



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2026 – 10:37 AM UTC

PDB ID : 4POT / pdb_00004pot
Title : Structure of Human Polyomavirus 9 VP1 pentamer in complex with N-glycolylneuraminic acid containing 3'-sialyllactosamine
Authors : Khan, Z.M.; Stehle, T.
Deposited on : 2014-02-26
Resolution : 2.10 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

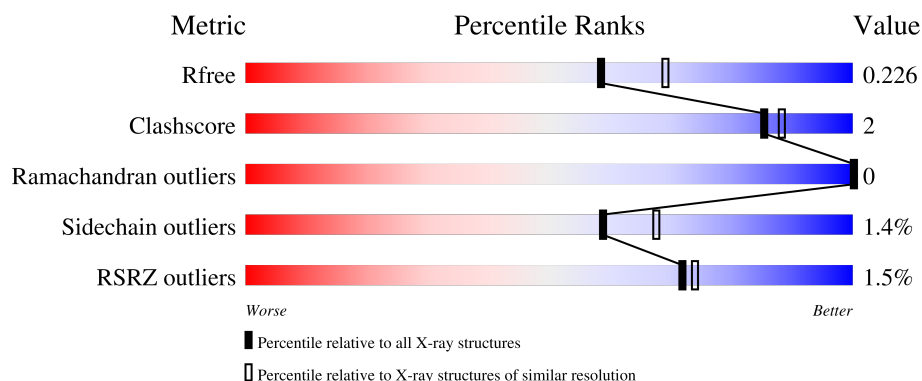
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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.



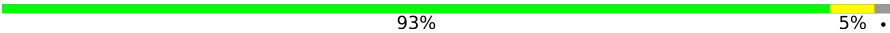
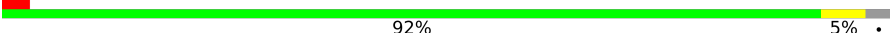
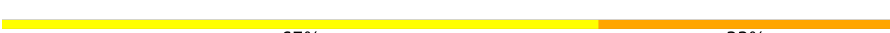
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	278	% 91% 6% .
1	B	278	2% 94% . .
1	C	278	2% 89% 7% .
1	D	278	% 92% 5% .
1	E	278	% 88% 8% . .

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Mol	Chain	Length	Quality of chain
1	F	278	 93% 5% •
1	G	278	 89% 8% •
1	H	278	 92% 5% •
1	I	278	 92% 5% •
1	J	278	 93% 5% •
2	K	3	 67% 33%
2	L	3	 67% 33%
2	M	3	 33% 67%
2	N	3	 33% 67%
2	O	3	 67% 33%
2	P	3	 33% 67%
2	Q	3	 33% 67%
2	R	3	 33% 67%
2	S	3	 67% 33%
2	T	3	 33% 67%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	EDO	J	402	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 23698 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 VP1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	269	Total	C	N	O	S	0	1	0
			2057	1296	341	409	11			
1	B	270	Total	C	N	O	S	0	1	0
			2065	1301	341	412	11			
1	C	269	Total	C	N	O	S	0	0	0
			2051	1293	340	407	11			
1	D	270	Total	C	N	O	S	0	1	0
			2067	1301	342	413	11			
1	E	269	Total	C	N	O	S	0	0	0
			2050	1292	340	407	11			
1	F	272	Total	C	N	O	S	0	2	0
			2093	1318	345	419	11			
1	G	270	Total	C	N	O	S	0	2	0
			2072	1305	343	413	11			
1	H	270	Total	C	N	O	S	0	1	0
			2067	1301	342	413	11			
1	I	269	Total	C	N	O	S	0	1	0
			2059	1297	342	409	11			
1	J	272	Total	C	N	O	S	0	1	0
			2086	1315	344	416	11			

There are 40 discrepancies between the modelled and reference sequences:

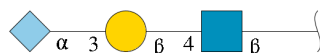
Chain	Residue	Modelled	Actual	Comment	Reference
A	27	GLY	-	expression tag	UNP E9NQ90
A	28	SER	-	expression tag	UNP E9NQ90
A	29	HIS	-	expression tag	UNP E9NQ90
A	30	MET	-	expression tag	UNP E9NQ90
B	27	GLY	-	expression tag	UNP E9NQ90
B	28	SER	-	expression tag	UNP E9NQ90
B	29	HIS	-	expression tag	UNP E9NQ90
B	30	MET	-	expression tag	UNP E9NQ90
C	27	GLY	-	expression tag	UNP E9NQ90

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Chain	Residue	Modelled	Actual	Comment	Reference
C	28	SER	-	expression tag	UNP E9NQ90
C	29	HIS	-	expression tag	UNP E9NQ90
C	30	MET	-	expression tag	UNP E9NQ90
D	27	GLY	-	expression tag	UNP E9NQ90
D	28	SER	-	expression tag	UNP E9NQ90
D	29	HIS	-	expression tag	UNP E9NQ90
D	30	MET	-	expression tag	UNP E9NQ90
E	27	GLY	-	expression tag	UNP E9NQ90
E	28	SER	-	expression tag	UNP E9NQ90
E	29	HIS	-	expression tag	UNP E9NQ90
E	30	MET	-	expression tag	UNP E9NQ90
F	27	GLY	-	expression tag	UNP E9NQ90
F	28	SER	-	expression tag	UNP E9NQ90
F	29	HIS	-	expression tag	UNP E9NQ90
F	30	MET	-	expression tag	UNP E9NQ90
G	27	GLY	-	expression tag	UNP E9NQ90
G	28	SER	-	expression tag	UNP E9NQ90
G	29	HIS	-	expression tag	UNP E9NQ90
G	30	MET	-	expression tag	UNP E9NQ90
H	27	GLY	-	expression tag	UNP E9NQ90
H	28	SER	-	expression tag	UNP E9NQ90
H	29	HIS	-	expression tag	UNP E9NQ90
H	30	MET	-	expression tag	UNP E9NQ90
I	27	GLY	-	expression tag	UNP E9NQ90
I	28	SER	-	expression tag	UNP E9NQ90
I	29	HIS	-	expression tag	UNP E9NQ90
I	30	MET	-	expression tag	UNP E9NQ90
J	27	GLY	-	expression tag	UNP E9NQ90
J	28	SER	-	expression tag	UNP E9NQ90
J	29	HIS	-	expression tag	UNP E9NQ90
J	30	MET	-	expression tag	UNP E9NQ90

- Molecule 2 is an oligosaccharide called N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	K	3	Total	C	N	O	0	0	0
			47	25	2	20			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	L	3	Total 47	C 25	N 2	O 20	0	0	0
2	M	3	Total 47	C 25	N 2	O 20	0	0	0
2	N	3	Total 47	C 25	N 2	O 20	0	0	0
2	O	3	Total 47	C 25	N 2	O 20	0	0	0
2	P	3	Total 47	C 25	N 2	O 20	0	0	0
2	Q	3	Total 47	C 25	N 2	O 20	0	0	0
2	R	3	Total 47	C 25	N 2	O 20	0	0	0
2	S	3	Total 47	C 25	N 2	O 20	0	0	0
2	T	3	Total 47	C 25	N 2	O 20	0	0	0

- Molecule 3 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total 1	Ca 1	0	0
3	B	1	Total 1	Ca 1	0	0
3	C	1	Total 1	Ca 1	0	0
3	D	1	Total 1	Ca 1	0	0
3	E	1	Total 1	Ca 1	0	0
3	F	1	Total 1	Ca 1	0	0
3	G	1	Total 1	Ca 1	0	0
3	H	1	Total 1	Ca 1	0	0
3	I	1	Total 1	Ca 1	0	0
3	J	1	Total 1	Ca 1	0	0

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



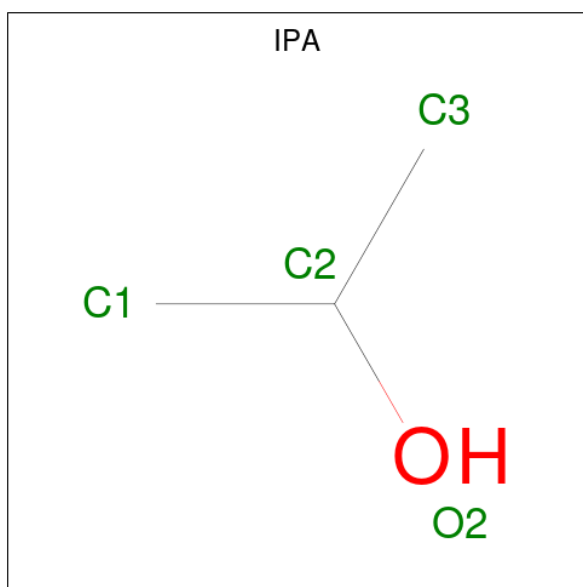
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	E	1	Total C O 4 2 2	0	0
4	F	1	Total C O 4 2 2	0	0
4	F	1	Total C O 4 2 2	0	0
4	F	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	H	1	Total C O 4 2 2	0	0
4	H	1	Total C O 4 2 2	0	0
4	I	1	Total C O 4 2 2	0	0
4	I	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0

- Molecule 5 is ISOPROPYL ALCOHOL (CCD ID: IPA) (formula: C₃H₈O).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 4 3 1	0	0
5	B	1	Total C O 4 3 1	0	0
5	C	1	Total C O 4 3 1	0	0
5	D	1	Total C O 4 3 1	0	0
5	E	1	Total C O 4 3 1	0	0
5	F	1	Total C O 4 3 1	0	0
5	G	1	Total C O 4 3 1	0	0
5	H	1	Total C O 4 3 1	0	0
5	I	1	Total C O 4 3 1	0	0
5	J	1	Total C O 4 3 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	221	Total O 221 221	0	0
6	B	254	Total O 254 254	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	244	Total 244	O 244	0	0
6	D	228	Total 228	O 228	0	0
6	E	245	Total 245	O 245	0	0
6	F	235	Total 235	O 235	0	0
6	G	238	Total 238	O 238	0	0
6	H	252	Total 252	O 252	0	0
6	I	244	Total 244	O 244	0	0
6	J	234	Total 234	O 234	0	0

3 Residue-property plots [i](#)

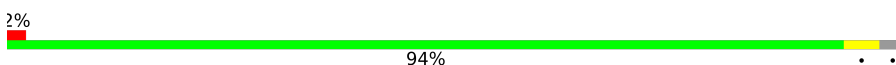
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: VP1

Chain A: 

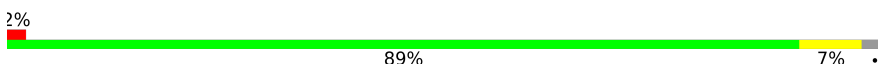


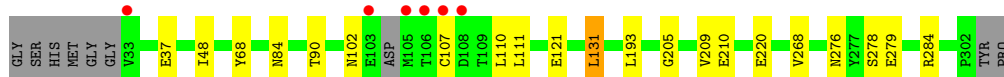
• Molecule 1: VP1

Chain B: 



• Molecule 1: VP1

Chain C: 



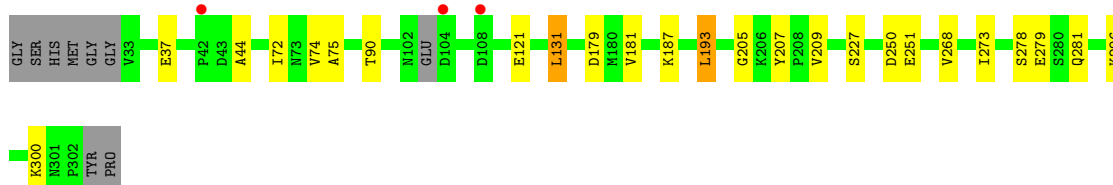
• Molecule 1: VP1

Chain D: 

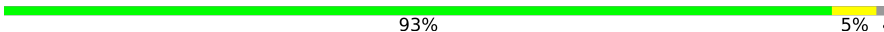


• Molecule 1: VP1

Chain E: 

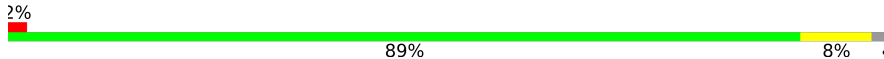


- Molecule 1: VP1

Chain F:  93% 5%

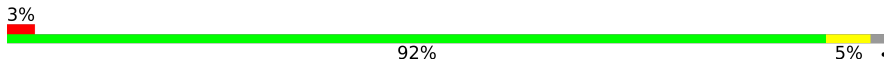


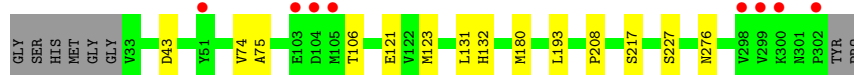
- Molecule 1: VP1

Chain G:  89% 8%

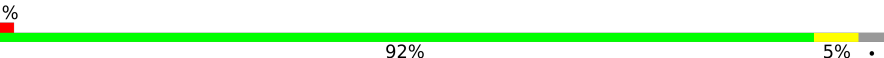


- Molecule 1: VP1

Chain H:  92% 5%

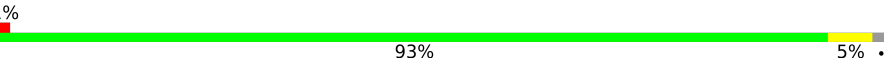


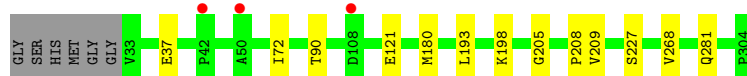
- Molecule 1: VP1

Chain I:  92% 5%



- Molecule 1: VP1

Chain J:  93% 5%



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  67% 33%



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  67% 33%



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:



- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:  67% 33%

NGC1
GAL2
NGC3

- Molecule 2: N-glycolyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T:  33% 67%

NGC1
GAL2
NGC3

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	103.40Å 177.65Å 198.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	132.42 – 2.10 132.42 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.3 (132.42-2.10) 99.4 (132.42-2.10)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.40 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.8.0025	Depositor
R, R_{free}	0.184 , 0.224 0.186 , 0.226	Depositor DCC
R_{free} test set	10548 reflections (4.47%)	wwPDB-VP
Wilson B-factor (Å ²)	22.1	Xtriage
Anisotropy	0.609	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 43.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	23698	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, CA, IPA, NGC, EDO, GAL

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	0.70	1/2100 (0.0%)	0.79	1/2866 (0.0%)
1	B	0.66	1/2112 (0.0%)	0.74	0/2884
1	C	0.66	2/2094 (0.1%)	0.76	0/2858
1	D	0.65	0/2111	0.73	0/2883
1	E	0.64	0/2093	0.75	0/2857
1	F	0.65	0/2139	0.72	0/2921
1	G	0.67	1/2116 (0.0%)	0.73	0/2890
1	H	0.68	0/2111	0.75	1/2883 (0.0%)
1	I	0.64	0/2102	0.72	0/2869
1	J	0.67	0/2132	0.73	0/2913
All	All	0.66	5/21110 (0.0%)	0.74	2/28824 (0.0%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	45	ILE	C-N	-9.31	1.22	1.33
1	B	110	LEU	C-O	-6.14	1.16	1.23
1	G	139	TYR	CA-C	5.81	1.55	1.52
1	C	110	LEU	C-O	-5.37	1.17	1.23
1	C	102	ASN	C-O	-5.03	1.18	1.24

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	45	ILE	O-C-N	-10.97	111.52	123.03
1	H	106	THR	N-CA-C	5.16	119.85	113.50

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	2057	0	2036	8	0
1	B	2065	0	2043	5	0
1	C	2051	0	2033	13	0
1	D	2067	0	2041	7	0
1	E	2050	0	2031	15	0
1	F	2093	0	2061	6	0
1	G	2072	0	2050	13	0
1	H	2067	0	2040	7	0
1	I	2059	0	2037	10	0
1	J	2086	0	2057	13	0
2	K	47	0	31	0	0
2	L	47	0	31	1	0
2	M	47	0	31	2	0
2	N	47	0	31	0	0
2	O	47	0	31	1	0
2	P	47	0	31	0	0
2	Q	47	0	31	1	0
2	R	47	0	31	2	0
2	S	47	0	31	0	0
2	T	47	0	31	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
3	G	1	0	0	0	0
3	H	1	0	0	0	0
3	I	1	0	0	0	0
3	J	1	0	0	0	0
4	A	8	0	12	0	0
4	B	8	0	12	1	0
4	C	16	0	24	1	0
4	D	16	0	24	0	0
4	E	8	0	12	1	0
4	F	12	0	18	0	0
4	G	20	0	30	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	H	8	0	12	3	0
4	I	8	0	12	0	0
4	J	12	0	18	6	0
5	A	4	0	8	0	0
5	B	4	0	8	0	0
5	C	4	0	8	0	0
5	D	4	0	8	0	0
5	E	4	0	8	1	0
5	F	4	0	8	0	0
5	G	4	0	8	0	0
5	H	4	0	8	1	0
5	I	4	0	8	0	0
5	J	4	0	8	0	0
6	A	221	0	0	1	0
6	B	254	0	0	0	0
6	C	244	0	0	1	0
6	D	228	0	0	0	0
6	E	245	0	0	1	0
6	F	235	0	0	1	0
6	G	238	0	0	1	0
6	H	252	0	0	0	0
6	I	244	0	0	1	0
6	J	234	0	0	0	0
All	All	23698	0	20993	90	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 2.

All (90) 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:G:103:GLU:HG3	1:G:104:ASP:H	1.47	0.79
1:I:239[A]:GLN:HE22	1:J:227:SER:HB2	1.54	0.72
1:I:107:CYS:HB3	6:I:657:HOH:O	1.90	0.70
1:G:104:ASP:OD1	1:G:106:THR:OG1	2.10	0.69
1:E:37:GLU:HG3	1:J:37:GLU:HG3	1.81	0.62
1:I:104:ASP:O	1:I:105:MET:HG2	2.00	0.62
1:I:238:MET:C	1:I:239[A]:GLN:HE21	2.08	0.61
4:G:403:EDO:H21	6:G:534:HOH:O	2.02	0.58
1:J:198:LYS:HZ1	4:J:402:EDO:H12	1.68	0.58
1:J:198:LYS:NZ	4:J:402:EDO:C1	2.67	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:278:SER:O	1:A:279:GLU:HB2	2.04	0.57
4:B:403:EDO:H11	1:C:220:GLU:HA	1.88	0.56
1:J:180:MET:HE2	1:J:208:PRO:HG3	1.90	0.54
1:J:198:LYS:NZ	4:J:402:EDO:H12	2.23	0.54
1:D:90:THR:OG1	1:D:205:GLY:HA2	2.07	0.53
1:E:179:ASP:HB3	6:E:510:HOH:O	2.09	0.52
1:A:77:SER:HB2	2:O:2:GAL:H2	1.92	0.51
1:G:209:VAL:HG11	1:G:268:VAL:HG21	1.92	0.51
1:J:90:THR:OG1	1:J:205:GLY:HA2	2.11	0.50
1:B:276:ASN:HB3	2:L:3:NGC:O1A	2.12	0.50
1:D:131:LEU:HD11	1:E:273:ILE:HD13	1.94	0.49
1:A:178:THR:HG22	6:A:702:HOH:O	2.12	0.49
1:G:278:SER:O	1:G:279:GLU:HB2	2.14	0.48
1:C:111:LEU:HG	4:C:402:EDO:H21	1.95	0.48
2:M:2:GAL:H4	2:M:3:NGC:C1	2.43	0.48
1:E:278:SER:O	1:E:279:GLU:HB2	2.14	0.48
1:C:278:SER:O	1:C:279:GLU:HB2	2.14	0.47
1:E:193:LEU:HD11	4:E:402:EDO:H11	1.97	0.47
1:E:209:VAL:HG11	1:E:268:VAL:HG21	1.95	0.47
1:D:68:TYR:CE1	1:D:284:ARG:HD3	2.49	0.46
1:A:33:VAL:HG22	1:A:302:PRO:HG3	1.96	0.46
1:E:90:THR:OG1	1:E:205:GLY:HA2	2.15	0.46
1:I:90:THR:OG1	1:I:205:GLY:HA2	2.15	0.46
2:R:2:GAL:H4	2:R:3:NGC:C1	2.46	0.46
1:E:72:ILE:HG12	1:E:281:GLN:O	2.16	0.46
1:B:90:THR:OG1	1:B:205:GLY:HA2	2.15	0.46
1:C:107:CYS:HG	1:G:107:CYS:HG	1.63	0.46
1:B:278:SER:O	1:B:279:GLU:HB2	2.16	0.45
1:H:74:VAL:HG12	1:H:75:ALA:O	2.17	0.45
1:C:276:ASN:HB3	2:M:3:NGC:O1A	2.17	0.45
1:C:131:LEU:HD11	1:D:273:ILE:HD13	2.00	0.44
1:B:132:HIS:HE2	1:C:210:GLU:CD	2.25	0.44
1:D:278:SER:O	1:D:279:GLU:HB2	2.17	0.44
1:F:48:ILE:C	1:F:48:ILE:HD12	2.43	0.44
1:G:51:TYR:HD2	4:H:403:EDO:H21	1.82	0.44
1:C:48:ILE:C	1:C:48:ILE:HD12	2.43	0.44
1:E:74:VAL:HG12	1:E:75:ALA:O	2.18	0.44
1:J:72:ILE:HG12	1:J:281:GLN:O	2.18	0.44
1:E:181:VAL:HG11	1:E:207:TYR:CE1	2.53	0.43
1:H:180:MET:HE2	1:H:208:PRO:HG3	2.00	0.43
1:A:48:ILE:HD12	1:A:48:ILE:C	2.42	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:104:ASP:OD2	1:I:105:MET:N	2.51	0.43
1:J:198:LYS:HZ3	4:J:402:EDO:C1	2.30	0.43
1:I:105:MET:HE3	1:I:105:MET:HB3	1.73	0.43
1:I:251:GLU:H	1:I:251:GLU:CD	2.27	0.43
1:J:198:LYS:HZ1	4:J:402:EDO:C1	2.32	0.43
1:F:132:HIS:HE2	1:G:210:GLU:CD	2.27	0.43
1:H:132:HIS:HE2	1:I:210:GLU:CD	2.26	0.43
1:H:227:SER:HB2	5:H:404:IPA:H31	1.99	0.43
1:J:198:LYS:HZ3	4:J:402:EDO:H11	1.84	0.43
1:D:209:VAL:HG11	1:D:268:VAL:HG21	2.01	0.42
1:J:209:VAL:HG11	1:J:268:VAL:HG21	2.01	0.42
1:I:273:ILE:CG2	1:I:281:GLN:HB3	2.49	0.42
1:C:84:ASN:HB3	6:C:535:HOH:O	2.20	0.42
1:F:278:SER:O	1:F:279:GLU:HB2	2.20	0.42
1:G:88:LEU:HB2	1:G:180:MET:HE1	2.00	0.42
1:G:90:THR:OG1	1:G:205:GLY:HA2	2.19	0.42
1:C:37:GLU:HG3	1:G:37:GLU:HG3	2.01	0.42
1:E:44:ALA:HA	1:E:296:LYS:HD2	2.02	0.42
1:H:217:SER:HB3	4:H:403:EDO:H22	2.00	0.42
2:Q:2:GAL:H4	2:Q:3:NGC:C1	2.49	0.42
1:A:273:ILE:HD13	1:E:131:LEU:HD21	2.02	0.41
1:E:37:GLU:CG	1:J:37:GLU:HG3	2.49	0.41
1:F:90:THR:OG1	1:F:205:GLY:HA2	2.20	0.41
1:A:149:GLN:HA	1:A:236:PRO:HD3	2.03	0.41
1:D:48:ILE:HD12	1:D:48:ILE:C	2.45	0.41
1:G:72:ILE:HG12	1:G:281:GLN:O	2.21	0.41
1:H:276:ASN:HB3	2:R:3:NGC:O1A	2.21	0.41
1:C:90:THR:OG1	1:C:205:GLY:HA2	2.20	0.41
1:C:209:VAL:HG11	1:C:268:VAL:HG21	2.02	0.41
1:F:101:LEU:HD22	1:F:296:LYS:HE2	2.03	0.41
1:G:51:TYR:CD2	4:H:403:EDO:H21	2.55	0.41
1:C:68:TYR:CE1	1:C:284:ARG:HD3	2.56	0.41
1:G:125:ILE:HG23	1:G:238:MET:HE3	2.02	0.40
1:H:123:MET:HE3	1:H:123:MET:HB2	1.98	0.40
1:E:250:ASP:HB2	1:E:251:GLU:OE1	2.21	0.40
1:A:155:MET:O	1:A:267:ALA:HA	2.22	0.40
1:E:227:SER:HB2	5:E:404:IPA:H31	2.03	0.40
1:F:236:PRO:HB3	6:F:520:HOH:O	2.21	0.40
1:B:97:LYS:HA	1:B:97:LYS:HD2	1.86	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	266/278 (96%)	255 (96%)	11 (4%)	0	100	100
1	B	269/278 (97%)	254 (94%)	15 (6%)	0	100	100
1	C	265/278 (95%)	255 (96%)	10 (4%)	0	100	100
1	D	269/278 (97%)	259 (96%)	10 (4%)	0	100	100
1	E	265/278 (95%)	252 (95%)	13 (5%)	0	100	100
1	F	272/278 (98%)	262 (96%)	10 (4%)	0	100	100
1	G	270/278 (97%)	258 (96%)	12 (4%)	0	100	100
1	H	269/278 (97%)	259 (96%)	10 (4%)	0	100	100
1	I	266/278 (96%)	253 (95%)	13 (5%)	0	100	100
1	J	271/278 (98%)	259 (96%)	12 (4%)	0	100	100
All	All	2682/2780 (96%)	2566 (96%)	116 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	235/240 (98%)	231 (98%)	4 (2%)	53	62
1	B	236/240 (98%)	234 (99%)	2 (1%)	73	81
1	C	234/240 (98%)	231 (99%)	3 (1%)	61	69
1	D	236/240 (98%)	232 (98%)	4 (2%)	53	62

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	234/240 (98%)	229 (98%)	5 (2%)	47	54
1	F	239/240 (100%)	235 (98%)	4 (2%)	53	62
1	G	237/240 (99%)	234 (99%)	3 (1%)	61	69
1	H	236/240 (98%)	232 (98%)	4 (2%)	53	62
1	I	235/240 (98%)	233 (99%)	2 (1%)	70	78
1	J	238/240 (99%)	236 (99%)	2 (1%)	73	81
All	All	2360/2400 (98%)	2327 (99%)	33 (1%)	59	67

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	THR
1	A	121	GLU
1	A	131	LEU
1	A	193	LEU
1	B	121	GLU
1	B	193	LEU
1	C	121	GLU
1	C	131	LEU
1	C	193	LEU
1	D	43	ASP
1	D	121	GLU
1	D	131	LEU
1	D	193	LEU
1	E	121	GLU
1	E	131	LEU
1	E	187	LYS
1	E	193	LEU
1	E	300	LYS
1	F	108	ASP
1	F	121	GLU
1	F	193	LEU
1	F	220	GLU
1	G	121	GLU
1	G	131	LEU
1	G	193	LEU
1	H	43	ASP
1	H	121	GLU
1	H	131	LEU
1	H	193	LEU

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Mol	Chain	Res	Type
1	I	33	VAL
1	I	193	LEU
1	J	121	GLU
1	J	193	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	ASN
1	A	276	ASN
1	A	282	ASN
1	B	239	GLN
1	C	47	GLN
1	C	58	ASN
1	D	58	ASN
1	E	58	ASN
1	G	47	GLN
1	G	58	ASN
1	G	196	ASN
1	G	239	GLN
1	H	58	ASN
1	I	58	ASN
1	I	185	ASN
1	J	58	ASN
1	J	185	ASN
1	J	276	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

30 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	K	1	2	15,15,15	0.53	0	21,21,21	1.24	2 (9%)
2	GAL	K	2	2	11,11,12	0.65	0	15,15,17	0.55	0
2	NGC	K	3	2	21,21,22	0.78	0	22,29,32	0.99	0
2	NAG	L	1	2	15,15,15	0.52	0	21,21,21	1.10	1 (4%)
2	GAL	L	2	2	11,11,12	0.77	0	15,15,17	1.15	1 (6%)
2	NGC	L	3	2	21,21,22	0.66	0	22,29,32	0.96	2 (9%)
2	NAG	M	1	2	15,15,15	0.68	0	21,21,21	2.19	7 (33%)
2	GAL	M	2	2	11,11,12	0.92	1 (9%)	15,15,17	1.05	1 (6%)
2	NGC	M	3	2	21,21,22	0.60	0	22,29,32	1.20	2 (9%)
2	NAG	N	1	2	15,15,15	0.50	0	21,21,21	1.51	3 (14%)
2	GAL	N	2	2	11,11,12	0.71	0	15,15,17	0.85	0
2	NGC	N	3	2	21,21,22	0.62	0	22,29,32	1.10	2 (9%)
2	NAG	O	1	2	15,15,15	0.52	0	21,21,21	1.20	1 (4%)
2	GAL	O	2	2	11,11,12	0.74	0	15,15,17	1.01	1 (6%)
2	NGC	O	3	2	21,21,22	0.67	0	22,29,32	1.26	2 (9%)
2	NAG	P	1	2	15,15,15	0.51	0	21,21,21	1.40	3 (14%)
2	GAL	P	2	2	11,11,12	0.64	0	15,15,17	0.97	0
2	NGC	P	3	2	21,21,22	0.64	0	22,29,32	0.89	1 (4%)
2	NAG	Q	1	2	15,15,15	0.45	0	21,21,21	1.01	2 (9%)
2	GAL	Q	2	2	11,11,12	0.61	0	15,15,17	1.07	1 (6%)
2	NGC	Q	3	2	21,21,22	0.88	1 (4%)	22,29,32	0.95	1 (4%)
2	NAG	R	1	2	15,15,15	0.45	0	21,21,21	1.14	2 (9%)
2	GAL	R	2	2	11,11,12	0.66	0	15,15,17	1.29	1 (6%)
2	NGC	R	3	2	21,21,22	0.67	0	22,29,32	1.06	1 (4%)
2	NAG	S	1	2	15,15,15	0.50	0	21,21,21	0.90	0
2	GAL	S	2	2	11,11,12	0.53	0	15,15,17	0.88	0
2	NGC	S	3	2	21,21,22	0.63	0	22,29,32	1.28	2 (9%)
2	NAG	T	1	2	15,15,15	0.47	0	21,21,21	0.98	0
2	GAL	T	2	2	11,11,12	0.75	0	15,15,17	1.10	2 (13%)
2	NGC	T	3	2	21,21,22	0.67	0	22,29,32	1.02	2 (9%)

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	K	1	2	-	0/6/26/26	0/1/1/1
2	GAL	K	2	2	-	1/2/19/22	0/1/1/1
2	NGC	K	3	2	-	6/20/36/40	0/1/1/1
2	NAG	L	1	2	-	0/6/26/26	0/1/1/1
2	GAL	L	2	2	-	1/2/19/22	0/1/1/1
2	NGC	L	3	2	-	2/20/36/40	0/1/1/1
2	NAG	M	1	2	-	0/6/26/26	0/1/1/1
2	GAL	M	2	2	-	1/2/19/22	0/1/1/1
2	NGC	M	3	2	-	0/20/36/40	0/1/1/1
2	NAG	N	1	2	-	0/6/26/26	0/1/1/1
2	GAL	N	2	2	-	2/2/19/22	0/1/1/1
2	NGC	N	3	2	-	0/20/36/40	0/1/1/1
2	NAG	O	1	2	-	2/6/26/26	0/1/1/1
2	GAL	O	2	2	-	1/2/19/22	0/1/1/1
2	NGC	O	3	2	-	2/20/36/40	0/1/1/1
2	NAG	P	1	2	-	0/6/26/26	0/1/1/1
2	GAL	P	2	2	-	1/2/19/22	0/1/1/1
2	NGC	P	3	2	-	0/20/36/40	0/1/1/1
2	NAG	Q	1	2	-	0/6/26/26	0/1/1/1
2	GAL	Q	2	2	-	2/2/19/22	0/1/1/1
2	NGC	Q	3	2	-	0/20/36/40	0/1/1/1
2	NAG	R	1	2	-	0/6/26/26	0/1/1/1
2	GAL	R	2	2	-	2/2/19/22	0/1/1/1
2	NGC	R	3	2	-	0/20/36/40	0/1/1/1
2	NAG	S	1	2	-	0/6/26/26	0/1/1/1
2	GAL	S	2	2	-	1/2/19/22	0/1/1/1
2	NGC	S	3	2	-	0/20/36/40	0/1/1/1
2	NAG	T	1	2	-	0/6/26/26	0/1/1/1
2	GAL	T	2	2	-	1/2/19/22	0/1/1/1
2	NGC	T	3	2	-	0/20/36/40	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	M	2	GAL	O5-C1	-2.19	1.40	1.43
2	Q	3	NGC	C2-C1	2.09	1.54	1.52

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	M	1	NAG	C1-C2-C3	-6.40	101.81	110.54
2	M	1	NAG	O5-C1-C2	-4.96	104.53	109.52
2	R	2	GAL	C1-O5-C5	3.66	117.09	112.19
2	M	3	NGC	O1B-C1-C2	3.37	121.49	112.71
2	M	2	GAL	C1-O5-C5	3.29	116.60	112.19
2	N	1	NAG	C1-C2-C3	3.28	115.02	110.54
2	P	1	NAG	C1-C2-N2	-3.21	107.01	110.73
2	S	3	NGC	O1B-C1-C2	3.20	121.03	112.71
2	N	1	NAG	C4-C3-C2	3.19	115.05	110.40
2	P	1	NAG	C4-C3-C2	3.16	115.00	110.40
2	Q	2	GAL	C1-O5-C5	3.12	116.37	112.19
2	K	1	NAG	C4-C3-C2	3.08	114.89	110.40
2	N	1	NAG	O5-C1-C2	2.94	112.47	109.52
2	N	3	NGC	C8-C7-C6	-2.78	107.84	113.05
2	R	1	NAG	C4-C3-C2	2.72	114.36	110.40
2	O	3	NGC	O6-C2-C3	-2.71	106.92	110.56
2	O	3	NGC	O1B-C1-C2	2.66	119.63	112.71
2	S	3	NGC	O1A-C1-C2	-2.65	117.13	122.85
2	O	1	NAG	C4-C3-C2	2.63	114.23	110.40
2	L	2	GAL	C1-O5-C5	2.61	115.69	112.19
2	M	1	NAG	C1-C2-N2	2.55	113.68	110.73
2	L	1	NAG	O4-C4-C3	-2.53	104.42	110.38
2	Q	3	NGC	O1B-C1-C2	2.48	119.16	112.71
2	R	3	NGC	O1B-C1-C2	2.48	119.16	112.71
2	R	1	NAG	C1-O5-C5	-2.42	108.97	113.65
2	K	1	NAG	C1-O5-C5	-2.36	109.09	113.65
2	M	1	NAG	C1-O5-C5	-2.34	109.13	113.65
2	T	2	GAL	C1-C2-C3	2.31	113.01	109.64
2	L	3	NGC	O10-C10-C11	2.28	121.11	119.62
2	T	3	NGC	O6-C2-C1	2.27	112.00	107.72
2	L	3	NGC	O1B-C1-C2	2.19	118.41	112.71
2	T	3	NGC	O1B-C1-C2	2.16	118.32	112.71
2	P	3	NGC	O1B-C1-C2	2.10	118.17	112.71
2	O	2	GAL	C1-C2-C3	2.10	112.70	109.64
2	Q	1	NAG	O4-C4-C3	-2.07	105.49	110.38
2	M	1	NAG	O4-C4-C5	-2.07	104.22	109.32
2	N	3	NGC	O1B-C1-C2	2.06	118.07	112.71
2	T	2	GAL	C1-O5-C5	2.05	114.94	112.19
2	P	1	NAG	C1-C2-C3	2.05	113.34	110.54
2	M	1	NAG	C3-C4-C5	2.04	113.93	110.23
2	M	3	NGC	O1A-C1-C2	-2.04	118.45	122.85
2	M	1	NAG	O7-C7-C8	-2.01	118.48	122.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	Q	1	NAG	C4-C3-C2	2.01	113.32	110.40

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	K	3	NGC	O8-C8-C9-O9
2	K	3	NGC	C7-C8-C9-O9
2	K	3	NGC	O7-C7-C8-C9
2	K	3	NGC	C6-C7-C8-O8
2	N	2	GAL	O5-C5-C6-O6
2	K	3	NGC	O7-C7-C8-O8
2	K	3	NGC	C6-C7-C8-C9
2	N	2	GAL	C4-C5-C6-O6
2	L	2	GAL	O5-C5-C6-O6
2	Q	2	GAL	O5-C5-C6-O6
2	L	3	NGC	O8-C8-C9-O9
2	K	2	GAL	O5-C5-C6-O6
2	O	2	GAL	O5-C5-C6-O6
2	M	2	GAL	O5-C5-C6-O6
2	T	2	GAL	O5-C5-C6-O6
2	R	2	GAL	C4-C5-C6-O6
2	S	2	GAL	O5-C5-C6-O6
2	P	2	GAL	O5-C5-C6-O6
2	O	1	NAG	C4-C5-C6-O6
2	O	1	NAG	O5-C5-C6-O6
2	R	2	GAL	O5-C5-C6-O6
2	O	3	NGC	O8-C8-C9-O9
2	L	3	NGC	C7-C8-C9-O9
2	O	3	NGC	C7-C8-C9-O9
2	Q	2	GAL	C4-C5-C6-O6

There are no ring outliers.

8 monomers are involved in 7 short contacts:

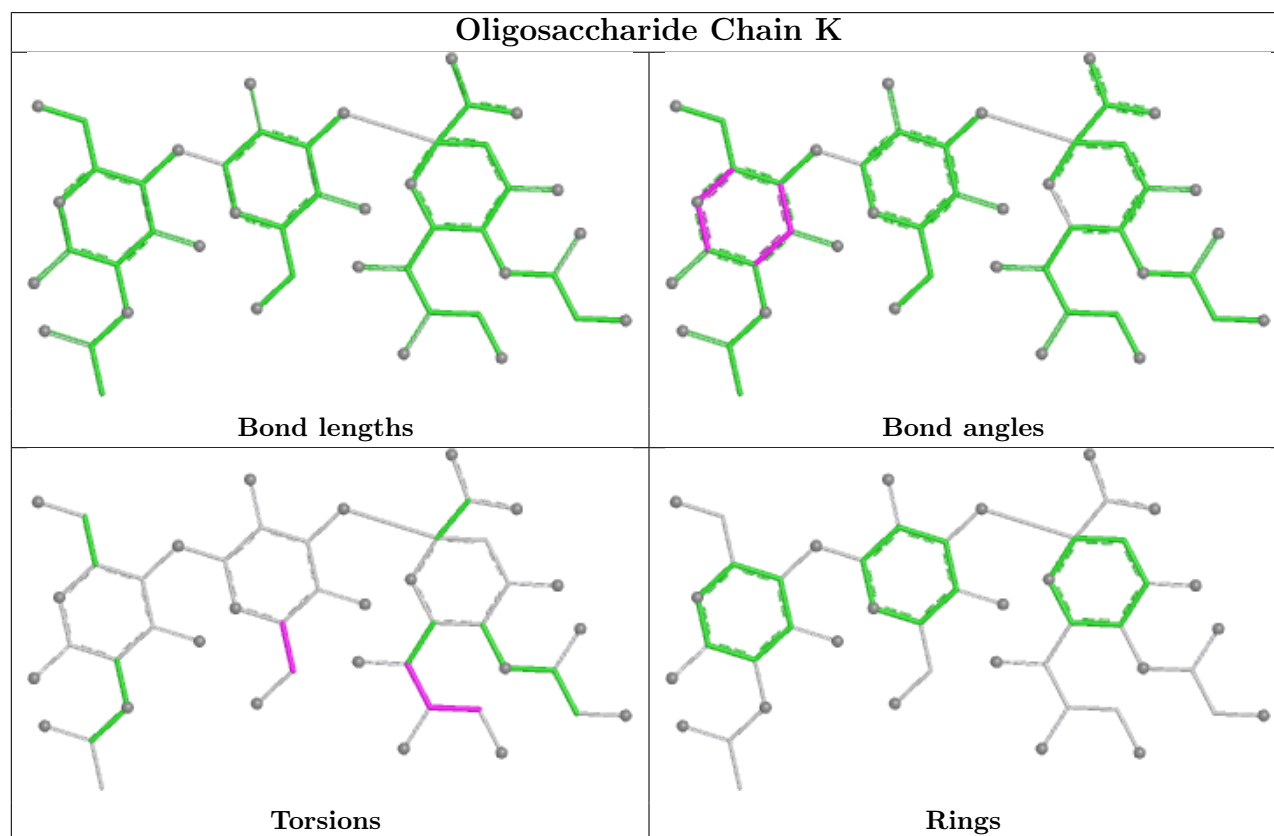
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	R	3	NGC	2	0
2	O	2	GAL	1	0
2	Q	2	GAL	1	0
2	L	3	NGC	1	0
2	Q	3	NGC	1	0

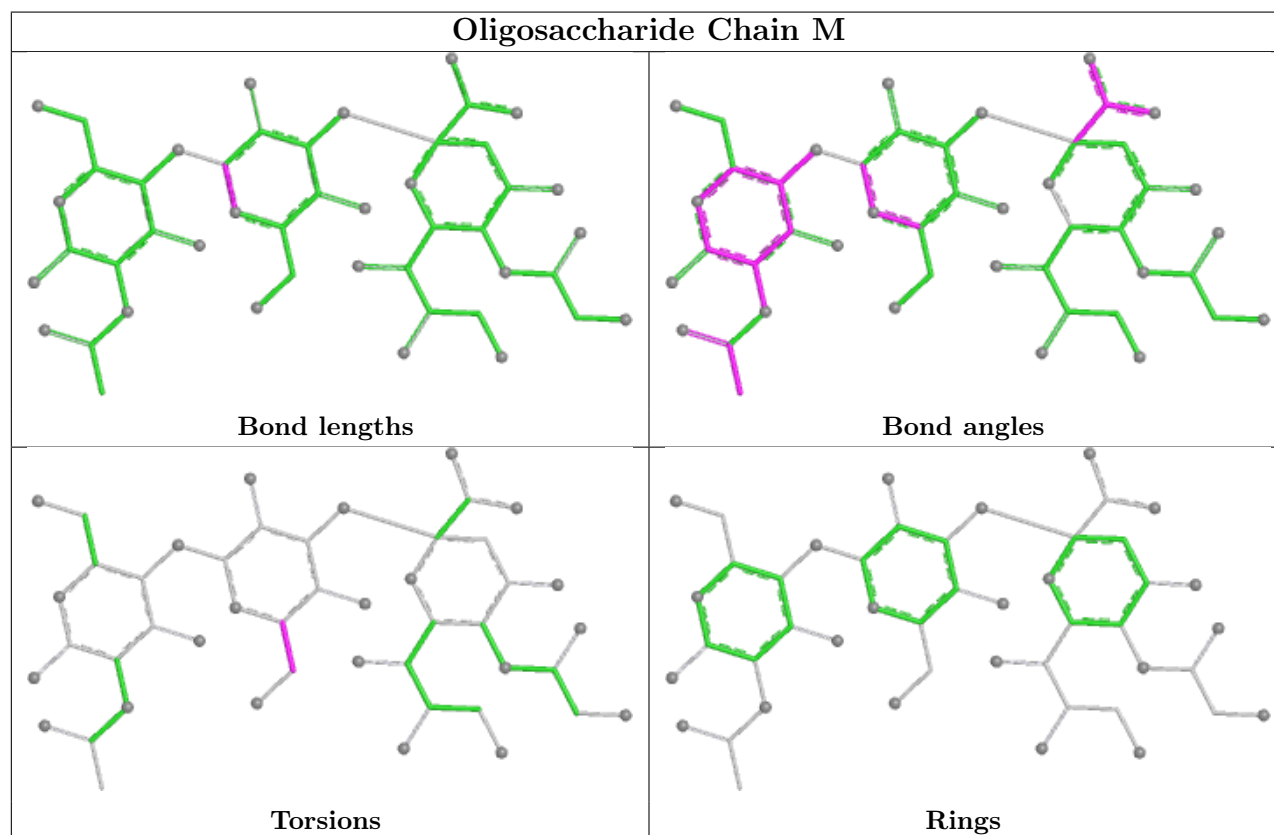
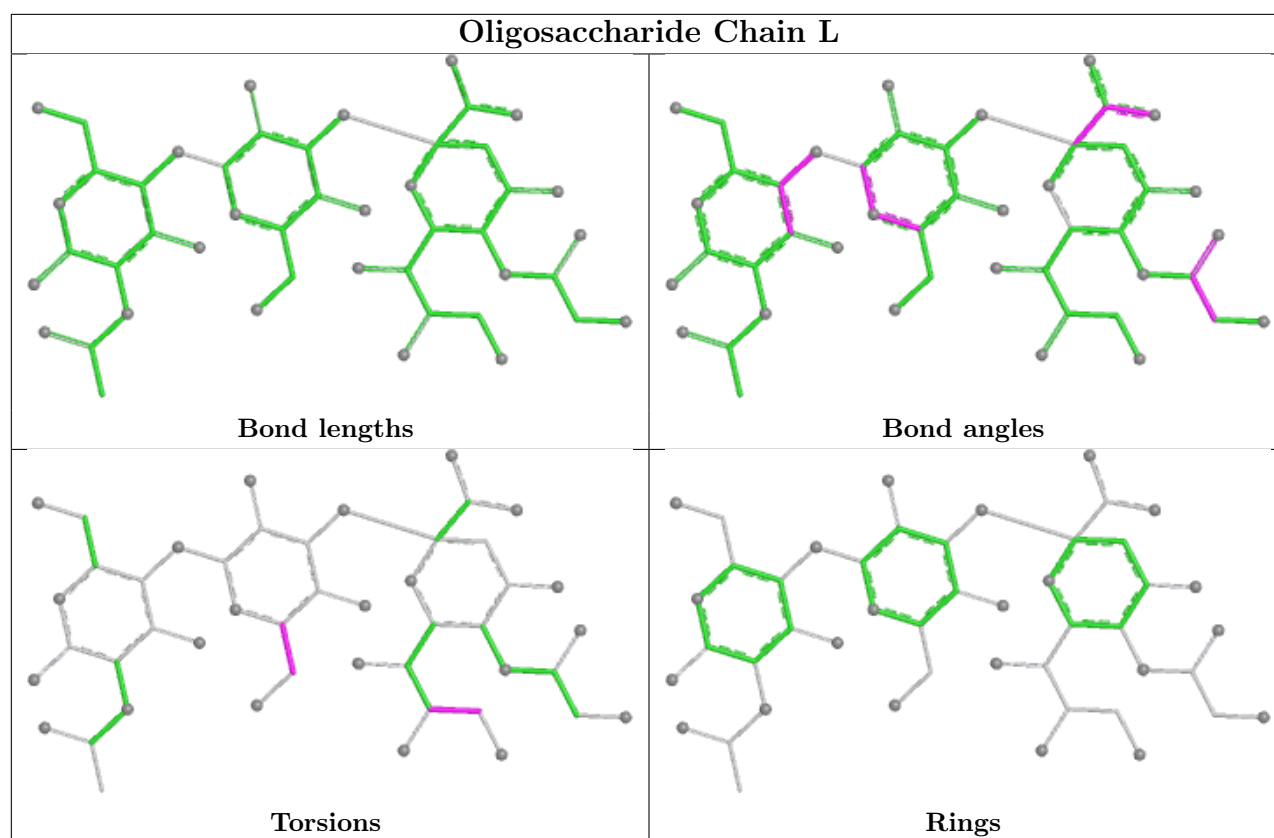
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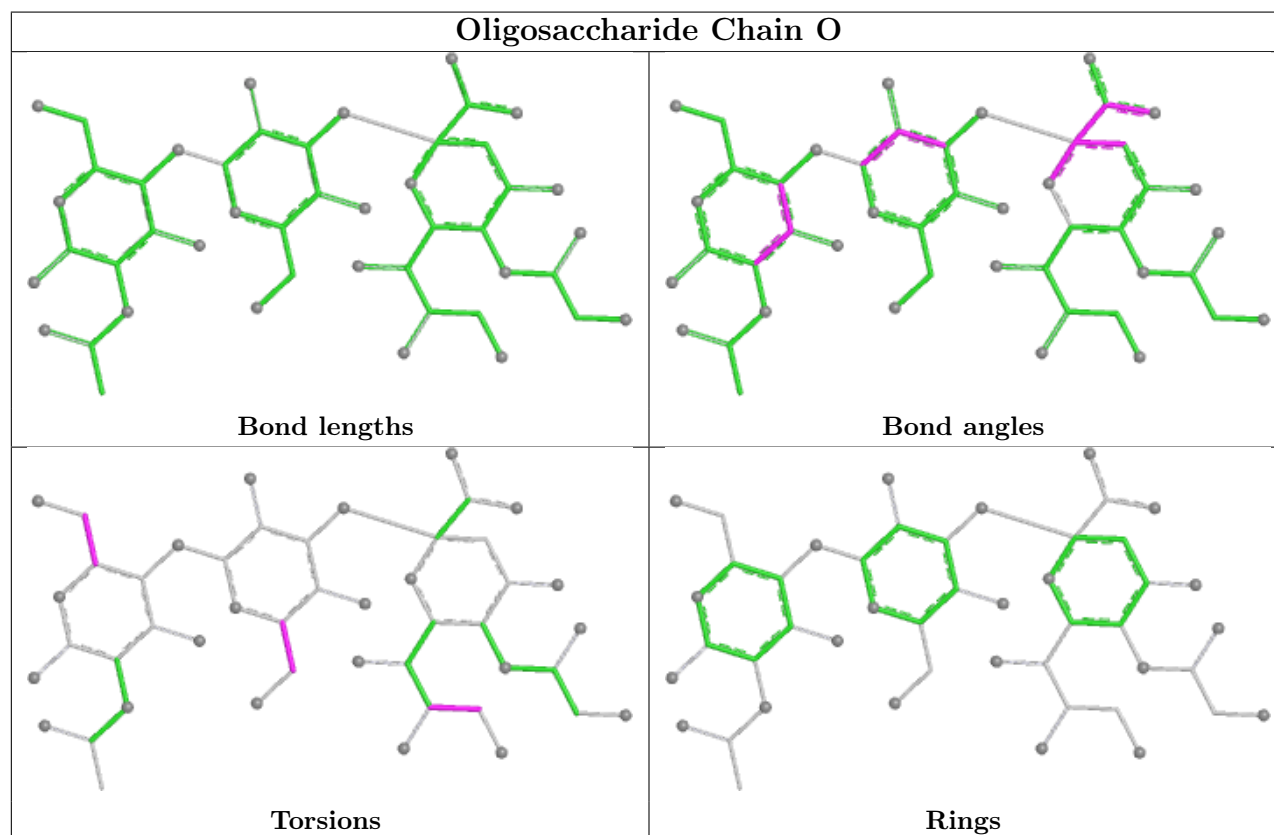
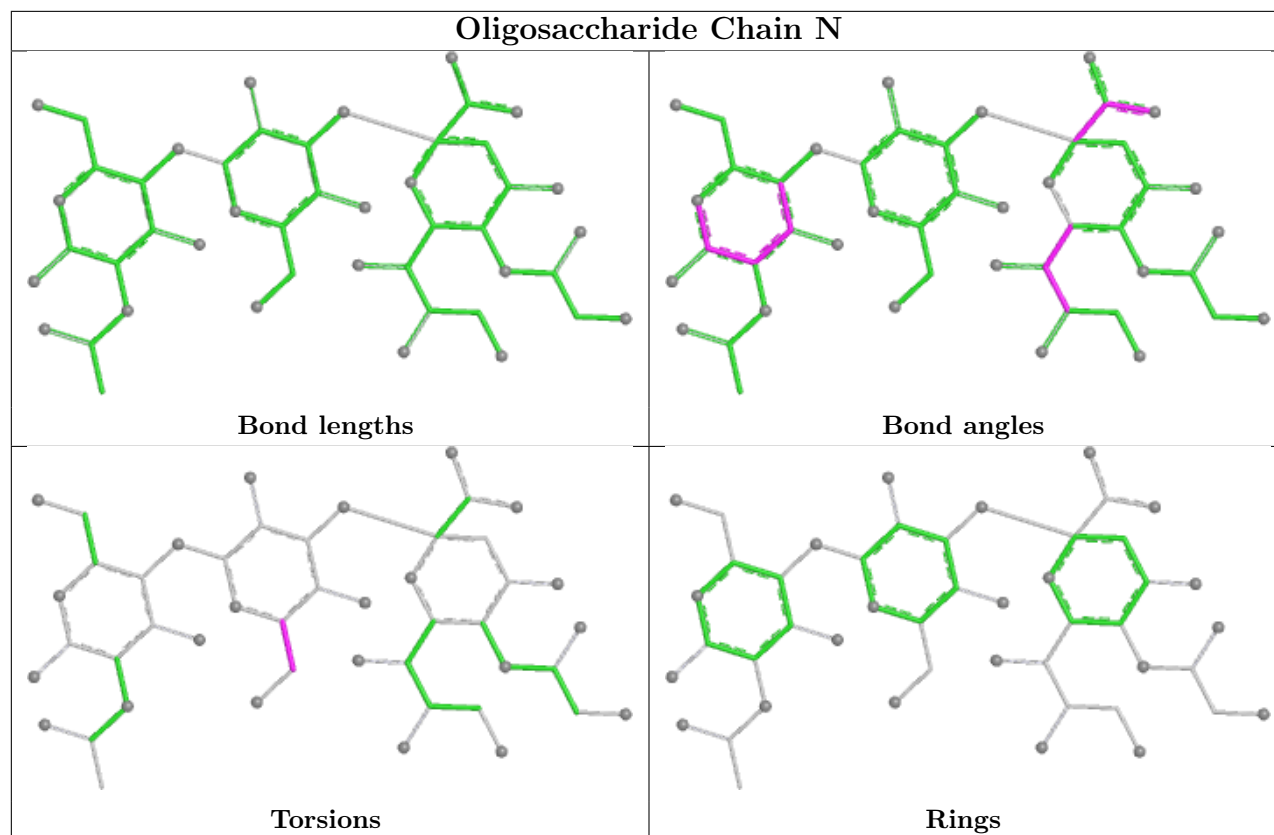
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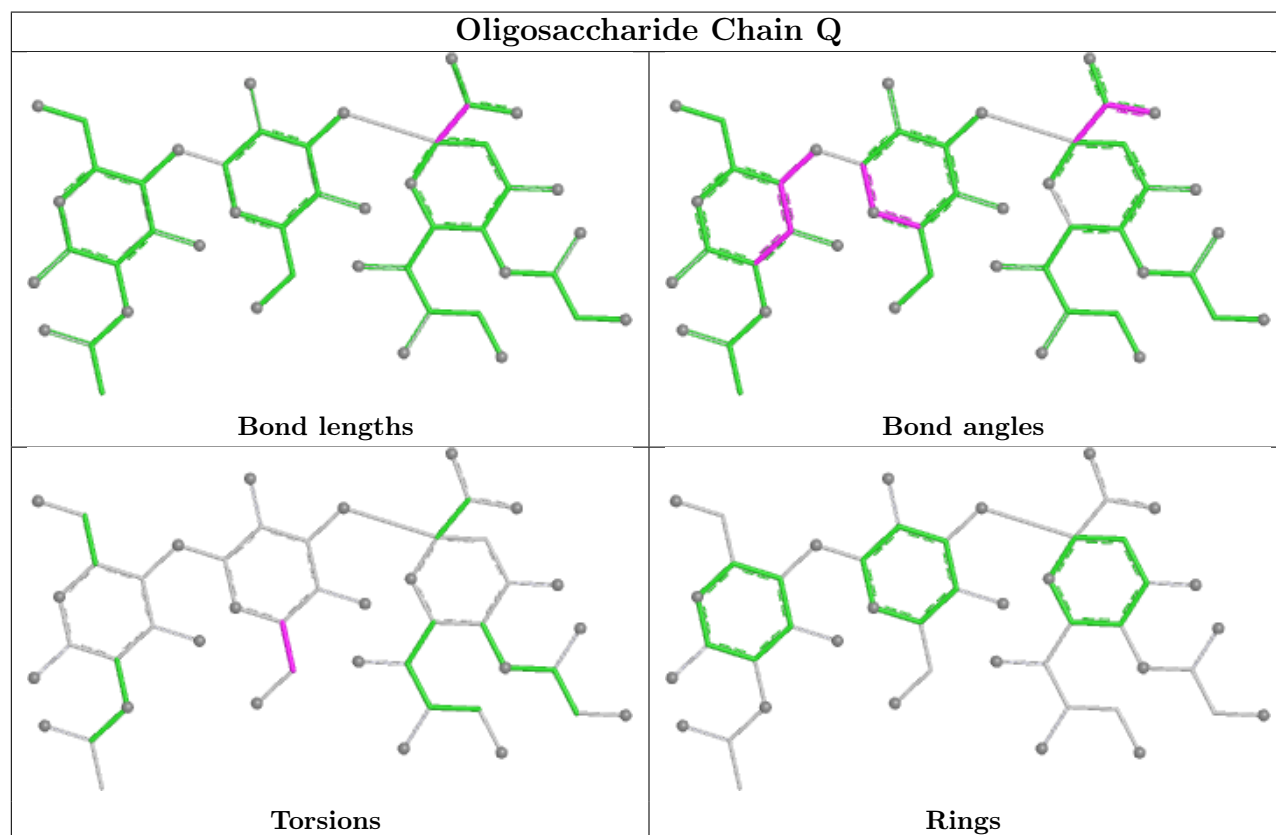
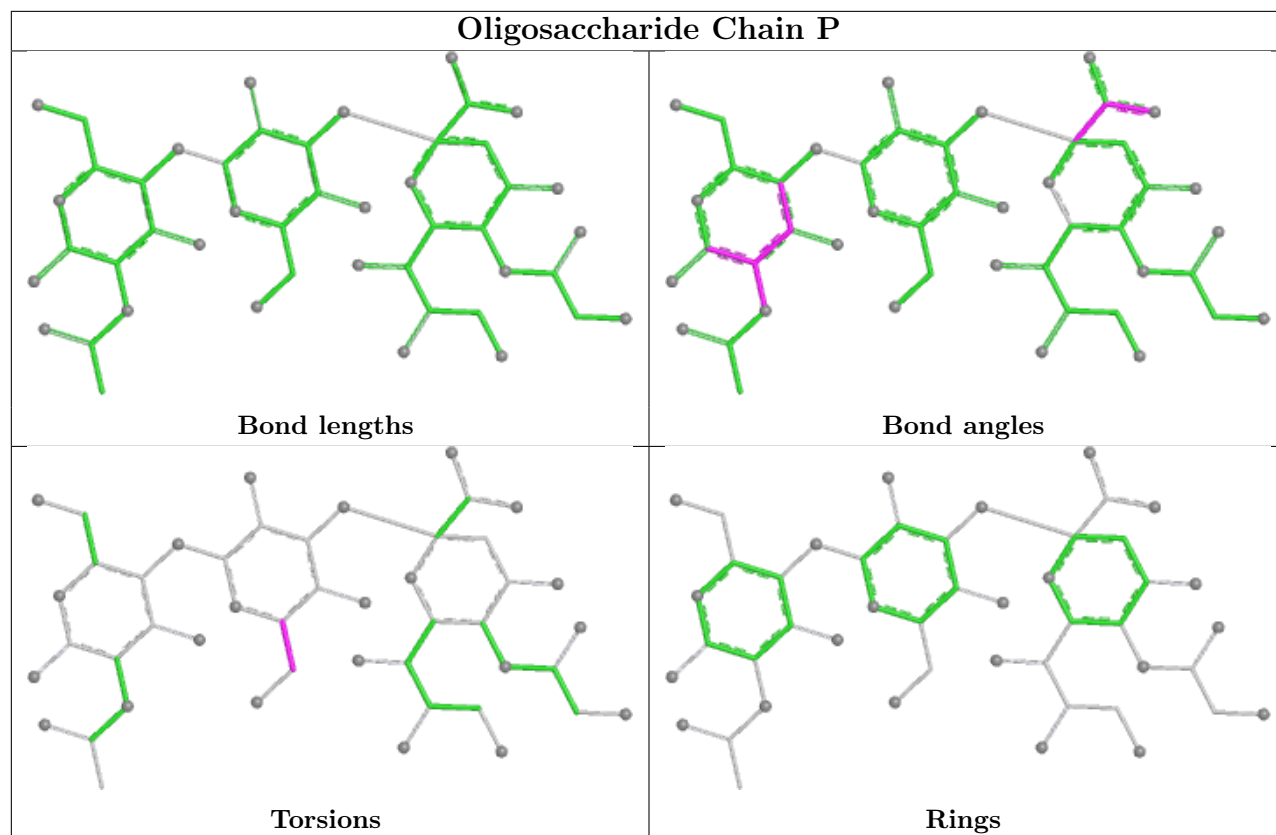
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	R	2	GAL	1	0
2	M	2	GAL	1	0
2	M	3	NGC	2	0

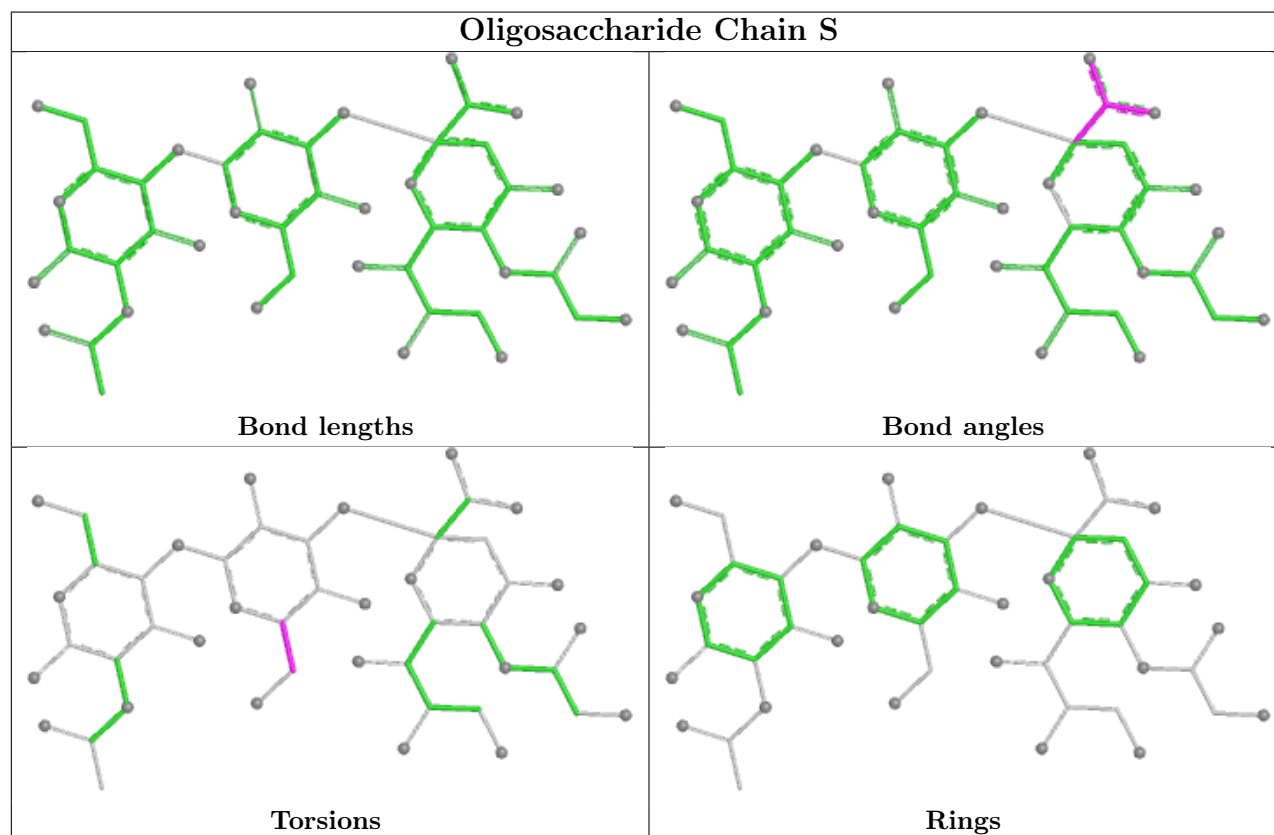
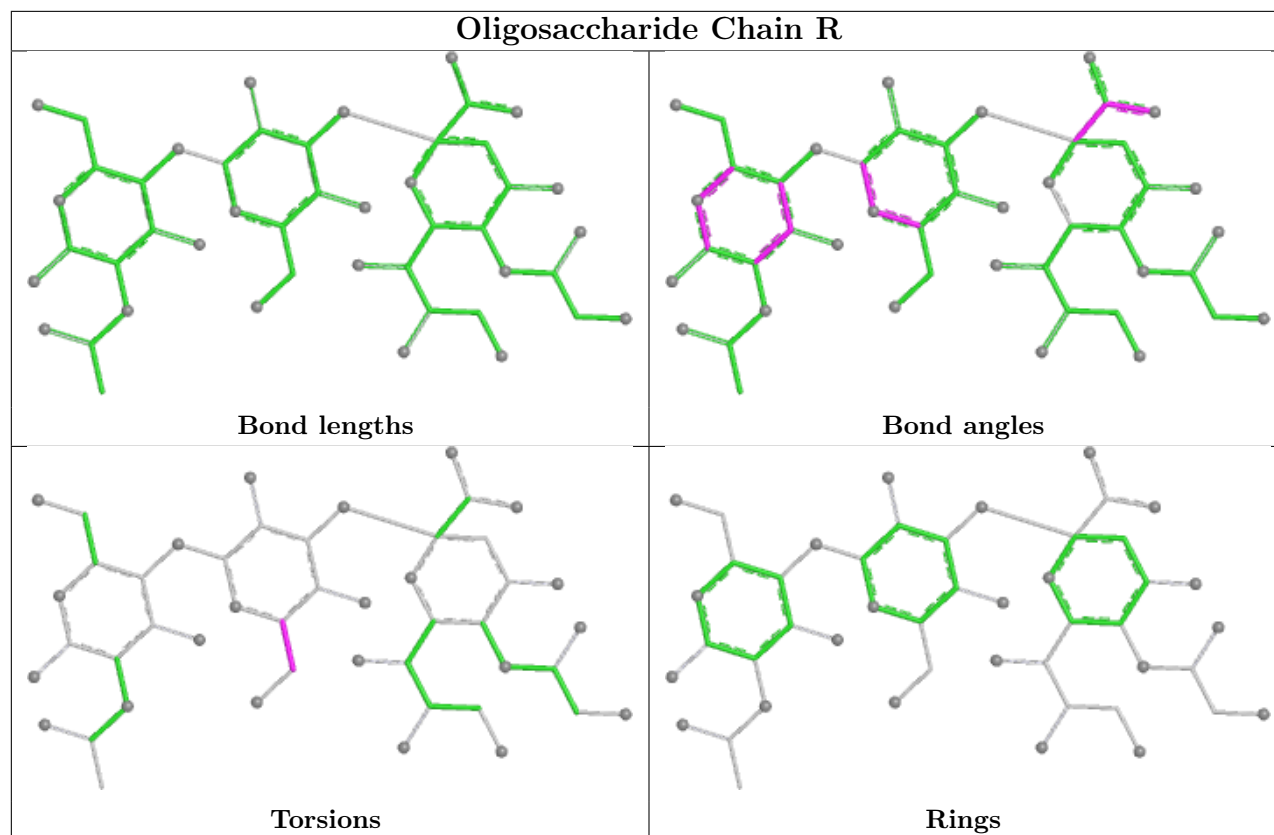
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

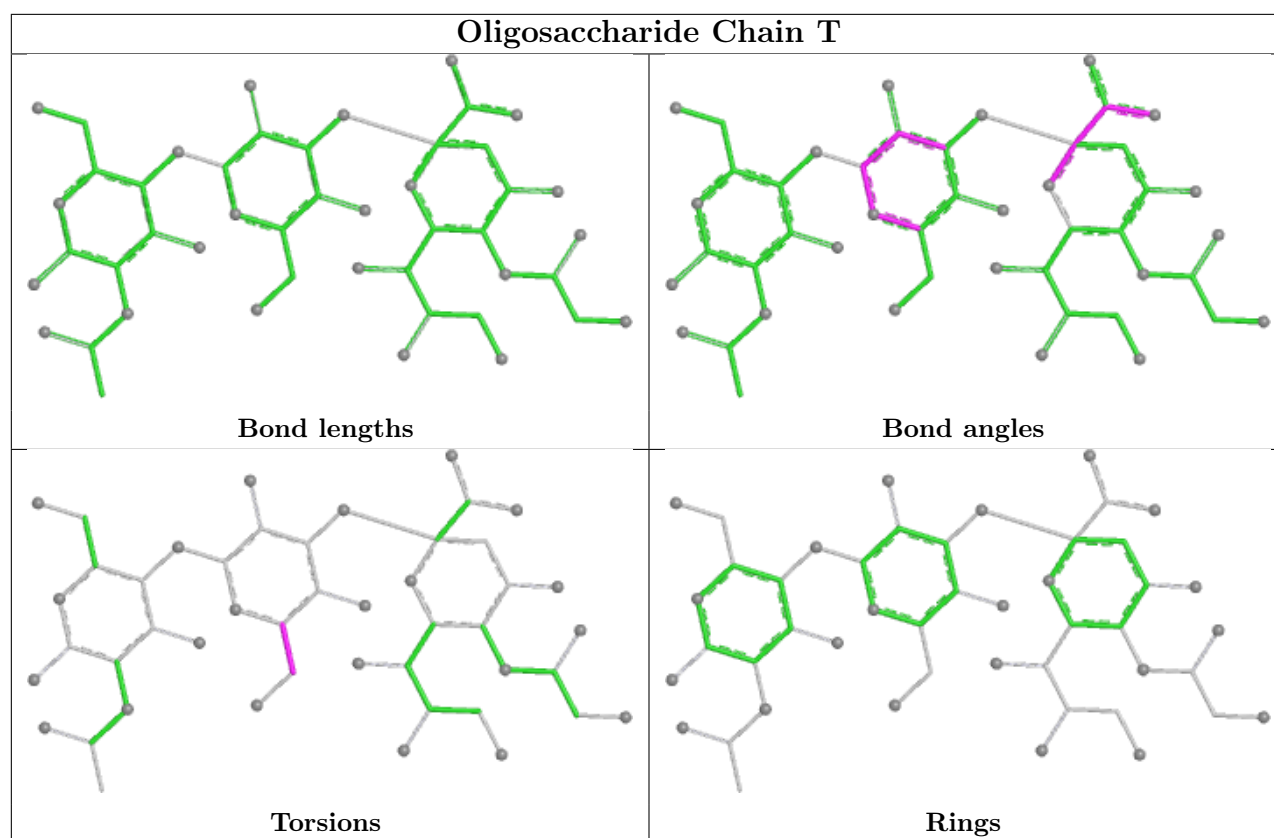












5.6 Ligand geometry [i](#)

Of 49 ligands modelled in this entry, 10 are monoatomic - leaving 39 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	$\# Z > 2$
5	IPA	E	404	-	3,3,3	0.39	0	3,3,3	0.46	0
4	EDO	E	402	-	3,3,3	0.43	0	2,2,2	0.34	0
5	IPA	J	405	-	3,3,3	0.41	0	3,3,3	0.56	0
4	EDO	A	403	-	3,3,3	0.47	0	2,2,2	0.67	0
4	EDO	G	404	-	3,3,3	0.61	0	2,2,2	0.17	0
4	EDO	J	404	-	3,3,3	0.44	0	2,2,2	0.49	0
4	EDO	C	403	-	3,3,3	0.38	0	2,2,2	0.59	0
5	IPA	G	407	-	3,3,3	0.47	0	3,3,3	0.39	0
5	IPA	B	404	-	3,3,3	0.45	0	3,3,3	0.52	0
4	EDO	J	402	-	3,3,3	0.41	0	2,2,2	0.66	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	IPA	H	404	-	3,3,3	0.46	0	3,3,3	0.42	0
4	EDO	C	405	-	3,3,3	0.47	0	2,2,2	0.21	0
4	EDO	D	402	-	3,3,3	0.42	0	2,2,2	0.51	0
4	EDO	I	403	-	3,3,3	0.49	0	2,2,2	0.28	0
4	EDO	C	402	-	3,3,3	0.43	0	2,2,2	0.26	0
4	EDO	B	403	-	3,3,3	0.40	0	2,2,2	0.44	0
5	IPA	D	406	-	3,3,3	0.54	0	3,3,3	0.37	0
4	EDO	G	402	-	3,3,3	0.49	0	2,2,2	0.38	0
4	EDO	G	406	-	3,3,3	0.33	0	2,2,2	0.74	0
5	IPA	F	405	-	3,3,3	0.45	0	3,3,3	0.52	0
4	EDO	A	402	-	3,3,3	0.46	0	2,2,2	0.39	0
4	EDO	D	403	-	3,3,3	0.55	0	2,2,2	0.17	0
4	EDO	J	403	-	3,3,3	0.53	0	2,2,2	0.19	0
4	EDO	H	402	-	3,3,3	0.45	0	2,2,2	0.39	0
4	EDO	H	403	-	3,3,3	0.51	0	2,2,2	0.20	0
5	IPA	I	404	-	3,3,3	0.50	0	3,3,3	0.37	0
4	EDO	D	405	-	3,3,3	0.46	0	2,2,2	0.45	0
5	IPA	C	406	-	3,3,3	0.44	0	3,3,3	0.42	0
4	EDO	I	402	-	3,3,3	0.42	0	2,2,2	0.56	0
4	EDO	E	403	-	3,3,3	0.40	0	2,2,2	0.61	0
4	EDO	F	404	-	3,3,3	0.47	0	2,2,2	0.32	0
4	EDO	B	402	-	3,3,3	0.50	0	2,2,2	0.47	0
5	IPA	A	404	-	3,3,3	0.45	0	3,3,3	0.40	0
4	EDO	C	404	-	3,3,3	0.46	0	2,2,2	0.35	0
4	EDO	F	402	-	3,3,3	0.39	0	2,2,2	0.45	0
4	EDO	F	403	-	3,3,3	0.44	0	2,2,2	0.52	0
4	EDO	G	403	-	3,3,3	0.39	0	2,2,2	0.55	0
4	EDO	G	405	-	3,3,3	0.33	0	2,2,2	0.65	0
4	EDO	D	404	-	3,3,3	0.40	0	2,2,2	0.51	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
4	EDO	E	402	-	-	1/1/1/1	-
4	EDO	A	403	-	-	0/1/1/1	-
4	EDO	G	404	-	-	1/1/1/1	-
4	EDO	J	404	-	-	0/1/1/1	-
4	EDO	C	403	-	-	1/1/1/1	-
4	EDO	J	402	-	-	1/1/1/1	-
4	EDO	C	405	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	D	402	-	-	0/1/1/1	-
4	EDO	I	403	-	-	0/1/1/1	-
4	EDO	C	402	-	-	0/1/1/1	-
4	EDO	B	403	-	-	0/1/1/1	-
4	EDO	G	402	-	-	0/1/1/1	-
4	EDO	G	406	-	-	1/1/1/1	-
4	EDO	A	402	-	-	1/1/1/1	-
4	EDO	D	403	-	-	0/1/1/1	-
4	EDO	J	403	-	-	0/1/1/1	-
4	EDO	H	402	-	-	0/1/1/1	-
4	EDO	H	403	-	-	1/1/1/1	-
4	EDO	D	405	-	-	0/1/1/1	-
4	EDO	I	402	-	-	0/1/1/1	-
4	EDO	E	403	-	-	0/1/1/1	-
4	EDO	F	404	-	-	1/1/1/1	-
4	EDO	B	402	-	-	0/1/1/1	-
4	EDO	C	404	-	-	0/1/1/1	-
4	EDO	F	402	-	-	0/1/1/1	-
4	EDO	F	403	-	-	0/1/1/1	-
4	EDO	G	403	-	-	1/1/1/1	-
4	EDO	G	405	-	-	0/1/1/1	-
4	EDO	D	404	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	402	EDO	O1-C1-C2-O2
4	H	403	EDO	O1-C1-C2-O2
4	G	403	EDO	O1-C1-C2-O2
4	F	404	EDO	O1-C1-C2-O2
4	G	406	EDO	O1-C1-C2-O2
4	C	403	EDO	O1-C1-C2-O2
4	G	404	EDO	O1-C1-C2-O2
4	J	402	EDO	O1-C1-C2-O2
4	A	402	EDO	O1-C1-C2-O2
4	D	404	EDO	O1-C1-C2-O2

There are no ring outliers.

8 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	404	IPA	1	0
4	E	402	EDO	1	0
4	J	402	EDO	6	0
5	H	404	IPA	1	0
4	C	402	EDO	1	0
4	B	403	EDO	1	0
4	H	403	EDO	3	0
4	G	403	EDO	1	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	269/278 (96%)	-0.41	3 (1%) 78 80	14, 22, 42, 87	1 (0%)
1	B	270/278 (97%)	-0.42	5 (1%) 66 69	15, 22, 39, 62	1 (0%)
1	C	269/278 (96%)	-0.39	6 (2%) 62 65	18, 24, 46, 78	0
1	D	270/278 (97%)	-0.37	2 (0%) 84 86	18, 24, 40, 55	1 (0%)
1	E	269/278 (96%)	-0.40	3 (1%) 78 80	17, 23, 41, 65	0
1	F	272/278 (97%)	-0.42	1 (0%) 88 90	14, 24, 37, 55	2 (0%)
1	G	270/278 (97%)	-0.35	5 (1%) 66 69	10, 22, 45, 86	2 (0%)
1	H	270/278 (97%)	-0.37	8 (2%) 52 55	15, 22, 44, 63	1 (0%)
1	I	269/278 (96%)	-0.38	5 (1%) 66 69	12, 24, 47, 87	1 (0%)
1	J	272/278 (97%)	-0.39	3 (1%) 78 80	15, 24, 38, 60	1 (0%)
All	All	2700/2780 (97%)	-0.39	41 (1%) 72 74	10, 23, 42, 87	10 (0%)

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	108	ASP	4.2
1	C	105	MET	4.1
1	G	106	THR	3.9
1	A	108	ASP	3.8
1	G	108	ASP	3.8
1	B	33	VAL	3.8
1	G	107	CYS	3.8
1	G	302	PRO	3.6
1	I	108	ASP	3.6
1	G	105	MET	3.4
1	H	298	VAL	3.4
1	C	106	THR	3.1
1	C	108	ASP	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	107	CYS	3.0
1	H	299	VAL	3.0
1	I	104	ASP	3.0
1	H	302	PRO	3.0
1	E	108	ASP	2.9
1	J	42	PRO	2.8
1	A	105	MET	2.8
1	I	105	MET	2.8
1	E	104	ASP	2.8
1	H	105	MET	2.7
1	B	105	MET	2.6
1	D	108	ASP	2.6
1	C	33	VAL	2.5
1	J	108	ASP	2.5
1	C	103	GLU	2.5
1	B	179	ASP	2.4
1	J	50	ALA	2.4
1	F	103	GLU	2.3
1	B	107	CYS	2.3
1	H	300	LYS	2.2
1	H	104	ASP	2.2
1	H	103	GLU	2.2
1	I	107	CYS	2.2
1	A	42	PRO	2.1
1	I	106	THR	2.1
1	E	42	PRO	2.1
1	D	101	LEU	2.0
1	H	51	TYR	2.0

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

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

6.3 Carbohydrates [i](#)

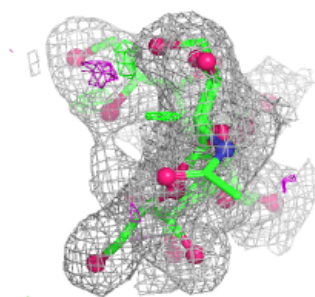
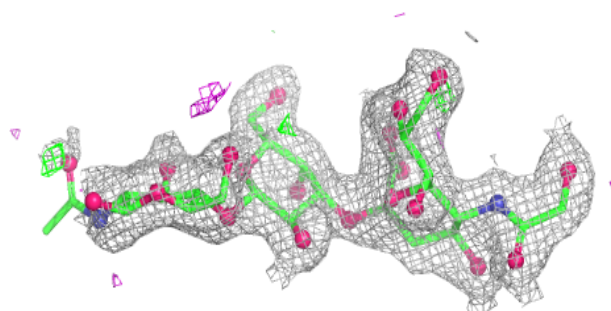
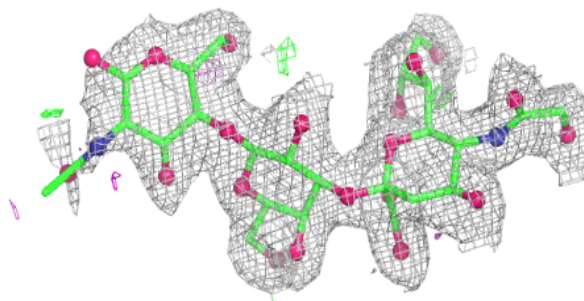
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAG	N	1	15/15	0.75	0.16	38,48,57,65	0
2	NAG	O	1	15/15	0.75	0.16	43,52,59,64	0
2	NAG	K	1	15/15	0.84	0.15	34,45,67,67	0
2	NAG	T	1	15/15	0.84	0.12	33,36,39,50	0
2	NAG	Q	1	15/15	0.87	0.12	29,39,54,58	0
2	NAG	L	1	15/15	0.87	0.11	28,34,45,45	0
2	NAG	M	1	15/15	0.89	0.10	23,26,31,42	0
2	NAG	R	1	15/15	0.89	0.10	31,35,40,43	0
2	NAG	P	1	15/15	0.89	0.11	32,41,61,63	0
2	GAL	N	2	11/12	0.92	0.08	27,30,35,35	0
2	NAG	S	1	15/15	0.92	0.09	32,38,49,50	0
2	GAL	L	2	11/12	0.92	0.09	19,22,29,34	0
2	GAL	T	2	11/12	0.92	0.09	24,26,31,41	0
2	GAL	O	2	11/12	0.93	0.08	24,28,31,33	0
2	GAL	Q	2	11/12	0.93	0.08	21,23,27,30	0
2	GAL	P	2	11/12	0.93	0.08	24,25,28,30	0
2	GAL	S	2	11/12	0.94	0.07	26,28,32,36	0
2	GAL	R	2	11/12	0.94	0.08	25,27,31,35	0
2	GAL	M	2	11/12	0.94	0.08	22,24,28,36	0
2	NGC	T	3	21/22	0.94	0.07	22,24,26,26	0
2	NGC	Q	3	21/22	0.95	0.06	18,20,22,23	0
2	NGC	S	3	21/22	0.95	0.07	20,24,25,28	0
2	NGC	N	3	21/22	0.95	0.07	21,23,26,27	0
2	NGC	O	3	21/22	0.95	0.06	18,21,23,24	0
2	NGC	K	3	21/22	0.95	0.07	18,25,35,36	0
2	NGC	L	3	21/22	0.96	0.06	18,20,23,28	0
2	NGC	P	3	21/22	0.96	0.06	20,22,24,26	0
2	NGC	M	3	21/22	0.96	0.06	19,22,24,28	0
2	NGC	R	3	21/22	0.96	0.06	15,19,24,25	0
2	GAL	K	2	11/12	0.96	0.06	25,27,29,29	0

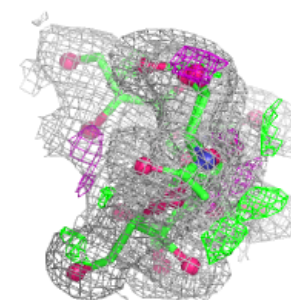
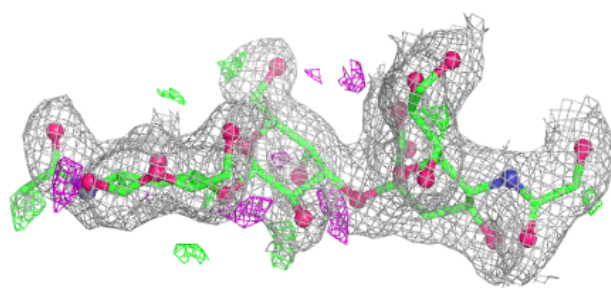
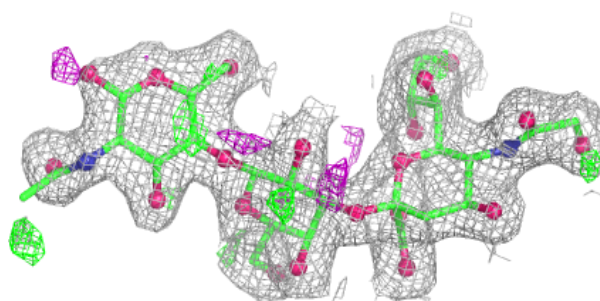
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain K:

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

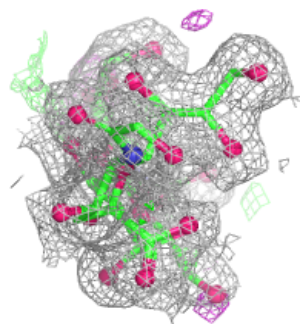
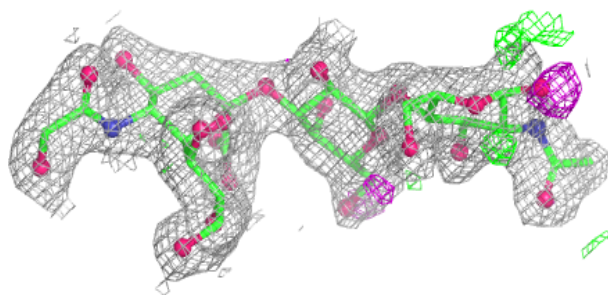
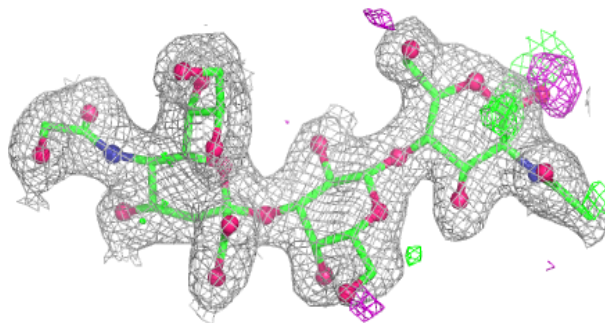
**Electron density around Chain L:**

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

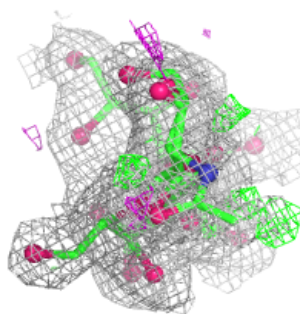
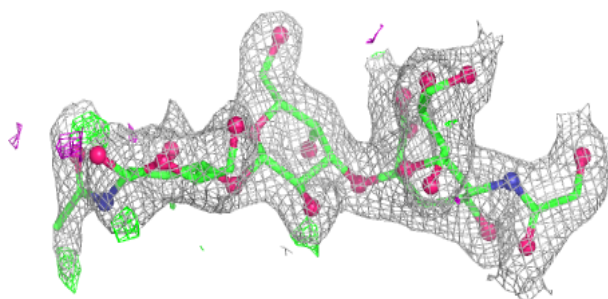
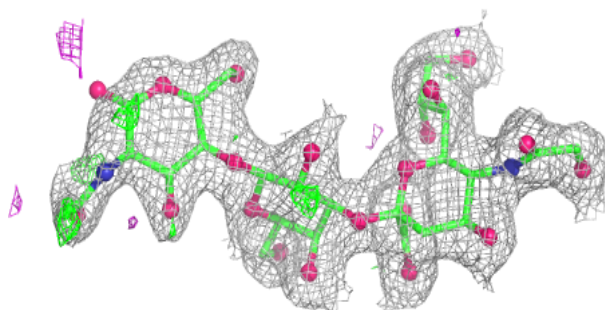


Electron density around Chain M:

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

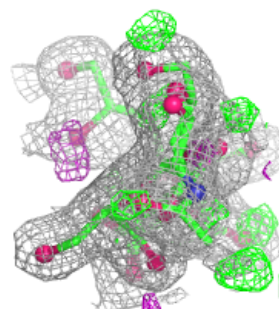
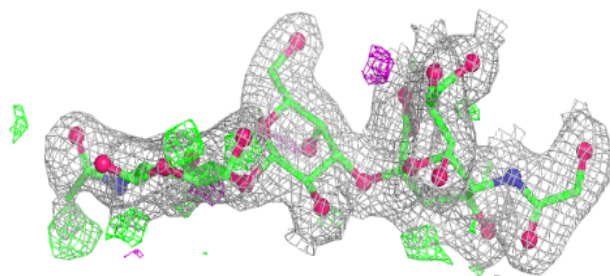
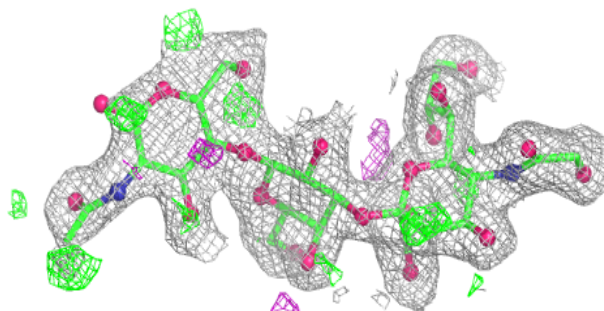
**Electron density around Chain N:**

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

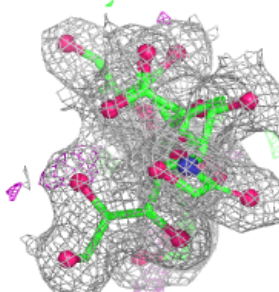
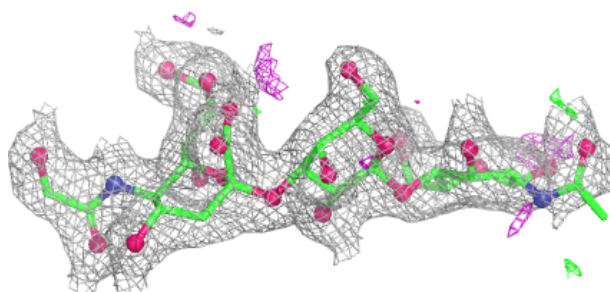
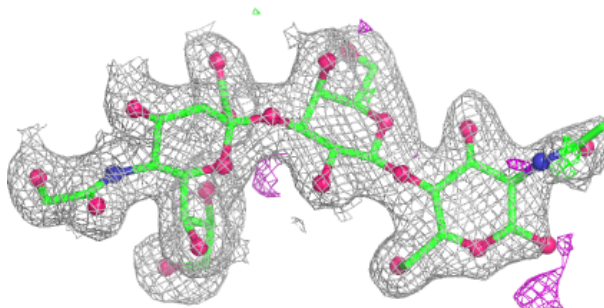


Electron density around Chain O:

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

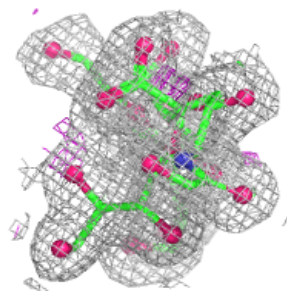
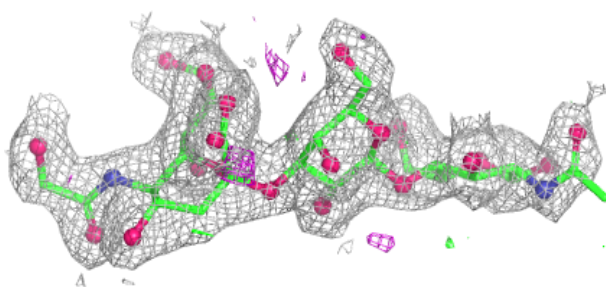
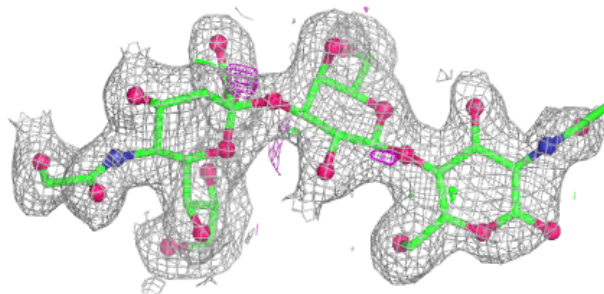
**Electron density around Chain P:**

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

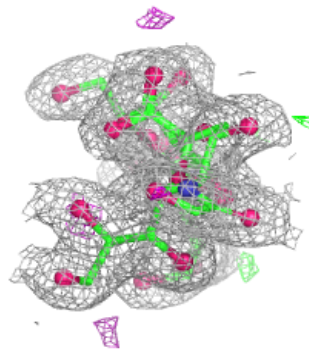
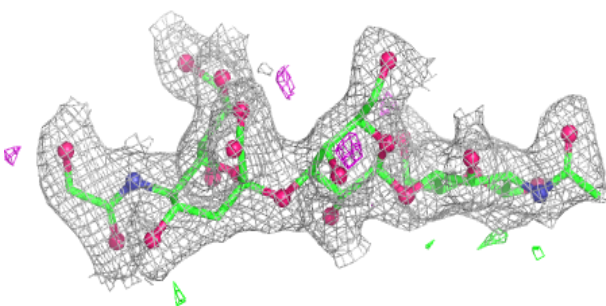
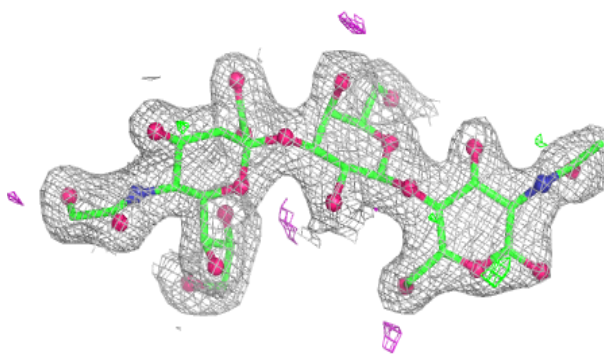


Electron density around Chain Q:

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

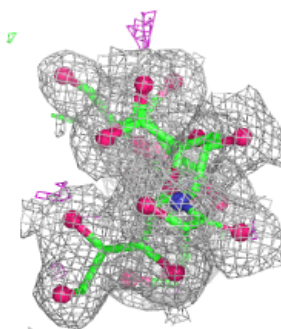
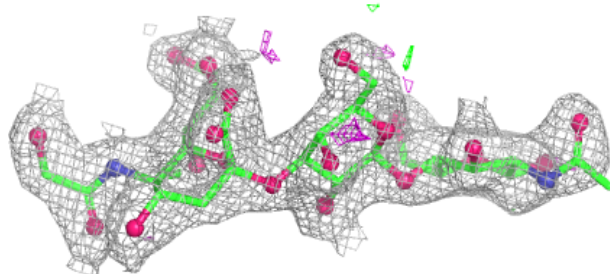
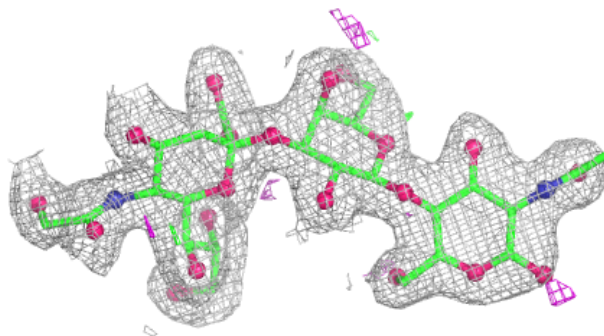
**Electron density around Chain R:**

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

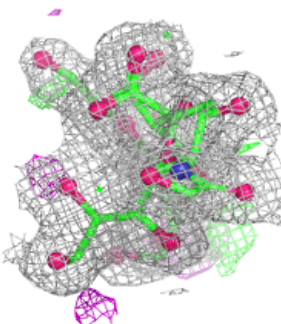
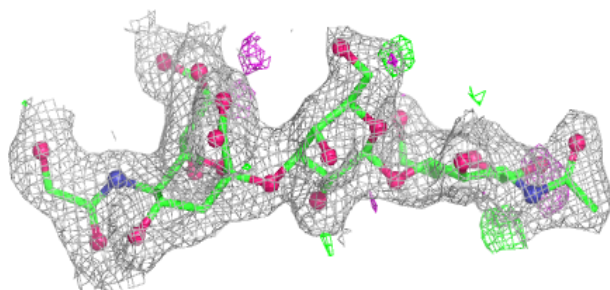
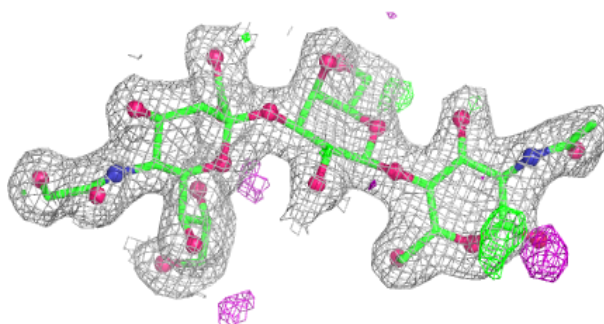


Electron density around Chain S:

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

**Electron density around Chain T:**

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



6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	IPA	J	405	4/4	0.85	0.15	27,29,30,30	0
5	IPA	D	406	4/4	0.86	0.13	29,30,33,33	0
4	EDO	C	403	4/4	0.86	0.14	29,29,31,36	0
4	EDO	H	403	4/4	0.87	0.11	29,31,31,39	0
4	EDO	D	403	4/4	0.87	0.16	31,33,34,37	0
5	IPA	F	405	4/4	0.87	0.16	29,31,31,32	0
4	EDO	G	402	4/4	0.87	0.13	38,41,41,45	0
4	EDO	G	404	4/4	0.88	0.13	29,30,32,33	0
4	EDO	G	405	4/4	0.88	0.15	33,33,34,37	0
5	IPA	A	404	4/4	0.89	0.15	37,37,37,38	0
4	EDO	D	402	4/4	0.90	0.13	36,43,44,49	0
5	IPA	E	404	4/4	0.90	0.12	29,29,29,30	0
4	EDO	J	402	4/4	0.91	0.11	33,33,33,39	0
4	EDO	B	403	4/4	0.91	0.10	34,36,37,42	0
5	IPA	H	404	4/4	0.91	0.11	28,28,28,29	0
5	IPA	I	404	4/4	0.91	0.11	31,32,32,35	0
4	EDO	A	402	4/4	0.91	0.10	27,27,28,32	0
4	EDO	F	402	4/4	0.92	0.10	40,43,44,47	0
4	EDO	J	403	4/4	0.92	0.10	32,35,36,41	0
3	CA	H	401	1/1	0.92	0.09	49,49,49,49	0
5	IPA	B	404	4/4	0.92	0.10	23,26,27,28	0
4	EDO	G	403	4/4	0.92	0.11	30,30,33,35	0
4	EDO	B	402	4/4	0.93	0.10	30,31,31,32	0
4	EDO	F	404	4/4	0.93	0.09	28,28,30,31	0
4	EDO	C	405	4/4	0.93	0.10	33,34,35,35	0
5	IPA	C	406	4/4	0.93	0.13	32,33,34,38	0
4	EDO	E	402	4/4	0.93	0.10	30,34,35,37	0
4	EDO	J	404	4/4	0.94	0.09	28,29,30,30	0
3	CA	I	401	1/1	0.94	0.06	53,53,53,53	0
5	IPA	G	407	4/4	0.94	0.12	30,33,33,35	0
4	EDO	D	405	4/4	0.94	0.09	27,33,34,34	0
3	CA	D	401	1/1	0.94	0.06	43,43,43,43	0
4	EDO	C	402	4/4	0.94	0.09	34,34,37,39	0
4	EDO	C	404	4/4	0.95	0.08	33,33,34,34	0
4	EDO	G	406	4/4	0.95	0.08	27,27,28,29	0
4	EDO	H	402	4/4	0.95	0.09	29,29,30,30	0
4	EDO	F	403	4/4	0.95	0.07	24,25,25,27	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	I	402	4/4	0.95	0.07	23,24,26,26	0
4	EDO	A	403	4/4	0.95	0.10	23,24,26,29	0
3	CA	A	401	1/1	0.96	0.05	49,49,49,49	0
3	CA	G	401	1/1	0.96	0.07	43,43,43,43	0
4	EDO	E	403	4/4	0.96	0.07	29,30,30,33	0
3	CA	B	401	1/1	0.97	0.04	44,44,44,44	0
3	CA	E	401	1/1	0.97	0.05	40,40,40,40	0
3	CA	F	401	1/1	0.97	0.06	41,41,41,41	0
3	CA	C	401	1/1	0.97	0.07	41,41,41,41	0
4	EDO	I	403	4/4	0.97	0.06	26,26,28,28	0
4	EDO	D	404	4/4	0.97	0.06	28,28,28,29	0
3	CA	J	401	1/1	0.99	0.04	37,37,37,37	0

6.5 Other polymers [i](#)

There are no such residues in this entry.