



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 23, 2025 – 04:13 AM EST

PDB ID : 9PRU / pdb_00009pru
Title : Complex of the 3G8 Fab bound to Fc gamma receptor 3a / CD16a F158 allotype
Authors : Barb, A.W.; Lanzilotta, W.N.; Kremer, P.G.
Deposited on : 2025-07-24
Resolution : 1.90 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:

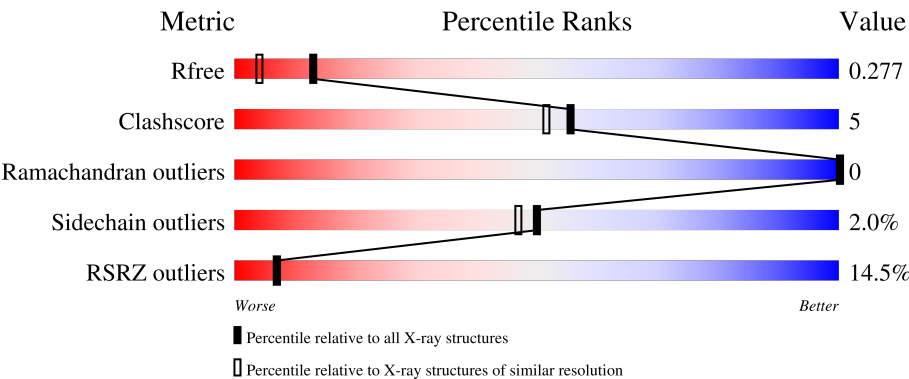
MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (1.90-1.90)

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	218	
1	C	218	
1	E	218	
1	G	218	
2	B	221	

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Mol	Chain	Length	Quality of chain
2	D	221	
2	F	221	
2	H	221	
3	W	175	
3	X	175	
3	Y	175	
3	Z	175	
4	I	3	
4	J	3	
4	L	3	
5	K	2	

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 19484 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 3G8 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	214	Total	C	N	O	S	0	0	0
			1603	1003	267	327	6			
1	C	213	Total	C	N	O	S	0	0	0
			1632	1019	271	336	6			
1	E	217	Total	C	N	O	S	0	0	0
			1624	1015	270	333	6			
1	G	213	Total	C	N	O	S	0	0	0
			1576	982	261	327	6			

- Molecule 2 is a protein called 3G8 Fab Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	217	Total	C	N	O	S	0	0	0
			1587	1016	256	309	6			
2	D	218	Total	C	N	O	S	0	0	0
			1617	1031	263	317	6			
2	F	217	Total	C	N	O	S	0	0	0
			1590	1020	257	307	6			
2	H	218	Total	C	N	O	S	0	0	0
			1616	1032	263	315	6			

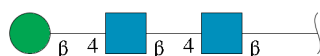
- Molecule 3 is a protein called Low affinity immunoglobulin gamma Fc region receptor III-A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	W	171	Total	C	N	O	S	0	0	0
			1352	858	228	262	4			
3	X	165	Total	C	N	O	S	0	0	0
			1238	785	214	235	4			
3	Y	160	Total	C	N	O	S	0	0	0
			1241	796	209	232	4			
3	Z	171	Total	C	N	O	S	0	0	0
			1340	858	227	251	4			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
W	38	GLN	ASN	engineered mutation	UNP P08637
W	74	GLN	ASN	engineered mutation	UNP P08637
W	169	GLN	ASN	engineered mutation	UNP P08637
X	38	GLN	ASN	engineered mutation	UNP P08637
X	74	GLN	ASN	engineered mutation	UNP P08637
X	169	GLN	ASN	engineered mutation	UNP P08637
Y	38	GLN	ASN	engineered mutation	UNP P08637
Y	74	GLN	ASN	engineered mutation	UNP P08637
Y	169	GLN	ASN	engineered mutation	UNP P08637
Z	38	GLN	ASN	engineered mutation	UNP P08637
Z	74	GLN	ASN	engineered mutation	UNP P08637
Z	169	GLN	ASN	engineered mutation	UNP P08637

- 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	I	3	Total	C	N	O	0	0	0
			39	22	2	15			
4	J	3	Total	C	N	O	0	0	0
			39	22	2	15			
4	L	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	K	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	C	1	Total	C	O	0	0
			6	3	3		
6	E	1	Total	C	O	0	0
			6	3	3		

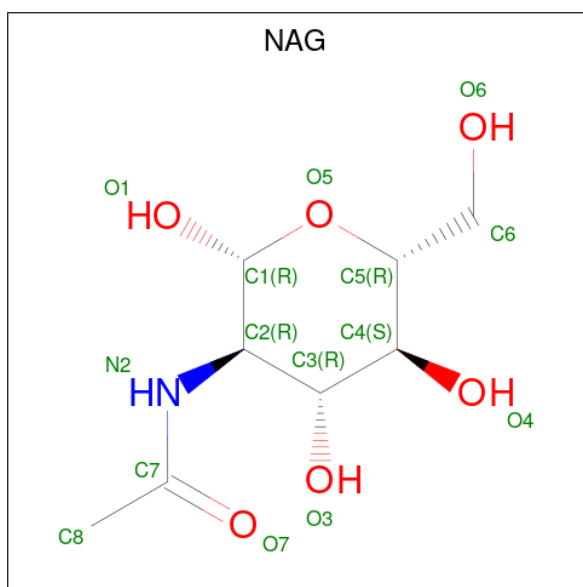
- Molecule 7 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	E	1	Total	Na	0	0
			1	1		
7	G	1	Total	Na	0	0
			1	1		
7	H	1	Total	Na	0	0
			1	1		

- Molecule 8 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	G	1	Total	Cl	0	0
			1	1		

- Molecule 9 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
9	W	1	Total	C	N	O	0	0
			14	8	1	5		
9	X	1	Total	C	N	O	0	0
			14	8	1	5		
9	Y	1	Total	C	N	O	0	0
			14	8	1	5		
9	Z	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	98	Total	O	0	0
			98	98		
10	B	56	Total	O	0	0
			56	56		
10	C	175	Total	O	0	0
			175	175		
10	D	141	Total	O	0	0
			141	141		
10	E	140	Total	O	0	0
			140	140		
10	F	114	Total	O	0	0
			114	114		
10	G	90	Total	O	0	0
			90	90		
10	H	82	Total	O	0	0
			82	82		

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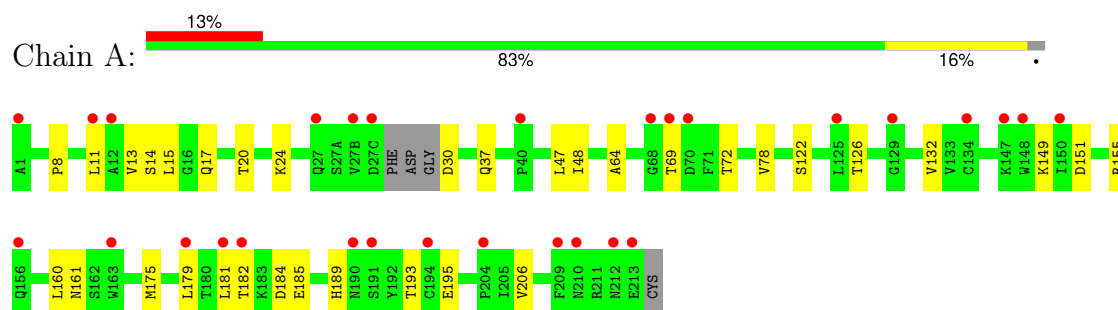
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	W	137	Total 137	O 137	0	0
10	X	39	Total 39	O 39	0	0
10	Y	54	Total 54	O 54	0	0
10	Z	119	Total 119	O 119	0	0

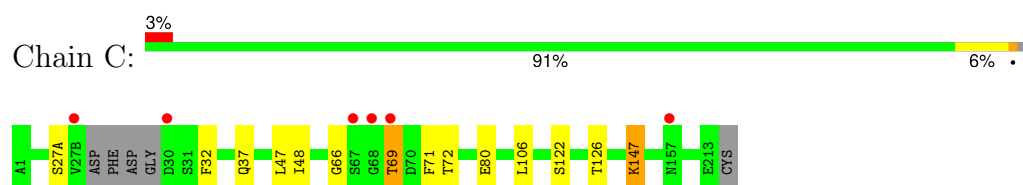
3 Residue-property plots [i](#)

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.

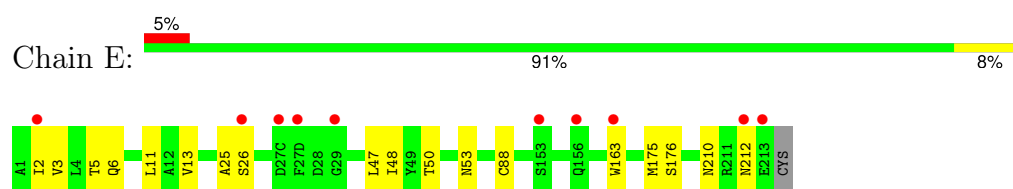
- Molecule 1: 3G8 Fab light chain



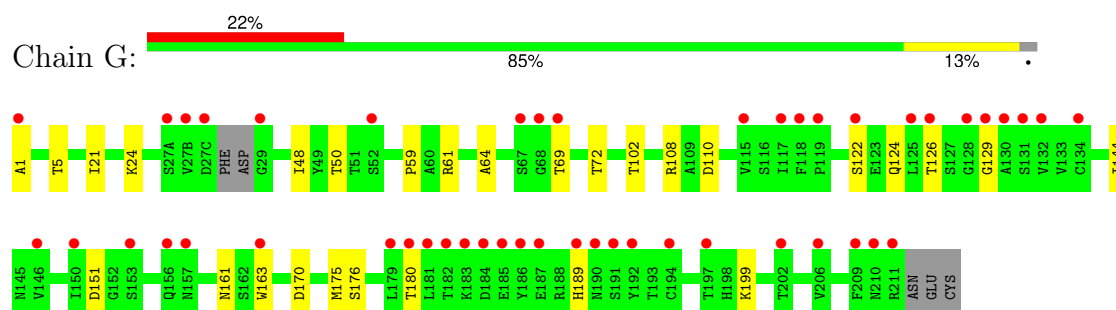
- Molecule 1: 3G8 Fab light chain



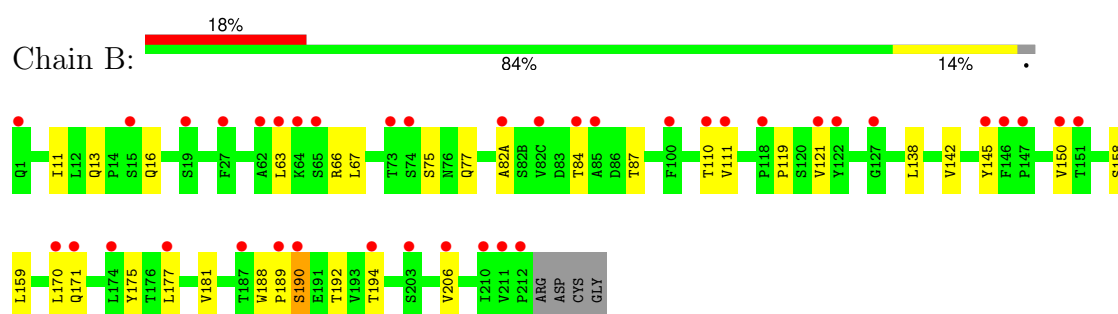
- Molecule 1: 3G8 Fab light chain



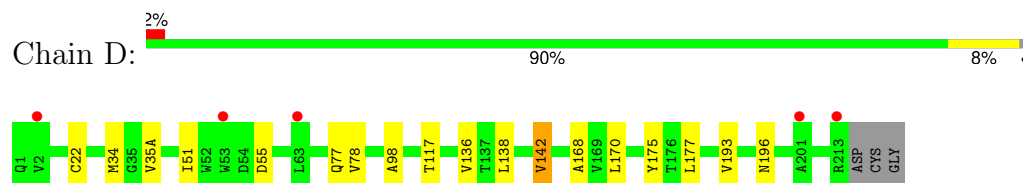
- Molecule 1: 3G8 Fab light chain



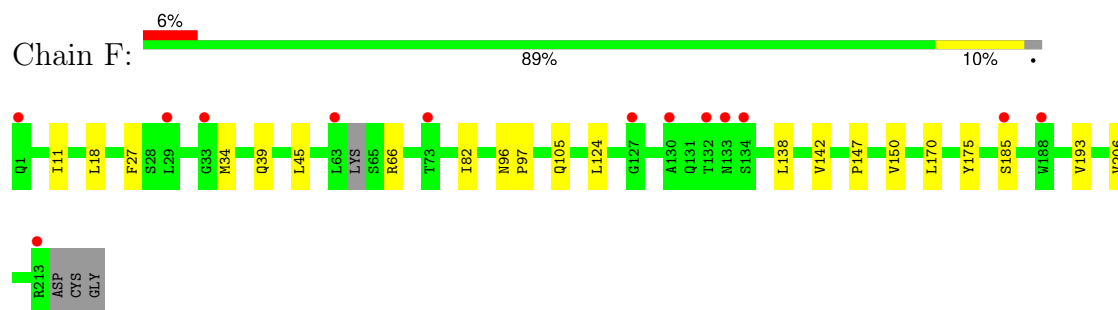
- Molecule 2: 3G8 Fab Heavy Chain



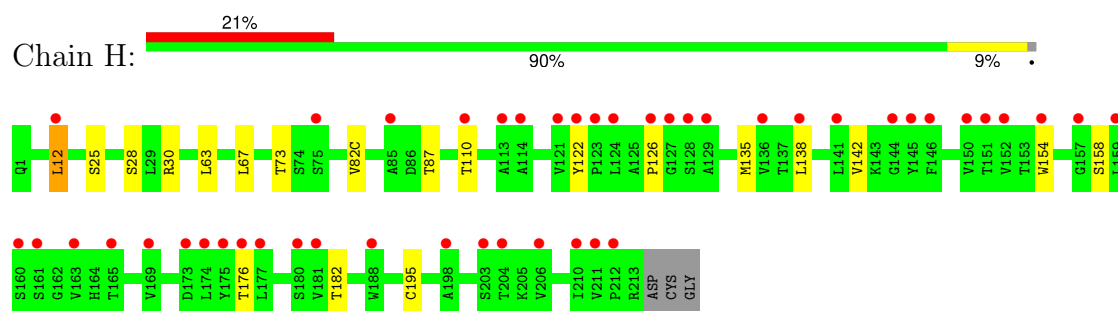
• Molecule 2: 3G8 Fab Heavy Chain



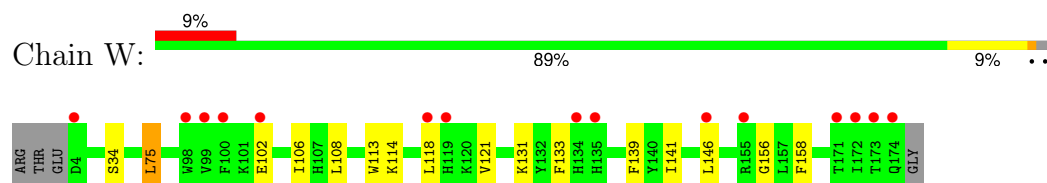
• Molecule 2: 3G8 Fab Heavy Chain



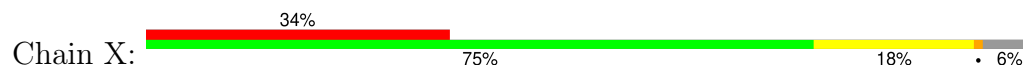
• Molecule 2: 3G8 Fab Heavy Chain

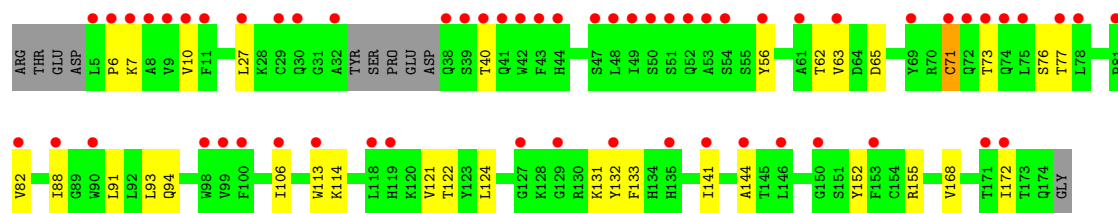


• Molecule 3: Low affinity immunoglobulin gamma Fc region receptor III-A

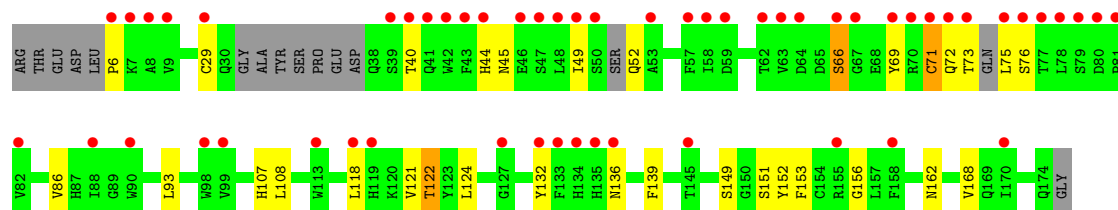


• Molecule 3: Low affinity immunoglobulin gamma Fc region receptor III-A

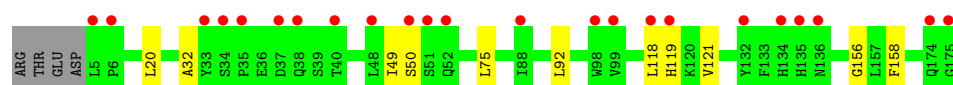




- Molecule 3: Low affinity immunoglobulin gamma Fc region receptor III-A



- Molecule 3: Low affinity immunoglobulin gamma Fc region receptor III-A



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



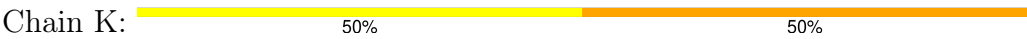
- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



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



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	130.06Å 130.59Å 170.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.00 – 1.90 48.00 – 1.90	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.00-1.90) 92.0 (48.00-1.90)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.43 (at 1.88Å)	Xtriage
Refinement program	PHENIX 1.21.2_5419	Depositor
R, R_{free}	0.230 , 0.280 0.231 , 0.277	Depositor DCC
R_{free} test set	2003 reflections (0.88%)	wwPDB-VP
Wilson B-factor (Å ²)	25.6	Xtriage
Anisotropy	0.831	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 35.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.023 for k,h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	19484	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 21.64 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.7170e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

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

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	0.37	0/1639	0.58	0/2236
1	C	0.40	0/1668	0.59	0/2268
1	E	0.33	0/1661	0.54	0/2266
1	G	0.35	0/1611	0.54	0/2200
2	B	0.29	0/1634	0.55	1/2254 (0.0%)
2	D	0.33	0/1664	0.57	0/2291
2	F	0.36	1/1636 (0.1%)	0.54	0/2255
2	H	0.30	0/1663	0.51	0/2290
3	W	0.35	0/1389	0.55	0/1893
3	X	0.31	0/1269	0.48	0/1733
3	Y	0.30	0/1273	0.52	0/1734
3	Z	0.34	0/1378	0.48	0/1878
All	All	0.34	1/18485 (0.0%)	0.54	1/25298 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	105	GLN	CD-OE1	-7.15	1.09	1.23

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
2	B	190	SER	N-CA-C	6.41	117.95	110.97

There are no chirality outliers.

There are no planarity outliers.

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	A	1603	0	1480	20	0
1	C	1632	0	1541	7	0
1	E	1624	0	1503	12	0
1	G	1576	0	1429	17	0
2	B	1587	0	1484	19	0
2	D	1617	0	1539	10	0
2	F	1590	0	1496	7	0
2	H	1616	0	1542	14	0
3	W	1352	0	1239	8	0
3	X	1238	0	1091	23	0
3	Y	1241	0	1129	21	0
3	Z	1340	0	1242	9	0
4	I	39	0	34	0	0
4	J	39	0	34	0	0
4	L	39	0	34	0	0
5	K	28	0	25	1	0
6	A	6	0	8	1	0
6	C	6	0	8	0	0
6	E	6	0	8	0	0
7	E	1	0	0	0	0
7	G	1	0	0	0	0
7	H	1	0	0	0	0
8	G	1	0	0	0	0
9	W	14	0	13	0	0
9	X	14	0	13	0	0
9	Y	14	0	13	1	0
9	Z	14	0	13	0	0
10	A	98	0	0	0	0
10	B	56	0	0	0	0
10	C	175	0	0	0	0
10	D	141	0	0	1	0
10	E	140	0	0	1	0
10	F	114	0	0	0	0
10	G	90	0	0	2	0
10	H	82	0	0	2	0
10	W	137	0	0	0	0
10	X	39	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	Y	54	0	0	0	0
10	Z	119	0	0	0	0
All	All	19484	0	16918	160	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 5.

All (160) 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:B:87:THR:HG22	2:B:111:VAL:H	1.38	0.89
3:X:122:THR:HG22	3:X:132:TYR:HD1	1.53	0.74
1:A:8:PRO:HG3	1:A:11:LEU:HD13	1.71	0.72
2:H:30:ARG:HG2	2:H:73:THR:HG21	1.75	0.68
1:A:195:GLU:HG3	1:A:206:VAL:HG22	1.77	0.67
3:Z:118:LEU:HG	3:Z:121:VAL:HG22	1.78	0.66
3:Z:118:LEU:HD11	3:Z:156:GLY:HA3	1.77	0.65
3:X:10:VAL:HB	3:X:82:VAL:HG21	1.78	0.65
3:X:6:PRO:HD2	3:X:76:SER:HA	1.80	0.64
3:Z:118:LEU:HD12	3:Z:119:HIS:H	1.63	0.64
3:Y:118:LEU:HD11	3:Y:156:GLY:HA3	1.80	0.63
3:X:106:ILE:HB	3:X:141:ILE:HB	1.79	0.63
3:Y:122:THR:HG22	3:Y:132:TYR:HD2	1.63	0.62
3:Z:49:ILE:HG13	3:Z:50:SER:H	1.67	0.60
3:Y:124:LEU:HD12	3:Y:153:PHE:CZ	2.39	0.57
1:E:163:TRP:CZ2	1:E:175:MET:HE2	2.39	0.57
3:X:40:THR:HA	3:X:73:THR:HA	1.87	0.57
2:H:110:THR:HG21	10:H:440:HOH:O	2.04	0.57
3:X:144:ALA:HB1	3:X:172:ILE:HD12	1.85	0.57
2:B:87:THR:HG22	2:B:111:VAL:N	2.15	0.57
1:A:13:VAL:HG13	1:A:17:GLN:HG2	1.87	0.56
2:B:66:ARG:HD2	2:B:82(A):ALA:O	2.06	0.56
1:E:2:ILE:HD11	1:E:25:ALA:HB1	1.88	0.56
2:H:63:LEU:HD22	2:H:67:LEU:HD21	1.88	0.56
3:X:113:TRP:CZ2	3:X:114:LYS:HE3	2.41	0.55
1:A:151:ASP:OD2	1:A:189:HIS:HB3	2.06	0.55
1:C:122:SER:O	1:C:126:THR:HG23	2.07	0.55
2:D:138:LEU:HD12	2:D:193:VAL:HG11	1.89	0.55
2:H:87:THR:HG23	2:H:110:THR:HA	1.89	0.54
1:E:175:MET:HG2	1:E:176:SER:N	2.20	0.54
1:A:122:SER:O	1:A:126:THR:HG23	2.08	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:163:TRP:CE2	1:G:175:MET:HE3	2.43	0.53
1:G:163:TRP:CZ2	1:G:175:MET:HE3	2.43	0.53
3:W:118:LEU:HG	3:W:121:VAL:HG22	1.89	0.53
1:E:50:THR:HG22	10:E:409:HOH:O	2.07	0.53
2:H:12:LEU:HD11	2:H:82(C):VAL:HG21	1.90	0.53
2:D:117:THR:HG22	10:D:302:HOH:O	2.08	0.53
1:A:160:LEU:HD11	2:B:171:GLN:HG3	1.91	0.52
1:A:14:SER:HA	6:A:301:GOL:H32	1.92	0.52
1:A:161:ASN:HB3	1:A:175:MET:HE3	1.92	0.52
3:Y:118:LEU:HG	3:Y:121:VAL:HG22	1.92	0.51
1:A:37:GLN:HB2	1:A:47:LEU:HD11	1.93	0.51
1:G:151:ASP:OD2	1:G:189:HIS:HB3	2.10	0.51
3:Y:66:SER:HB3	3:Y:86:VAL:H	1.76	0.51
3:X:63:VAL:CG1	3:X:88:ILE:HD11	2.41	0.51
2:B:119:PRO:HB3	2:B:145:TYR:HB3	1.93	0.50
1:A:182:THR:HG23	1:A:184:ASP:H	1.76	0.50
2:B:75:SER:HB2	2:B:77:GLN:HE21	1.76	0.50
2:B:158:SER:HB2	3:Y:6:PRO:HB3	1.93	0.50
2:D:51:ILE:HD11	2:D:55:ASP:OD1	2.11	0.50
3:Y:45:ASN:HD22	5:K:1:NAG:H83	1.77	0.50
3:Y:73:THR:HG22	3:Y:76:SER:HB3	1.93	0.50
2:F:27:PHE:CD2	2:F:34:MET:HE3	2.47	0.50
2:H:12:LEU:CD1	2:H:82(C):VAL:HG21	2.41	0.49
3:Z:118:LEU:HD13	3:Z:158:PHE:CE1	2.46	0.49
3:W:118:LEU:HD13	3:W:158:PHE:CZ	2.46	0.49
1:A:155:ARG:HG2	1:A:179:LEU:HD11	1.94	0.49
3:Z:118:LEU:HD12	3:Z:119:HIS:N	2.27	0.48
1:G:1:ALA:N	10:G:401:HOH:O	2.22	0.48
1:G:21:ILE:HG12	1:G:102:THR:HG21	1.93	0.48
3:X:113:TRP:CH2	3:X:114:LYS:HE3	2.48	0.48
2:H:110:THR:HG23	10:H:420:HOH:O	2.12	0.48
2:B:188:TRP:CG	2:B:189:PRO:HA	2.48	0.48
2:H:158:SER:HB3	3:X:6:PRO:HB3	1.94	0.47
3:X:155:ARG:HD2	10:X:333:HOH:O	2.14	0.47
3:Y:44:HIS:HB3	3:Y:49:ILE:CD1	2.44	0.47
1:E:11:LEU:HG	1:E:13:VAL:HG23	1.96	0.47
1:A:13:VAL:HG11	1:A:78:VAL:HG21	1.97	0.47
3:X:6:PRO:O	3:X:77:THR:HG22	2.13	0.47
3:X:93:LEU:HD23	3:X:168:VAL:HG22	1.96	0.47
1:C:37:GLN:HB2	1:C:47:LEU:HD11	1.97	0.47
1:E:3:VAL:HG12	1:E:26:SER:HB3	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:59:PRO:HB2	1:G:61:ARG:HG2	1.97	0.47
3:Y:93:LEU:HD23	3:Y:168:VAL:HG12	1.95	0.47
1:E:163:TRP:CZ2	1:E:175:MET:CE	2.98	0.47
1:E:210:ASN:HB3	1:E:212:ASN:OD1	2.14	0.47
3:W:106:ILE:HB	3:W:141:ILE:HB	1.97	0.47
3:X:10:VAL:HG22	3:X:71:CYS:HB3	1.96	0.47
2:B:159:LEU:HD13	2:B:181:VAL:HG21	1.97	0.47
1:A:149:LYS:HB2	1:A:193:THR:HB	1.96	0.46
1:G:50:THR:HG22	10:G:404:HOH:O	2.15	0.46
1:G:161:ASN:HB3	1:G:175:MET:HE2	1.98	0.46
3:W:131:LYS:HD2	3:W:133:PHE:CZ	2.51	0.46
2:H:158:SER:HA	3:X:6:PRO:HG3	1.98	0.46
1:E:163:TRP:CH2	1:E:175:MET:HE2	2.51	0.46
1:G:124:GLN:HG2	1:G:129:GLY:O	2.16	0.46
2:H:135:MET:HE3	2:H:182:THR:HG22	1.97	0.46
2:B:13:GLN:O	2:B:16:GLN:HB2	2.16	0.46
2:B:87:THR:CG2	2:B:111:VAL:H	2.19	0.46
2:B:142:VAL:HB	2:B:177:LEU:HG	1.97	0.46
2:B:170:LEU:HD13	2:B:175:TYR:CZ	2.51	0.45
3:Z:20:LEU:HD21	3:Z:92:LEU:HB2	1.98	0.45
1:G:24:LYS:HG3	1:G:69:THR:O	2.17	0.45
1:C:66:GLY:HA3	1:C:71:PHE:CD2	2.52	0.45
1:E:6:GLN:HG3	1:E:88:CYS:SG	2.57	0.45
1:G:110:ASP:OD2	1:G:199:LYS:HD3	2.16	0.45
3:Y:124:LEU:HD12	3:Y:153:PHE:CE1	2.52	0.45
2:D:170:LEU:HB2	2:D:175:TYR:CE1	2.52	0.45
2:F:96:ASN:HB2	2:F:97:PRO:HD2	1.98	0.45
1:G:124:GLN:HB2	2:H:122:TYR:CD2	2.51	0.45
1:G:175:MET:HG2	1:G:176:SER:N	2.30	0.45
3:X:124:LEU:O	3:X:152:TYR:HA	2.16	0.45
3:Y:124:LEU:O	3:Y:152:TYR:HA	2.17	0.45
1:A:20:THR:HG23	1:A:72:THR:HG23	1.98	0.45
1:G:108:ARG:HD2	1:G:170:ASP:O	2.16	0.45
2:F:138:LEU:HD12	2:F:193:VAL:HG11	1.99	0.44
3:Z:118:LEU:HG	3:Z:121:VAL:CG2	2.47	0.44
1:E:50:THR:OG1	1:E:53:ASN:ND2	2.51	0.44
1:G:48:ILE:HG21	1:G:64:ALA:HB3	1.98	0.44
3:X:91:LEU:HD23	3:X:91:LEU:HA	1.82	0.44
2:B:121:VAL:HG21	2:B:206:VAL:HG21	1.99	0.44
2:D:142:VAL:HG22	2:D:177:LEU:HG	1.99	0.44
2:F:39:GLN:HB2	2:F:45:LEU:HD23	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:126:PRO:HD3	2:H:138:LEU:HD23	2.00	0.44
3:X:62:THR:HG22	3:X:65:ASP:OD2	2.17	0.43
2:F:11:ILE:HB	2:F:147:PRO:HG3	2.00	0.43
1:A:15:LEU:HD13	3:Y:107:HIS:CE1	2.54	0.43
1:A:48:ILE:HG21	1:A:64:ALA:HB3	2.00	0.43
2:D:22:CYS:O	2:D:77:GLN:HA	2.19	0.43
2:D:168:ALA:HA	2:D:177:LEU:HB3	2.00	0.43
1:E:47:LEU:C	1:E:48:ILE:HD12	2.44	0.43
2:F:18:LEU:HD23	2:F:82:ILE:HD12	2.01	0.43
3:X:131:LYS:HD2	3:X:131:LYS:HA	1.72	0.43
1:A:155:ARG:HH21	1:A:181:LEU:CD2	2.32	0.42
3:W:108:LEU:HB2	3:W:139:PHE:HB3	2.02	0.42
3:Y:44:HIS:HB2	3:Y:69:TYR:CE2	2.55	0.42
3:Y:93:LEU:HD22	3:Y:153:PHE:HA	2.00	0.42
2:B:11:ILE:HD12	2:B:110:THR:O	2.19	0.42
2:D:35(A):VAL:HB	2:D:78:VAL:HG21	2.02	0.42
3:Y:118:LEU:HD11	3:Y:156:GLY:CA	2.49	0.42
3:Z:32:ALA:HB3	3:Z:75:LEU:HB2	2.01	0.42
1:C:32:PHE:CD2	2:D:98:ALA:HA	2.55	0.42
3:W:34:SER:HB3	3:W:75:LEU:HD21	2.01	0.42
3:Y:40:THR:O	3:Y:52:GLN:HA	2.19	0.42
3:Y:71:CYS:SG	3:Y:72:GLN:N	2.93	0.42
3:X:121:VAL:HG12	3:X:133:PHE:HB2	2.02	0.42
1:C:80:GLU:HA	1:C:106:LEU:HG	2.01	0.41
1:A:182:THR:HG23	1:A:184:ASP:N	2.35	0.41
2:F:170:LEU:HB2	2:F:175:TYR:CE1	2.55	0.41
3:X:10:VAL:HB	3:X:82:VAL:CG2	2.46	0.41
3:Y:162:ASN:OD1	9:Y:201:NAG:H2	2.20	0.41
1:A:182:THR:HG22	1:A:185:GLU:HG2	2.03	0.41
2:B:63:LEU:HD22	2:B:67:LEU:HD11	2.01	0.41
3:W:113:TRP:CH2	3:W:114:LYS:HE3	2.56	0.41
2:B:145:TYR:CE2	2:B:150:VAL:HG23	2.56	0.41
2:H:142:VAL:O	2:H:176:THR:HA	2.20	0.41
3:X:27:LEU:HD12	3:X:56:TYR:HD2	1.86	0.41
2:B:84:THR:O	2:B:87:THR:HG23	2.20	0.41
1:C:27(A):SER:HA	1:C:69:THR:HG22	2.03	0.41
1:G:122:SER:O	1:G:126:THR:HG23	2.21	0.41
1:A:24:LYS:HA	1:A:69:THR:O	2.21	0.41
2:H:154:TRP:CZ3	2:H:195:CYS:HB3	2.56	0.41
3:W:118:LEU:HD11	3:W:156:GLY:HA3	2.02	0.41
3:X:7:LYS:HA	3:X:77:THR:CG2	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:147:LYS:HB3	1:C:147:LYS:HE2	1.75	0.41
3:Y:73:THR:HG23	3:Y:75:LEU:N	2.36	0.40
3:Y:108:LEU:HB2	3:Y:139:PHE:HB3	2.02	0.40
1:G:144:ILE:HG22	1:G:163:TRP:CH2	2.56	0.40
2:D:34:MET:HE2	2:D:34:MET:HA	2.03	0.40
2:B:121:VAL:HG21	2:B:206:VAL:CG2	2.51	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	210/218 (96%)	204 (97%)	6 (3%)	0	100	100
1	C	209/218 (96%)	201 (96%)	8 (4%)	0	100	100
1	E	215/218 (99%)	210 (98%)	5 (2%)	0	100	100
1	G	209/218 (96%)	200 (96%)	9 (4%)	0	100	100
2	B	215/221 (97%)	205 (95%)	10 (5%)	0	100	100
2	D	216/221 (98%)	211 (98%)	5 (2%)	0	100	100
2	F	213/221 (96%)	207 (97%)	6 (3%)	0	100	100
2	H	216/221 (98%)	207 (96%)	9 (4%)	0	100	100
3	W	169/175 (97%)	163 (96%)	6 (4%)	0	100	100
3	X	161/175 (92%)	152 (94%)	9 (6%)	0	100	100
3	Y	152/175 (87%)	143 (94%)	9 (6%)	0	100	100
3	Z	169/175 (97%)	165 (98%)	4 (2%)	0	100	100
All	All	2354/2456 (96%)	2268 (96%)	86 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	171/192 (89%)	169 (99%)	2 (1%)	67	68
1	C	181/192 (94%)	177 (98%)	4 (2%)	47	43
1	E	174/192 (91%)	173 (99%)	1 (1%)	84	86
1	G	166/192 (86%)	163 (98%)	3 (2%)	54	52
2	B	167/189 (88%)	163 (98%)	4 (2%)	44	39
2	D	176/189 (93%)	173 (98%)	3 (2%)	56	54
2	F	168/189 (89%)	162 (96%)	6 (4%)	30	23
2	H	176/189 (93%)	173 (98%)	3 (2%)	56	54
3	W	144/158 (91%)	141 (98%)	3 (2%)	48	45
3	X	119/158 (75%)	117 (98%)	2 (2%)	56	54
3	Y	127/158 (80%)	120 (94%)	7 (6%)	18	10
3	Z	140/158 (89%)	140 (100%)	0	100	100
All	All	1909/2156 (88%)	1871 (98%)	38 (2%)	50	47

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	ASP
1	A	132	VAL
2	B	138	LEU
2	B	190	SER
2	B	192	THR
2	B	194	THR
1	C	48	ILE
1	C	69	THR
1	C	72	THR
1	C	147	LYS
2	D	136	VAL
2	D	142	VAL
2	D	196	ASN
1	E	5	THR

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Mol	Chain	Res	Type
2	F	66	ARG
2	F	124	LEU
2	F	142	VAL
2	F	150	VAL
2	F	185	SER
2	F	206	VAL
1	G	5	THR
1	G	72	THR
1	G	180	THR
2	H	12	LEU
2	H	25	SER
2	H	28	SER
3	W	75	LEU
3	W	102	GLU
3	W	146	LEU
3	X	71	CYS
3	X	94	GLN
3	Y	29	CYS
3	Y	66	SER
3	Y	71	CYS
3	Y	122	THR
3	Y	136	ASN
3	Y	149	SER
3	Y	151	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	38	GLN
1	A	42	GLN
1	A	53	ASN
1	A	189	HIS
2	B	39	GLN
2	B	77	GLN
2	B	105	GLN
2	B	131	GLN
1	C	38	GLN
1	C	145	ASN
1	C	190	ASN
2	D	39	GLN
2	D	105	GLN
2	D	171	GLN

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Mol	Chain	Res	Type
1	E	17	GLN
1	E	37	GLN
1	E	38	GLN
1	E	53	ASN
1	E	76	HIS
2	F	39	GLN
2	F	77	GLN
2	F	171	GLN
1	G	38	GLN
1	G	190	ASN
2	H	39	GLN
2	H	77	GLN
3	W	30	GLN
3	W	119	HIS
3	W	135	HIS
3	X	83	GLN
3	Y	115	ASN

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 ⓘ

11 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	I	1	4,3	14,14,15	1.03	1 (7%)	17,19,21	1.33	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	I	2	4	14,14,15	0.85	0	17,19,21	1.39	3 (17%)
4	BMA	I	3	4	11,11,12	0.89	0	15,15,17	1.90	3 (20%)
4	NAG	J	1	4,3	14,14,15	0.63	0	17,19,21	1.40	3 (17%)
4	NAG	J	2	4	14,14,15	0.71	0	17,19,21	1.57	2 (11%)
4	BMA	J	3	4	11,11,12	1.18	1 (9%)	15,15,17	2.35	5 (33%)
5	NAG	K	1	5,3	14,14,15	0.87	1 (7%)	17,19,21	1.34	3 (17%)
5	NAG	K	2	5	14,14,15	0.70	0	17,19,21	1.43	2 (11%)
4	NAG	L	1	4,3	14,14,15	0.65	0	17,19,21	1.57	3 (17%)
4	NAG	L	2	4	14,14,15	0.77	0	17,19,21	1.65	2 (11%)
4	BMA	L	3	4	11,11,12	1.05	1 (9%)	15,15,17	1.86	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	I	1	4,3	-	0/6/23/26	0/1/1/1
4	NAG	I	2	4	-	2/6/23/26	0/1/1/1
4	BMA	I	3	4	-	0/2/19/22	0/1/1/1
4	NAG	J	1	4,3	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	3/6/23/26	0/1/1/1
4	BMA	J	3	4	-	2/2/19/22	0/1/1/1
5	NAG	K	1	5,3	-	3/6/23/26	0/1/1/1
5	NAG	K	2	5	-	4/6/23/26	0/1/1/1
4	NAG	L	1	4,3	-	2/6/23/26	0/1/1/1
4	NAG	L	2	4	-	2/6/23/26	0/1/1/1
4	BMA	L	3	4	-	1/2/19/22	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	3	BMA	C2-C3	3.11	1.57	1.52
4	I	1	NAG	O5-C1	-2.98	1.38	1.43
5	K	1	NAG	O5-C1	-2.73	1.39	1.43
4	L	3	BMA	C2-C3	2.47	1.56	1.52

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	J	3	BMA	C1-O5-C5	6.34	120.68	112.19
4	I	3	BMA	C1-O5-C5	5.19	119.14	112.19
4	L	3	BMA	C1-O5-C5	4.71	118.49	112.19
4	L	1	NAG	C1-O5-C5	4.37	118.04	112.19
4	L	2	NAG	O5-C1-C2	-3.82	105.37	111.29
5	K	1	NAG	O5-C1-C2	-3.65	105.64	111.29
4	I	1	NAG	O5-C1-C2	-3.57	105.76	111.29
4	J	3	BMA	C3-C4-C5	3.51	116.59	110.23
4	J	3	BMA	C2-C3-C4	3.47	116.96	110.86
4	J	2	NAG	C1-O5-C5	3.35	116.67	112.19
5	K	2	NAG	C2-N2-C7	3.19	127.17	122.90
4	L	3	BMA	C2-C3-C4	3.07	116.26	110.86
5	K	1	NAG	C2-N2-C7	3.02	126.95	122.90
4	J	2	NAG	O5-C1-C2	-2.87	106.85	111.29
4	J	1	NAG	C2-N2-C7	2.84	126.71	122.90
5	K	2	NAG	C1-O5-C5	2.84	115.99	112.19
4	J	1	NAG	O4-C4-C3	-2.82	103.73	110.38
4	J	1	NAG	O5-C1-C2	-2.82	106.93	111.29
4	I	1	NAG	O3-C3-C2	-2.63	103.94	109.40
4	L	1	NAG	O5-C1-C2	-2.61	107.25	111.29
4	J	3	BMA	O3-C3-C2	-2.59	104.76	110.05
4	I	2	NAG	O4-C4-C5	2.54	115.58	109.32
4	L	2	NAG	C2-N2-C7	2.49	126.23	122.90
4	I	3	BMA	O4-C4-C3	-2.48	104.52	110.38
4	I	3	BMA	O5-C5-C6	2.31	112.16	107.66
5	K	1	NAG	O4-C4-C3	-2.22	105.14	110.38
4	I	2	NAG	O5-C1-C2	-2.22	107.86	111.29
4	I	2	NAG	C4-C3-C2	-2.10	107.94	111.02
4	L	1	NAG	C2-N2-C7	2.09	125.69	122.90
4	J	3	BMA	O5-C5-C4	2.01	115.72	110.83

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	L	2	NAG	O5-C5-C6-O6
4	L	1	NAG	C4-C5-C6-O6
5	K	2	NAG	C4-C5-C6-O6
4	J	3	BMA	C4-C5-C6-O6
4	L	1	NAG	O5-C5-C6-O6
5	K	2	NAG	O5-C5-C6-O6
4	J	3	BMA	O5-C5-C6-O6
4	J	1	NAG	O5-C5-C6-O6

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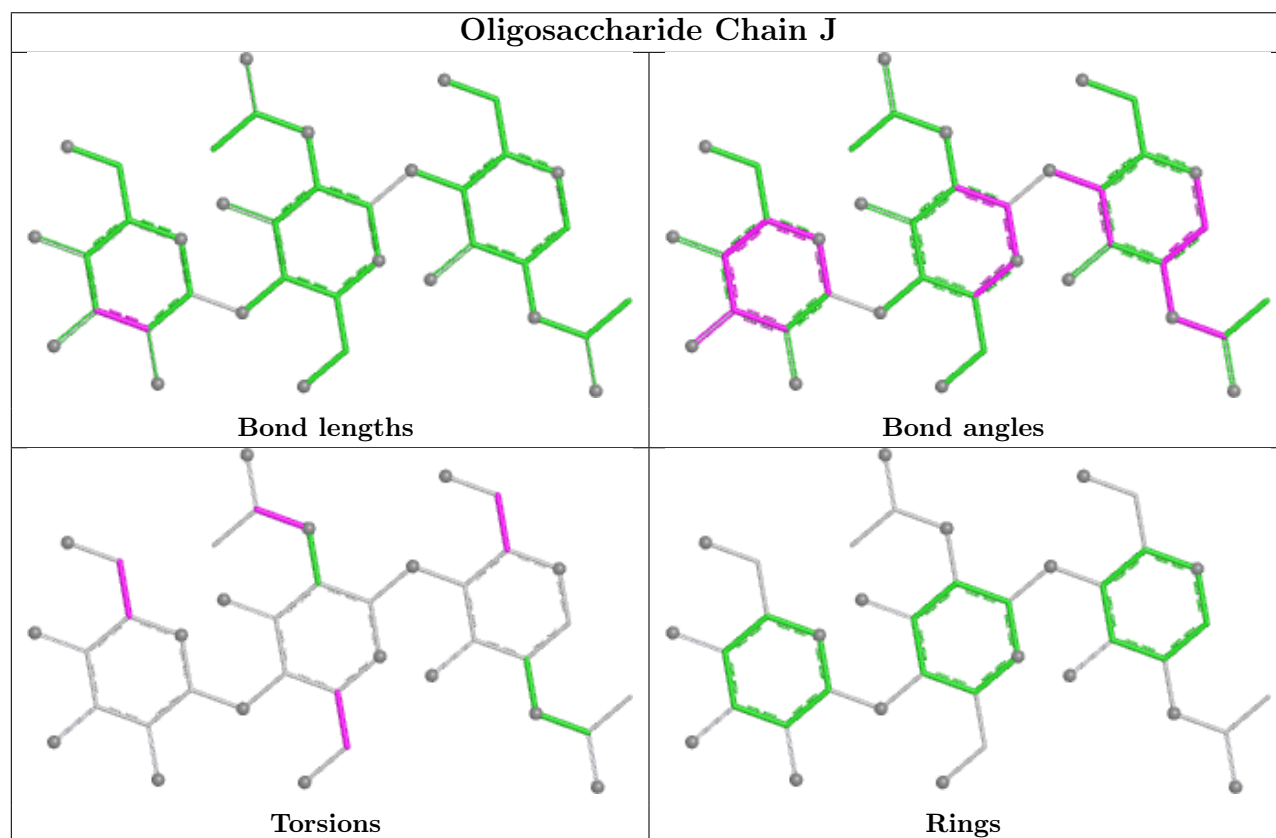
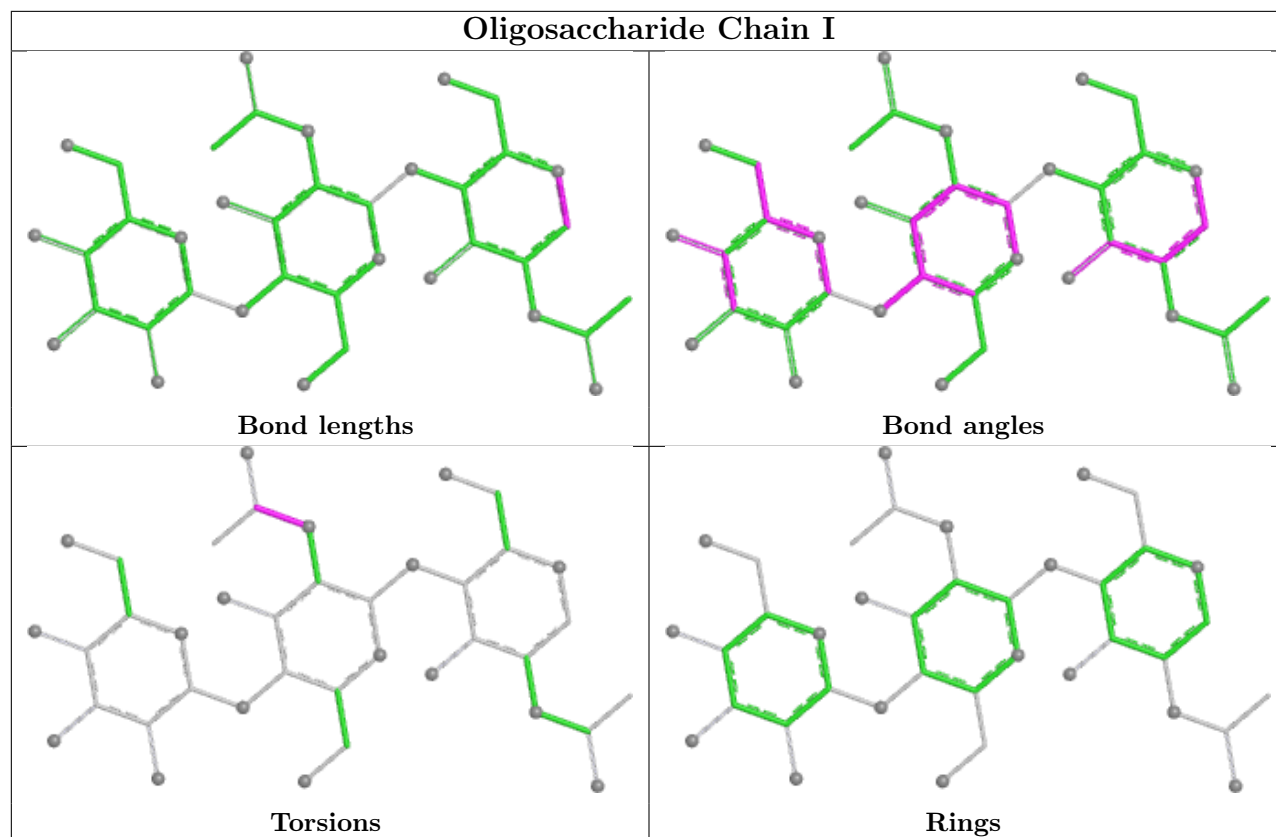
Mol	Chain	Res	Type	Atoms
4	L	2	NAG	C4-C5-C6-O6
4	I	2	NAG	C8-C7-N2-C2
4	I	2	NAG	O7-C7-N2-C2
4	J	2	NAG	C8-C7-N2-C2
4	J	2	NAG	O7-C7-N2-C2
5	K	1	NAG	C8-C7-N2-C2
5	K	1	NAG	O7-C7-N2-C2
5	K	2	NAG	C8-C7-N2-C2
5	K	2	NAG	O7-C7-N2-C2
4	J	2	NAG	O5-C5-C6-O6
4	J	1	NAG	C4-C5-C6-O6
5	K	1	NAG	O5-C5-C6-O6
4	L	3	BMA	C4-C5-C6-O6

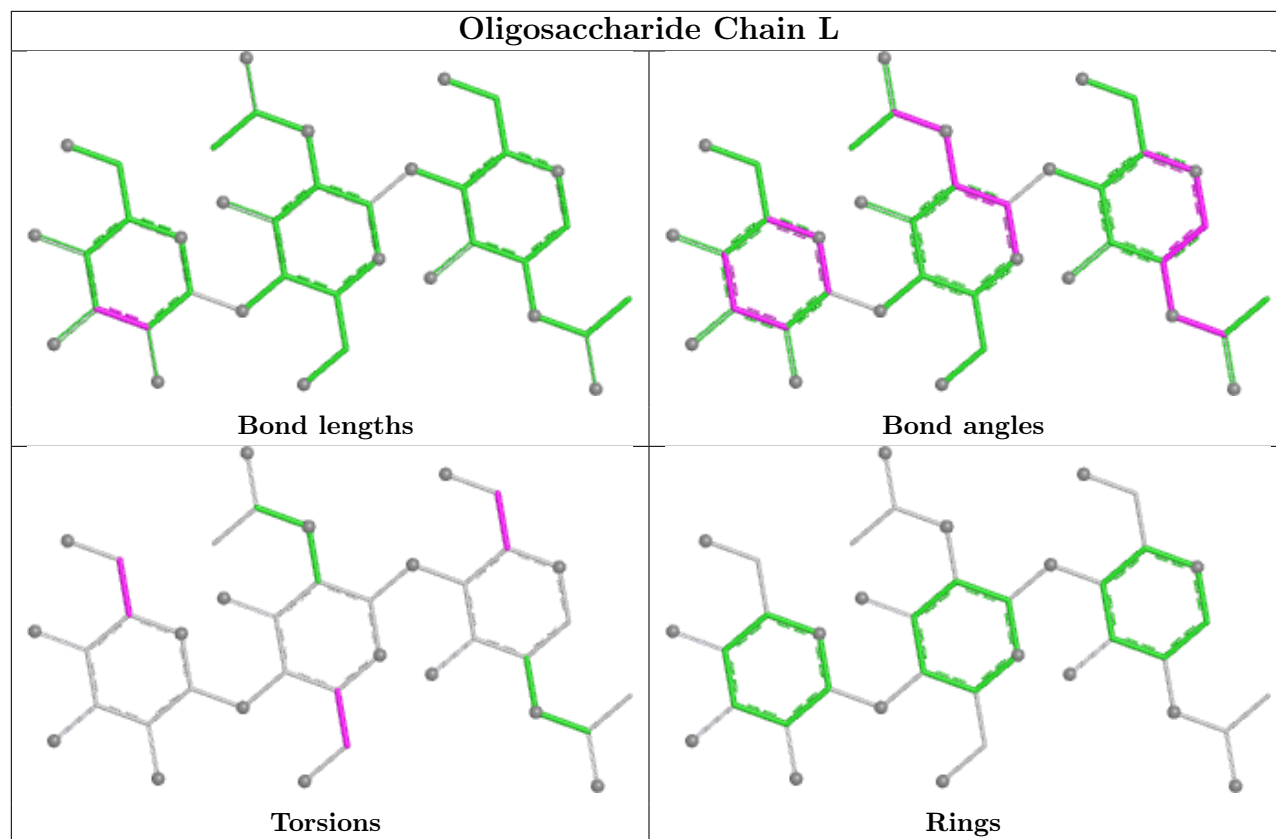
There are no ring outliers.

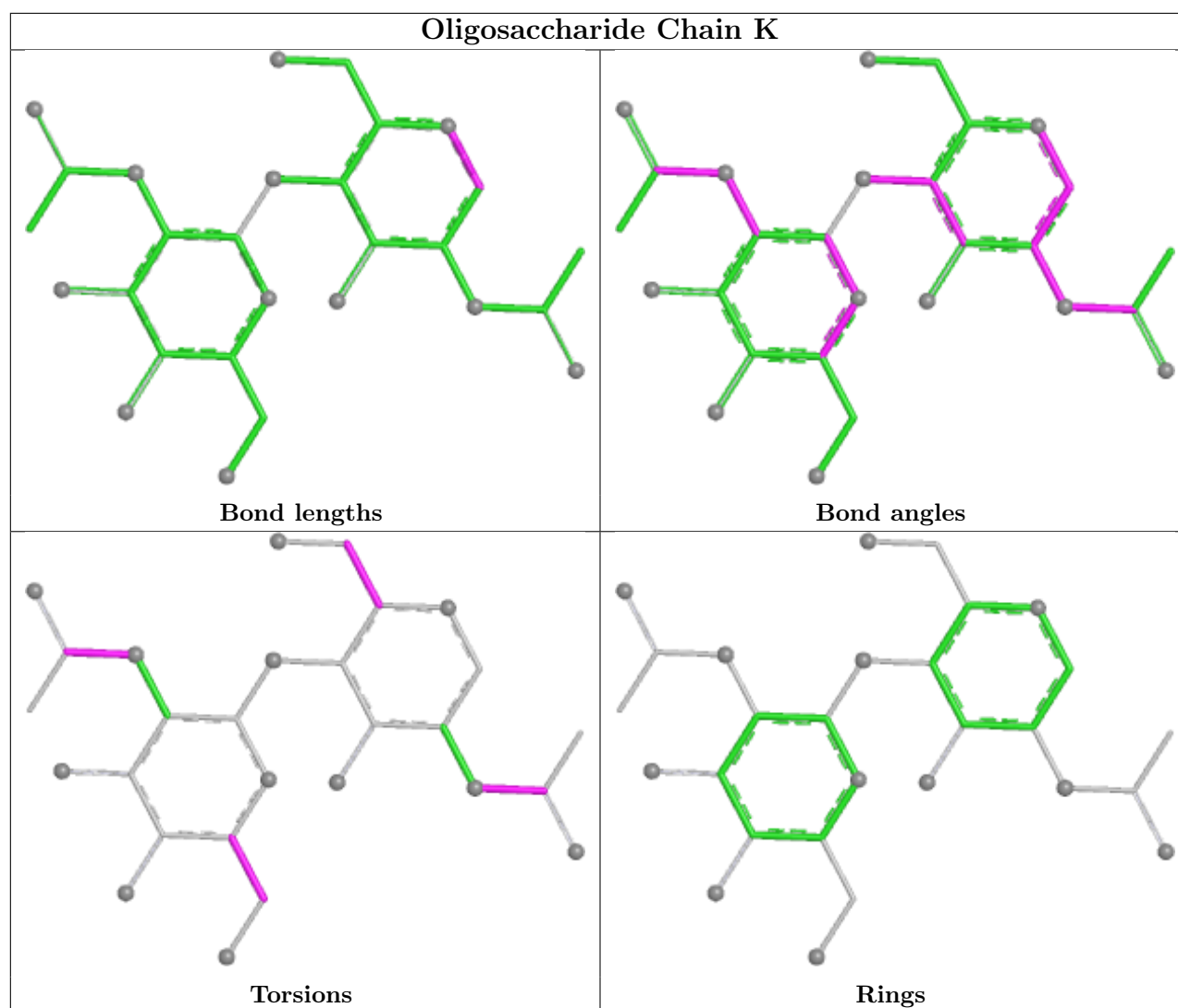
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	K	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.







5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 4 are monoatomic - leaving 7 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	$\# Z > 2$
9	NAG	Y	201	3	14,14,15	0.76	0	17,19,21	2.12	6 (35%)
9	NAG	Z	201	3	14,14,15	0.73	0	17,19,21	1.36	1 (5%)
6	GOL	E	302	-	5,5,5	0.46	0	5,5,5	1.01	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	NAG	W	201	3	14,14,15	0.64	0	17,19,21	1.64	5 (29%)
9	NAG	X	201	3	14,14,15	0.50	0	17,19,21	1.88	2 (11%)
6	GOL	C	301	-	5,5,5	0.71	0	5,5,5	1.48	1 (20%)
6	GOL	A	301	-	5,5,5	0.34	0	5,5,5	0.96	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
9	NAG	Y	201	3	-	0/6/23/26	0/1/1/1
9	NAG	Z	201	3	-	2/6/23/26	0/1/1/1
6	GOL	E	302	-	-	3/4/4/4	-
9	NAG	W	201	3	-	4/6/23/26	0/1/1/1
9	NAG	X	201	3	-	0/6/23/26	0/1/1/1
6	GOL	C	301	-	-	2/4/4/4	-
6	GOL	A	301	-	-	2/4/4/4	-

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	X	201	NAG	C1-O5-C5	6.61	121.04	112.19
9	Y	201	NAG	C1-C2-N2	4.62	117.71	110.43
9	Y	201	NAG	O5-C1-C2	-4.05	105.02	111.29
9	Y	201	NAG	C2-N2-C7	3.90	128.12	122.90
9	W	201	NAG	C3-C4-C5	3.16	115.96	110.23
9	Z	201	NAG	C1-O5-C5	3.07	116.31	112.19
9	W	201	NAG	C4-C3-C2	3.06	115.50	111.02
9	Y	201	NAG	C1-O5-C5	2.92	116.10	112.19
6	C	301	GOL	O3-C3-C2	-2.67	98.35	110.38
9	W	201	NAG	O5-C1-C2	-2.53	107.37	111.29
9	X	201	NAG	C2-N2-C7	2.52	126.28	122.90
9	Y	201	NAG	C4-C3-C2	2.37	114.49	111.02
9	W	201	NAG	C2-N2-C7	2.21	125.87	122.90
9	Y	201	NAG	O7-C7-N2	2.02	125.56	121.98
9	W	201	NAG	C1-C2-N2	2.00	113.58	110.43

There are no chirality outliers.

All (13) torsion outliers are listed below:

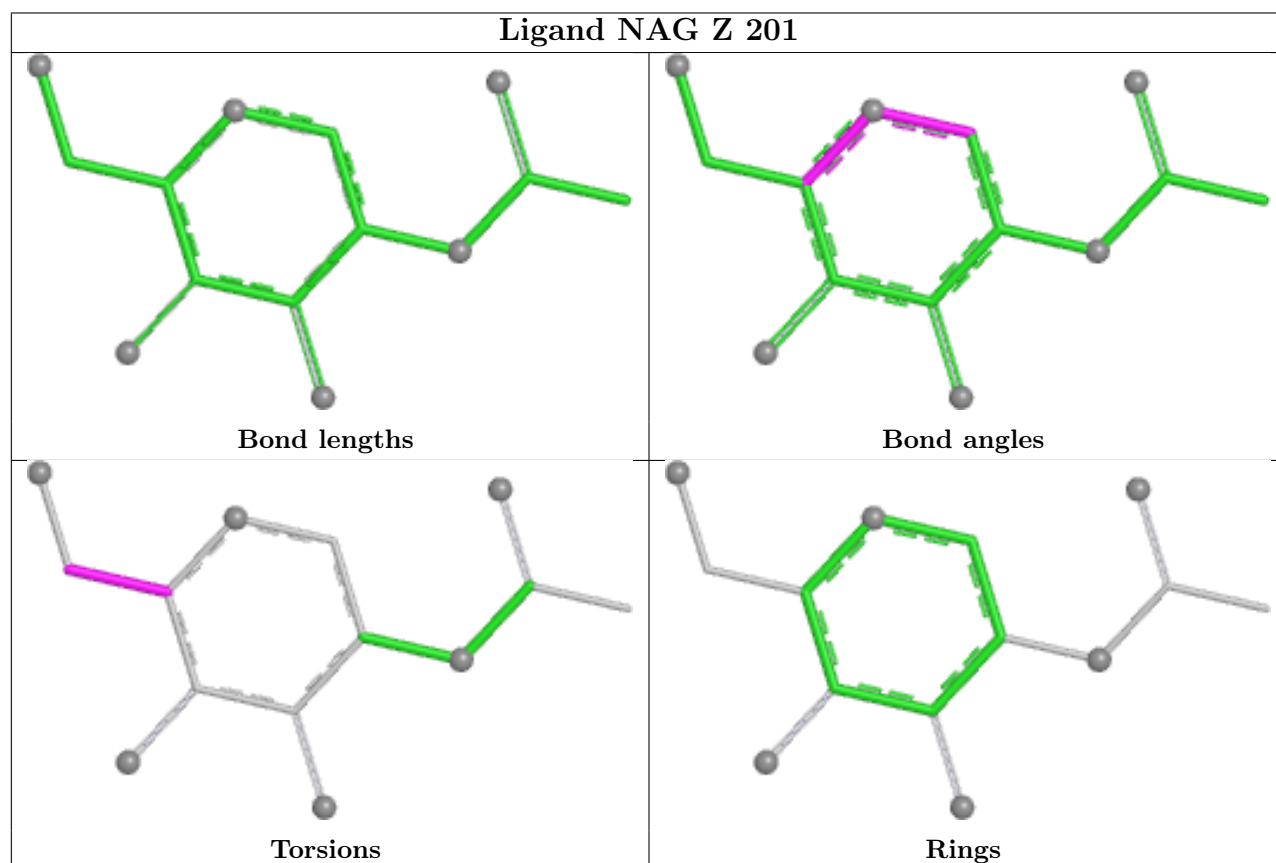
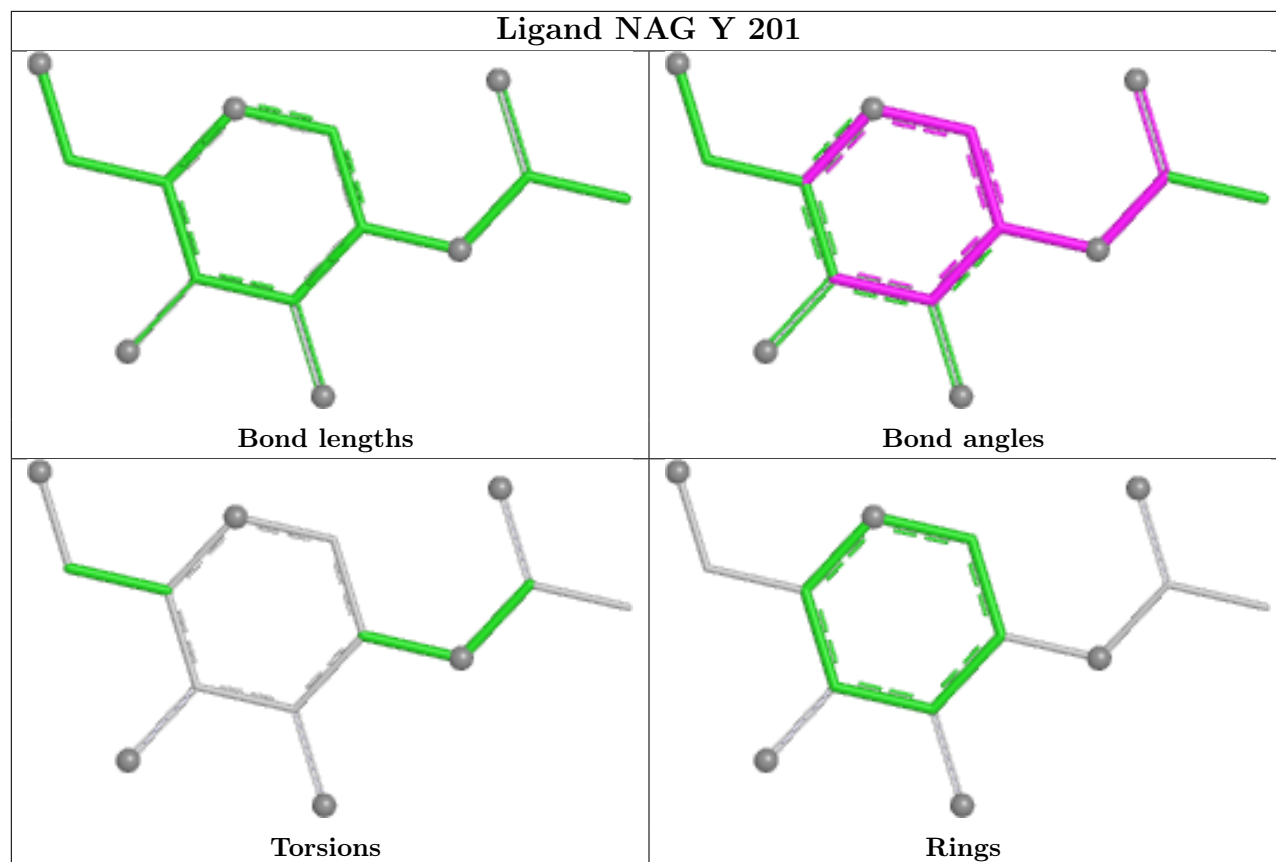
Mol	Chain	Res	Type	Atoms
6	A	301	GOL	C1-C2-C3-O3
6	E	302	GOL	O1-C1-C2-C3
9	Z	201	NAG	C4-C5-C6-O6
9	Z	201	NAG	O5-C5-C6-O6
6	C	301	GOL	C1-C2-C3-O3
6	A	301	GOL	O2-C2-C3-O3
6	C	301	GOL	O2-C2-C3-O3
6	E	302	GOL	O1-C1-C2-O2
9	W	201	NAG	O5-C5-C6-O6
9	W	201	NAG	C3-C2-N2-C7
6	E	302	GOL	C1-C2-C3-O3
9	W	201	NAG	C1-C2-N2-C7
9	W	201	NAG	C4-C5-C6-O6

There are no ring outliers.

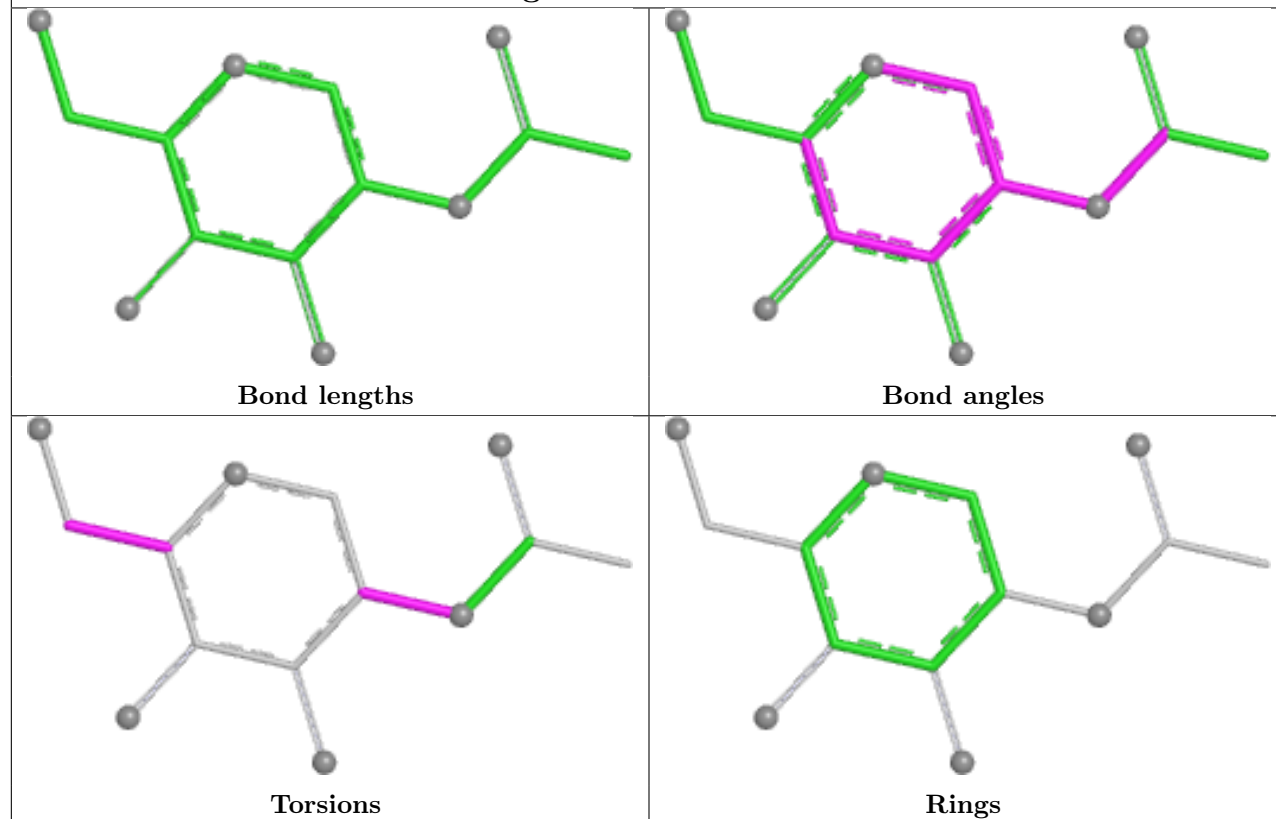
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	Y	201	NAG	1	0
6	A	301	GOL	1	0

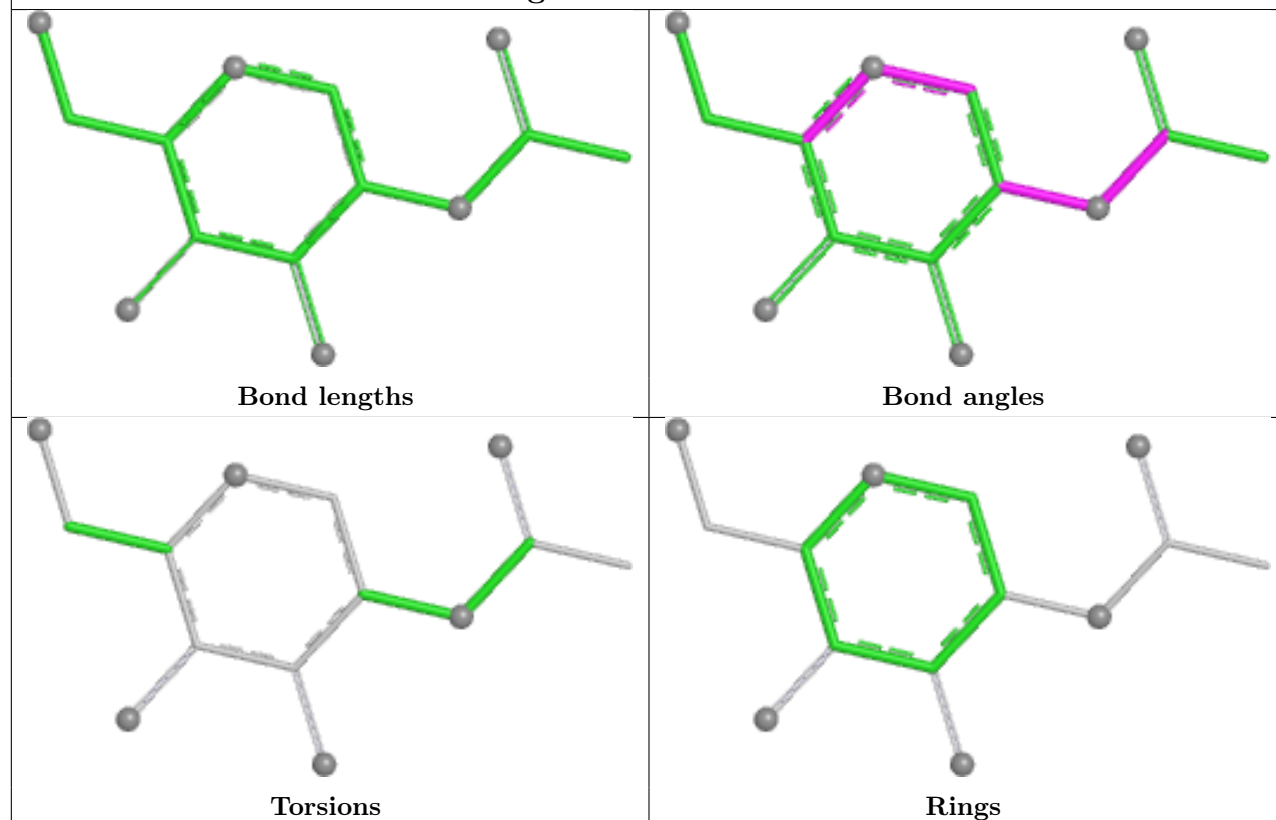
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



Ligand NAG W 201



Ligand NAG X 201



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	214/218 (98%)	0.98	29 (13%) 8 8	26, 36, 62, 76	0
1	C	213/218 (97%)	0.35	6 (2%) 55 57	19, 29, 46, 61	0
1	E	217/218 (99%)	0.54	10 (4%) 38 39	22, 34, 52, 67	0
1	G	213/218 (97%)	1.15	48 (22%) 3 2	22, 38, 66, 74	0
2	B	217/221 (98%)	1.31	39 (17%) 4 4	28, 46, 59, 63	0
2	D	218/221 (98%)	0.51	5 (2%) 61 63	22, 33, 48, 59	0
2	F	217/221 (98%)	0.70	13 (5%) 29 30	25, 36, 57, 62	0
2	H	218/221 (98%)	1.14	46 (21%) 3 3	23, 43, 63, 73	0
3	W	171/175 (97%)	0.64	15 (8%) 17 18	21, 32, 50, 63	0
3	X	165/175 (94%)	1.79	59 (35%) 1 1	29, 48, 97, 102	0
3	Y	160/175 (91%)	1.66	55 (34%) 1 1	28, 46, 102, 109	0
3	Z	171/175 (97%)	0.68	23 (13%) 8 8	19, 33, 57, 81	0
All	All	2394/2456 (97%)	0.93	348 (14%) 7 7	19, 37, 65, 109	0

All (348) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	Y	78	LEU	6.2
3	X	78	LEU	5.8
3	Y	75	LEU	5.3
3	X	32	ALA	5.1
1	A	213	GLU	5.0
3	Y	71	CYS	4.9
3	X	98	TRP	4.9
1	C	69	THR	4.8
3	W	98	TRP	4.8
3	Y	82	VAL	4.8
3	Z	5	LEU	4.8

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Mol	Chain	Res	Type	RSRZ
1	E	27(D)	PHE	4.7
3	Z	37	ASP	4.7
3	Y	132	TYR	4.6
1	C	30	ASP	4.5
3	Y	136	ASN	4.4
1	C	27(B)	VAL	4.4
1	G	150	ILE	4.4
3	W	146	LEU	4.4
3	X	5	LEU	4.4
2	B	64	LYS	4.4
3	X	6	PRO	4.4
3	X	7	LYS	4.3
3	W	173	THR	4.3
3	X	9	VAL	4.2
3	Y	39	SER	4.1
3	Y	77	THR	4.1
3	Y	43	PHE	4.0
2	B	73	THR	4.0
3	X	48	LEU	4.0
3	Y	6	PRO	4.0
3	X	8	ALA	4.0
3	Z	33	TYR	3.9
3	Z	98	TRP	3.9
3	Y	7	LYS	3.9
1	G	182	THR	3.9
3	Y	40	THR	3.9
3	Y	90	TRP	3.9
1	G	27(B)	VAL	3.9
1	G	129	GLY	3.9
1	G	125	LEU	3.9
2	H	210	ILE	3.9
1	A	27(B)	VAL	3.8
2	H	123	PRO	3.8
1	G	184	ASP	3.8
3	X	82	VAL	3.8
1	C	67	SER	3.8
3	X	50	SER	3.8
1	A	27(C)	ASP	3.7
1	G	27(C)	ASP	3.7
1	G	181	LEU	3.7
2	H	113	ALA	3.7
3	Y	42	TRP	3.7

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Mol	Chain	Res	Type	RSRZ
3	Z	51	SER	3.7
3	Z	35	PRO	3.7
1	G	192	TYR	3.7
2	H	157	GLY	3.7
3	Y	8	ALA	3.7
1	A	194	CYS	3.6
3	X	49	ILE	3.6
3	X	47	SER	3.6
3	Y	118	LEU	3.6
3	Y	41	GLN	3.6
2	B	121	VAL	3.6
3	Y	29	CYS	3.6
1	E	2	ILE	3.5
3	Y	73	THR	3.5
1	G	194	CYS	3.5
3	Z	50	SER	3.5
3	Y	98	TRP	3.5
3	Y	72	GLN	3.5
3	X	100	PHE	3.5
3	Y	47	SER	3.5
3	Y	48	LEU	3.4
3	Y	69	TYR	3.4
1	G	126	THR	3.4
1	G	29	GLY	3.4
3	X	71	CYS	3.4
3	Y	57	PHE	3.4
3	W	134	HIS	3.4
3	X	38	GLN	3.4
2	H	206	VAL	3.3
3	Y	53	ALA	3.3
1	A	1	ALA	3.3
2	B	62	ALA	3.3
3	Y	49	ILE	3.3
3	Y	133	PHE	3.3
1	A	163	TRP	3.2
3	X	39	SER	3.2
3	X	44	HIS	3.2
3	X	51	SER	3.1
1	G	130	ALA	3.1
2	H	174	LEU	3.1
3	Z	135	HIS	3.1
3	Y	46	GLU	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	212	ASN	3.1
1	G	210	ASN	3.1
2	B	170	LEU	3.1
3	X	73	THR	3.1
2	H	159	LEU	3.0
1	E	213	GLU	3.0
3	W	174	GLN	3.0
3	X	42	TRP	3.0
3	X	99	VAL	3.0
3	X	81	PRO	3.0
3	X	88	ILE	3.0
3	X	172	ILE	3.0
2	H	122	TYR	3.0
2	H	204	THR	3.0
1	G	211	ARG	3.0
1	G	163	TRP	3.0
2	H	144	GLY	2.9
2	F	132	THR	2.9
3	Z	38	GLN	2.9
3	Z	118	LEU	2.9
2	F	130	ALA	2.9
1	G	180	THR	2.9
3	X	27	LEU	2.9
3	X	43	PHE	2.9
3	W	4	ASP	2.9
2	H	121	VAL	2.9
3	Y	119	HIS	2.9
3	W	172	ILE	2.9
3	Y	88	ILE	2.9
2	H	110	THR	2.9
3	Y	145	THR	2.9
2	H	152	VAL	2.9
2	H	127	GLY	2.9
2	D	53	TRP	2.9
3	Z	52	GLN	2.9
3	Z	136	ASN	2.9
1	G	1	ALA	2.9
3	X	144	ALA	2.9
3	Y	155	ARG	2.8
3	Z	134	HIS	2.8
3	X	41	GLN	2.8
3	Y	9	VAL	2.8

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Mol	Chain	Res	Type	RSRZ
3	Y	135	HIS	2.8
2	H	138	LEU	2.8
1	G	191	SER	2.8
2	B	74	SER	2.8
3	W	118	LEU	2.8
2	B	145	TYR	2.8
2	H	212	PRO	2.8
1	G	202	THR	2.8
1	G	67	SER	2.8
1	G	118	PHE	2.7
2	H	169	VAL	2.7
3	X	40	THR	2.7
1	A	68	GLY	2.7
1	G	128	GLY	2.7
1	G	190	ASN	2.7
3	Y	67	GLY	2.7
3	W	119	HIS	2.7
3	X	72	GLN	2.7
2	D	2	VAL	2.7
2	H	136	VAL	2.7
3	X	10	VAL	2.7
2	H	129	ALA	2.7
2	H	151	THR	2.7
1	G	157	ASN	2.7
3	X	106	ILE	2.7
1	G	119	PRO	2.7
2	B	177	LEU	2.7
2	H	146	PHE	2.7
3	X	29	CYS	2.7
1	E	26	SER	2.6
3	X	150	GLY	2.6
3	Z	175	GLY	2.6
1	A	190	ASN	2.6
1	E	212	ASN	2.6
1	E	153	SER	2.6
3	X	171	THR	2.6
3	Y	79	SER	2.6
1	G	209	PHE	2.6
1	G	68	GLY	2.6
1	G	186	TYR	2.6
1	G	189	HIS	2.6
1	A	11	LEU	2.6

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Mol	Chain	Res	Type	RSRZ
2	B	110	THR	2.6
3	X	74	GLN	2.6
2	B	82(A)	ALA	2.6
3	X	113	TRP	2.6
3	Y	113	TRP	2.6
2	B	122	TYR	2.6
3	X	56	TYR	2.6
3	X	69	TYR	2.6
3	Y	80	ASP	2.6
3	Y	70	ARG	2.6
2	B	118	PRO	2.6
3	X	141	ILE	2.6
2	D	63	LEU	2.6
2	F	133	ASN	2.6
3	Y	127	GLY	2.6
3	Y	158	PHE	2.5
2	B	63	LEU	2.5
2	F	213	ARG	2.5
2	F	1	GLN	2.5
1	G	27(A)	SER	2.5
3	Y	50	SER	2.5
1	E	27(C)	ASP	2.5
1	G	69	THR	2.5
2	B	151	THR	2.5
2	H	173	ASP	2.5
3	X	119	HIS	2.5
1	A	210	ASN	2.5
2	F	134	SER	2.5
3	X	75	LEU	2.5
2	B	194	THR	2.5
1	G	156	GLN	2.5
2	B	212	PRO	2.4
1	G	131	SER	2.4
2	D	213	ARG	2.4
1	E	163	TRP	2.4
1	A	209	PHE	2.4
2	F	185	SER	2.4
3	W	100	PHE	2.4
3	Y	44	HIS	2.4
1	A	148	TRP	2.4
2	B	15	SER	2.4
1	E	29	GLY	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	156	GLN	2.4
3	Z	132	TYR	2.4
2	H	124	LEU	2.4
2	H	85	ALA	2.4
2	H	203	SER	2.4
1	A	27	GLN	2.4
2	B	1	GLN	2.4
2	B	111	VAL	2.4
2	B	150	VAL	2.4
2	H	211	VAL	2.4
1	G	179	LEU	2.3
2	H	198	ALA	2.3
3	X	53	ALA	2.3
2	H	160	SER	2.3
2	B	147	PRO	2.3
3	X	132	TYR	2.3
1	A	125	LEU	2.3
2	B	174	LEU	2.3
3	Z	48	LEU	2.3
3	W	135	HIS	2.3
3	Z	119	HIS	2.3
2	F	127	GLY	2.3
2	H	126	PRO	2.3
2	H	188	TRP	2.3
3	Y	81	PRO	2.3
3	W	99	VAL	2.3
2	B	146	PHE	2.3
3	X	77	THR	2.3
3	Y	134	HIS	2.3
2	H	145	TYR	2.3
2	H	175	TYR	2.3
2	B	203	SER	2.3
2	D	201	ALA	2.3
3	Y	58	ILE	2.3
3	X	90	TRP	2.3
2	F	73	THR	2.3
3	W	171	THR	2.3
1	G	153	SER	2.3
3	X	118	LEU	2.3
3	X	146	LEU	2.3
2	B	127	GLY	2.2
1	A	69	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	G	132	VAL	2.2
1	G	117	ILE	2.2
3	Z	88	ILE	2.2
1	A	40	PRO	2.2
3	X	30	GLN	2.2
1	G	187	GLU	2.2
2	B	84	THR	2.2
2	H	165	THR	2.2
3	Y	64	ASP	2.2
2	B	206	VAL	2.2
3	Y	66	SER	2.2
3	Y	76	SER	2.2
3	X	11	PHE	2.2
3	X	52	GLN	2.2
1	A	182	THR	2.2
1	G	52	SER	2.2
3	Z	34	SER	2.2
2	B	82(C)	VAL	2.2
3	Y	99	VAL	2.2
3	Z	99	VAL	2.2
3	X	127	GLY	2.2
1	A	181	LEU	2.2
3	Y	62	THR	2.1
2	H	75	SER	2.1
1	C	68	GLY	2.1
1	A	179	LEU	2.1
2	H	12	LEU	2.1
2	H	177	LEU	2.1
1	A	70	ASP	2.1
2	B	19	SER	2.1
2	B	171	GLN	2.1
3	Z	174	GLN	2.1
1	A	134	CYS	2.1
1	G	146	VAL	2.1
2	B	211	VAL	2.1
2	H	181	VAL	2.1
3	Y	63	VAL	2.1
3	W	155	ARG	2.1
3	X	153	PHE	2.1
3	Y	59	ASP	2.1
2	H	154	TRP	2.1
1	A	191	SER	2.1

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Mol	Chain	Res	Type	RSRZ
2	B	65	SER	2.1
1	A	147	LYS	2.1
1	G	197	THR	2.1
1	C	157	ASN	2.1
1	A	129	GLY	2.1
2	F	33	GLY	2.1
3	X	135	HIS	2.1
1	G	134	CYS	2.1
2	H	150	VAL	2.1
2	B	85	ALA	2.1
1	A	150	ILE	2.1
2	B	190	SER	2.1
2	H	128	SER	2.1
2	H	176	THR	2.1
3	W	102	GLU	2.1
3	X	63	VAL	2.0
2	H	141	LEU	2.0
1	E	156	GLN	2.0
2	B	27	PHE	2.0
2	B	100	PHE	2.0
2	H	161	SER	2.0
3	X	54	SER	2.0
2	B	187	THR	2.0
2	B	210	ILE	2.0
3	Y	170	ILE	2.0
3	Z	40	THR	2.0
2	F	188	TRP	2.0
3	X	129	GLY	2.0
1	A	12	ALA	2.0
1	G	115	VAL	2.0
1	G	183	LYS	2.0
1	G	185	GLU	2.0
1	A	204	PRO	2.0
1	G	206	VAL	2.0
2	B	189	PRO	2.0
2	H	114	ALA	2.0
2	H	163	VAL	2.0
3	X	61	ALA	2.0
3	Z	6	PRO	2.0
1	G	122	SER	2.0
2	F	29	LEU	2.0
2	F	63	LEU	2.0

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Mol	Chain	Res	Type	RSRZ
2	H	180	SER	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](#)

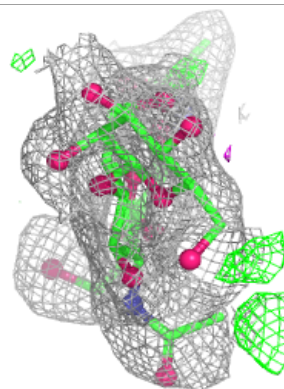
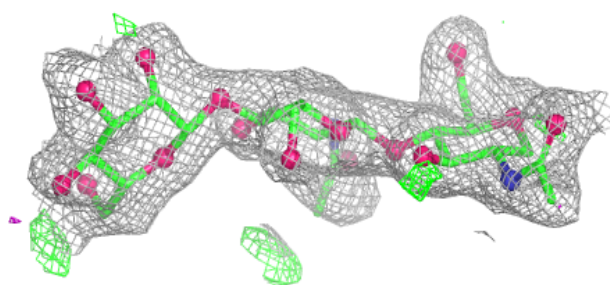
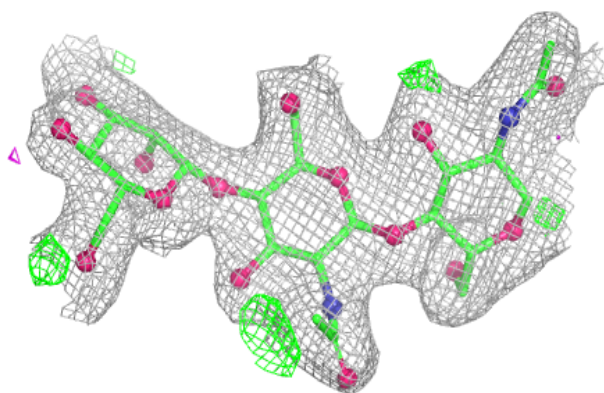
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	NAG	I	1	14/15	-	-	30,36,42,43	0
4	NAG	I	2	14/15	-	-	41,48,52,54	0
4	BMA	I	3	11/12	-	-	51,53,59,59	0
4	NAG	J	1	14/15	-	-	67,70,74,77	0
4	NAG	J	2	14/15	-	-	69,75,81,87	0
4	BMA	J	3	11/12	-	-	88,91,93,94	0
4	NAG	L	1	14/15	-	-	41,45,54,55	0
4	NAG	L	2	14/15	-	-	52,57,64,70	0
4	BMA	L	3	11/12	-	-	71,78,81,84	0
5	NAG	K	1	14/15	-	-	67,69,74,75	0
5	NAG	K	2	14/15	-	-	69,71,76,76	0

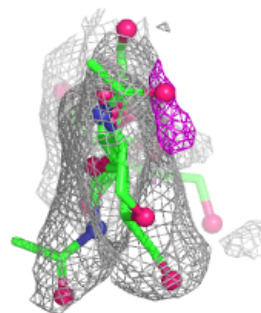
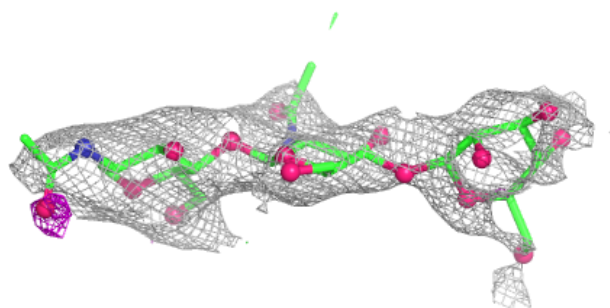
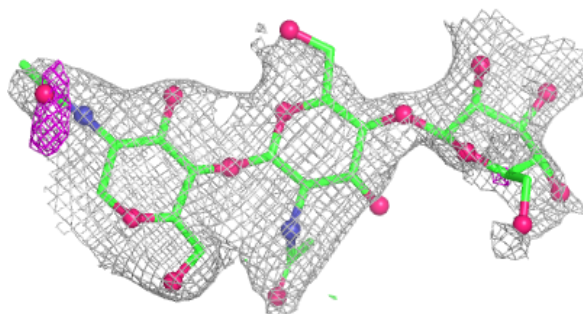
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain I:

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

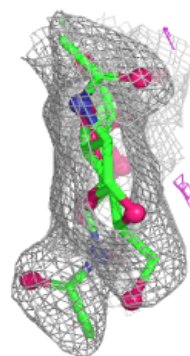
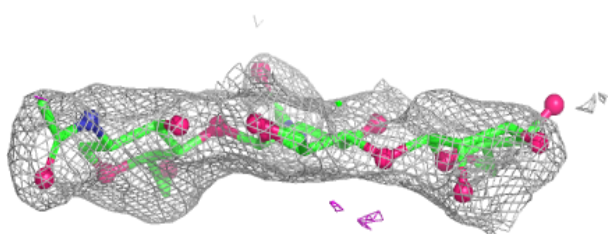
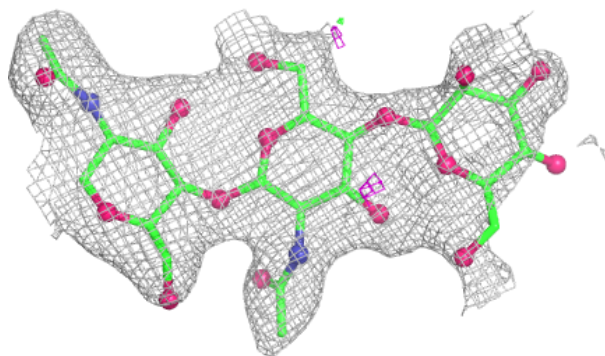
**Electron density around Chain J:**

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

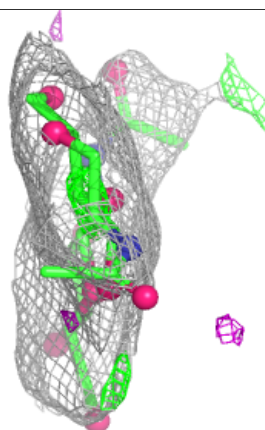
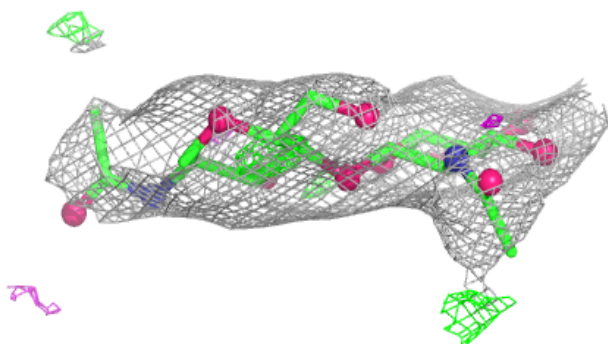
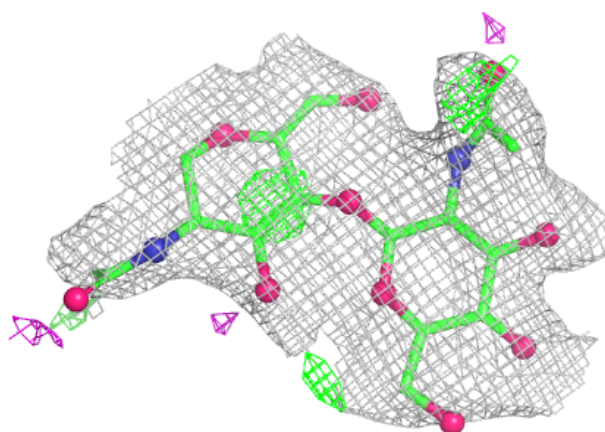


Electron density around Chain L:

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

**Electron density around Chain K:**

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



6.4 Ligands

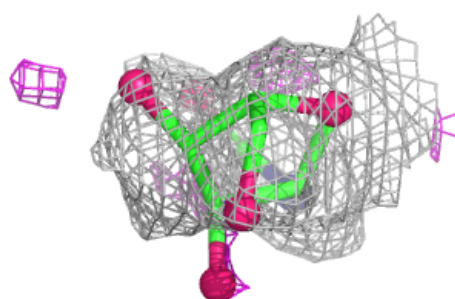
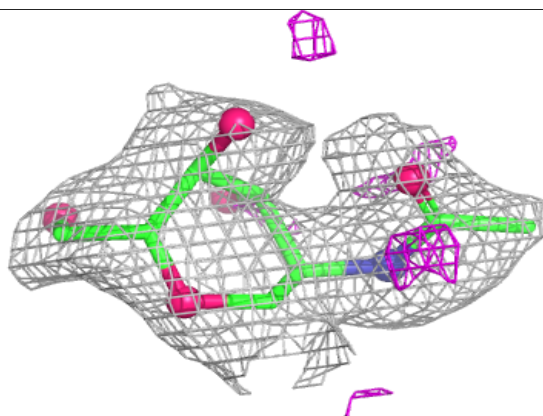
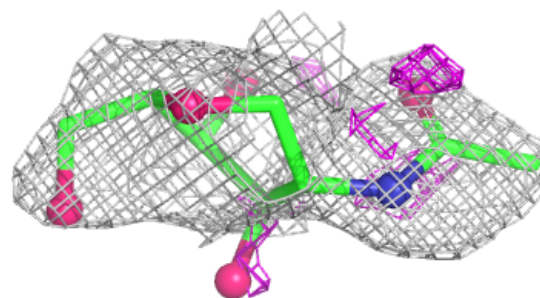
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
7	NA	G	301	1/1	0.66	0.19	50,50,50,50	0
9	NAG	W	201	14/15	0.67	0.16	47,57,65,68	0
9	NAG	Z	201	14/15	0.76	0.14	33,40,52,58	0
9	NAG	Y	201	14/15	0.77	0.14	44,56,60,60	0
7	NA	H	301	1/1	0.81	0.16	51,51,51,51	0
6	GOL	A	301	6/6	0.83	0.13	33,34,34,35	0
6	GOL	E	302	6/6	0.84	0.24	35,45,60,142	0
9	NAG	X	201	14/15	0.84	0.11	40,49,61,61	0
7	NA	E	301	1/1	0.85	0.13	61,61,61,61	0
6	GOL	C	301	6/6	0.88	0.27	38,42,60,142	0
8	CL	G	302	1/1	0.92	0.33	59,59,59,59	0

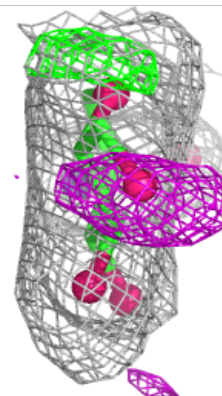
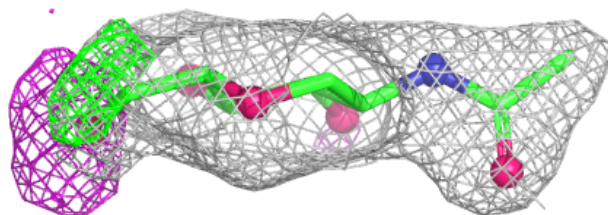
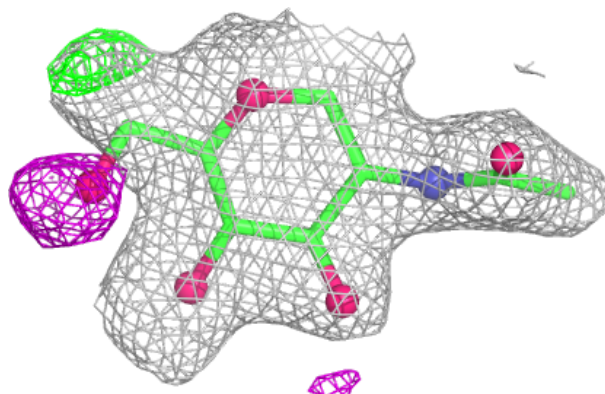
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NAG W 201:

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

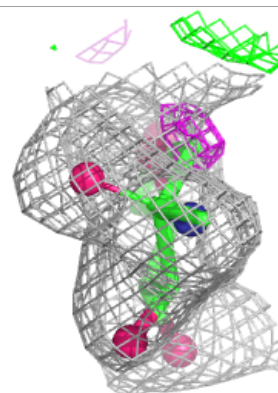
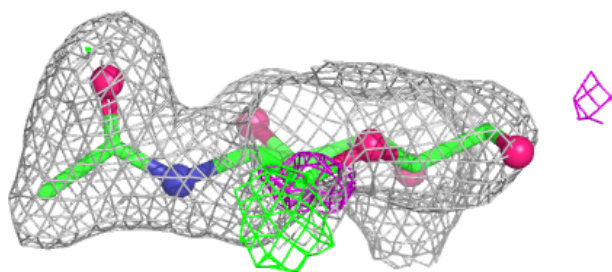
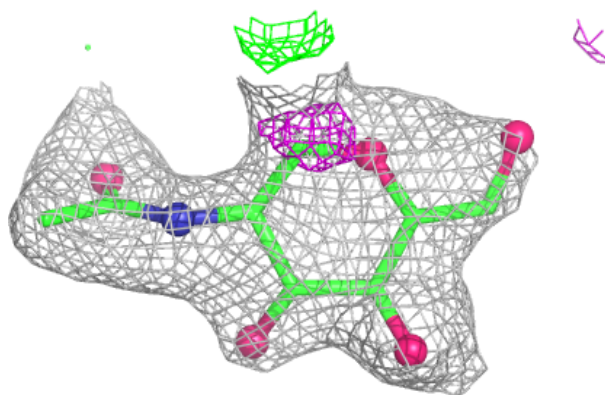
**Electron density around NAG Z 201:**

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

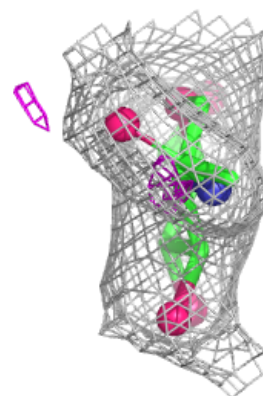
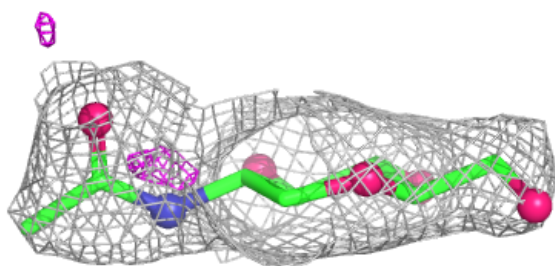
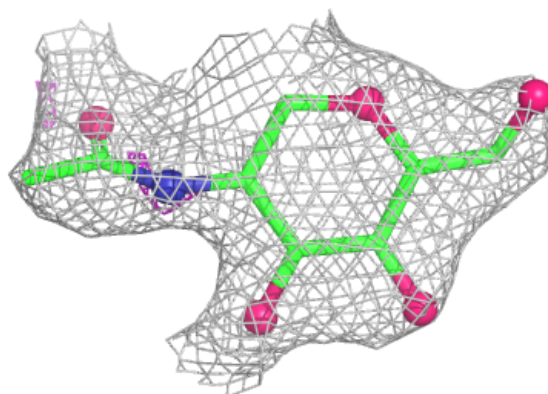


Electron density around NAG Y 201:

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

**Electron density around NAG X 201:**

$2mF_o-DF_c$ (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.