WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Nov 9, 2024 – 06:57 PM EST

PDB ID	:	1NMA
Title	:	N9 NEURAMINIDASE COMPLEXES WITH ANTIBODIES NC41 AND NC10: EMPIRICAL FREE-ENERGY CALCULATIONS CAPTURE SPECIFICITY TRENDS OBSERVED WITH MUTANT BINDING DATA
Authors	:	Tulip, W.R.; Varghese, J.N.; Colman, P.M.
Deposited on	:	1994-05-06
Resolution	:	3.00 Å(reported)

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

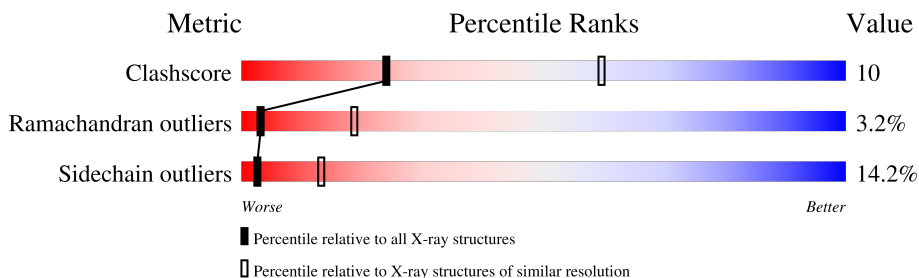|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.00 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
Clashscore		10
Ramachandran outliers		3.2%
Sidechain outliers		14.2%

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))
Clashscore	180529	2866 (3.00-3.00)
Ramachandran outliers	177936	2778 (3.00-3.00)
Sidechain outliers	177891	2781 (3.00-3.00)

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%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	N	388	61% 28% 8% · ·
2	L	109	57% 31% 7% 5%
3	H	122	57% 38% · ·
4	A	6	100%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 4863 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 N9 NEURAMINIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	N	378	Total 2979	C 1851	N 527	O 578	S 23	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
N	387	LYS	ARG	conflict	UNP P05803
N	389	ARG	LYS	conflict	UNP P05803

- Molecule 2 is a protein called FAB NC10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	109	Total 853	C 530	N 142	O 178	S 3	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	3	GLN	GLU	conflict	GB 501094
L	4	MET	LEU	conflict	GB 501094

- Molecule 3 is a protein called FAB NC10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	122	Total 945	C 594	N 154	O 192	S 5	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	7	PRO	SER	conflict	GB 501094
H	109	LEU	VAL	conflict	GB 501094

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyran ose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
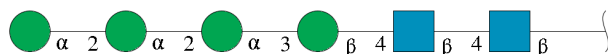
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	A	6	72	40	2	30	0	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).
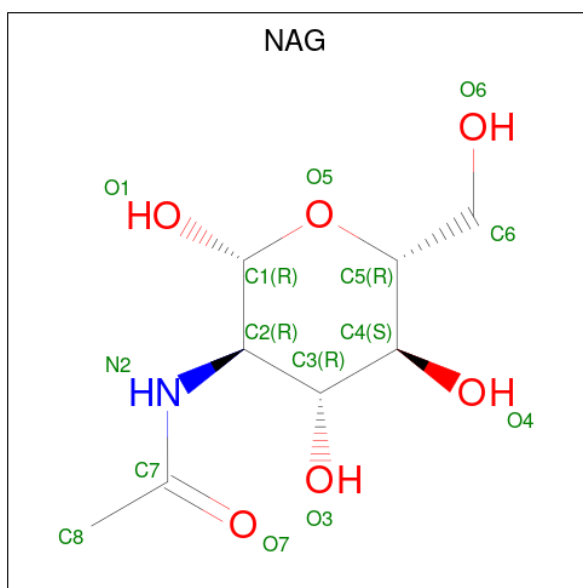
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	N	1	14	8	1	5	0	0

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. 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. 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.

Note EDS was not executed.

• Molecule 1: N9 NEURAMINIDASE
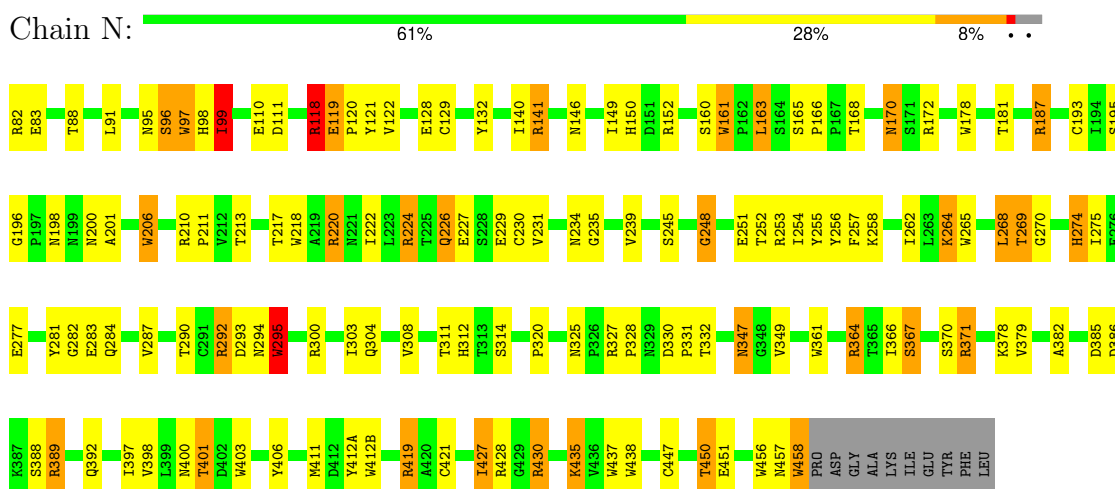
Chain N:

• Molecule 2: FAB NC10
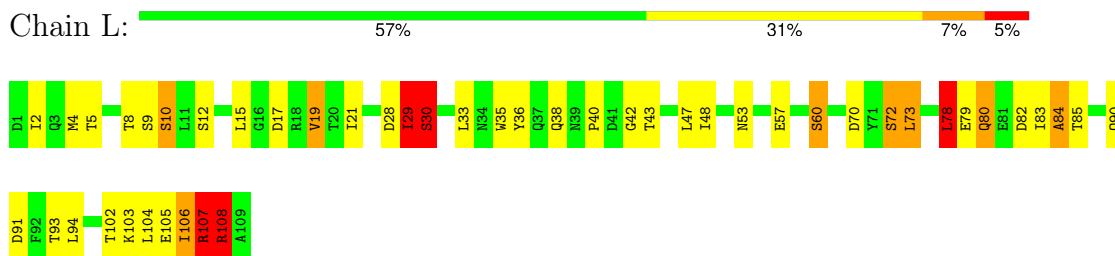
Chain L:

• Molecule 3: FAB NC10
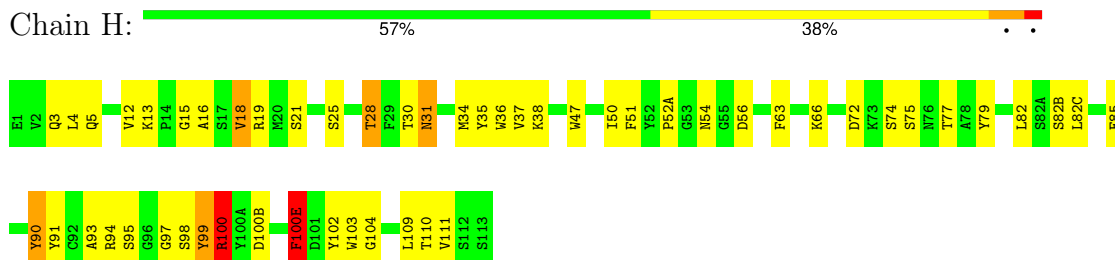
Chain H:

• Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain A:

100%

NAG1 NAG2 BMA3 MAN4 MAN5 MAN6

4 Data and refinement statistics ⓘ

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α, β, γ	171.50Å 171.50Å 160.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 3.00	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-3.00)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.200 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4863	wwPDB-VP
Average B, all atoms (Å²)	22.0	wwPDB-VP

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, MAN, 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	N	0.86	0/3058	1.81	88/4167 (2.1%)
2	L	0.81	1/869 (0.1%)	1.69	20/1178 (1.7%)
3	H	0.81	0/969	1.92	29/1311 (2.2%)
All	All	0.84	1/4896 (0.0%)	1.81	137/6656 (2.1%)

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	N	0	2
2	L	0	2
3	H	0	2
All	All	0	6

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	L	107	ARG	CZ-NH2	5.12	1.39	1.33

All (137) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	H	100	ARG	NE-CZ-NH1	18.95	129.78	120.30
3	H	100	ARG	NE-CZ-NH2	-17.86	111.37	120.30
1	N	364	ARG	NE-CZ-NH1	9.96	125.28	120.30
1	N	265	TRP	CD1-CG-CD2	9.65	114.02	106.30
3	H	36	TRP	CD1-CG-CD2	9.53	113.92	106.30
1	N	187	ARG	NE-CZ-NH1	9.31	124.96	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	218	TRP	CD1-CG-CD2	9.01	113.51	106.30
2	L	107	ARG	NE-CZ-NH1	-8.89	115.85	120.30
3	H	47	TRP	CD1-CG-CD2	8.72	113.27	106.30
1	N	361	TRP	CD1-CG-CD2	8.60	113.18	106.30
1	N	97	TRP	CD1-CG-CD2	8.40	113.02	106.30
3	H	100	ARG	NH1-CZ-NH2	-8.35	110.22	119.40
1	N	371	ARG	NE-CZ-NH2	-8.26	116.17	120.30
1	N	437	TRP	CD1-CG-CD2	8.22	112.88	106.30
1	N	412(B)	TRP	CD1-CG-CD2	8.14	112.82	106.30
1	N	206	TRP	CD1-CG-CD2	8.11	112.79	106.30
2	L	2	ILE	N-CA-C	-8.03	89.33	111.00
1	N	172	ARG	NE-CZ-NH1	7.99	124.29	120.30
1	N	412(B)	TRP	CE2-CD2-CG	-7.92	100.96	107.30
1	N	265	TRP	CE2-CD2-CG	-7.89	100.99	107.30
3	H	36	TRP	CE2-CD2-CG	-7.86	101.01	107.30
1	N	210	ARG	NE-CZ-NH1	7.82	124.21	120.30
1	N	97	TRP	CE2-CD2-CG	-7.80	101.06	107.30
1	N	218	TRP	CE2-CD2-CG	-7.72	101.12	107.30
1	N	161	TRP	CD1-CG-CD2	7.65	112.42	106.30
1	N	295	TRP	CD1-CG-CD2	7.60	112.38	106.30
1	N	178	TRP	CD1-CG-CD2	7.60	112.38	106.30
1	N	401	THR	N-CA-CB	-7.54	95.98	110.30
3	H	103	TRP	CD1-CG-CD2	7.50	112.30	106.30
3	H	47	TRP	CE2-CD2-CG	-7.47	101.33	107.30
1	N	403	TRP	CE2-CD2-CG	-7.41	101.37	107.30
1	N	403	TRP	CG-CD2-CE3	7.41	140.57	133.90
1	N	295	TRP	CE2-CD2-CG	-7.34	101.43	107.30
1	N	361	TRP	CE2-CD2-CG	-7.30	101.46	107.30
1	N	161	TRP	CE2-CD2-CG	-7.29	101.47	107.30
1	N	437	TRP	CE2-CD2-CG	-7.17	101.57	107.30
3	H	35	TYR	CB-CG-CD2	-7.13	116.72	121.00
1	N	265	TRP	CG-CD2-CE3	7.11	140.30	133.90
1	N	406	TYR	CB-CG-CD2	-7.04	116.78	121.00
1	N	265	TRP	CB-CG-CD1	-7.02	117.87	127.00
3	H	79	TYR	CB-CG-CD2	-6.97	116.82	121.00
1	N	178	TRP	CE2-CD2-CG	-6.97	101.72	107.30
1	N	458	TRP	CD1-CG-CD2	6.95	111.86	106.30
1	N	403	TRP	CD1-CG-CD2	6.94	111.85	106.30
1	N	430	ARG	NE-CZ-NH2	-6.87	116.87	120.30
2	L	35	TRP	CE2-CD2-CG	-6.82	101.84	107.30
2	L	35	TRP	CD1-CG-CD2	6.80	111.74	106.30
1	N	438	TRP	CE2-CD2-CG	-6.73	101.92	107.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	N	456	TRP	CG-CD2-CE3	6.71	139.94	133.90
3	H	103	TRP	CE2-CD2-CG	-6.67	101.97	107.30
1	N	403	TRP	CB-CG-CD1	-6.65	118.36	127.00
1	N	206	TRP	CE2-CD2-CG	-6.62	102.00	107.30
1	N	371	ARG	NE-CZ-NH1	6.56	123.58	120.30
2	L	35	TRP	CG-CD2-CE3	6.56	139.80	133.90
3	H	90	TYR	CB-CG-CD2	-6.50	117.10	121.00
1	N	265	TRP	CG-CD1-NE1	-6.46	103.64	110.10
1	N	88	THR	N-CA-CB	-6.41	98.11	110.30
2	L	107	ARG	CG-CD-NE	-6.36	98.44	111.80
1	N	456	TRP	CE2-CD2-CG	-6.35	102.22	107.30
1	N	152	ARG	NE-CZ-NH2	-6.33	117.13	120.30
1	N	438	TRP	CD1-CG-CD2	6.33	111.37	106.30
3	H	100	ARG	CB-CG-CD	-6.33	95.14	111.60
1	N	300	ARG	NE-CZ-NH2	-6.31	117.14	120.30
1	N	256	TYR	CB-CG-CD1	-6.30	117.22	121.00
1	N	458	TRP	CE2-CD2-CG	-6.30	102.26	107.30
1	N	161	TRP	CG-CD2-CE3	6.27	139.54	133.90
1	N	224	ARG	NE-CZ-NH1	6.26	123.43	120.30
1	N	226	GLN	N-CA-C	6.25	127.89	111.00
2	L	36	TYR	CB-CG-CD1	-6.25	117.25	121.00
1	N	187	ARG	NE-CZ-NH2	-6.24	117.18	120.30
3	H	97	GLY	CA-C-N	6.19	130.82	117.20
1	N	364	ARG	NE-CZ-NH2	-6.19	117.21	120.30
3	H	36	TRP	CG-CD1-NE1	-6.16	103.94	110.10
1	N	172	ARG	NE-CZ-NH2	-6.13	117.23	120.30
3	H	36	TRP	CB-CG-CD1	-6.12	119.05	127.00
1	N	119	GLU	CA-CB-CG	6.00	126.60	113.40
1	N	82	ARG	N-CA-C	-5.96	94.90	111.00
3	H	100(E)	PHE	CB-CG-CD2	-5.94	116.64	120.80
1	N	218	TRP	CG-CD1-NE1	-5.85	104.25	110.10
3	H	36	TRP	CG-CD2-CE3	5.84	139.16	133.90
1	N	361	TRP	CG-CD1-NE1	-5.83	104.27	110.10
2	L	30	SER	CA-C-N	5.82	130.00	117.20
1	N	412(B)	TRP	CG-CD2-CE3	5.80	139.12	133.90
2	L	107	ARG	NE-CZ-NH2	5.80	123.20	120.30
1	N	206	TRP	CG-CD1-NE1	-5.78	104.32	110.10
3	H	56	ASP	CA-CB-CG	5.73	126.00	113.40
1	N	152	ARG	NE-CZ-NH1	5.69	123.14	120.30
1	N	419	ARG	NE-CZ-NH1	5.67	123.14	120.30
1	N	347	ASN	CA-C-N	5.65	127.50	116.20
2	L	108	ARG	CD-NE-CZ	-5.64	115.70	123.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	255	TYR	CB-CG-CD2	-5.63	117.62	121.00
1	N	456	TRP	CD1-CG-CD2	5.61	110.79	106.30
1	N	274	HIS	CA-CB-CG	5.60	123.11	113.60
1	N	292	ARG	NE-CZ-NH1	5.58	123.09	120.30
1	N	295	TRP	CG-CD2-CE3	5.58	138.93	133.90
1	N	210	ARG	NE-CZ-NH2	-5.58	117.51	120.30
2	L	108	ARG	NE-CZ-NH1	5.57	123.09	120.30
2	L	29	ILE	N-CA-CB	-5.57	97.98	110.80
1	N	97	TRP	CB-CG-CD1	-5.54	119.80	127.00
2	L	35	TRP	CB-CG-CD1	-5.53	119.81	127.00
1	N	118	ARG	CD-NE-CZ	-5.49	115.92	123.60
3	H	85	GLU	CA-CB-CG	5.48	125.46	113.40
1	N	163	LEU	CA-C-N	-5.48	105.15	117.20
2	L	19	VAL	N-CA-CB	-5.47	99.47	111.50
1	N	295	TRP	CG-CD1-NE1	-5.45	104.65	110.10
2	L	28	ASP	CA-C-N	-5.42	105.27	117.20
2	L	73	LEU	CA-CB-CG	5.40	127.73	115.30
2	L	107	ARG	NH1-CZ-NH2	-5.39	113.47	119.40
3	H	102	TYR	CB-CG-CD1	-5.36	117.78	121.00
1	N	308	VAL	CA-CB-CG1	-5.36	102.86	110.90
3	H	100	ARG	CB-CA-C	-5.36	99.68	110.40
2	L	106	ILE	CA-CB-CG1	-5.35	100.84	111.00
3	H	94	ARG	NE-CZ-NH1	5.34	122.97	120.30
1	N	386	ASP	CA-CB-CG	5.34	125.14	113.40
3	H	99	TYR	CA-CB-CG	5.34	123.54	113.40
1	N	220	ARG	N-CA-C	5.31	125.35	111.00
3	H	72	ASP	CB-CG-OD1	5.30	123.07	118.30
1	N	83	GLU	N-CA-C	-5.29	96.73	111.00
1	N	99	ILE	CB-CA-C	-5.27	101.06	111.60
1	N	253	ARG	NE-CZ-NH1	5.27	122.93	120.30
3	H	18	VAL	CA-CB-CG2	-5.27	103.00	110.90
2	L	78	LEU	CA-CB-CG	5.25	127.37	115.30
3	H	47	TRP	CG-CD1-NE1	-5.20	104.91	110.10
3	H	19	ARG	CA-C-N	-5.19	105.78	117.20
1	N	218	TRP	CG-CD2-CE3	5.18	138.56	133.90
1	N	161	TRP	CB-CG-CD1	-5.17	120.28	127.00
1	N	412(A)	TYR	CB-CG-CD2	-5.17	117.90	121.00
1	N	458	TRP	CG-CD1-NE1	-5.14	104.96	110.10
3	H	100(E)	PHE	CB-CG-CD1	5.13	124.39	120.80
1	N	178	TRP	CB-CG-CD1	-5.12	120.34	127.00
2	L	73	LEU	CB-CG-CD1	-5.12	102.31	111.00
1	N	361	TRP	CG-CD2-CE3	5.10	138.49	133.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	N	264	LYS	CA-CB-CG	5.10	124.62	113.40
1	N	121	TYR	CA-CB-CG	5.09	123.08	113.40
1	N	308	VAL	CA-CB-CG2	5.07	118.50	110.90
1	N	419	ARG	CB-CG-CD	-5.04	98.49	111.60
1	N	458	TRP	CG-CD2-CE3	5.03	138.43	133.90

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	H	100	ARG	Sidechain
3	H	90	TYR	Sidechain
2	L	107	ARG	Sidechain
2	L	108	ARG	Sidechain
1	N	248	GLY	Peptide
1	N	327	ARG	Peptide

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	N	2979	0	2800	53	0
2	L	853	0	810	20	0
3	H	945	0	882	18	0
4	A	72	0	61	0	0
5	N	14	0	13	0	0
All	All	4863	0	4566	90	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 10.

All (90) 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)
2:L:12:SER:HB2	2:L:107:ARG:HD3	1.48	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:3:GLN:HB2	3:H:25:SER:HB3	1.56	0.87
3:H:12:VAL:HG21	3:H:82(C):LEU:HD22	1.64	0.79
1:N:366:ILE:HD11	1:N:400:ASN:HB3	1.69	0.72
2:L:12:SER:CB	2:L:107:ARG:HD3	2.22	0.70
3:H:66:LYS:O	3:H:82:LEU:HA	1.98	0.64
1:N:235:GLY:HA3	1:N:258:LYS:HE3	1.78	0.64
2:L:38:GLN:O	2:L:84:ALA:HB1	1.99	0.63
1:N:349:VAL:HG22	1:N:371:ARG:HE	1.67	0.59
2:L:38:GLN:HG3	2:L:42:GLY:O	2.02	0.59
2:L:83:ILE:HD12	2:L:106:ILE:HD12	1.85	0.58
3:H:12:VAL:HG23	3:H:111:VAL:HG13	1.85	0.58
1:N:149:ILE:HD12	1:N:430:ARG:HB3	1.84	0.58
3:H:82(C):LEU:HD23	3:H:109:LEU:HD21	1.85	0.58
2:L:15:LEU:HD11	2:L:80:GLN:HB2	1.86	0.58
1:N:427:ILE:HD13	1:N:428:ARG:H	1.68	0.57
1:N:435:LYS:HD3	1:N:435:LYS:H	1.70	0.57
1:N:168:THR:OG1	1:N:170:ASN:HB2	2.05	0.56
1:N:245:SER:HB3	1:N:248:GLY:O	2.06	0.56
1:N:269:THR:H	1:N:312:HIS:HE1	1.53	0.55
1:N:99:ILE:HD12	1:N:458:TRP:CZ2	2.41	0.55
1:N:248:GLY:HA2	1:N:295:TRP:CD2	2.42	0.55
1:N:99:ILE:H	1:N:99:ILE:HD13	1.71	0.55
2:L:85:THR:HA	2:L:102:THR:O	2.07	0.55
3:H:28:THR:HB	3:H:31:ASN:CG	2.28	0.55
1:N:397:ILE:HG22	1:N:398:VAL:HG23	1.89	0.55
1:N:95:ASN:HD22	1:N:450:THR:HA	1.71	0.54
2:L:29:ILE:HD11	2:L:90:GLN:CB	2.37	0.54
1:N:110:GLU:HG2	1:N:141:ARG:NH1	2.22	0.54
2:L:17:ASP:O	2:L:78:LEU:HB2	2.08	0.53
1:N:235:GLY:O	1:N:258:LYS:HG2	2.09	0.53
1:N:330:ASP:HB3	1:N:389:ARG:HH21	1.74	0.52
1:N:320:PRO:HB3	1:N:331:PRO:O	2.10	0.51
2:L:48:ILE:HA	2:L:53:ASN:O	2.11	0.51
3:H:28:THR:HB	3:H:31:ASN:OD1	2.10	0.50
1:N:118:ARG:HE	1:N:119:GLU:H	1.59	0.50
1:N:283:GLU:HG3	1:N:284:GLN:H	1.77	0.50
2:L:10:SER:HA	2:L:103:LYS:O	2.11	0.50
1:N:149:ILE:HG23	1:N:150:HIS:ND1	2.28	0.49
2:L:9:SER:HA	2:L:102:THR:HA	1.95	0.49
1:N:257:PHE:CE1	1:N:262:ILE:HG12	2.48	0.48
1:N:196:GLY:HA3	1:N:201:ALA:HA	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:15:GLY:O	3:H:82(B):SER:HA	2.13	0.48
3:H:38:LYS:HD3	3:H:63:PHE:HZ	1.78	0.48
3:H:37:VAL:HG13	3:H:91:TYR:HB2	1.96	0.47
1:N:231:VAL:HG11	1:N:282:GLY:HA3	1.96	0.47
1:N:96:SER:HB2	1:N:451:GLU:O	2.15	0.47
1:N:269:THR:H	1:N:312:HIS:CE1	2.32	0.47
1:N:270:GLY:HA3	1:N:314:SER:OG	2.16	0.46
1:N:129:CYS:HB2	1:N:163:LEU:HD22	1.98	0.45
2:L:29:ILE:HD11	2:L:90:GLN:HB3	1.97	0.45
1:N:275:ILE:HD13	1:N:303:ILE:HD11	1.97	0.45
1:N:166:PRO:HB2	1:N:168:THR:HG23	1.99	0.45
1:N:98:HIS:CE1	1:N:419:ARG:HH21	2.34	0.45
1:N:274:HIS:CE1	1:N:294:ASN:HB3	2.51	0.45
2:L:15:LEU:HD11	2:L:80:GLN:CB	2.46	0.45
1:N:325:ASN:ND2	1:N:367:SER:O	2.50	0.45
1:N:427:ILE:HD13	1:N:428:ARG:N	2.31	0.45
2:L:103:LYS:HD3	2:L:104:LEU:N	2.32	0.44
1:N:269:THR:N	1:N:312:HIS:HE1	2.16	0.44
1:N:206:TRP:HA	1:N:211:PRO:HA	2.00	0.44
1:N:379:VAL:HG12	1:N:382:ALA:HB2	2.00	0.44
2:L:29:ILE:HD13	2:L:29:ILE:HG21	1.73	0.43
3:H:75:SER:O	3:H:77:THR:HG23	2.18	0.43
3:H:5:GLN:NE2	3:H:25:SER:HB2	2.33	0.43
2:L:12:SER:HA	2:L:105:GLU:O	2.18	0.43
3:H:100:ARG:NH1	3:H:100:ARG:HG3	2.33	0.43
1:N:385:ASP:HB3	1:N:388:SER:OG	2.17	0.43
3:H:4:LEU:HB2	3:H:104:GLY:HA2	2.01	0.43
1:N:235:GLY:C	1:N:258:LYS:HG2	2.39	0.43
1:N:332:THR:HA	1:N:389:ARG:HH12	1.82	0.43
3:H:38:LYS:HD3	3:H:63:PHE:CZ	2.53	0.43
3:H:93:ALA:HB1	3:H:100(E):PHE:HB3	2.01	0.42
1:N:161:TRP:NE1	1:N:165:SER:O	2.51	0.42
2:L:12:SER:HB2	2:L:107:ARG:CD	2.34	0.42
1:N:95:ASN:ND2	1:N:450:THR:HA	2.33	0.41
1:N:274:HIS:HB3	1:N:293:ASP:OD1	2.20	0.41
1:N:132:TYR:CE2	1:N:160:SER:HB3	2.55	0.41
3:H:51:PHE:O	3:H:52(A):PRO:HD3	2.20	0.41
1:N:328:PRO:HB3	2:L:93:THR:HB	2.03	0.41
1:N:283:GLU:HG3	1:N:284:GLN:N	2.36	0.41
1:N:226:GLN:O	1:N:227:GLU:HB2	2.21	0.40
1:N:421:CYS:HA	1:N:447:CYS:HA	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:21:ILE:O	2:L:72:SER:HA	2.22	0.40
3:H:100(E):PHE:CD1	3:H:100(E):PHE:N	2.89	0.40
1:N:91:LEU:HD21	1:N:281:TYR:HE1	1.87	0.40
1:N:181:THR:HG21	1:N:239:VAL:HG21	2.03	0.40
1:N:268:LEU:HD22	1:N:269:THR:H	1.85	0.40
1:N:98:HIS:CE1	1:N:447:CYS:HB2	2.57	0.40
1:N:378:LYS:HB2	1:N:392:GLN:HB3	2.02	0.40

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

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	N	376/388 (97%)	326 (87%)	43 (11%)	7 (2%)	6	31
2	L	107/109 (98%)	85 (79%)	12 (11%)	10 (9%)	0	2
3	H	120/122 (98%)	110 (92%)	8 (7%)	2 (2%)	7	33
All	All	603/619 (97%)	521 (86%)	63 (10%)	19 (3%)	3	19

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	N	220	ARG
1	N	222	ILE
2	L	78	LEU
2	L	80	GLN
1	N	170	ASN
2	L	43	THR
2	L	60	SER
3	H	16	ALA
3	H	99	TYR
1	N	264	LYS

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Mol	Chain	Res	Type
1	N	277	GLU
2	L	82	ASP
1	N	217	THR
1	N	295	TRP
2	L	8	THR
2	L	30	SER
2	L	84	ALA
2	L	29	ILE
2	L	40	PRO

5.3.2 Protein sidechains ⓘ

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	N	332/340 (98%)	290 (87%)	42 (13%)	3	17
2	L	97/97 (100%)	80 (82%)	17 (18%)	1	8
3	H	100/100 (100%)	84 (84%)	16 (16%)	2	10
All	All	529/537 (98%)	454 (86%)	75 (14%)	2	13

All (75) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	96	SER
1	N	97	TRP
1	N	99	ILE
1	N	111	ASP
1	N	118	ARG
1	N	120	PRO
1	N	122	VAL
1	N	128	GLU
1	N	140	ILE
1	N	141	ARG
1	N	146	ASN
1	N	187	ARG
1	N	193	CYS

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Mol	Chain	Res	Type
1	N	195	SER
1	N	198	ASN
1	N	200	ASN
1	N	213	THR
1	N	224	ARG
1	N	229	GLU
1	N	230	CYS
1	N	234	ASN
1	N	251	GLU
1	N	252	THR
1	N	254	ILE
1	N	268	LEU
1	N	269	THR
1	N	287	VAL
1	N	290	THR
1	N	292	ARG
1	N	304	GLN
1	N	311	THR
1	N	347	ASN
1	N	364	ARG
1	N	367	SER
1	N	370	SER
1	N	389	ARG
1	N	401	THR
1	N	411	MET
1	N	427	ILE
1	N	435	LYS
1	N	450	THR
1	N	457	ASN
2	L	4	MET
2	L	5	THR
2	L	10	SER
2	L	19	VAL
2	L	30	SER
2	L	33	LEU
2	L	47	LEU
2	L	57	GLU
2	L	60	SER
2	L	70	ASP
2	L	72	SER
2	L	73	LEU
2	L	78	LEU

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Mol	Chain	Res	Type
2	L	79	GLU
2	L	91	ASP
2	L	94	LEU
2	L	108	ARG
3	H	13	LYS
3	H	18	VAL
3	H	21	SER
3	H	28	THR
3	H	30	THR
3	H	31	ASN
3	H	34	MET
3	H	50	ILE
3	H	54	ASN
3	H	74	SER
3	H	95	SER
3	H	98	SER
3	H	100	ARG
3	H	100(B)	ASP
3	H	100(E)	PHE
3	H	110	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	N	95	ASN
1	N	98	HIS
1	N	146	ASN
1	N	198	ASN
1	N	216	ASN
1	N	234	ASN
1	N	312	HIS
1	N	346	ASN
1	N	347	ASN
2	L	77	ASN
3	H	5	GLN

5.3.3   RNA (i)

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 ⓘ

6 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	#$|Z| > 2$
4	NAG	A	1	1,4	14,14,15	1.74	5 (35%)	17,19,21	1.92	3 (17%)
4	NAG	A	2	4	14,14,15	1.34	2 (14%)	17,19,21	1.62	5 (29%)
4	BMA	A	3	4	11,11,12	0.92	0	15,15,17	0.87	1 (6%)
4	MAN	A	4	4	11,11,12	0.82	0	15,15,17	1.49	4 (26%)
4	MAN	A	5	4	11,11,12	1.12	1 (9%)	15,15,17	1.54	3 (20%)
4	MAN	A	6	4	11,11,12	0.83	0	15,15,17	1.23	2 (13%)

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
4	NAG	A	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	A	2	4	-	0/6/23/26	0/1/1/1
4	BMA	A	3	4	-	2/2/19/22	0/1/1/1
4	MAN	A	4	4	-	0/2/19/22	0/1/1/1
4	MAN	A	5	4	-	2/2/19/22	0/1/1/1
4	MAN	A	6	4	-	0/2/19/22	0/1/1/1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1	NAG	C1-C2	3.34	1.56	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1	NAG	C3-C2	3.02	1.58	1.52
4	A	2	NAG	C4-C5	2.95	1.59	1.53
4	A	2	NAG	O5-C1	-2.75	1.39	1.43
4	A	1	NAG	C8-C7	2.24	1.55	1.50
4	A	1	NAG	O4-C4	2.18	1.48	1.43
4	A	5	MAN	C2-C3	-2.09	1.49	1.52
4	A	1	NAG	O5-C5	2.03	1.47	1.43

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	1	NAG	C2-N2-C7	4.68	129.18	122.90
4	A	1	NAG	C1-C2-N2	-4.50	103.33	110.43
4	A	2	NAG	C4-C3-C2	-3.67	105.65	111.02
4	A	5	MAN	C1-O5-C5	3.12	116.37	112.19
4	A	5	MAN	O3-C3-C2	3.00	116.18	110.05
4	A	2	NAG	C1-C2-N2	-2.97	105.75	110.43
4	A	6	MAN	C1-O5-C5	2.91	116.09	112.19
4	A	2	NAG	C8-C7-N2	2.73	120.64	116.12
4	A	4	MAN	O5-C5-C4	-2.61	104.48	110.83
4	A	4	MAN	C1-O5-C5	2.61	115.68	112.19
4	A	6	MAN	O4-C4-C3	-2.49	104.52	110.38
4	A	1	NAG	O3-C3-C4	-2.43	104.65	110.38
4	A	3	BMA	C1-C2-C3	2.35	113.07	109.64
4	A	2	NAG	O3-C3-C2	2.25	114.07	109.40
4	A	4	MAN	O5-C5-C6	2.24	112.01	107.66
4	A	5	MAN	O4-C4-C3	-2.23	105.11	110.38
4	A	2	NAG	O7-C7-N2	-2.12	118.24	121.98
4	A	4	MAN	C3-C4-C5	-2.01	106.58	110.23

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	5	MAN	O5-C5-C6-O6
4	A	5	MAN	C4-C5-C6-O6
4	A	3	BMA	C4-C5-C6-O6
4	A	3	BMA	O5-C5-C6-O6
4	A	1	NAG	C1-C2-N2-C7
4	A	1	NAG	C3-C2-N2-C7

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 oligosaccharide.
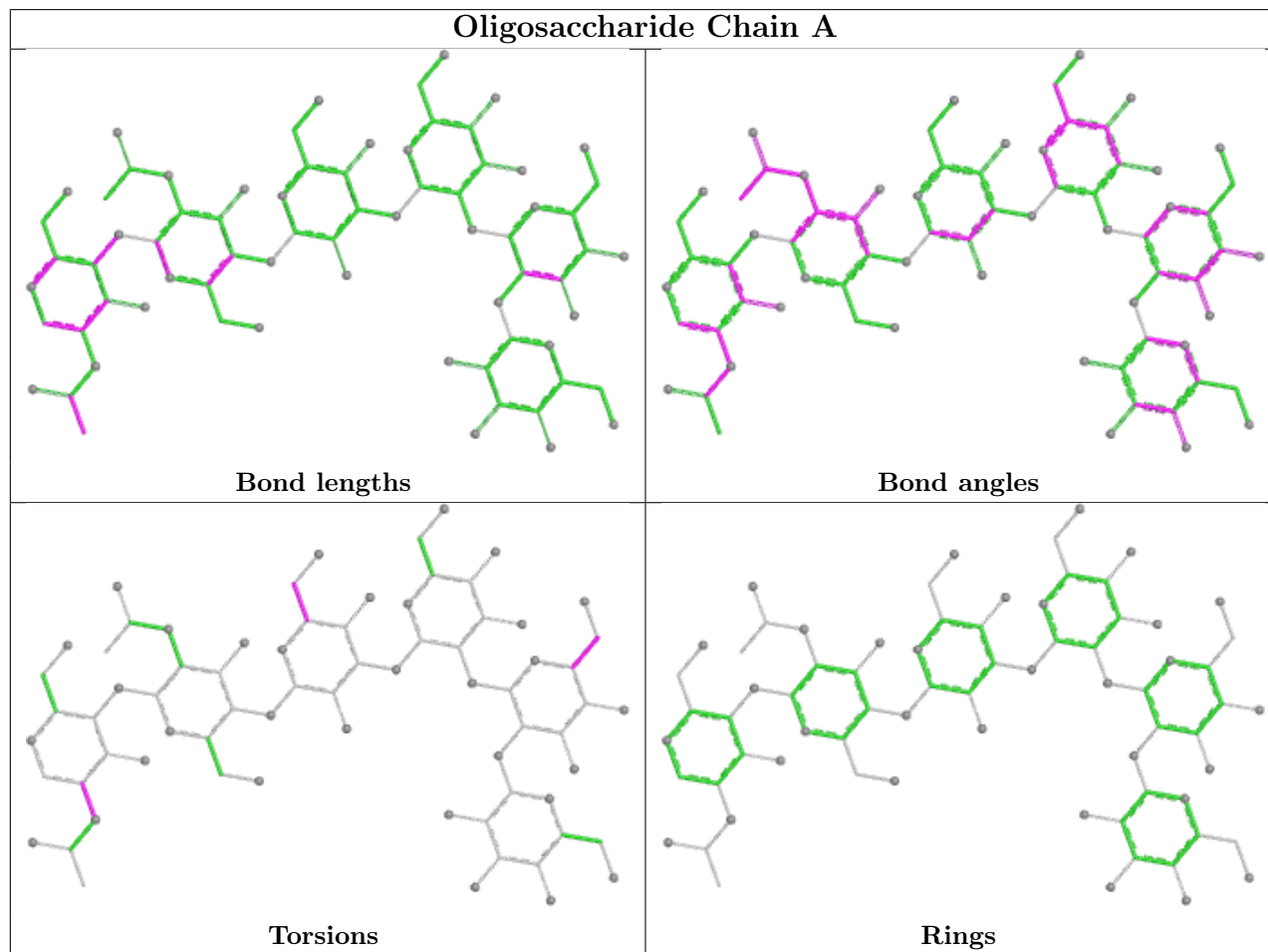
5.6 Ligand geometry ⓘ

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	$\#|Z| > 2$
5	NAG	N	475(A)	1	14,14,15	0.97	1 (7%)	17,19,21	1.49	3 (17%)

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	N	475(A)	1	-	1/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	N	475(A)	NAG	C4-C5	-2.19	1.48	1.53

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	N	475(A)	NAG	C1-C2-N2	-3.24	105.33	110.43
5	N	475(A)	NAG	C8-C7-N2	2.61	120.45	116.12
5	N	475(A)	NAG	C2-N2-C7	-2.04	120.17	122.90

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	N	475(A)	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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 ⓘ

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.