



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:30 AM UTC

PDB ID : 5WPZ / pdb_00005wpz
Title : Crystal structure of MNDA PYD with MBP tag
Authors : Jin, T.C.; Xiao, T.S.
Deposited on : 2016-11-22
Resolution : 2.00 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
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

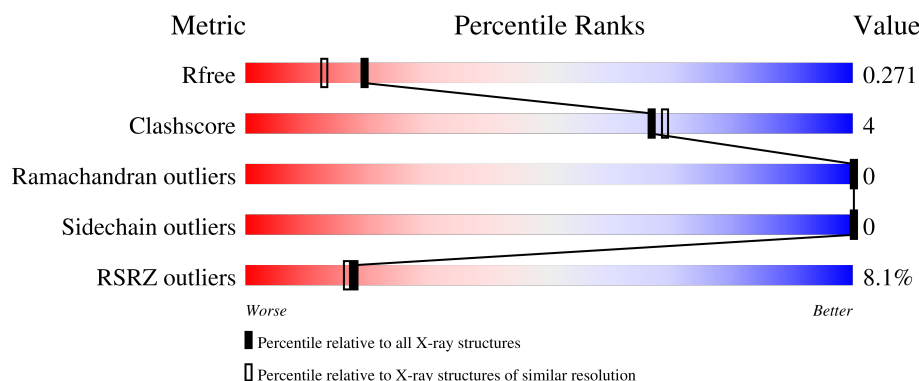
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	477	
1	B	477	
1	C	477	
1	D	477	
1	E	477	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	477	20% 85% 12%
2	G	2	100%
2	H	2	100%
2	I	2	50% 50%
2	J	2	50% 50%
2	K	2	50% 50%
2	L	2	50% 50%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 22797 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 MBP-hMNDA-PYD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	460	Total	C	N	O	S	0	1	0
			3576	2304	585	676	11			
1	B	462	Total	C	N	O	S	0	0	0
			3585	2311	587	676	11			
1	C	461	Total	C	N	O	S	0	3	0
			3599	2319	591	678	11			
1	D	459	Total	C	N	O	S	0	2	0
			3579	2306	587	675	11			
1	E	463	Total	C	N	O	S	0	1	0
			3599	2319	590	679	11			
1	F	459	Total	C	N	O	S	0	2	0
			3579	2306	587	675	11			

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	G	2	Total	C	O	0	0	0
			23	12	11			
2	H	2	Total	C	O	0	0	0
			23	12	11			
2	I	2	Total	C	O	0	0	0
			23	12	11			
2	J	2	Total	C	O	0	0	0
			23	12	11			
2	K	2	Total	C	O	0	0	0
			23	12	11			
2	L	2	Total	C	O	0	0	0
			23	12	11			

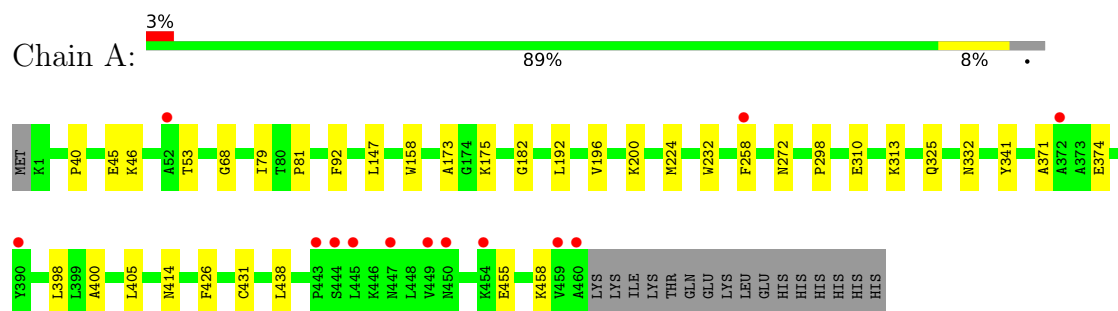
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	240	Total 240	O 240	0	0
3	B	239	Total 239	O 239	0	0
3	C	189	Total 189	O 189	0	0
3	D	173	Total 173	O 173	0	0
3	E	159	Total 159	O 159	0	0
3	F	142	Total 142	O 142	0	0

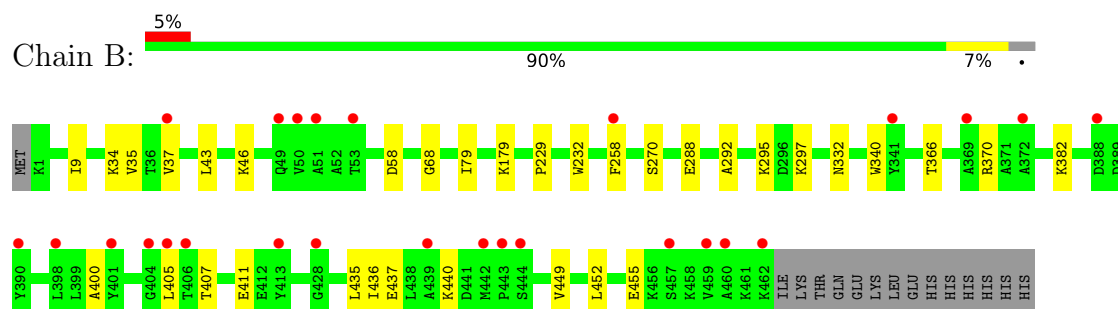
3 Residue-property plots [i](#)

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.

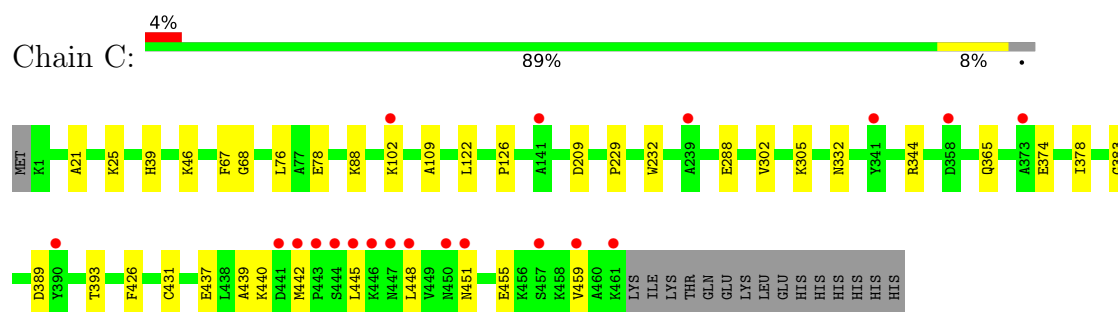
• Molecule 1: MBP-hMNDA-PYD



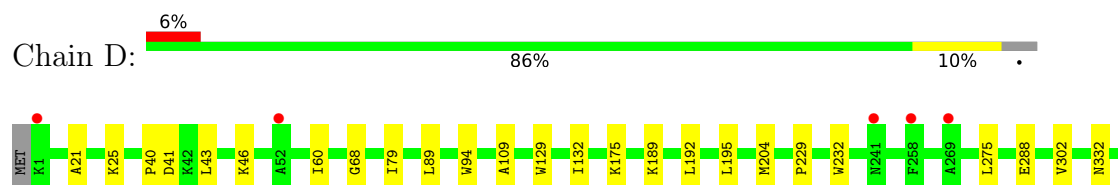
• Molecule 1: MBP-hMNDA-PYD

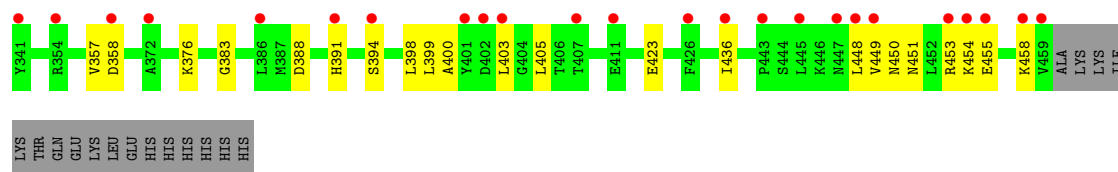


• Molecule 1: MBP-hMNDA-PYD

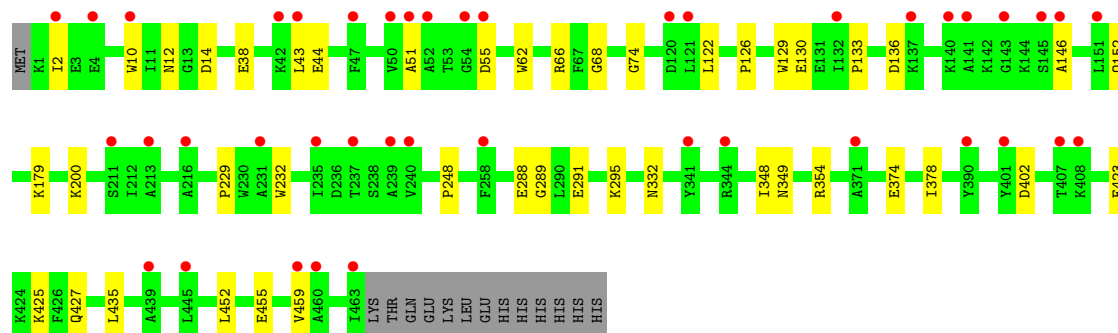
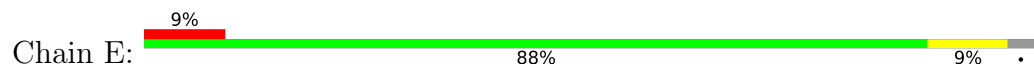


• Molecule 1: MBP-hMNDA-PYD

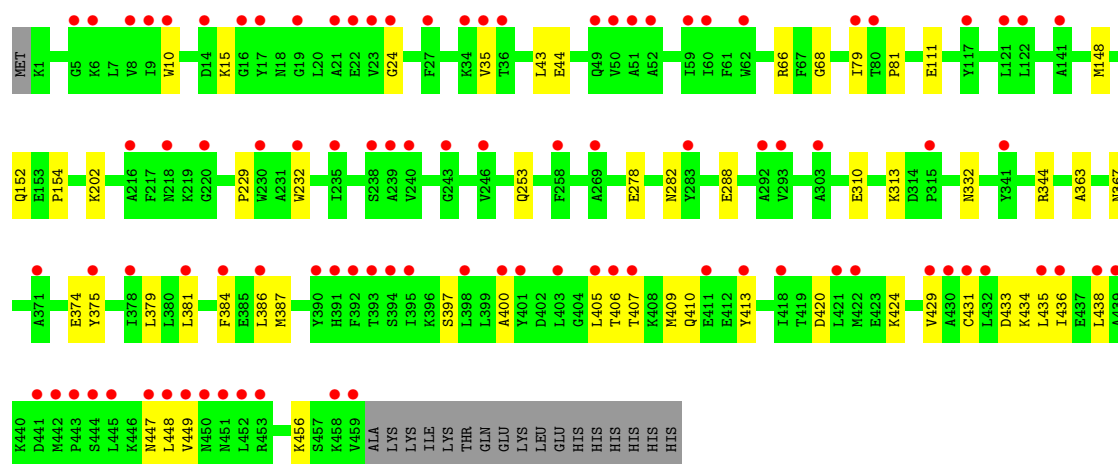
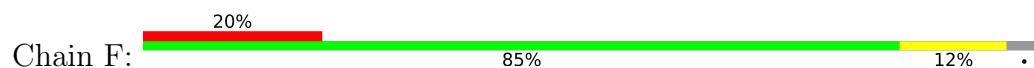




• Molecule 1: MBP-hMNDA-PYD



• Molecule 1: MBP-hMNDA-PYD



• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose





- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	192.15Å 235.61Å 73.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.36 – 2.00 48.36 – 2.00	Depositor EDS
% Data completeness (in resolution range)	89.0 (48.36-2.00) 89.2 (48.36-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.91 (at 2.00Å)	Xtriage
Refinement program	PHENIX (dev_2481: ???)	Depositor
R, R_{free}	0.221 , 0.269 0.223 , 0.271	Depositor DCC
R_{free} test set	10016 reflections (4.42%)	wwPDB-VP
Wilson B-factor (Å ²)	30.3	Xtriage
Anisotropy	0.853	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 35.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	22797	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.75% 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: GLC

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	0.13	0/3654	0.32	0/4950
1	B	0.15	0/3663	0.33	0/4960
1	C	0.14	0/3683	0.32	0/4988
1	D	0.13	0/3660	0.32	0/4957
1	E	0.13	0/3677	0.32	0/4979
1	F	0.13	0/3660	0.32	0/4957
All	All	0.13	0/21997	0.32	0/29791

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	3576	0	3597	26	0
1	B	3585	0	3616	23	0
1	C	3599	0	3631	25	0
1	D	3579	0	3605	27	0
1	E	3599	0	3625	28	0
1	F	3579	0	3605	34	0
2	G	23	0	21	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	H	23	0	21	0	0
2	I	23	0	21	1	0
2	J	23	0	21	0	0
2	K	23	0	21	0	0
2	L	23	0	21	0	0
3	A	240	0	0	6	0
3	B	239	0	0	5	0
3	C	189	0	0	2	0
3	D	173	0	0	0	0
3	E	159	0	0	2	0
3	F	142	0	0	3	0
All	All	22797	0	21805	161	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (161) 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:C:437:GLU:O	1:C:440:LYS:HE3	1.77	0.83
1:F:436:ILE:HG12	1:F:449:VAL:HG13	1.67	0.74
1:B:295:LYS:NZ	3:B:601:HOH:O	2.20	0.72
1:D:399:LEU:HB3	1:D:403:LEU:HD12	1.71	0.72
1:F:407:THR:HA	1:F:410:GLN:HB2	1.72	0.71
1:F:79:ILE:HD12	1:F:81:PRO:HD3	1.73	0.71
1:E:374:GLU:H	1:E:374:GLU:CD	2.03	0.66
1:F:24:GLY:HA3	1:F:35:VAL:HG21	1.77	0.66
1:A:173:ALA:O	3:A:601:HOH:O	2.15	0.64
1:F:44:GLU:HB2	1:F:66:ARG:HD3	1.81	0.62
1:F:400:ALA:HA	1:F:405:LEU:HB2	1.82	0.61
1:B:382:LYS:HG3	1:B:455:GLU:HG2	1.82	0.61
1:D:383:GLY:HA2	1:D:448:LEU:HD21	1.83	0.60
1:C:378:ILE:HD11	1:C:459:VAL:HG11	1.84	0.60
1:C:442:MET:HE3	1:C:445:LEU:HD12	1.84	0.59
1:B:297:LYS:NZ	3:B:608:HOH:O	2.36	0.59
1:F:447:ASN:OD1	1:F:448:LEU:N	2.35	0.59
1:B:400:ALA:HA	1:B:405:LEU:HB2	1.85	0.58
1:B:435:LEU:HD23	1:B:452:LEU:HD11	1.85	0.58
1:C:67:PHE:HD1	1:C:76:LEU:HD11	1.68	0.58
1:E:291:GLU:O	1:E:295:LYS:HB2	2.04	0.58
1:C:365:GLN:NE2	3:C:606:HOH:O	2.31	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:400:ALA:HA	1:D:405:LEU:HB2	1.86	0.57
1:D:21:ALA:O	1:D:25:LYS:HD2	2.04	0.57
1:E:10:TRP:CD1	1:E:38:GLU:HG3	2.40	0.57
1:A:325:GLN:NE2	3:A:610:HOH:O	2.36	0.57
1:F:313:LYS:NZ	3:F:604:HOH:O	2.27	0.57
1:F:253:GLN:NE2	3:F:610:HOH:O	2.38	0.57
1:F:154:PRO:HD3	1:F:344[B]:ARG:HG3	1.87	0.56
1:A:310:GLU:OE1	1:A:313:LYS:NZ	2.30	0.56
1:C:21:ALA:O	1:C:25:LYS:HG2	2.06	0.56
1:A:398:LEU:HD23	1:A:438:LEU:HD22	1.87	0.55
1:A:400:ALA:HA	1:A:405:LEU:HB2	1.89	0.55
1:A:147:LEU:HB2	1:A:224:MET:HE3	1.88	0.55
1:D:41:ASP:O	1:D:46:LYS:NZ	2.28	0.54
1:F:10:TRP:HB3	1:F:43:LEU:HD11	1.89	0.54
1:D:455:GLU:OE2	1:D:458:LYS:HE3	2.08	0.53
1:C:378:ILE:HG23	1:C:455:GLU:HG2	1.91	0.53
1:E:68:GLY:HA3	1:E:332:ASN:O	2.08	0.53
1:D:436:ILE:HG23	1:D:449:VAL:HG13	1.91	0.53
1:D:68:GLY:HA3	1:D:332:ASN:O	2.07	0.53
1:D:451:ASN:HA	1:D:454:LYS:HG2	1.90	0.53
1:F:44:GLU:N	1:F:44:GLU:OE1	2.42	0.53
1:F:363:ALA:O	1:F:367:ASN:HB2	2.08	0.52
1:D:450:ASN:OD1	1:D:453:ARG:NH1	2.43	0.52
1:E:10:TRP:HB3	1:E:43:LEU:HD11	1.91	0.52
1:B:436:ILE:HG23	1:B:449:VAL:HG13	1.90	0.52
1:E:44:GLU:OE1	1:E:44:GLU:N	2.34	0.52
1:D:388:ASP:OD1	1:D:391:HIS:ND1	2.44	0.51
1:E:74:GLY:O	3:E:601:HOH:O	2.19	0.51
1:F:288:GLU:H	1:F:288:GLU:CD	2.16	0.51
1:C:383:GLY:HA2	1:C:448:LEU:HD21	1.94	0.50
1:E:402:ASP:O	1:E:425:LYS:NZ	2.42	0.50
1:A:68:GLY:HA3	1:A:332:ASN:O	2.11	0.50
1:A:45:GLU:OE2	1:A:341:TYR:OH	2.27	0.50
1:F:374:GLU:OE1	1:F:374:GLU:N	2.39	0.50
1:B:34:LYS:HD2	1:B:35:VAL:N	2.27	0.49
1:B:407:THR:O	1:B:411:GLU:HG3	2.12	0.49
1:C:451:ASN:O	1:C:455:GLU:HB2	2.13	0.49
1:B:68:GLY:HA3	1:B:332:ASN:O	2.11	0.49
1:B:179:LYS:NZ	3:B:603:HOH:O	2.35	0.49
1:E:374:GLU:OE1	1:E:374:GLU:N	2.34	0.48
1:A:232:TRP:HB2	1:A:298:PRO:HG2	1.95	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:455:GLU:OE2	1:D:455:GLU:HA	2.13	0.48
1:F:310:GLU:HA	1:F:313:LYS:HE3	1.95	0.48
1:F:434:LYS:O	1:F:438:LEU:HG	2.14	0.48
1:B:9:ILE:HB	1:B:37:VAL:HG22	1.96	0.48
1:D:129:TRP:HA	1:D:132:ILE:HD13	1.96	0.48
1:E:288:GLU:HG2	1:E:289:GLY:N	2.29	0.48
1:B:79:ILE:O	3:B:602:HOH:O	2.20	0.48
1:F:420:ASP:O	1:F:424:LYS:HG3	2.14	0.48
1:E:374:GLU:O	1:E:378:ILE:HD12	2.14	0.48
1:A:192:LEU:O	1:A:196:VAL:HG23	2.14	0.47
1:C:344[B]:ARG:NH2	2:I:2:GLC:H62	2.29	0.47
1:C:455:GLU:O	1:C:459:VAL:HG22	2.14	0.47
1:F:278:GLU:OE2	1:F:282:ASN:ND2	2.38	0.47
1:F:381:LEU:O	1:F:386:LEU:HD13	2.13	0.47
1:C:39:HIS:ND1	1:C:39:HIS:O	2.48	0.46
1:D:43:LEU:HD13	1:D:60:ILE:HD11	1.97	0.46
1:D:376:LYS:HG3	1:D:423:GLU:HG3	1.98	0.46
1:D:275:LEU:H	1:D:275:LEU:HD12	1.81	0.46
1:A:40:PRO:HB2	1:A:46:LYS:HE3	1.97	0.46
1:D:195:LEU:HD12	1:D:204:MET:HE1	1.98	0.46
1:A:272:ASN:OD1	3:A:602:HOH:O	2.20	0.46
1:A:414:ASN:ND2	3:A:620:HOH:O	2.48	0.46
1:D:394:SER:O	1:D:398:LEU:HG	2.17	0.45
1:F:397:SER:HA	1:F:410:GLN:NE2	2.31	0.45
1:A:224:MET:HE3	1:A:224:MET:HB2	1.90	0.45
1:F:409:MET:HE3	1:F:413:TYR:CE2	2.51	0.45
1:F:229:PRO:HA	1:F:232:TRP:CE2	2.52	0.45
1:B:366:THR:O	1:B:370:ARG:HB3	2.15	0.45
1:E:200:LYS:NZ	3:E:617:HOH:O	2.50	0.45
1:A:196:VAL:HG12	1:A:200:LYS:HE3	1.99	0.45
1:E:51:ALA:HA	1:E:55:ASP:O	2.17	0.45
1:D:229:PRO:HA	1:D:232:TRP:CE2	2.52	0.45
1:F:68:GLY:HA3	1:F:332:ASN:O	2.17	0.45
1:F:15:LYS:HE3	1:F:111:GLU:OE2	2.17	0.44
1:B:229:PRO:HA	1:B:232:TRP:CE2	2.52	0.44
1:B:370:ARG:O	3:B:603:HOH:O	2.21	0.44
1:C:68:GLY:HA3	1:C:332:ASN:O	2.17	0.44
1:A:53:THR:O	1:B:288:GLU:HG2	2.18	0.44
1:A:79:ILE:HD12	1:A:81:PRO:HD3	1.99	0.44
1:F:406:THR:O	1:F:409:MET:HG2	2.17	0.44
1:F:152:GLN:NE2	3:F:607:HOH:O	2.35	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:379:LEU:HD22	1:F:431:CYS:HB2	2.00	0.44
1:B:258:PHE:HD2	1:B:340:TRP:CH2	2.35	0.44
1:E:122:LEU:HD21	1:E:126:PRO:HD3	1.98	0.44
1:B:292:ALA:O	1:B:295:LYS:HE3	2.18	0.44
1:A:46:LYS:HB2	1:A:46:LYS:HE2	1.74	0.43
1:A:182:GLY:HA2	3:A:652:HOH:O	2.18	0.43
1:C:78:GLU:OE1	1:C:102:LYS:NZ	2.36	0.43
1:D:40:PRO:HG2	1:D:43:LEU:HB3	2.01	0.43
1:D:288:GLU:H	1:D:288:GLU:CD	2.26	0.43
1:A:175:LYS:HE2	3:A:601:HOH:O	2.18	0.43
1:B:288:GLU:H	1:B:288:GLU:CD	2.24	0.43
1:B:437:GLU:O	1:B:440:LYS:HD2	2.17	0.43
1:C:439:ALA:HA	1:C:442:MET:HE2	1.99	0.43
1:D:189:LYS:HE2	1:D:358:ASP:CG	2.44	0.43
1:F:375:TYR:CZ	1:F:429:VAL:HG22	2.54	0.43
1:A:455:GLU:HA	1:A:458:LYS:HB3	2.01	0.43
1:A:92:PHE:CD2	1:D:175:LYS:HD2	2.54	0.43
1:C:229:PRO:HA	1:C:232:TRP:CE2	2.54	0.43
1:E:129:TRP:CD1	1:E:248:PRO:HB2	2.54	0.43
1:E:378:ILE:HD13	1:E:459:VAL:HG21	2.00	0.43
1:B:58:ASP:OD1	1:B:270:SER:OG	2.31	0.42
1:C:122:LEU:HD21	1:C:126:PRO:HD3	2.00	0.42
1:D:89:LEU:HD12	1:D:94:TRP:CZ2	2.54	0.42
1:D:109:ALA:HA	1:D:302:VAL:HA	2.00	0.42
1:B:43:LEU:HA	1:B:46:LYS:HB2	2.02	0.42
1:E:2:ILE:HD13	1:E:2:ILE:HA	1.78	0.42
1:F:202:LYS:HE2	1:F:202:LYS:HB3	1.84	0.42
1:B:295:LYS:HD2	1:B:295:LYS:C	2.44	0.42
1:E:12:ASN:ND2	1:E:14:ASP:OD1	2.51	0.42
1:A:158:TRP:CD1	1:A:258:PHE:CD2	3.08	0.42
1:C:389:ASP:O	1:C:393:THR:HG23	2.20	0.42
1:D:192:LEU:HG	1:D:357:VAL:HG22	2.02	0.42
1:E:136:ASP:HA	1:E:146:ALA:HB2	2.02	0.41
1:C:426:PHE:O	1:C:431:CYS:HB3	2.20	0.41
1:D:79:ILE:O	1:D:79:ILE:HG13	2.20	0.41
1:C:209:ASP:HB2	3:C:739:HOH:O	2.20	0.41
1:E:349:ASN:OD1	1:E:354:ARG:NH1	2.51	0.41
1:F:384:PHE:O	1:F:387:MET:HG2	2.20	0.41
1:C:46:LYS:HE2	1:C:46:LYS:HB2	1.77	0.41
1:F:148:MET:HE3	1:F:148:MET:HB2	1.79	0.41
1:E:130:GLU:O	1:E:133:PRO:HD2	2.19	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:426:PHE:O	1:A:431:CYS:HB3	2.20	0.41
1:E:152:GLN:HA	1:E:348:ILE:HD11	2.02	0.41
1:F:433:ASP:OD1	1:F:456:LYS:HE2	2.21	0.41
1:F:435:LEU:HD12	1:F:438:LEU:HD11	2.02	0.41
1:E:455:GLU:O	1:E:459:VAL:HG12	2.20	0.41
1:C:88:LYS:O	1:C:305:LYS:HG3	2.21	0.41
1:C:109:ALA:HA	1:C:302:VAL:HA	2.02	0.41
1:C:374:GLU:O	1:C:378:ILE:HD12	2.21	0.41
1:E:179:LYS:HA	1:E:179:LYS:HD3	1.87	0.41
1:E:435:LEU:HD23	1:E:452:LEU:HD11	2.02	0.41
1:A:371:ALA:HB1	1:A:374:GLU:HG3	2.03	0.40
1:E:229:PRO:HA	1:E:232:TRP:CE2	2.56	0.40
1:A:158:TRP:CE2	1:A:258:PHE:CE2	3.09	0.40
1:E:62:TRP:CD1	1:E:66:ARG:HG3	2.57	0.40
1:C:288:GLU:CD	1:C:288:GLU:H	2.29	0.40
1:E:423:GLU:O	1:E:427:GLN:HA	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	459/477 (96%)	452 (98%)	7 (2%)	0	100	100
1	B	460/477 (96%)	453 (98%)	7 (2%)	0	100	100
1	C	462/477 (97%)	452 (98%)	10 (2%)	0	100	100
1	D	459/477 (96%)	449 (98%)	10 (2%)	0	100	100
1	E	462/477 (97%)	450 (97%)	12 (3%)	0	100	100
1	F	459/477 (96%)	446 (97%)	13 (3%)	0	100	100
All	All	2761/2862 (96%)	2702 (98%)	59 (2%)	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	368/384 (96%)	368 (100%)	0	100	100
1	B	369/384 (96%)	369 (100%)	0	100	100
1	C	371/384 (97%)	371 (100%)	0	100	100
1	D	369/384 (96%)	369 (100%)	0	100	100
1	E	370/384 (96%)	370 (100%)	0	100	100
1	F	369/384 (96%)	369 (100%)	0	100	100
All	All	2216/2304 (96%)	2216 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	253	GLN
1	A	282	ASN
1	B	72	GLN
1	B	241	ASN
1	B	253	GLN
1	B	282	ASN
1	B	349	ASN
1	B	355	GLN
1	C	86	GLN
1	C	282	ASN
1	F	152	GLN
1	F	253	GLN
1	F	410	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

12 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	$\# Z > 2$
2	GLC	G	1	2	12,12,12	0.49	0	17,17,17	0.47	0
2	GLC	G	2	2	11,11,12	0.59	0	15,15,17	0.69	0
2	GLC	H	1	2	12,12,12	0.51	0	17,17,17	0.59	0
2	GLC	H	2	2	11,11,12	0.60	0	15,15,17	0.60	0
2	GLC	I	1	2	12,12,12	0.47	0	17,17,17	0.52	0
2	GLC	I	2	2	11,11,12	0.58	0	15,15,17	0.85	1 (6%)
2	GLC	J	1	2	12,12,12	0.50	0	17,17,17	0.41	0
2	GLC	J	2	2	11,11,12	0.57	0	15,15,17	1.05	1 (6%)
2	GLC	K	1	2	12,12,12	0.52	0	17,17,17	0.70	0
2	GLC	K	2	2	11,11,12	0.56	0	15,15,17	0.85	1 (6%)
2	GLC	L	1	2	12,12,12	0.50	0	17,17,17	0.47	0
2	GLC	L	2	2	11,11,12	0.56	0	15,15,17	0.90	1 (6%)

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
2	GLC	G	1	2	-	0/2/22/22	0/1/1/1
2	GLC	G	2	2	-	0/2/19/22	0/1/1/1
2	GLC	H	1	2	-	1/2/22/22	0/1/1/1
2	GLC	H	2	2	-	0/2/19/22	0/1/1/1
2	GLC	I	1	2	-	0/2/22/22	0/1/1/1
2	GLC	I	2	2	-	0/2/19/22	0/1/1/1
2	GLC	J	1	2	-	0/2/22/22	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	J	2	2	-	0/2/19/22	0/1/1/1
2	GLC	K	1	2	-	0/2/22/22	0/1/1/1
2	GLC	K	2	2	-	0/2/19/22	0/1/1/1
2	GLC	L	1	2	-	1/2/22/22	0/1/1/1
2	GLC	L	2	2	-	0/2/19/22	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(°)
2	J	2	GLC	C1-O5-C5	3.40	116.74	112.19
2	L	2	GLC	C1-O5-C5	2.86	116.02	112.19
2	I	2	GLC	C1-O5-C5	2.46	115.49	112.19
2	K	2	GLC	C1-O5-C5	2.20	115.13	112.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

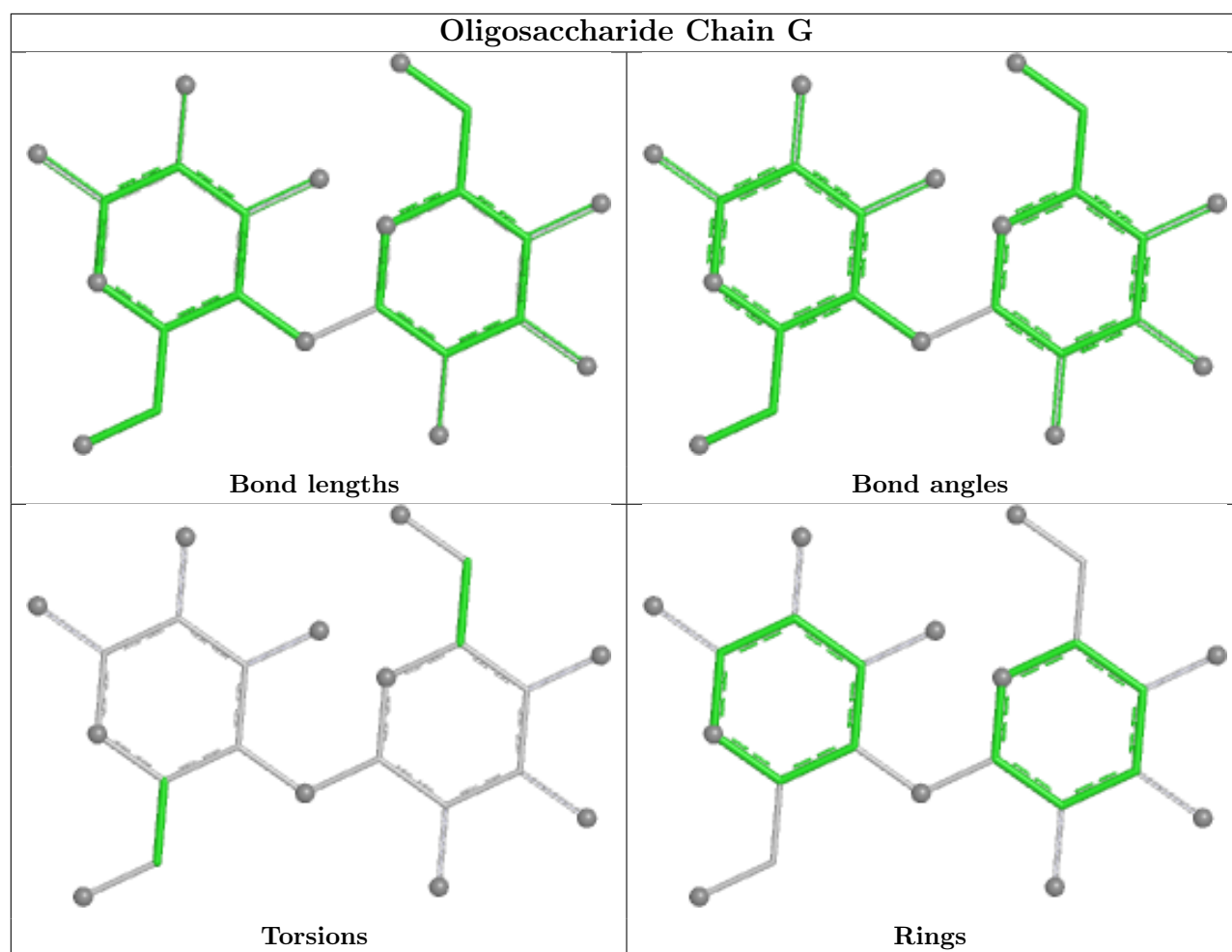
Mol	Chain	Res	Type	Atoms
2	L	1	GLC	C4-C5-C6-O6
2	H	1	GLC	C4-C5-C6-O6

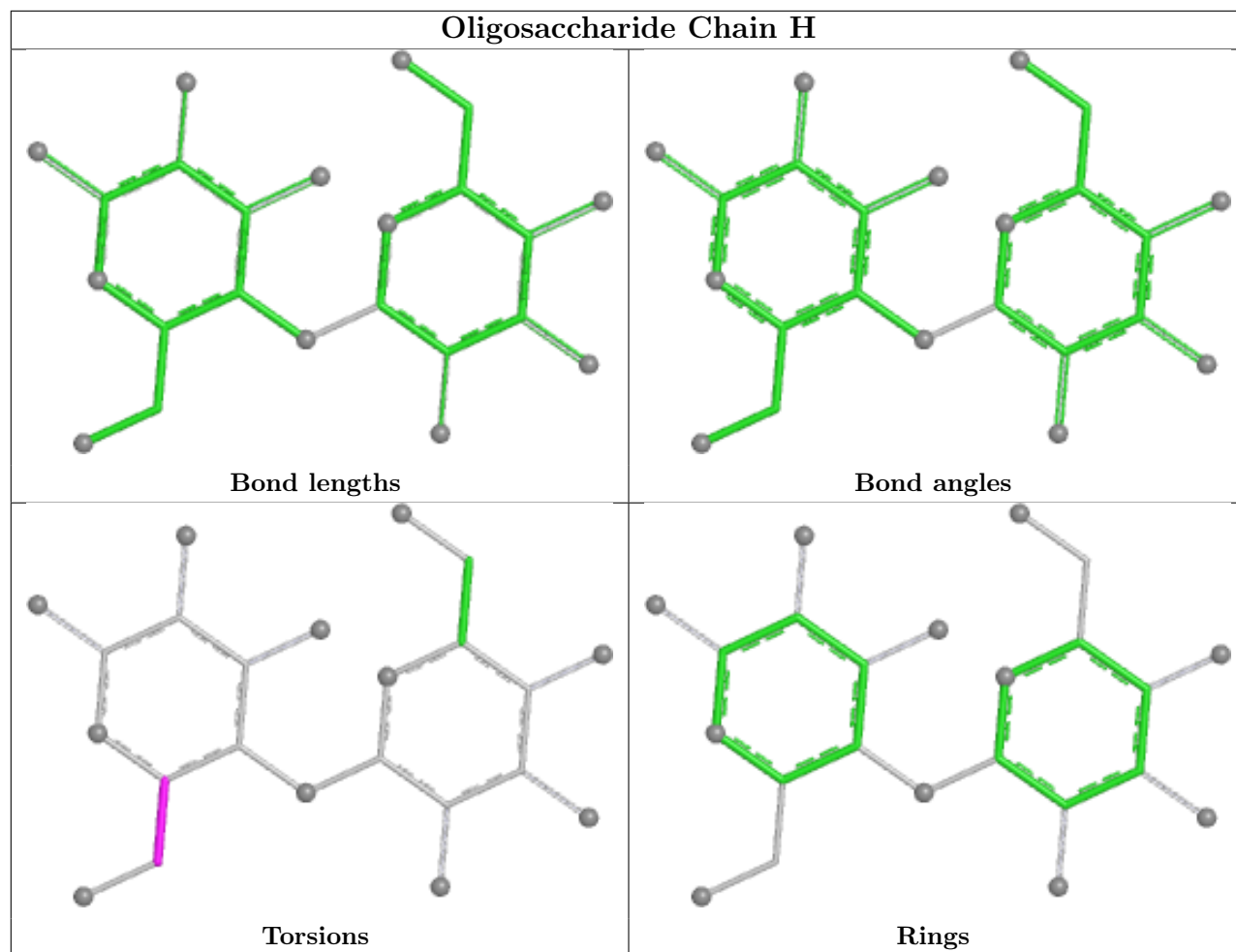
There are no ring outliers.

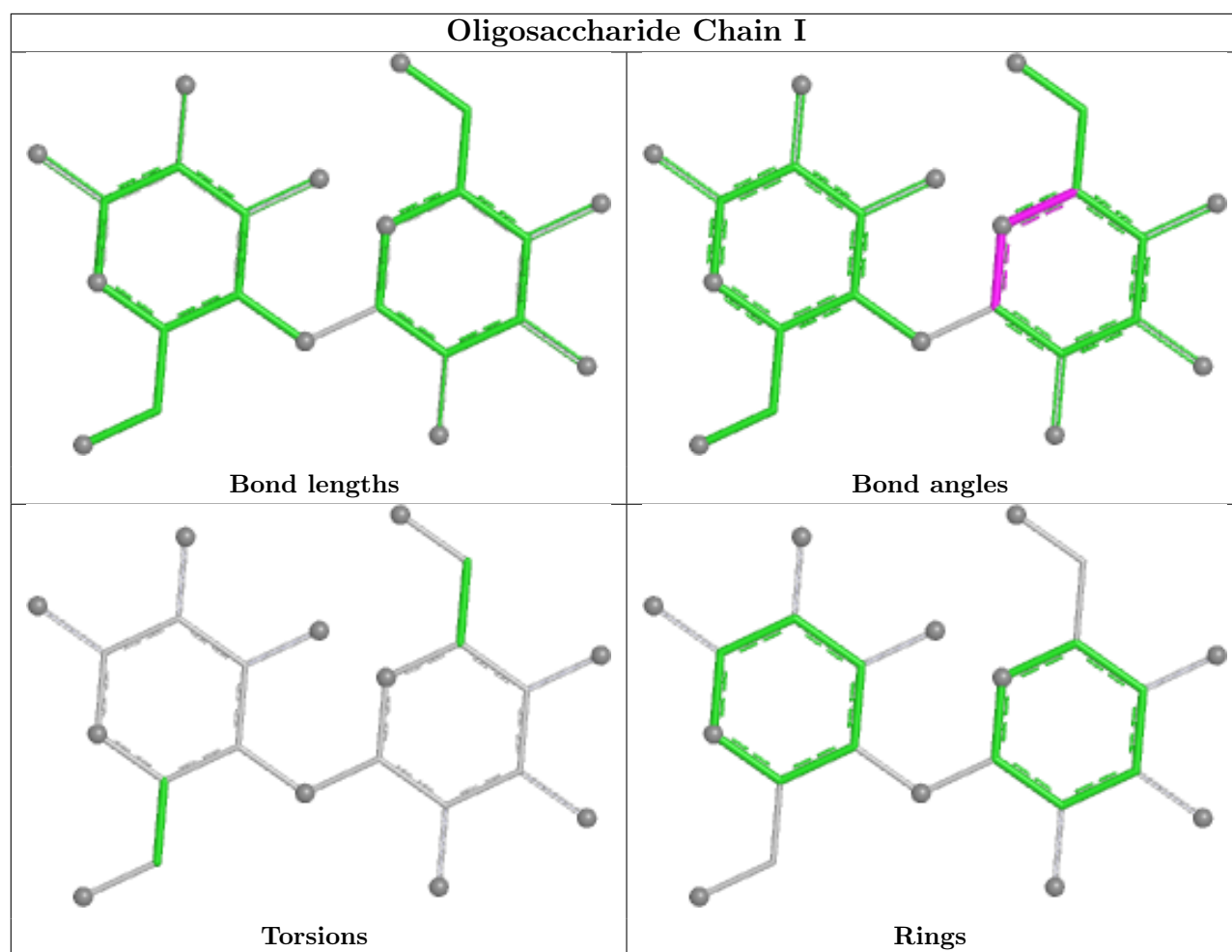
1 monomer is involved in 1 short contact:

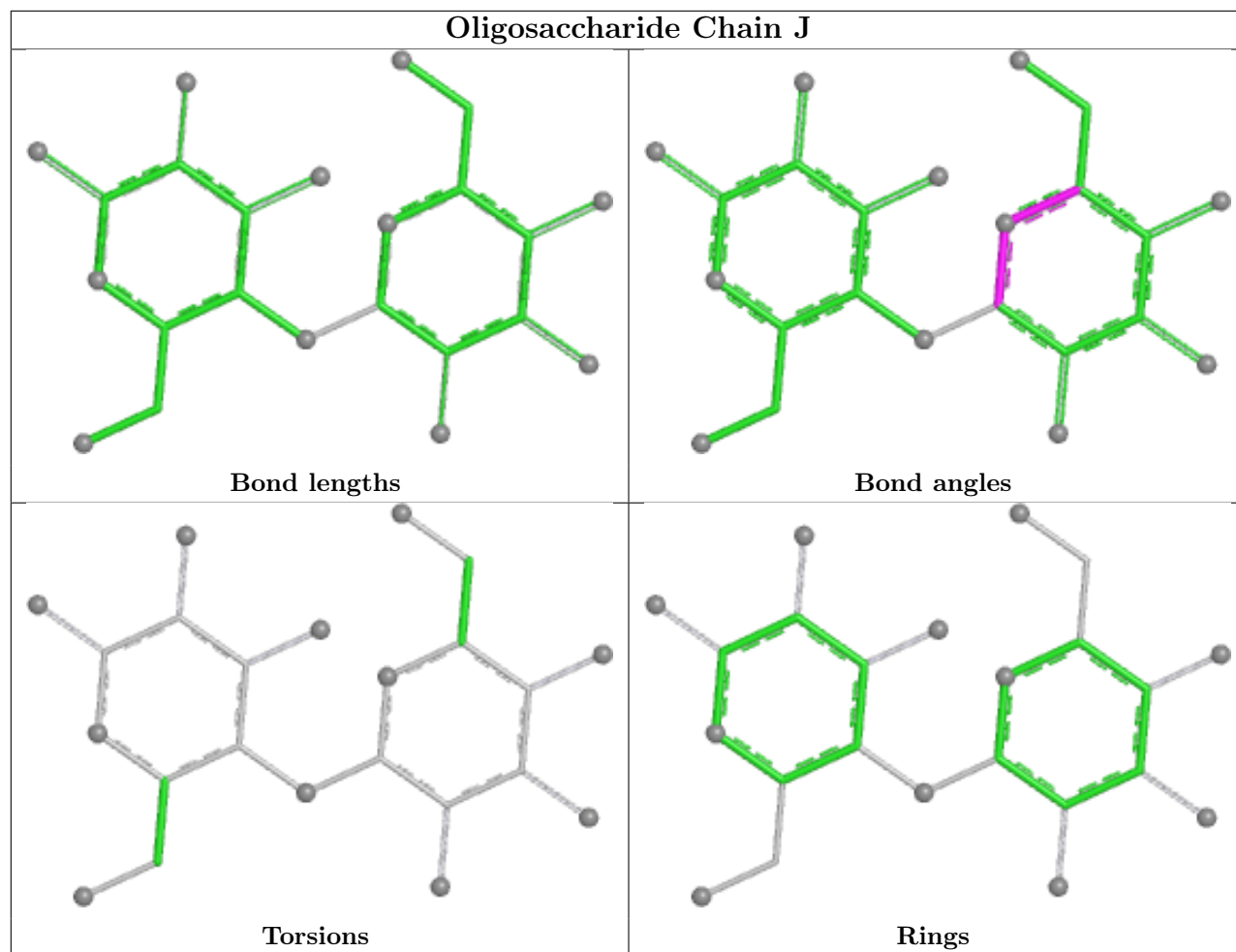
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	I	2	GLC	1	0

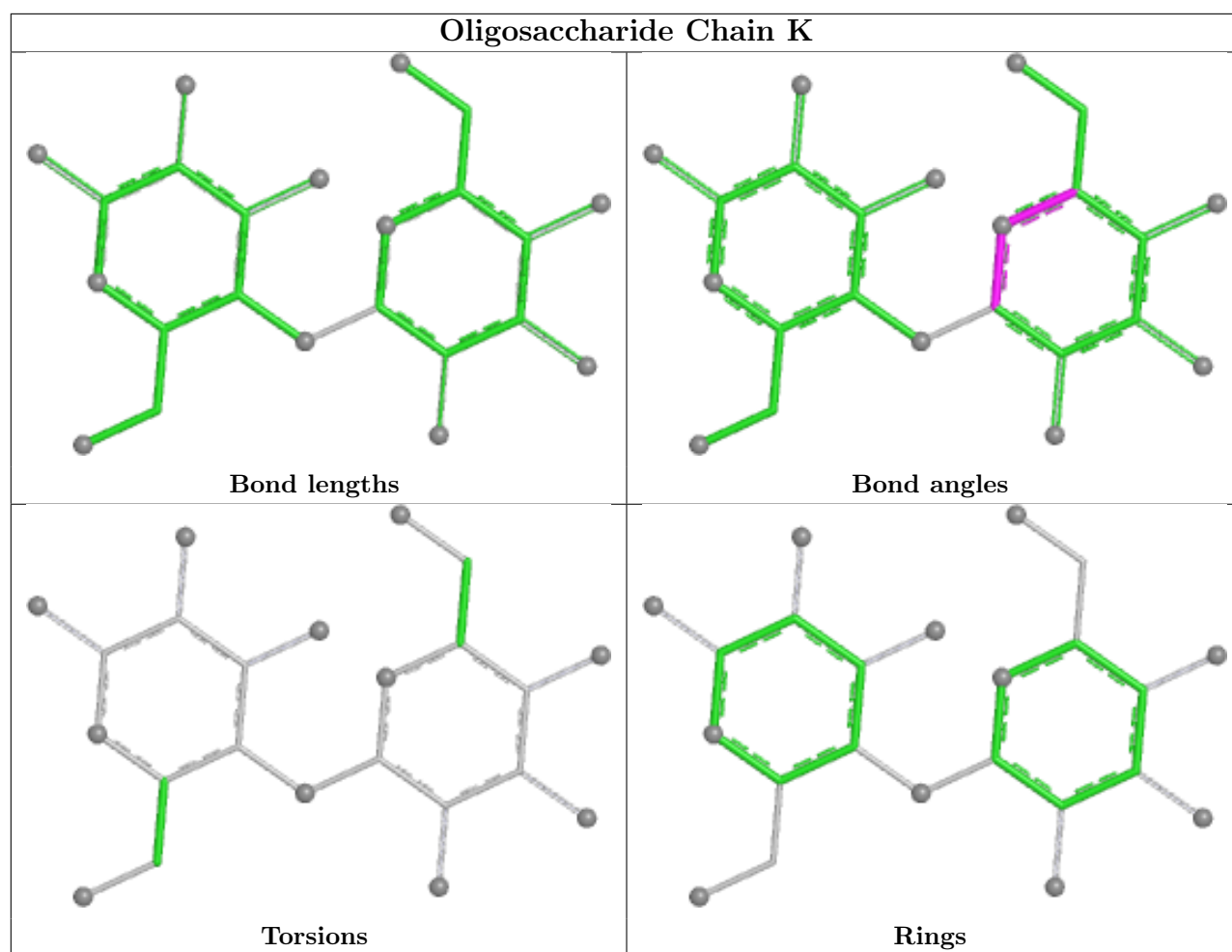
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

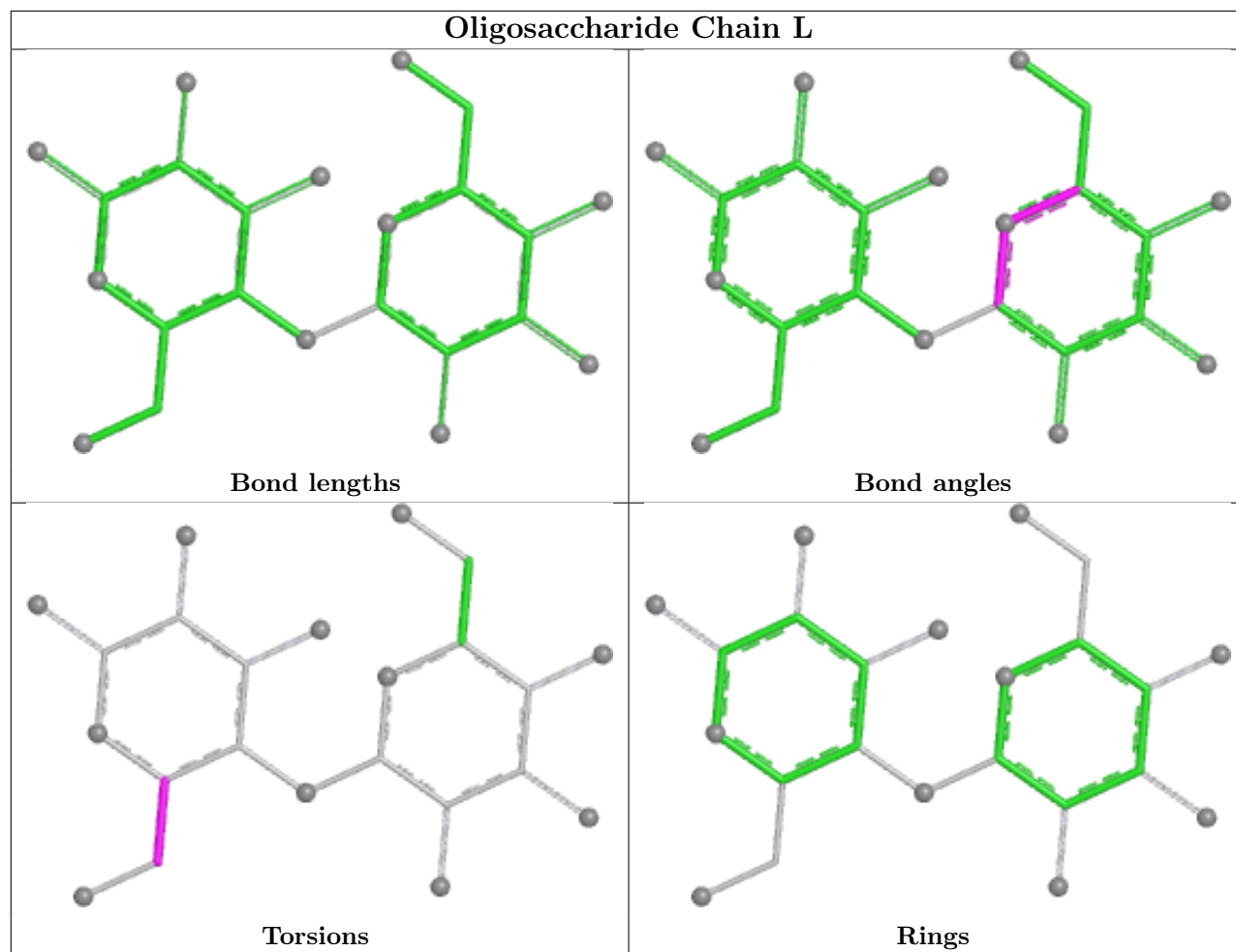












5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	460/477 (96%)	0.47	13 (2%)	55	54	14, 31, 47, 62	1 (0%)
1	B	462/477 (96%)	0.55	26 (5%)	30	29	20, 31, 60, 75	0
1	C	461/477 (96%)	0.62	20 (4%)	40	39	17, 33, 54, 74	3 (0%)
1	D	459/477 (96%)	0.71	29 (6%)	26	24	17, 35, 56, 84	2 (0%)
1	E	463/477 (97%)	0.92	42 (9%)	15	13	16, 38, 56, 77	1 (0%)
1	F	459/477 (96%)	1.27	95 (20%)	2	2	18, 42, 76, 90	2 (0%)
All	All	2764/2862 (96%)	0.76	225 (8%)	18	17	14, 35, 59, 90	9 (0%)

All (225) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	459	VAL	6.3
1	F	459	VAL	6.0
1	F	443	PRO	5.5
1	F	239	ALA	5.0
1	A	460	ALA	4.6
1	F	390	TYR	4.2
1	E	463	ILE	4.0
1	C	443	PRO	3.9
1	F	452	LEU	3.8
1	F	438	LEU	3.8
1	D	258	PHE	3.8
1	E	401	TYR	3.7
1	F	35	VAL	3.7
1	C	451	ASN	3.6
1	F	235	ILE	3.6
1	F	21	ALA	3.6
1	B	443	PRO	3.6
1	F	449	VAL	3.5
1	C	445	LEU	3.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	442	MET	3.3
1	B	372	ALA	3.3
1	F	398	LEU	3.3
1	E	145	SER	3.3
1	E	231	ALA	3.3
1	F	52	ALA	3.2
1	F	23	VAL	3.2
1	E	390	TYR	3.2
1	B	439	ALA	3.1
1	E	2	ILE	3.1
1	B	258	PHE	3.1
1	E	460	ALA	3.1
1	D	448	LEU	3.1
1	F	436	ILE	3.1
1	F	240	VAL	3.0
1	F	445	LEU	3.0
1	F	292	ALA	3.0
1	E	408	LYS	3.0
1	F	413	TYR	3.0
1	B	398	LEU	2.9
1	C	448	LEU	2.9
1	E	459	VAL	2.9
1	E	42	LYS	2.9
1	B	413	TYR	2.9
1	D	455	GLU	2.9
1	F	371	ALA	2.9
1	E	50	VAL	2.9
1	A	454	LYS	2.9
1	F	232	TRP	2.9
1	C	459	VAL	2.8
1	F	79	ILE	2.8
1	F	378	ILE	2.8
1	E	258	PHE	2.8
1	C	390	TYR	2.8
1	D	269	ALA	2.8
1	F	442	MET	2.8
1	E	407	THR	2.8
1	F	141	ALA	2.8
1	F	293	VAL	2.8
1	B	369	ALA	2.8
1	F	341	TYR	2.8
1	F	375	TYR	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	143	GLY	2.7
1	D	403	LEU	2.7
1	F	17	TYR	2.7
1	F	451	ASN	2.7
1	E	211	SER	2.7
1	E	140	LYS	2.7
1	F	401	TYR	2.7
1	F	238	SER	2.7
1	E	137	LYS	2.7
1	E	43	LEU	2.7
1	F	19	GLY	2.7
1	C	239	ALA	2.6
1	F	405	LEU	2.6
1	F	431	CYS	2.6
1	D	407	THR	2.6
1	C	444	SER	2.6
1	F	50	VAL	2.6
1	F	406	THR	2.6
1	F	258	PHE	2.6
1	B	401	TYR	2.6
1	E	54	GLY	2.6
1	F	16	GLY	2.6
1	F	6	LYS	2.6
1	D	372	ALA	2.6
1	A	258	PHE	2.5
1	F	8	VAL	2.5
1	F	283	TYR	2.5
1	F	391	HIS	2.5
1	F	450	ASN	2.5
1	E	55	ASP	2.5
1	E	216	ALA	2.5
1	E	371	ALA	2.5
1	B	405	LEU	2.5
1	F	392	PHE	2.5
1	C	441	ASP	2.5
1	F	441	ASP	2.5
1	B	444	SER	2.5
1	B	462	LYS	2.5
1	D	411	GLU	2.5
1	C	457	SER	2.5
1	D	443	PRO	2.5
1	A	443	PRO	2.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	439	ALA	2.4
1	D	445	LEU	2.4
1	D	241	ASN	2.4
1	A	459	VAL	2.4
1	F	60	ILE	2.4
1	D	1	LYS	2.4
1	F	243	GLY	2.4
1	B	459	VAL	2.4
1	D	394	SER	2.4
1	B	53	THR	2.4
1	F	315	PRO	2.4
1	F	448	LEU	2.4
1	F	411	GLU	2.4
1	C	450	ASN	2.4
1	F	218	ASN	2.4
1	F	80	THR	2.4
1	D	358	ASP	2.3
1	F	14	ASP	2.3
1	F	34	LYS	2.3
1	F	458	LYS	2.3
1	F	407	THR	2.3
1	A	390	TYR	2.3
1	D	341	TYR	2.3
1	A	447	ASN	2.3
1	E	121	LEU	2.3
1	C	358	ASP	2.3
1	D	354	ARG	2.3
1	D	458	LYS	2.3
1	D	426	PHE	2.3
1	F	59	ILE	2.3
1	B	50	VAL	2.3
1	D	52	ALA	2.3
1	E	141	ALA	2.3
1	B	404	GLY	2.3
1	F	10	TRP	2.3
1	D	453	ARG	2.3
1	F	453	ARG	2.3
1	D	454	LYS	2.3
1	F	49	GLN	2.3
1	D	449	VAL	2.3
1	A	52	ALA	2.3
1	F	394	SER	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	449	VAL	2.2
1	B	37	VAL	2.2
1	B	406	THR	2.2
1	F	447	ASN	2.2
1	C	141	ALA	2.2
1	E	146	ALA	2.2
1	F	444	SER	2.2
1	F	429	VAL	2.2
1	B	388	ASP	2.2
1	F	381	LEU	2.2
1	E	10	TRP	2.2
1	F	230	TRP	2.2
1	C	446	LYS	2.2
1	C	447	ASN	2.2
1	D	447	ASN	2.2
1	D	402	ASP	2.2
1	F	22	GLU	2.2
1	F	220	GLY	2.2
1	A	372	ALA	2.2
1	C	373	ALA	2.2
1	F	400	ALA	2.2
1	F	435	LEU	2.2
1	A	444	SER	2.2
1	B	457	SER	2.2
1	B	341	TYR	2.2
1	F	422	MET	2.2
1	D	436	ILE	2.1
1	E	4	GLU	2.1
1	E	47	PHE	2.1
1	B	49	GLN	2.1
1	D	391	HIS	2.1
1	B	460	ALA	2.1
1	E	52	ALA	2.1
1	F	303	ALA	2.1
1	F	430	ALA	2.1
1	F	121	LEU	2.1
1	F	421	LEU	2.1
1	A	450	ASN	2.1
1	B	390	TYR	2.1
1	F	393	THR	2.1
1	F	384	PHE	2.1
1	E	51	ALA	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	213	ALA	2.1
1	F	51	ALA	2.1
1	F	269	ALA	2.1
1	A	445	LEU	2.1
1	F	403	LEU	2.1
1	E	341	TYR	2.1
1	F	117	TYR	2.1
1	E	237	THR	2.1
1	F	9	ILE	2.1
1	F	395	ILE	2.1
1	C	461	LYS	2.1
1	E	239	ALA	2.1
1	D	386	LEU	2.1
1	E	120	ASP	2.1
1	C	341	TYR	2.1
1	D	401	TYR	2.1
1	E	344	ARG	2.1
1	F	36	THR	2.1
1	F	5	GLY	2.1
1	F	24	GLY	2.1
1	E	235	ILE	2.1
1	F	418	ILE	2.1
1	F	62	TRP	2.1
1	B	51	ALA	2.1
1	E	151	LEU	2.0
1	F	386	LEU	2.0
1	E	132	ILE	2.0
1	E	240	VAL	2.0
1	F	27	PHE	2.0
1	F	246	VAL	2.0
1	B	442	MET	2.0
1	F	216	ALA	2.0
1	F	439	ALA	2.0
1	E	445	LEU	2.0
1	F	122	LEU	2.0
1	F	432	LEU	2.0
1	C	102	LYS	2.0
1	B	428	GLY	2.0

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

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

6.3 Carbohydrates

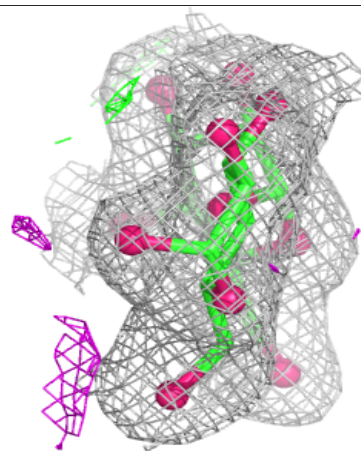
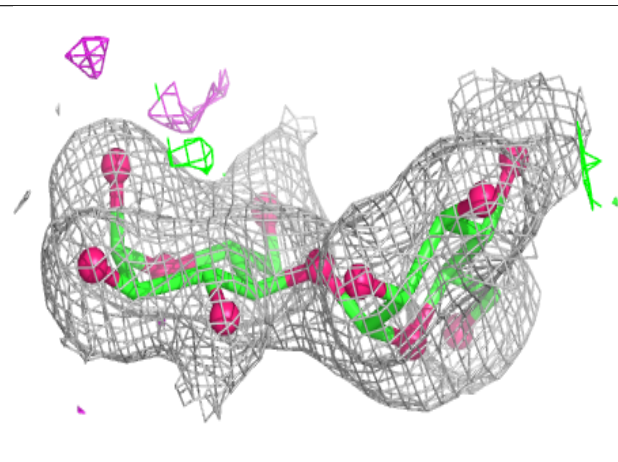
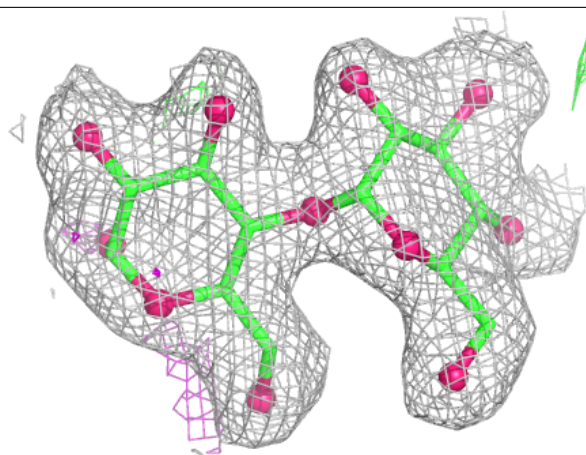
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GLC	K	1	12/12	0.87	0.11	32,34,36,39	0
2	GLC	L	1	12/12	0.87	0.11	33,38,41,46	0
2	GLC	L	2	11/12	0.88	0.11	28,32,35,36	0
2	GLC	G	1	12/12	0.90	0.09	28,32,33,35	0
2	GLC	I	1	12/12	0.90	0.09	28,31,35,36	0
2	GLC	J	1	12/12	0.90	0.09	25,33,36,38	0
2	GLC	H	1	12/12	0.92	0.08	26,30,31,32	0
2	GLC	K	2	11/12	0.92	0.08	28,31,34,35	0
2	GLC	J	2	11/12	0.94	0.07	23,29,32,32	0
2	GLC	H	2	11/12	0.95	0.07	20,24,26,27	0
2	GLC	G	2	11/12	0.95	0.08	23,25,30,30	0
2	GLC	I	2	11/12	0.95	0.06	23,27,30,32	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.

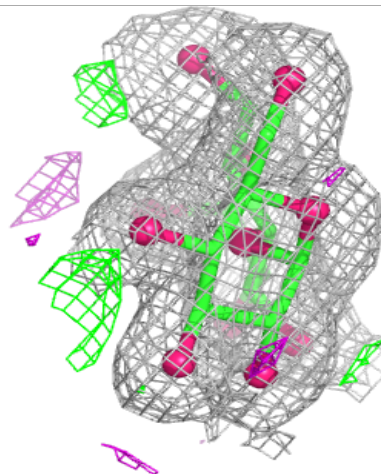
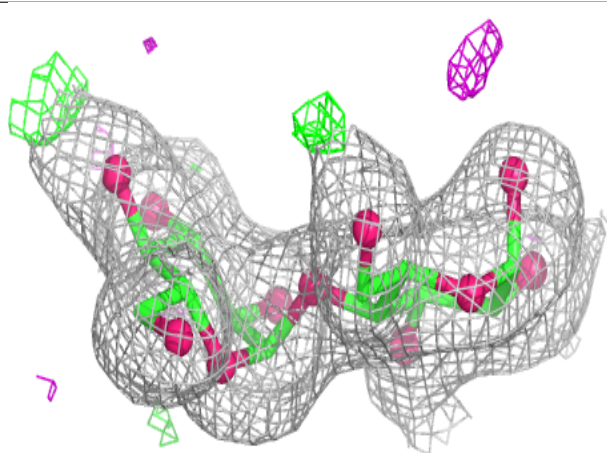
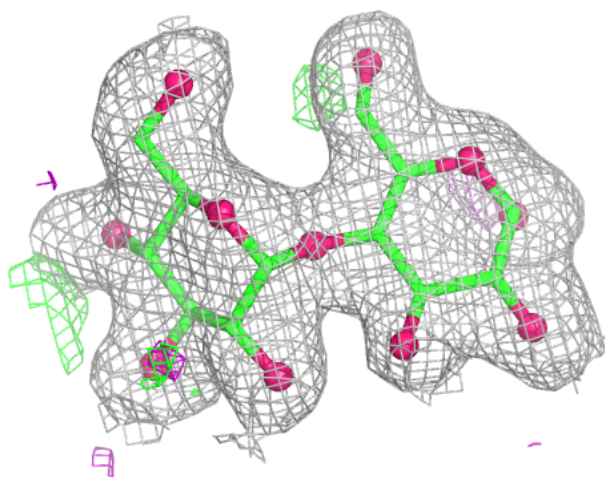
Electron density around Chain G:

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



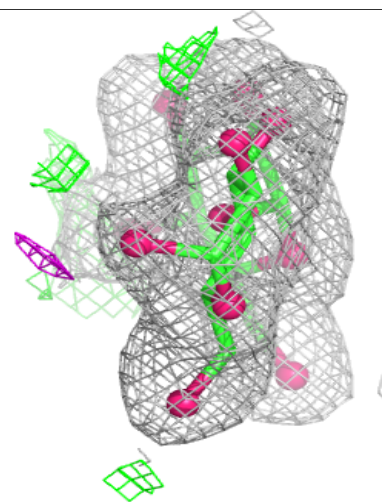
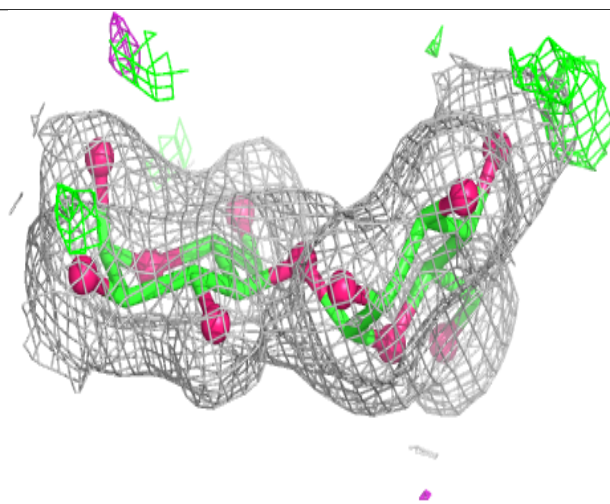
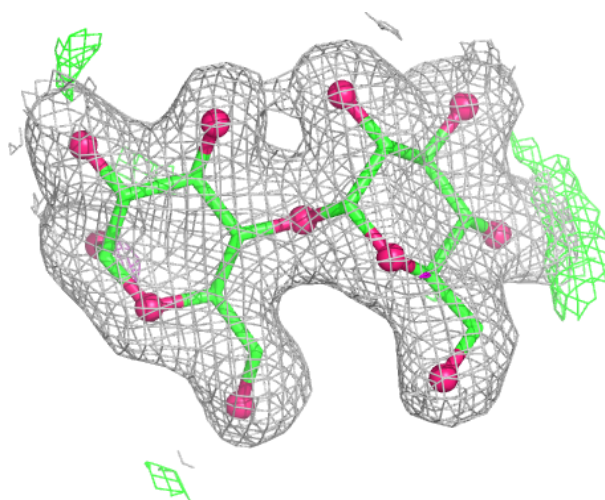
Electron density around Chain H:

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



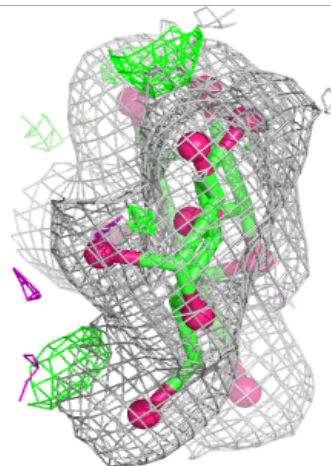
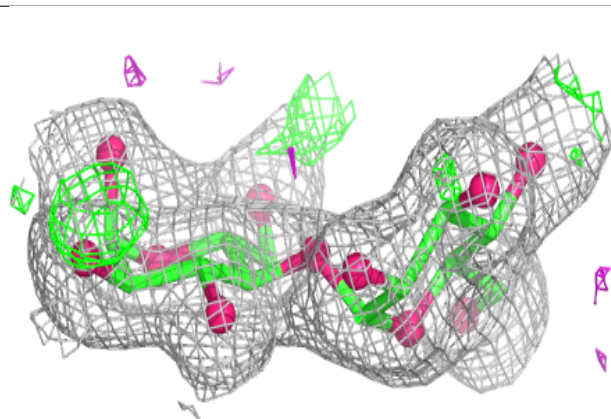
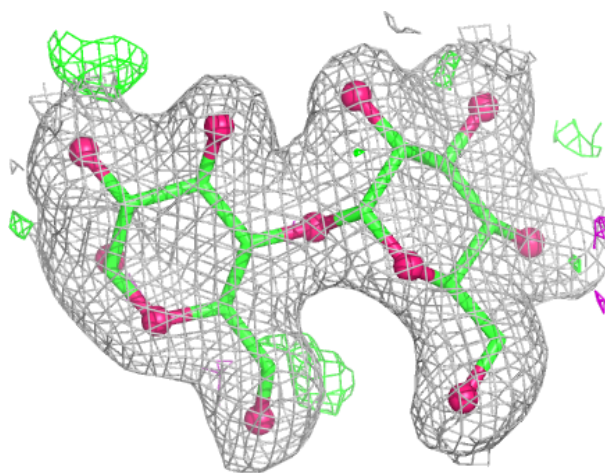
Electron density around Chain I:

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



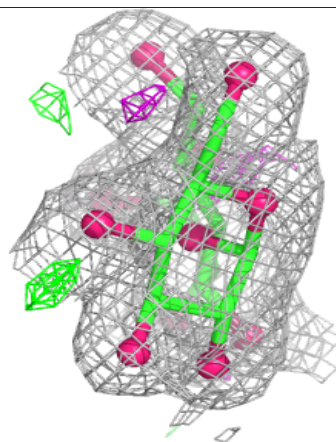
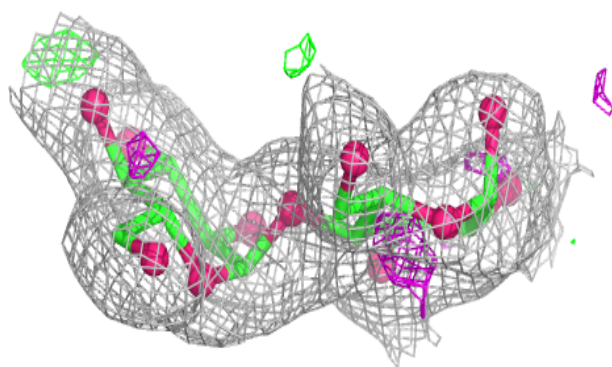
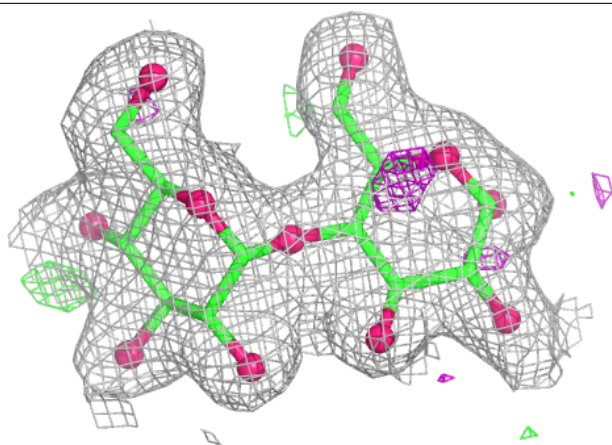
Electron density around Chain J:

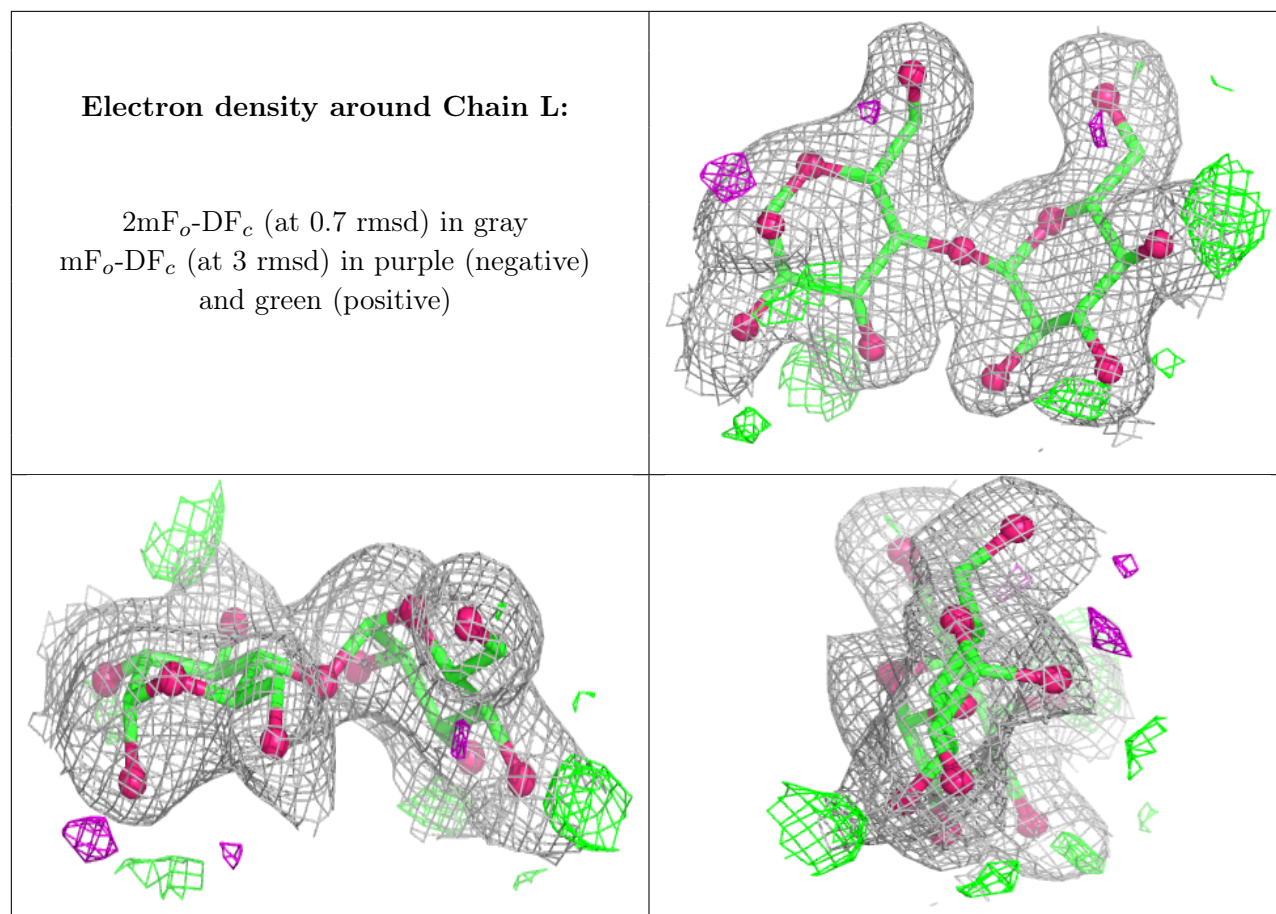
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain 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 [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.