Full wwPDB X-ray Structure Validation Report ⓘ

Apr 30, 2025 – 10:06 AM EDT

PDB ID	:	9C0U / pdb_00009c0u
Title	:	Crystal structure of chimeric hemagglutinin cH5/1 in complex with broad protective antibody 31.b.09
Authors	:	Nguyen, T.K.Y.; Zhu, X.; Wilson, I.A.
Deposited on	:	2024-05-27
Resolution	:	3.59 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:

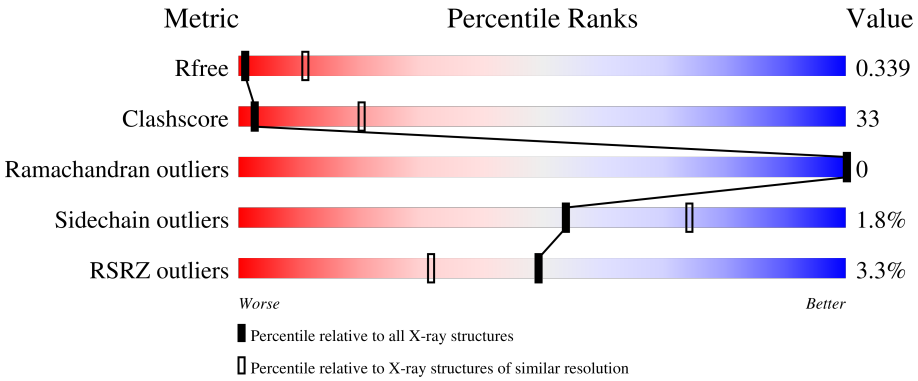
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 3.59 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	1563 (3.70-3.50)
Clashscore	180529	1665 (3.70-3.50)
Ramachandran outliers	177936	1641 (3.70-3.50)
Sidechain outliers	177891	1640 (3.70-3.50)
RSRZ outliers	164620	1562 (3.70-3.50)

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	504	4% 29% 33% • 36%
1	B	504	21% 11% • 67%
2	H	224	% 56% 41% •
3	L	218	3% 52% 42% 6%
4	S	3	100%

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Mol	Chain	Length	Quality of chain
5	C	2	100%

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
4	NAG	S	2	X	-	-	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 7347 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 Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	165	Total	C	N	O	S	0	0	0
			1340	836	228	270	6			
1	A	323	Total	C	N	O	S	0	0	0
			2552	1615	439	486	12			

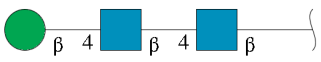
- Molecule 2 is a protein called Antibody 31.b.09 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	224	Total	C	N	O	S	0	0	0
			1681	1057	285	332	7			

- Molecule 3 is a protein called Antibody 31.b.09 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	218	Total	C	N	O	S	0	0	0
			1693	1062	287	338	6			

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

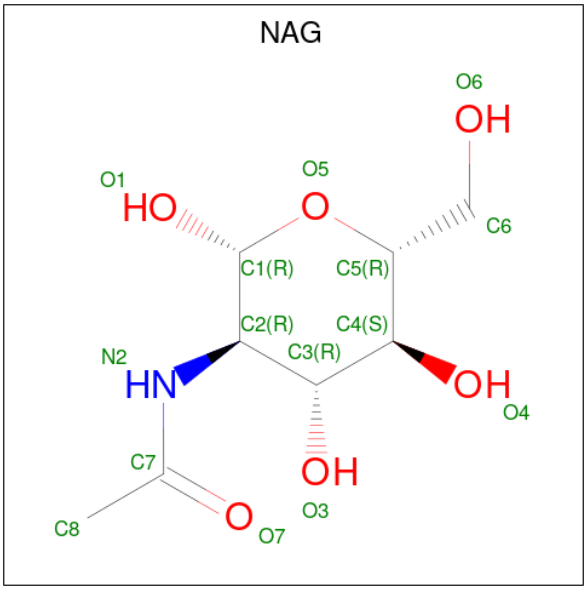


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	S	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
5	C	2	Total C N O 28 16 2 10	0	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



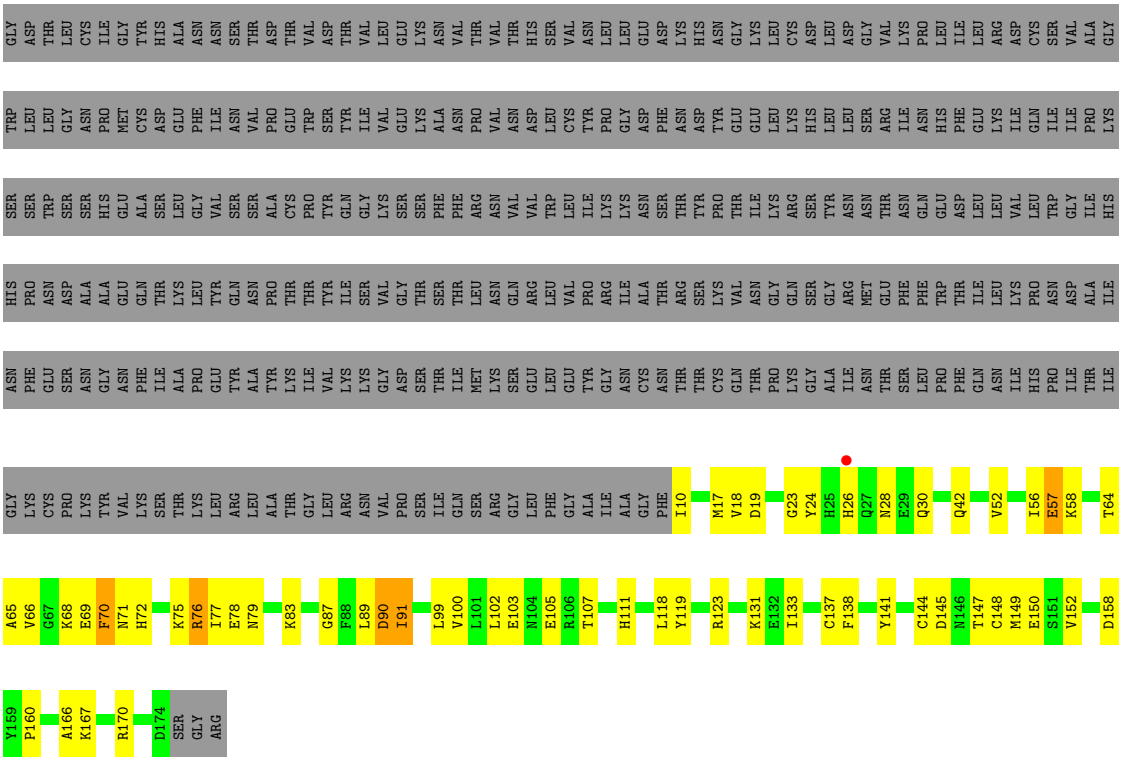
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C N O 14 8 1 5	0	0

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.

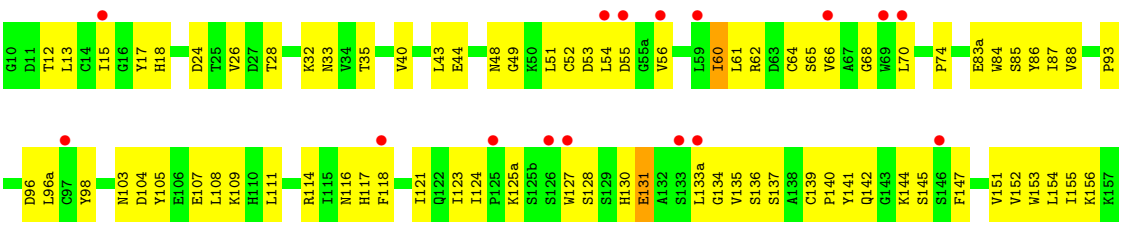
• Molecule 1: Hemagglutinin

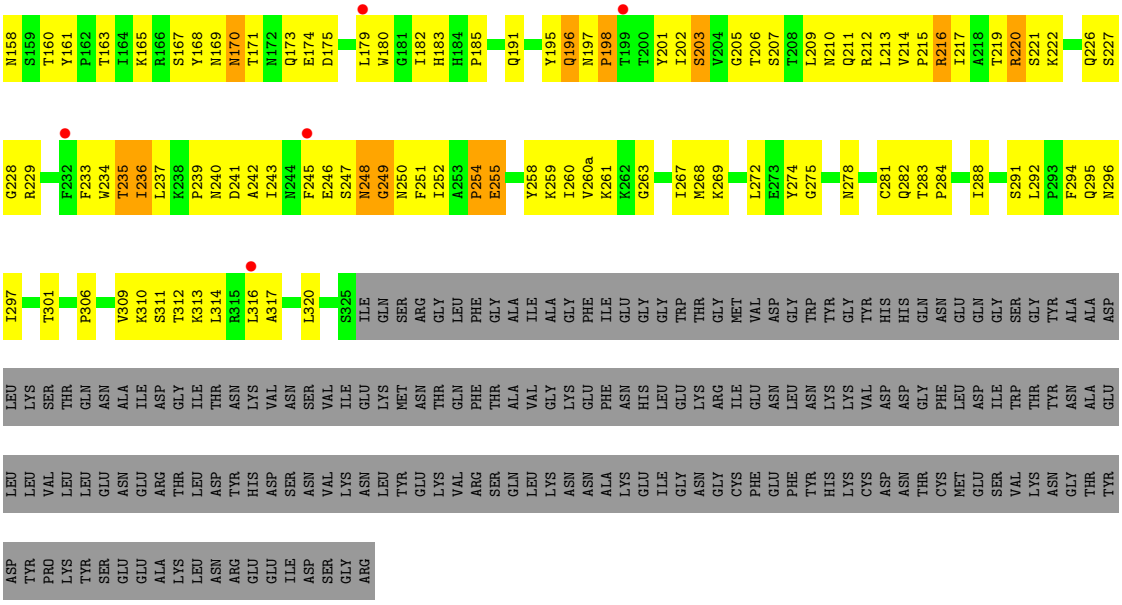
Chain B:



• Molecule 1: Hemagglutinin

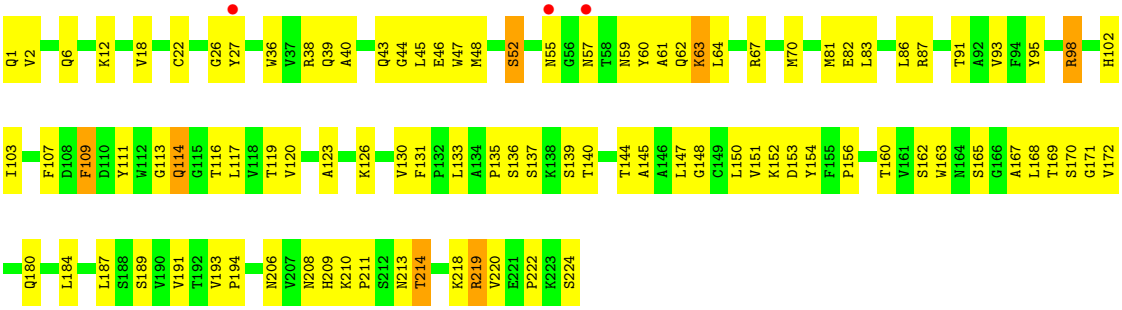
Chain A:





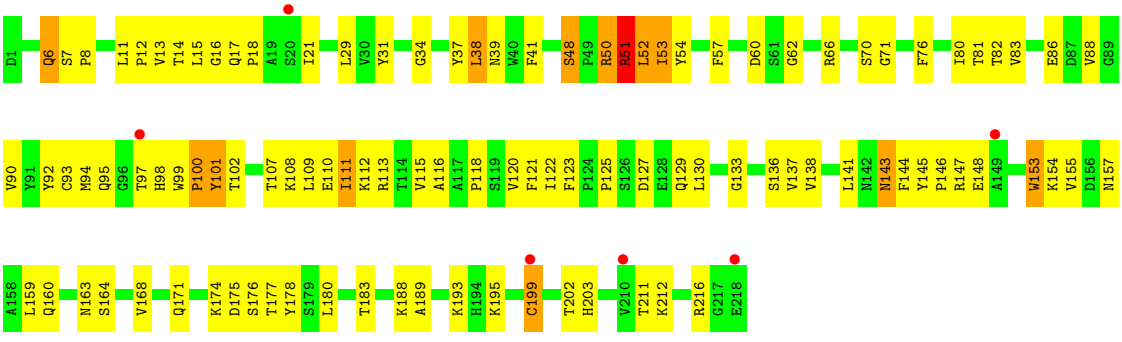
• Molecule 2: Antibody 31.b.09 Fab heavy chain

Chain H:



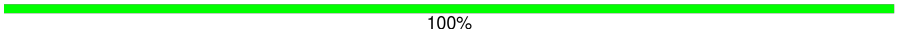
• Molecule 3: Antibody 31.b.09 Fab light chain

Chain L:



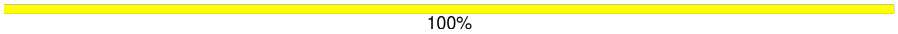
• Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, α, β, γ	162.08Å 162.08Å 162.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.87 – 3.59 48.87 – 3.59	Depositor EDS
% Data completeness (in resolution range)	94.6 (48.87-3.59) 99.9 (48.87-3.59)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.09 (at 3.57Å)	Xtriage
Refinement program	PHENIX (1.19.2_4158: ???)	Depositor
R, R_{free}	0.294 , 0.344 0.341 , 0.339	Depositor DCC
R_{free} test set	827 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å^2)	121.1	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 103.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.40$, $< L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.124 for l,-k,h	Xtriage
F_o,F_c correlation	0.86	EDS
Total number of atoms	7347	wwPDB-VP
Average B, all atoms (Å^2)	147.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.17% 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

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

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	5/2613 (0.2%)	1.22	28/3554 (0.8%)
1	B	0.51	1/1366 (0.1%)	0.83	6/1841 (0.3%)
2	H	0.57	0/1722	0.89	10/2346 (0.4%)
3	L	0.85	4/1732 (0.2%)	1.30	19/2355 (0.8%)
All	All	0.71	10/7433 (0.1%)	1.11	63/10096 (0.6%)

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	1
1	B	0	1
2	H	0	1
3	L	0	3
All	All	0	6

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	L	53	ILE	N-CA	8.13	1.55	1.46
1	A	198	PRO	N-CD	-6.93	1.38	1.47
1	A	131	GLU	N-CA	6.58	1.53	1.46
1	A	248	ASN	CA-C	6.31	1.62	1.52
1	A	221	SER	N-CA	6.07	1.54	1.45
1	A	220	ARG	N-CA	6.04	1.53	1.46
3	L	52	LEU	CA-C	-5.52	1.45	1.52
3	L	53	ILE	CA-C	-5.37	1.46	1.52
3	L	199	CYS	C-N	-5.28	1.26	1.33
1	B	90	ASP	N-CA	5.09	1.52	1.46

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	171	THR	N-CA-C	-19.97	88.15	113.12
1	A	254	PRO	CB-CA-C	-12.03	97.04	111.11
1	A	170	ASN	N-CA-C	-11.64	92.38	109.15
3	L	199	CYS	O-C-N	10.87	136.12	122.43
3	L	143	ASN	CB-CA-C	-10.44	92.05	109.80
3	L	86	GLU	N-CA-C	-9.43	101.19	112.89
1	A	142	GLN	CB-CA-C	9.37	129.06	110.42
1	A	128	SER	N-CA-C	-9.35	101.04	111.14
3	L	53	ILE	N-CA-CB	-8.41	100.89	111.41
1	A	54	LEU	N-CA-C	8.29	123.49	112.13
3	L	100	PRO	N-CA-C	-8.06	95.86	112.47
3	L	51	ARG	CB-CA-C	-7.65	96.43	109.51
1	A	55	ASP	N-CA-CB	7.61	122.38	111.19
3	L	52	LEU	N-CA-CB	-7.55	97.74	110.49
1	A	196	GLN	N-CA-C	7.39	119.97	111.11
1	A	55	ASP	N-CA-C	-7.25	98.59	109.83
1	A	203	SER	N-CA-C	-7.22	96.75	108.52
1	A	60	ILE	CB-CA-C	7.16	119.15	111.35
1	B	91	ILE	N-CA-C	-7.13	104.77	111.48
3	L	199	CYS	CA-C-N	-7.12	110.61	121.86
3	L	199	CYS	C-N-CA	-7.12	110.61	121.86
1	A	236	ILE	N-CA-C	-7.06	99.61	109.21
3	L	111	ILE	N-CA-C	7.03	117.14	110.53
3	L	101	TYR	CA-C-N	-6.79	113.19	122.77
3	L	101	TYR	C-N-CA	-6.79	113.19	122.77
2	H	114	GLN	CB-CA-C	6.76	120.88	109.80
2	H	109	PHE	N-CA-C	-6.70	99.57	109.62
3	L	62	GLY	CA-C-N	-6.54	117.64	123.33
3	L	62	GLY	C-N-CA	-6.54	117.64	123.33
2	H	123	ALA	N-CA-CB	6.45	121.47	110.57
3	L	153	TRP	N-CA-CB	-6.42	100.48	110.55
3	L	153	TRP	N-CA-C	6.29	118.77	108.52
2	H	219	ARG	N-CA-C	6.24	118.89	108.96
2	H	169	THR	N-CA-C	6.24	121.22	112.93
1	A	248	ASN	CA-C-O	6.24	128.55	121.32
1	A	235	THR	CB-CA-C	6.04	120.09	109.89
1	A	131	GLU	N-CA-CB	-6.00	97.55	110.88
1	A	216	ARG	N-CA-C	-5.99	98.51	108.75
1	A	54	LEU	CB-CA-C	-5.99	101.37	110.83
1	A	249	GLY	N-CA-C	5.93	119.78	111.00
2	H	220	VAL	N-CA-CB	5.87	118.08	111.21
3	L	101	TYR	N-CA-C	-5.86	99.69	109.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	58	LYS	N-CA-C	-5.86	106.76	114.31
1	A	60	ILE	N-CA-C	-5.85	100.28	108.12
1	A	197	ASN	N-CA-C	-5.83	100.93	109.50
2	H	170	SER	N-CA-C	-5.73	101.26	110.14
1	A	216	ARG	CB-CA-C	5.67	120.90	109.68
2	H	169	THR	CB-CA-C	-5.66	101.19	110.08
3	L	53	ILE	N-CA-C	5.62	115.88	107.51
2	H	214	THR	N-CA-C	-5.61	98.11	107.99
1	A	142	GLN	N-CA-C	-5.60	98.88	110.80
1	B	90	ASP	CB-CA-C	-5.53	99.41	110.42
1	A	196	GLN	CB-CA-C	-5.46	102.07	110.81
1	A	144	LYS	N-CA-CB	5.43	119.62	110.77
1	B	57	GLU	CB-CA-C	5.38	117.54	110.06
1	B	57	GLU	N-CA-C	-5.35	102.28	110.30
1	A	144	LYS	N-CA-C	-5.30	99.46	108.26
1	A	248	ASN	CB-CA-C	-5.30	102.34	111.45
2	H	114	GLN	N-CA-C	-5.28	100.69	109.46
1	A	170	ASN	CB-CA-C	5.23	118.61	110.67
3	L	111	ILE	CB-CA-C	-5.22	105.18	112.02
1	A	255	GLU	N-CA-CB	-5.22	103.02	110.80
1	B	70	PHE	N-CA-C	5.14	119.02	112.34

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	216	ARG	Sidechain
1	B	76	ARG	Sidechain
2	H	98	ARG	Sidechain
3	L	113	ARG	Sidechain
3	L	50	ARG	Sidechain
3	L	51	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	2552	0	2516	239	0
1	B	1340	0	1259	69	0
2	H	1681	0	1643	116	0
3	L	1693	0	1640	94	0
4	S	39	0	34	0	0
5	C	28	0	25	1	0
6	A	14	0	13	0	0
All	All	7347	0	7130	477	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 33.

All (477) 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:A:84:TRP:HH2	1:A:118:PHE:CD2	1.48	1.29
1:A:127:TRP:O	1:A:131:GLU:HB2	1.45	1.17
1:A:84:TRP:CH2	1:A:118:PHE:HD2	1.64	1.16
1:A:84:TRP:CH2	1:A:118:PHE:CD2	2.35	1.12
3:L:144:PHE:HD1	3:L:146:PRO:HD2	1.06	1.09
1:B:69:GLU:HA	1:B:78:GLU:HB2	1.37	1.05
1:A:151:VAL:CG1	1:A:252:ILE:HG22	1.87	1.05
2:H:27:TYR:CD2	2:H:98:ARG:NH1	2.26	1.04
1:A:234:TRP:O	1:A:235:THR:HG23	1.59	1.02
1:A:151:VAL:HG12	1:A:252:ILE:HG22	1.42	1.01
2:H:27:TYR:HD2	2:H:98:ARG:NH2	1.60	0.99
3:L:144:PHE:CD1	3:L:146:PRO:HD2	1.97	0.99
1:A:179:LEU:CD2	1:A:234:TRP:HB3	1.94	0.97
1:B:69:GLU:HG2	1:B:78:GLU:OE1	1.64	0.96
3:L:118:PRO:HG3	3:L:144:PHE:HB3	1.44	0.95
1:A:202:ILE:HD11	1:A:213:LEU:HB2	1.45	0.95
1:A:136:SER:HB2	1:A:139:CYS:HB2	1.47	0.94
1:A:179:LEU:CD2	1:A:234:TRP:CB	2.46	0.94
1:A:66:VAL:HG11	1:A:109:LYS:HZ3	1.32	0.93
2:H:27:TYR:HD2	2:H:98:ARG:HH22	1.08	0.93
1:A:179:LEU:HD23	1:A:234:TRP:HA	1.50	0.91
3:L:122:ILE:HD12	3:L:212:LYS:HB2	1.53	0.90
1:A:17:TYR:HB2	1:A:320:LEU:HD13	1.54	0.87
1:A:84:TRP:NE1	1:A:87:ILE:CG1	2.37	0.87
3:L:16:GLY:HA2	3:L:82:THR:HA	1.54	0.87
3:L:189:ALA:O	3:L:193:LYS:HG3	1.74	0.87
1:A:191:GLN:OE1	1:A:217:ILE:HD11	1.75	0.86

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:93:VAL:HA	2:H:117:LEU:HA	1.57	0.85
3:L:155:VAL:HG23	3:L:160:GLN:HG3	1.57	0.84
2:H:27:TYR:CE2	2:H:98:ARG:NH1	2.44	0.83
2:H:6:GLN:CD	2:H:114:GLN:O	2.22	0.82
2:H:27:TYR:HD2	2:H:98:ARG:CZ	1.91	0.82
2:H:135:PRO:HD3	2:H:147:LEU:HD21	1.58	0.82
1:A:163:THR:HG22	1:A:248:ASN:HB3	1.60	0.82
2:H:130:VAL:HG12	2:H:218:LYS:HG2	1.61	0.82
1:A:51:LEU:CD1	1:A:272:LEU:HB2	2.09	0.82
1:A:127:TRP:CZ3	1:A:152:VAL:HG21	2.16	0.80
1:A:84:TRP:CH2	1:A:118:PHE:CE2	2.70	0.80
1:A:234:TRP:O	1:A:235:THR:CG2	2.31	0.79
1:A:109:LYS:HE3	1:A:267:ILE:HG12	1.63	0.79
1:A:109:LYS:HE3	1:A:267:ILE:HG21	1.65	0.79
1:A:140:PRO:HA	1:A:145:SER:HA	1.64	0.79
2:H:27:TYR:HD2	2:H:98:ARG:NH1	1.79	0.78
3:L:145:TYR:CD1	3:L:146:PRO:HD3	2.18	0.78
2:H:57:ASN:ND2	2:H:103:ILE:HD11	1.98	0.78
1:A:239:PRO:O	1:A:240:ASN:OD1	2.01	0.78
1:A:151:VAL:HG11	1:A:252:ILE:HG22	1.65	0.77
3:L:144:PHE:HD1	3:L:146:PRO:CD	1.95	0.77
1:A:202:ILE:CD1	1:A:213:LEU:HB2	2.14	0.77
1:A:237:LEU:HD22	1:A:243:ILE:HD11	1.65	0.77
1:A:179:LEU:HD23	1:A:234:TRP:CA	2.15	0.77
2:H:91:THR:HG23	2:H:119:THR:HA	1.66	0.76
1:A:127:TRP:O	1:A:131:GLU:CB	2.32	0.76
1:A:123:ILE:HG22	1:A:124:ILE:HG12	1.65	0.76
1:A:170:ASN:HB3	1:A:239:PRO:HA	1.66	0.76
1:B:71:ASN:HD22	1:B:75:LYS:NZ	1.83	0.76
1:A:111:LEU:HD13	1:A:236:ILE:HD11	1.68	0.76
1:A:179:LEU:HD23	1:A:234:TRP:CB	2.16	0.75
1:A:84:TRP:HE1	1:A:87:ILE:CG1	1.99	0.75
1:A:219:THR:HG21	1:A:228:GLY:HA2	1.68	0.75
1:A:48:ASN:OD1	1:A:49:GLY:N	2.19	0.75
3:L:34:GLY:HA2	1:A:40:VAL:HG22	1.68	0.75
3:L:120:VAL:HG22	3:L:141:LEU:CD2	2.17	0.74
3:L:154:LYS:HE3	3:L:157:ASN:HA	1.68	0.74
2:H:150:LEU:HB3	2:H:152:LYS:HE3	1.68	0.74
3:L:38:LEU:HA	3:L:94:MET:HB3	1.70	0.74
1:A:84:TRP:NE1	1:A:87:ILE:HG12	2.04	0.73
1:A:278:ASN:OD1	1:A:278:ASN:O	2.05	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:131:LYS:HE3	1:B:141:TYR:HE1	1.51	0.72
1:A:83(a):GLU:HB3	1:A:117:HIS:HB2	1.70	0.72
1:A:74:PRO:HB2	1:A:141:TYR:HA	1.70	0.72
1:A:260(a):VAL:HG12	1:A:261:LYS:HG3	1.71	0.72
2:H:27:TYR:CD2	2:H:98:ARG:NH2	2.50	0.71
2:H:152:LYS:NZ	3:L:136:SER:OG	2.24	0.71
1:A:312:THR:O	1:A:313:LYS:HD2	1.91	0.70
2:H:36:TRP:HB2	2:H:81:MET:HE3	1.74	0.70
1:A:267:ILE:HD12	1:A:267:ILE:O	1.91	0.70
1:A:283:THR:HG22	1:A:301:THR:HG22	1.74	0.70
1:B:10:ILE:CD1	1:A:15:ILE:HG22	2.22	0.69
3:L:127:ASP:HA	3:L:130:LEU:HB2	1.73	0.69
2:H:36:TRP:CG	2:H:81:MET:HE2	2.27	0.69
1:A:84:TRP:CZ2	1:A:118:PHE:HE2	2.10	0.69
1:A:52:CYS:SG	1:A:53:ASP:N	2.64	0.69
1:A:134:GLY:H	1:A:153:TRP:HE3	1.41	0.69
1:B:70:PHE:HE1	1:B:76:ARG:HA	1.57	0.69
2:H:70:MET:SD	2:H:81:MET:HE1	2.33	0.69
1:B:70:PHE:CE1	1:B:76:ARG:HA	2.27	0.68
2:H:133:LEU:HD22	3:L:123:PHE:HB3	1.75	0.68
1:A:173:GLN:O	1:A:174:GLU:HG3	1.94	0.68
3:L:122:ILE:CD1	3:L:212:LYS:HB2	2.23	0.68
1:A:179:LEU:HD22	1:A:234:TRP:HB3	1.76	0.68
1:A:52:CYS:HA	1:A:275:GLY:HA3	1.76	0.67
1:B:119:TYR:HD1	1:A:15:ILE:HD12	1.57	0.67
3:L:111:ILE:HB	3:L:176:SER:HB3	1.76	0.67
3:L:199:CYS:O	3:L:211:THR:HB	1.95	0.67
1:B:111:HIS:HB3	1:A:320:LEU:CD2	2.24	0.67
1:A:84:TRP:CZ2	1:A:118:PHE:CE2	2.82	0.67
1:B:69:GLU:CA	1:B:78:GLU:HB2	2.20	0.67
1:B:89:LEU:O	1:B:90:ASP:HB2	1.94	0.67
2:H:144:THR:HA	2:H:194:PRO:HA	1.78	0.66
1:A:237:LEU:HD11	1:A:241:ASP:HB3	1.78	0.66
1:A:84:TRP:HE1	1:A:87:ILE:HG13	1.60	0.66
1:A:222:LYS:HA	1:A:227:SER:HA	1.76	0.66
1:A:111:LEU:HD13	1:A:236:ILE:CD1	2.26	0.66
2:H:86:LEU:HD22	2:H:120:VAL:HG21	1.76	0.66
1:A:151:VAL:HG12	1:A:252:ILE:CG2	2.23	0.66
1:B:18:VAL:HG13	2:H:102:HIS:CE1	2.31	0.65
3:L:95:GLN:HA	3:L:102:THR:H	1.61	0.65
2:H:93:VAL:HG23	2:H:117:LEU:N	2.12	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:309:VAL:HG12	1:A:311:SER:H	1.61	0.65
1:B:68:LYS:HB3	1:B:77:ILE:HG22	1.79	0.65
3:L:29:LEU:HD12	3:L:38:LEU:HD11	1.79	0.65
2:H:156:PRO:HB2	2:H:211:PRO:HG3	1.79	0.65
3:L:8:PRO:HB2	3:L:11:LEU:HD21	1.79	0.64
3:L:39:ASN:HA	3:L:53:ILE:O	1.97	0.64
3:L:12:PRO:HA	3:L:110:GLU:HB2	1.78	0.64
1:A:312:THR:O	1:A:313:LYS:CD	2.44	0.64
3:L:155:VAL:HG23	3:L:160:GLN:CG	2.28	0.64
1:A:68:GLY:HA3	1:A:96:ASP:OD2	1.97	0.64
1:A:96(a):LEU:N	1:A:96(a):LEU:HD12	2.13	0.64
1:A:109:LYS:CE	1:A:267:ILE:HG21	2.26	0.64
2:H:6:GLN:CG	2:H:114:GLN:O	2.46	0.64
2:H:36:TRP:HB2	2:H:81:MET:CE	2.28	0.64
2:H:139:SER:HB2	3:L:121:PHE:CD1	2.33	0.63
1:A:295:GLN:HE21	1:A:306:PRO:HD2	1.63	0.63
3:L:6:GLN:HE21	3:L:107:THR:HG23	1.63	0.63
3:L:120:VAL:HG22	3:L:141:LEU:HD23	1.79	0.63
1:B:10:ILE:HD11	1:A:15:ILE:CG2	2.28	0.63
3:L:51:ARG:O	3:L:51:ARG:NH1	2.31	0.63
1:A:51:LEU:HD12	1:A:272:LEU:HB2	1.80	0.63
1:A:179:LEU:HD21	1:A:234:TRP:CB	2.29	0.63
3:L:51:ARG:O	3:L:51:ARG:NE	2.32	0.62
1:B:69:GLU:HG2	1:B:78:GLU:CD	2.24	0.62
2:H:36:TRP:CD1	2:H:70:MET:HE3	2.33	0.62
3:L:15:LEU:H	3:L:112:LYS:HD2	1.65	0.62
1:A:111:LEU:HD22	1:A:236:ILE:CD1	2.29	0.62
2:H:70:MET:HG2	2:H:81:MET:SD	2.39	0.62
3:L:13:VAL:HG11	3:L:83:VAL:HG21	1.82	0.62
3:L:155:VAL:CG2	3:L:160:GLN:HG3	2.28	0.61
1:A:43:LEU:HD11	1:A:314:LEU:HG	1.82	0.61
1:A:202:ILE:HG22	1:A:247:SER:OG	2.00	0.61
2:H:86:LEU:HD13	2:H:120:VAL:HG22	1.81	0.61
3:L:133:GLY:HA2	3:L:188:LYS:HE3	1.83	0.61
1:A:104:ASP:HB3	1:A:234:TRP:CZ2	2.35	0.61
1:A:154:LEU:HG	1:A:251:PHE:O	2.00	0.61
1:A:278:ASN:O	1:A:278:ASN:CG	2.44	0.61
1:A:295:GLN:HG3	1:A:306:PRO:HB2	1.81	0.61
3:L:125:PRO:HD3	3:L:137:VAL:HG22	1.83	0.61
1:A:205:GLY:HA2	1:A:210:ASN:HA	1.83	0.61
2:H:6:GLN:HE22	2:H:95:TYR:HA	1.66	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:234:TRP:C	1:A:235:THR:HG23	2.26	0.60
1:A:127:TRP:O	1:A:131:GLU:N	2.34	0.60
1:B:10:ILE:HD11	1:A:15:ILE:HG22	1.83	0.60
1:A:51:LEU:HG	1:A:272:LEU:HB2	1.82	0.60
1:A:51:LEU:HG	1:A:272:LEU:CB	2.32	0.60
1:B:24:TYR:HB3	1:A:13:LEU:HD11	1.83	0.60
1:A:84:TRP:HH2	1:A:118:PHE:HD2	0.75	0.60
3:L:57:PHE:HE2	1:A:291:SER:HB3	1.67	0.60
1:A:84:TRP:NE1	1:A:87:ILE:HG13	2.13	0.60
3:L:174:LYS:H	3:L:174:LYS:HD2	1.66	0.60
1:A:133(a):LEU:HD12	1:A:147:PHE:HB3	1.84	0.60
3:L:153:TRP:O	3:L:160:GLN:N	2.33	0.60
1:B:71:ASN:HD22	1:B:75:LYS:CE	2.15	0.59
2:H:83:LEU:HD23	2:H:86:LEU:HD23	1.83	0.59
1:A:109:LYS:HZ2	1:A:267:ILE:HG21	1.67	0.59
1:B:69:GLU:CD	1:B:70:PHE:N	2.61	0.59
2:H:12:LYS:NZ	2:H:18:VAL:HA	2.17	0.59
1:A:84:TRP:HZ2	1:A:118:PHE:HE2	1.50	0.59
2:H:165:SER:C	2:H:167:ALA:H	2.11	0.58
3:L:118:PRO:HG2	3:L:203:HIS:NE2	2.19	0.58
1:A:84:TRP:CD1	1:A:87:ILE:HG12	2.38	0.58
1:B:69:GLU:HA	1:B:78:GLU:CB	2.22	0.58
2:H:27:TYR:CD2	2:H:98:ARG:CZ	2.75	0.58
1:B:19:ASP:HA	2:H:102:HIS:ND1	2.18	0.58
1:B:100:VAL:HG13	1:A:316:LEU:HD23	1.85	0.58
1:A:237:LEU:HD22	1:A:243:ILE:CD1	2.31	0.58
2:H:126:LYS:HD2	2:H:184:LEU:HD21	1.86	0.58
1:A:43:LEU:CD1	1:A:314:LEU:HG	2.33	0.58
2:H:136:SER:HA	2:H:224:SER:HA	1.85	0.57
1:A:51:LEU:CG	1:A:272:LEU:HB2	2.33	0.57
1:A:74:PRO:CB	1:A:141:TYR:HA	2.34	0.57
1:A:211:GLN:NE2	1:A:213:LEU:HD11	2.19	0.57
2:H:2:VAL:HG22	2:H:111:TYR:CE1	2.39	0.57
1:B:71:ASN:ND2	1:B:75:LYS:NZ	2.52	0.57
1:A:104:ASP:HB3	1:A:234:TRP:HZ2	1.70	0.57
1:A:179:LEU:HD21	1:A:234:TRP:HB3	1.83	0.57
3:L:95:GLN:HB3	3:L:101:TYR:CA	2.34	0.57
2:H:135:PRO:HD2	2:H:222:PRO:HA	1.87	0.56
1:A:222:LYS:HA	1:A:227:SER:CA	2.34	0.56
1:B:65:ALA:HB2	1:A:114:ARG:NH2	2.21	0.56
1:A:44:GLU:HB2	1:A:292:LEU:HD12	1.86	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:206:THR:HG22	1:A:243:ILE:HG12	1.85	0.56
1:A:96(a):LEU:N	1:A:96(a):LEU:CD1	2.68	0.56
1:B:18:VAL:HA	1:A:18:HIS:CE1	2.40	0.56
1:A:109:LYS:HE3	1:A:267:ILE:CG1	2.36	0.56
1:A:121:ILE:HD12	1:A:259:LYS:HD3	1.88	0.56
1:A:140:PRO:HA	1:A:145:SER:CA	2.35	0.56
1:A:133(a):LEU:HA	1:A:153:TRP:O	2.06	0.56
1:A:211:GLN:HG2	1:A:213:LEU:HG	1.87	0.56
2:H:140:THR:H	3:L:121:PHE:HE1	1.52	0.56
1:A:170:ASN:O	1:A:240:ASN:N	2.37	0.56
2:H:93:VAL:HG23	2:H:117:LEU:CA	2.37	0.55
1:A:108:LEU:HA	1:A:111:LEU:HD12	1.88	0.55
2:H:156:PRO:HD2	2:H:209:HIS:CE1	2.41	0.55
1:B:119:TYR:CE2	1:B:123:ARG:HD2	2.41	0.55
1:A:309:VAL:HG11	1:A:314:LEU:HD11	1.88	0.55
2:H:131:PHE:CD2	3:L:129:GLN:HB3	2.41	0.55
1:A:239:PRO:O	1:A:240:ASN:CG	2.49	0.55
1:A:43:LEU:HG	1:A:314:LEU:HB2	1.89	0.55
1:A:191:GLN:O	1:A:195:TYR:N	2.34	0.55
2:H:133:LEU:HD12	2:H:148:GLY:HA3	1.89	0.54
3:L:14:THR:HA	3:L:112:LYS:HA	1.88	0.54
2:H:98:ARG:O	2:H:109:PHE:HA	2.07	0.54
1:A:17:TYR:HB2	1:A:320:LEU:CD1	2.34	0.54
1:A:241:ASP:OD1	1:A:242:ALA:N	2.40	0.54
2:H:6:GLN:HG2	2:H:22:CYS:SG	2.48	0.54
3:L:116:ALA:HB1	3:L:144:PHE:HB2	1.90	0.54
1:A:109:LYS:CE	1:A:267:ILE:HG12	2.36	0.54
3:L:95:GLN:HB3	3:L:101:TYR:CB	2.39	0.53
1:A:203:SER:HA	1:A:212:ARG:HA	1.88	0.53
2:H:6:GLN:H	2:H:114:GLN:HG3	1.73	0.53
1:A:105:TYR:O	1:A:109:LYS:HG2	2.08	0.53
1:A:84:TRP:NE1	1:A:87:ILE:HD11	2.24	0.53
1:A:84:TRP:HE1	1:A:87:ILE:CD1	2.20	0.53
1:B:69:GLU:OE1	1:B:71:ASN:N	2.31	0.53
3:L:154:LYS:HG2	3:L:159:LEU:HD23	1.90	0.53
1:A:206:THR:OG1	1:A:209:LEU:HB2	2.08	0.53
1:A:295:GLN:HE21	1:A:306:PRO:CD	2.21	0.53
3:L:195:LYS:O	3:L:216:ARG:N	2.42	0.53
2:H:93:VAL:HG23	2:H:116:THR:C	2.34	0.53
1:A:33:ASN:HD22	5:C:1:NAG:H5	1.72	0.53
1:A:43:LEU:HD23	1:A:294:PHE:HB2	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:167:SER:HA	1:A:243:ILE:O	2.08	0.53
1:A:109:LYS:NZ	1:A:267:ILE:HG21	2.23	0.52
1:A:180:TRP:HB3	1:A:254:PRO:HG3	1.91	0.52
3:L:141:LEU:HB2	3:L:180:LEU:HB2	1.92	0.52
1:A:84:TRP:CD1	1:A:87:ILE:CG1	2.92	0.52
2:H:154:TYR:HB2	2:H:209:HIS:CE1	2.45	0.52
2:H:208:ASN:HA	2:H:214:THR:O	2.09	0.52
3:L:116:ALA:HB2	3:L:145:TYR:HD1	1.75	0.52
1:B:90:ASP:OD1	1:A:310:LYS:HD2	2.09	0.52
2:H:160:THR:HG21	2:H:210:LYS:HE3	1.92	0.52
1:A:61:LEU:O	1:A:62:ARG:C	2.53	0.52
1:B:89:LEU:C	1:B:91:ILE:H	2.18	0.51
2:H:133:LEU:HB2	2:H:148:GLY:H	1.74	0.51
2:H:38:ARG:HB2	2:H:48:MET:SD	2.50	0.51
1:A:109:LYS:HE3	1:A:267:ILE:CG2	2.38	0.51
1:A:84:TRP:HE1	1:A:87:ILE:HD11	1.75	0.51
1:B:42:GLN:HE22	3:L:99:TRP:HD1	1.58	0.51
1:B:76:ARG:O	1:B:77:ILE:C	2.53	0.51
2:H:70:MET:CG	2:H:81:MET:SD	2.98	0.51
1:A:137:SER:HB3	1:A:226:GLN:HG3	1.93	0.51
2:H:40:ALA:HB3	2:H:43:GLN:HB2	1.93	0.50
1:A:84:TRP:NE1	1:A:87:ILE:CD1	2.74	0.50
1:A:140:PRO:CA	1:A:145:SER:HA	2.38	0.50
1:A:214:VAL:HG12	1:A:215:PRO:O	2.10	0.50
1:B:111:HIS:CG	1:A:320:LEU:HD23	2.47	0.50
2:H:57:ASN:ND2	2:H:103:ILE:CD1	2.73	0.50
3:L:88:VAL:HG13	3:L:109:LEU:O	2.11	0.50
3:L:145:TYR:CG	3:L:146:PRO:HD3	2.47	0.50
1:A:56:VAL:HG12	1:A:85:SER:H	1.76	0.50
1:A:161:TYR:CE2	1:A:195:TYR:HD1	2.29	0.50
1:B:56:ILE:O	1:B:57:GLU:C	2.55	0.50
1:B:148:CYS:O	1:B:152:VAL:HG23	2.11	0.50
1:A:60:ILE:CD1	1:A:274:TYR:HB2	2.41	0.50
1:A:169:ASN:OD1	1:A:240:ASN:HA	2.11	0.49
1:B:83:LYS:O	1:B:87:GLY:N	2.36	0.49
2:H:131:PHE:CG	3:L:129:GLN:HB3	2.47	0.49
1:A:154:LEU:C	1:A:154:LEU:HD12	2.36	0.49
1:A:111:LEU:HD22	1:A:236:ILE:HD11	1.93	0.49
1:A:220:ARG:HG3	1:A:229:ARG:HH21	1.77	0.49
1:A:267:ILE:CD1	1:A:269:LYS:HE3	2.42	0.49
1:B:52:VAL:O	1:B:56:ILE:HG12	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:183:HIS:HD2	1:A:195:TYR:HE2	1.60	0.49
1:B:167:LYS:HA	1:B:170:ARG:HE	1.78	0.49
1:B:144:CYS:SG	1:B:149:MET:SD	3.11	0.49
1:B:166:ALA:O	1:B:170:ARG:HG3	2.12	0.49
1:A:153:TRP:CZ3	1:A:155:ILE:HD11	2.48	0.49
1:B:65:ALA:HB2	1:A:114:ARG:HH22	1.78	0.49
2:H:39:GLN:HB2	2:H:45:LEU:HD23	1.93	0.49
2:H:6:GLN:HG3	2:H:114:GLN:H	1.78	0.49
2:H:191:VAL:HG12	2:H:193:VAL:HG23	1.95	0.48
1:A:206:THR:HG1	1:A:209:LEU:HB2	1.77	0.48
2:H:12:LYS:HZ3	2:H:18:VAL:HA	1.79	0.48
2:H:86:LEU:HB3	2:H:120:VAL:HG11	1.95	0.48
1:A:154:LEU:HD12	1:A:154:LEU:O	2.14	0.48
1:B:42:GLN:HE22	3:L:99:TRP:CD1	2.32	0.48
3:L:71:GLY:HA3	3:L:76:PHE:HA	1.95	0.48
1:A:191:GLN:NE2	1:A:198:PRO:O	2.46	0.48
1:A:179:LEU:HD22	1:A:233:PHE:O	2.14	0.48
1:A:209:LEU:HD12	1:A:235:THR:CG2	2.44	0.48
1:B:28:ASN:HB3	1:B:30:GLN:HG2	1.96	0.48
2:H:154:TYR:OH	2:H:187:LEU:HG	2.13	0.48
3:L:39:ASN:ND2	3:L:94:MET:HG2	2.28	0.48
2:H:219:ARG:HG3	2:H:219:ARG:O	2.12	0.48
1:A:84:TRP:CD1	1:A:86:TYR:O	2.67	0.48
1:A:179:LEU:CD2	1:A:234:TRP:HB2	2.39	0.48
1:B:167:LYS:HA	1:B:170:ARG:NE	2.29	0.48
2:H:163:TRP:HB3	2:H:168:LEU:HB3	1.95	0.48
2:H:38:ARG:HD2	2:H:46:GLU:CD	2.39	0.47
1:A:43:LEU:HG	1:A:314:LEU:HD12	1.96	0.47
1:A:105:TYR:CZ	1:A:109:LYS:HD3	2.48	0.47
3:L:95:GLN:HB3	3:L:101:TYR:HA	1.95	0.47
1:A:135:VAL:HB	1:A:145:SER:HB3	1.95	0.47
2:H:162:SER:HB2	2:H:206:ASN:HB2	1.96	0.47
3:L:118:PRO:HA	3:L:143:ASN:O	2.14	0.47
1:A:161:TYR:CE2	1:A:249:GLY:HA2	2.50	0.47
1:A:312:THR:O	1:A:313:LYS:CG	2.62	0.47
1:B:145:ASP:N	1:B:148:CYS:HB3	2.30	0.47
2:H:168:LEU:HD21	2:H:191:VAL:HG11	1.96	0.47
1:B:133:ILE:O	1:B:137:CYS:HB2	2.15	0.47
2:H:18:VAL:HG12	2:H:83:LEU:HB3	1.97	0.47
1:A:207:SER:HB2	1:A:241:ASP:OD2	2.14	0.47
1:B:69:GLU:OE2	1:B:70:PHE:HB2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:39:GLN:HB2	2:H:45:LEU:CD2	2.44	0.47
1:A:151:VAL:CG1	1:A:252:ILE:CG2	2.77	0.47
1:A:43:LEU:HD11	1:A:311:SER:HB3	1.96	0.47
1:A:84:TRP:CZ2	1:A:87:ILE:HD11	2.50	0.47
1:A:96(a):LEU:C	1:A:98:TYR:N	2.73	0.47
2:H:172:VAL:HG22	2:H:191:VAL:HG22	1.97	0.47
1:A:281:CYS:SG	1:A:282:GLN:N	2.88	0.47
1:A:109:LYS:HE2	1:A:267:ILE:HD13	1.96	0.47
3:L:99:TRP:O	3:L:100:PRO:C	2.58	0.47
1:A:84:TRP:HD1	1:A:86:TYR:C	2.23	0.47
1:B:147:THR:HA	1:B:150:GLU:CD	2.41	0.46
2:H:67:ARG:HH22	2:H:87:ARG:NE	2.12	0.46
3:L:88:VAL:HG21	3:L:111:ILE:HD13	1.95	0.46
3:L:130:LEU:O	3:L:188:LYS:HE2	2.15	0.46
1:A:96(a):LEU:C	1:A:98:TYR:H	2.22	0.46
2:H:130:VAL:CG1	2:H:218:LYS:HG2	2.40	0.46
1:A:191:GLN:OE1	1:A:217:ILE:CD1	2.55	0.46
1:A:217:ILE:O	1:A:217:ILE:HG22	2.15	0.46
2:H:52:SER:O	2:H:55:ASN:O	2.33	0.46
2:H:163:TRP:HE1	2:H:189:SER:HB3	1.81	0.46
1:A:154:LEU:CD1	1:A:195:TYR:HE1	2.28	0.46
2:H:153:ASP:HA	2:H:184:LEU:HD13	1.98	0.46
2:H:156:PRO:HD2	2:H:209:HIS:HE1	1.81	0.46
3:L:88:VAL:HA	3:L:109:LEU:HB2	1.97	0.46
2:H:117:LEU:HD12	2:H:117:LEU:O	2.16	0.46
2:H:135:PRO:HD3	2:H:147:LEU:CD2	2.38	0.46
2:H:6:GLN:H	2:H:114:GLN:CG	2.28	0.46
1:A:123:ILE:HG23	1:A:168:TYR:CG	2.51	0.46
3:L:176:SER:O	3:L:177:THR:HG23	2.16	0.46
1:A:169:ASN:HA	1:A:241:ASP:O	2.15	0.46
1:A:183:HIS:O	1:A:250:ASN:HB3	2.16	0.46
1:B:18:VAL:HG22	1:B:18:VAL:O	2.16	0.46
3:L:171:GLN:HG3	3:L:178:TYR:CZ	2.51	0.46
1:A:152:VAL:HG23	1:A:255:GLU:HB2	1.98	0.46
1:A:179:LEU:HD21	1:A:234:TRP:HB2	1.97	0.46
1:B:10:ILE:HD13	1:A:15:ILE:HG22	1.97	0.45
2:H:2:VAL:HG22	2:H:111:TYR:CZ	2.51	0.45
1:A:116:ASN:ND2	1:A:263:GLY:HA3	2.31	0.45
1:A:243:ILE:HG21	1:A:245:PHE:CE2	2.51	0.45
1:B:103:GLU:O	1:B:107:THR:HG23	2.15	0.45
2:H:36:TRP:CG	2:H:81:MET:CE	2.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:6:GLN:OE1	3:L:93:CYS:SG	2.75	0.45
2:H:60:TYR:HE1	2:H:70:MET:HG3	1.82	0.45
1:A:84:TRP:HD1	1:A:86:TYR:O	1.99	0.45
1:B:76:ARG:O	1:B:79:ASN:N	2.49	0.45
1:B:131:LYS:HE3	1:B:141:TYR:CE1	2.42	0.45
2:H:61:ALA:O	2:H:62:GLN:C	2.60	0.45
2:H:64:LEU:HD23	2:H:64:LEU:HA	1.84	0.45
2:H:139:SER:OG	2:H:145:ALA:HA	2.16	0.45
1:A:154:LEU:HD12	1:A:195:TYR:HE1	1.82	0.45
1:A:267:ILE:O	1:A:267:ILE:CD1	2.62	0.45
1:B:72:HIS:HB2	1:A:103:ASN:CG	2.41	0.45
1:A:60:ILE:HA	1:A:88:VAL:HB	1.98	0.45
1:B:64:THR:O	1:B:65:ALA:C	2.60	0.45
2:H:6:GLN:HG3	2:H:114:GLN:N	2.32	0.45
1:A:195:TYR:CE2	1:A:250:ASN:HA	2.51	0.45
1:B:71:ASN:HD22	1:B:75:LYS:HE3	1.81	0.44
2:H:60:TYR:HE1	2:H:70:MET:CG	2.30	0.44
1:A:104:ASP:CG	1:A:107:GLU:OE1	2.60	0.44
1:A:175:ASP:O	1:A:260:ILE:N	2.50	0.44
1:A:220:ARG:HG3	1:A:229:ARG:NH2	2.32	0.44
2:H:165:SER:C	2:H:167:ALA:N	2.73	0.44
1:A:98:TYR:N	1:A:98:TYR:CD1	2.85	0.44
1:A:156:LYS:HB3	1:A:161:TYR:HB2	1.99	0.44
1:A:26:VAL:HG11	1:A:317:ALA:HB2	2.00	0.44
2:H:18:VAL:O	2:H:82:GLU:HA	2.18	0.44
1:A:182:ILE:HD11	1:A:202:ILE:HD11	1.99	0.44
1:B:111:HIS:HB3	1:A:320:LEU:HD21	2.00	0.44
1:B:26:HIS:ND1	1:B:149:MET:HE3	2.33	0.44
2:H:1:GLN:HA	2:H:26:GLY:O	2.18	0.44
1:A:43:LEU:HB3	1:A:296:ASN:HD21	1.83	0.44
2:H:107:PHE:CZ	3:L:37:TYR:HB3	2.53	0.44
3:L:51:ARG:O	3:L:51:ARG:CZ	2.66	0.44
1:A:109:LYS:CE	1:A:267:ILE:CG1	2.96	0.44
1:B:64:THR:O	1:B:66:VAL:HG23	2.18	0.43
3:L:98:HIS:CG	3:L:100:PRO:HD2	2.53	0.43
3:L:110:GLU:HB3	3:L:171:GLN:HE22	1.83	0.43
1:A:70:LEU:HA	1:A:258:TYR:HE2	1.82	0.43
1:B:158:ASP:CG	1:B:160:PRO:HD2	2.43	0.43
2:H:209:HIS:O	2:H:213:ASN:N	2.51	0.43
2:H:117:LEU:HD12	2:H:117:LEU:C	2.43	0.43
3:L:54:TYR:HE1	3:L:60:ASP:HB2	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:84:TRP:CE2	1:A:87:ILE:HD11	2.54	0.43
1:B:17:MET:O	1:A:18:HIS:ND1	2.51	0.43
2:H:130:VAL:HG22	2:H:151:VAL:HG22	2.00	0.43
2:H:44:GLY:HA2	3:L:92:TYR:OH	2.19	0.43
2:H:171:GLY:O	2:H:191:VAL:HA	2.19	0.43
3:L:8:PRO:HB2	3:L:11:LEU:HD11	1.98	0.43
1:A:173:GLN:O	1:A:174:GLU:CG	2.63	0.43
1:B:119:TYR:HD1	1:A:15:ILE:CD1	2.26	0.43
2:H:6:GLN:HB2	2:H:114:GLN:O	2.18	0.43
2:H:130:VAL:HG11	2:H:218:LYS:HB2	2.00	0.43
2:H:137:SER:C	2:H:139:SER:H	2.27	0.43
1:B:138:PHE:O	1:A:12:THR:HA	2.18	0.43
1:A:137:SER:N	1:A:226:GLN:OE1	2.48	0.43
3:L:168:VAL:HG22	3:L:180:LEU:HD22	1.99	0.43
3:L:95:GLN:H	3:L:95:GLN:HG3	1.47	0.43
1:A:24:ASP:O	1:A:35:THR:HA	2.19	0.43
1:A:169:ASN:OD1	1:A:170:ASN:O	2.36	0.43
1:B:105:GLU:HG2	1:A:28:THR:HB	2.00	0.43
1:A:56:VAL:CG1	1:A:85:SER:HB3	2.49	0.43
1:A:288:ILE:HD11	1:A:297:ILE:HD12	2.01	0.42
1:B:149:MET:HE1	1:A:13:LEU:HB2	2.01	0.42
2:H:6:GLN:HE21	2:H:113:GLY:C	2.27	0.42
3:L:31:TYR:HB2	3:L:97:THR:HG21	2.02	0.42
1:A:64:CYS:HA	1:A:96:ASP:HB3	2.00	0.42
3:L:57:PHE:CE2	1:A:291:SER:HB3	2.49	0.42
1:A:243:ILE:CG2	1:A:245:PHE:CE2	3.02	0.42
3:L:95:GLN:HB3	3:L:101:TYR:HB3	2.00	0.42
1:A:201:TYR:HE2	1:A:246:GLU:HG2	1.83	0.42
1:A:220:ARG:O	1:A:227:SER:OG	2.31	0.42
2:H:47:TRP:HH2	2:H:59:ASN:ND2	2.17	0.42
3:L:39:ASN:HD21	3:L:94:MET:HE2	1.84	0.42
3:L:81:THR:O	3:L:82:THR:C	2.61	0.42
1:A:312:THR:O	1:A:313:LYS:HG2	2.19	0.42
1:B:99:LEU:HA	1:B:102:LEU:HD12	1.99	0.42
2:H:133:LEU:HD13	3:L:123:PHE:CG	2.55	0.42
1:A:103:ASN:O	1:A:104:ASP:C	2.63	0.42
1:A:165:LYS:HG2	1:A:246:GLU:HG3	2.02	0.42
3:L:90:VAL:HG22	3:L:108:LYS:HG2	2.01	0.42
1:A:74:PRO:HB2	1:A:141:TYR:CA	2.46	0.42
1:A:154:LEU:CG	1:A:251:PHE:O	2.67	0.42
1:A:66:VAL:CG1	1:A:109:LYS:HZ3	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:VAL:HA	1:A:268:MET:HB2	2.01	0.42
2:H:6:GLN:CB	2:H:114:GLN:O	2.68	0.42
3:L:21:ILE:HG23	3:L:107:THR:HG21	2.02	0.42
1:A:237:LEU:CD1	1:A:241:ASP:HB3	2.47	0.42
3:L:57:PHE:CE1	3:L:70:SER:HA	2.55	0.41
1:A:158:ASN:O	1:A:160:THR:HG23	2.19	0.41
2:H:36:TRP:CB	2:H:81:MET:CE	2.96	0.41
2:H:130:VAL:HG11	2:H:218:LYS:CB	2.50	0.41
1:A:125(a):LYS:HG3	1:A:255:GLU:OE2	2.21	0.41
3:L:17:GLN:O	3:L:18:PRO:C	2.64	0.41
2:H:139:SER:HB2	3:L:121:PHE:HD1	1.84	0.41
1:B:24:TYR:OH	1:B:118:LEU:HB3	2.20	0.41
2:H:109:PHE:HB2	3:L:41:PHE:HZ	1.86	0.41
2:H:180:GLN:OE1	2:H:184:LEU:HB2	2.21	0.41
3:L:175:ASP:O	3:L:176:SER:C	2.63	0.41
1:A:183:HIS:CD2	1:A:195:TYR:HE2	2.38	0.41
2:H:133:LEU:N	2:H:148:GLY:O	2.53	0.41
3:L:147:ARG:HG3	3:L:148:GLU:HG2	2.02	0.41
1:A:152:VAL:CG2	1:A:255:GLU:HB2	2.51	0.41
1:B:17:MET:HE3	1:B:23:GLY:HA3	2.02	0.41
2:H:95:TYR:CE1	3:L:48:SER:HB2	2.55	0.41
1:A:65:SER:HB3	1:A:93:PRO:HG2	2.01	0.41
1:A:267:ILE:O	1:A:267:ILE:CG1	2.69	0.41
3:L:118:PRO:CA	3:L:143:ASN:O	2.70	0.41
3:L:138:VAL:HG22	3:L:183:THR:HG22	2.02	0.41
1:A:118:PHE:HB3	1:A:258:TYR:CD1	2.56	0.41
1:A:156:LYS:HD2	1:A:196:GLN:HG2	2.02	0.41
2:H:12:LYS:HZ2	2:H:18:VAL:HA	1.84	0.40
1:A:161:TYR:HE2	1:A:195:TYR:CD1	2.38	0.40
1:A:222:LYS:HA	1:A:227:SER:N	2.36	0.40
3:L:66:ARG:O	3:L:80:ILE:HA	2.21	0.40
3:L:141:LEU:HD12	3:L:180:LEU:HD12	2.03	0.40
1:B:76:ARG:C	1:B:78:GLU:N	2.78	0.40
2:H:62:GLN:O	2:H:63:LYS:C	2.64	0.40
1:A:43:LEU:HD21	1:A:309:VAL:HB	2.04	0.40
1:A:185:PRO:HG2	1:A:217:ILE:HG12	2.04	0.40
1:A:260(a):VAL:O	1:A:261:LYS:C	2.65	0.40
1:A:283:THR:O	1:A:284:PRO:C	2.65	0.40
1:B:18:VAL:HG13	2:H:102:HIS:HE1	1.84	0.40
2:H:139:SER:HB2	3:L:121:PHE:CE1	2.56	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	321/504 (64%)	280 (87%)	41 (13%)	0	100	100
1	B	163/504 (32%)	150 (92%)	13 (8%)	0	100	100
2	H	222/224 (99%)	206 (93%)	16 (7%)	0	100	100
3	L	216/218 (99%)	191 (88%)	25 (12%)	0	100	100
All	All	922/1450 (64%)	827 (90%)	95 (10%)	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	291/446 (65%)	289 (99%)	2 (1%)	81	90
1	B	145/446 (32%)	145 (100%)	0	100	100
2	H	189/189 (100%)	187 (99%)	2 (1%)	70	83
3	L	193/193 (100%)	182 (94%)	11 (6%)	17	46
All	All	818/1274 (64%)	803 (98%)	15 (2%)	54	74

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

Mol	Chain	Res	Type
2	H	52	SER
2	H	63	LYS

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Mol	Chain	Res	Type
3	L	6	GLN
3	L	7	SER
3	L	38	LEU
3	L	48	SER
3	L	50	ARG
3	L	51	ARG
3	L	52	LEU
3	L	115	VAL
3	L	163	ASN
3	L	164	SER
3	L	202	THR
1	A	32	LYS
1	A	130	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	71	ASN
1	B	114	ASN
1	B	142	HIS
2	H	6	GLN
2	H	57	ASN
3	L	6	GLN
3	L	98	HIS
3	L	142	ASN
3	L	143	ASN
1	A	33	ASN
1	A	95	ASN
1	A	116	ASN
1	A	122	GLN
1	A	183	HIS
1	A	184	HIS
1	A	196	GLN
1	A	197	ASN
1	A	224	ASN
1	A	295	GLN

5.3.3 RNA

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)

5 monosaccharides 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	$\#\|Z\| > 2$
5	NAG	C	1	5	14,14,15	0.39	0	17,19,21	0.71	0
5	NAG	C	2	5	14,14,15	0.40	0	17,19,21	1.01	2 (11%)
4	NAG	S	1	4	14,14,15	0.39	0	17,19,21	0.70	0
4	NAG	S	2	4	14,14,15	0.39	0	17,19,21	0.83	0
4	BMA	S	3	4	11,11,12	0.28	0	15,15,17	0.57	0

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
5	NAG	C	1	5	-	5/6/23/26	0/1/1/1
5	NAG	C	2	5	-	1/6/23/26	0/1/1/1
4	NAG	S	1	4	-	4/6/23/26	0/1/1/1
4	NAG	S	2	4	1/1/5/7	2/6/23/26	0/1/1/1
4	BMA	S	3	4	-	1/2/19/22	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	C	2	NAG	C1-O5-C5	3.08	116.32	112.19
5	C	2	NAG	O5-C1-C2	2.01	114.40	111.29

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	S	2	NAG	C1

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	S	1	NAG	C1-C2-N2-C7
4	S	1	NAG	C8-C7-N2-C2
4	S	1	NAG	O7-C7-N2-C2
5	C	1	NAG	C1-C2-N2-C7
5	C	1	NAG	C8-C7-N2-C2
5	C	1	NAG	O7-C7-N2-C2
5	C	1	NAG	C4-C5-C6-O6
4	S	2	NAG	O5-C5-C6-O6
4	S	3	BMA	O5-C5-C6-O6
5	C	1	NAG	O5-C5-C6-O6
5	C	2	NAG	C4-C5-C6-O6
4	S	1	NAG	C3-C2-N2-C7
4	S	2	NAG	C3-C2-N2-C7

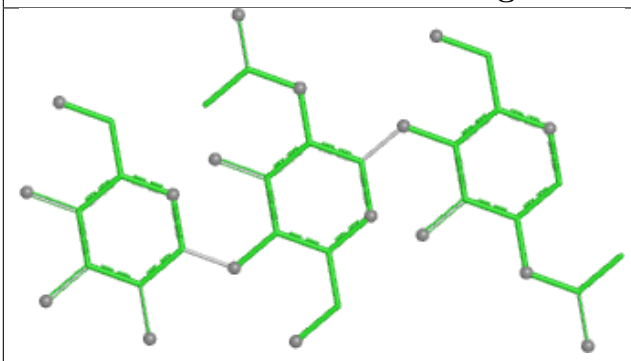
There are no ring outliers.

1 monomer is involved in 1 short contact:

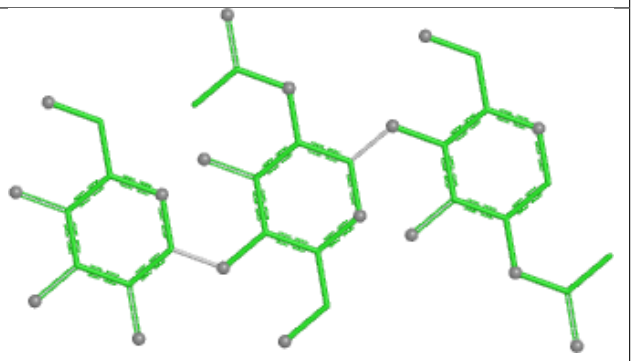
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	1	NAG	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

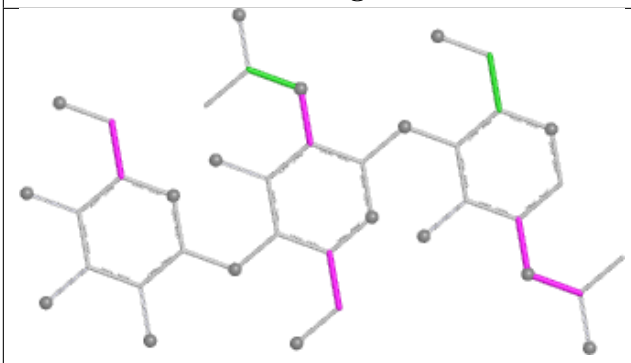
Oligosaccharide Chain S



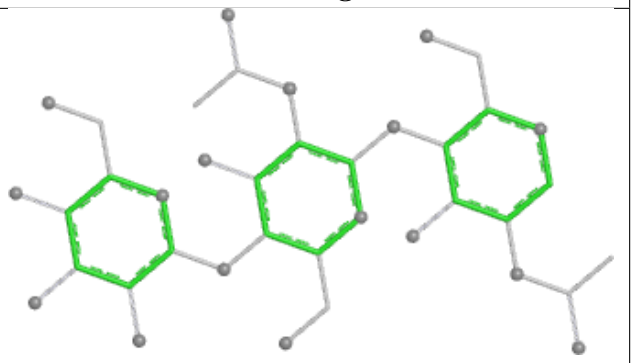
Bond lengths



Bond angles

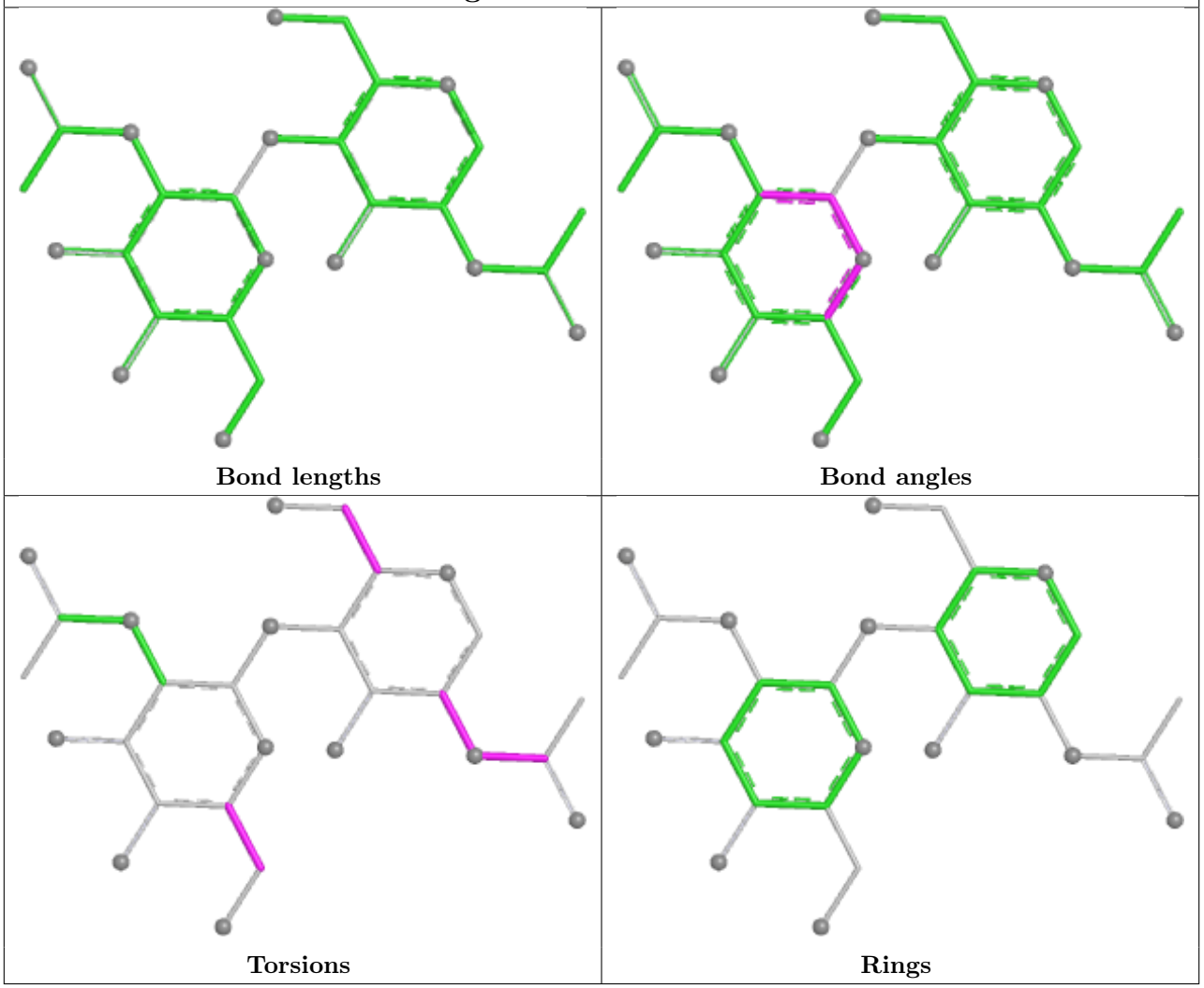


Torsions



Rings

Oligosaccharide Chain C



5.6 Ligand geometry (i)

1 ligand is 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	$\#\|Z\| > 2$
6	NAG	A	601	-	14,14,15	0.39	0	17,19,21	0.40	0

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
6	NAG	A	601	-	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

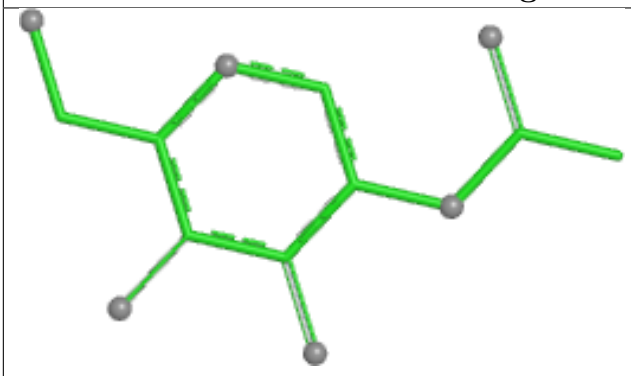
Mol	Chain	Res	Type	Atoms
6	A	601	NAG	C8-C7-N2-C2
6	A	601	NAG	O7-C7-N2-C2

There are no ring outliers.

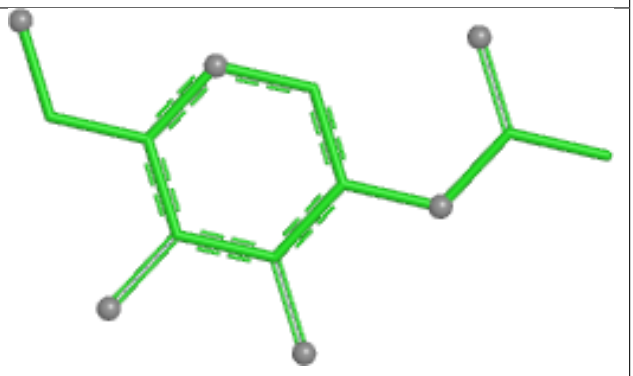
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

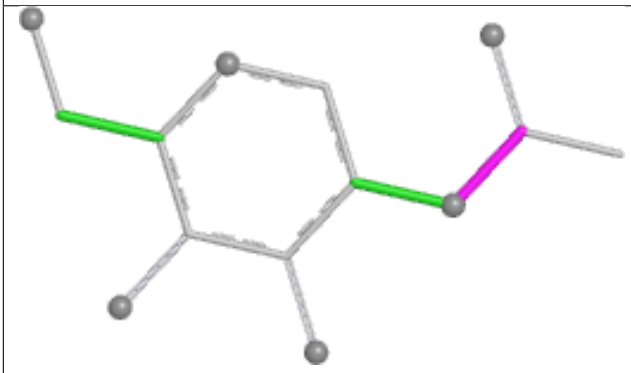
Ligand NAG A 601



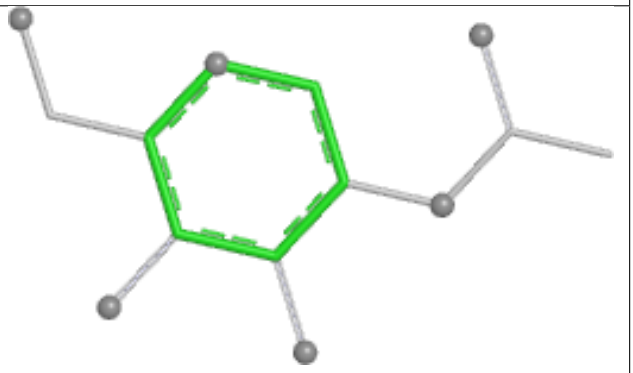
Bond lengths



Bond angles



Torsions



Rings

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	323/504 (64%)	0.42	21 (6%)	26	19	30, 142, 197, 253	0
1	B	165/504 (32%)	0.00	1 (0%)	85	69	91, 144, 210, 243	0
2	H	224/224 (100%)	0.09	3 (1%)	74	53	30, 150, 212, 262	0
3	L	218/218 (100%)	0.21	6 (2%)	55	35	30, 157, 192, 211	0
All	All	930/1450 (64%)	0.22	31 (3%)	49	32	30, 148, 204, 262	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	232	PHE	5.4
2	H	57	ASN	4.1
1	A	69	TRP	4.0
3	L	149	ALA	3.8
1	A	97	CYS	3.6
1	A	15	ILE	3.6
1	A	245	PHE	3.6
3	L	20	SER	3.3
1	A	54	LEU	3.0
1	A	127	TRP	3.0
2	H	27	TYR	2.9
3	L	210	VAL	2.9
1	A	126	SER	2.9
1	B	26	HIS	2.9
1	A	199	THR	2.8
1	A	316	LEU	2.7
1	A	66	VAL	2.7
1	A	133	SER	2.7
1	A	118	PHE	2.6
1	A	59	LEU	2.5
1	A	70	LEU	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	56	VAL	2.5
2	H	55	ASN	2.4
3	L	218	GLU	2.4
3	L	199	CYS	2.3
1	A	133(a)	LEU	2.3
3	L	97	THR	2.2
1	A	179	LEU	2.2
1	A	125	PRO	2.1
1	A	146	SER	2.1
1	A	55	ASP	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)

SUGAR-RSR INFOmissingINFO

6.4 Ligands (i)

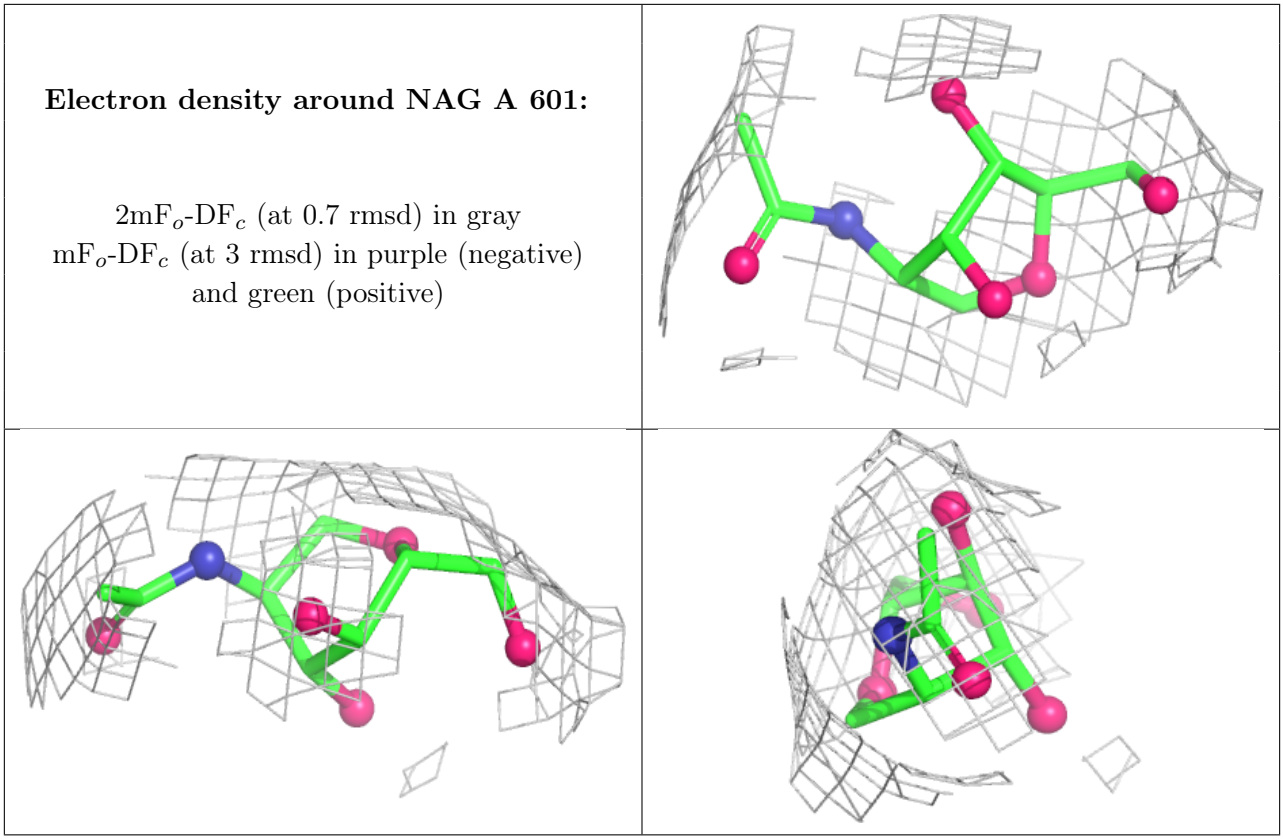
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
6	NAG	A	601	14/15	0.75	0.09	161,161,161,161	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around NAG A 601:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.