



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:30 PM UTC

PDB ID : 5M8R / pdb_00005m8r
Title : Crystal structure of human tyrosinase related protein 1 (T391V-R374S-Y362F)
in complex with mimosine
Authors : Lai, X.; Soler-Lopez, M.; Wichers, H.J.; Dijkstra, B.W.
Deposited on : 2016-10-29
Resolution : 2.40 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

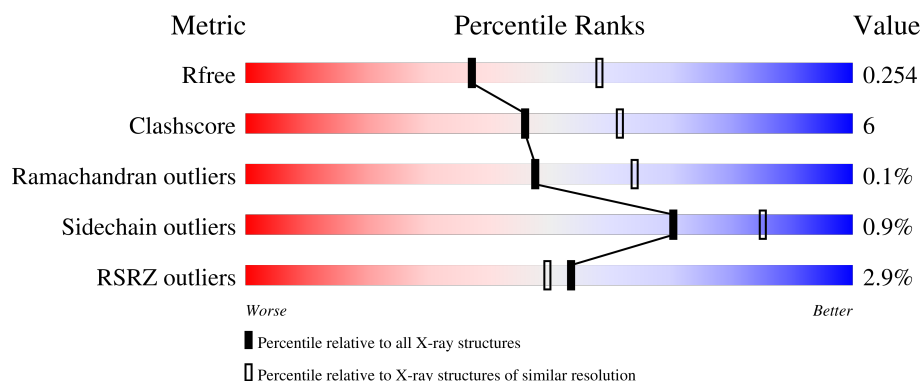
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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	446	<div> <div>0%</div> <div>87%</div> <div>13%</div> </div>
1	B	446	<div> <div>4%</div> <div>86%</div> <div>13%</div> </div>
1	C	446	<div> <div>2%</div> <div>86%</div> <div>13%</div> </div>
1	D	446	<div> <div>4%</div> <div>86%</div> <div>13%</div> </div>
2	E	3	<div> <div>33%</div> <div>67%</div> </div>

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Mol	Chain	Length	Quality of chain
2	F	3	 33% 67%
2	I	3	 33% 33% 33%
2	J	3	 67% 33%
3	G	2	 100%
3	K	2	 50% 50%
4	H	4	 25% 75%
4	L	4	 100%
5	M	2	 100%

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 14806 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.

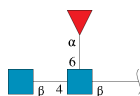
- Molecule 1 is a protein called 5,6-dihydroxyindole-2-carboxylic acid oxidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	446	Total	C	N	O	S	0	0	0
			3554	2231	629	671	23			
1	B	446	Total	C	N	O	S	0	0	0
			3554	2231	629	671	23			
1	C	446	Total	C	N	O	S	0	0	0
			3554	2231	629	671	23			
1	D	446	Total	C	N	O	S	0	0	0
			3554	2231	629	671	23			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	362	PHE	TYR	engineered mutation	UNP P17643
A	374	SER	ARG	engineered mutation	UNP P17643
A	391	VAL	THR	engineered mutation	UNP P17643
B	362	PHE	TYR	engineered mutation	UNP P17643
B	374	SER	ARG	engineered mutation	UNP P17643
B	391	VAL	THR	engineered mutation	UNP P17643
C	362	PHE	TYR	engineered mutation	UNP P17643
C	374	SER	ARG	engineered mutation	UNP P17643
C	391	VAL	THR	engineered mutation	UNP P17643
D	362	PHE	TYR	engineered mutation	UNP P17643
D	374	SER	ARG	engineered mutation	UNP P17643
D	391	VAL	THR	engineered mutation	UNP P17643

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	3	Total	C	N	O	0	0	0
			38	22	2	14			
2	F	3	Total	C	N	O	0	0	0
			38	22	2	14			
2	I	3	Total	C	N	O	0	0	0
			38	22	2	14			
2	J	3	Total	C	N	O	0	0	0
			38	22	2	14			

- Molecule 3 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
3	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	K	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



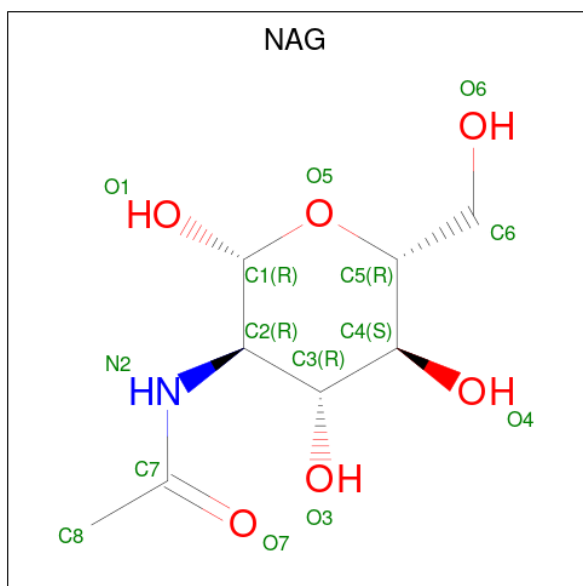
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	H	4	Total	C	N	O	0	0	0
			50	28	2	20			
4	L	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 5 is an oligosaccharide called alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	M	2	Total	C	N	O	0	0	0
			24	14	1	9			

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

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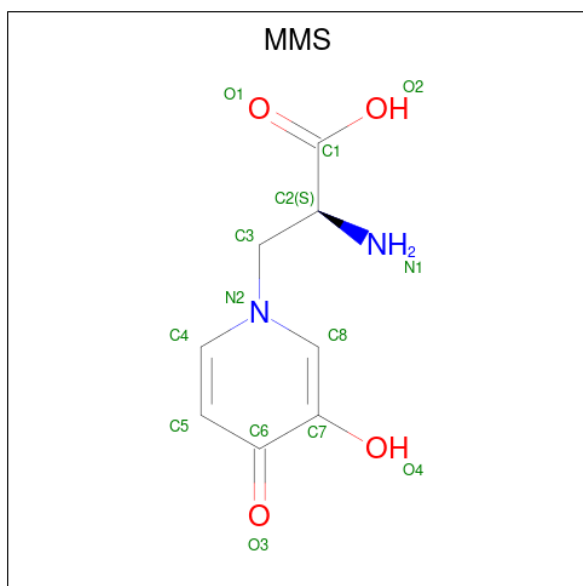
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	D	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	3	Total	Zn	0	0
			3	3		
7	B	2	Total	Zn	0	0
			2	2		
7	C	2	Total	Zn	0	0
			2	2		
7	D	2	Total	Zn	0	0
			2	2		

- Molecule 8 is MIMOSINE (CCD ID: MMS) (formula: C₈H₁₀N₂O₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	N	O	0	0
			14	8	2	4		
8	B	1	Total	C	N	O	0	0
			14	8	2	4		
8	C	1	Total	C	N	O	0	0
			14	8	2	4		
8	D	1	Total	C	N	O	0	0
			14	8	2	4		

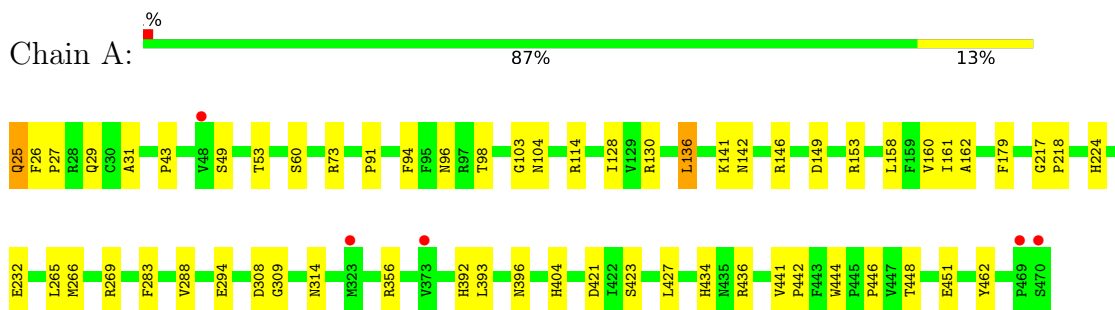
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	6	Total 6	O 6	0	0
9	B	11	Total 11	O 11	0	0
9	C	9	Total 9	O 9	0	0
9	D	13	Total 13	O 13	0	0

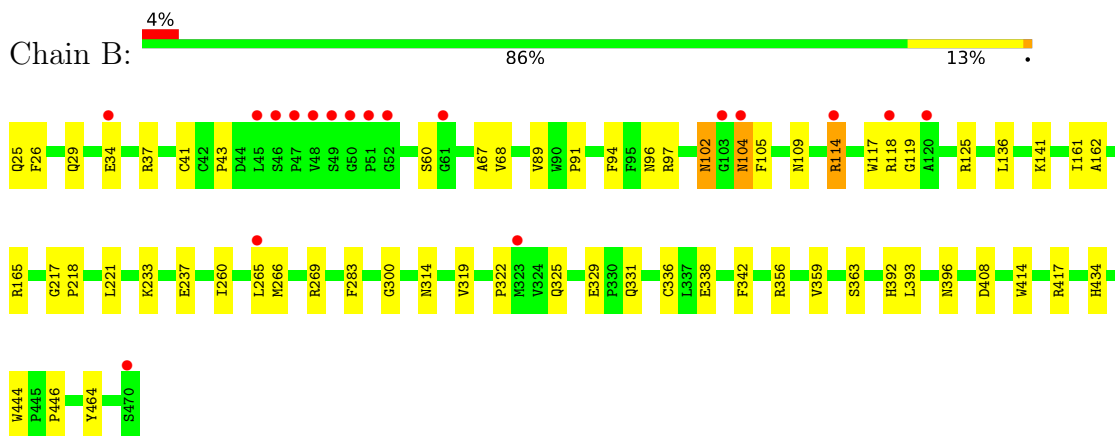
3 Residue-property plots [i](#)

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.

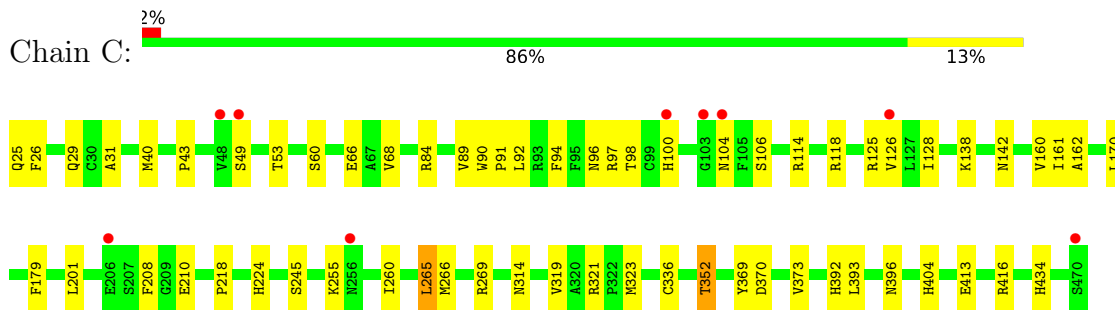
- Molecule 1: 5,6-dihydroxyindole-2-carboxylic acid oxidase



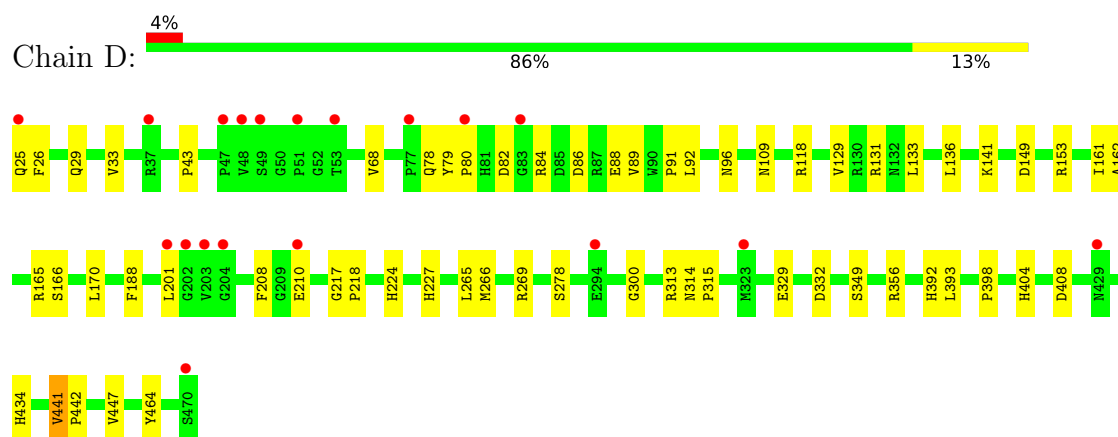
- Molecule 1: 5,6-dihydroxyindole-2-carboxylic acid oxidase



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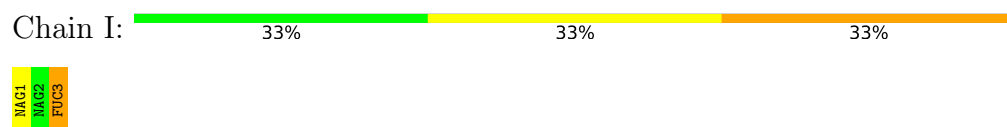
- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



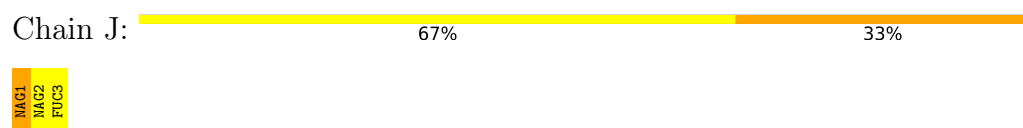
- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



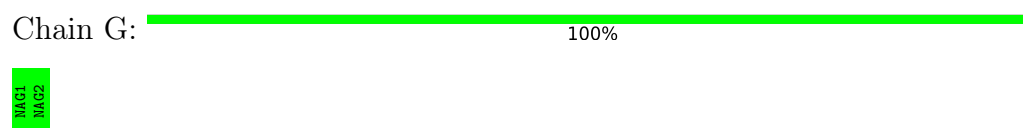
- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



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



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



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

Chain K:  50% 50%


NAG1
NAG2

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

Chain H:  25% 75%

NAG1
NAG2
MAN3
MAN4

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

Chain L:  100%

NAG1
NAG2
MAN3
MAN4

- Molecule 5: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%

NAG1
FUC2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	89.35Å 139.73Å 190.95Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.74 – 2.40 47.74 – 2.40	Depositor EDS
% Data completeness (in resolution range)	100.0 (47.74-2.40) 94.5 (47.74-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.80 (at 2.39Å)	Xtriage
Refinement program	REFMAC, PHENIX 1.10.1_2155	Depositor
R, R_{free}	0.200 , 0.249 0.210 , 0.254	Depositor DCC
R_{free} test set	4651 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	35.9	Xtriage
Anisotropy	0.406	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 32.7	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	0.93	EDS
Total number of atoms	14806	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.84% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MAN, NAG, FUC, MMS

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	0.40	0/3661	0.63	2/4990 (0.0%)
1	B	0.43	0/3661	0.62	3/4990 (0.1%)
1	C	0.40	0/3661	0.61	2/4990 (0.0%)
1	D	0.38	0/3661	0.58	1/4990 (0.0%)
All	All	0.40	0/14644	0.61	8/19960 (0.0%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	441	VAL	N-CA-C	5.56	113.41	108.63
1	B	104	ASN	CA-C-N	5.55	133.23	122.07
1	B	104	ASN	C-N-CA	5.55	133.23	122.07
1	B	114	ARG	NE-CZ-NH2	-5.25	114.48	119.20
1	C	255	LYS	CA-C-N	5.19	130.22	121.14
1	C	255	LYS	C-N-CA	5.19	130.22	121.14
1	A	25	GLN	CA-C-N	-5.14	107.48	122.38
1	A	25	GLN	C-N-CA	-5.14	107.48	122.38

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	3554	0	3320	38	0
1	B	3554	0	3320	44	0
1	C	3554	0	3320	43	0
1	D	3554	0	3320	38	0
2	E	38	0	34	2	0
2	F	38	0	34	2	0
2	I	38	0	34	2	0
2	J	38	0	34	1	0
3	G	28	0	25	0	0
3	K	28	0	25	0	0
4	H	50	0	43	0	0
4	L	50	0	43	0	0
5	M	24	0	22	2	0
6	A	56	0	52	0	0
6	B	28	0	26	2	0
6	C	14	0	13	2	0
6	D	56	0	52	0	0
7	A	3	0	0	0	0
7	B	2	0	0	0	0
7	C	2	0	0	0	0
7	D	2	0	0	0	0
8	A	14	0	0	0	0
8	B	14	0	0	0	0
8	C	14	0	0	0	0
8	D	14	0	0	0	0
9	A	6	0	0	0	0
9	B	11	0	0	1	0
9	C	9	0	0	1	0
9	D	13	0	0	2	0
All	All	14806	0	13717	165	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 6.

All (165) 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:25:GLN:HG3	1:C:26:PHE:H	1.36	0.90
1:B:392:HIS:NE2	1:B:393:LEU:HD23	1.92	0.85
1:C:269:ARG:NH1	1:C:314:ASN:OD1	2.11	0.83
1:B:25:GLN:HG3	1:B:26:PHE:H	1.46	0.78
1:D:25:GLN:HG3	1:D:26:PHE:H	1.48	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:49:SER:HB2	1:A:53:THR:HG21	1.66	0.76
1:C:323:MET:SD	1:C:323:MET:N	2.59	0.73
1:B:105:PHE:O	1:B:114:ARG:NH1	2.21	0.72
1:D:29:GLN:HG3	1:D:43:PRO:HB3	1.72	0.72
1:A:25:GLN:HG3	1:A:26:PHE:H	1.55	0.72
1:D:25:GLN:HG2	1:D:161:ILE:HA	1.72	0.71
1:B:233:LYS:NZ	1:B:237:GLU:OE1	2.24	0.71
1:B:102:ASN:O	1:B:114:ARG:NH1	2.24	0.69
1:B:392:HIS:CD2	1:B:393:LEU:HD23	2.28	0.69
9:D:602:HOH:O	5:M:1:NAG:O4	2.10	0.68
1:A:96:ASN:HD22	2:E:1:NAG:H83	1.58	0.68
1:C:49:SER:HB2	1:C:53:THR:HG21	1.76	0.68
1:C:138:LYS:NZ	1:C:142:ASN:HB2	2.08	0.67
1:C:25:GLN:HG3	1:C:26:PHE:N	2.08	0.67
1:B:102:ASN:C	1:B:114:ARG:HH12	2.03	0.66
1:B:105:PHE:O	1:B:114:ARG:HD2	1.95	0.66
1:D:25:GLN:HE21	1:D:162:ALA:H	1.43	0.66
1:C:40:MET:HE2	1:C:97:ARG:HE	1.60	0.66
1:C:352:THR:HG22	1:C:369:TYR:H	1.61	0.65
1:C:218:PRO:HD2	1:C:434:HIS:HB3	1.78	0.64
1:B:29:GLN:HG3	1:B:43:PRO:HB3	1.79	0.64
1:C:413:GLU:OE1	1:C:416:ARG:NH2	2.31	0.64
1:D:269:ARG:NH1	1:D:314:ASN:OD1	2.32	0.63
1:A:25:GLN:HE21	1:A:162:ALA:H	1.45	0.62
1:B:392:HIS:CD2	1:B:393:LEU:CD2	2.83	0.61
1:C:25:GLN:HG2	1:C:161:ILE:HA	1.81	0.61
1:C:138:LYS:HZ3	1:C:142:ASN:HB2	1.65	0.61
1:B:338:GLU:OE1	1:B:417:ARG:NH2	2.33	0.61
1:D:218:PRO:HD2	1:D:434:HIS:HB3	1.83	0.60
1:C:118:ARG:CZ	1:C:126:VAL:HG11	2.32	0.59
1:A:73:ARG:NH2	1:A:427:LEU:HD23	2.16	0.59
1:B:96:ASN:HD22	2:F:1:NAG:H83	1.67	0.59
1:B:165:ARG:HD3	1:B:300:GLY:O	2.02	0.58
1:B:331:GLN:H	1:B:331:GLN:CD	2.11	0.58
1:B:34:GLU:OE2	1:B:37:ARG:NH1	2.36	0.58
1:B:25:GLN:HG3	1:B:26:PHE:N	2.15	0.58
1:A:25:GLN:HG2	1:A:161:ILE:HA	1.87	0.57
1:A:98:THR:HG22	1:A:444:TRP:CZ2	2.40	0.56
1:D:149:ASP:OD2	1:D:153:ARG:NH1	2.40	0.55
1:C:25:GLN:HE21	1:C:162:ALA:H	1.55	0.55
1:D:25:GLN:HG3	1:D:26:PHE:N	2.18	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:392:HIS:NE2	1:D:393:LEU:HG	2.21	0.55
1:D:25:GLN:HA	1:D:25:GLN:OE1	2.08	0.54
1:A:141:LYS:HD3	1:A:265:LEU:HD21	1.90	0.54
1:C:138:LYS:NZ	1:C:138:LYS:O	2.33	0.54
1:C:68:VAL:CG1	1:C:98:THR:HG23	2.38	0.53
1:C:128:ILE:HD12	1:C:245:SER:HB3	1.90	0.53
1:A:269:ARG:NH1	1:A:314:ASN:OD1	2.42	0.53
6:B:511:NAG:O4	9:B:601:HOH:O	2.19	0.53
1:D:96:ASN:HD22	5:M:1:NAG:H83	1.73	0.53
1:C:370:ASP:O	1:C:373:VAL:HG22	2.09	0.53
1:B:105:PHE:N	1:B:114:ARG:HH11	2.07	0.53
1:A:294:GLU:H	1:A:294:GLU:CD	2.17	0.52
1:A:25:GLN:NE2	1:A:162:ALA:H	2.07	0.52
1:D:43:PRO:HG2	1:D:109:ASN:HB3	1.92	0.52
1:C:29:GLN:HG3	1:C:43:PRO:HB3	1.91	0.52
1:A:29:GLN:HG3	1:A:43:PRO:HB3	1.91	0.52
1:C:260:ILE:O	1:C:265:LEU:O	2.29	0.51
1:A:25:GLN:HG3	1:A:26:PHE:N	2.24	0.51
1:C:94:PHE:O	2:I:3:FUC:H61	2.11	0.51
1:A:427:LEU:HD11	1:A:436:ARG:CZ	2.41	0.51
1:C:66:GLU:HB2	1:C:100:HIS:CE1	2.46	0.51
1:B:117:TRP:CZ3	1:B:125:ARG:HG2	2.46	0.50
1:C:106:SER:HB2	1:C:114:ARG:HD2	1.93	0.50
1:A:94:PHE:O	2:E:3:FUC:H61	2.12	0.50
1:D:129:VAL:HG12	1:D:131:ARG:HG2	1.94	0.49
1:A:218:PRO:HD2	1:A:434:HIS:HB3	1.94	0.49
1:C:84:ARG:NH2	1:C:201:LEU:O	2.46	0.49
1:C:224:HIS:CD2	1:C:404:HIS:CE1	2.99	0.49
1:B:67:ALA:HA	1:B:97:ARG:HD3	1.94	0.49
1:A:27:PRO:HB3	1:A:158:LEU:HD11	1.95	0.48
1:C:104:ASN:O	1:C:114:ARG:HG2	2.13	0.48
6:C:513:NAG:O4	9:C:601:HOH:O	2.19	0.48
1:C:160:VAL:HG11	2:J:1:NAG:H82	1.96	0.48
1:D:392:HIS:CD2	1:D:393:LEU:HG	2.49	0.48
1:B:104:ASN:HA	1:B:114:ARG:HD3	1.96	0.47
1:D:86:ASP:OD1	1:D:166:SER:OG	2.31	0.47
1:D:84:ARG:NH1	1:D:201:LEU:O	2.43	0.47
1:D:224:HIS:CD2	1:D:404:HIS:CE1	3.02	0.47
1:A:224:HIS:CD2	1:A:404:HIS:CE1	3.03	0.47
1:B:105:PHE:C	1:B:114:ARG:HD2	2.40	0.47
1:D:313:ARG:HG2	1:D:315:PRO:HD3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:68:VAL:HG11	1:B:91:PRO:HD2	1.98	0.46
1:D:408:ASP:HB3	1:D:464:TYR:OH	2.14	0.46
1:B:218:PRO:HD2	1:B:434:HIS:HB3	1.98	0.46
1:A:392:HIS:NE2	1:A:393:LEU:HG	2.31	0.46
1:B:392:HIS:NE2	1:B:393:LEU:CD2	2.73	0.46
1:A:308:ASP:HB3	1:A:309:GLY:H	1.59	0.46
1:D:329:GLU:N	1:D:332:ASP:OD2	2.46	0.45
1:D:68:VAL:HG11	1:D:91:PRO:HD2	1.97	0.45
1:A:441:VAL:HA	1:A:442:PRO:HA	1.83	0.45
1:B:41:CYS:HB3	1:B:444:TRP:CZ2	2.51	0.45
1:A:130:ARG:HH21	1:A:232:GLU:CD	2.25	0.45
1:B:136:LEU:O	1:B:141:LYS:HE3	2.17	0.45
1:A:142:ASN:HD21	1:A:146:ARG:HH11	1.64	0.45
1:A:128:ILE:O	1:A:462:TYR:HA	2.17	0.45
1:B:260:ILE:O	1:B:265:LEU:O	2.35	0.44
1:D:141:LYS:HD3	1:D:265:LEU:HD21	1.99	0.44
1:D:208:PHE:CZ	1:D:210:GLU:HB2	2.53	0.44
1:B:322:PRO:HA	1:B:325:GLN:OE1	2.16	0.44
1:C:96:ASN:HD22	2:I:1:NAG:H83	1.82	0.44
1:A:217:GLY:O	1:A:356:ARG:HD3	2.17	0.44
1:B:269:ARG:NH1	1:B:314:ASN:OD1	2.45	0.44
1:C:25:GLN:NE2	1:C:162:ALA:H	2.16	0.44
1:C:319:VAL:N	6:C:513:NAG:O6	2.51	0.44
1:B:117:TRP:CH2	1:B:125:ARG:HG2	2.53	0.44
1:B:393:LEU:HD13	1:B:396:ASN:ND2	2.32	0.44
1:D:266:MET:HE3	1:D:398:PRO:HG2	2.00	0.44
1:D:78:GLN:O	1:D:80:PRO:HD3	2.18	0.43
1:C:393:LEU:HD22	1:C:396:ASN:ND2	2.32	0.43
1:D:89:VAL:CG1	1:D:92:LEU:HD12	2.48	0.43
1:A:25:GLN:HG3	1:A:160:VAL:O	2.19	0.43
1:D:133:LEU:HD12	1:D:136:LEU:HD22	1.99	0.43
1:D:217:GLY:O	1:D:356:ARG:HD3	2.18	0.43
1:A:103:GLY:N	1:B:102:ASN:OD1	2.51	0.43
1:D:79:TYR:HE2	1:D:88:GLU:OE2	2.02	0.43
1:C:138:LYS:HA	1:C:138:LYS:HD2	1.82	0.43
1:A:31:ALA:HB1	1:A:179:PHE:CD2	2.53	0.43
1:C:125:ARG:HG3	1:C:126:VAL:N	2.33	0.43
1:D:165:ARG:HD3	1:D:300:GLY:O	2.19	0.43
1:A:91:PRO:HG3	1:A:446:PRO:HG3	2.00	0.43
1:C:392:HIS:NE2	1:C:393:LEU:HG	2.33	0.42
1:D:82:ASP:HA	1:D:88:GLU:OE2	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:266:MET:HA	1:A:283:PHE:CE2	2.54	0.42
1:B:118:ARG:HG3	1:B:119:GLY:N	2.32	0.42
1:B:266:MET:HA	1:B:283:PHE:CE2	2.54	0.42
1:C:89:VAL:HG22	1:C:92:LEU:HD12	2.01	0.42
1:D:89:VAL:HG12	1:D:92:LEU:HD12	2.00	0.42
1:D:92:LEU:HD23	1:D:92:LEU:HA	1.78	0.42
1:C:208:PHE:CZ	1:C:210:GLU:HB2	2.55	0.42
1:B:408:ASP:HB3	1:B:464:TYR:OH	2.19	0.42
1:B:217:GLY:O	1:B:356:ARG:HD3	2.19	0.42
1:C:321:ARG:HG3	1:C:323:MET:HE1	2.01	0.42
1:A:25:GLN:HE21	1:A:162:ALA:N	2.13	0.41
1:B:342:PHE:HB2	1:B:414:TRP:CH2	2.55	0.41
1:D:33:VAL:HG12	1:D:170:LEU:HD22	2.02	0.41
1:A:104:ASN:HA	1:A:114:ARG:HD2	2.02	0.41
1:C:170:LEU:HD23	1:C:170:LEU:HA	1.79	0.41
1:A:136:LEU:O	1:A:141:LYS:HE3	2.20	0.41
1:B:25:GLN:HE21	1:B:162:ALA:H	1.69	0.41
1:C:31:ALA:HB1	1:C:179:PHE:CD2	2.55	0.41
1:D:188:PHE:CE1	1:D:227:HIS:CE1	3.08	0.41
1:A:448:THR:OG1	1:A:451:GLU:HG3	2.21	0.41
1:A:427:LEU:N	1:A:427:LEU:HD12	2.36	0.41
1:B:319:VAL:N	6:B:511:NAG:O6	2.54	0.41
1:C:90:TRP:HA	1:C:91:PRO:HA	1.87	0.41
1:C:114:ARG:HG2	1:C:114:ARG:H	1.64	0.41
1:B:43:PRO:HG2	1:B:109:ASN:HB3	2.03	0.41
1:A:288:VAL:HG12	1:A:396:ASN:HB3	2.03	0.40
1:B:91:PRO:HG3	1:B:446:PRO:HG3	2.02	0.40
1:C:92:LEU:HA	1:C:92:LEU:HD23	1.72	0.40
1:A:421:ASP:OD1	1:A:423:SER:OG	2.29	0.40
1:C:352:THR:CG2	1:C:369:TYR:H	2.29	0.40
1:A:149:ASP:OD2	1:A:153:ARG:NH1	2.55	0.40
1:D:118:ARG:NH2	9:D:601:HOH:O	1.95	0.40
1:B:94:PHE:O	2:F:3:FUC:H61	2.21	0.40
1:B:221:LEU:HD11	1:B:359:VAL:HG11	2.04	0.40
1:B:329:GLU:HB3	1:B:331:GLN:OE1	2.22	0.40
1:D:136:LEU:O	1:D:141:LYS:HE3	2.21	0.40
1:D:441:VAL:HA	1:D:442:PRO:HA	1.84	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	444/446 (100%)	420 (95%)	24 (5%)	0	100	100
1	B	444/446 (100%)	425 (96%)	19 (4%)	0	100	100
1	C	444/446 (100%)	424 (96%)	19 (4%)	1 (0%)	43	58
1	D	444/446 (100%)	422 (95%)	22 (5%)	0	100	100
All	All	1776/1784 (100%)	1691 (95%)	84 (5%)	1 (0%)	48	64

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	266	MET

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	395/395 (100%)	393 (100%)	2 (0%)	81	91
1	B	395/395 (100%)	389 (98%)	6 (2%)	57	77
1	C	395/395 (100%)	391 (99%)	4 (1%)	68	84
1	D	395/395 (100%)	392 (99%)	3 (1%)	73	86
All	All	1580/1580 (100%)	1565 (99%)	15 (1%)	70	85

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	60	SER
1	A	136	LEU
1	B	60	SER
1	B	89	VAL
1	B	102	ASN
1	B	161	ILE
1	B	336	CYS
1	B	363	SER
1	C	60	SER
1	C	265	LEU
1	C	336	CYS
1	C	352	THR
1	D	278	SER
1	D	349	SER
1	D	447	VAL

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

Mol	Chain	Res	Type
1	A	142	ASN
1	B	78	GLN
1	B	250	ASN
1	C	100	HIS
1	C	390	GLN
1	D	353	ASN
1	D	429	ASN
1	D	459	ASN
1	D	467	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

26 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	NAG	E	1	2,1	14,14,15	0.31	0	17,19,21	0.80	1 (5%)
2	NAG	E	2	2	14,14,15	0.53	0	17,19,21	0.54	0
2	FUC	E	3	2	10,10,11	1.13	0	14,14,16	1.33	2 (14%)
2	NAG	F	1	2,1	14,14,15	0.26	0	17,19,21	1.01	1 (5%)
2	NAG	F	2	2	14,14,15	0.85	1 (7%)	17,19,21	0.39	0
2	FUC	F	3	2	10,10,11	1.17	1 (10%)	14,14,16	1.18	2 (14%)
3	NAG	G	1	3,1	14,14,15	0.35	0	17,19,21	0.52	0
3	NAG	G	2	3	14,14,15	0.34	0	17,19,21	0.39	0
4	NAG	H	1	1,4	14,14,15	0.30	0	17,19,21	0.74	0
4	NAG	H	2	4	14,14,15	0.71	1 (7%)	17,19,21	0.70	0
4	MAN	H	3	4	11,11,12	1.23	1 (9%)	15,15,17	1.26	2 (13%)
4	MAN	H	4	4	11,11,12	1.08	0	15,15,17	1.09	2 (13%)
2	NAG	I	1	2,1	14,14,15	0.44	0	17,19,21	0.62	0
2	NAG	I	2	2	14,14,15	0.54	0	17,19,21	0.49	0
2	FUC	I	3	2	10,10,11	1.25	1 (10%)	14,14,16	1.44	2 (14%)
2	NAG	J	1	2,1	14,14,15	0.89	1 (7%)	17,19,21	0.84	0
2	NAG	J	2	2	14,14,15	0.97	1 (7%)	17,19,21	0.93	1 (5%)
2	FUC	J	3	2	10,10,11	1.71	3 (30%)	14,14,16	1.23	2 (14%)
3	NAG	K	1	3,1	14,14,15	0.50	0	17,19,21	0.50	0
3	NAG	K	2	3	14,14,15	0.62	1 (7%)	17,19,21	0.58	0
4	NAG	L	1	1,4	14,14,15	0.38	0	17,19,21	0.93	1 (5%)
4	NAG	L	2	4	14,14,15	0.66	1 (7%)	17,19,21	1.10	2 (11%)
4	MAN	L	3	4	11,11,12	2.06	4 (36%)	15,15,17	1.95	3 (20%)
4	MAN	L	4	4	11,11,12	1.37	3 (27%)	15,15,17	1.50	2 (13%)
5	NAG	M	1	5,1	14,14,15	0.42	0	17,19,21	0.71	0
5	FUC	M	2	5	10,10,11	0.88	0	14,14,16	1.26	3 (21%)

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	NAG	E	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	E	2	2	-	2/6/23/26	0/1/1/1
2	FUC	E	3	2	-	-	0/1/1/1
2	NAG	F	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	F	2	2	-	2/6/23/26	0/1/1/1
2	FUC	F	3	2	-	-	0/1/1/1
3	NAG	G	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	3/6/23/26	0/1/1/1
4	NAG	H	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	H	2	4	-	0/6/23/26	0/1/1/1
4	MAN	H	3	4	-	0/2/19/22	1/1/1/1
4	MAN	H	4	4	-	2/2/19/22	0/1/1/1
2	NAG	I	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	I	2	2	-	2/6/23/26	0/1/1/1
2	FUC	I	3	2	-	-	0/1/1/1
2	NAG	J	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	J	2	2	-	0/6/23/26	0/1/1/1
2	FUC	J	3	2	-	-	0/1/1/1
3	NAG	K	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	K	2	3	-	2/6/23/26	0/1/1/1
4	NAG	L	1	1,4	-	3/6/23/26	0/1/1/1
4	NAG	L	2	4	-	0/6/23/26	0/1/1/1
4	MAN	L	3	4	-	1/2/19/22	1/1/1/1
4	MAN	L	4	4	-	2/2/19/22	1/1/1/1
5	NAG	M	1	5,1	-	2/6/23/26	0/1/1/1
5	FUC	M	2	5	-	-	0/1/1/1

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	3	MAN	O5-C5	4.07	1.51	1.43
2	J	3	FUC	O5-C5	3.51	1.50	1.43
2	J	2	NAG	C1-C2	3.41	1.57	1.52
4	L	3	MAN	O3-C3	2.96	1.50	1.43
4	H	3	MAN	O5-C5	2.92	1.49	1.43
4	L	4	MAN	C1-C2	2.72	1.58	1.52
2	I	3	FUC	O5-C5	2.66	1.48	1.43
2	F	3	FUC	O5-C5	2.50	1.48	1.43
4	L	3	MAN	C2-C3	-2.34	1.48	1.52
2	F	2	NAG	C1-C2	2.34	1.55	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	2	NAG	O5-C1	-2.32	1.39	1.43
4	L	4	MAN	C2-C3	2.23	1.55	1.52
4	H	2	NAG	O5-C1	-2.23	1.40	1.43
2	J	3	FUC	C4-C5	2.21	1.57	1.52
4	L	4	MAN	O5-C5	2.21	1.47	1.43
2	J	1	NAG	O5-C1	-2.20	1.40	1.43
3	K	2	NAG	C1-C2	2.20	1.55	1.52
4	L	3	MAN	C6-C5	2.20	1.59	1.51
2	J	3	FUC	C1-C2	2.02	1.57	1.52

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	3	MAN	O3-C3-C2	4.26	118.74	110.05
4	L	3	MAN	C1-O5-C5	4.25	117.88	112.19
2	I	3	FUC	O5-C5-C4	3.45	115.75	109.55
4	L	2	NAG	C1-O5-C5	3.32	116.64	112.19
2	J	2	NAG	C1-O5-C5	3.17	116.44	112.19
2	F	1	NAG	C1-O5-C5	3.11	116.36	112.19
4	H	3	MAN	C1-O5-C5	3.10	116.34	112.19
4	L	1	NAG	C1-O5-C5	2.99	116.19	112.19
4	L	4	MAN	C3-C4-C5	-2.78	105.19	110.23
2	F	3	FUC	O5-C5-C4	2.68	114.37	109.55
5	M	2	FUC	O5-C5-C4	2.63	114.28	109.55
2	I	3	FUC	C1-O5-C5	2.61	119.12	112.97
4	H	4	MAN	C1-C2-C3	-2.56	105.91	109.64
2	J	3	FUC	O5-C5-C4	2.54	114.12	109.55
4	L	4	MAN	O2-C2-C1	2.50	114.95	109.22
2	E	3	FUC	O5-C5-C4	2.44	113.95	109.55
5	M	2	FUC	C1-C2-C3	2.35	113.07	109.64
5	M	2	FUC	C1-O5-C5	2.33	118.45	112.97
2	J	3	FUC	C2-C3-C4	-2.27	106.86	110.86
4	L	3	MAN	C1-C2-C3	-2.24	106.39	109.64
2	E	3	FUC	C1-O5-C5	2.21	118.19	112.97
2	E	1	NAG	C1-O5-C5	2.14	115.05	112.19
4	H	3	MAN	O2-C2-C3	-2.11	105.79	110.15
2	F	3	FUC	C1-O5-C5	2.08	117.87	112.97
4	H	4	MAN	O3-C3-C2	2.05	114.24	110.05
4	L	2	NAG	O4-C4-C5	-2.03	104.33	109.32

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	L	4	MAN	C4-C5-C6-O6
3	G	2	NAG	O5-C5-C6-O6
3	K	2	NAG	O5-C5-C6-O6
2	J	1	NAG	O5-C5-C6-O6
4	L	4	MAN	O5-C5-C6-O6
4	H	4	MAN	C4-C5-C6-O6
4	H	4	MAN	O5-C5-C6-O6
2	E	2	NAG	O5-C5-C6-O6
2	I	2	NAG	O5-C5-C6-O6
2	J	1	NAG	C4-C5-C6-O6
3	K	2	NAG	C4-C5-C6-O6
3	G	2	NAG	C4-C5-C6-O6
2	E	1	NAG	C8-C7-N2-C2
2	E	1	NAG	O7-C7-N2-C2
2	F	1	NAG	C8-C7-N2-C2
2	F	1	NAG	O7-C7-N2-C2
2	I	1	NAG	C8-C7-N2-C2
2	I	1	NAG	O7-C7-N2-C2
4	H	1	NAG	C8-C7-N2-C2
4	H	1	NAG	O7-C7-N2-C2
4	L	1	NAG	C8-C7-N2-C2
4	L	1	NAG	O7-C7-N2-C2
5	M	1	NAG	C8-C7-N2-C2
5	M	1	NAG	O7-C7-N2-C2
2	E	2	NAG	C4-C5-C6-O6
2	I	2	NAG	C4-C5-C6-O6
2	F	2	NAG	O5-C5-C6-O6
4	L	3	MAN	O5-C5-C6-O6
2	F	2	NAG	C4-C5-C6-O6
3	G	2	NAG	C1-C2-N2-C7
4	L	1	NAG	C4-C5-C6-O6

All (3) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	H	3	MAN	C1-C2-C3-C4-C5-O5
4	L	3	MAN	C1-C2-C3-C4-C5-O5
4	L	4	MAN	C1-C2-C3-C4-C5-O5

8 monomers are involved in 9 short contacts:

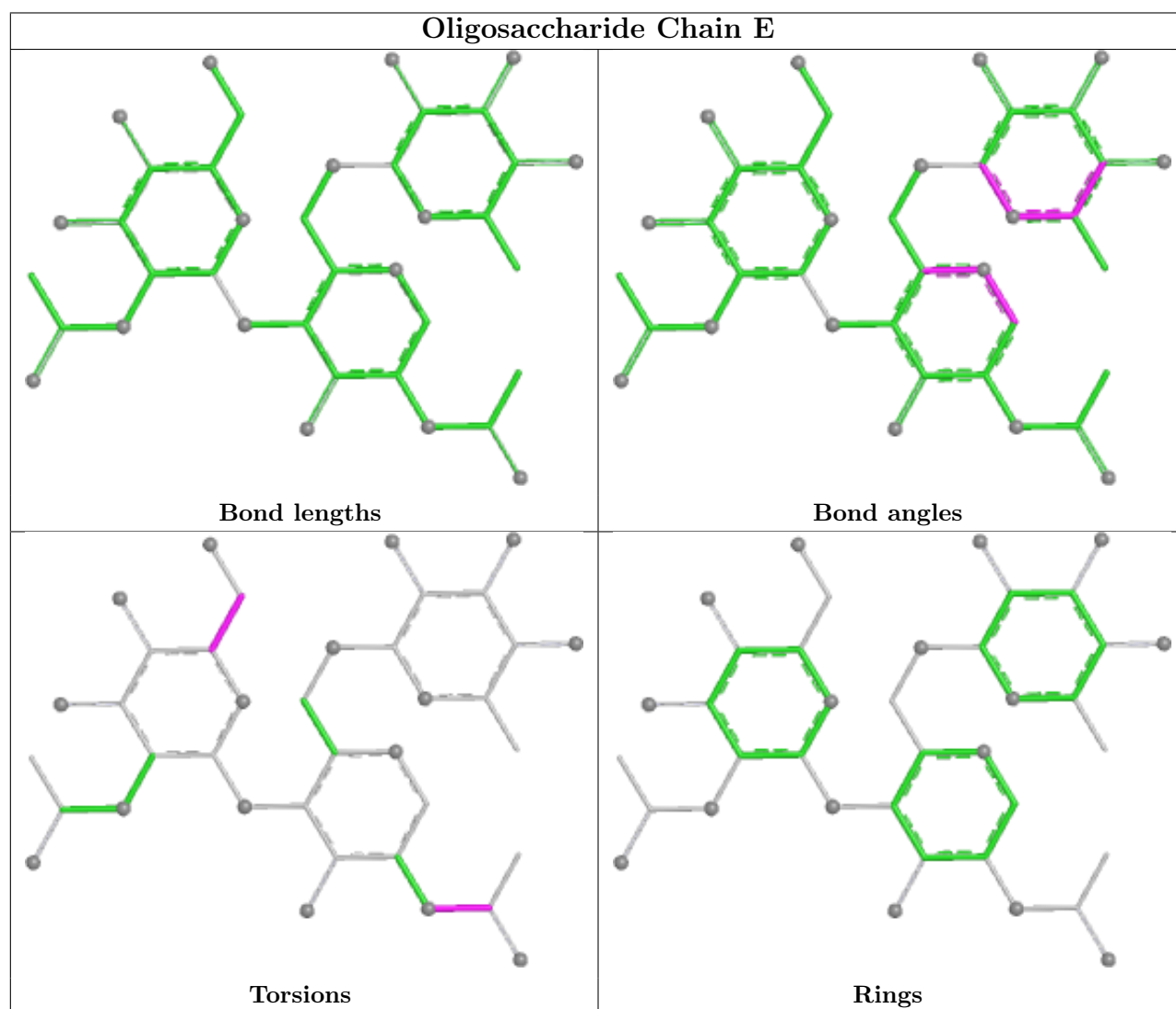
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	I	3	FUC	1	0

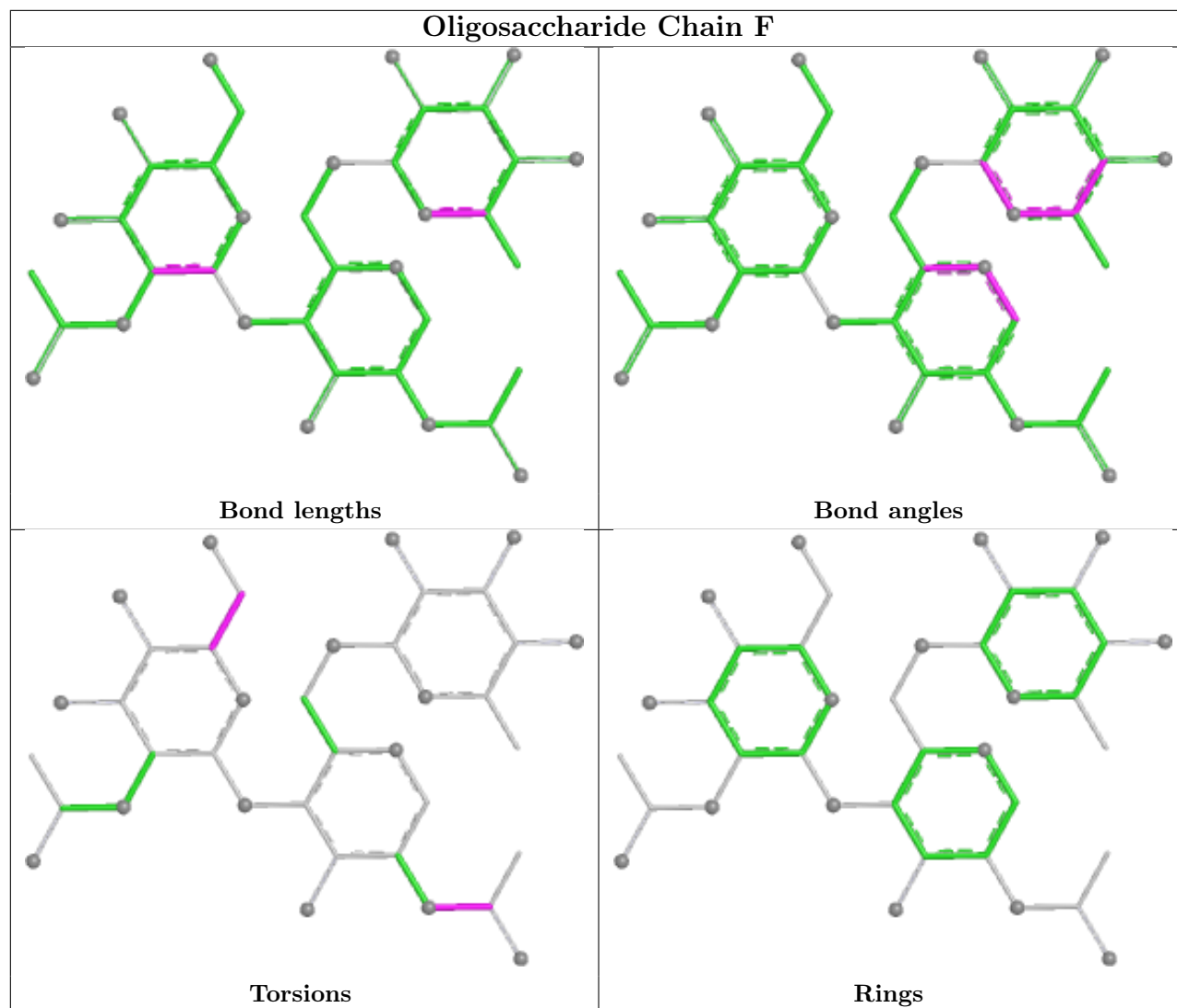
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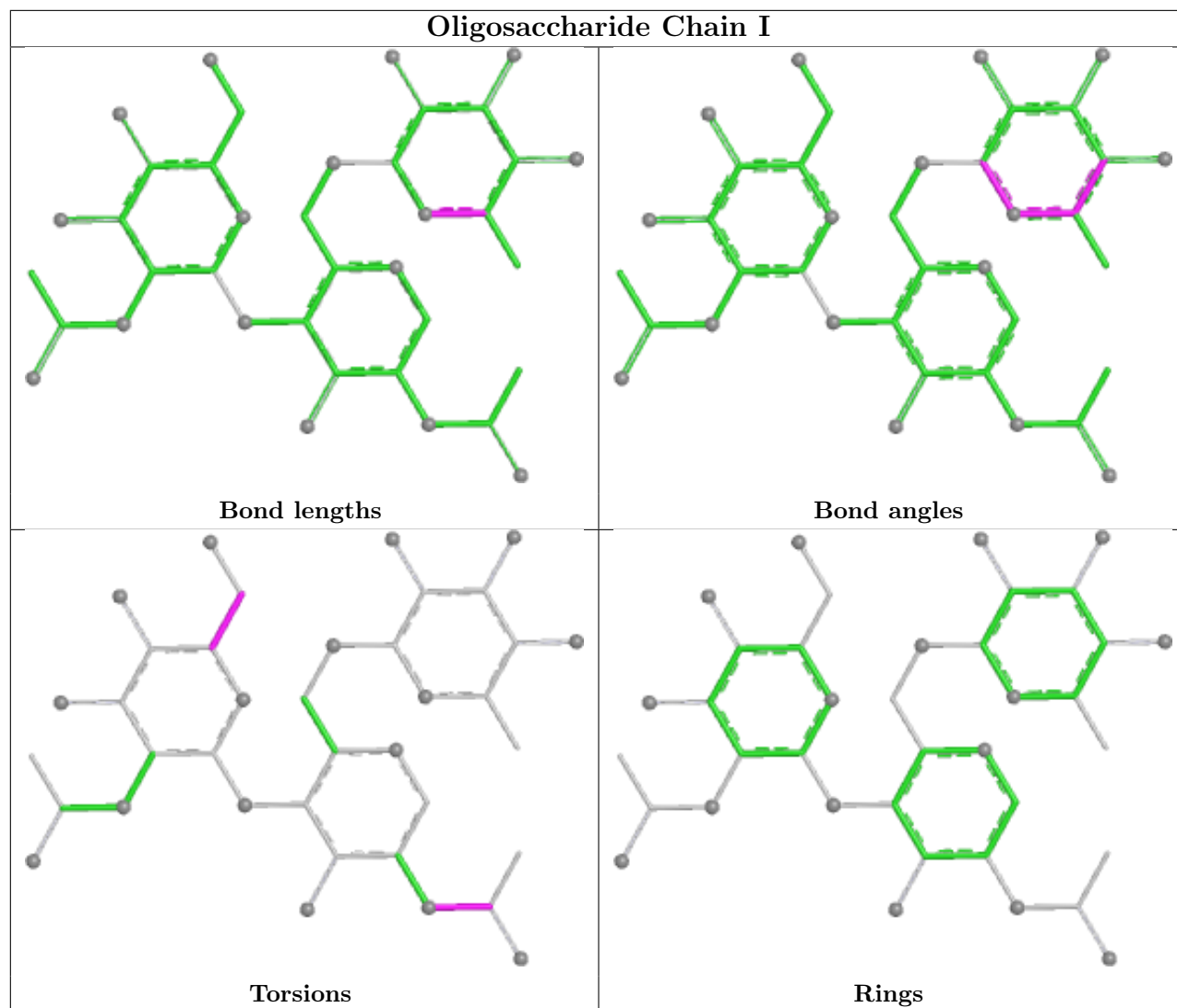
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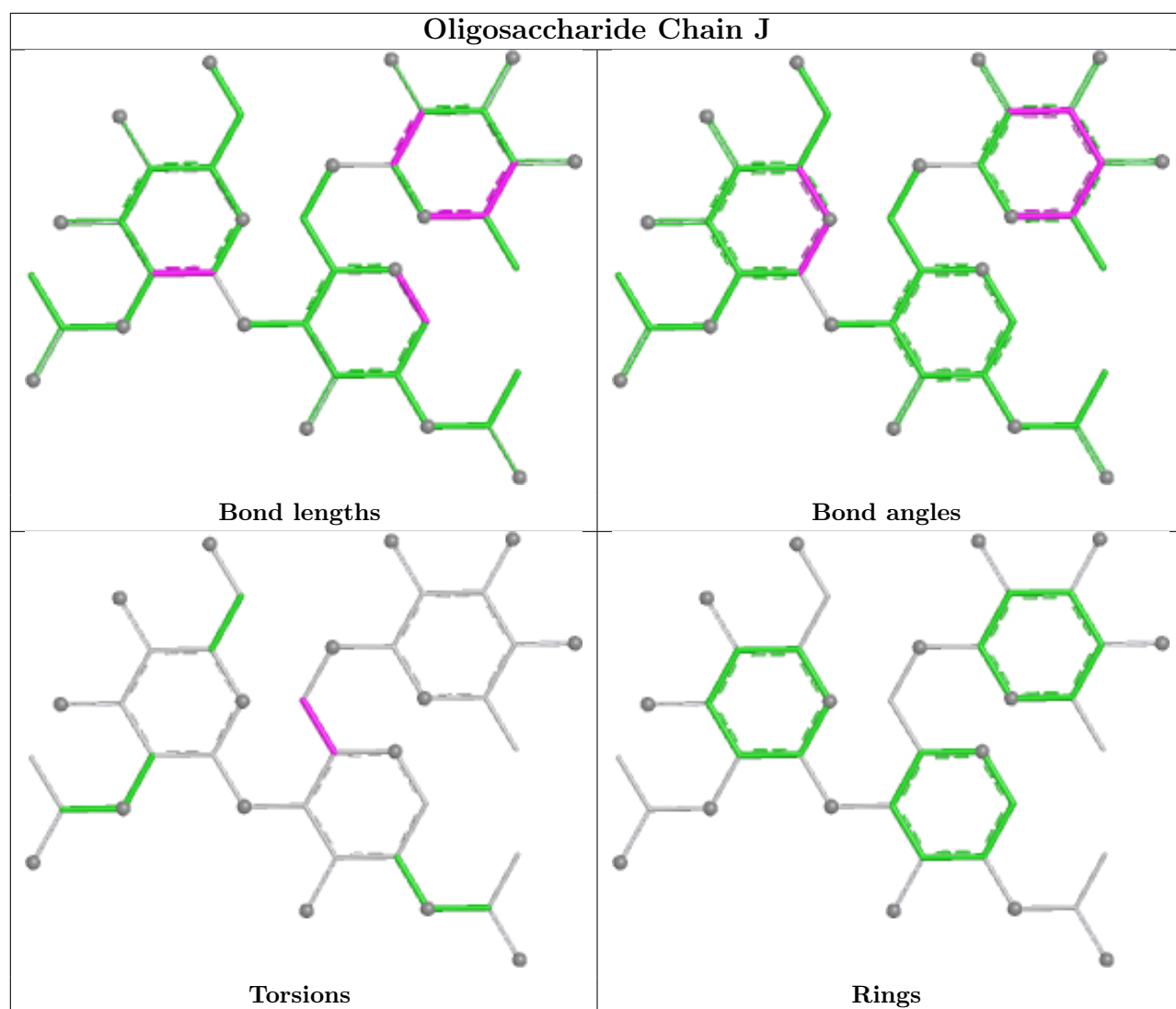
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	NAG	1	0
2	F	3	FUC	1	0
2	I	1	NAG	1	0
2	E	3	FUC	1	0
2	J	1	NAG	1	0
5	M	1	NAG	2	0
2	F	1	NAG	1	0

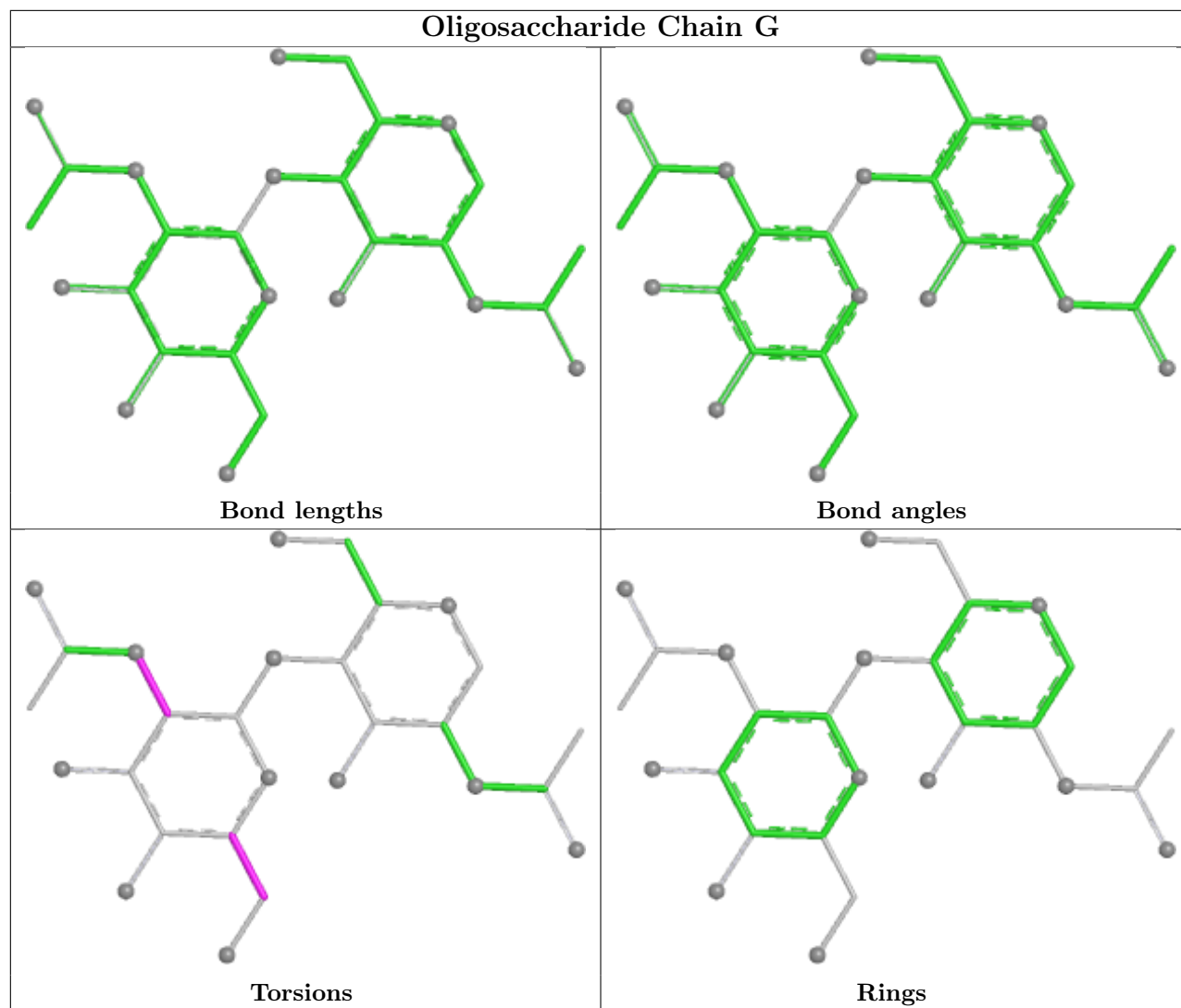
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

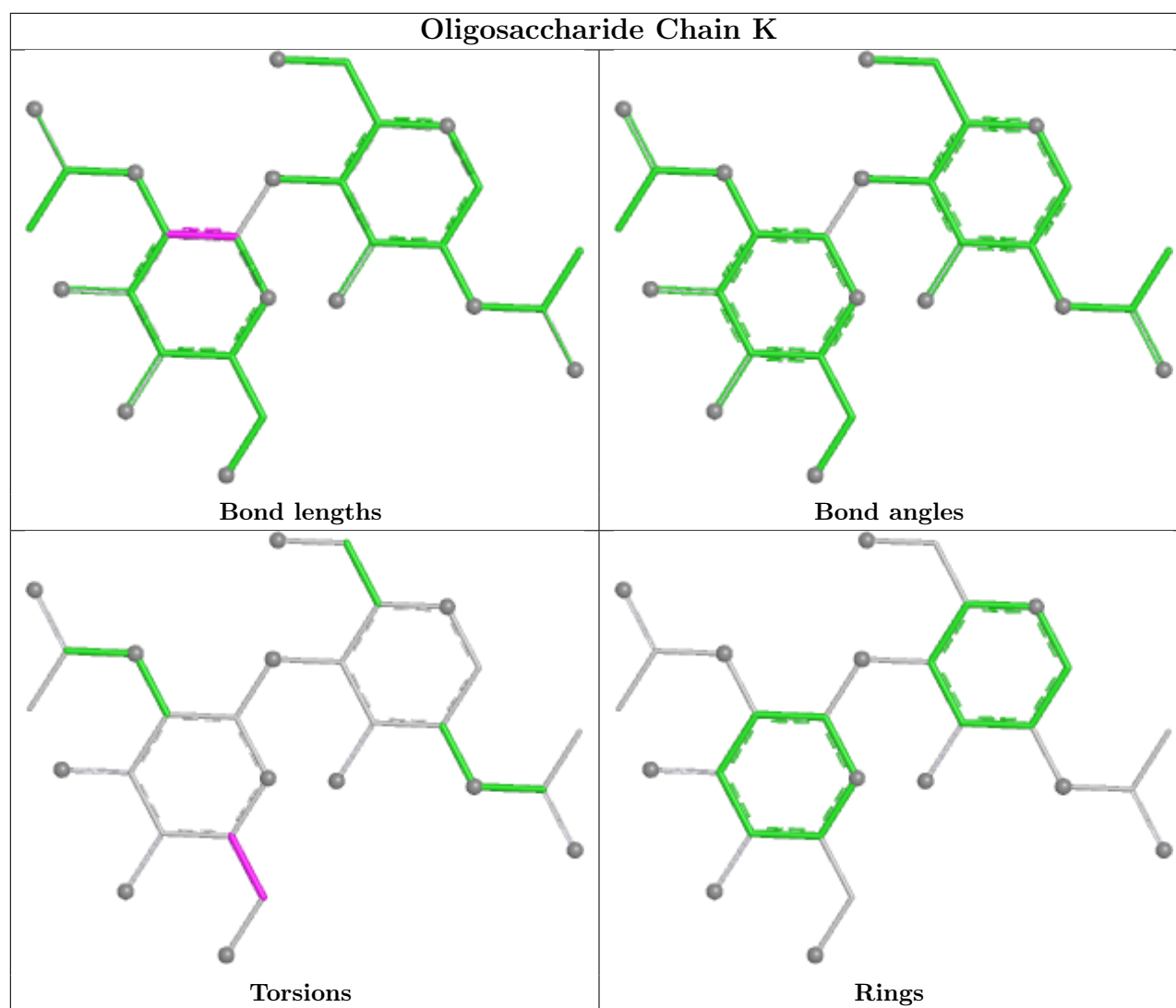




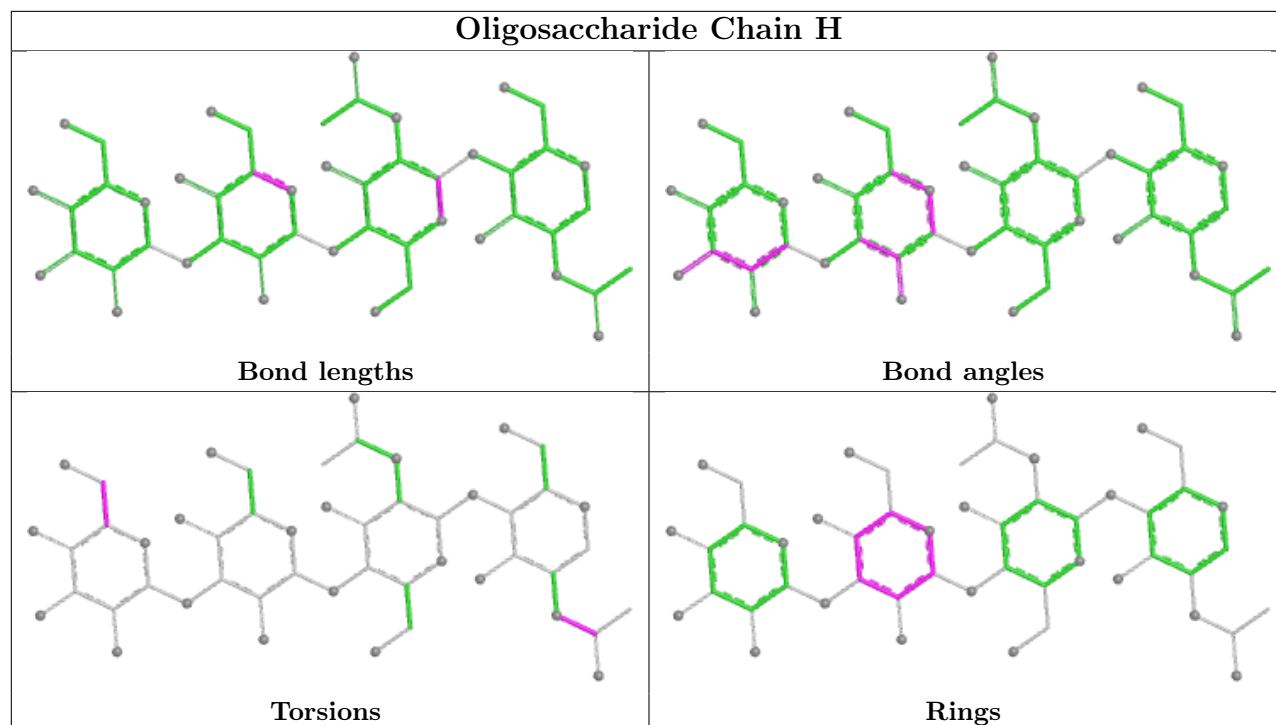




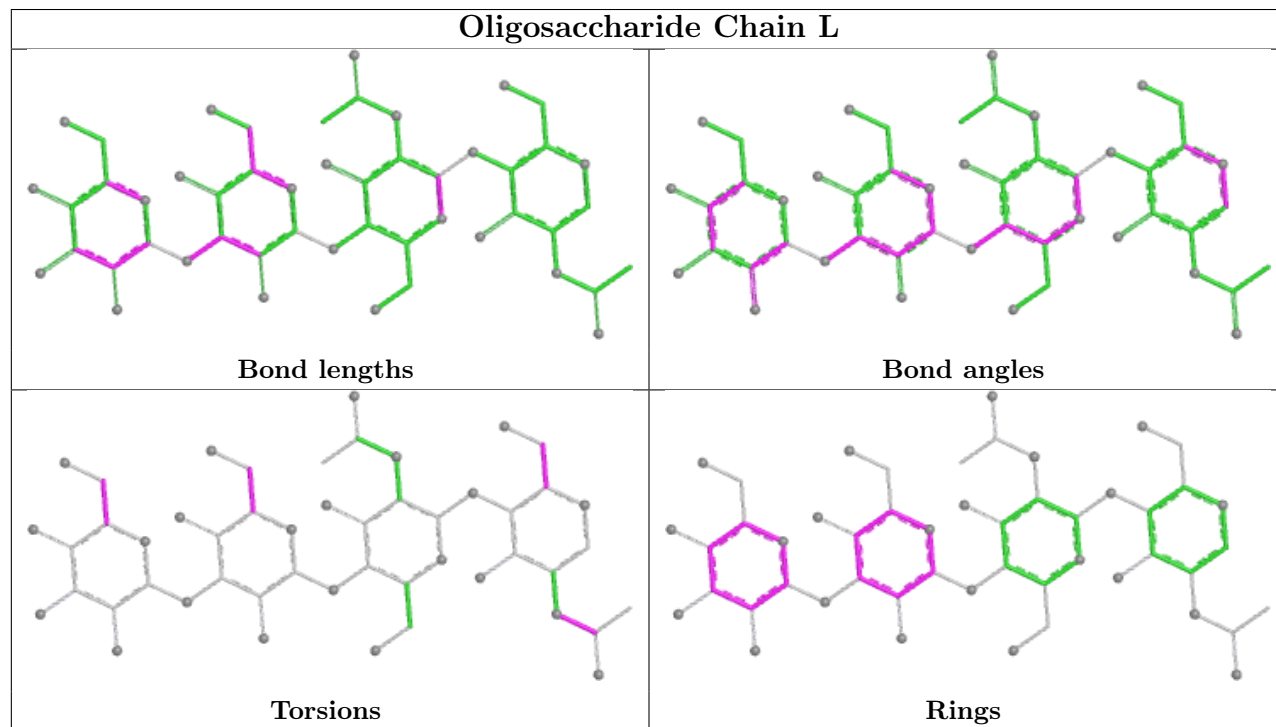


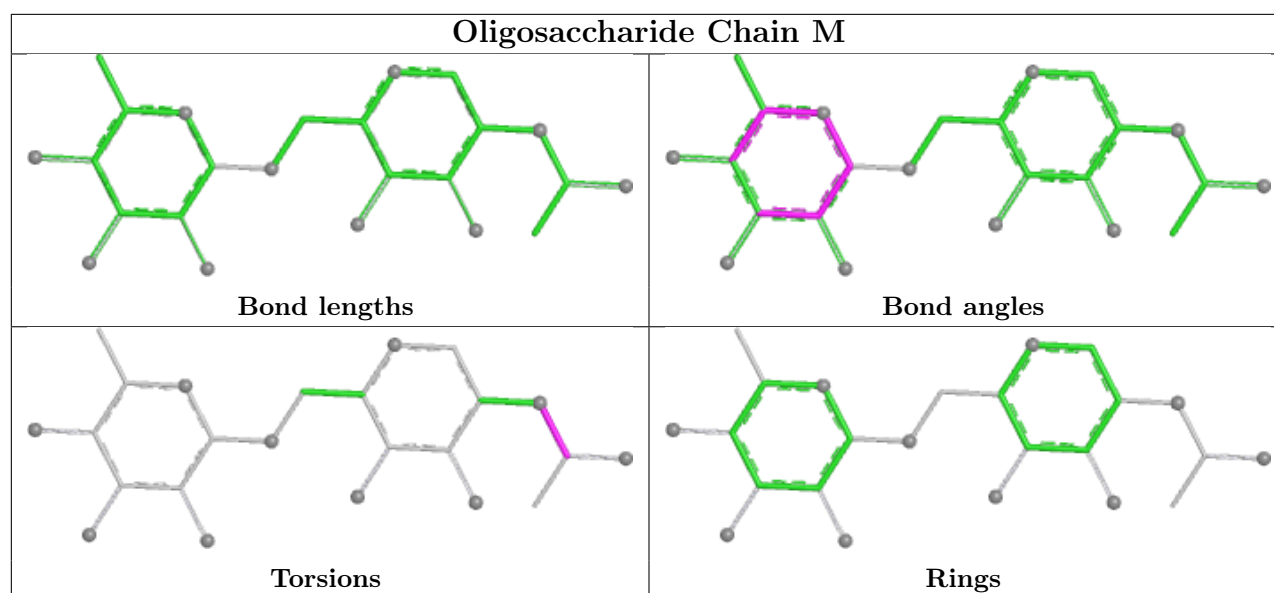


Oligosaccharide Chain H



Oligosaccharide Chain L





5.6 Ligand geometry [i](#)

Of 24 ligands modelled in this entry, 9 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	NAG	A	505	1	14,14,15	0.58	0	17,19,21	0.78	1 (5%)
6	NAG	A	507	1	14,14,15	0.70	0	17,19,21	0.77	0
6	NAG	D	504	1	14,14,15	0.29	0	17,19,21	0.67	0
8	MMS	C	516	-	13,14,14	2.78	4 (30%)	11,19,19	1.97	3 (27%)
8	MMS	B	514	-	13,14,14	2.84	4 (30%)	11,19,19	1.97	2 (18%)
6	NAG	B	511	1	14,14,15	0.53	0	17,19,21	0.67	1 (5%)
8	MMS	A	511	-	13,14,14	2.79	4 (30%)	11,19,19	1.54	2 (18%)
6	NAG	B	504	1	14,14,15	1.66	3 (21%)	17,19,21	1.30	2 (11%)
6	NAG	A	506	1	14,14,15	0.57	0	17,19,21	0.58	0
6	NAG	C	513	1	14,14,15	1.08	1 (7%)	17,19,21	0.74	1 (5%)
8	MMS	D	509	-	13,14,14	2.85	5 (38%)	11,19,19	1.85	4 (36%)
6	NAG	D	506	1	14,14,15	0.33	0	17,19,21	0.84	1 (5%)
6	NAG	D	503	1	14,14,15	1.32	2 (14%)	17,19,21	1.13	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	NAG	A	504	1	14,14,15	1.44	2 (14%)	17,19,21	1.42	2 (11%)
6	NAG	D	505	1	14,14,15	0.64	0	17,19,21	0.61	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	NAG	A	505	1	-	0/6/23/26	0/1/1/1
6	NAG	A	507	1	-	0/6/23/26	0/1/1/1
6	NAG	D	504	1	-	0/6/23/26	0/1/1/1
8	MMS	C	516	-	-	2/8/8/8	0/1/1/1
8	MMS	B	514	-	-	2/8/8/8	0/1/1/1
6	NAG	B	511	1	-	1/6/23/26	0/1/1/1
8	MMS	A	511	-	-	2/8/8/8	0/1/1/1
6	NAG	B	504	1	-	0/6/23/26	0/1/1/1
6	NAG	A	506	1	-	2/6/23/26	0/1/1/1
6	NAG	C	513	1	-	2/6/23/26	0/1/1/1
8	MMS	D	509	-	-	1/8/8/8	0/1/1/1
6	NAG	D	506	1	-	0/6/23/26	0/1/1/1
6	NAG	D	503	1	-	0/6/23/26	0/1/1/1
6	NAG	A	504	1	-	0/6/23/26	0/1/1/1
6	NAG	D	505	1	-	2/6/23/26	0/1/1/1

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	514	MMS	C8-N2	7.21	1.50	1.36
8	D	509	MMS	C4-N2	6.40	1.50	1.36
8	A	511	MMS	C8-N2	6.39	1.48	1.36
8	C	516	MMS	C8-N2	6.28	1.48	1.36
8	D	509	MMS	C8-N2	6.27	1.48	1.36
8	A	511	MMS	C4-N2	6.11	1.49	1.36
8	C	516	MMS	C4-N2	5.99	1.49	1.36
8	B	514	MMS	C4-N2	5.51	1.48	1.36
6	A	504	NAG	C1-C2	4.55	1.58	1.52
6	B	504	NAG	O5-C1	-4.52	1.36	1.43
6	D	503	NAG	C1-C2	4.06	1.57	1.52
6	C	513	NAG	O5-C1	3.50	1.49	1.43
6	B	504	NAG	C1-C2	3.37	1.56	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	509	MMS	O4-C7	2.54	1.40	1.33
8	C	516	MMS	O4-C7	2.46	1.40	1.33
6	B	504	NAG	C3-C2	2.33	1.57	1.52
8	C	516	MMS	C8-C7	-2.31	1.31	1.35
6	A	504	NAG	C3-C2	2.28	1.57	1.52
8	D	509	MMS	C8-C7	-2.20	1.32	1.35
8	A	511	MMS	O4-C7	2.20	1.39	1.33
8	B	514	MMS	O4-C7	2.14	1.39	1.33
8	B	514	MMS	O3-C6	-2.13	1.18	1.24
6	D	503	NAG	O5-C1	-2.09	1.40	1.43
8	D	509	MMS	O3-C6	-2.03	1.19	1.24
8	A	511	MMS	C5-C6	2.02	1.50	1.45

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	514	MMS	C5-C6-C7	4.94	119.92	115.12
6	A	504	NAG	C4-C3-C2	4.78	118.03	111.02
8	C	516	MMS	C5-C6-C7	4.54	119.53	115.12
6	B	504	NAG	C4-C3-C2	4.06	116.96	111.02
8	D	509	MMS	C5-C6-C7	4.03	119.04	115.12
8	A	511	MMS	C5-C6-C7	3.90	118.92	115.12
8	B	514	MMS	C4-C5-C6	-3.70	118.61	121.28
6	D	506	NAG	C1-O5-C5	2.97	116.16	112.19
8	D	509	MMS	C4-C5-C6	-2.87	119.21	121.28
8	C	516	MMS	C4-C5-C6	-2.53	119.45	121.28
6	D	503	NAG	O5-C5-C4	-2.52	104.70	110.83
6	A	504	NAG	O5-C5-C4	-2.48	104.80	110.83
8	A	511	MMS	C4-C5-C6	-2.37	119.57	121.28
6	C	513	NAG	C1-O5-C5	2.36	115.35	112.19
6	B	504	NAG	O5-C5-C4	-2.35	105.11	110.83
8	C	516	MMS	O4-C7-C8	-2.27	117.78	121.21
8	D	509	MMS	O2-C1-O1	-2.13	119.25	124.08
6	B	511	NAG	C1-O5-C5	2.10	115.00	112.19
6	A	505	NAG	C1-O5-C5	2.08	114.97	112.19
6	D	503	NAG	C4-C3-C2	2.06	114.04	111.02
8	D	509	MMS	O4-C7-C8	-2.05	118.11	121.21

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	511	MMS	C2-C3-N2-C8
8	A	511	MMS	C2-C3-N2-C4
8	B	514	MMS	C2-C3-N2-C8
8	B	514	MMS	C2-C3-N2-C4
8	C	516	MMS	C2-C3-N2-C8
8	C	516	MMS	C2-C3-N2-C4
6	C	513	NAG	O5-C5-C6-O6
6	A	506	NAG	C8-C7-N2-C2
6	A	506	NAG	O7-C7-N2-C2
6	D	505	NAG	C8-C7-N2-C2
6	D	505	NAG	O7-C7-N2-C2
6	C	513	NAG	C4-C5-C6-O6
8	D	509	MMS	C2-C3-N2-C4
6	B	511	NAG	O5-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	511	NAG	2	0
6	C	513	NAG	2	0

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	446/446 (100%)	-0.12	5 (1%) 78 74	21, 36, 54, 78	0
1	B	446/446 (100%)	-0.02	18 (4%) 42 38	23, 36, 60, 96	0
1	C	446/446 (100%)	-0.06	9 (2%) 65 60	21, 36, 53, 81	0
1	D	446/446 (100%)	0.20	19 (4%) 40 36	24, 41, 63, 82	0
All	All	1784/1784 (100%)	0.00	51 (2%) 53 50	21, 37, 58, 96	0

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	48	VAL	9.0
1	D	48	VAL	6.6
1	B	51	PRO	4.1
1	C	470	SER	4.1
1	A	470	SER	4.0
1	B	49	SER	3.9
1	B	470	SER	3.9
1	B	47	PRO	3.8
1	D	49	SER	3.7
1	C	103	GLY	3.4
1	D	204	GLY	3.3
1	D	203	VAL	3.2
1	B	52	GLY	3.1
1	C	104	ASN	3.1
1	A	48	VAL	3.1
1	B	46	SER	3.0
1	D	25	GLN	2.9
1	D	210	GLU	2.8
1	D	53	THR	2.8
1	D	429	ASN	2.8
1	D	80	PRO	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	120	ALA	2.6
1	C	100	HIS	2.5
1	C	48	VAL	2.4
1	D	51	PRO	2.4
1	A	323	MET	2.4
1	B	323	MET	2.4
1	B	61	GLY	2.3
1	B	50	GLY	2.3
1	D	323	MET	2.2
1	B	104	ASN	2.2
1	B	118	ARG	2.2
1	D	470	SER	2.2
1	D	83	GLY	2.2
1	B	265	LEU	2.1
1	B	114	ARG	2.1
1	D	201	LEU	2.1
1	C	206	GLU	2.1
1	D	37	ARG	2.1
1	D	47	PRO	2.1
1	D	77	PRO	2.1
1	C	256	ASN	2.1
1	A	373	VAL	2.1
1	C	126	VAL	2.1
1	D	202	GLY	2.1
1	B	34	GLU	2.1
1	D	294	GLU	2.1
1	B	45	LEU	2.0
1	B	103	GLY	2.0
1	A	469	PRO	2.0
1	C	49	SER	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 ⓘ

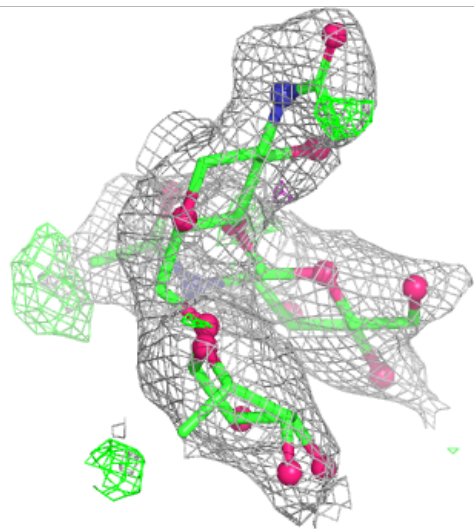
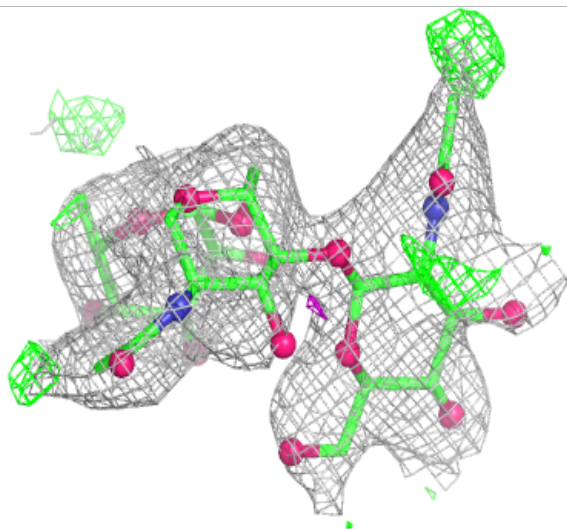
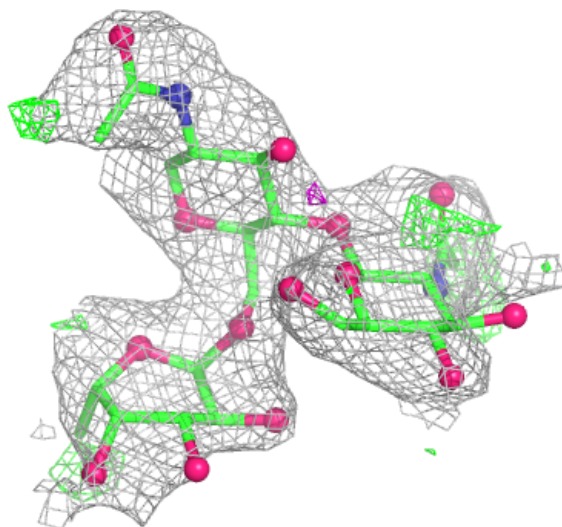
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	E	2	14/15	0.66	0.18	60,68,75,77	0
2	NAG	I	2	14/15	0.70	0.16	58,73,81,82	0
5	NAG	M	1	14/15	0.70	0.16	56,64,69,71	0
4	MAN	L	4	11/12	0.71	0.18	48,56,62,66	0
5	FUC	M	2	10/11	0.72	0.18	63,68,75,78	0
2	FUC	J	3	10/11	0.74	0.17	51,59,64,64	0
4	MAN	H	3	11/12	0.76	0.14	46,52,56,56	0
2	NAG	I	1	14/15	0.79	0.12	41,54,61,65	0
4	MAN	H	4	11/12	0.80	0.15	55,63,71,71	0
4	MAN	L	3	11/12	0.80	0.13	36,40,48,52	0
2	FUC	F	3	10/11	0.80	0.14	48,53,62,65	0
3	NAG	G	2	14/15	0.80	0.14	47,53,60,68	0
2	FUC	I	3	10/11	0.80	0.16	47,54,64,67	0
2	FUC	E	3	10/11	0.81	0.14	50,59,64,67	0
2	NAG	J	2	14/15	0.82	0.14	46,52,60,65	0
2	NAG	J	1	14/15	0.83	0.12	28,44,49,62	0
2	NAG	F	2	14/15	0.83	0.13	49,67,76,78	0
2	NAG	E	1	14/15	0.84	0.14	48,54,66,67	0
4	NAG	L	1	14/15	0.86	0.12	35,38,40,41	0
3	NAG	K	2	14/15	0.87	0.12	43,49,65,66	0
2	NAG	F	1	14/15	0.88	0.12	45,56,61,65	0
4	NAG	H	1	14/15	0.92	0.09	37,41,46,47	0
3	NAG	K	1	14/15	0.92	0.09	35,40,41,43	0
4	NAG	H	2	14/15	0.93	0.09	38,44,47,55	0
3	NAG	G	1	14/15	0.94	0.09	35,39,45,46	0
4	NAG	L	2	14/15	0.95	0.09	35,39,46,47	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.

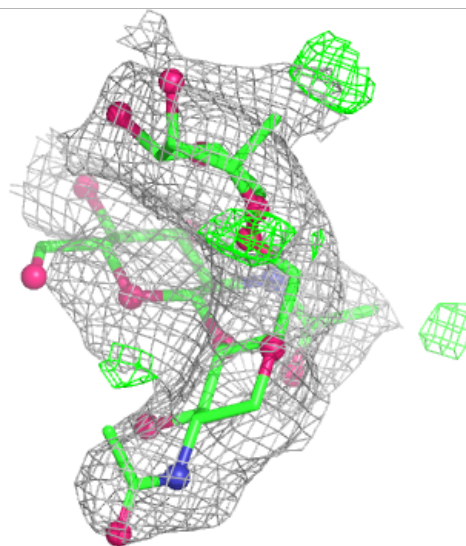
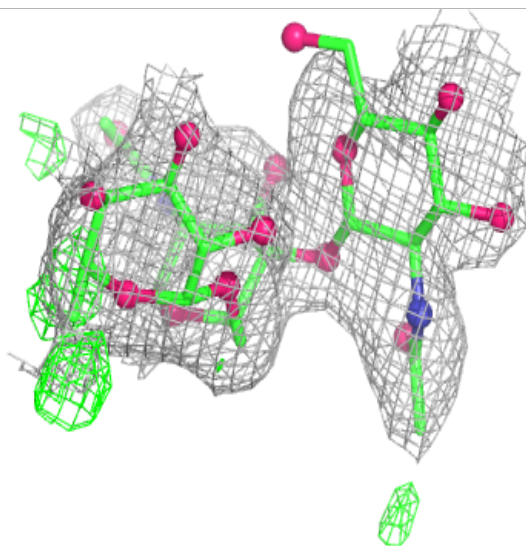
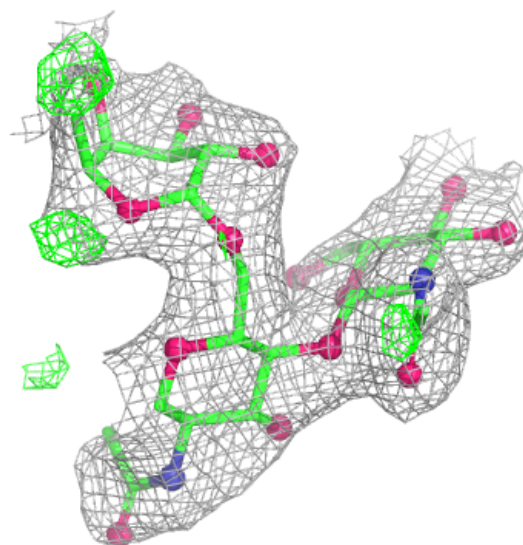
Electron density around Chain E:

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



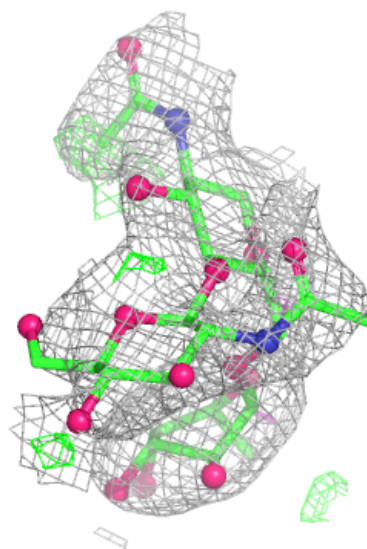
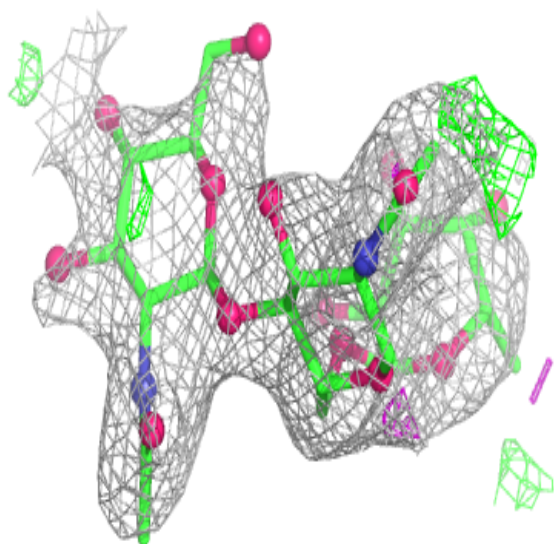
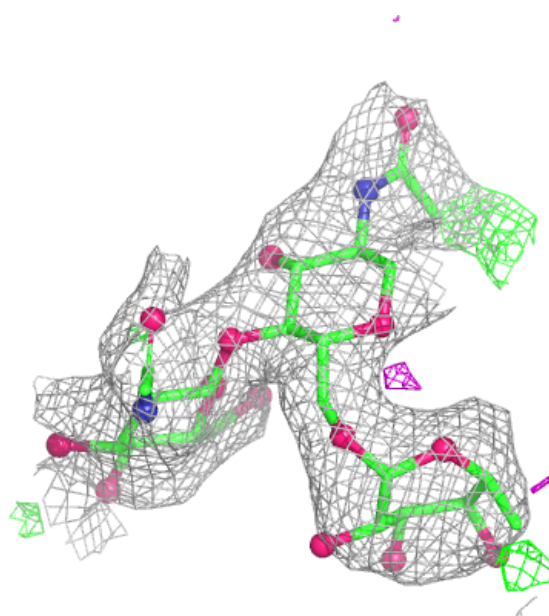
Electron density around Chain F:

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



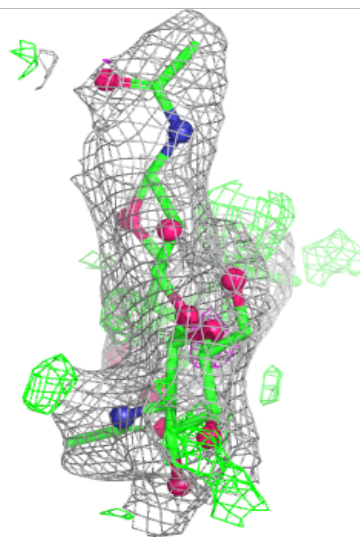
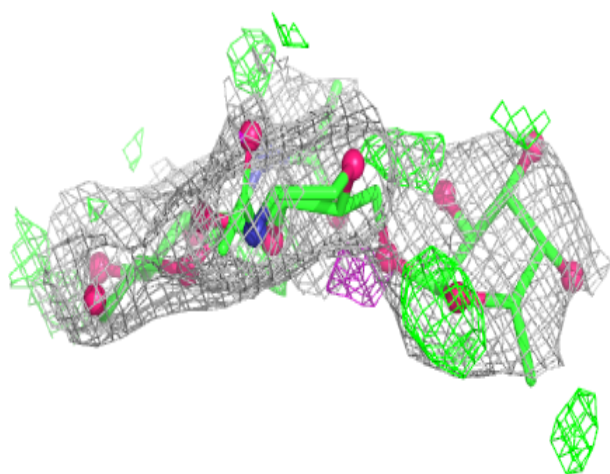
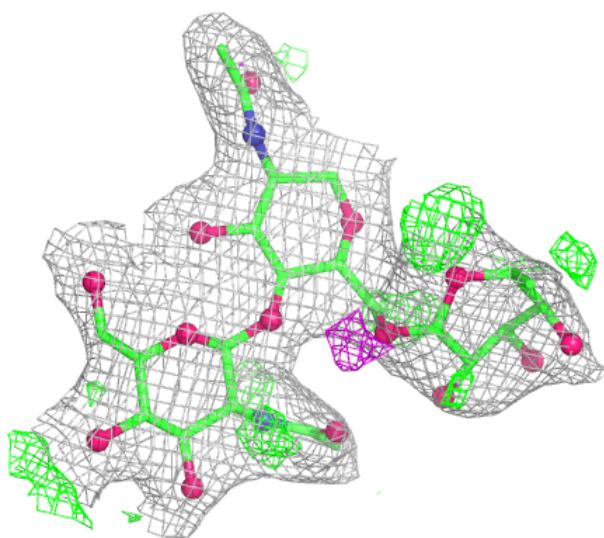
Electron density around Chain I:

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



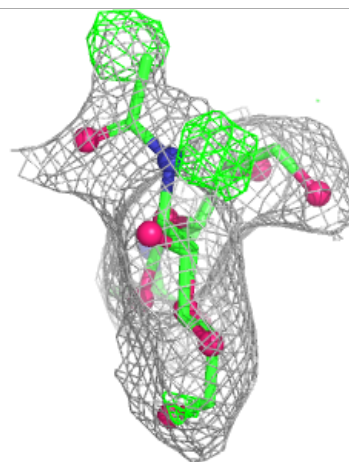
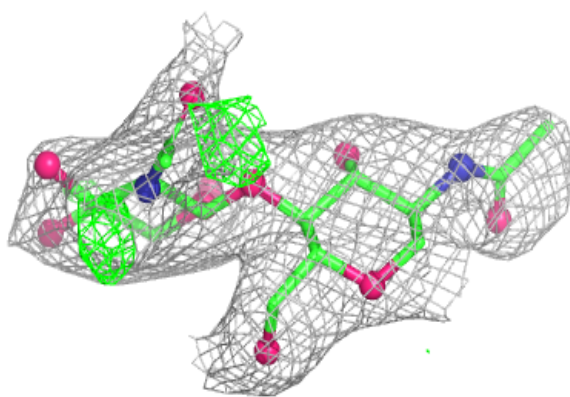
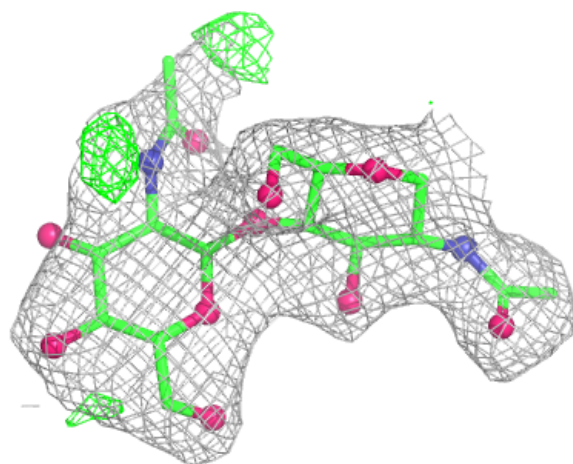
Electron density around Chain J:

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



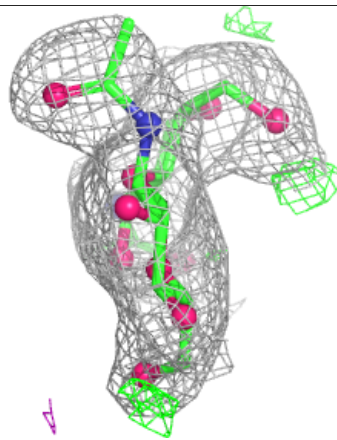
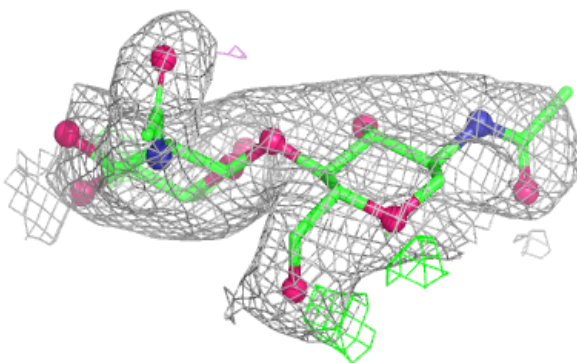
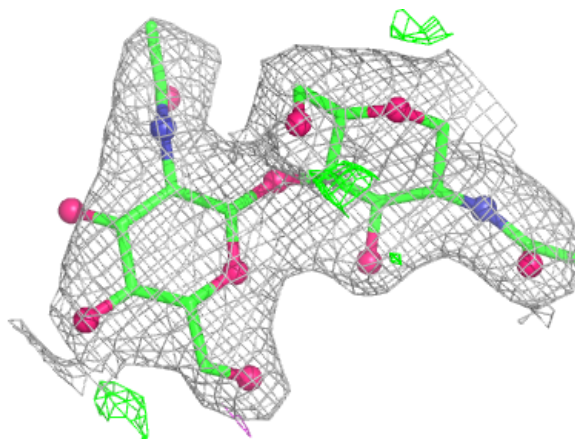
Electron density around Chain G:

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



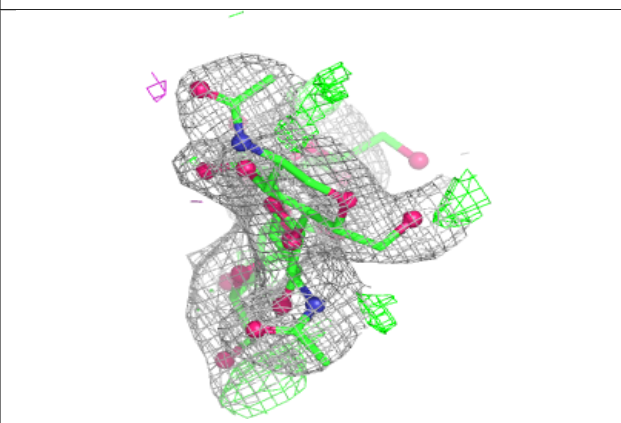
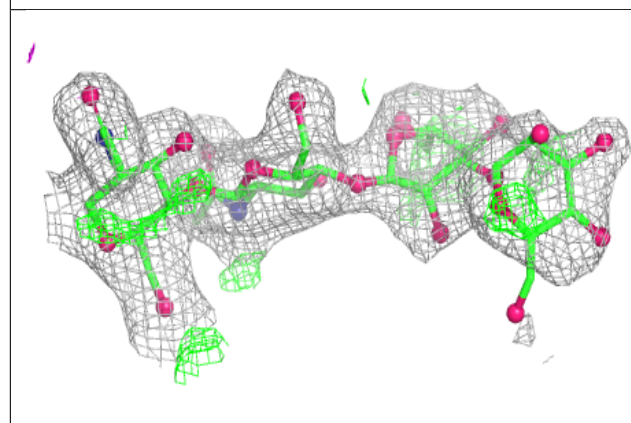
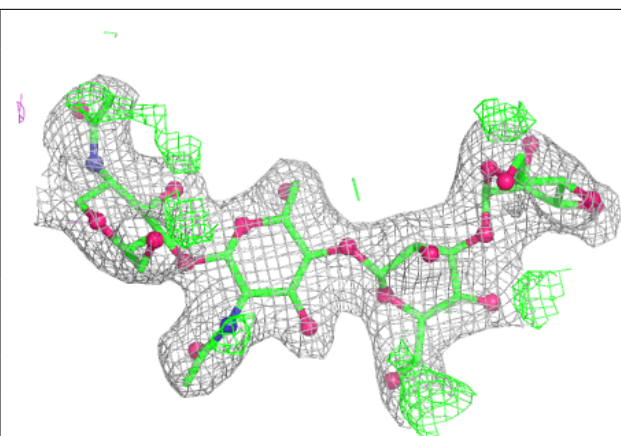
Electron density around Chain K:

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

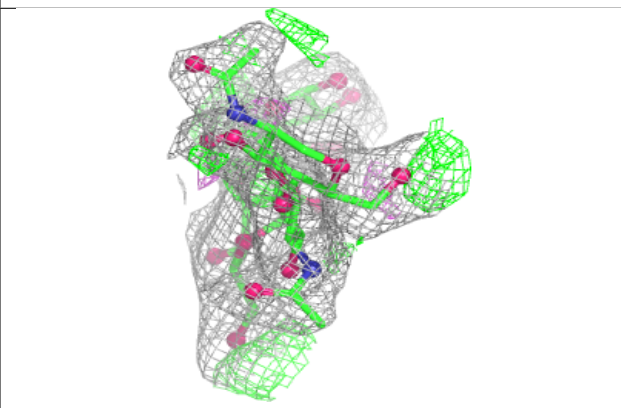
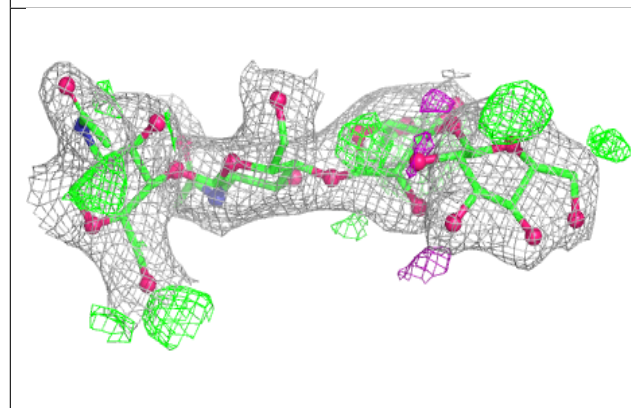
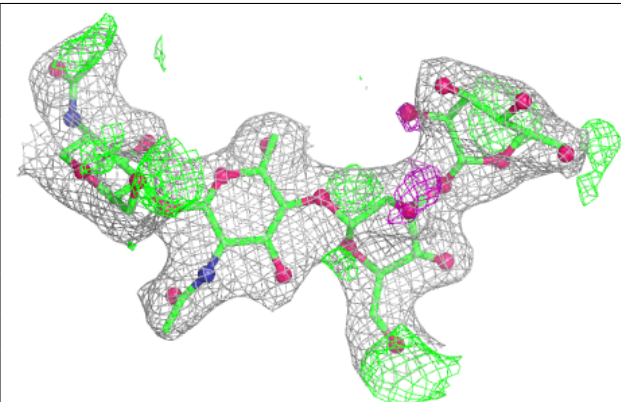


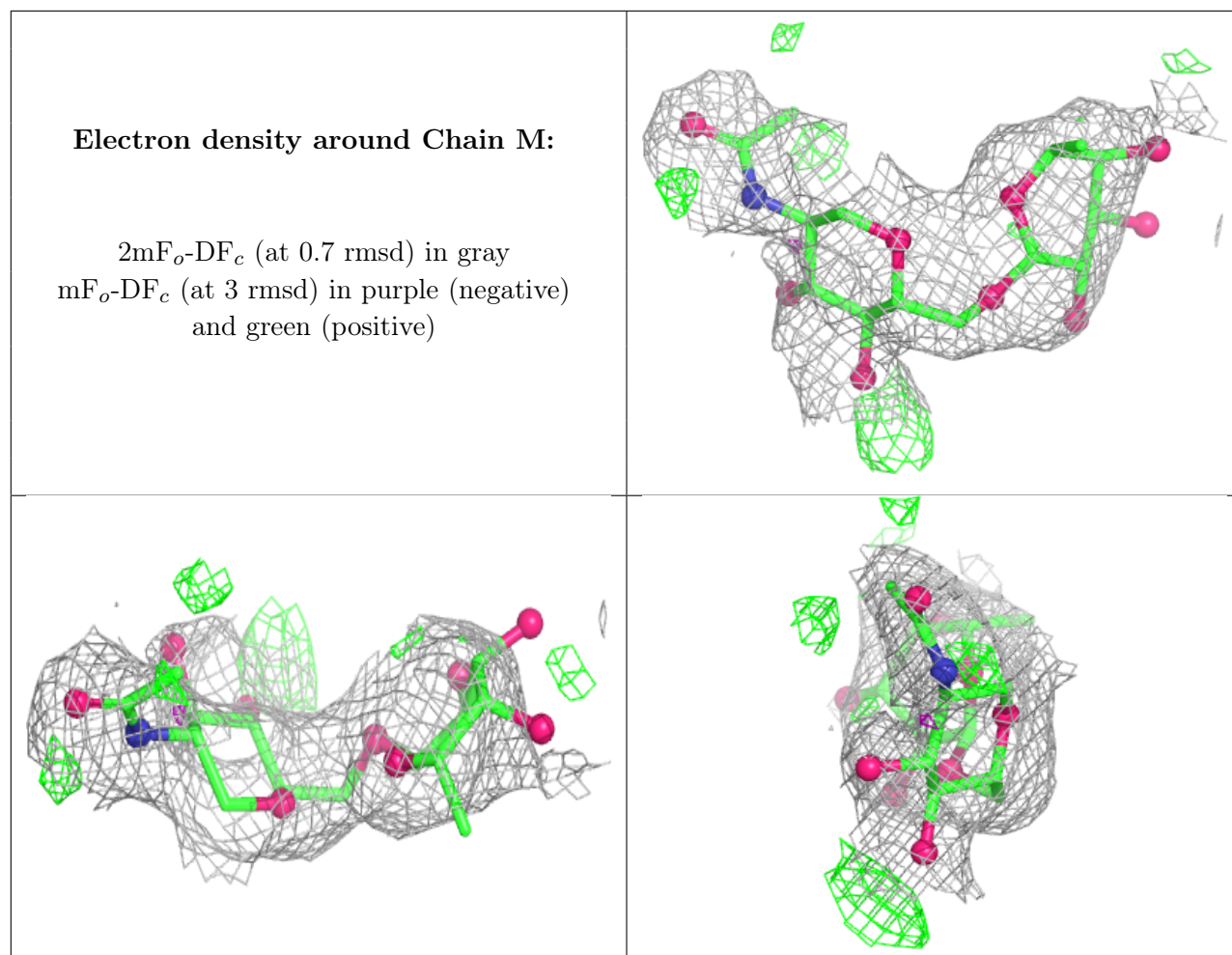
Electron density around Chain H:

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

**Electron density around Chain L:**

$2mF_o-DF_c$ (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(Å ²)	Q<0.9
6	NAG	D	503	14/15	0.61	0.20	57,65,74,77	0
6	NAG	B	504	14/15	0.69	0.17	51,61,67,70	0
6	NAG	A	504	14/15	0.70	0.19	48,66,71,71	0
6	NAG	A	506	14/15	0.71	0.15	50,56,64,67	0
6	NAG	D	505	14/15	0.81	0.15	42,56,62,68	0
6	NAG	B	511	14/15	0.83	0.14	40,47,56,57	0
6	NAG	D	506	14/15	0.84	0.12	48,53,58,59	0
6	NAG	C	513	14/15	0.86	0.12	41,45,55,59	0
6	NAG	A	507	14/15	0.86	0.12	41,51,56,59	0
6	NAG	A	505	14/15	0.89	0.09	31,37,45,48	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	NAG	D	504	14/15	0.89	0.09	44,48,51,55	0
8	MMS	D	509	14/14	0.92	0.10	34,41,46,46	0
8	MMS	C	516	14/14	0.93	0.08	27,33,44,44	0
8	MMS	A	511	14/14	0.94	0.07	28,31,40,41	0
8	MMS	B	514	14/14	0.96	0.06	22,27,34,40	0
7	ZN	B	513	1/1	1.00	0.01	23,23,23,23	0
7	ZN	C	514	1/1	1.00	0.01	24,24,24,24	0
7	ZN	C	515	1/1	1.00	0.02	23,23,23,23	0
7	ZN	D	507	1/1	1.00	0.03	32,32,32,32	0
7	ZN	D	508	1/1	1.00	0.01	31,31,31,31	0
7	ZN	A	508	1/1	1.00	0.02	28,28,28,28	0
7	ZN	A	509	1/1	1.00	0.03	27,27,27,27	0
7	ZN	A	510	1/1	1.00	0.03	46,46,46,46	0
7	ZN	B	512	1/1	1.00	0.02	24,24,24,24	0

6.5 Other polymers [i](#)

There are no such residues in this entry.