOH:O	1.99	0.61
1:A:15:PHE:HE1	1:A:280:MET:SD	2.23	0.61
1:D:353:LEU:HD11	1:D:387:THR:HG21	1.84	0.59
1:C:170:LYS:HD2	1:C:298:ILE:HD11	1.85	0.58
1:D:20:ILE:HD11	1:D:24:LEU:HD13	1.86	0.57
1:B:178:ARG:HB3	1:B:178:ARG:NH1	2.19	0.57
1:B:90:LLP:H4'1	2:B:461:HOH:O	2.05	0.56
1:D:71:LYS:HE3	1:D:342:GLU:OE2	2.06	0.56
1:A:15:PHE:CE1	1:A:280:MET:SD	2.98	0.56
1:C:21:PRO:HD2	1:C:24:LEU:HD12	1.87	0.55
1:C:198:HIS:CD2	1:C:199:PRO:HA	2.41	0.54
1:B:146:HIS:HD2	2:B:478:HOH:O	1.90	0.54
1:C:118:HIS:CE1	1:C:192:GLY:HA2	2.43	0.54
1:D:154:MET:HE1	1:C:388:TYR:CD2	2.44	0.53
1:B:21:PRO:HG2	1:B:24:LEU:HD13	1.91	0.53
1:D:198:HIS:CD2	1:D:199:PRO:HA	2.44	0.52
1:C:293:ASN:HD21	1:C:297:GLN:HB2	1.75	0.51
1:A:154:MET:HB3	1:B:344:THR:HG21	1.92	0.51
1:B:177:ILE:HD13	1:B:189:TYR:CE2	2.46	0.51
1:A:271:THR:HG23	1:A:291:MET:HE1	1.92	0.50
1:B:118:HIS:CE1	1:B:192:GLY:HA2	2.47	0.50
1:A:198:HIS:HD2	2:A:501:HOH:O	1.94	0.49
1:C:337:LEU:HD13	1:C:391:TYR:CD2	2.48	0.49
1:B:198:HIS:CD2	1:B:199:PRO:HA	2.47	0.49
1:D:198:HIS:HD2	2:D:461:HOH:O	1.94	0.49
1:D:337:LEU:HD21	1:D:391:TYR:CG	2.48	0.49
1:D:162:VAL:HG21	1:D:172:ALA:HA	1.94	0.49
1:A:198:HIS:CD2	1:A:199:PRO:HA	2.48	0.48
1:C:58:ARG:HB3	1:C:59:PRO:HA	1.96	0.48
1:D:136:TYR:OH	1:D:179:ASP:OD2	2.31	0.47
1:B:178:ARG:HB3	1:B:178:ARG:HH11	1.79	0.47
1:A:196:GLY:HA2	1:A:284:HIS:O	2.13	0.47
1:B:198:HIS:HD2	2:B:496:HOH:O	1.98	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:300:GLU:HA	1:A:301:PRO:HD3	1.82	0.47
1:B:173:THR:O	1:B:177:ILE:HG12	2.15	0.47
1:B:34:ASN:HA	1:B:37:LYS:HE3	1.98	0.46
1:A:134:ILE:HD12	1:A:134:ILE:N	2.29	0.46
1:D:49:ASP:O	1:D:53:ARG:HG3	2.15	0.46
1:B:24:LEU:CD1	1:B:181:CYS:SG	3.03	0.46
1:B:10:GLY:HA2	1:B:198:HIS:CD2	2.52	0.45
1:A:118:HIS:CE1	1:A:192:GLY:HA2	2.52	0.44
1:A:310:TYR:HB2	2:A:440:HOH:O	2.17	0.44
1:D:14:GLU:O	1:D:287:LYS:HE2	2.17	0.44
1:A:302:TYR:CD2	1:A:302:TYR:C	2.96	0.44
1:C:6:VAL:CG2	1:C:10:GLY:HA2	2.47	0.44
1:B:304:ILE:HD13	1:B:337:LEU:HD11	1.99	0.44
1:B:146:HIS:CD2	2:B:478:HOH:O	2.70	0.43
1:A:304:ILE:CD1	1:A:337:LEU:HD11	2.48	0.43
1:D:19:TYR:HB3	1:D:282:ILE:HD13	2.00	0.43
1:B:58:ARG:HA	1:B:59:PRO:C	2.44	0.43
1:C:302:TYR:CD2	1:C:302:TYR:C	2.97	0.43
1:D:302:TYR:CD2	1:D:302:TYR:C	2.95	0.43
1:B:293:ASN:HD21	1:B:297:GLN:HB2	1.84	0.43
1:D:110:ILE:HA	1:D:134:ILE:O	2.19	0.42
1:B:103:ARG:HH11	1:B:103:ARG:HG3	1.84	0.42
1:A:261:ALA:HB3	1:A:272:ALA:HB3	2.01	0.42
1:D:166:ASN:OD1	1:D:168:THR:HG22	2.19	0.42
1:D:118:HIS:CE1	1:D:192:GLY:HA2	2.55	0.42
1:A:162:VAL:HG21	1:A:172:ALA:HA	2.00	0.42
1:B:24:LEU:CG	1:B:181:CYS:SG	3.05	0.42
1:B:28:VAL:O	1:B:32:GLN:HG3	2.20	0.41
1:A:71:LYS:NZ	1:A:363:GLU:OE2	2.52	0.41
1:D:22:GLU:H	1:D:22:GLU:CD	2.29	0.41
1:A:173:THR:HG21	1:A:284:HIS:CE1	2.55	0.41
1:C:154:MET:HE2	1:C:154:MET:HB3	1.86	0.41
1:C:313:ILE:HG13	1:C:314:GLY:N	2.36	0.40
1:D:58:ARG:HB3	1:D:59:PRO:HA	2.03	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	388/397 (98%)	384 (99%)	4 (1%)	0	100	100
1	B	387/397 (98%)	379 (98%)	8 (2%)	0	100	100
1	C	381/397 (96%)	374 (98%)	7 (2%)	0	100	100
1	D	387/397 (98%)	380 (98%)	7 (2%)	0	100	100
All	All	1543/1588 (97%)	1517 (98%)	26 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	321/327 (98%)	318 (99%)	3 (1%)	75	67
1	B	320/327 (98%)	316 (99%)	4 (1%)	65	52
1	C	316/327 (97%)	312 (99%)	4 (1%)	65	52
1	D	320/327 (98%)	316 (99%)	4 (1%)	65	52
All	All	1277/1308 (98%)	1262 (99%)	15 (1%)	67	56

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	134	ILE
1	A	159	VAL

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Mol	Chain	Res	Type
1	A	199	PRO
1	D	22	GLU
1	D	164	SER
1	D	191	ILE
1	D	199	PRO
1	C	14	GLU
1	C	181	CYS
1	C	199	PRO
1	C	313	ILE
1	B	3	THR
1	B	37	LYS
1	B	70	GLU
1	B	170	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	ASN
1	A	50	GLN
1	A	117	GLN
1	A	198	HIS
1	A	240	ASN
1	D	32	GLN
1	D	50	GLN
1	D	150	GLN
1	D	198	HIS
1	D	220	GLN
1	C	117	GLN
1	C	166	ASN
1	C	198	HIS
1	C	220	GLN
1	C	293	ASN
1	B	146	HIS
1	B	166	ASN
1	B	198	HIS
1	B	240	ASN
1	B	292	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	LLP	B	90	1	23,24,25	2.10	2 (8%)	25,32,34	1.54	4 (16%)
1	LLP	D	90	1	23,24,25	2.29	1 (4%)	25,32,34	1.76	5 (20%)
1	LLP	C	90	1	23,24,25	2.27	1 (4%)	25,32,34	1.43	5 (20%)
1	LLP	A	90	1	23,24,25	2.35	2 (8%)	25,32,34	1.69	6 (24%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	LLP	B	90	1	-	2/16/17/19	0/1/1/1
1	LLP	D	90	1	-	2/16/17/19	0/1/1/1
1	LLP	C	90	1	-	2/16/17/19	0/1/1/1
1	LLP	A	90	1	-	2/16/17/19	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	90	LLP	C4'-NZ	10.60	1.62	1.27
1	A	90	LLP	C4'-NZ	10.44	1.62	1.27
1	C	90	LLP	C4'-NZ	10.38	1.62	1.27
1	B	90	LLP	C4'-NZ	9.25	1.58	1.27
1	A	90	LLP	C3-C2	-2.45	1.38	1.40
1	B	90	LLP	C3-C2	-2.41	1.38	1.40

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	90	LLP	CE-NZ-C4'	5.32	135.24	118.90
1	A	90	LLP	CE-NZ-C4'	5.26	135.05	118.90
1	D	90	LLP	OP4-C5'-C5	4.44	117.81	109.35
1	B	90	LLP	OP4-C5'-C5	4.34	117.62	109.35
1	A	90	LLP	OP4-C5'-C5	3.36	115.75	109.35
1	B	90	LLP	C3-C4-C5	3.28	120.78	118.26
1	C	90	LLP	CE-NZ-C4'	3.20	128.73	118.90
1	C	90	LLP	OP4-C5'-C5	2.80	114.69	109.35
1	B	90	LLP	C4-C3-C2	-2.75	118.49	120.19
1	C	90	LLP	C4-C4'-NZ	-2.71	111.88	124.31
1	B	90	LLP	OP4-P-OP1	-2.61	99.14	106.47
1	D	90	LLP	CD-CG-CB	-2.54	104.63	113.62
1	D	90	LLP	C4-C3-C2	-2.49	118.64	120.19
1	C	90	LLP	OP4-P-OP1	-2.46	99.58	106.47
1	D	90	LLP	OP4-P-OP1	-2.43	99.64	106.47
1	A	90	LLP	C4-C3-C2	-2.38	118.72	120.19
1	A	90	LLP	OP4-P-OP1	-2.37	99.81	106.47
1	A	90	LLP	C3-C4-C5	2.23	119.97	118.26
1	C	90	LLP	O3-C3-C4	2.16	125.39	119.60
1	A	90	LLP	CD-CG-CB	-2.03	106.44	113.62

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	90	LLP	O-C-CA-CB
1	A	90	LLP	C4-C4'-NZ-CE
1	D	90	LLP	C4-C4'-NZ-CE
1	B	90	LLP	C4-C4'-NZ-CE
1	C	90	LLP	CD-CE-NZ-C4'
1	C	90	LLP	C3-C4-C4'-NZ
1	A	90	LLP	CD-CE-NZ-C4'
1	D	90	LLP	CD-CE-NZ-C4'

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	90	LLP	1	0
1	A	90	LLP	1	0

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, 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	390/397 (98%)	0.10	7 (1%)	67	70	13, 24, 41, 58	0
1	B	388/397 (97%)	0.31	14 (3%)	46	49	11, 24, 45, 69	1 (0%)
1	C	385/397 (96%)	0.03	8 (2%)	63	66	13, 22, 39, 66	0
1	D	389/397 (97%)	0.51	27 (6%)	24	25	13, 27, 46, 62	0
All	All	1552/1588 (97%)	0.24	56 (3%)	46	49	11, 24, 44, 69	1 (0%)

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	310	TYR	5.9
1	C	310	TYR	4.9
1	D	20	ILE	4.4
1	B	181	CYS	4.3
1	D	181	CYS	3.9
1	B	391	TYR	3.8
1	B	182	CYS	3.7
1	C	298	ILE	3.7
1	B	23	ILE	3.7
1	D	310	TYR	3.6
1	B	310	TYR	3.4
1	D	184	PRO	3.3
1	D	298	ILE	3.3
1	A	146	HIS	3.3
1	D	3	THR	3.1
1	D	146	HIS	3.0
1	D	24	LEU	3.0
1	D	168	THR	3.0
1	B	3	THR	3.0
1	D	177	ILE	2.9
1	C	391	TYR	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	25	HIS	2.8
1	A	298	ILE	2.8
1	C	25	HIS	2.7
1	D	266	ILE	2.6
1	C	296	GLY	2.6
1	A	140	THR	2.6
1	D	284	HIS	2.6
1	D	27	CYS	2.5
1	A	311	PRO	2.5
1	D	391	TYR	2.5
1	D	169	LEU	2.4
1	D	182	CYS	2.4
1	B	184	PRO	2.4
1	D	296	GLY	2.4
1	D	140	THR	2.3
1	D	292	GLN	2.3
1	D	294	GLU	2.3
1	B	24	LEU	2.3
1	B	177	ILE	2.2
1	D	147	VAL	2.2
1	A	181	CYS	2.2
1	C	181	CYS	2.2
1	D	180	TRP	2.2
1	B	27	CYS	2.2
1	B	165	GLY	2.1
1	D	264	LYS	2.1
1	D	270	MET	2.1
1	B	28	VAL	2.1
1	C	23	ILE	2.1
1	B	224	GLY	2.1
1	D	18	ALA	2.0
1	C	146	HIS	2.0
1	A	144	ARG	2.0
1	D	115	ALA	2.0
1	D	392	LYS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	LLP	A	90	24/25	0.97	0.05	13,15,18,21	0
1	LLP	D	90	24/25	0.97	0.06	15,18,21,22	0
1	LLP	B	90	24/25	0.97	0.06	14,16,19,22	0
1	LLP	C	90	24/25	0.98	0.05	13,16,22,23	0

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.