



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 03:07 AM UTC

PDB ID : 8V9Q / pdb_00008v9q
Title : Crystal structure of mGalNAc-T1 in complex with the mucin glycopeptide Muc5AC-13, Mn²⁺, and UDP.
Authors : Samara, N.L.; Collette, A.M.
Deposited on : 2023-12-08
Resolution : 2.29 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	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

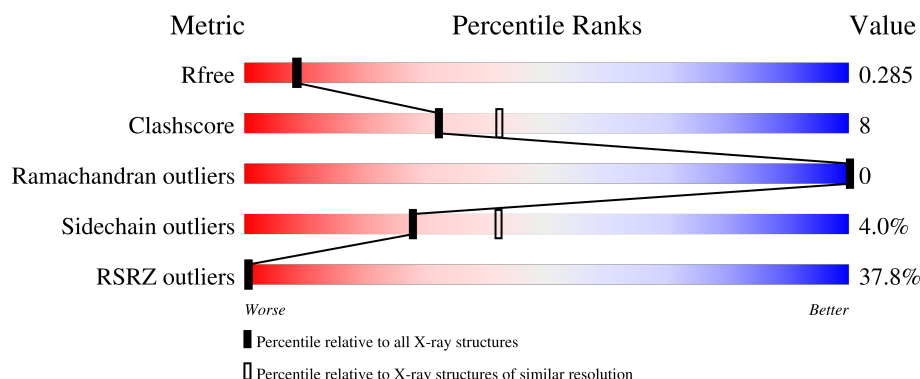
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.29 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.



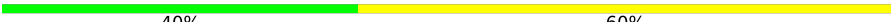

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	559	<div> <div>2%</div> <div>77%</div> <div>11%</div> <div>11%</div> </div>
1	B	559	<div> <div>61%</div> <div>61%</div> <div>18%</div> <div>20%</div> </div>
2	D	16	<div> <div>6%</div> <div>100%</div> </div>
2	F	16	<div> <div>94%</div> <div>81%</div> <div>12%</div> <div>6%</div> </div>
2	H	16	<div> <div>38%</div> <div>6%</div> <div>25%</div> <div>12%</div> <div>56%</div> </div>

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Mol	Chain	Length	Quality of chain
3	X	5	 40%60%
4	C	2	 100%

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 16274 atoms, of which 7964 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.

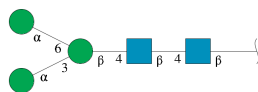
- Molecule 1 is a protein called Polypeptide N-acetylgalactosaminyltransferase 1 soluble form.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	500	Total	C	H	N	O	S	0	0	0
			7974	2543	3946	717	739	29			
1	B	449	Total	C	H	N	O	S	0	0	0
			7227	2302	3579	656	664	26			

- Molecule 2 is a protein called Mucin-5AC.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	16	Total	C	H	N	O	0	0	0
			207	63	103	16	25			
2	F	15	Total	C	H	N	O	0	0	0
			193	59	96	15	23			
2	H	7	Total	C	H	N	O	0	0	0
			73	26	28	7	12			

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



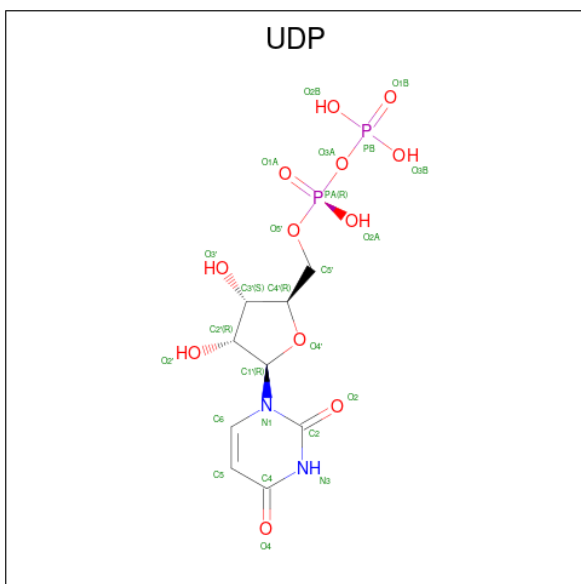
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	X	5	Total	C	H	N	O	0	0	0
			115	34	54	2	25			

- Molecule 4 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
4	C	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			

- Molecule 5 is URIDINE-5'-DIPHOSPHATE (CCD ID: UDP) (formula: $C_9H_{14}N_2O_{12}P_2$) (labeled as "Ligand of Interest" by depositor).



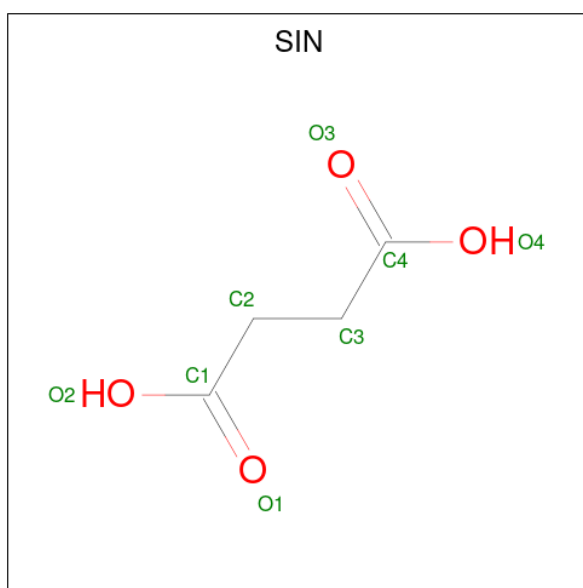
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	H	N	O	0	0
			36	9	11	2	12		
5	B	1	Total	C	H	N	O	0	0
			36	9	11	2	12		

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			13	3	7	3		
6	A	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 7 is SUCCINIC ACID (CCD ID: SIN) (formula: $C_4H_6O_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	0
			12	4	4	4		

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

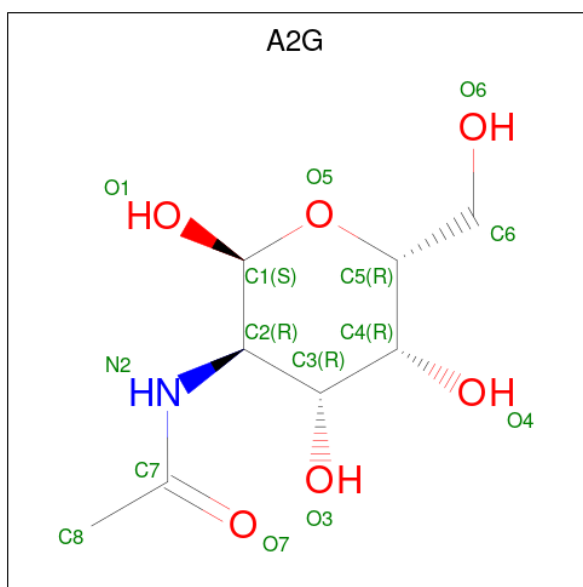


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total C H O 10 2 6 2	0	0
8	A	1	Total C H O 10 2 6 2	0	0
8	A	1	Total C H O 9 2 5 2	0	0
8	D	1	Total C H O 10 2 6 2	0	0
8	D	1	Total C O 4 2 2	0	0

- Molecule 9 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn) (labeled as "Ligand of Interest" by depositor).

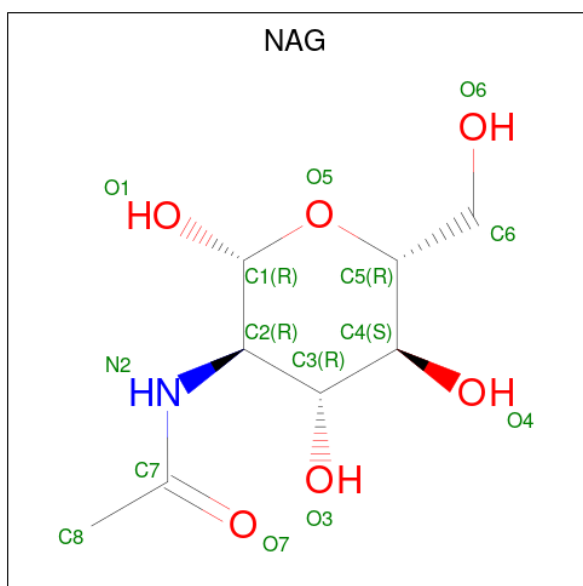
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total Mn 1 1	0	0
9	B	1	Total Mn 1 1	0	0

- Molecule 10 is 2-acetamido-2-deoxy-alpha-D-galactopyranose (CCD ID: A2G) (formula: C₈H₁₅NO₆) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
10	D	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
10	F	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
10	H	1	Total	C	H	N	O	0	0
			27	8	13	1	5		

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
11	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
11	B	1	Total	C	H	N	O	0	0
			28	8	14	1	5		

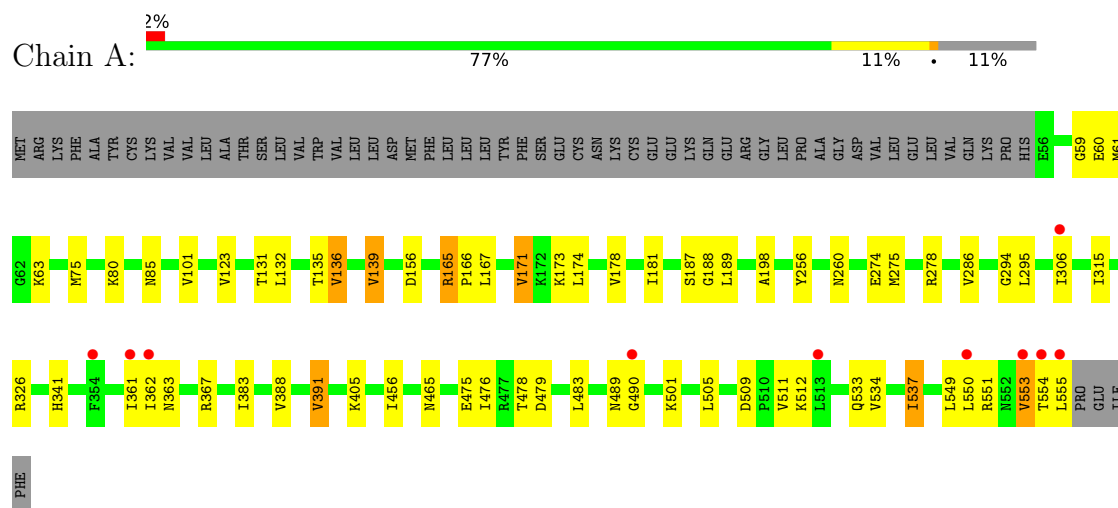
- Molecule 12 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	132	Total	O	0	0
			132	132		
12	D	4	Total	O	0	0
			4	4		
12	B	1	Total	O	0	0
			1	1		

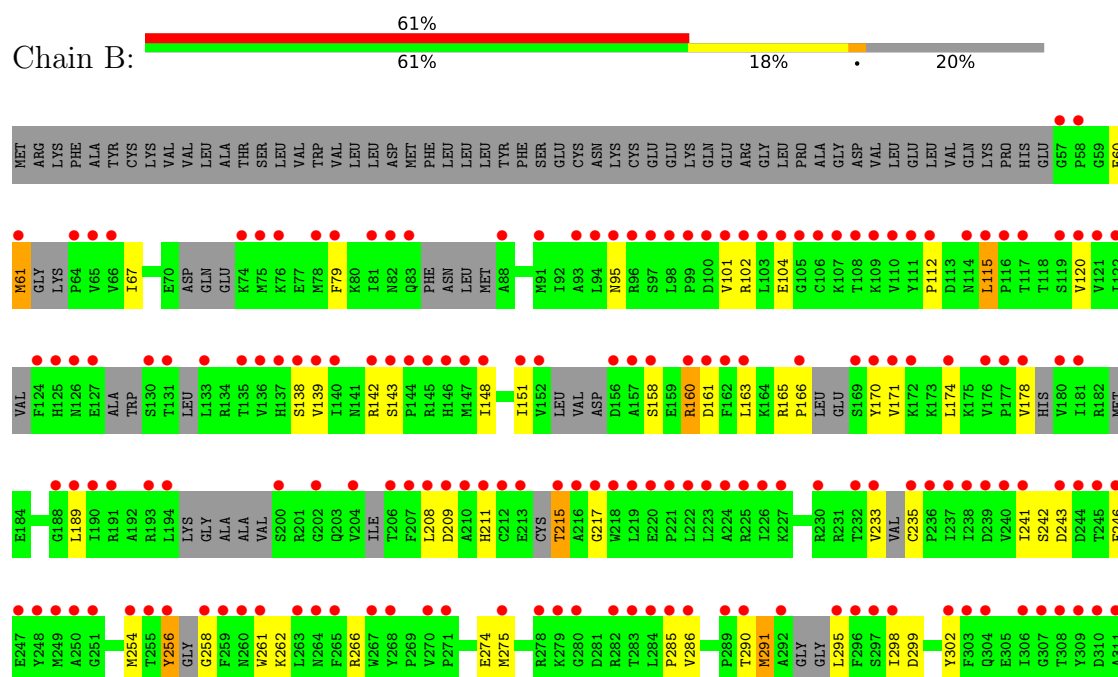
3 Residue-property plots

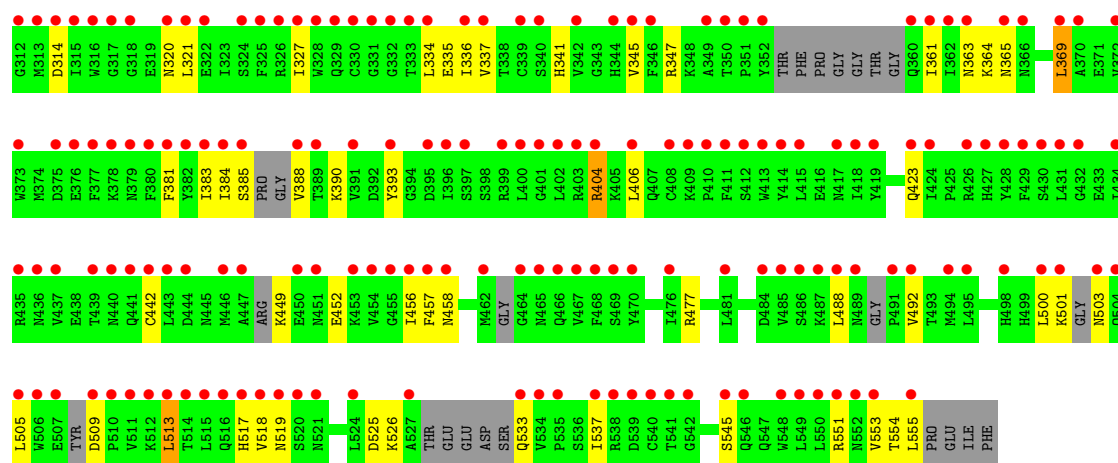
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Polypeptide N-acetylgalactosaminyltransferase 1 soluble form

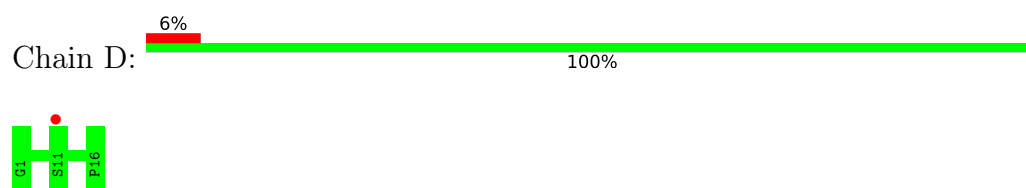


- Molecule 1: Polypeptide N-acetylgalactosaminyltransferase 1 soluble form

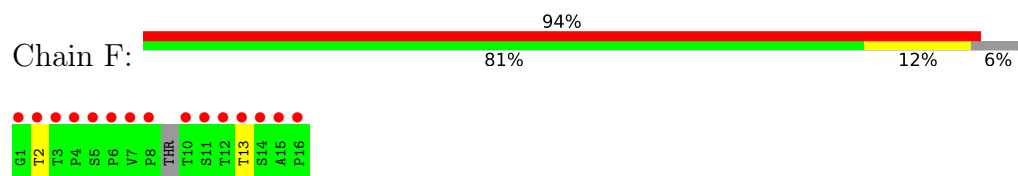




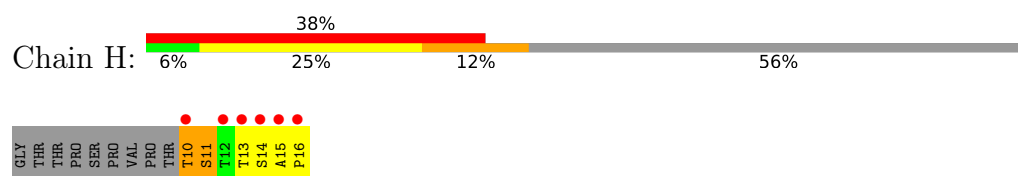
- Molecule 2: Mucin-5AC



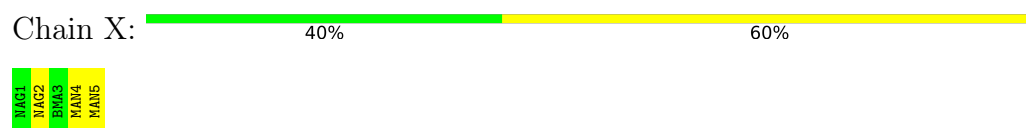
- Molecule 2: Mucin-5AC



- Molecule 2: Mucin-5AC



- Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



MAG
MAG2

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.63Å 72.76Å 148.50Å 90.00° 95.44° 90.00°	Depositor
Resolution (Å)	29.90 – 2.29 29.90 – 2.29	Depositor EDS
% Data completeness (in resolution range)	96.6 (29.90-2.29) 96.5 (29.90-2.29)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.30 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.248 , 0.278 0.260 , 0.285	Depositor DCC
R_{free} test set	2757 reflections (4.84%)	wwPDB-VP
Wilson B-factor (Å ²)	40.2	Xtriage
Anisotropy	0.096	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 64.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	16274	wwPDB-VP
Average B, all atoms (Å ²)	89.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.65% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A2G, UDP, BMA, EDO, SIN, GOL, NAG, MAN, MN

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	0.14	0/4119	0.38	0/5570
1	B	0.12	0/3705	0.37	0/4970
2	D	0.10	0/107	0.39	0/151
2	F	0.12	0/99	0.38	0/138
2	H	0.16	0/45	0.35	0/62
All	All	0.13	0/8075	0.38	0/10891

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	551	ARG	Sidechain
1	B	551	ARG	Sidechain

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	4028	3946	3983	42	1
1	B	3648	3579	3604	79	0
2	D	104	103	103	0	0
2	F	97	96	95	3	0
2	H	45	28	41	6	0
3	X	61	54	52	0	0
4	C	28	25	25	0	0
5	A	25	11	10	2	0
5	B	25	11	10	3	0
6	A	12	15	16	0	0
7	A	8	4	4	0	0
8	A	12	17	18	0	0
8	D	8	6	12	0	0
9	A	1	0	0	0	0
9	B	1	0	0	0	0
10	D	14	14	12	0	0
10	F	14	14	12	2	0
10	H	14	13	12	3	0
11	B	28	28	26	0	0
12	A	132	0	0	3	0
12	B	1	0	0	0	0
12	D	4	0	0	0	0
All	All	8310	7964	8035	129	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (129) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:158:SER:HB3	1:B:163:LEU:HD13	1.52	0.89
1:B:258:GLY:N	1:B:290:THR:HG1	1.69	0.88
1:A:509:ASP:OD2	1:A:512:LYS:HE2	1.87	0.74
1:B:298:ILE:HD11	1:B:302:TYR:HD2	1.54	0.73
1:B:404:ARG:HE	1:B:404:ARG:HA	1.60	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:60:GLU:O	1:B:61:MET:HB2	1.95	0.65
1:B:160:ARG:HB2	1:B:163:LEU:HD12	1.79	0.65
1:A:274:GLU:HG2	1:A:286:VAL:HG13	1.81	0.63
2:H:13:THR:HA	10:H:101:A2G:N2	2.14	0.62
1:B:314:ASP:OD1	1:B:365:ASN:ND2	2.33	0.62
1:B:233:VAL:HG21	1:B:327:ILE:HD13	1.82	0.61
1:A:465:ASN:H	10:H:101:A2G:H8A	1.66	0.60
1:A:490:GLY:O	1:A:537:ILE:HD11	2.02	0.60
1:B:423:GLN:OE1	1:B:477:ARG:NH2	2.34	0.59
1:A:501:LYS:HD3	1:A:505:LEU:HD13	1.85	0.58
1:B:364:LYS:HG3	1:B:393:TYR:HA	1.85	0.58
1:B:235:CYS:N	1:B:335:GLU:O	2.38	0.57
1:A:533:GLN:O	12:A:701:HOH:O	2.18	0.56
1:B:449:LYS:HG2	1:B:452:GLU:CD	2.30	0.56
1:B:120:VAL:HG13	1:B:208:LEU:HD12	1.85	0.56
1:B:385:SER:C	1:B:388:VAL:HG12	2.30	0.56
1:A:388:VAL:O	1:A:391:VAL:HG13	2.07	0.55
1:A:132:LEU:O	1:A:136:VAL:HG13	2.06	0.55
1:B:258:GLY:N	1:B:290:THR:OG1	2.37	0.55
1:A:275:MET:SD	1:A:278:ARG:NH2	2.79	0.55
1:B:369:LEU:C	1:B:369:LEU:HD23	2.32	0.55
1:B:274:GLU:HG2	1:B:286:VAL:HG13	1.88	0.54
1:B:505:LEU:HD22	1:B:518:VAL:CG1	2.37	0.54
1:B:120:VAL:CG1	1:B:208:LEU:HD12	2.38	0.54
1:A:476:ILE:HG21	1:A:483:LEU:HD12	1.89	0.54
1:A:59:GLY:HA2	1:A:63:LYS:O	2.08	0.53
1:B:142:ARG:HD3	1:B:215:THR:C	2.34	0.52
1:B:347:ARG:H	2:F:2:THR:HG21	1.74	0.52
1:A:60:GLU:O	1:A:61:MET:HB2	2.10	0.51
1:A:135:THR:O	1:A:139:VAL:HG13	2.11	0.51
1:A:260:ASN:HB2	1:A:479:ASP:OD1	2.10	0.51
1:B:233:VAL:HG22	1:B:298:ILE:HD13	1.91	0.51
1:B:505:LEU:HD22	1:B:518:VAL:HG11	1.92	0.51
1:B:526:LYS:HG2	1:B:545:SER:HB2	1.92	0.51
1:B:112:PRO:O	1:B:115:LEU:HD13	2.10	0.51
1:A:188:GLY:HA3	12:A:815:HOH:O	2.11	0.51
1:B:161:ASP:N	1:B:161:ASP:OD1	2.43	0.51
1:A:405:LYS:C	1:A:405:LYS:HD3	2.36	0.51
1:A:188:GLY:HA2	1:A:315:ILE:HG13	1.92	0.50
1:A:156:ASP:OD2	5:A:601:UDP:N3	2.39	0.50
1:B:139:VAL:O	1:B:143:SER:OG	2.13	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:254:MET:HE1	1:B:275:MET:SD	2.51	0.50
1:B:158:SER:HB3	1:B:163:LEU:CD1	2.34	0.50
1:B:112:PRO:HG2	1:B:115:LEU:HD11	1.94	0.50
1:A:171:VAL:HG13	1:A:178:VAL:HB	1.94	0.50
1:B:242:SER:O	1:B:246:PHE:HA	2.12	0.50
1:B:363:ASN:HD22	1:B:381:PHE:HZ	1.59	0.49
1:B:383:ILE:HD11	1:B:553:VAL:HG11	1.94	0.49
1:B:501:LYS:O	1:B:503:ASN:N	2.45	0.49
1:B:235:CYS:HB2	1:B:336:ILE:HD13	1.94	0.49
1:B:361:ILE:HD11	1:B:388:VAL:HG11	1.95	0.49
1:B:500:LEU:O	1:B:501:LYS:C	2.56	0.48
1:A:306:ILE:O	1:A:326:ARG:HD2	2.14	0.48
1:B:165:ARG:N	1:B:166:PRO:CD	2.76	0.48
1:A:383:ILE:HD11	1:A:553:VAL:CG1	2.44	0.48
1:A:554:THR:O	1:A:555:LEU:C	2.56	0.48
1:B:525:ASP:OD1	1:B:526:LYS:N	2.43	0.48
1:A:362:ILE:HG22	1:A:363:ASN:H	1.79	0.47
1:B:361:ILE:CD1	1:B:388:VAL:HG11	2.44	0.47
1:B:262:LYS:N	1:B:384:ILE:HD11	2.29	0.47
1:B:321:LEU:HD12	1:B:321:LEU:H	1.81	0.46
1:A:174:LEU:HD12	1:A:178:VAL:HG21	1.97	0.46
1:B:457:PHE:CG	1:B:458:ASN:N	2.83	0.46
1:B:170:TYR:CE1	1:B:174:LEU:HD21	2.51	0.46
1:B:388:VAL:O	1:B:388:VAL:HG13	2.16	0.46
1:B:503:ASN:O	1:B:517:HIS:NE2	2.49	0.46
2:F:13:THR:HG21	10:F:101:A2G:O5	2.16	0.46
1:B:554:THR:O	1:B:555:LEU:C	2.58	0.46
1:B:215:THR:HG21	1:B:341:HIS:HB2	1.97	0.46
1:B:442:CYS:C	1:B:456:ILE:HG13	2.41	0.46
1:B:60:GLU:O	1:B:61:MET:CB	2.64	0.45
1:A:362:ILE:O	1:A:363:ASN:HB2	2.15	0.45
1:A:294:GLY:C	1:A:295:LEU:HD12	2.41	0.45
2:H:13:THR:HG22	2:H:14:SER:N	2.32	0.45
1:B:285:PRO:HB3	1:B:337:VAL:HG22	1.98	0.45
1:A:75:MET:SD	1:A:85:ASN:ND2	2.89	0.44
1:B:361:ILE:O	1:B:361:ILE:HG23	2.16	0.44
1:B:533:GLN:OE1	1:B:533:GLN:N	2.50	0.44
1:B:503:ASN:HB2	10:F:101:A2G:O3	2.18	0.44
1:B:79:PHE:CE1	1:B:243:ASP:O	2.71	0.44
1:A:383:ILE:HD11	1:A:553:VAL:HG13	1.99	0.44
1:A:478:THR:HG23	1:A:478:THR:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:211:HIS:NE2	5:B:601:UDP:O1A	2.51	0.44
2:H:10:THR:CG2	2:H:11:SER:N	2.80	0.43
1:B:518:VAL:HG13	1:B:519:ASN:N	2.33	0.43
1:B:151:ILE:O	1:B:178:VAL:HA	2.17	0.43
1:B:151:ILE:HB	1:B:178:VAL:HG22	2.00	0.43
1:A:475:GLU:OE2	12:A:702:HOH:O	2.20	0.43
1:B:102:ARG:CZ	1:B:217:GLY:HA3	2.49	0.43
1:A:489:ASN:HA	1:A:537:ILE:HD12	2.01	0.43
1:B:298:ILE:HD11	1:B:302:TYR:CD2	2.44	0.43
1:A:549:LEU:C	1:A:550:LEU:HD12	2.44	0.43
1:B:211:HIS:CE1	5:B:601:UDP:O1A	2.72	0.43
1:B:291:MET:O	1:B:320:ASN:HB2	2.19	0.43
1:B:101:VAL:HG23	1:B:341:HIS:CG	2.54	0.42
1:B:442:CYS:O	1:B:456:ILE:HG13	2.19	0.42
1:B:321:LEU:HB2	1:B:369:LEU:HD11	2.01	0.42
1:A:189:LEU:HD12	5:A:601:UDP:O4'	2.20	0.42
1:A:456:ILE:O	1:A:456:ILE:HG23	2.19	0.42
1:B:291:MET:CE	1:B:334:LEU:HD11	2.50	0.42
1:A:171:VAL:CG2	1:A:178:VAL:HG11	2.49	0.42
1:A:156:ASP:OD2	1:A:187:SER:O	2.37	0.42
1:B:509:ASP:O	1:B:513:LEU:N	2.51	0.42
2:H:10:THR:HG23	2:H:11:SER:N	2.35	0.42
1:B:256:TYR:CD1	1:B:256:TYR:C	2.97	0.41
1:A:165:ARG:N	1:A:166:PRO:CD	2.83	0.41
1:A:367:ARG:HD2	1:A:388:VAL:O	2.20	0.41
1:B:298:ILE:HD12	1:B:299:ASP:H	1.85	0.41
1:B:492:VAL:HG22	1:B:537:ILE:HD11	2.01	0.41
1:B:513:LEU:N	1:B:513:LEU:HD12	2.35	0.41
5:B:601:UDP:O2B	2:F:2:THR:HG23	2.21	0.41
2:H:13:THR:HA	10:H:101:A2G:HN2	1.84	0.41
1:B:61:MET:HA	1:B:61:MET:HE2	2.03	0.41
1:B:286:VAL:O	1:B:336:ILE:N	2.52	0.41
1:A:101:VAL:HG23	1:A:341:HIS:CG	2.56	0.41
1:A:490:GLY:N	1:A:537:ILE:HD11	2.36	0.41
2:H:15:ALA:HB1	2:H:16:PRO:HD2	2.02	0.41
1:B:209:ASP:OD1	1:B:295:LEU:HD11	2.21	0.41
1:B:241:ILE:HB	1:B:345:VAL:HG22	2.03	0.41
1:A:315:ILE:O	1:A:315:ILE:HG12	2.22	0.40
1:A:181:ILE:N	1:A:181:ILE:HD12	2.37	0.40
1:B:158:SER:HB3	1:B:163:LEU:HB3	2.02	0.40
1:B:261:TRP:O	1:B:262:LYS:CB	2.68	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:189:LEU:HD23	1:B:189:LEU:C	2.46	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:LYS:HZ3	1:A:198:ALA:O[2_656]	1.55	0.05

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	498/559 (89%)	479 (96%)	19 (4%)	0	100	100
1	B	399/559 (71%)	380 (95%)	19 (5%)	0	100	100
2	D	14/16 (88%)	14 (100%)	0	0	100	100
2	F	11/16 (69%)	11 (100%)	0	0	100	100
2	H	5/16 (31%)	3 (60%)	2 (40%)	0	100	100
All	All	927/1166 (80%)	887 (96%)	40 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	447/501 (89%)	432 (97%)	15 (3%)	32	49
1	B	409/501 (82%)	390 (95%)	19 (5%)	24	36
2	D	14/14 (100%)	14 (100%)	0	100	100
2	F	13/14 (93%)	13 (100%)	0	100	100
2	H	6/14 (43%)	4 (67%)	2 (33%)	0	0
All	All	889/1044 (85%)	853 (96%)	36 (4%)	28	42

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	123	VAL
1	A	131	THR
1	A	136	VAL
1	A	139	VAL
1	A	165	ARG
1	A	167	LEU
1	A	171	VAL
1	A	173	LYS
1	A	256	TYR
1	A	361	ILE
1	A	391	VAL
1	A	511	VAL
1	A	534	VAL
1	A	537	ILE
1	A	553	VAL
1	B	61	MET
1	B	67	ILE
1	B	95	ASN
1	B	104	GLU
1	B	115	LEU
1	B	138	SER
1	B	148	ILE
1	B	160	ARG
1	B	171	VAL
1	B	215	THR
1	B	256	TYR
1	B	266	ARG
1	B	291	MET
1	B	369	LEU
1	B	390	LYS
1	B	404	ARG

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Mol	Chain	Res	Type
1	B	406	LEU
1	B	488	LEU
1	B	513	LEU
2	H	10	THR
2	H	11	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	82	ASN
1	A	304	GLN
1	B	228	HIS
1	B	304	GLN
1	B	329	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 ⓘ

7 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	C	1	4,1	14,14,15	0.29	0	17,19,21	0.51	0
4	NAG	C	2	4	14,14,15	0.29	0	17,19,21	0.64	0
3	NAG	X	1	1,3	14,14,15	0.18	0	17,19,21	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	X	2	3	14,14,15	0.19	0	17,19,21	0.69	1 (5%)
3	BMA	X	3	3	11,11,12	0.70	0	15,15,17	0.75	0
3	MAN	X	4	3	11,11,12	0.56	0	15,15,17	1.00	1 (6%)
3	MAN	X	5	3	11,11,12	0.66	0	15,15,17	1.02	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	C	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	C	2	4	-	0/6/23/26	0/1/1/1
3	NAG	X	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	X	2	3	-	2/6/23/26	0/1/1/1
3	BMA	X	3	3	-	2/2/19/22	0/1/1/1
3	MAN	X	4	3	-	0/2/19/22	0/1/1/1
3	MAN	X	5	3	-	1/2/19/22	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	X	5	MAN	C1-O5-C5	2.88	116.05	112.19
3	X	4	MAN	C1-O5-C5	2.76	115.88	112.19
3	X	2	NAG	C1-O5-C5	2.16	115.08	112.19
3	X	5	MAN	O2-C2-C3	-2.14	105.72	110.15

There are no chirality outliers.

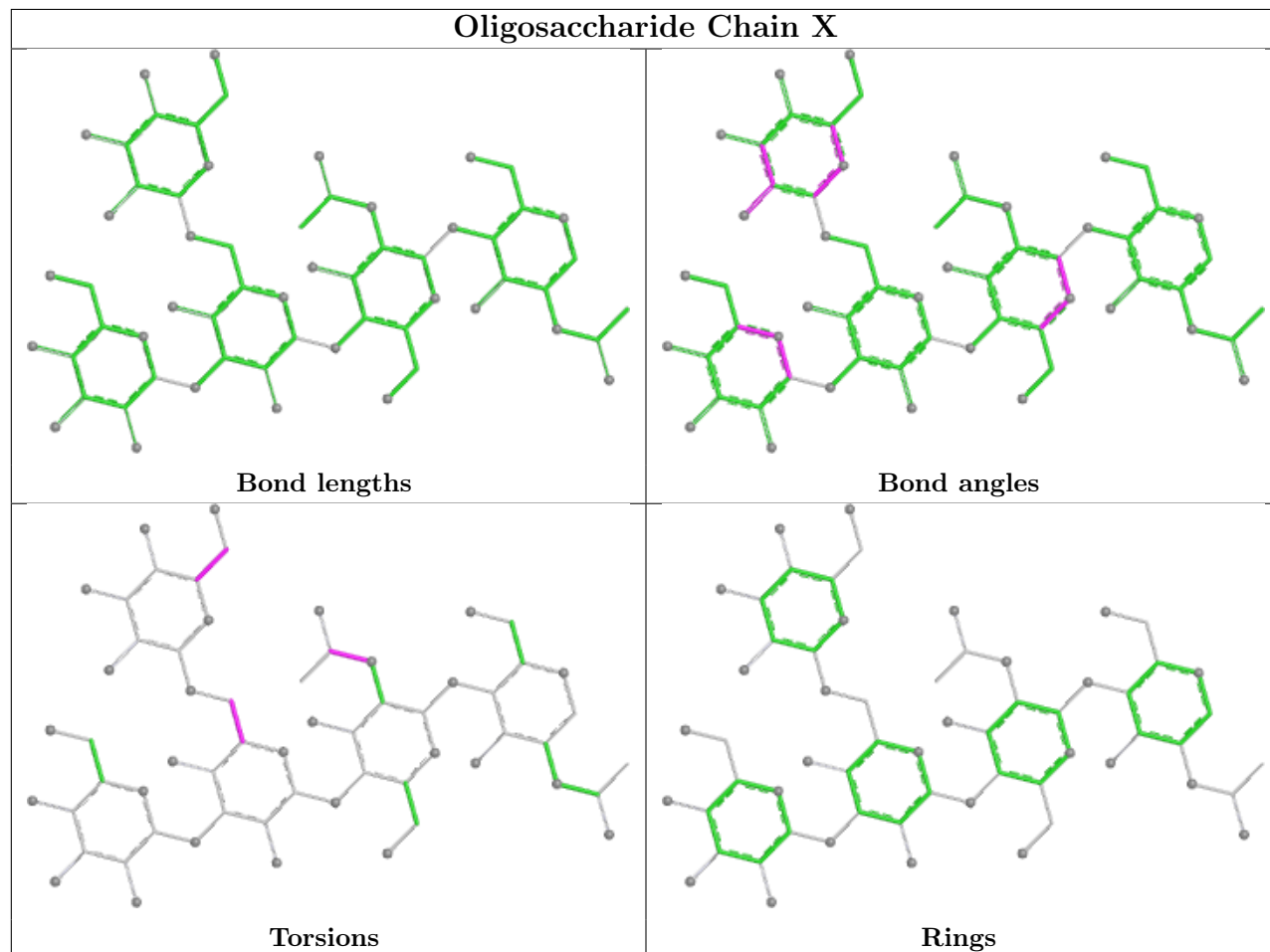
All (7) torsion outliers are listed below:

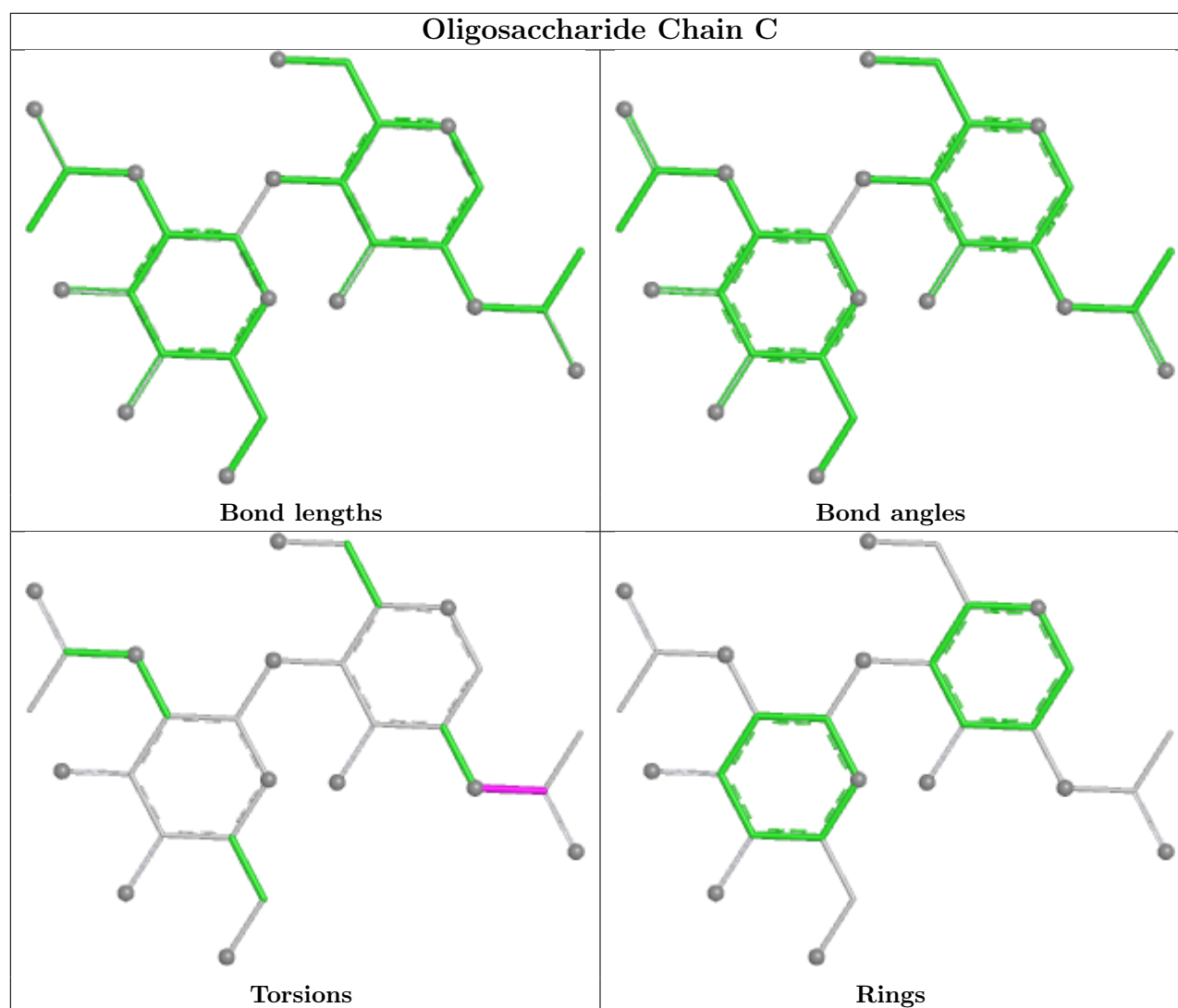
Mol	Chain	Res	Type	Atoms
3	X	2	NAG	C8-C7-N2-C2
3	X	2	NAG	O7-C7-N2-C2
4	C	1	NAG	C8-C7-N2-C2
4	C	1	NAG	O7-C7-N2-C2
3	X	5	MAN	O5-C5-C6-O6
3	X	3	BMA	C4-C5-C6-O6
3	X	3	BMA	O5-C5-C6-O6

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, 2 are monoatomic - leaving 15 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	$\# Z > 2$
6	GOL	A	608	-	5,5,5	0.94	0	5,5,5	0.96	0
5	UDP	A	601	9	25,26,26	3.81	14 (56%)	38,40,40	1.47	5 (13%)
10	A2G	D	101	2	14,14,15	1.77	4 (28%)	17,19,21	0.90	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	EDO	A	606	-	3,3,3	0.45	0	2,2,2	0.36	0
8	EDO	D	102	-	3,3,3	0.44	0	2,2,2	0.35	0
10	A2G	H	101	2	14,14,15	1.82	5 (35%)	17,19,21	1.21	1 (5%)
11	NAG	B	602	1	14,14,15	0.26	0	17,19,21	0.54	0
8	EDO	A	605	-	3,3,3	0.48	0	2,2,2	0.25	0
10	A2G	F	101	2	14,14,15	1.87	5 (35%)	17,19,21	2.30	7 (41%)
11	NAG	B	603	-	14,14,15	0.20	0	17,19,21	0.52	0
6	GOL	A	602	-	5,5,5	0.90	0	5,5,5	1.04	0
8	EDO	D	103	-	3,3,3	0.44	0	2,2,2	0.31	0
8	EDO	A	604	-	3,3,3	0.42	0	2,2,2	0.43	0
5	UDP	B	601	9	25,26,26	3.89	14 (56%)	38,40,40	1.60	5 (13%)
7	SIN	A	603	-	7,7,7	1.17	0	8,8,8	1.46	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	GOL	A	608	-	-	0/4/4/4	-
5	UDP	A	601	9	-	2/16/32/32	0/2/2/2
10	A2G	D	101	2	-	0/6/23/26	0/1/1/1
8	EDO	A	606	-	-	0/1/1/1	-
8	EDO	D	102	-	-	0/1/1/1	-
10	A2G	H	101	2	-	4/6/23/26	0/1/1/1
11	NAG	B	602	1	-	4/6/23/26	0/1/1/1
8	EDO	A	605	-	-	1/1/1/1	-
10	A2G	F	101	2	-	3/6/23/26	0/1/1/1
11	NAG	B	603	-	-	2/6/23/26	0/1/1/1
6	GOL	A	602	-	-	1/4/4/4	-
8	EDO	D	103	-	-	0/1/1/1	-
8	EDO	A	604	-	-	1/1/1/1	-
5	UDP	B	601	9	-	0/16/32/32	0/2/2/2
7	SIN	A	603	-	-	2/5/5/5	-

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	601	UDP	O4'-C4'	7.35	1.61	1.45
5	A	601	UDP	O4'-C4'	7.32	1.61	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	601	UDP	C3'-C4'	-7.27	1.34	1.53
5	B	601	UDP	C3'-C4'	-7.13	1.34	1.53
5	B	601	UDP	C2-N1	7.07	1.49	1.38
5	B	601	UDP	C2-N3	7.06	1.50	1.38
5	A	601	UDP	C2-N1	6.99	1.49	1.38
5	A	601	UDP	C2-N3	6.93	1.50	1.38
5	B	601	UDP	C6-C5	6.17	1.49	1.35
5	A	601	UDP	C6-C5	6.07	1.49	1.35
5	B	601	UDP	PA-O3A	5.85	1.65	1.59
5	B	601	UDP	O4'-C1'	-5.16	1.30	1.42
5	A	601	UDP	PA-O3A	5.03	1.64	1.59
5	A	601	UDP	O4'-C1'	-4.99	1.30	1.42
5	B	601	UDP	C4-N3	4.58	1.46	1.38
5	A	601	UDP	C4-N3	4.38	1.46	1.38
10	F	101	A2G	C7-N2	3.73	1.46	1.34
10	H	101	A2G	C7-N2	3.66	1.46	1.34
10	D	101	A2G	C7-N2	3.56	1.45	1.34
5	A	601	UDP	C6-N1	3.02	1.45	1.38
5	B	601	UDP	C6-N1	2.96	1.45	1.38
5	B	601	UDP	O3'-C3'	2.85	1.50	1.43
5	A	601	UDP	O3'-C3'	2.78	1.49	1.43
5	B	601	UDP	C5-C4	2.78	1.49	1.43
5	B	601	UDP	O4-C4	-2.69	1.19	1.24
10	F	101	A2G	O5-C5	2.69	1.48	1.43
5	A	601	UDP	O4-C4	-2.67	1.19	1.24
5	A	601	UDP	C5-C4	2.66	1.49	1.43
5	B	601	UDP	O2-C2	-2.66	1.18	1.23
5	A	601	UDP	O2'-C2'	-2.63	1.36	1.43
5	B	601	UDP	O2'-C2'	-2.63	1.36	1.43
5	A	601	UDP	O2-C2	-2.58	1.18	1.23
10	D	101	A2G	C3-C2	-2.34	1.47	1.52
10	F	101	A2G	C3-C2	-2.33	1.47	1.52
10	H	101	A2G	C3-C2	-2.27	1.47	1.52
10	F	101	A2G	C2-N2	2.24	1.50	1.46
10	H	101	A2G	C2-N2	2.17	1.49	1.46
10	F	101	A2G	O7-C7	-2.10	1.18	1.23
10	H	101	A2G	O5-C5	2.08	1.47	1.43
10	H	101	A2G	O5-C1	2.07	1.47	1.43
10	D	101	A2G	C2-N2	2.02	1.49	1.46
10	D	101	A2G	O7-C7	-2.01	1.18	1.23

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	601	UDP	C4-N3-C2	-5.44	119.86	126.61
5	A	601	UDP	C4-N3-C2	-5.27	120.07	126.61
10	F	101	A2G	O5-C1-C2	-4.63	104.14	111.29
10	F	101	A2G	C8-C7-N2	4.22	123.11	116.12
10	F	101	A2G	C1-C2-N2	3.97	116.69	110.43
5	A	601	UDP	N3-C2-N1	3.89	119.95	114.89
5	B	601	UDP	N3-C2-N1	3.87	119.93	114.89
5	B	601	UDP	C5-C4-N3	3.49	119.69	114.80
5	A	601	UDP	C5-C4-N3	3.36	119.51	114.80
10	F	101	A2G	O5-C5-C4	3.09	118.34	110.83
5	B	601	UDP	O4-C4-C5	-2.83	120.28	125.16
5	A	601	UDP	O4-C4-C5	-2.82	120.31	125.16
10	H	101	A2G	C8-C7-N2	2.76	120.69	116.12
10	F	101	A2G	O7-C7-C8	-2.43	117.73	122.05
10	F	101	A2G	C3-C4-C5	2.22	114.26	110.23
10	F	101	A2G	C1-O5-C5	2.15	115.07	112.19
5	A	601	UDP	O2-C2-N1	-2.05	120.12	122.80
5	B	601	UDP	C2'-C3'-C4'	2.05	106.57	102.61

There are no chirality outliers.

All (20) torsion outliers are listed below:

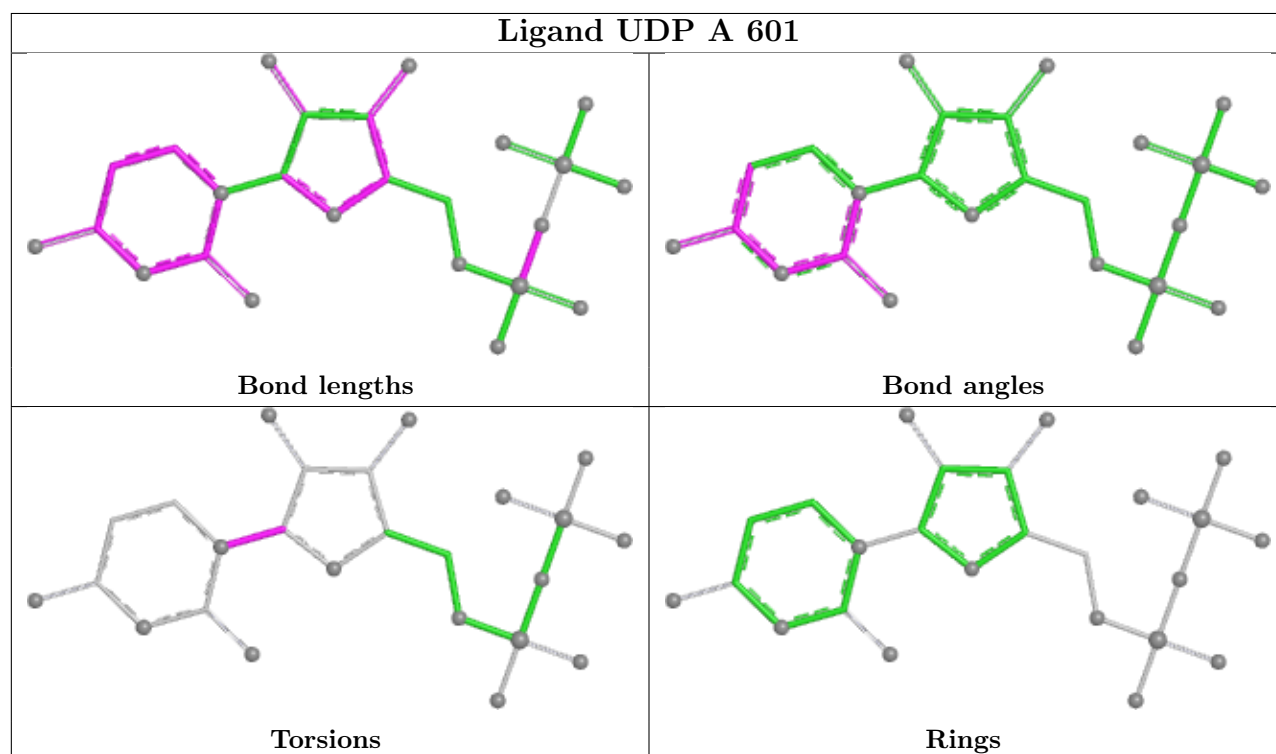
Mol	Chain	Res	Type	Atoms
10	F	101	A2G	C1-C2-N2-C7
11	B	603	NAG	O5-C5-C6-O6
10	H	101	A2G	C4-C5-C6-O6
11	B	603	NAG	C4-C5-C6-O6
10	F	101	A2G	O7-C7-N2-C2
10	F	101	A2G	C8-C7-N2-C2
10	H	101	A2G	O7-C7-N2-C2
10	H	101	A2G	C8-C7-N2-C2
11	B	602	NAG	C8-C7-N2-C2
11	B	602	NAG	O7-C7-N2-C2
10	H	101	A2G	O5-C5-C6-O6
8	A	604	EDO	O1-C1-C2-O2
6	A	602	GOL	O1-C1-C2-O2
11	B	602	NAG	C4-C5-C6-O6
8	A	605	EDO	O1-C1-C2-O2
7	A	603	SIN	C2-C3-C4-O4
7	A	603	SIN	C2-C3-C4-O3
11	B	602	NAG	O5-C5-C6-O6
5	A	601	UDP	C2'-C1'-N1-C6
5	A	601	UDP	O4'-C1'-N1-C6

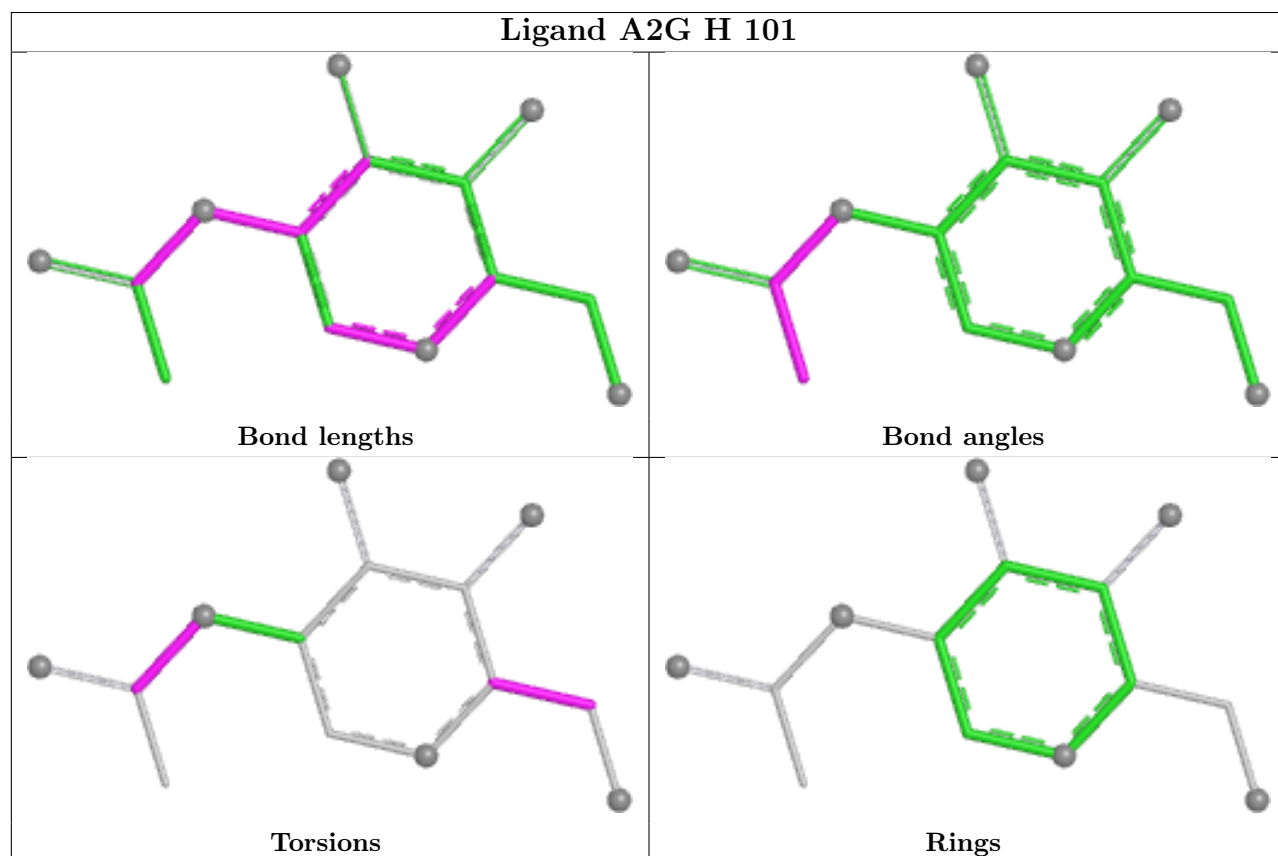
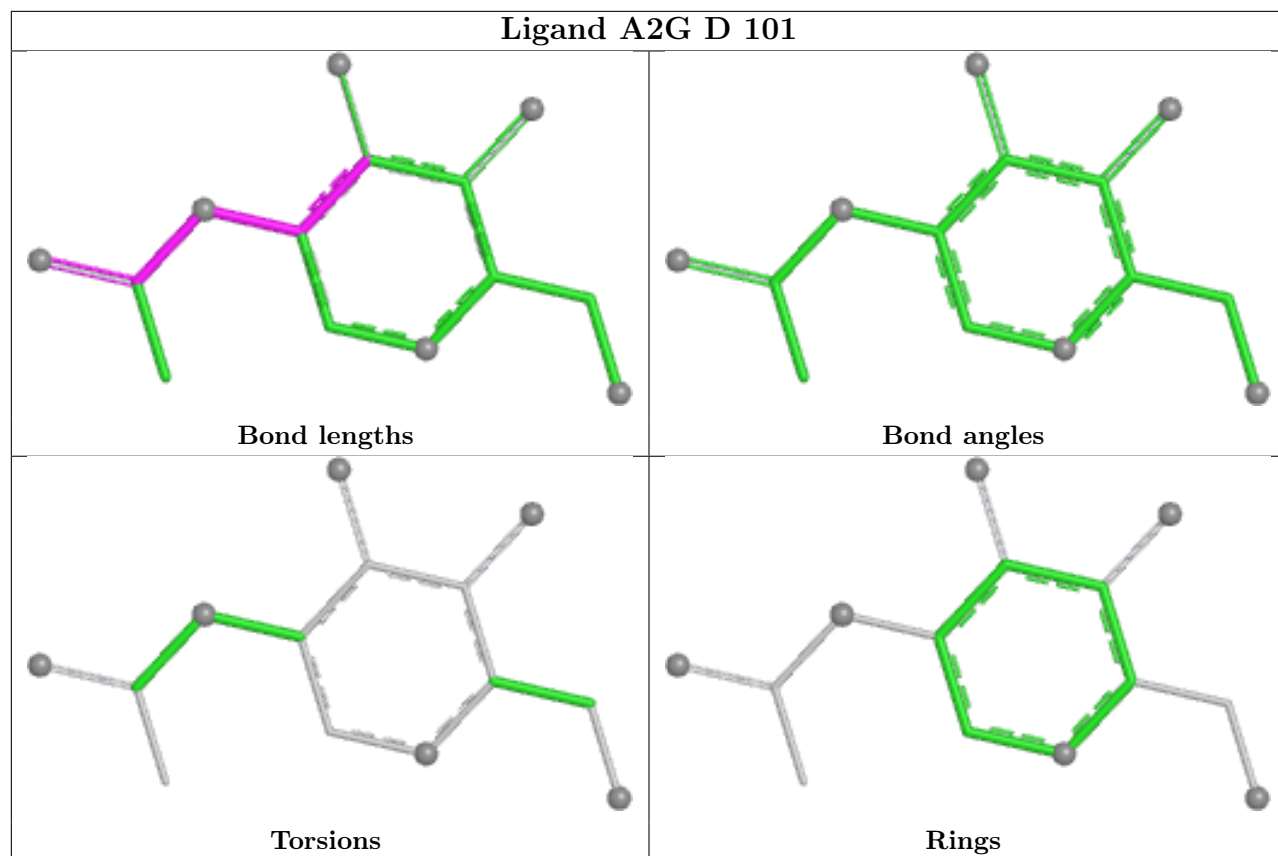
There are no ring outliers.

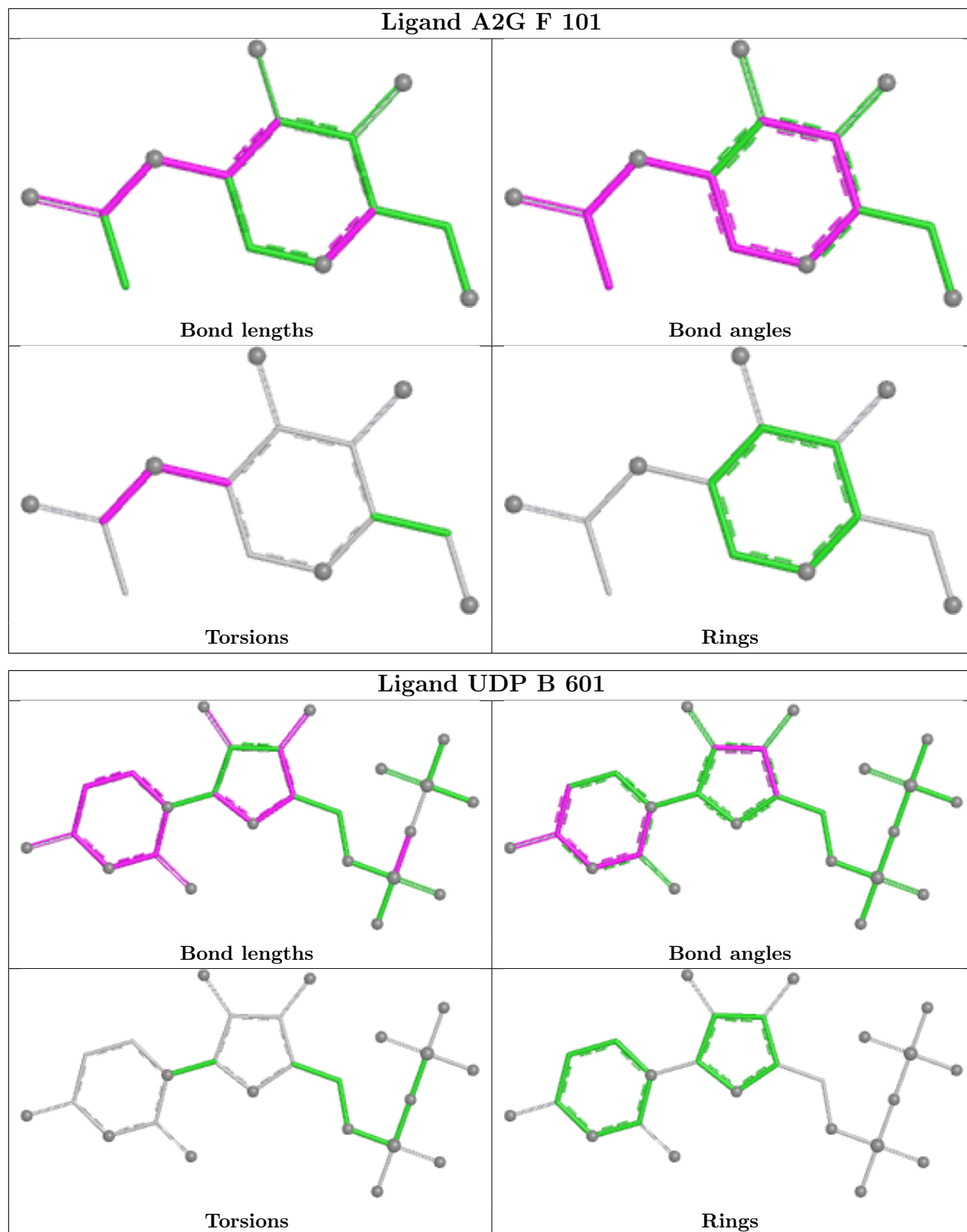
4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	601	UDP	2	0
10	H	101	A2G	3	0
10	F	101	A2G	2	0
5	B	601	UDP	3	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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	500/559 (89%)	0.24	10 (2%) 65 66	25, 41, 70, 125	0
1	B	449/559 (80%)	2.95	341 (75%) 0 0	93, 137, 173, 224	0
2	D	16/16 (100%)	0.62	1 (6%) 26 28	33, 43, 73, 79	0
2	F	15/16 (93%)	3.67	15 (100%) 0 0	119, 140, 161, 184	0
2	H	7/16 (43%)	3.56	6 (85%) 0 0	72, 93, 134, 152	0
All	All	987/1166 (84%)	1.55	373 (37%) 1 0	25, 71, 164, 224	0

All (373) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	212	CYS	8.0
1	B	124	PHE	7.2
1	B	208	LEU	6.8
1	B	295	LEU	6.4
1	B	136	VAL	6.3
1	B	388	VAL	6.2
1	B	383	ILE	6.0
1	B	434	ILE	6.0
1	B	98	LEU	5.9
2	F	1	GLY	5.8
1	B	456	ILE	5.8
1	B	292	ALA	5.8
1	B	133	LEU	5.8
1	B	349	ALA	5.7
1	B	309	TYR	5.7
1	B	121	VAL	5.5
1	B	316	TRP	5.4
1	B	296	PHE	5.3
2	F	16	PRO	5.3
1	B	101	VAL	5.3

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Mol	Chain	Res	Type	RSRZ
1	B	152	VAL	5.2
1	B	122	ILE	5.2
1	B	240	VAL	5.2
1	B	548	TRP	5.2
1	B	120	VAL	5.2
1	B	307	GLY	5.2
1	B	138	SER	5.1
1	B	447	ALA	5.1
1	B	258	GLY	5.1
1	B	135	THR	5.0
1	B	207	PHE	5.0
1	B	380	PHE	4.9
1	B	57	GLY	4.9
1	B	524	LEU	4.9
1	B	352	TYR	4.9
1	B	503	ASN	4.9
1	B	248	TYR	4.9
1	B	103	LEU	4.8
1	B	218	TRP	4.8
1	A	555	LEU	4.8
1	B	116	PRO	4.8
1	B	216	ALA	4.8
2	H	12	THR	4.7
1	B	385	SER	4.7
2	H	15	ALA	4.7
1	B	223	LEU	4.7
1	B	414	TYR	4.7
1	B	534	VAL	4.7
1	B	189	LEU	4.7
1	B	437	VAL	4.6
1	B	428	TYR	4.6
1	B	346	PHE	4.6
1	B	256	TYR	4.6
1	B	492	VAL	4.6
1	B	336	ILE	4.6
1	B	373	TRP	4.5
1	B	317	GLY	4.5
1	B	369	LEU	4.5
1	B	443	LEU	4.5
1	B	241	ILE	4.5
1	B	246	PHE	4.5
1	B	190	ILE	4.5

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Mol	Chain	Res	Type	RSRZ
1	B	297	SER	4.5
1	B	429	PHE	4.4
2	F	13	THR	4.4
1	B	115	LEU	4.4
1	B	325	PHE	4.4
1	B	194	LEU	4.4
1	B	328	TRP	4.4
1	B	88	ALA	4.3
2	H	13	THR	4.3
1	B	362	ILE	4.3
1	B	130	SER	4.3
1	B	384	ILE	4.3
1	B	454	VAL	4.3
1	B	140	ILE	4.3
1	B	537	ILE	4.3
1	B	485	VAL	4.2
1	B	236	PRO	4.2
1	B	413	TRP	4.2
1	B	64	PRO	4.2
1	B	500	LEU	4.2
1	B	467	VAL	4.2
1	B	157	ALA	4.1
1	B	209	ASP	4.1
1	B	329	GLN	4.1
1	B	549	LEU	4.1
1	B	553	VAL	4.1
1	B	112	PRO	4.1
1	B	400	LEU	4.1
1	B	215	THR	4.1
1	B	61	MET	4.1
2	F	3	THR	4.0
2	H	16	PRO	4.0
1	B	505	LEU	4.0
1	B	515	LEU	4.0
1	B	324	SER	4.0
1	B	342	VAL	4.0
1	B	415	LEU	4.0
1	B	100	ASP	4.0
1	B	235	CYS	3.9
1	B	535	PRO	3.9
1	B	245	THR	3.9
1	B	377	PHE	3.9

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Mol	Chain	Res	Type	RSRZ
1	B	550	LEU	3.9
1	B	81	ILE	3.9
1	B	111	TYR	3.9
1	B	139	VAL	3.9
1	B	204	VAL	3.8
1	B	312	GLY	3.8
1	B	303	PHE	3.8
1	B	285	PRO	3.8
1	B	151	ILE	3.8
1	B	470	TYR	3.8
1	B	318	GLY	3.8
1	B	206	THR	3.8
1	B	527	ALA	3.8
1	B	457	PHE	3.8
1	B	66	VAL	3.8
1	B	402	LEU	3.8
1	B	306	ILE	3.8
1	B	382	TYR	3.7
1	B	376	GLU	3.7
1	B	107	LYS	3.7
1	B	259	PHE	3.7
1	B	331	GLY	3.7
2	F	11	SER	3.7
1	B	163	LEU	3.6
1	B	455	GLY	3.6
1	B	442	CYS	3.6
1	B	265	PHE	3.6
1	B	106	CYS	3.6
1	B	310	ASP	3.6
1	B	509	ASP	3.6
2	F	10	THR	3.6
2	F	4	PRO	3.6
1	B	520	SER	3.6
1	B	237	ILE	3.6
1	B	219	LEU	3.6
1	B	261	TRP	3.6
1	B	290	THR	3.5
1	B	110	VAL	3.5
1	B	178	VAL	3.5
1	B	423	GLN	3.5
1	B	486	SER	3.5
1	A	306	ILE	3.5

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Mol	Chain	Res	Type	RSRZ
1	B	238	ILE	3.5
1	B	436	ASN	3.5
2	F	14	SER	3.5
1	B	476	ILE	3.5
1	B	468	PHE	3.5
1	A	361	ILE	3.5
1	B	213	GLU	3.5
1	B	488	LEU	3.5
1	B	162	PHE	3.5
1	B	191	ARG	3.5
1	B	391	VAL	3.4
1	B	397	SER	3.4
2	F	5	SER	3.4
1	B	344	HIS	3.4
1	B	263	LEU	3.4
1	B	117	THR	3.4
1	B	255	THR	3.4
2	H	14	SER	3.4
1	B	282	ARG	3.4
1	B	491	PRO	3.4
1	B	372	VAL	3.4
1	B	518	VAL	3.4
1	B	142	ARG	3.4
1	B	408	CYS	3.4
1	B	506	TRP	3.3
1	B	220	GLU	3.3
1	B	180	VAL	3.3
1	B	109	LYS	3.3
1	B	75	MET	3.3
2	F	8	PRO	3.3
2	F	7	VAL	3.3
1	B	345	VAL	3.3
1	B	188	GLY	3.3
1	B	148	ILE	3.3
1	B	510	PRO	3.3
1	B	158	SER	3.3
1	B	65	VAL	3.3
2	F	15	ALA	3.2
1	B	105	GLY	3.2
1	B	409	LYS	3.2
1	B	540	CYS	3.2
1	B	439	THR	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	147	MET	3.2
1	B	210	ALA	3.2
1	B	270	VAL	3.2
1	B	102	ARG	3.2
1	B	156	ASP	3.2
1	B	321	LEU	3.2
1	B	286	VAL	3.2
1	B	302	TYR	3.2
1	A	490	GLY	3.2
1	B	217	GLY	3.2
1	B	94	LEU	3.2
1	B	555	LEU	3.2
1	B	79	PHE	3.2
1	B	95	ASN	3.2
1	B	322	GLU	3.1
1	B	99	PRO	3.1
1	B	249	MET	3.1
1	B	551	ARG	3.1
1	B	146	HIS	3.1
1	B	320	ASN	3.1
1	B	393	TYR	3.1
1	B	131	THR	3.1
1	B	464	GLY	3.1
1	B	93	ALA	3.1
1	B	224	ALA	3.1
1	B	250	ALA	3.1
1	B	511	VAL	3.1
1	B	315	ILE	3.0
1	B	143	SER	3.0
1	B	174	LEU	3.0
1	B	298	ILE	3.0
1	B	260	ASN	3.0
1	B	411	PHE	3.0
1	A	362	ILE	3.0
1	B	389	THR	3.0
1	B	521	ASN	3.0
1	B	539	ASP	3.0
1	B	221	PRO	3.0
1	B	181	ILE	3.0
1	B	504	GLN	3.0
1	B	417	ASN	3.0
2	F	12	THR	2.9

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Mol	Chain	Res	Type	RSRZ
1	B	412	SER	2.9
1	B	410	PRO	2.9
1	B	311	ALA	2.9
1	B	487	LYS	2.9
1	B	363	ASN	2.9
1	A	354	PHE	2.9
1	B	431	LEU	2.9
1	B	418	ILE	2.9
1	B	108	THR	2.9
1	B	313	MET	2.9
1	B	166	PRO	2.9
1	B	337	VAL	2.9
1	B	275	MET	2.9
1	B	514	THR	2.9
1	B	193	ARG	2.8
1	B	441	GLN	2.8
1	B	233	VAL	2.8
1	B	222	LEU	2.8
1	B	462	MET	2.8
1	B	404	ARG	2.8
1	B	308	THR	2.8
1	B	327	ILE	2.8
1	B	541	THR	2.8
1	B	379	ASN	2.7
1	B	280	GLY	2.7
1	B	211	HIS	2.7
1	A	554	THR	2.7
1	B	251	GLY	2.7
1	B	176	VAL	2.7
2	H	10	THR	2.7
1	B	202	GLY	2.7
1	B	361	ILE	2.7
1	B	481	LEU	2.7
1	B	76	LYS	2.6
1	B	507	GLU	2.6
1	B	424	ILE	2.6
1	B	542	GLY	2.6
1	B	96	ARG	2.6
1	B	399	ARG	2.6
1	B	419	TYR	2.6
1	B	435	ARG	2.6
2	F	6	PRO	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	406	LEU	2.6
1	B	74	LYS	2.6
1	B	160	ARG	2.6
1	B	326	ARG	2.6
1	A	553	VAL	2.6
1	B	289	PRO	2.6
1	B	226	ILE	2.6
1	B	340	SER	2.6
1	B	545	SER	2.6
1	B	427	HIS	2.6
1	B	339	CYS	2.6
1	B	82	ASN	2.6
1	B	243	ASP	2.6
1	B	370	ALA	2.5
1	B	284	LEU	2.5
1	B	489	ASN	2.5
1	B	227	LYS	2.5
1	B	453	LYS	2.5
1	B	232	THR	2.5
1	B	360	GLN	2.5
1	B	170	TYR	2.5
1	B	172	LYS	2.5
1	B	169	SER	2.5
1	B	501	LYS	2.5
1	B	58	PRO	2.5
1	B	145	ARG	2.4
1	B	403	ARG	2.4
1	B	267	TRP	2.4
1	B	458	ASN	2.4
1	B	466	GLN	2.4
1	B	268	TYR	2.4
1	B	484	ASP	2.4
1	B	396	ILE	2.4
1	B	494	MET	2.4
1	B	137	HIS	2.4
1	B	538	ARG	2.4
1	B	546	GLN	2.4
1	B	314	ASP	2.4
1	B	200	SER	2.4
1	B	440	ASN	2.3
1	B	91	MET	2.3
1	B	254	MET	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	330	CYS	2.3
1	B	332	GLY	2.3
1	B	432	GLY	2.3
2	F	2	THR	2.3
1	B	381	PHE	2.3
1	B	334	LEU	2.3
1	B	378	LYS	2.3
1	B	552	ASN	2.3
1	B	350	THR	2.3
1	B	430	SER	2.3
1	B	125	HIS	2.3
1	B	83	GLN	2.3
1	B	512	LYS	2.3
1	B	366	ASN	2.3
1	B	244	ASP	2.2
1	B	365	ASN	2.2
1	B	225	ARG	2.2
1	B	230	ARG	2.2
1	B	97	SER	2.2
1	B	126	ASN	2.2
1	B	161	ASP	2.2
1	B	451	ASN	2.2
1	B	519	ASN	2.2
1	A	550	LEU	2.2
1	B	495	LEU	2.2
1	B	375	ASP	2.2
1	B	426	ARG	2.2
1	B	446	MET	2.2
1	B	513	LEU	2.2
1	B	78	MET	2.2
1	B	144	PRO	2.2
1	B	283	THR	2.2
1	B	114	ASN	2.1
1	B	239	ASP	2.1
1	B	395	ASP	2.1
1	B	465	ASN	2.1
1	B	127	GLU	2.1
1	B	271	PRO	2.1
1	B	498	HIS	2.1
1	B	119	SER	2.1
1	B	278	ARG	2.1
1	B	171	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	351	PRO	2.1
1	B	469	SER	2.1
1	B	450	GLU	2.1
1	B	517	HIS	2.1
1	B	333	THR	2.0
2	D	11	SER	2.0
1	B	247	GLU	2.0
1	B	264	ASN	2.0
1	B	444	ASP	2.0
1	B	177	PRO	2.0
1	B	401	GLY	2.0
1	B	104	GLU	2.0
1	B	304	GLN	2.0
1	B	516	GLN	2.0
1	B	533	GLN	2.0
1	A	513	LEU	2.0
1	B	279	LYS	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 ⓘ

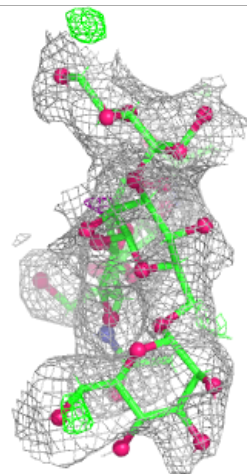
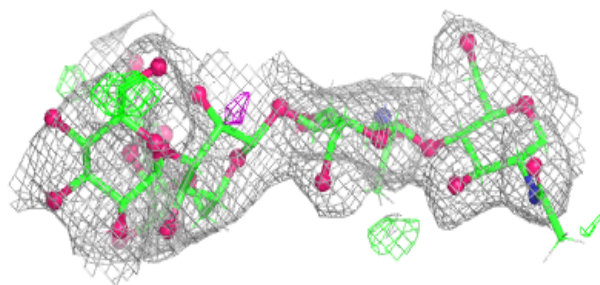
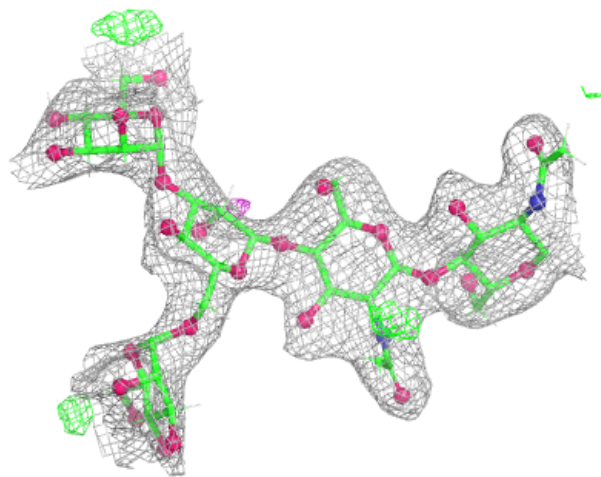
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

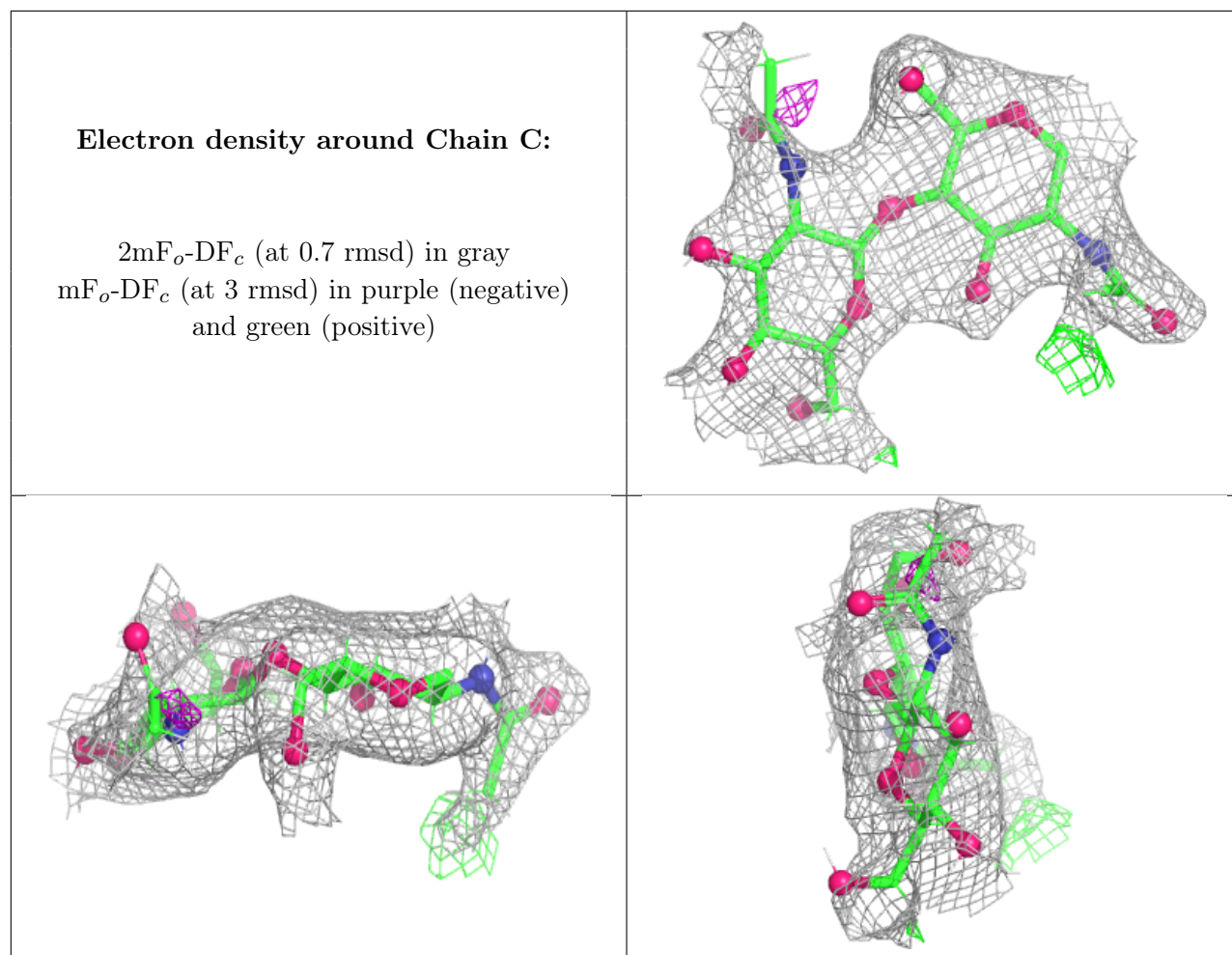
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAG	X	1	14/15	-	-	48,62,85,85	0
3	NAG	X	2	14/15	-	-	58,77,98,105	0
3	BMA	X	3	11/12	-	-	93,106,127,131	0
3	MAN	X	4	11/12	-	-	101,119,142,151	0
3	MAN	X	5	11/12	-	-	86,103,118,122	0
4	NAG	C	1	14/15	-	-	51,60,72,80	0
4	NAG	C	2	14/15	-	-	75,90,108,111	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 X:

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





6.4 Ligands [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.

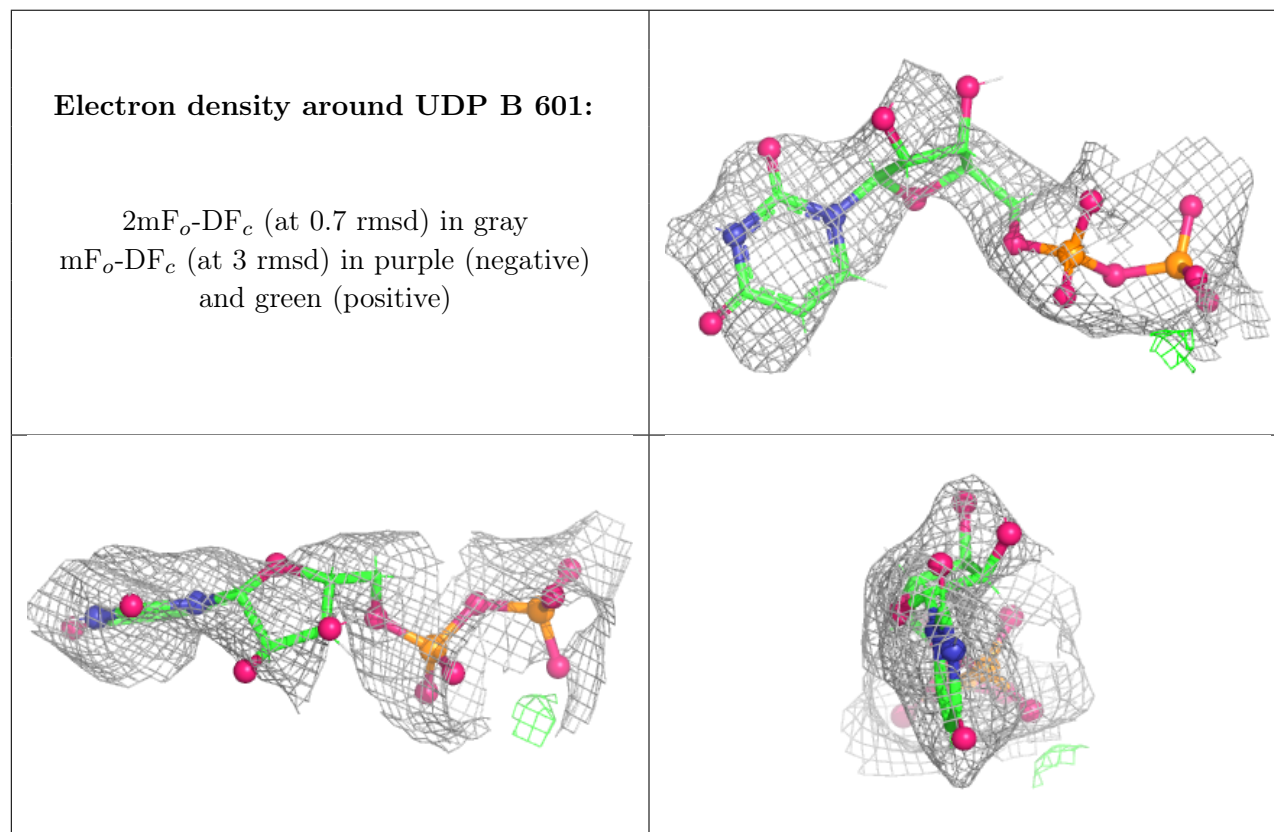
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
7	SIN	A	603	8/8	0.70	0.14	59,78,93,93	0
11	NAG	B	602	14/15	0.73	0.18	93,113,126,139	0
6	GOL	A	602	6/6	0.74	0.19	54,77,96,96	0
11	NAG	B	603	14/15	0.76	0.15	84,110,138,138	0
5	UDP	B	601	25/25	0.77	0.18	118,132,152,158	0
10	A2G	F	101	14/15	0.78	0.25	116,134,152,158	0
8	EDO	A	606	4/4	0.81	0.18	37,45,55,66	0
8	EDO	D	102	4/4	0.82	0.16	41,50,77,77	0
8	EDO	A	604	4/4	0.83	0.13	39,46,53,60	0
6	GOL	A	608	6/6	0.84	0.17	34,56,87,104	0

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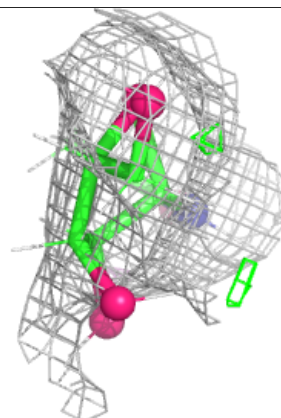
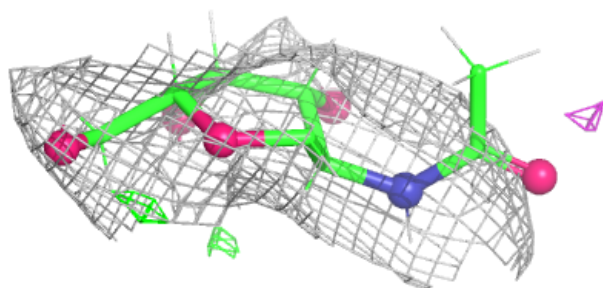
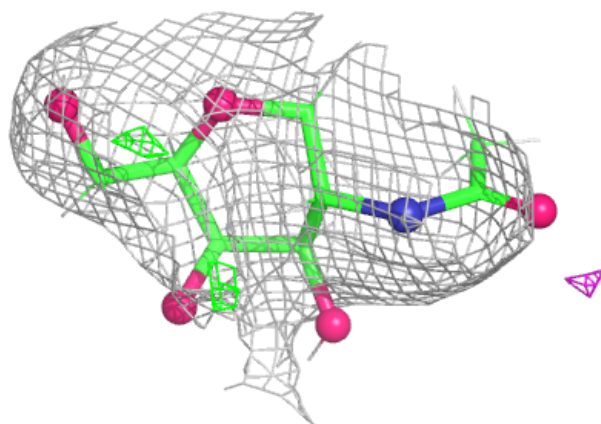
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
10	A2G	H	101	14/15	0.85	0.16	42,57,72,82	0
8	EDO	D	103	4/4	0.89	0.18	24,34,35,37	0
8	EDO	A	605	4/4	0.90	0.22	31,37,45,45	0
9	MN	B	604	1/1	0.91	0.09	143,143,143,143	0
5	UDP	A	601	25/25	0.93	0.13	18,42,56,63	0
10	A2G	D	101	14/15	0.93	0.08	19,26,33,34	0
9	MN	A	607	1/1	0.99	0.03	25,25,25,25	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.

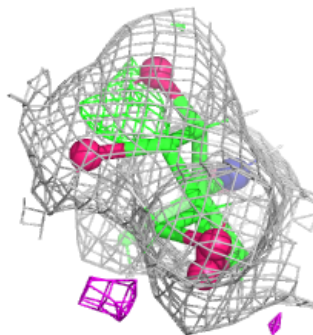
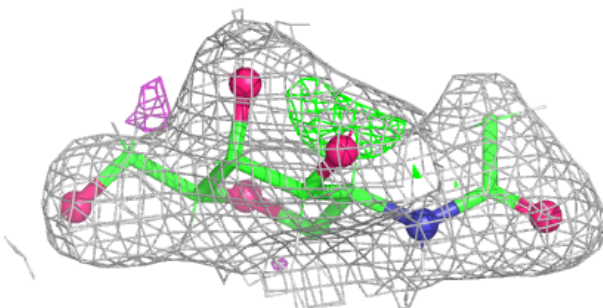
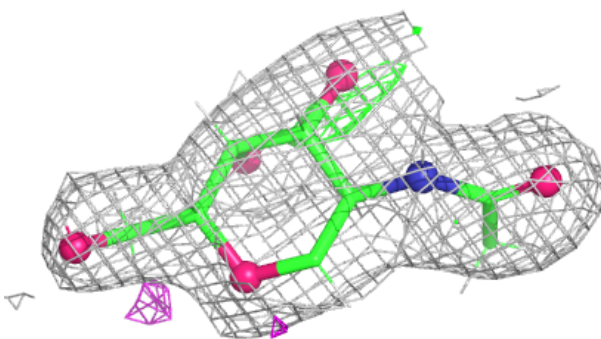


Electron density around A2G F 101:

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

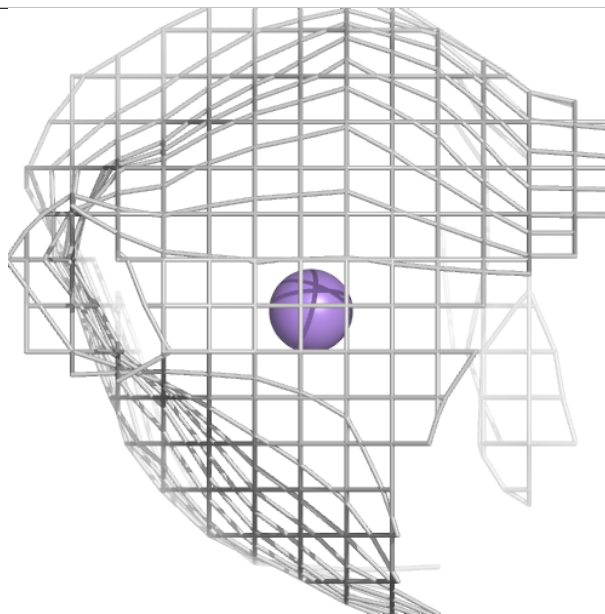
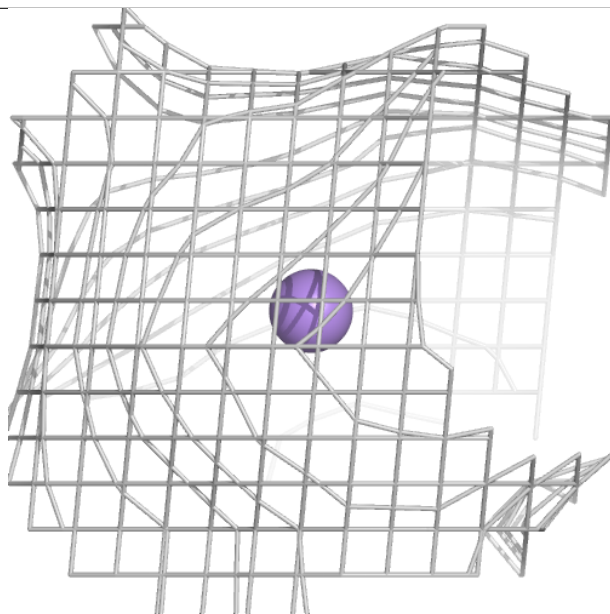
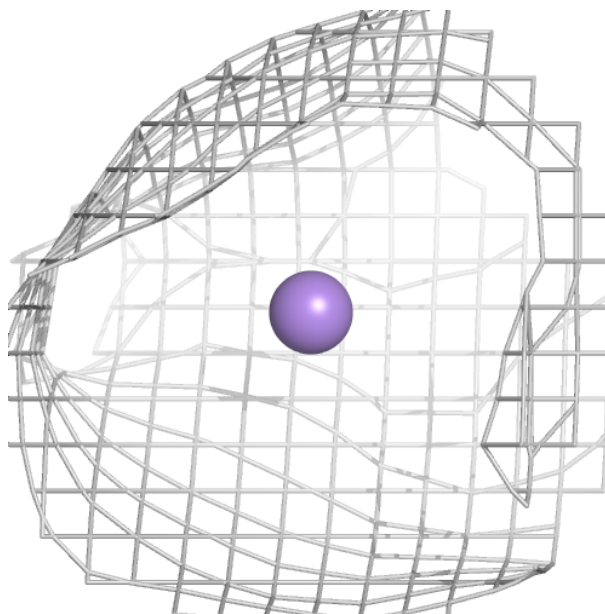
**Electron density around A2G H 101:**

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



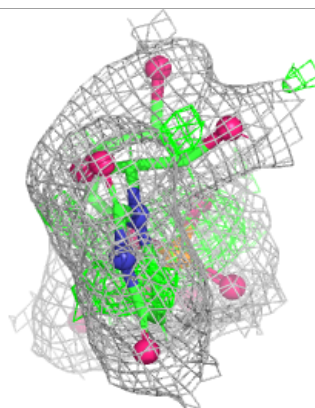
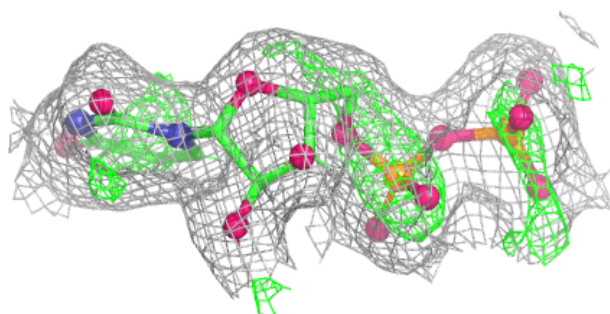
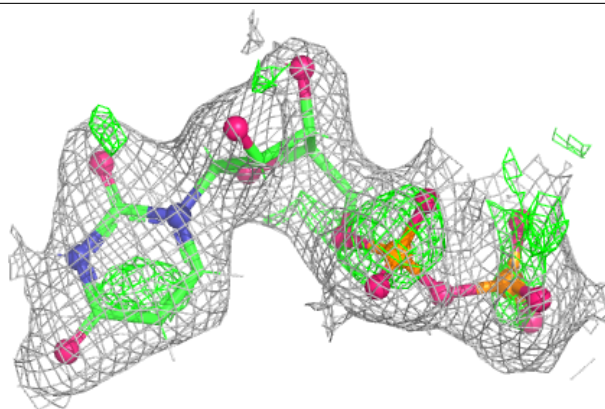
Electron density around MN B 604:

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

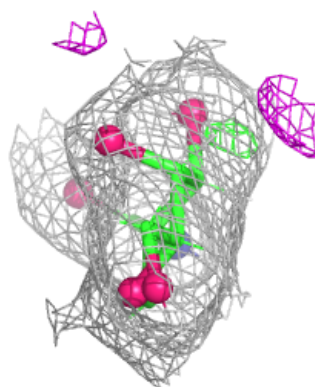
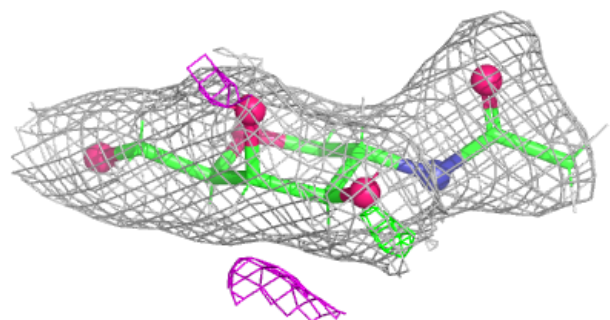
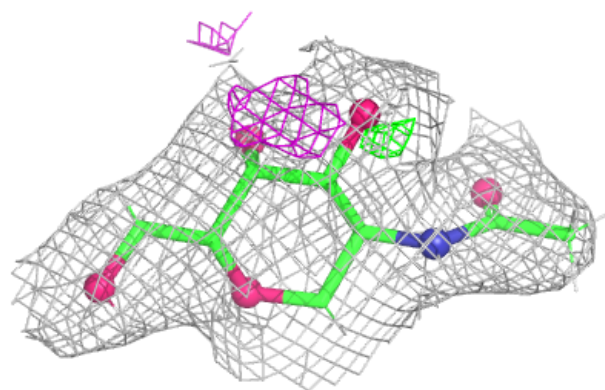


Electron density around UDP A 601:

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

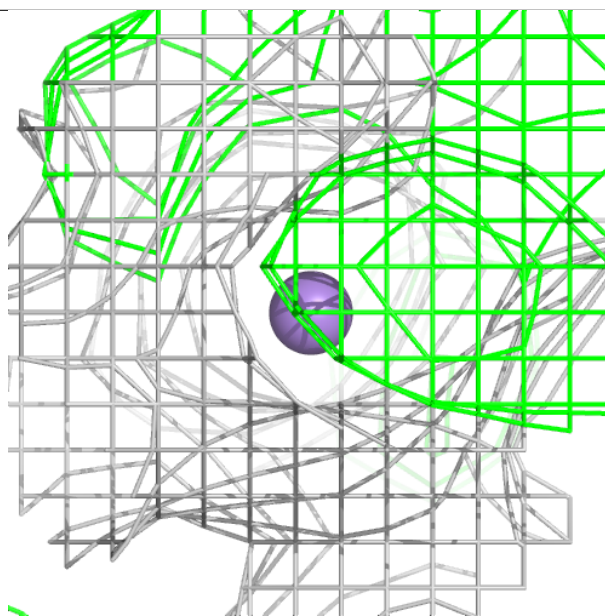
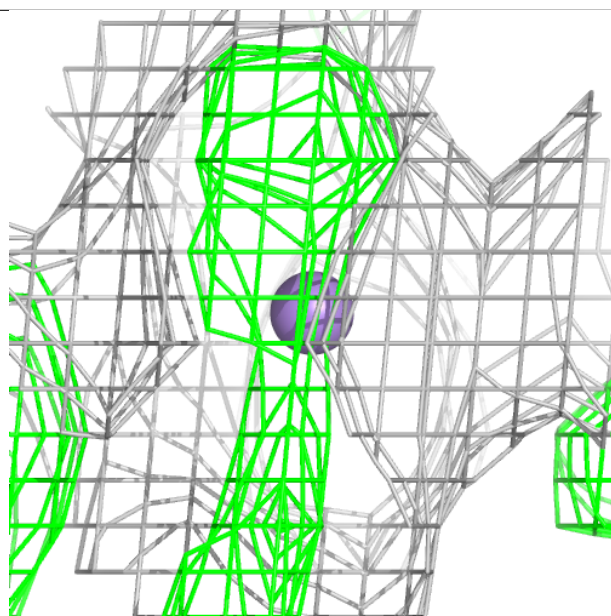
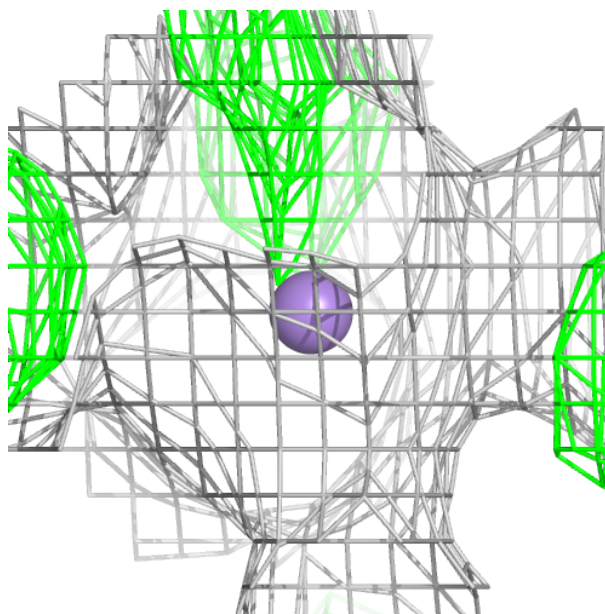
**Electron density around A2G D 101:**

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



Electron density around MN A 607:

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



6.5 Other polymers ⓘ

There are no such residues in this entry.