



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 23, 2026 – 02:11 PM EDT

PDB ID : 9NV2 / pdb_00009nv2
Title : Crystal structure of NP207 TCR in complex with NP366-H-2Db
Authors : Tan, K.; Reinherz, E.L.; Mallis, R.J.
Deposited on : 2025-03-20
Resolution : 1.95 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 Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.015 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

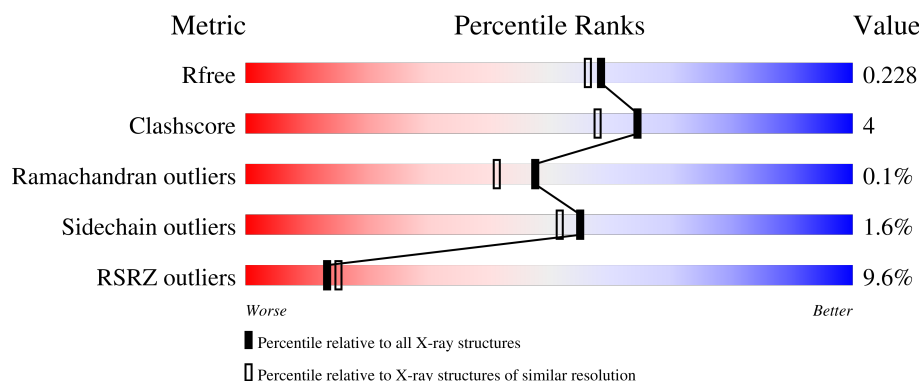
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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}	180053	3494 (1.96-1.96)
Clashscore	190562	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (1.96-1.96)

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 $\leq 5\%$. 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	223	6% 81% 11% 8%
2	B	254	2% 85% 10% .
3	C	281	21% 86% 11% .
4	D	100	85% 13% .
5	P	9	100%

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Mol	Chain	Length	Quality of chain
6	E	3	 100%

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 7027 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 NP207 TCR alpha-chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	205	Total	C	N	O	S	0	1	0
			1599	1008	258	323	10			

- Molecule 2 is a protein called NP207 TCR beta-chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	243	Total	C	N	O	S	0	1	0
			1959	1243	339	369	8			

- Molecule 3 is a protein called H-2 class I histocompatibility antigen, D-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	271	Total	C	N	O	S	0	4	0
			2198	1386	396	408	8			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	0	MET	-	initiating methionine	UNP P01899

- Molecule 4 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	98	Total	C	N	O	S	0	0	0
			813	518	137	151	7			

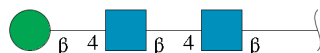
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	0	MET	-	initiating methionine	UNP P01887
D	85	ASP	ALA	variant	UNP P01887

- Molecule 5 is a protein called Nucleoprotein peptide.

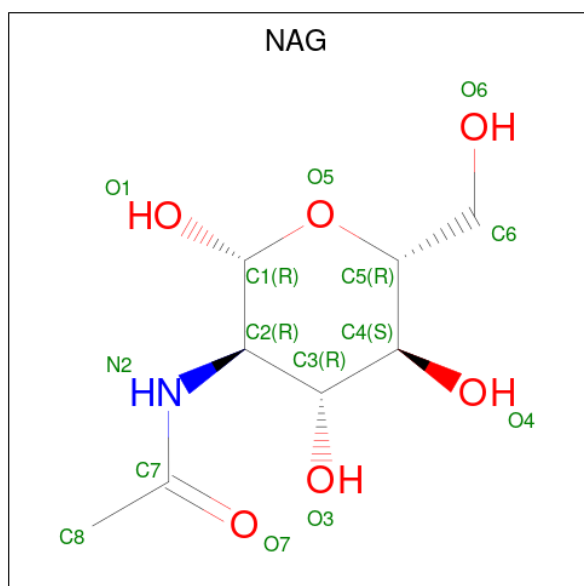
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	P	9	Total	C	N	O	S	0	0	0
			69	38	11	18	2			

- Molecule 6 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
6	E	3	Total	C	N	O		0	0	0
			39	22	2	15				

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆) (labeled as "Ligand of Interest" by depositor).



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

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

- Molecule 8 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			4	2	2		
8	A	1	Total	C	O	0	0
			4	2	2		
8	A	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	D	1	Total	C	O	0	0
			4	2	2		
8	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 9 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total 1	Cl 1	0	0
9	B	1	Total 1	Cl 1	0	0
9	C	1	Total 1	Cl 1	0	0

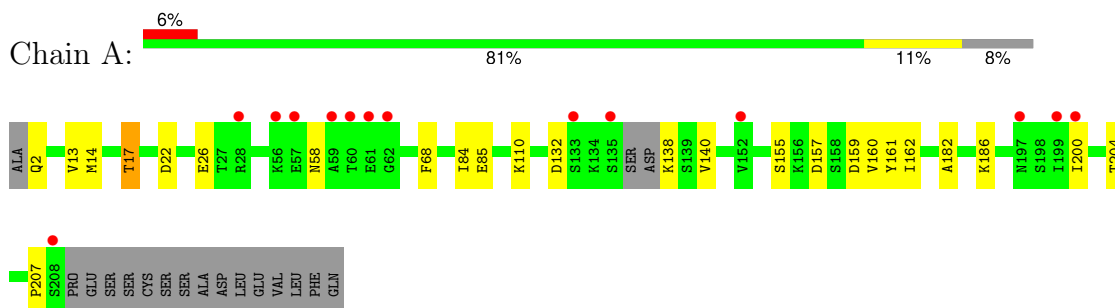
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	62	Total 62	O 62	0	0
10	B	76	Total 76	O 76	0	0
10	C	76	Total 76	O 76	0	0
10	D	28	Total 28	O 28	0	0
10	P	9	Total 9	O 9	0	0

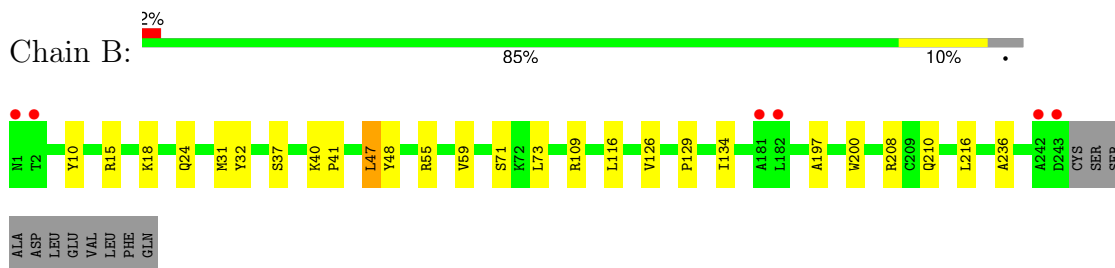
3 Residue-property plots

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.

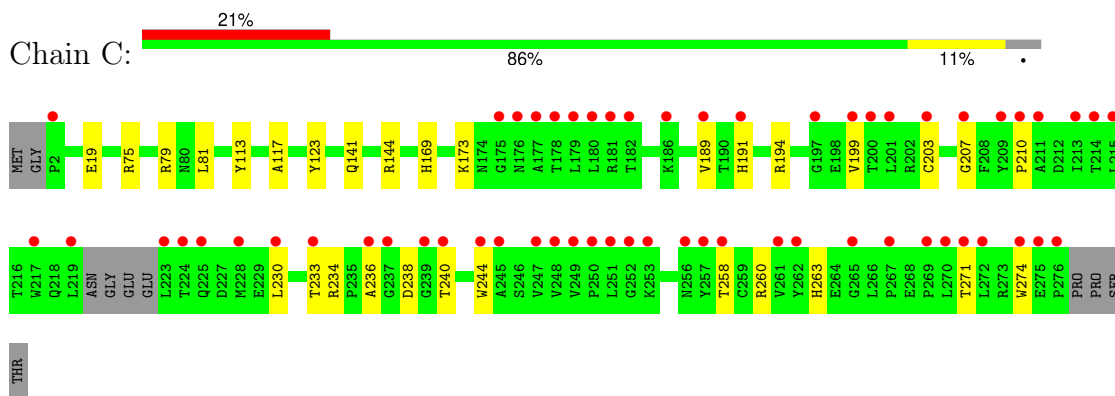
- Molecule 1: NP207 TCR alpha-chain



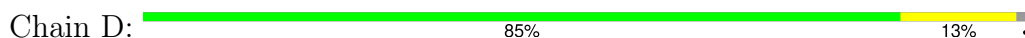
- Molecule 2: NP207 TCR beta-chain



- Molecule 3: H-2 class I histocompatibility antigen, D-B alpha chain



- Molecule 4: Beta-2-microglobulin





- Molecule 5: Nucleoprotein peptide

Chain P:  100%

There are no outlier residues recorded for this chain.

- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:  100%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	57.53Å 68.02Å 74.68Å 72.83° 89.36° 67.21°	Depositor
Resolution (Å)	44.87 – 1.95 44.87 – 1.95	Depositor EDS
% Data completeness (in resolution range)	94.4 (44.87-1.95) 95.0 (44.87-1.95)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.36 (at 1.95Å)	Xtriage
Refinement program	PHENIX 1.21.2_5419	Depositor
R, R_{free}	0.194 , 0.228 0.194 , 0.228	Depositor DCC
R_{free} test set	3339 reflections (4.59%)	wwPDB-VP
Wilson B-factor (Å ²)	37.8	Xtriage
Anisotropy	0.363	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 40.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.011 for h,h-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7027	wwPDB-VP
Average B, all atoms (Å ²)	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.84% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: CL, EDO, 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	0.36	0/1630	0.52	0/2206
2	B	0.32	0/2014	0.51	0/2743
3	C	0.36	0/2269	0.49	0/3084
4	D	0.36	0/839	0.55	0/1137
5	P	0.53	0/68	0.67	0/88
All	All	0.35	0/6820	0.51	0/9258

There are no bond length outliers.

There are no bond angle outliers.

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	1599	0	1518	14	0
2	B	1959	0	1881	15	0
3	C	2198	0	2014	18	0
4	D	813	0	782	12	0
5	P	69	0	61	0	0
6	E	39	0	34	0	0
7	A	42	0	39	0	0
7	B	14	0	13	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	A	12	0	18	1	0
8	B	4	0	6	0	0
8	C	16	0	24	3	0
8	D	8	0	12	3	0
9	A	1	0	0	0	0
9	B	1	0	0	0	0
9	C	1	0	0	0	0
10	A	62	0	0	0	0
10	B	76	0	0	0	0
10	C	76	0	0	0	0
10	D	28	0	0	0	0
10	P	9	0	0	0	0
All	All	7027	0	6402	52	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 4.

All (52) 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)
3:C:236:ALA:HB1	4:D:12:ARG:HG3	1.51	0.91
8:C:304:EDO:H22	4:D:58:LYS:HE2	1.62	0.81
1:A:159:ASP:HB2	1:A:186:LYS:HE2	1.75	0.67
1:A:200:ILE:HD11	1:A:204:THR:HG21	1.78	0.65
2:B:126:VAL:HG23	2:B:236:ALA:HB3	1.82	0.61
1:A:132:ASP:HB2	1:A:138:LYS:HB2	1.81	0.61
3:C:19:GLU:OE1	3:C:75[A]:ARG:HD2	2.05	0.57
2:B:116:LEU:HD12	2:B:216:LEU:HD21	1.87	0.57
3:C:169:HIS:O	3:C:173:LYS:HD3	2.05	0.57
4:D:53:ASP:H	8:D:102:EDO:H11	1.71	0.55
3:C:117:ALA:HB2	4:D:60:TRP:CE2	2.42	0.55
1:A:110:LYS:NZ	2:B:41:PRO:HD3	2.22	0.54
1:A:157:ASP:HB3	1:A:160:VAL:HB	1.88	0.54
3:C:189:VAL:HG22	3:C:203:CYS:HB3	1.89	0.54
2:B:10:TYR:CE1	2:B:109[A]:ARG:HD3	2.43	0.53
3:C:230:LEU:HD12	3:C:244:TRP:O	2.08	0.53
3:C:194:ARG:H	3:C:199:VAL:HA	1.74	0.53
2:B:37:SER:HB2	2:B:40:LYS:HE2	1.91	0.52
3:C:141:GLN:HE22	3:C:144:ARG:NH2	2.09	0.51
1:A:14:MET:O	1:A:17:THR:HB	2.12	0.49
1:A:84:ILE:HG13	1:A:85:GLU:OE2	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:207:GLY:HA2	3:C:240:THR:HB	1.93	0.49
1:A:13:VAL:HB	1:A:17:THR:HG21	1.94	0.49
1:A:110:LYS:HZ3	2:B:41:PRO:HD3	1.77	0.49
3:C:191:HIS:NE2	3:C:199:VAL:HG21	2.28	0.49
2:B:134:ILE:HG23	2:B:197:ALA:HB1	1.95	0.48
4:D:43:GLY:H	8:D:101:EDO:H22	1.79	0.47
3:C:75[A]:ARG:O	3:C:79[A]:ARG:HG2	2.14	0.47
1:A:161:TYR:O	1:A:182:ALA:HA	2.15	0.47
3:C:210:PRO:HD2	3:C:263:HIS:CE1	2.50	0.47
3:C:238:ASP:HB3	4:D:12:ARG:NH1	2.30	0.46
1:A:22:ASP:HB3	8:A:305:EDO:H21	1.97	0.46
3:C:123:TYR:HD1	8:C:303:EDO:H11	1.79	0.46
2:B:31:MET:HE2	2:B:73:LEU:HG	1.96	0.46
2:B:129:PRO:HD2	2:B:200:TRP:CZ2	2.51	0.45
1:A:155:SER:HB3	1:A:162:ILE:HD12	1.97	0.45
4:D:43:GLY:HA2	8:D:101:EDO:H22	1.99	0.45
3:C:191:HIS:HB2	3:C:274:TRP:NE1	2.33	0.44
4:D:55:SER:HB2	4:D:63:TYR:CZ	2.52	0.44
2:B:32:TYR:CE2	2:B:47:LEU:HD13	2.53	0.44
4:D:28:THR:HG22	4:D:63:TYR:HB2	2.00	0.43
1:A:58:ASN:OD1	1:A:68:PHE:HB3	2.19	0.43
1:A:110:LYS:NZ	2:B:40:LYS:HA	2.34	0.42
4:D:25:CYS:HB2	4:D:39:MET:HE3	2.00	0.42
2:B:47:LEU:HD12	2:B:48:TYR:N	2.34	0.42
2:B:208:ARG:NH1	2:B:210:GLN:HB2	2.35	0.41
3:C:260:ARG:HD2	3:C:271:THR:HG22	2.02	0.41
4:D:51:MET:HE3	4:D:51:MET:HB3	1.80	0.41
2:B:24:GLN:O	2:B:71:SER:HB2	2.21	0.41
2:B:15:ARG:HH21	2:B:18:LYS:NZ	2.18	0.41
3:C:234:ARG:HD2	4:D:10:TYR:CE1	2.55	0.41
3:C:113:TYR:CD2	8:C:304:EDO:H12	2.56	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	A	202/223 (91%)	194 (96%)	7 (4%)	1 (0%)	24	16
2	B	242/254 (95%)	235 (97%)	7 (3%)	0	100	100
3	C	271/281 (96%)	258 (95%)	13 (5%)	0	100	100
4	D	96/100 (96%)	94 (98%)	2 (2%)	0	100	100
5	P	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	818/867 (94%)	787 (96%)	30 (4%)	1 (0%)	48	41

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	207	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	A	180/201 (90%)	176 (98%)	4 (2%)	45	40
2	B	215/225 (96%)	212 (99%)	3 (1%)	59	56
3	C	216/239 (90%)	213 (99%)	3 (1%)	59	56
4	D	93/95 (98%)	92 (99%)	1 (1%)	65	64
5	P	8/8 (100%)	8 (100%)	0	100	100
All	All	712/768 (93%)	701 (98%)	11 (2%)	55	54

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	GLN
1	A	17	THR
1	A	26	GLU
1	A	140	VAL

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Mol	Chain	Res	Type
2	B	47	LEU
2	B	55	ARG
2	B	59	VAL
3	C	81	LEU
3	C	233	THR
3	C	258	THR
4	D	4	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	103	ASN
2	B	118	ASN
2	B	232	GLN
3	C	65	GLN
3	C	87	GLN
3	C	127	ASN
3	C	141	GLN
3	C	174	ASN
4	D	6	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 ⓘ

3 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
6	NAG	E	1	2,6	14,14,15	0.75	0	17,19,21	1.39	3 (17%)
6	NAG	E	2	6	14,14,15	0.71	0	17,19,21	1.20	3 (17%)
6	BMA	E	3	6	11,11,12	0.91	0	15,15,17	2.28	5 (33%)

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	E	1	2,6	-	2/6/23/26	0/1/1/1
6	NAG	E	2	6	-	0/6/23/26	0/1/1/1
6	BMA	E	3	6	-	2/2/19/22	0/1/1/1

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	E	3	BMA	C1-O5-C5	5.34	119.35	112.19
6	E	3	BMA	C3-C4-C5	3.88	117.27	110.23
6	E	3	BMA	C2-C3-C4	3.20	116.49	110.86
6	E	2	NAG	O5-C1-C2	-2.98	106.68	111.29
6	E	3	BMA	O4-C4-C3	-2.60	104.24	110.38
6	E	1	NAG	O5-C1-C2	-2.31	107.72	111.29
6	E	3	BMA	O5-C5-C4	2.24	116.28	110.83
6	E	1	NAG	O4-C4-C3	-2.18	105.23	110.38
6	E	2	NAG	O4-C4-C3	-2.12	105.38	110.38
6	E	1	NAG	C3-C4-C5	-2.09	106.44	110.23
6	E	2	NAG	C4-C3-C2	2.06	114.04	111.02

There are no chirality outliers.

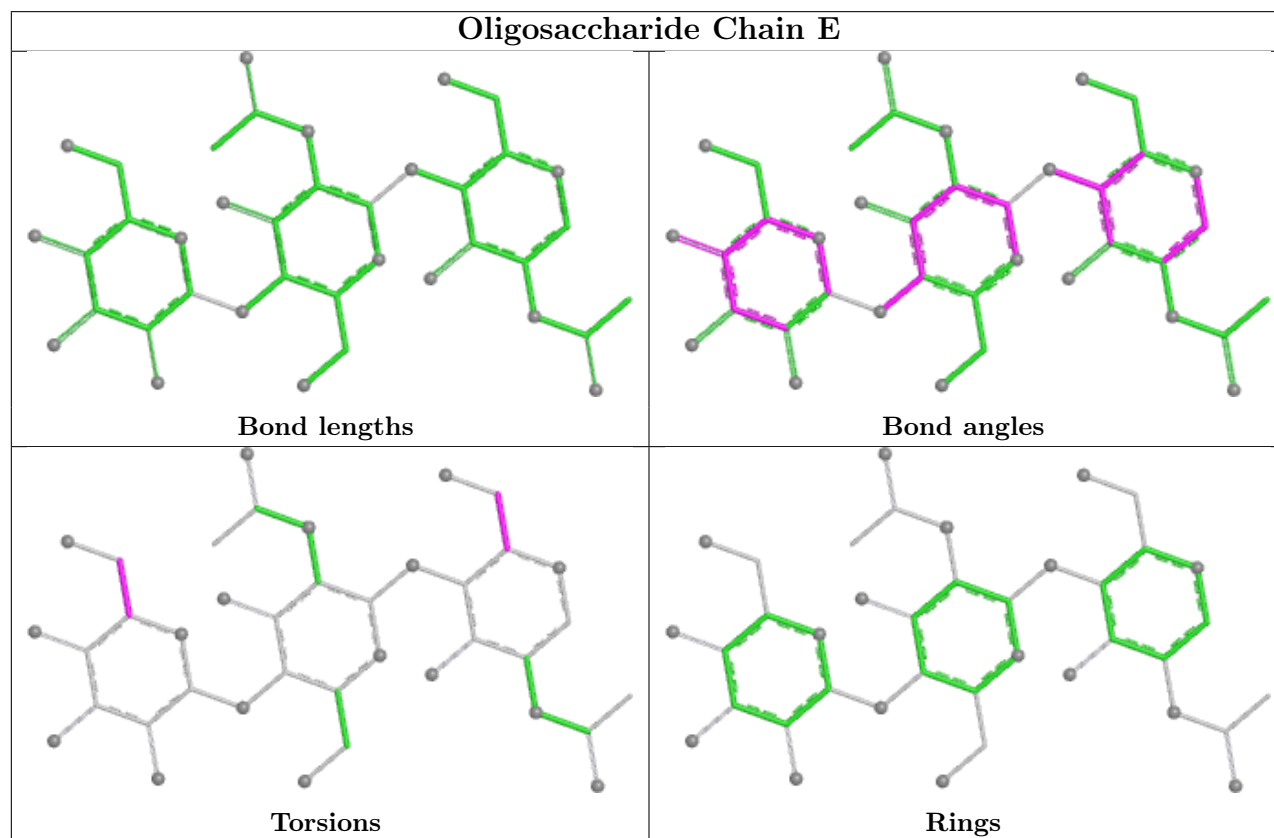
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	E	3	BMA	O5-C5-C6-O6
6	E	1	NAG	C4-C5-C6-O6
6	E	3	BMA	C4-C5-C6-O6
6	E	1	NAG	O5-C5-C6-O6

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 [i](#)

Of 17 ligands modelled in this entry, 3 are monoatomic - leaving 14 for Mogul analysis.

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	$\# Z > 2$
8	EDO	A	305	-	3,3,3	0.26	0	2,2,2	0.38	0
8	EDO	C	304	-	3,3,3	0.25	0	2,2,2	0.25	0
8	EDO	D	102	-	3,3,3	0.29	0	2,2,2	0.20	0
7	NAG	A	303	1	14,14,15	0.70	0	17,19,21	0.92	1 (5%)
8	EDO	A	306	-	3,3,3	0.22	0	2,2,2	0.43	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	EDO	C	301	-	3,3,3	0.27	0	2,2,2	0.18	0
8	EDO	D	101	-	3,3,3	0.28	0	2,2,2	0.51	0
8	EDO	A	304	-	3,3,3	0.25	0	2,2,2	0.39	0
8	EDO	B	302	-	3,3,3	0.26	0	2,2,2	0.22	0
7	NAG	A	301	1	14,14,15	0.70	0	17,19,21	1.16	2 (11%)
8	EDO	C	303	-	3,3,3	0.31	0	2,2,2	0.43	0
7	NAG	A	302	1	14,14,15	1.04	1 (7%)	17,19,21	1.40	1 (5%)
8	EDO	C	302	-	3,3,3	0.26	0	2,2,2	0.41	0
7	NAG	B	301	2	14,14,15	0.79	0	17,19,21	0.93	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
8	EDO	A	305	-	-	1/1/1/1	-
8	EDO	C	304	-	-	0/1/1/1	-
8	EDO	D	102	-	-	1/1/1/1	-
7	NAG	A	303	1	-	2/6/23/26	0/1/1/1
8	EDO	A	306	-	-	1/1/1/1	-
8	EDO	C	301	-	-	0/1/1/1	-
8	EDO	D	101	-	-	0/1/1/1	-
8	EDO	A	304	-	-	0/1/1/1	-
8	EDO	B	302	-	-	1/1/1/1	-
7	NAG	A	301	1	-	0/6/23/26	0/1/1/1
8	EDO	C	303	-	-	1/1/1/1	-
7	NAG	A	302	1	-	0/6/23/26	0/1/1/1
8	EDO	C	302	-	-	1/1/1/1	-
7	NAG	B	301	2	-	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)
7	A	302	NAG	C1-C2	3.23	1.56	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	302	NAG	C2-N2-C7	4.17	128.49	122.90
7	A	301	NAG	C2-N2-C7	2.71	126.53	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	303	NAG	C2-N2-C7	2.29	125.97	122.90
7	A	301	NAG	O5-C1-C2	-2.11	108.03	111.29

There are no chirality outliers.

All (9) torsion outliers are listed below:

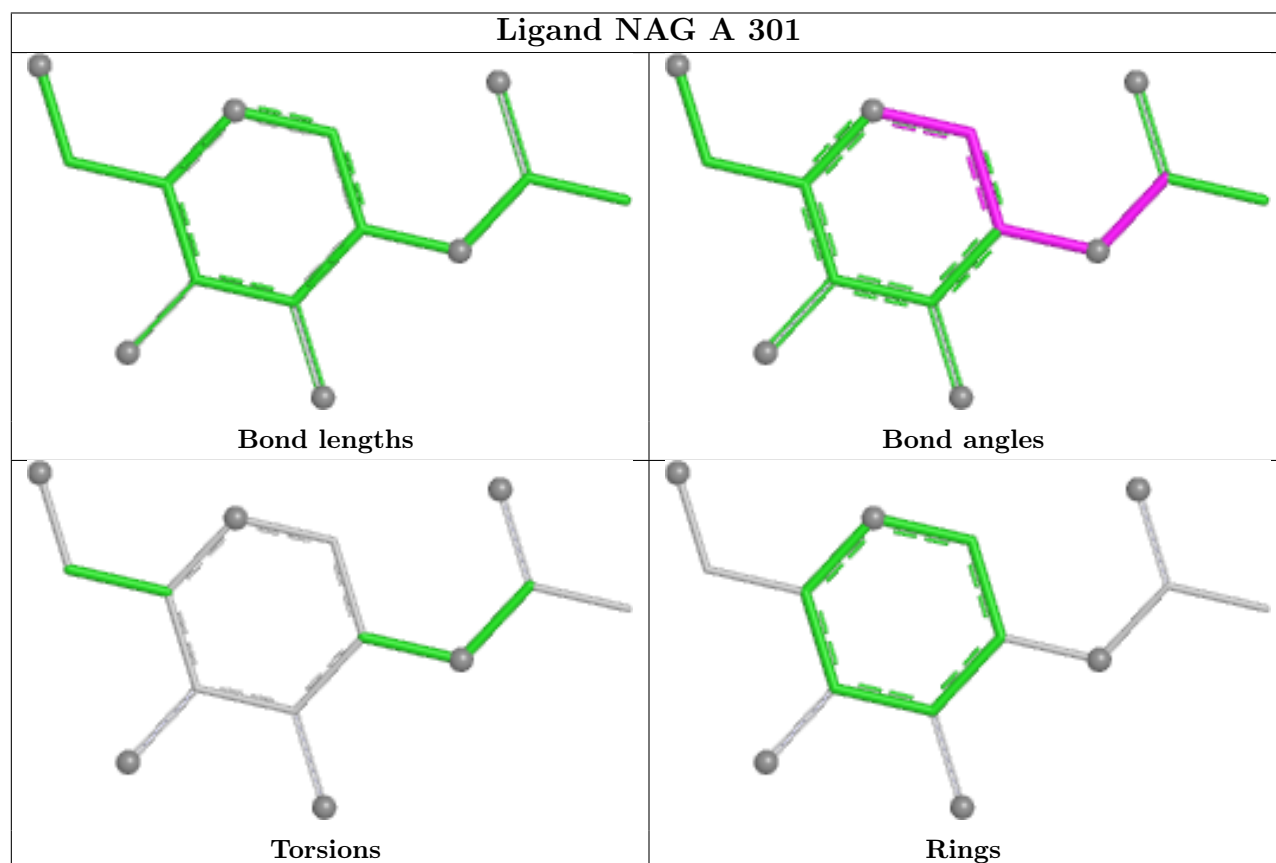
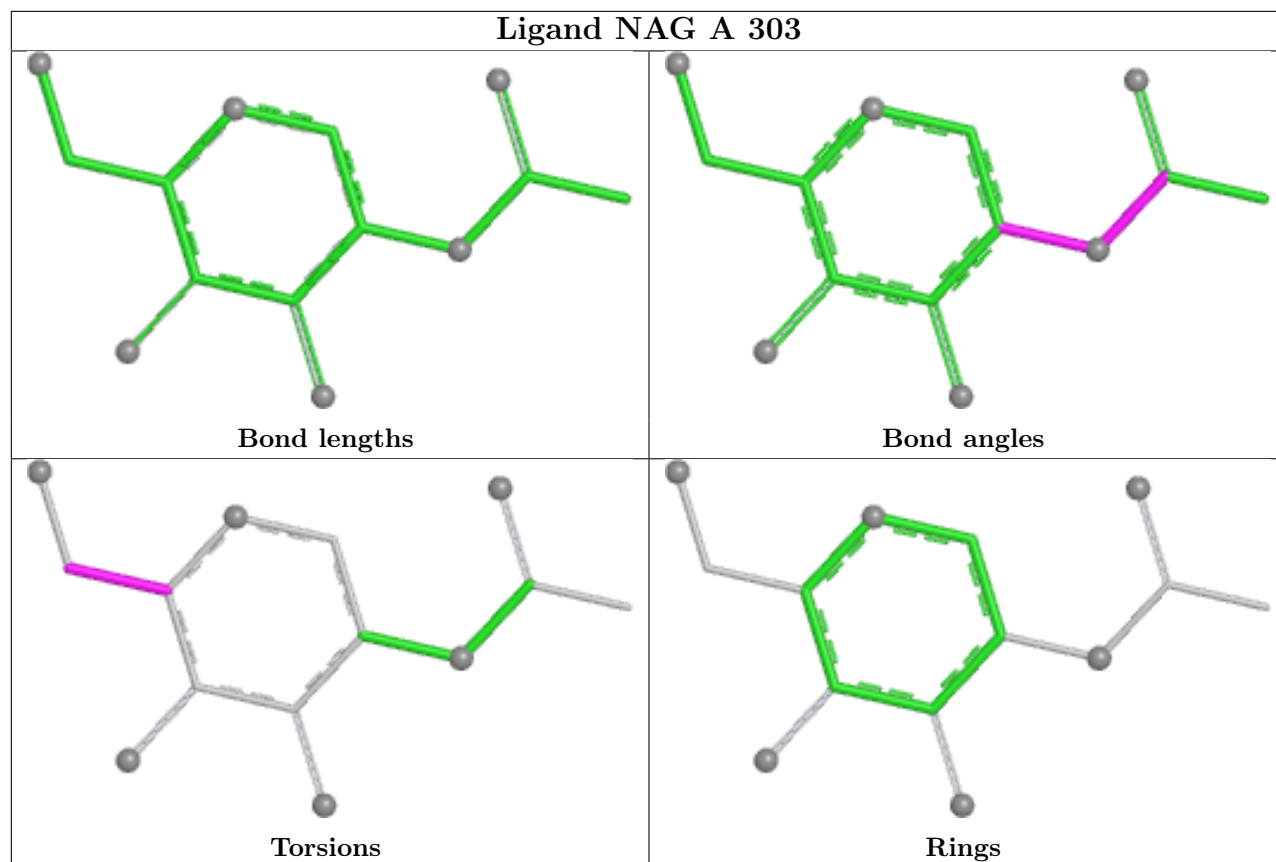
Mol	Chain	Res	Type	Atoms
8	C	303	EDO	O1-C1-C2-O2
8	D	102	EDO	O1-C1-C2-O2
8	A	306	EDO	O1-C1-C2-O2
8	B	302	EDO	O1-C1-C2-O2
7	A	303	NAG	C4-C5-C6-O6
8	A	305	EDO	O1-C1-C2-O2
7	A	303	NAG	O5-C5-C6-O6
8	C	302	EDO	O1-C1-C2-O2
7	B	301	NAG	C4-C5-C6-O6

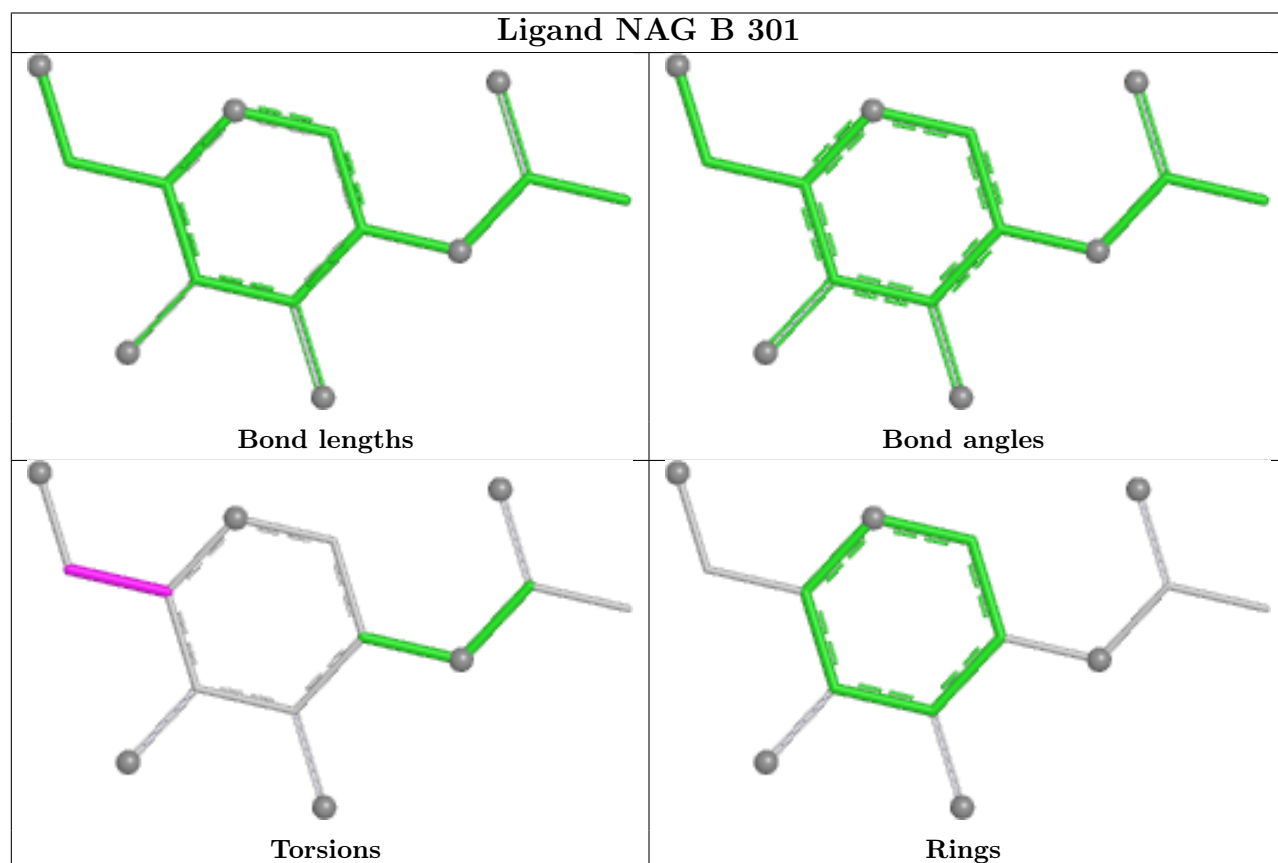
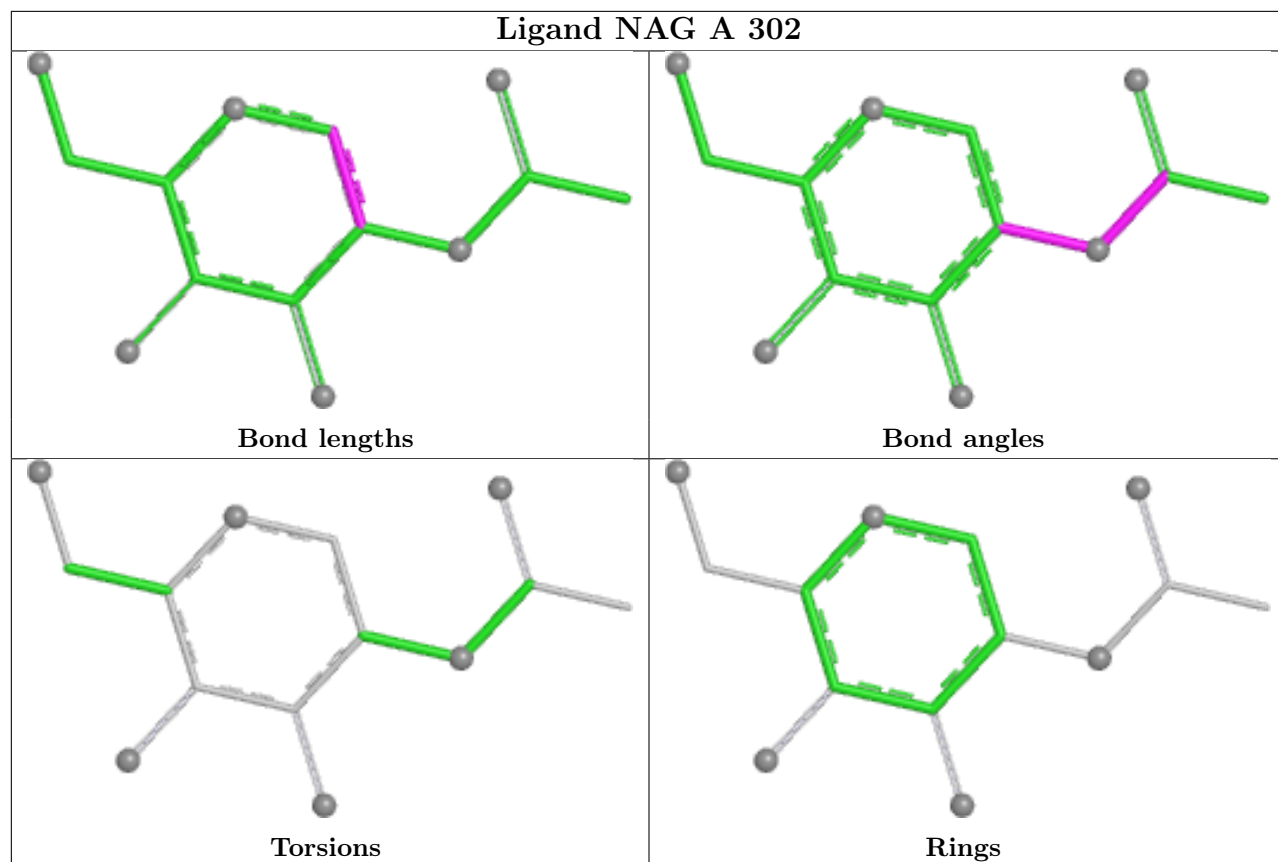
There are no ring outliers.

5 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	305	EDO	1	0
8	C	304	EDO	2	0
8	D	102	EDO	1	0
8	D	101	EDO	2	0
8	C	303	EDO	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 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 than 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.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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(Å ²)	Q<0.9
1	A	205/223 (91%)	0.57	14 (6%) 23 27	24, 51, 100, 122	1 (0%)
2	B	243/254 (95%)	0.29	6 (2%) 58 65	21, 48, 80, 115	1 (0%)
3	C	271/281 (96%)	0.89	59 (21%) 2 2	18, 50, 145, 174	4 (1%)
4	D	98/100 (98%)	0.43	0 100 100	37, 51, 82, 91	0
5	P	9/9 (100%)	-0.55	0 100 100	30, 31, 39, 41	0
All	All	826/867 (95%)	0.56	79 (9%) 13 15	18, 50, 129, 174	6 (0%)

All (79) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	215	LEU	5.0
3	C	248	VAL	4.8
3	C	261	VAL	4.8
3	C	251	LEU	4.8
1	A	59	ALA	4.7
3	C	237	GLY	4.5
3	C	180	LEU	4.3
3	C	217	TRP	4.3
1	A	135	SER	4.3
3	C	219	LEU	4.2
3	C	223	LEU	4.1
3	C	175	GLY	4.1
3	C	179	LEU	3.9
3	C	276	PRO	3.7
3	C	177	ALA	3.6
3	C	178	THR	3.6
3	C	272	LEU	3.6
3	C	230	LEU	3.5
3	C	274	TRP	3.5
3	C	236	ALA	3.5

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Mol	Chain	Res	Type	RSRZ
3	C	265	GLY	3.4
3	C	189	VAL	3.4
3	C	182	THR	3.4
2	B	243	ASP	3.3
3	C	209	TYR	3.3
3	C	213	ILE	3.3
3	C	247	VAL	3.3
3	C	233	THR	3.3
3	C	270	LEU	3.2
2	B	2	THR	3.1
1	A	28	ARG	3.1
3	C	262	TYR	3.1
1	A	60	THR	3.1
3	C	201	LEU	3.0
3	C	176	ASN	3.0
3	C	2	PRO	3.0
3	C	271	THR	2.9
1	A	197	ASN	2.9
1	A	208	SER	2.9
2	B	182	LEU	2.9
3	C	224	THR	2.9
3	C	257	TYR	2.8
3	C	269	PRO	2.7
2	B	1	ASN	2.7
3	C	252	GLY	2.7
3	C	210	PRO	2.7
3	C	245	ALA	2.7
1	A	61	GLU	2.7
3	C	256	ASN	2.7
1	A	199	ILE	2.6
1	A	56	LYS	2.6
1	A	200	ILE	2.5
3	C	249	VAL	2.5
1	A	152	VAL	2.5
3	C	225	GLN	2.4
3	C	239	GLY	2.4
3	C	228	MET	2.4
2	B	242	ALA	2.4
3	C	267	PRO	2.4
3	C	244	TRP	2.4
3	C	250	PRO	2.3
3	C	253	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
3	C	200	THR	2.3
3	C	258	THR	2.3
3	C	186	LYS	2.3
3	C	181	ARG	2.2
3	C	275	GLU	2.2
3	C	191	HIS	2.2
1	A	57	GLU	2.2
3	C	199	VAL	2.2
1	A	62	GLY	2.2
3	C	240	THR	2.1
3	C	207	GLY	2.1
3	C	211	ALA	2.1
3	C	203	CYS	2.1
3	C	214	THR	2.1
1	A	133	SER	2.0
2	B	181	ALA	2.0
3	C	197	GLY	2.0

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

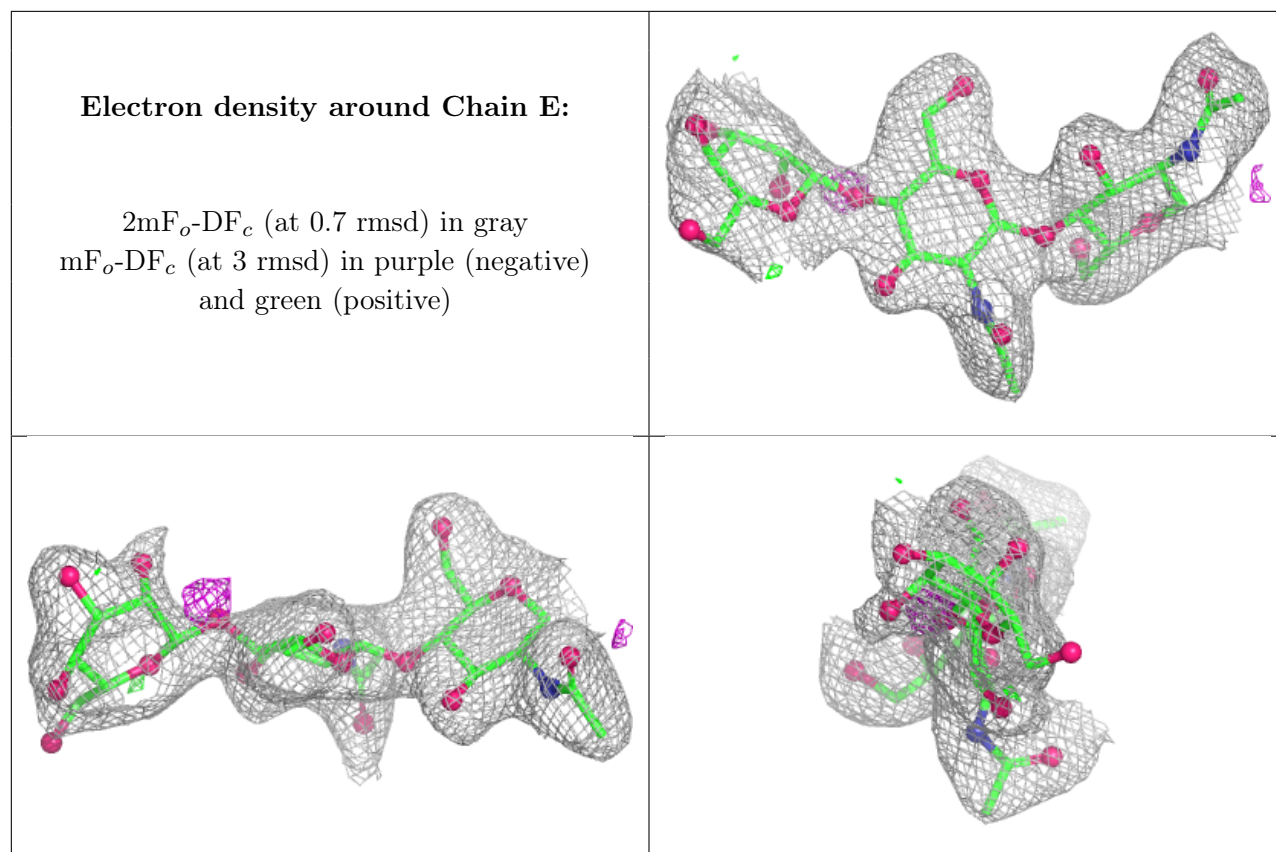
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

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(Å ²)	Q<0.9
6	NAG	E	1	14/15	-	-	43,52,61,62	0
6	NAG	E	2	14/15	-	-	62,67,77,84	0
6	BMA	E	3	11/12	-	-	86,88,90,90	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



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, 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(Å ²)	Q<0.9
7	NAG	B	301	14/15	0.53	0.19	76,85,89,89	0
7	NAG	A	303	14/15	0.55	0.17	91,95,98,100	14
7	NAG	A	302	14/15	0.67	0.15	64,66,68,69	0
8	EDO	D	102	4/4	0.75	0.15	50,53,55,62	0
7	NAG	A	301	14/15	0.77	0.11	71,79,81,81	0
8	EDO	C	304	4/4	0.79	0.26	54,56,56,57	0
8	EDO	A	304	4/4	0.80	0.13	68,69,70,70	0
8	EDO	C	302	4/4	0.86	0.15	51,53,54,59	0
8	EDO	A	306	4/4	0.87	0.16	45,46,54,56	0
8	EDO	C	301	4/4	0.89	0.13	44,49,51,52	0
8	EDO	A	305	4/4	0.91	0.11	54,55,57,58	0
8	EDO	C	303	4/4	0.91	0.20	45,47,47,53	0
8	EDO	D	101	4/4	0.92	0.13	38,42,45,52	0
9	CL	C	305	1/1	0.92	0.10	40,40,40,40	1

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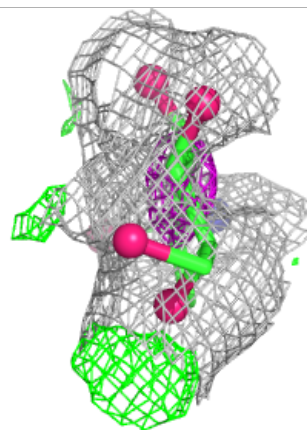
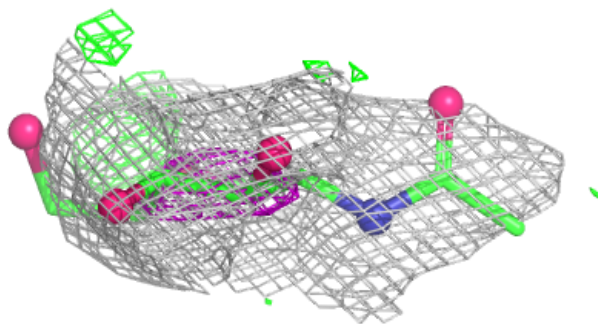
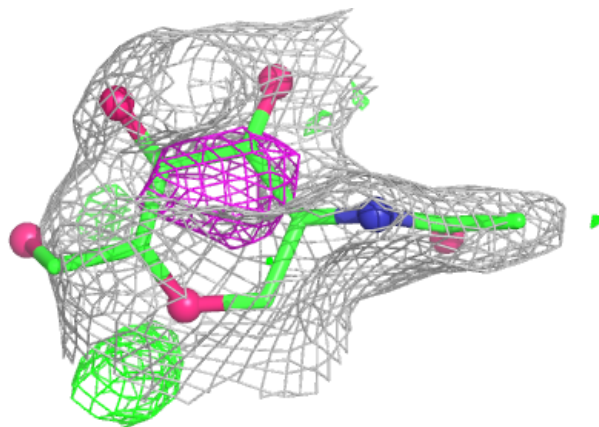
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
8	EDO	B	302	4/4	0.93	0.11	44,44,47,52	0
9	CL	B	303	1/1	0.95	0.11	58,58,58,58	0
9	CL	A	307	1/1	0.97	0.05	37,37,37,37	1

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.

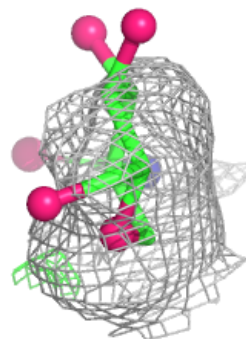
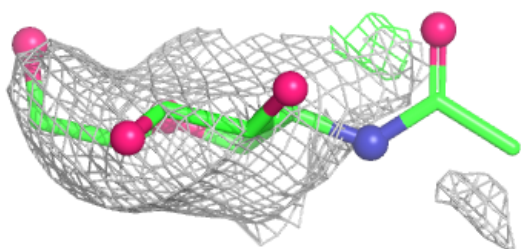
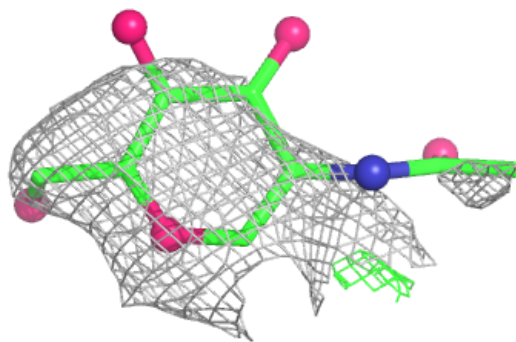
Electron density around NAG B 301:

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

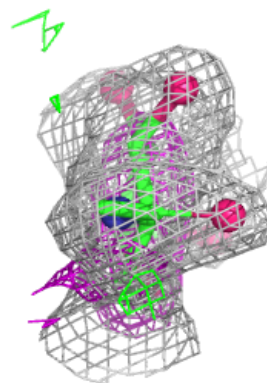
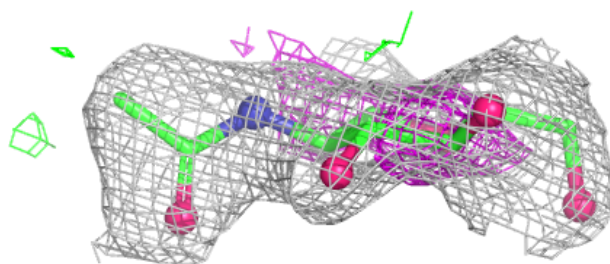
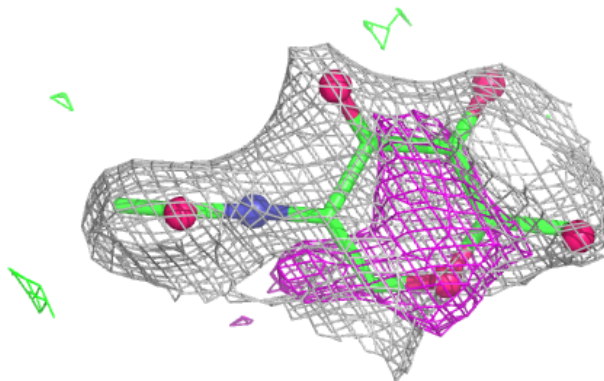


Electron density around NAG A 303:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

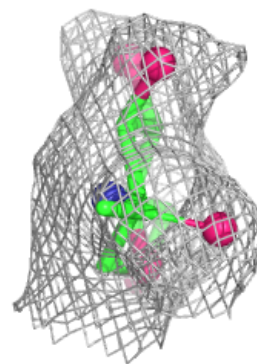
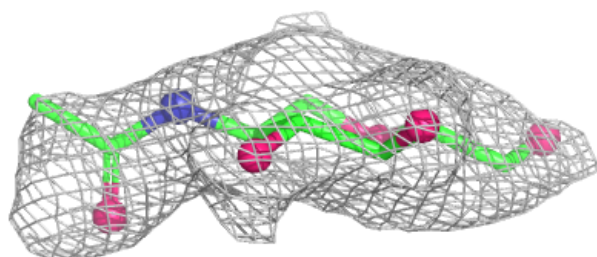
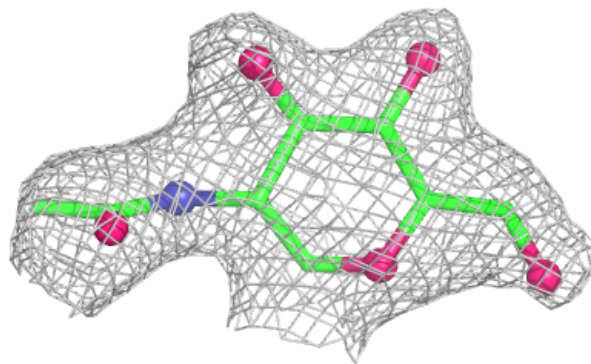
**Electron density around NAG A 302:**

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



Electron density around NAG A 301:

$2mF_o-DF_c$ (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.