Full wwPDB X-ray Structure Validation Report (i)

Dec 7, 2023 – 12:26 am GMT

PDB ID	:	2V70
Title	:	Third LRR domain of human Slit2
Authors	:	Morlot, C.; Cusack, S.; McCarthy, A.A.
Deposited on	:	2007-07-24
Resolution	:	3.01 Å(reported)

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

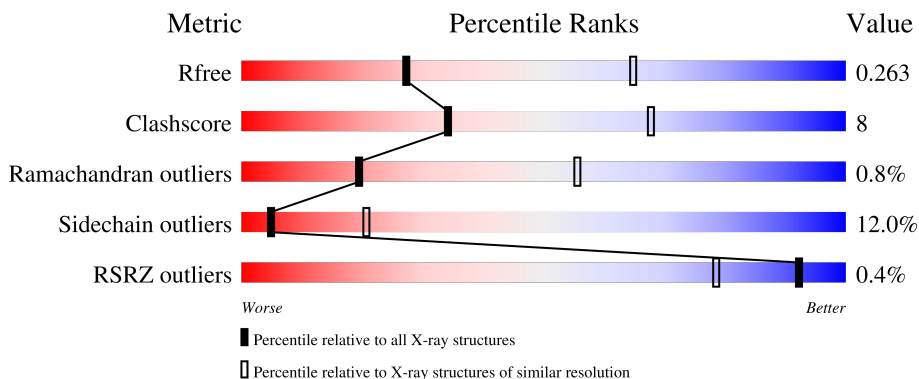|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.01 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		0.263
Clashscore		8
Ramachandran outliers		0.8%
Sidechain outliers		12.0%
RSRZ outliers		0.4%

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	2399 (3.04-3.00)
Clashscore	141614	2734 (3.04-3.00)
Ramachandran outliers	138981	2640 (3.04-3.00)
Sidechain outliers	138945	2643 (3.04-3.00)
RSRZ outliers	127900	2287 (3.04-3.00)

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	220	74% 20% • 5%
1	B	220	70% 22% • 5%
1	C	220	% 73% 20% • 5%
1	D	220	70% 23% • 5%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

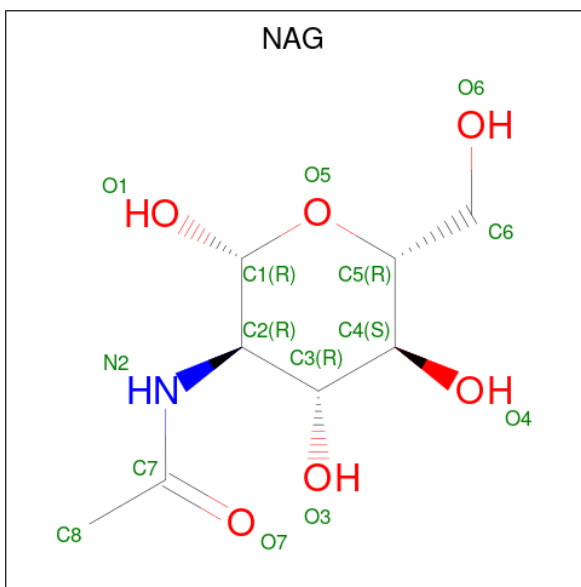| Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	A	1715	-	-	-	X
2	NAG	B	1715	-	-	-	X

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 6551 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 SLIT HOMOLOG 2 PROTEIN N-PRODUCT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	210	Total	C	N	O	S	0	0	0
			1631	1029	283	308	11			
1	B	210	Total	C	N	O	S	0	0	0
			1629	1027	281	310	11			
1	C	210	Total	C	N	O	S	0	0	0
			1611	1019	271	310	11			
1	D	210	Total	C	N	O	S	0	0	0
			1624	1025	280	308	11			

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	C	1	Total 14	C 8	N 1	O 5	0	0
2	D	1	Total 14	C 8	N 1	O 5	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.

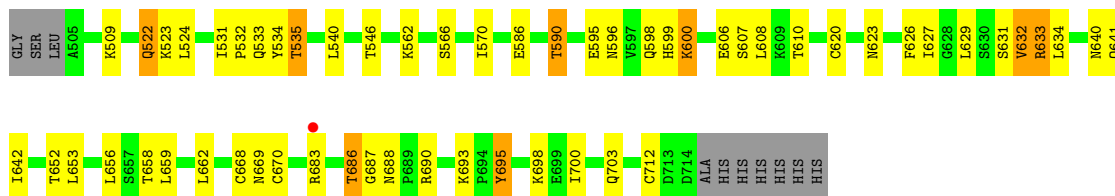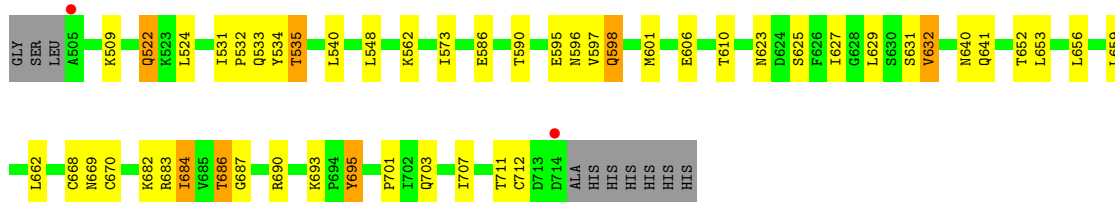- Molecule 1: SLIT HOMOLOG 2 PROTEIN N-PRODUCT

Chain A:
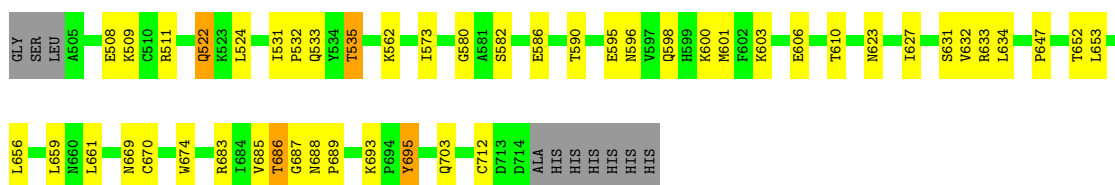
- Molecule 1: SLIT HOMOLOG 2 PROTEIN N-PRODUCT

Chain B:

- Molecule 1: SLIT HOMOLOG 2 PROTEIN N-PRODUCT

Chain C:
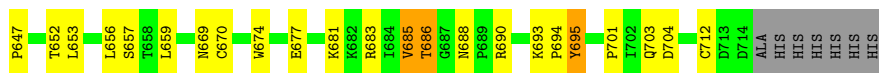

- Molecule 1: SLIT HOMOLOG 2 PROTEIN N-PRODUCT

Chain D:

P647 T652 L653 L656 S657 T658 L659 N669 C670 W674 E677 K681 K682 R683 I684 V685 T686 G687 N688 P689 R690 K693 P694 Y695 P701 I702 Q703 D704 C712 D713 D714 ALA HIS HIS HIS HIS HIS HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	63.65Å 96.86Å 87.15Å 90.00° 95.32° 90.00°	Depositor
Resolution (Å)	30.00 – 3.01 14.83 – 3.01	Depositor EDS
% Data completeness (in resolution range)	93.7 (30.00-3.01) 94.6 (14.83-3.01)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.51 (at 3.01Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.222 , 0.271 0.220 , 0.263	Depositor DCC
R_{free} test set	1008 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å^2)	56.8	Xtriage
Anisotropy	0.098	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.25 , 26.4	EDS
L-test for twinning[2]	$< |L| > = 0.45$, $< L^2 > = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	6551	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.25% 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 (i)

5.1 Standard geometry (i)

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

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	0.79	0/1660	0.81	0/2251
1	B	0.80	0/1658	0.83	2/2248 (0.1%)
1	C	0.76	1/1640 (0.1%)	0.80	1/2230 (0.0%)
1	D	0.77	0/1653	0.81	0/2243
All	All	0.78	1/6611 (0.0%)	0.81	3/8972 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	668	CYS	CB-SG	-5.06	1.73	1.81

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	690	ARG	NE-CZ-NH1	6.72	123.66	120.30
1	B	668	CYS	CA-CB-SG	-5.25	104.55	114.00
1	C	668	CYS	CA-CB-SG	-5.21	104.62	114.00

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	1631	0	1599	34	0
1	B	1629	0	1589	34	0
1	C	1611	0	1546	24	0
1	D	1624	0	1583	31	0
2	A	14	0	13	0	0
2	B	14	0	13	0	0
2	C	14	0	13	0	0
2	D	14	0	13	0	0
All	All	6551	0	6369	109	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 8.

All (109) 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:532:PRO:O	1:C:535:THR:HG22	1.49	1.12
1:D:532:PRO:O	1:D:535:THR:HG22	1.56	1.06
1:A:532:PRO:O	1:A:535:THR:HG22	1.55	1.06
1:A:580:GLY:HA2	1:D:521:ASN:HD21	1.26	1.00
1:B:532:PRO:O	1:B:535:THR:HG22	1.62	0.98
1:A:580:GLY:HA2	1:D:521:ASN:ND2	1.85	0.89
1:B:599:HIS:CE1	1:B:600:LYS:HE3	2.11	0.86
1:A:685:VAL:HG11	1:B:698:LYS:O	1.77	0.84
1:A:687:GLY:CA	1:B:700:ILE:CD1	2.60	0.80
1:D:509:LYS:HB3	1:D:522:GLN:HG2	1.62	0.80
1:C:562:LYS:HG3	1:C:586:GLU:HG2	1.65	0.78
1:A:586:GLU:HB2	1:A:610:THR:HB	1.68	0.74
1:A:509:LYS:HB3	1:A:522:GLN:HG2	1.68	0.74
1:A:580:GLY:CA	1:D:521:ASN:HD21	2.00	0.73
1:D:586:GLU:HB2	1:D:610:THR:HB	1.70	0.72
1:B:586:GLU:HB2	1:B:610:THR:HB	1.71	0.71
1:D:562:LYS:HG3	1:D:586:GLU:HG2	1.71	0.71
1:C:670:CYS:H	1:C:712:CYS:H	1.39	0.71
1:B:562:LYS:HG3	1:B:586:GLU:HG2	1.73	0.70
1:C:509:LYS:HB3	1:C:522:GLN:HG2	1.72	0.70
1:B:509:LYS:HB3	1:B:522:GLN:HG2	1.73	0.70
1:D:531:ILE:HG22	1:D:535:THR:HG21	1.74	0.69
1:A:531:ILE:HG22	1:A:535:THR:HG21	1.74	0.67
1:C:531:ILE:HG22	1:C:535:THR:HG21	1.75	0.67
1:C:586:GLU:HB2	1:C:610:THR:HB	1.75	0.67
1:B:531:ILE:HG22	1:B:535:THR:HG21	1.76	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:562:LYS:HG3	1:A:586:GLU:HG2	1.80	0.64
1:B:670:CYS:H	1:B:712:CYS:H	1.47	0.62
1:C:659:LEU:O	1:C:686:THR:HA	1.99	0.62
1:A:695:TYR:N	1:A:695:TYR:CD2	2.68	0.61
1:A:687:GLY:HA2	1:B:700:ILE:CD1	2.32	0.60
1:C:695:TYR:CD2	1:C:695:TYR:N	2.69	0.60
1:A:669:ASN:HB2	1:A:712:CYS:HB3	1.83	0.60
1:C:597:VAL:O	1:C:598:GLN:HG3	2.01	0.59
1:A:687:GLY:HA3	1:B:700:ILE:HD13	1.84	0.59
1:A:573:ILE:HB	1:A:601:MET:HG2	1.85	0.59
1:A:687:GLY:HA3	1:B:700:ILE:CD1	2.33	0.58
1:C:682:LYS:HB3	1:C:684:ILE:CG2	2.33	0.58
1:D:695:TYR:N	1:D:695:TYR:CD2	2.72	0.58
1:B:633:ARG:HH11	1:B:633:ARG:HB3	1.69	0.57
1:A:659:LEU:O	1:A:686:THR:HA	2.05	0.57
1:A:695:TYR:N	1:A:695:TYR:HD2	2.04	0.56
1:C:669:ASN:HB2	1:C:712:CYS:HB3	1.87	0.56
1:D:669:ASN:HB2	1:D:712:CYS:HB3	1.88	0.55
1:A:670:CYS:H	1:A:712:CYS:H	1.54	0.54
1:B:695:TYR:CD2	1:B:695:TYR:N	2.76	0.54
1:D:626:PHE:HB3	1:D:653:LEU:HD21	1.90	0.53
1:B:653:LEU:HD12	1:B:656:LEU:HD22	1.91	0.52
1:D:653:LEU:HD12	1:D:656:LEU:HD22	1.91	0.52
1:D:695:TYR:N	1:D:695:TYR:HD2	2.06	0.52
1:C:662:LEU:HD21	1:C:687:GLY:O	2.10	0.52
1:C:695:TYR:N	1:C:695:TYR:HD2	2.07	0.52
1:A:687:GLY:HA2	1:B:700:ILE:HD12	1.91	0.51
1:B:659:LEU:O	1:B:686:THR:HA	2.09	0.51
1:D:546:THR:O	1:D:570:ILE:HA	2.10	0.51
1:D:659:LEU:O	1:D:686:THR:HA	2.10	0.51
1:C:629:LEU:HB3	1:C:632:VAL:CG1	2.41	0.51
1:A:687:GLY:N	1:B:700:ILE:HD11	2.26	0.50
1:C:653:LEU:HD12	1:C:656:LEU:HD22	1.94	0.50
1:A:653:LEU:HD12	1:A:656:LEU:HD22	1.95	0.49
1:B:546:THR:O	1:B:570:ILE:HA	2.13	0.49
1:B:522:GLN:HB3	1:B:524:LEU:HG	1.94	0.48
1:D:534:TYR:C	1:D:534:TYR:CD2	2.87	0.48
1:A:586:GLU:CB	1:A:610:THR:HB	2.39	0.48
1:A:687:GLY:CA	1:B:700:ILE:HD13	2.39	0.48
1:C:573:ILE:HB	1:C:601:MET:HG2	1.95	0.48
1:D:670:CYS:H	1:D:712:CYS:H	1.60	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:534:TYR:C	1:B:534:TYR:CD2	2.86	0.48
1:A:661:LEU:HB2	1:A:689:PRO:HG3	1.96	0.47
1:D:629:LEU:HB3	1:D:632:VAL:CG1	2.44	0.47
1:B:669:ASN:HB2	1:B:712:CYS:HB3	1.96	0.47
1:A:522:GLN:HB3	1:A:524:LEU:HG	1.97	0.47
1:B:607:SER:O	1:B:608:LEU:C	2.53	0.47
1:D:701:PRO:O	1:D:704:ASP:HB2	2.14	0.47
1:B:629:LEU:HB3	1:B:632:VAL:CG1	2.45	0.46
1:A:582:SER:HB3	1:D:521:ASN:HD22	1.80	0.46
1:B:620:CYS:HA	1:B:642:ILE:HG23	1.98	0.46
1:A:695:TYR:HD2	1:A:695:TYR:H	1.64	0.46
1:B:695:TYR:N	1:B:695:TYR:HD2	2.14	0.46
1:C:534:TYR:C	1:C:534:TYR:CD2	2.90	0.45
1:C:690:ARG:HA	1:C:701:PRO:HA	1.99	0.45
1:D:690:ARG:HA	1:D:701:PRO:HA	1.99	0.45
1:D:694:PRO:O	1:D:695:TYR:C	2.53	0.45
1:D:522:GLN:HB3	1:D:524:LEU:HG	1.98	0.44
1:A:580:GLY:CA	1:D:521:ASN:ND2	2.67	0.44
1:D:657:SER:O	1:D:685:VAL:HG23	2.17	0.43
1:C:695:TYR:HD2	1:C:695:TYR:H	1.67	0.43
1:C:522:GLN:HB3	1:C:524:LEU:HG	2.00	0.43
1:C:540:LEU:HD23	1:C:540:LEU:HA	1.85	0.43
1:B:540:LEU:HD23	1:B:540:LEU:HA	1.91	0.43
1:C:684:ILE:HD13	1:C:684:ILE:HG21	1.70	0.42
1:B:662:LEU:HD11	1:B:687:GLY:HA3	2.00	0.42
1:B:566:SER:HA	1:B:590:THR:O	2.18	0.42
1:D:647:PRO:HA	1:D:674:TRP:CE2	2.53	0.42
1:B:626:PHE:HB3	1:B:653:LEU:HD21	2.02	0.42
1:A:647:PRO:HA	1:A:674:TRP:CE2	2.55	0.42
1:A:687:GLY:CA	1:B:700:ILE:HD11	2.46	0.42
1:A:687:GLY:O	1:A:688:ASN:CB	2.65	0.42
1:D:586:GLU:CB	1:D:610:THR:HB	2.44	0.42
1:D:607:SER:O	1:D:608:LEU:C	2.58	0.42
1:A:634:LEU:C	1:A:634:LEU:HD23	2.41	0.41
1:C:711:THR:O	1:C:712:CYS:C	2.58	0.41
1:B:634:LEU:HG	1:B:658:THR:HB	2.03	0.41
1:D:519:CYS:HB2	1:D:540:LEU:HD23	2.02	0.40
1:C:640:ASN:HB3	1:C:641:GLN:H	1.72	0.40
1:D:531:ILE:HA	1:D:532:PRO:HD3	1.96	0.40
1:A:531:ILE:HA	1:A:532:PRO:HD3	1.98	0.40
1:B:640:ASN:HB3	1:B:641:GLN:H	1.63	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:620:CYS:HA	1:D:642:ILE:HG23	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	208/220 (94%)	180 (86%)	27 (13%)	1 (0%)	29	66
1	B	208/220 (94%)	184 (88%)	22 (11%)	2 (1%)	15	50
1	C	208/220 (94%)	185 (89%)	21 (10%)	2 (1%)	15	50
1	D	208/220 (94%)	186 (89%)	20 (10%)	2 (1%)	15	50
All	All	832/880 (94%)	735 (88%)	90 (11%)	7 (1%)	19	55

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	683	ARG
1	A	683	ARG
1	B	683	ARG
1	C	683	ARG
1	C	707	ILE
1	B	688	ASN
1	D	688	ASN

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	180/197 (91%)	158 (88%)	22 (12%)	5	20
1	B	179/197 (91%)	159 (89%)	20 (11%)	6	23
1	C	174/197 (88%)	154 (88%)	20 (12%)	5	22
1	D	178/197 (90%)	155 (87%)	23 (13%)	4	18
All	All	711/788 (90%)	626 (88%)	85 (12%)	5	21

All (85) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	508	GLU
1	A	511	ARG
1	A	522	GLN
1	A	533	GLN
1	A	535	THR
1	A	590	THR
1	A	595	GLU
1	A	596	ASN
1	A	598	GLN
1	A	600	LYS
1	A	603	LYS
1	A	606	GLU
1	A	623	ASN
1	A	627	ILE
1	A	631	SER
1	A	632	VAL
1	A	633	ARG
1	A	652	THR
1	A	686	THR
1	A	693	LYS
1	A	695	TYR
1	A	703	GLN
1	B	522	GLN
1	B	523	LYS
1	B	533	GLN
1	B	535	THR
1	B	590	THR
1	B	595	GLU
1	B	596	ASN
1	B	598	GLN

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Mol	Chain	Res	Type
1	B	600	LYS
1	B	606	GLU
1	B	623	ASN
1	B	627	ILE
1	B	631	SER
1	B	632	VAL
1	B	633	ARG
1	B	652	THR
1	B	686	THR
1	B	693	LYS
1	B	695	TYR
1	B	703	GLN
1	C	522	GLN
1	C	533	GLN
1	C	535	THR
1	C	548	LEU
1	C	590	THR
1	C	595	GLU
1	C	596	ASN
1	C	598	GLN
1	C	606	GLU
1	C	623	ASN
1	C	625	SER
1	C	627	ILE
1	C	631	SER
1	C	632	VAL
1	C	652	THR
1	C	684	ILE
1	C	686	THR
1	C	693	LYS
1	C	695	TYR
1	C	703	GLN
1	D	511	ARG
1	D	522	GLN
1	D	523	LYS
1	D	533	GLN
1	D	535	THR
1	D	561	ARG
1	D	590	THR
1	D	595	GLU
1	D	596	ASN
1	D	598	GLN

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Mol	Chain	Res	Type
1	D	606	GLU
1	D	623	ASN
1	D	627	ILE
1	D	631	SER
1	D	632	VAL
1	D	652	THR
1	D	677	GLU
1	D	681	LYS
1	D	685	VAL
1	D	686	THR
1	D	693	LYS
1	D	695	TYR
1	D	703	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	522	GLN
1	A	541	ASN
1	A	542	ASN
1	A	596	ASN
1	A	599	HIS
1	A	692	GLN
1	A	708	GLN
1	B	522	GLN
1	B	596	ASN
1	B	599	HIS
1	B	692	GLN
1	B	708	GLN
1	C	522	GLN
1	C	541	ASN
1	C	542	ASN
1	C	596	ASN
1	C	708	GLN
1	D	521	ASN
1	D	522	GLN
1	D	541	ASN
1	D	542	ASN
1	D	596	ASN
1	D	692	GLN

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 ⓘ

4 ligands 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	$\#|Z| > 2$
2	NAG	D	1715	1	14,14,15	0.90	0	17,19,21	1.35	3 (17%)
2	NAG	A	1715	1	14,14,15	0.63	0	17,19,21	1.11	1 (5%)
2	NAG	B	1715	1	14,14,15	1.01	2 (14%)	17,19,21	1.25	2 (11%)
2	NAG	C	1715	1	14,14,15	1.13	2 (14%)	17,19,21	1.50	5 (29%)

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
2	NAG	D	1715	1	-	2/6/23/26	0/1/1/1
2	NAG	A	1715	1	-	2/6/23/26	0/1/1/1
2	NAG	B	1715	1	-	2/6/23/26	0/1/1/1
2	NAG	C	1715	1	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1715	NAG	C4-C5	2.53	1.58	1.53
2	B	1715	NAG	C1-C2	2.31	1.55	1.52
2	B	1715	NAG	C4-C5	2.24	1.57	1.53
2	C	1715	NAG	C1-C2	2.20	1.55	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1715	NAG	C6-C5-C4	3.22	120.54	113.00
2	B	1715	NAG	O4-C4-C5	2.47	115.43	109.30
2	C	1715	NAG	O4-C4-C3	-2.40	104.80	110.35
2	C	1715	NAG	C1-O5-C5	2.33	115.35	112.19
2	D	1715	NAG	O4-C4-C3	-2.28	105.07	110.35
2	A	1715	NAG	C1-O5-C5	2.26	115.26	112.19
2	C	1715	NAG	O4-C4-C5	2.19	114.74	109.30
2	D	1715	NAG	C1-O5-C5	2.15	115.10	112.19
2	C	1715	NAG	C2-N2-C7	2.08	125.86	122.90
2	B	1715	NAG	C1-O5-C5	2.08	115.01	112.19
2	D	1715	NAG	O4-C4-C5	2.05	114.38	109.30

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1715	NAG	C4-C5-C6-O6
2	D	1715	NAG	C4-C5-C6-O6
2	B	1715	NAG	C4-C5-C6-O6
2	C	1715	NAG	C4-C5-C6-O6
2	D	1715	NAG	O5-C5-C6-O6
2	A	1715	NAG	O5-C5-C6-O6
2	B	1715	NAG	O5-C5-C6-O6
2	C	1715	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

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(Å²)	Q<0.9
1	A	210/220 (95%)	-0.48	0	100	100	31, 35, 39, 42	0
1	B	210/220 (95%)	-0.33	1 (0%)	91	75	31, 35, 40, 42	0
1	C	210/220 (95%)	-0.52	2 (0%)	82	58	31, 35, 39, 42	0
1	D	210/220 (95%)	-0.48	0	100	100	31, 35, 40, 41	0
All	All	840/880 (95%)	-0.45	3 (0%)	92	78	31, 35, 40, 42	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	683	ARG	2.4
1	C	505	ALA	2.3
1	C	714	ASP	2.3

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 ⓘ

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, 95th 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(Å²)	Q<0.9
2	NAG	B	1715	14/15	0.27	0.74	45,46,47,47	14
2	NAG	A	1715	14/15	0.58	0.52	45,46,47,47	14
2	NAG	C	1715	14/15	0.80	0.38	45,46,47,48	0
2	NAG	D	1715	14/15	0.83	0.38	45,46,47,47	0

6.5 Other polymers ⓘ

There are no such residues in this entry.