Full wwPDB X-ray Structure Validation Report ⓘ

Oct 5, 2024 – 05:38 PM EDT

PDB ID	:	6MU6
Title	:	Crystal Structure of HIV-1 BG505 SOSIP.664 Prefusion Env Trimer Bound to Small Molecule HIV-1 Entry Inhibitor BMS-814508 in Complex with Human Antibodies 3H109L and 35O22 at 3.2 Angstrom
Authors	:	Lai, Y.-T.; Kwong, P.D.
Deposited on	:	2018-10-22
Resolution	:	2.55 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:

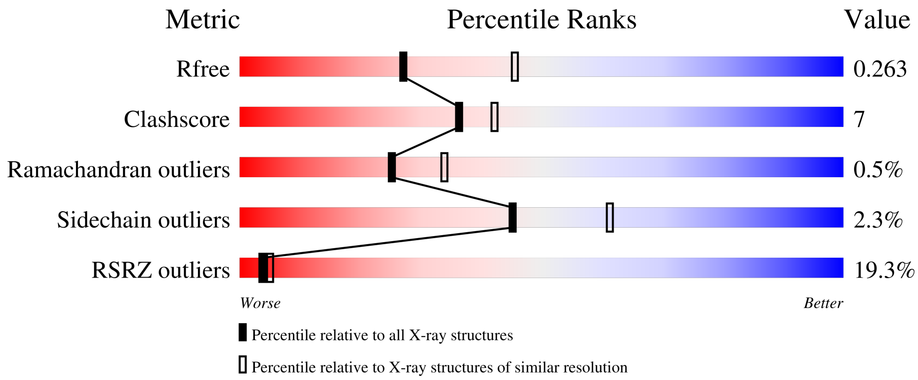
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.55 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1685 (2.58-2.54)
Clashscore	180529	1779 (2.58-2.54)
Ramachandran outliers	177936	1766 (2.58-2.54)
Sidechain outliers	177891	1766 (2.58-2.54)
RSRZ outliers	164620	1685 (2.58-2.54)

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 <=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	B	153	6% 74% 8% • 16%
2	D	134	55% 79% 16% • •
3	E	114	43% 78% 13% • 8%
4	G	481	10% 70% 20% • 8%

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Mol	Chain	Length	Quality of chain
5	H	244	21% / 73% 18% • 7%
6	L	217	3% / 76% 20% • •
7	A	6	33% 50% 17%
8	C	3	100%
8	I	3	100%
9	F	2	50% 50%
9	J	2	100%
9	K	2	100%
9	N	2	100%
10	M	10	20% 50% 30%

2 Entry composition (i)

There are 13 unique types of molecules in this entry. The entry contains 10185 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 Envelope glycoprotein gp160.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	128	Total 1019	C 648	N 175	O 190	S 6	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	559	PRO	ILE	engineered mutation	UNP Q2N0S6
B	605	CYS	THR	engineered mutation	UNP Q2N0S6

- Molecule 2 is a protein called 35O22 scFv heavy chain portion.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	128	Total 994	C 628	N 169	O 192	S 5	0	0	0

- Molecule 3 is a protein called 35O22 scFv light chain portion.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	105	Total 805	C 506	N 133	O 160	S 6	0	0	0

- Molecule 4 is a protein called Envelope glycoprotein gp160.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	G	442	Total 3479	C 2186	N 617	O 648	S 28	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	137	ALA	ASN	engineered mutation	UNP Q2N0S6
G	332	ASN	THR	conflict	UNP Q2N0S6

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Chain	Residue	Modelled	Actual	Comment	Reference
G	501	CYS	ALA	conflict	UNP Q2N0S6
G	509	ARG	-	expression tag	UNP Q2N0S6
G	510	ARG	-	expression tag	UNP Q2N0S6
G	511	ARG	-	expression tag	UNP Q2N0S6
G	512	ARG	-	expression tag	UNP Q2N0S6
G	513	ARG	-	expression tag	UNP Q2N0S6

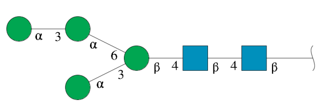
- Molecule 5 is a protein called 3H109L Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	H	226	Total 1715	C 1093	N 278	O 338	S 6	0	0	0

- Molecule 6 is a protein called 3H109L Fab light chain.

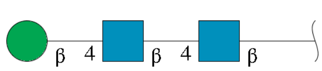
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	L	211	Total 1604	C 1009	N 276	O 312	S 7	0	0	0

- Molecule 7 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	A	6	Total 72	C 40	N 2	O 30	0	0	0

- Molecule 8 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	C	3	Total 39	C 22	N 2	O 15	0	0	0

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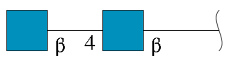
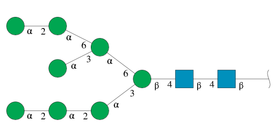
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
8	I	3	Total C N O 39 22 2 15	0	0	0

- Molecule 9 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



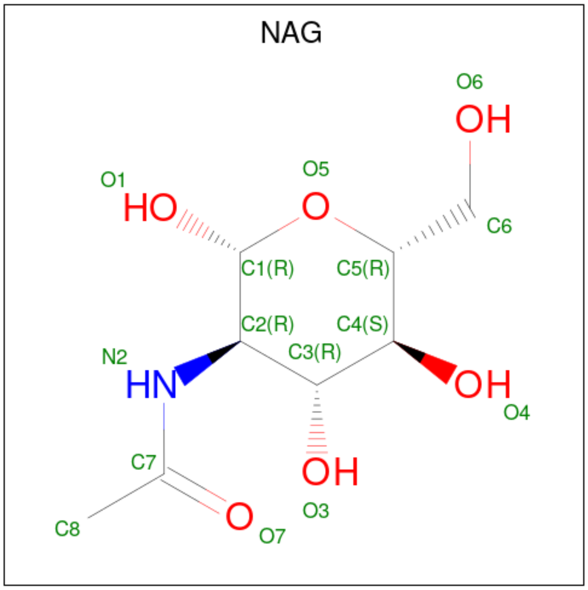
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
9	F	2	Total C N O 28 16 2 10	0	0	0
9	J	2	Total C N O 28 16 2 10	0	0	0
9	K	2	Total C N O 28 16 2 10	0	0	0
9	N	2	Total C N O 28 16 2 10	0	0	0

- Molecule 10 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



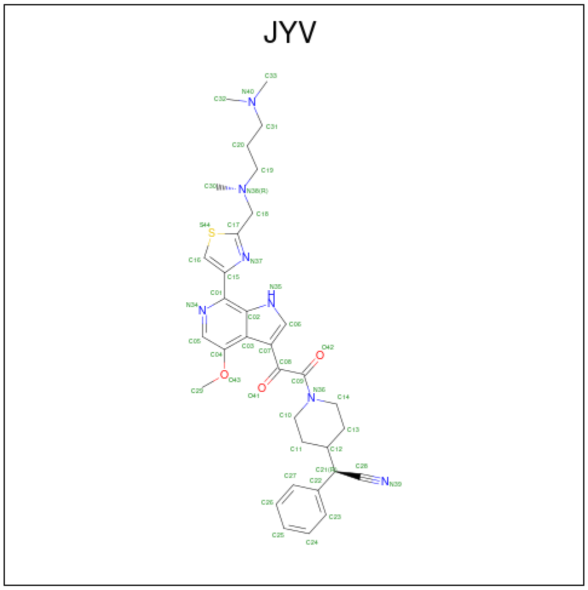
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
10	M	10	Total C N O 116 64 2 50	0	0	0

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



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

- Molecule 12 is (2R)-{1-[{7-[2-({[3-(dimethylamino)propyl](methyl)amino}methyl)-1,3-thiazol-4-yl]-4-methoxy-1H-pyrrolo[2,3-c]pyridin-3-yl}(oxo)acetyl]piperidin-4-yl}(phenyl)acetonitrile (three-letter code: JYV) (formula: $C_{33}H_{39}N_{7}O_{3}S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
12	G	1	44	33	7	3	1	0	0

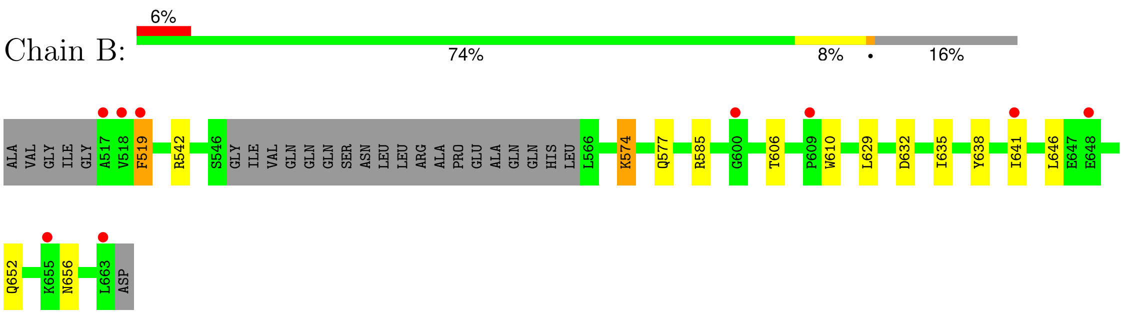
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
13	B	1	1	1	0	0
13	E	1	1	1	0	0
13	G	5	5	5	0	0

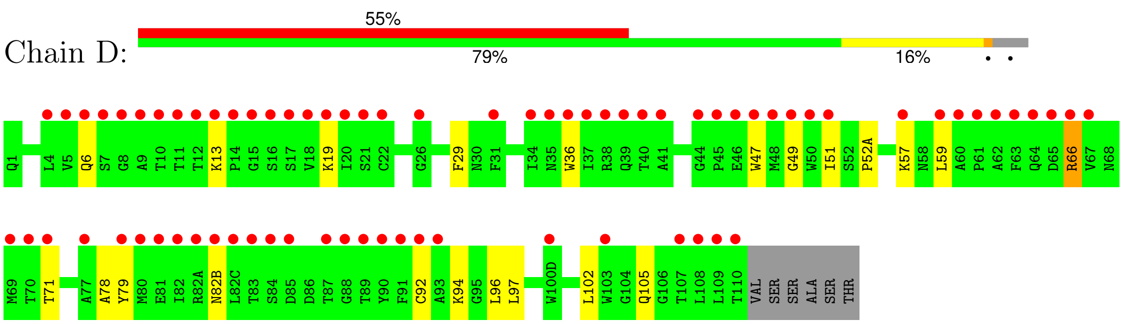
3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

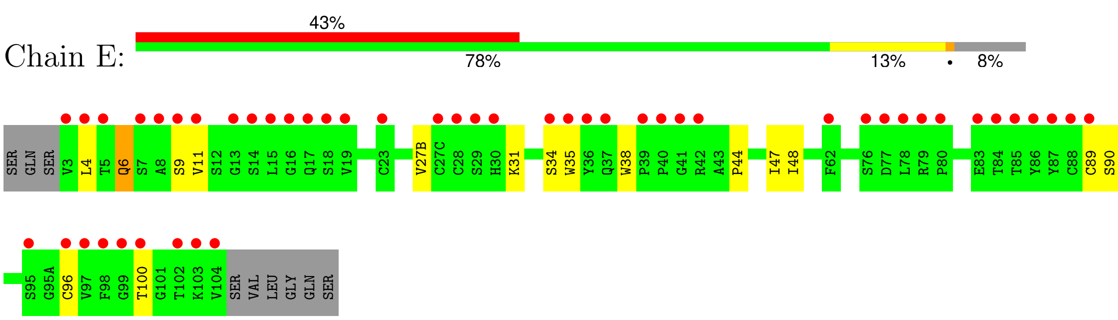
- Molecule 1: Envelope glycoprotein gp160



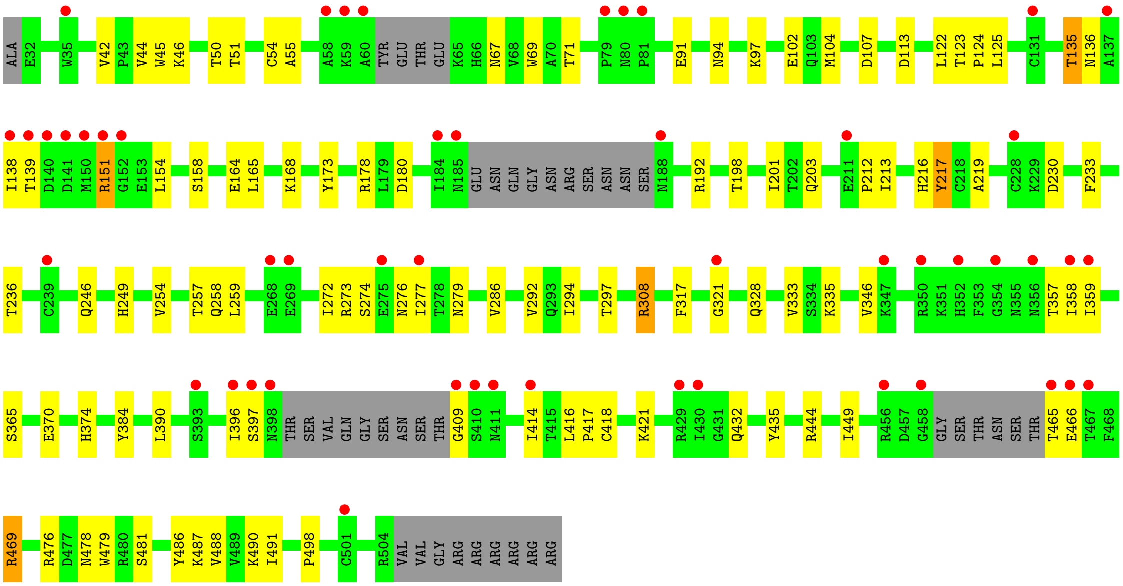
- Molecule 2: 35O22 scFv heavy chain portion



- Molecule 3: 35O22 scFv light chain portion

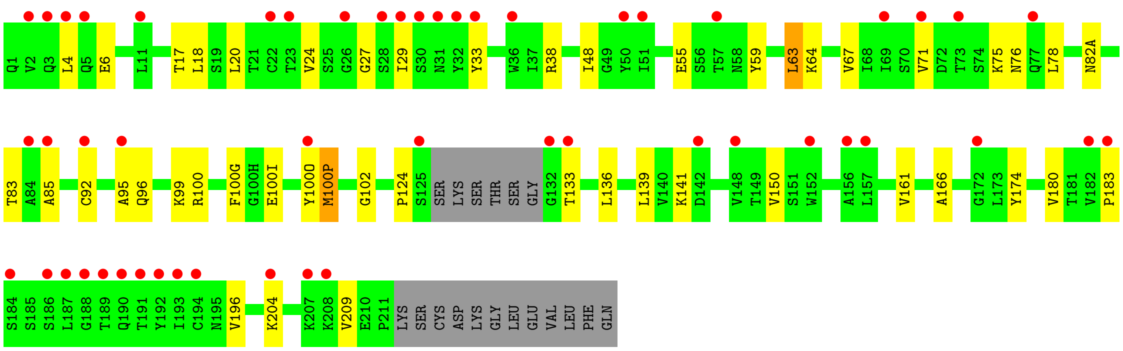


- Molecule 4: Envelope glycoprotein gp160



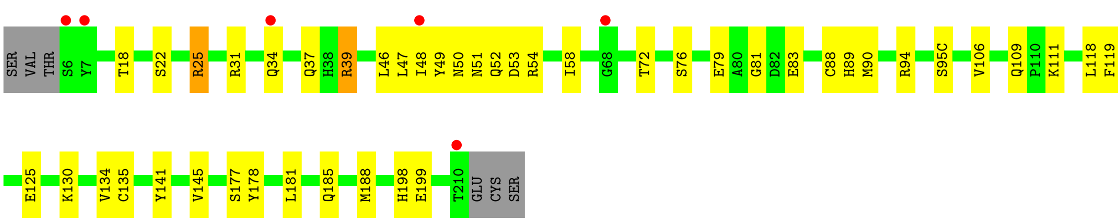
- Molecule 5: 3H109L Fab heavy chain

Chain H:



- Molecule 6: 3H109L Fab light chain

Chain L:



- Molecule 7: alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain A:

NAG1 NAG2 BMA3 MAN4 MAN5 MAN6

• Molecule 8: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C: 100%

NAG1 NAG2 BMA3

• Molecule 8: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I: 100%

NAG1 NAG2 BMA3

• Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F: 50% 50%

NAG1 NAG2

• Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J: 100%

NAG1 NAG2

• Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K: 100%

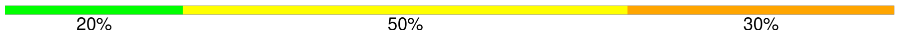
NAG1 NAG2

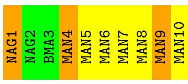
• Molecule 9: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N: 100%

NAG1 NAG2

• Molecule 10: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:




4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α, β, γ	131.25Å 131.25Å 314.12Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.96 – 2.55 42.96 – 2.55	Depositor EDS
% Data completeness (in resolution range)	39.1 (42.96-2.55) 39.1 (42.96-2.55)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.35 (at 2.54Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.231 , 0.264 0.231 , 0.263	Depositor DCC
R_{free} test set	36962 reflections (95.02%)	wwPDB-VP
Wilson B-factor (Å^2)	34.1	Xtriage
Anisotropy	0.072	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 25.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.058 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.81	EDS
Total number of atoms	10185	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.62% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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, JYV, BMA, MAN

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	B	0.22	0/1037	0.37	0/1406
2	D	0.24	0/1021	0.45	0/1390
3	E	0.24	0/829	0.44	0/1133
4	G	0.24	0/3550	0.45	0/4815
5	H	0.24	0/1758	0.46	0/2397
6	L	0.24	0/1647	0.44	0/2247
All	All	0.24	0/9842	0.44	0/13388

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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	B	1019	0	1009	11	0
2	D	994	0	952	11	0
3	E	805	0	752	7	0
4	G	3479	0	3423	67	0
5	H	1715	0	1685	28	0
6	L	1604	0	1553	26	0
7	A	72	0	61	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	C	39	0	34	0	0
8	I	39	0	34	0	0
9	F	28	0	25	1	0
9	J	28	0	25	0	0
9	K	28	0	25	0	0
9	N	28	0	25	0	0
10	M	116	0	97	3	0
11	B	28	0	26	0	0
11	D	14	0	13	0	0
11	G	98	0	91	1	0
12	G	44	0	0	2	0
13	B	1	0	0	0	0
13	E	1	0	0	0	0
13	G	5	0	0	0	0
All	All	10185	0	9830	142	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 7.

All (142) 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)
4:G:274:SER:HB3	4:G:277:ILE:HG12	1.67	0.76
5:H:136:LEU:HD13	5:H:209:VAL:HG21	1.70	0.73
3:E:35:TRP:HD1	3:E:48:ILE:HD11	1.57	0.69
2:D:96:LEU:HG	2:D:97:LEU:HG	1.74	0.68
4:G:233:PHE:O	4:G:273:ARG:NH1	2.27	0.67
4:G:138:ILE:HG22	4:G:151:ARG:HG3	1.79	0.65
4:G:138:ILE:HG23	4:G:139:THR:H	1.62	0.65
3:E:47:ILE:HG22	3:E:48:ILE:HG23	1.79	0.64
6:L:52:GLN:NE2	6:L:53:ASP:OD1	2.29	0.64
4:G:249:HIS:HD1	4:G:486:TYR:HH	1.45	0.64
4:G:292:VAL:HG13	4:G:449:ILE:HB	1.81	0.62
5:H:24:VAL:HB	5:H:76:ASN:HB3	1.81	0.62
4:G:113:ASP:OD1	12:G:638:JYV:N35	2.34	0.61
4:G:136:ASN:HA	4:G:151:ARG:HG2	1.81	0.61
2:D:6:GLN:H	2:D:105:GLN:HE22	1.49	0.61
4:G:297:THR:HB	4:G:444:ARG:HG3	1.83	0.61
1:B:574:LYS:NZ	4:G:107:ASP:OD2	2.32	0.60
6:L:34:GLN:HG3	6:L:49:TYR:HA	1.84	0.59
6:L:34:GLN:HB2	6:L:89:HIS:HB3	1.83	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:104:MET:HB2	4:G:217:TYR:HE2	1.68	0.59
4:G:219:ALA:O	4:G:246:GLN:NE2	2.35	0.59
5:H:17:THR:HA	5:H:82(A):ASN:HA	1.86	0.58
4:G:201:ILE:HD11	4:G:435:TYR:HB2	1.86	0.57
4:G:277:ILE:HG13	11:G:614:NAG:H81	1.86	0.57
1:B:629:LEU:HD23	4:G:44:VAL:HG23	1.85	0.57
4:G:67:ASN:HD22	4:G:69:TRP:HD1	1.53	0.57
4:G:365:SER:HB3	4:G:469:ARG:HE	1.69	0.57
7:A:2:NAG:H3	7:A:2:NAG:H83	1.87	0.56
6:L:46:LEU:HD21	6:L:49:TYR:HB3	1.88	0.56
6:L:83:GLU:HG3	6:L:106:VAL:HG23	1.88	0.56
1:B:585:ARG:NH2	4:G:491:ILE:O	2.39	0.55
6:L:22:SER:HA	6:L:72:THR:HG22	1.87	0.54
6:L:185:GLN:HA	6:L:188:MET:HG2	1.90	0.54
4:G:259:LEU:HD23	4:G:449:ILE:HD13	1.90	0.53
1:B:610:TRP:CD2	4:G:498:PRO:HB3	2.44	0.53
6:L:39:ARG:NH1	6:L:81:GLY:O	2.42	0.53
4:G:122:LEU:HD13	4:G:125:LEU:HD12	1.90	0.53
3:E:34:SER:OG	3:E:89:CYS:SG	2.66	0.53
4:G:476:ARG:HA	4:G:479:TRP:CD1	2.44	0.52
5:H:4:LEU:HD23	5:H:92:CYS:SG	2.49	0.52
5:H:6:GLU:N	5:H:6:GLU:OE1	2.42	0.52
4:G:257:THR:HG22	4:G:258:GLN:HG3	1.91	0.52
4:G:122:LEU:HD11	4:G:203:GLN:HB3	1.91	0.52
4:G:165:LEU:HD12	4:G:168:LYS:HD2	1.91	0.52
4:G:55:ALA:HB3	4:G:216:HIS:HB2	1.93	0.51
2:D:19:LYS:HD2	2:D:79:TYR:HB3	1.92	0.51
4:G:164:GLU:OE2	4:G:308:ARG:HD2	2.09	0.51
4:G:94:ASN:HA	4:G:236:THR:HG22	1.93	0.51
4:G:272:ILE:HG12	4:G:286:VAL:HG12	1.92	0.51
4:G:212:PRO:HG3	4:G:254:VAL:HG22	1.93	0.51
5:H:92:CYS:O	5:H:102:GLY:N	2.44	0.50
4:G:359:ILE:HG22	4:G:466:GLU:HB2	1.93	0.50
6:L:50:ASN:O	6:L:52:GLN:N	2.44	0.50
1:B:632:ASP:HA	1:B:635:ILE:HG22	1.94	0.50
4:G:478:ASN:O	4:G:481:SER:OG	2.28	0.49
6:L:109:GLN:HB2	6:L:141:TYR:CE1	2.47	0.49
5:H:99:LYS:HB3	10:M:9:MAN:H62	1.95	0.49
4:G:135:THR:HG21	6:L:94:ARG:HE	1.77	0.49
5:H:100(O):TYR:HB3	6:L:34:GLN:HG2	1.95	0.48
5:H:139:LEU:HD21	5:H:141:LYS:HB3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:652:GLN:NE2	1:B:656:ASN:OD1	2.47	0.48
5:H:100:ARG:NH1	6:L:31:ARG:O	2.45	0.48
4:G:102:GLU:OE2	4:G:476:ARG:NH1	2.47	0.48
4:G:276:ASN:ND2	4:G:279:ASN:HB2	2.29	0.48
2:D:94:LYS:HG2	2:D:102:LEU:HB3	1.96	0.47
6:L:25:ARG:NH1	6:L:88:CYS:O	2.46	0.47
4:G:333:VAL:HG11	4:G:390:LEU:HD21	1.95	0.47
4:G:432:GLN:NE2	12:G:638:JYV:S44	2.87	0.47
6:L:119:PHE:HB2	6:L:134:VAL:HG22	1.96	0.47
10:M:1:NAG:H83	10:M:1:NAG:H3	1.95	0.47
6:L:47:LEU:HA	6:L:58:ILE:HD13	1.97	0.47
1:B:606:THR:HG21	1:B:646:LEU:HD22	1.96	0.47
2:D:13:LYS:HD2	2:D:13:LYS:HA	1.61	0.47
4:G:257:THR:O	4:G:259:LEU:N	2.41	0.47
5:H:133:THR:HG22	5:H:183:PRO:HA	1.95	0.47
5:H:27:GLY:O	5:H:76:ASN:ND2	2.49	0.46
5:H:63:LEU:HD13	5:H:67:VAL:HG21	1.96	0.46
4:G:259:LEU:HB2	4:G:374:HIS:CE1	2.50	0.46
2:D:51:ILE:HG13	2:D:57:LYS:HB3	1.98	0.46
4:G:94:ASN:HB3	4:G:97:LYS:HG2	1.97	0.46
5:H:150:VAL:HG22	5:H:196:VAL:HG22	1.98	0.46
3:E:38:TRP:CE2	3:E:44:PRO:HG3	2.50	0.46
4:G:230:ASP:HB3	4:G:233:PHE:HB2	1.96	0.46
4:G:417:PRO:HB3	5:H:100(G):PHE:HE1	1.81	0.45
2:D:36:TRP:CZ3	2:D:92:CYS:HB3	2.51	0.45
4:G:125:LEU:HD11	4:G:317:PHE:CE1	2.51	0.45
4:G:158:SER:HA	4:G:173:TYR:HA	1.97	0.45
5:H:33:TYR:HB2	5:H:95:ALA:O	2.17	0.44
2:D:47:TRP:CZ2	2:D:49:GLY:HA2	2.53	0.44
4:G:346:VAL:HG22	4:G:359:ILE:HD11	1.99	0.44
4:G:357:THR:OG1	4:G:465:THR:OG1	2.35	0.44
4:G:122:LEU:HB2	4:G:201:ILE:HG23	1.99	0.44
2:D:29:PHE:CE2	2:D:52(A):PRO:HB3	2.52	0.44
3:E:4:LEU:HD11	3:E:90:SER:HB3	2.00	0.44
6:L:134:VAL:HG12	6:L:178:TYR:CD2	2.53	0.44
5:H:38:ARG:HB3	5:H:48:ILE:HD11	1.99	0.43
4:G:71:THR:HG21	4:G:213:ILE:HB	2.00	0.43
4:G:328:GLN:NE2	4:G:418:CYS:O	2.52	0.43
4:G:333:VAL:HG13	4:G:414:ILE:HG13	2.00	0.43
4:G:335:LYS:HD2	4:G:409:GLY:HA3	1.99	0.43
5:H:29:ILE:HD11	5:H:78:LEU:HB3	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:H:83:THR:HG23	5:H:85:ALA:H	1.83	0.43
6:L:18:THR:HG22	6:L:76:SER:HA	2.00	0.43
5:H:100(P):MET:N	5:H:100(P):MET:SD	2.91	0.43
6:L:37:GLN:HB2	6:L:47:LEU:HD11	2.01	0.43
6:L:111:LYS:HE3	6:L:199:GLU:HG3	2.01	0.43
6:L:145:VAL:HG12	6:L:198:HIS:HB2	2.00	0.43
1:B:519:PHE:HZ	1:B:542:ARG:HH22	1.67	0.42
4:G:45:TRP:O	4:G:46:LYS:HD2	2.19	0.42
2:D:71:THR:HG22	2:D:78:ALA:HA	2.01	0.42
4:G:42:VAL:HG23	4:G:44:VAL:HG12	2.01	0.42
1:B:585:ARG:HH12	4:G:490:LYS:HD2	1.84	0.42
4:G:50:THR:HG22	4:G:488:VAL:HG11	2.01	0.42
4:G:396:ILE:HG22	4:G:397:SER:H	1.85	0.42
6:L:135:CYS:HB3	6:L:177:SER:HB3	2.02	0.42
4:G:370:GLU:HG3	4:G:384:TYR:HE2	1.85	0.42
2:D:66:ARG:NH1	2:D:82(B):ASN:O	2.53	0.42
4:G:123:THR:N	4:G:124:PRO:HD2	2.35	0.42
5:H:161:VAL:HA	5:H:180:VAL:HG12	2.01	0.41
4:G:180:ASP:OD1	4:G:421:LYS:HG2	2.20	0.41
4:G:294:ILE:HB	4:G:449:ILE:HD11	2.01	0.41
3:E:6:GLN:HG3	3:E:100:THR:H	1.84	0.41
4:G:138:ILE:H	4:G:151:ARG:NH2	2.18	0.41
4:G:358:ILE:O	4:G:465:THR:N	2.53	0.41
5:H:55:GLU:HG2	5:H:71:VAL:HG11	2.02	0.41
5:H:100:ARG:HA	5:H:100:ARG:HD2	1.91	0.41
4:G:91:GLU:OE1	4:G:487:LYS:NZ	2.45	0.41
4:G:198:THR:HG22	9:F:1:NAG:H82	2.01	0.41
5:H:18:LEU:HD21	5:H:20:LEU:HD13	2.03	0.41
5:H:166:ALA:HB1	5:H:174:TYR:HB3	2.03	0.41
6:L:118:LEU:HD12	6:L:134:VAL:O	2.21	0.41
1:B:638:TYR:HA	1:B:641:ILE:HD13	2.03	0.41
3:E:6:GLN:HG3	3:E:100:THR:N	2.36	0.41
5:H:100:ARG:NH2	10:M:4:MAN:O6	2.54	0.41
4:G:390:LEU:HD11	4:G:416:LEU:HD11	2.02	0.41
5:H:96:GLN:HB2	5:H:100(O):TYR:CE2	2.55	0.41
1:B:577:GLN:HG2	4:G:51:THR:HG21	2.02	0.40
5:H:59:TYR:HD2	5:H:64:LYS:HD2	1.86	0.40
4:G:346:VAL:HG13	4:G:359:ILE:HD11	2.04	0.40
6:L:48:ILE:HG12	6:L:54:ARG:HB3	2.03	0.40
6:L:90:MET:O	6:L:95(C):SER:OG	2.27	0.40
6:L:125:GLU:HG2	6:L:130:LYS:O	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	124/153 (81%)	118 (95%)	6 (5%)	0	100	100
2	D	126/134 (94%)	108 (86%)	18 (14%)	0	100	100
3	E	103/114 (90%)	83 (81%)	18 (18%)	2 (2%)	6	7
4	G	432/481 (90%)	397 (92%)	33 (8%)	2 (0%)	25	34
5	H	222/244 (91%)	210 (95%)	11 (5%)	1 (0%)	25	34
6	L	209/217 (96%)	197 (94%)	11 (5%)	1 (0%)	25	34
All	All	1216/1343 (90%)	1113 (92%)	97 (8%)	6 (0%)	25	34

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	L	51	ASN
3	E	11	VAL
3	E	6	GLN
4	G	135	THR
4	G	321	GLY
5	H	124	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	110/129 (85%)	108 (98%)	2 (2%)	54	70
2	D	107/112 (96%)	105 (98%)	2 (2%)	52	68
3	E	92/100 (92%)	88 (96%)	4 (4%)	25	36
4	G	393/427 (92%)	385 (98%)	8 (2%)	50	67
5	H	196/212 (92%)	191 (97%)	5 (3%)	41	56
6	L	175/181 (97%)	171 (98%)	4 (2%)	45	61
All	All	1073/1161 (92%)	1048 (98%)	25 (2%)	45	61

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	519	PHE
1	B	574	LYS
2	D	59	LEU
2	D	66	ARG
3	E	9	SER
3	E	27(B)	VAL
3	E	31	LYS
3	E	96	CYS
4	G	54	CYS
4	G	151	ARG
4	G	154	LEU
4	G	178	ARG
4	G	192	ARG
4	G	217	TYR
4	G	308	ARG
4	G	469	ARG
5	H	63	LEU
5	H	75	LYS
5	H	100(I)	GLU
5	H	100(P)	MET
5	H	204	LYS
6	L	25	ARG
6	L	39	ARG
6	L	79	GLU
6	L	181	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
4	G	246	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)

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	$\#\|Z\| > 2$
7	NAG	A	1	7,4	14,14,15	0.32	0	17,19,21	0.48	0
7	NAG	A	2	7	14,14,15	0.41	0	17,19,21	1.36	2 (11%)
7	BMA	A	3	7	11,11,12	0.72	0	15,15,17	0.70	0
7	MAN	A	4	7	11,11,12	1.17	2 (18%)	15,15,17	1.42	3 (20%)
7	MAN	A	5	7	11,11,12	1.61	2 (18%)	15,15,17	2.11	4 (26%)
7	MAN	A	6	7	11,11,12	0.69	0	15,15,17	0.99	2 (13%)
8	NAG	C	1	8,4	14,14,15	0.28	0	17,19,21	0.44	0
8	NAG	C	2	8	14,14,15	0.23	0	17,19,21	0.42	0
8	BMA	C	3	8	11,11,12	0.59	0	15,15,17	0.68	0
9	NAG	F	1	4,9	14,14,15	0.20	0	17,19,21	0.44	0
9	NAG	F	2	9	14,14,15	0.27	0	17,19,21	0.40	0
8	NAG	I	1	8,4	14,14,15	0.32	0	17,19,21	0.51	0
8	NAG	I	2	8	14,14,15	0.27	0	17,19,21	0.52	0
8	BMA	I	3	8	11,11,12	0.59	0	15,15,17	0.66	0
9	NAG	J	1	4,9	14,14,15	0.31	0	17,19,21	0.42	0
9	NAG	J	2	9	14,14,15	0.25	0	17,19,21	0.42	0
9	NAG	K	1	4,9	14,14,15	0.24	0	17,19,21	0.44	0
9	NAG	K	2	9	14,14,15	0.24	0	17,19,21	0.50	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
10	NAG	M	1	10,4	14,14,15	0.36	0	17,19,21	1.46	2 (11%)
10	MAN	M	10	10	11,11,12	0.94	0	15,15,17	1.04	1 (6%)
10	NAG	M	2	10	14,14,15	0.23	0	17,19,21	0.46	0
10	BMA	M	3	10	11,11,12	0.69	0	15,15,17	0.99	0
10	MAN	M	4	10	11,11,12	0.77	1 (9%)	15,15,17	1.33	2 (13%)
10	MAN	M	5	10	11,11,12	0.60	0	15,15,17	0.95	2 (13%)
10	MAN	M	6	10	11,11,12	0.69	0	15,15,17	0.86	1 (6%)
10	MAN	M	7	10	11,11,12	0.76	0	15,15,17	0.91	1 (6%)
10	MAN	M	8	10	11,11,12	0.65	0	15,15,17	1.09	1 (6%)
10	MAN	M	9	10	11,11,12	0.75	0	15,15,17	1.37	2 (13%)
9	NAG	N	1	4,9	14,14,15	0.35	0	17,19,21	0.58	0
9	NAG	N	2	9	14,14,15	0.26	0	17,19,21	0.40	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
7	NAG	A	1	7,4	-	0/6/23/26	0/1/1/1
7	NAG	A	2	7	-	6/6/23/26	0/1/1/1
7	BMA	A	3	7	-	2/2/19/22	0/1/1/1
7	MAN	A	4	7	-	2/2/19/22	0/1/1/1
7	MAN	A	5	7	-	1/2/19/22	0/1/1/1
7	MAN	A	6	7	-	0/2/19/22	0/1/1/1
8	NAG	C	1	8,4	-	0/6/23/26	0/1/1/1
8	NAG	C	2	8	-	1/6/23/26	0/1/1/1
8	BMA	C	3	8	-	0/2/19/22	0/1/1/1
9	NAG	F	1	4,9	-	1/6/23/26	0/1/1/1
9	NAG	F	2	9	-	2/6/23/26	0/1/1/1
8	NAG	I	1	8,4	-	1/6/23/26	0/1/1/1
8	NAG	I	2	8	-	2/6/23/26	0/1/1/1
8	BMA	I	3	8	-	0/2/19/22	0/1/1/1
9	NAG	J	1	4,9	-	2/6/23/26	0/1/1/1
9	NAG	J	2	9	-	2/6/23/26	0/1/1/1
9	NAG	K	1	4,9	-	0/6/23/26	0/1/1/1
9	NAG	K	2	9	-	2/6/23/26	0/1/1/1
10	NAG	M	1	10,4	-	4/6/23/26	0/1/1/1
10	MAN	M	10	10	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	NAG	M	2	10	-	2/6/23/26	0/1/1/1
10	BMA	M	3	10	-	0/2/19/22	0/1/1/1
10	MAN	M	4	10	-	2/2/19/22	0/1/1/1
10	MAN	M	5	10	-	2/2/19/22	0/1/1/1
10	MAN	M	6	10	-	2/2/19/22	0/1/1/1
10	MAN	M	7	10	-	0/2/19/22	0/1/1/1
10	MAN	M	8	10	-	1/2/19/22	0/1/1/1
10	MAN	M	9	10	-	2/2/19/22	0/1/1/1
9	NAG	N	1	4,9	-	0/6/23/26	0/1/1/1
9	NAG	N	2	9	-	0/6/23/26	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	5	MAN	C1-C2	4.00	1.61	1.52
7	A	5	MAN	O5-C1	3.15	1.49	1.43
7	A	4	MAN	C1-C2	2.69	1.58	1.52
7	A	4	MAN	C2-C3	2.41	1.56	1.52
10	M	4	MAN	C1-C2	2.24	1.57	1.52

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	5	MAN	C1-O5-C5	6.74	121.22	112.19
10	M	1	NAG	C2-N2-C7	4.76	129.28	122.90
7	A	2	NAG	C2-N2-C7	4.59	129.05	122.90
10	M	9	MAN	C1-O5-C5	4.37	118.05	112.19
10	M	4	MAN	C1-O5-C5	3.88	117.38	112.19
7	A	4	MAN	C1-C2-C3	3.55	114.82	109.64
10	M	8	MAN	C1-O5-C5	3.00	116.20	112.19
7	A	5	MAN	C1-C2-C3	2.82	113.75	109.64
10	M	1	NAG	C1-C2-N2	2.64	114.60	110.43
7	A	6	MAN	C1-O5-C5	2.52	115.56	112.19
10	M	10	MAN	O2-C2-C3	-2.26	105.47	110.15
10	M	5	MAN	O2-C2-C3	-2.23	105.52	110.15
10	M	5	MAN	C1-O5-C5	2.21	115.15	112.19
7	A	2	NAG	C1-C2-N2	2.17	113.86	110.43
7	A	6	MAN	O2-C2-C3	-2.15	105.70	110.15
7	A	5	MAN	O2-C2-C3	-2.14	105.71	110.15
10	M	6	MAN	O2-C2-C3	-2.10	105.81	110.15
7	A	4	MAN	C1-O5-C5	2.09	114.99	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	M	9	MAN	O2-C2-C3	-2.08	105.84	110.15
7	A	4	MAN	O2-C2-C3	-2.06	105.88	110.15
10	M	4	MAN	O2-C2-C3	-2.05	105.91	110.15
10	M	7	MAN	O2-C2-C3	-2.03	105.95	110.15
7	A	5	MAN	O5-C1-C2	2.01	115.58	110.79

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	M	2	NAG	O5-C5-C6-O6
10	M	4	MAN	O5-C5-C6-O6
7	A	3	BMA	O5-C5-C6-O6
8	I	2	NAG	O5-C5-C6-O6
10	M	9	MAN	O5-C5-C6-O6
9	J	1	NAG	O5-C5-C6-O6
7	A	3	BMA	C4-C5-C6-O6
10	M	2	NAG	C4-C5-C6-O6
10	M	4	MAN	C4-C5-C6-O6
9	J	1	NAG	C4-C5-C6-O6
10	M	9	MAN	C4-C5-C6-O6
8	I	2	NAG	C4-C5-C6-O6
9	J	2	NAG	O5-C5-C6-O6
7	A	2	NAG	C8-C7-N2-C2
7	A	2	NAG	O7-C7-N2-C2
9	F	2	NAG	C8-C7-N2-C2
9	F	2	NAG	O7-C7-N2-C2
10	M	1	NAG	C8-C7-N2-C2
10	M	1	NAG	O7-C7-N2-C2
7	A	4	MAN	O5-C5-C6-O6
9	K	2	NAG	O5-C5-C6-O6
7	A	2	NAG	O5-C5-C6-O6
7	A	2	NAG	C4-C5-C6-O6
7	A	4	MAN	C4-C5-C6-O6
10	M	6	MAN	O5-C5-C6-O6
7	A	5	MAN	O5-C5-C6-O6
10	M	5	MAN	C4-C5-C6-O6
9	J	2	NAG	C4-C5-C6-O6
10	M	1	NAG	C1-C2-N2-C7
9	K	2	NAG	C4-C5-C6-O6
10	M	5	MAN	O5-C5-C6-O6
10	M	1	NAG	C3-C2-N2-C7

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Mol	Chain	Res	Type	Atoms
10	M	8	MAN	O5-C5-C6-O6
7	A	2	NAG	C1-C2-N2-C7
8	C	2	NAG	C1-C2-N2-C7
8	I	1	NAG	C1-C2-N2-C7
7	A	2	NAG	C3-C2-N2-C7
10	M	6	MAN	C4-C5-C6-O6
9	F	1	NAG	C4-C5-C6-O6

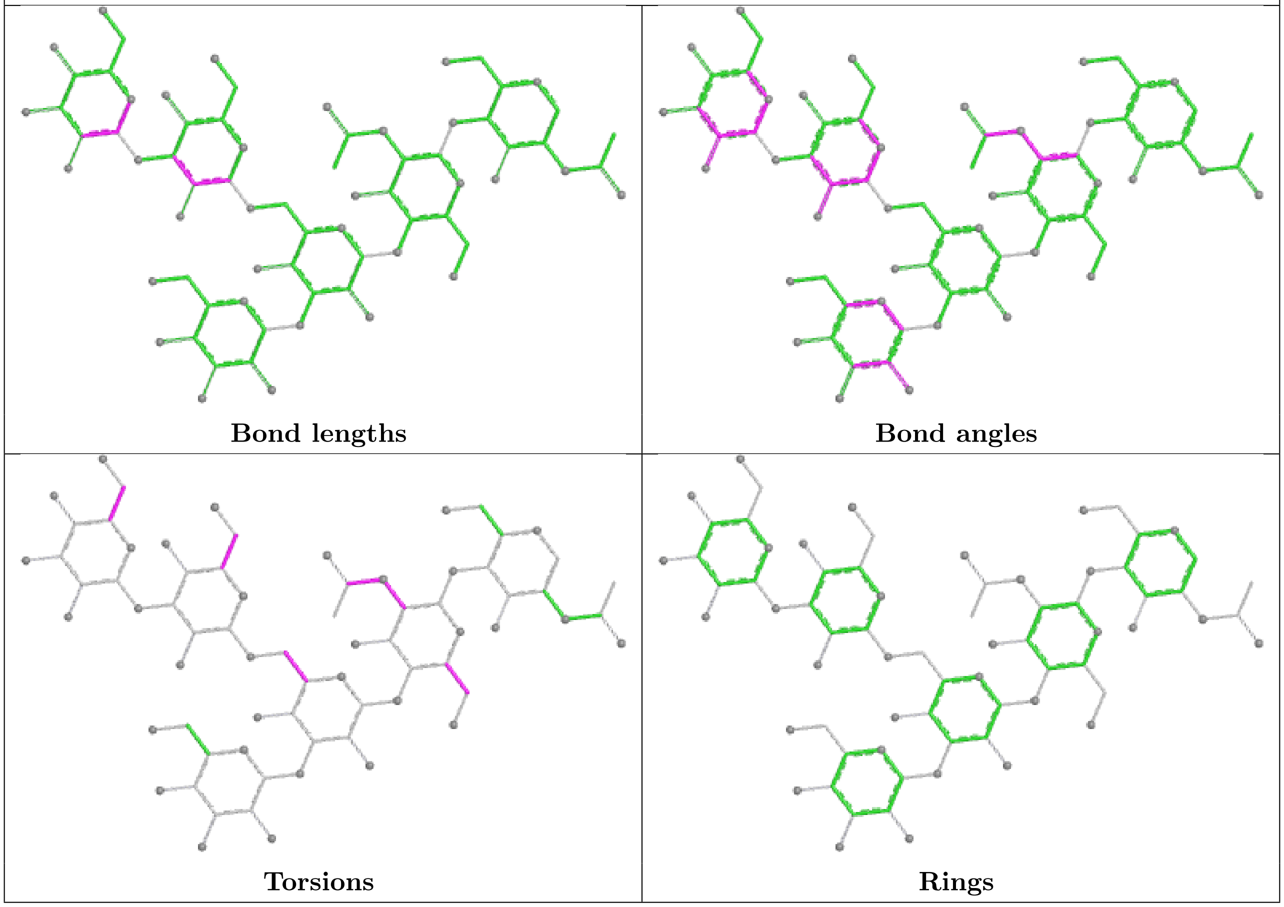
There are no ring outliers.

5 monomers are involved in 5 short contacts:

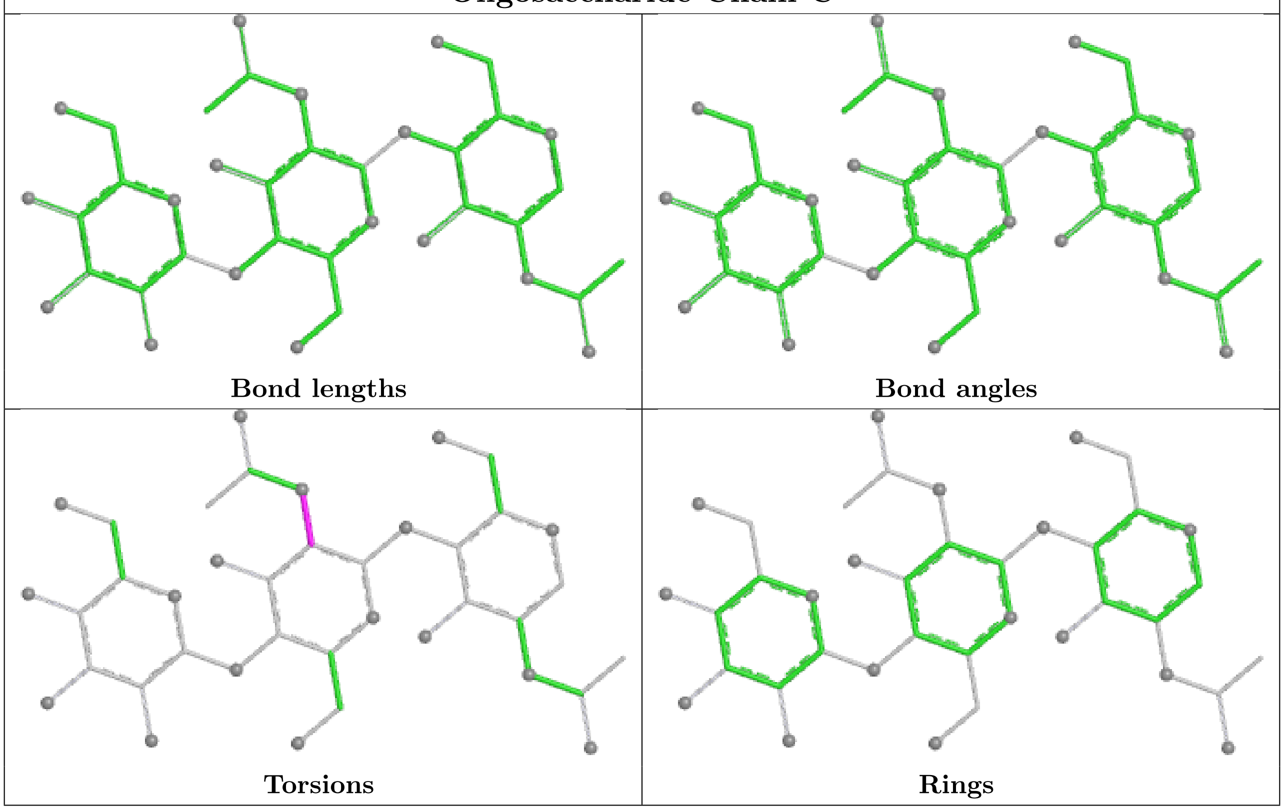
Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	M	4	MAN	1	0
9	F	1	NAG	1	0
10	M	9	MAN	1	0
10	M	1	NAG	1	0
7	A	2	NAG	1	0

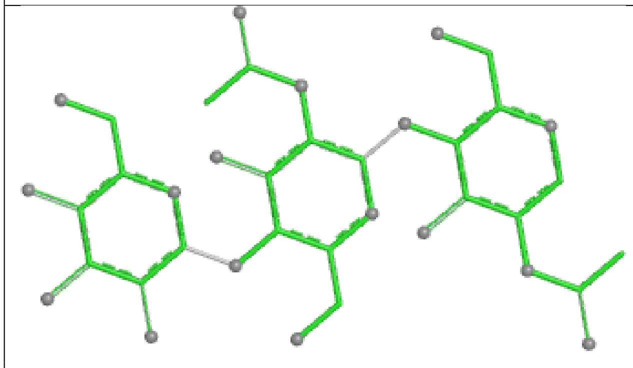
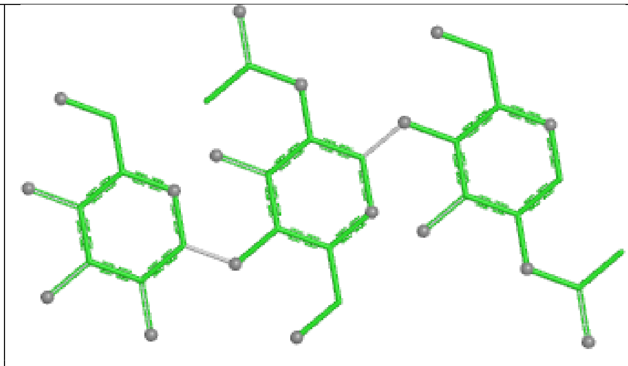
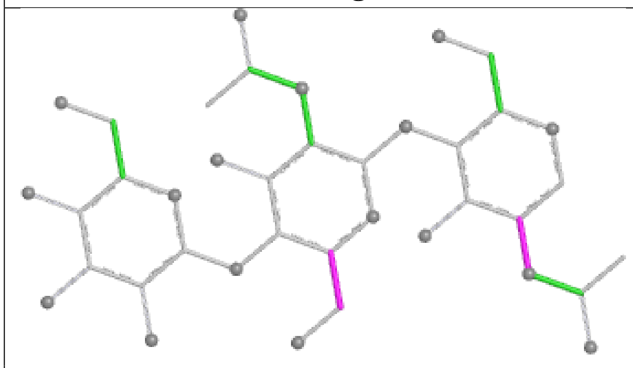
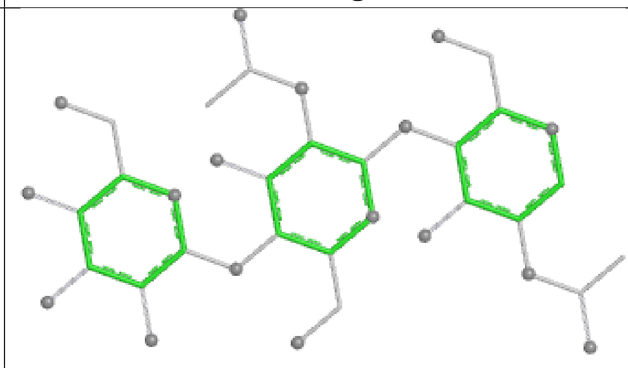
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain A

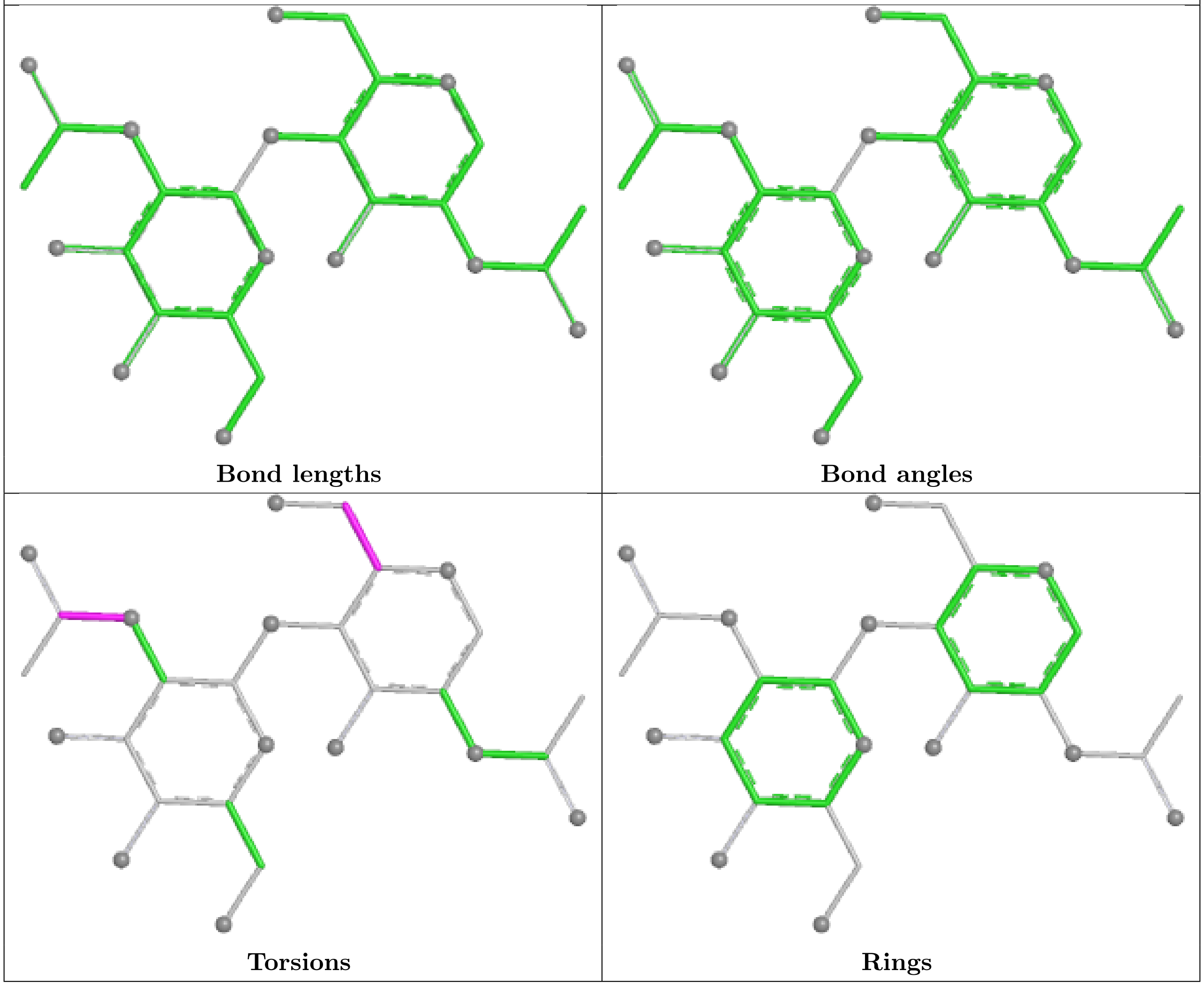


Oligosaccharide Chain C

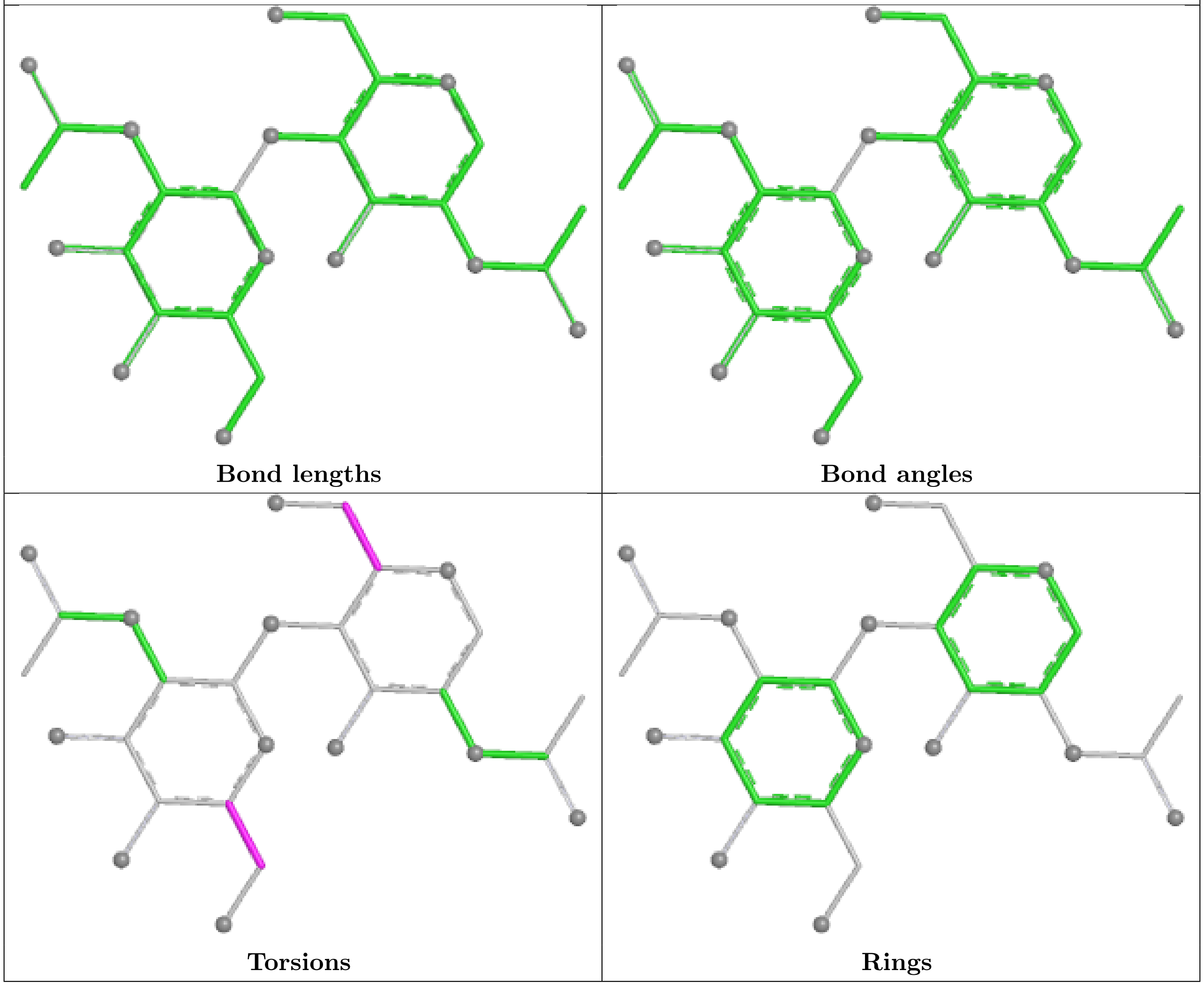


Oligosaccharide Chain I	
 Bond lengths	 Bond angles
 Torsions	 Rings

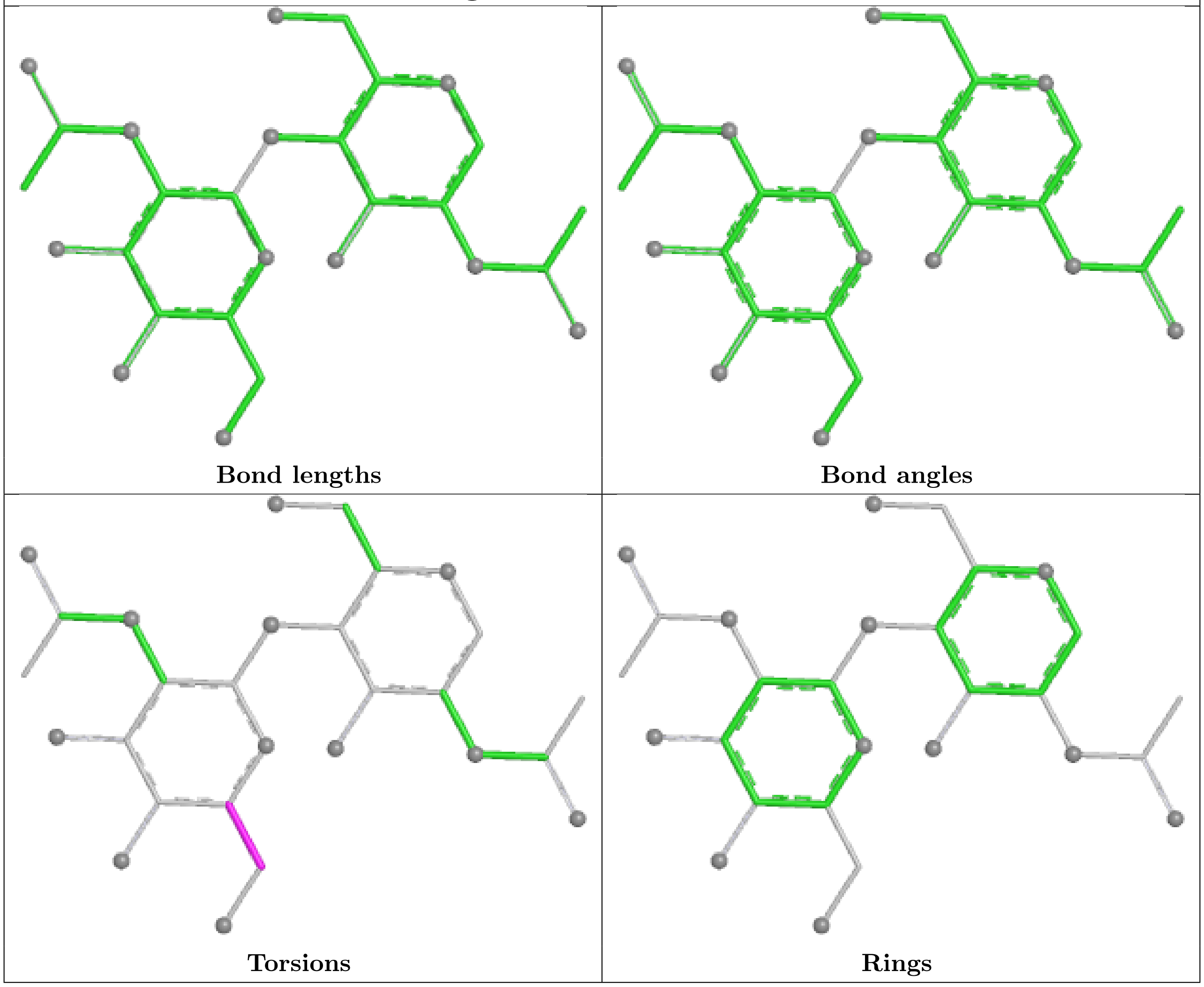
Oligosaccharide Chain F



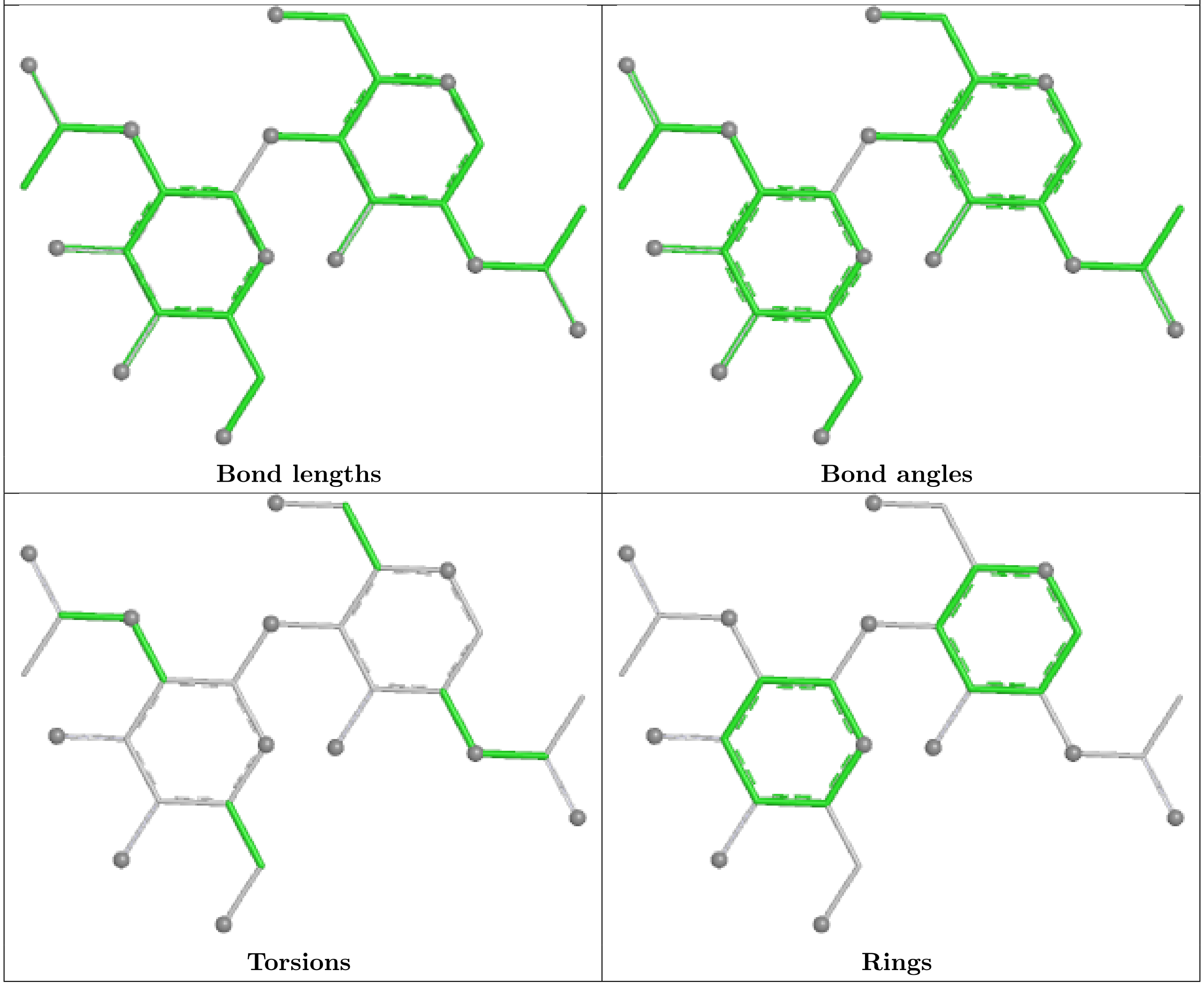
Oligosaccharide Chain J

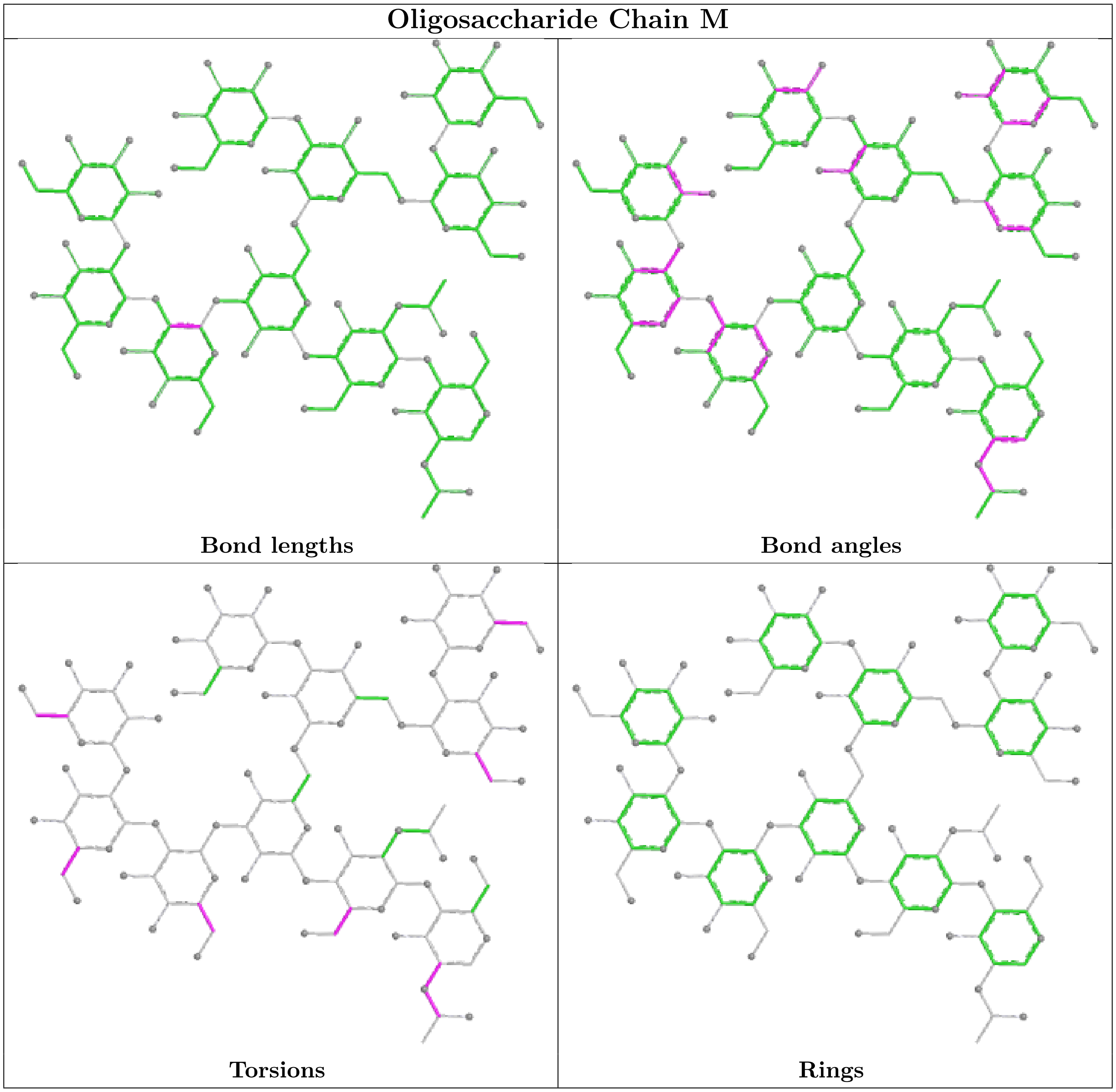


Oligosaccharide Chain K



Oligosaccharide Chain N





5.6 Ligand geometry (i)

11 ligands 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
11	NAG	G	634	4	14,14,15	0.22	0	17,19,21	0.49	0
11	NAG	B	702	1	14,14,15	0.23	0	17,19,21	0.46	0
11	NAG	G	633	4	14,14,15	0.27	0	17,19,21	0.48	0
12	JYV	G	638	-	42,48,48	5.31	21 (50%)	51,67,67	2.57	15 (29%)
11	NAG	G	611	4	14,14,15	0.30	0	17,19,21	0.46	0
11	NAG	D	201	2	14,14,15	0.32	0	17,19,21	0.51	0
11	NAG	G	614	4	14,14,15	0.32	0	17,19,21	0.44	0
11	NAG	G	635	4	14,14,15	0.27	0	17,19,21	0.55	0
11	NAG	B	701	1	14,14,15	0.38	0	17,19,21	0.55	0
11	NAG	G	618	4	14,14,15	0.27	0	17,19,21	0.42	0
11	NAG	G	607	4	14,14,15	0.26	0	17,19,21	0.52	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
11	NAG	G	634	4	-	2/6/23/26	0/1/1/1
11	NAG	B	702	1	-	1/6/23/26	0/1/1/1
11	NAG	G	633	4	-	0/6/23/26	0/1/1/1
12	JYV	G	638	-	-	12/28/48/48	0/5/5/5
11	NAG	G	611	4	-	2/6/23/26	0/1/1/1
11	NAG	D	201	2	-	1/6/23/26	0/1/1/1
11	NAG	G	614	4	-	2/6/23/26	0/1/1/1
11	NAG	G	635	4	-	2/6/23/26	0/1/1/1
11	NAG	B	701	1	-	2/6/23/26	0/1/1/1
11	NAG	G	618	4	-	2/6/23/26	0/1/1/1
11	NAG	G	607	4	-	0/6/23/26	0/1/1/1

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	G	638	JYV	C01-N34	15.17	1.47	1.32
12	G	638	JYV	C16-S44	-11.26	1.52	1.70
12	G	638	JYV	C23-C22	9.08	1.53	1.39
12	G	638	JYV	C27-C22	8.59	1.52	1.39
12	G	638	JYV	C26-C27	8.56	1.53	1.38
12	G	638	JYV	C24-C23	8.50	1.53	1.38
12	G	638	JYV	C09-N36	7.84	1.48	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	G	638	JYV	C05-C04	7.73	1.52	1.38
12	G	638	JYV	C01-C15	7.03	1.55	1.50
12	G	638	JYV	C21-C28	6.91	1.53	1.47
12	G	638	JYV	C26-C25	6.74	1.53	1.38
12	G	638	JYV	C25-C24	6.60	1.52	1.38
12	G	638	JYV	C01-C02	6.57	1.59	1.43
12	G	638	JYV	C04-C03	6.47	1.56	1.42
12	G	638	JYV	C15-N37	6.43	1.57	1.37
12	G	638	JYV	C05-N34	5.83	1.46	1.34
12	G	638	JYV	C07-C08	4.87	1.57	1.49
12	G	638	JYV	C18-C17	2.85	1.55	1.51
12	G	638	JYV	O41-C08	-2.13	1.18	1.23
12	G	638	JYV	C09-C08	2.07	1.55	1.53
12	G	638	JYV	O42-C09	-2.01	1.19	1.23

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	G	638	JYV	C13-C12-C21	9.12	125.24	111.96
12	G	638	JYV	C11-C12-C21	8.63	124.51	111.96
12	G	638	JYV	C22-C21-C28	6.96	119.25	110.78
12	G	638	JYV	O43-C04-C03	4.11	121.77	115.91
12	G	638	JYV	C11-C10-N36	3.39	117.31	110.66
12	G	638	JYV	O43-C04-C05	-3.35	117.94	125.15
12	G	638	JYV	C15-C01-N34	3.29	119.82	114.54
12	G	638	JYV	C15-C16-S44	-3.18	107.89	111.79
12	G	638	JYV	C13-C14-N36	3.03	116.61	110.66
12	G	638	JYV	C17-C18-N38	-2.43	109.60	113.31
12	G	638	JYV	C29-O43-C04	-2.42	113.64	117.67
12	G	638	JYV	O42-C09-C08	2.15	120.61	117.24
12	G	638	JYV	C10-C11-C12	2.14	114.29	109.53
12	G	638	JYV	C06-C07-C08	-2.11	123.27	127.72
12	G	638	JYV	C14-C13-C12	2.03	114.06	109.53

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	G	638	JYV	C13-C12-C21-C22
12	G	638	JYV	C13-C12-C21-C28
12	G	638	JYV	N34-C01-C15-C16
12	G	638	JYV	C17-C18-N38-C19

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Mol	Chain	Res	Type	Atoms
12	G	638	JYV	C17-C18-N38-C30
11	G	634	NAG	C4-C5-C6-O6
11	G	634	NAG	O5-C5-C6-O6
11	G	635	NAG	O5-C5-C6-O6
11	G	618	NAG	O5-C5-C6-O6
12	G	638	JYV	C20-C31-N40-C32
11	G	635	NAG	C4-C5-C6-O6
11	G	618	NAG	C4-C5-C6-O6
12	G	638	JYV	C20-C31-N40-C33
11	G	614	NAG	O5-C5-C6-O6
11	G	611	NAG	C4-C5-C6-O6
11	G	611	NAG	O5-C5-C6-O6
11	B	701	NAG	O5-C5-C6-O6
12	G	638	JYV	C03-C04-O43-C29
12	G	638	JYV	C20-C19-N38-C18
11	B	702	NAG	O5-C5-C6-O6
11	D	201	NAG	O5-C5-C6-O6
12	G	638	JYV	C20-C19-N38-C30
12	G	638	JYV	C05-C04-O43-C29
12	G	638	JYV	C11-C12-C21-C28
11	B	701	NAG	C4-C5-C6-O6
11	G	614	NAG	C1-C2-N2-C7

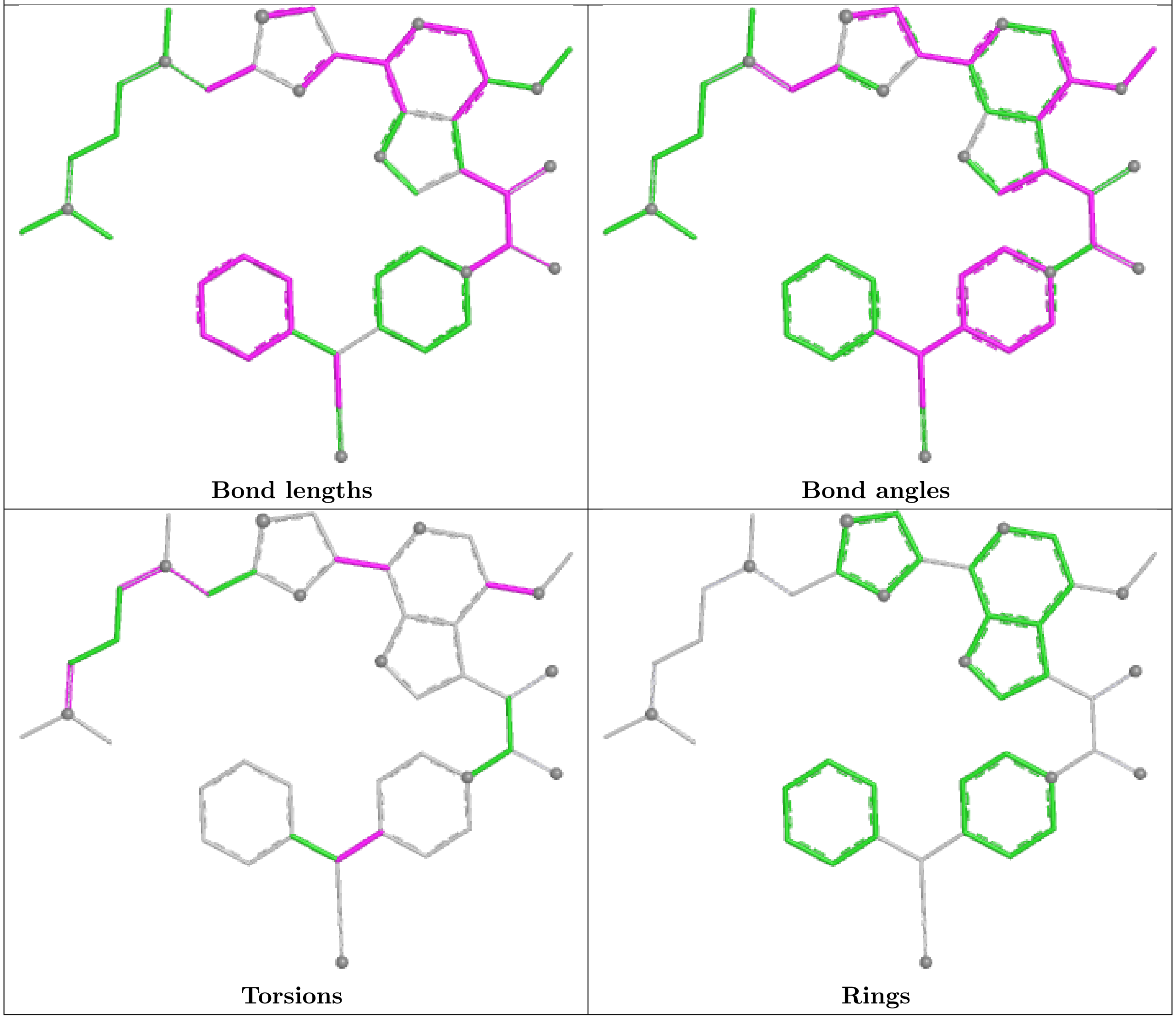
There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	G	638	JYV	2	0
11	G	614	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 all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand JYV G 638



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 (i)

6.1 Protein, DNA and RNA chains (i)

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, 95^{th} 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	B	128/153 (83%)	0.55	9 (7%)	24	27	10, 35, 70, 108	0
2	D	128/134 (95%)	2.47	74 (57%)	0	0	38, 80, 118, 125	0
3	E	105/114 (92%)	2.02	49 (46%)	0	0	39, 68, 108, 119	0
4	G	442/481 (91%)	0.49	50 (11%)	11	14	7, 30, 84, 122	0
5	H	226/244 (92%)	1.20	51 (22%)	3	4	18, 49, 87, 107	0
6	L	211/217 (97%)	0.25	6 (2%)	55	59	10, 33, 54, 109	0
All	All	1240/1343 (92%)	0.92	239 (19%)	4	5	7, 41, 99, 125	0

All (239) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	G	465	THR	9.1
4	G	458	GLY	7.7
2	D	108	LEU	7.0
2	D	18	VAL	6.8
2	D	83	THR	6.5
2	D	89	THR	6.2
3	E	96	CYS	5.9
3	E	80	PRO	5.8
2	D	10	THR	5.7
2	D	41	ALA	5.6
3	E	41	GLY	5.5
1	B	517	ALA	5.5
2	D	110	THR	5.4
4	G	188	ASN	5.3
4	G	138	ILE	5.3
5	H	187	LEU	5.2
2	D	15	GLY	5.1
5	H	132	GLY	5.1
2	D	19	LYS	5.1

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Mol	Chain	Res	Type	RSRZ
2	D	88	GLY	4.9
2	D	70	THR	4.8
6	L	7	TYR	4.8
4	G	60	ALA	4.8
3	E	15	LEU	4.7
2	D	84	SER	4.6
4	G	466	GLU	4.6
2	D	92	CYS	4.3
5	H	26	GLY	4.3
2	D	107	THR	4.3
2	D	39	GLN	4.2
2	D	45	PRO	4.2
2	D	91	PHE	4.1
4	G	397	SER	4.1
2	D	62	ALA	4.1
3	E	8	ALA	4.1
2	D	11	THR	4.0
3	E	99	GLY	3.9
4	G	185	ASN	3.9
3	E	78	LEU	3.9
2	D	14	PRO	3.9
4	G	79	PRO	3.9
5	H	51	ILE	3.8
4	G	151	ARG	3.8
1	B	648	GLU	3.8
2	D	59	LEU	3.8
2	D	87	THR	3.8
4	G	81	PRO	3.8
4	G	396	ILE	3.7
3	E	3	VAL	3.7
4	G	141	ASP	3.7
3	E	13	GLY	3.7
2	D	60	ALA	3.7
2	D	109	LEU	3.6
2	D	47	TRP	3.6
5	H	193	ILE	3.6
5	H	71	VAL	3.6
3	E	39	PRO	3.6
3	E	83	GLU	3.6
2	D	50	TRP	3.6
3	E	76	SER	3.5
2	D	82	ILE	3.5

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Mol	Chain	Res	Type	RSRZ
2	D	82(B)	ASN	3.5
5	H	30	SER	3.5
5	H	182	VAL	3.5
3	E	84	THR	3.5
2	D	82(A)	ARG	3.5
3	E	79	ARG	3.5
3	E	40	PRO	3.4
2	D	8	GLY	3.4
3	E	97	VAL	3.4
2	D	38	ARG	3.4
2	D	37	ILE	3.4
2	D	40	THR	3.4
4	G	139	THR	3.4
5	H	125	SER	3.4
2	D	90	TYR	3.3
2	D	35	ASN	3.3
5	H	188	GLY	3.3
3	E	62	PHE	3.3
2	D	79	TYR	3.3
2	D	61	PRO	3.3
4	G	429	ARG	3.2
2	D	22	CYS	3.2
4	G	398	ASN	3.2
2	D	48	MET	3.2
5	H	183	PRO	3.2
2	D	51	ILE	3.2
3	E	9	SER	3.2
3	E	27(C)	CYS	3.1
2	D	7	SER	3.1
3	E	86	TYR	3.1
5	H	189	THR	3.1
5	H	191	THR	3.1
6	L	210	THR	3.1
2	D	16	SER	3.1
3	E	14	SER	3.1
4	G	140	ASP	3.1
2	D	85	ASP	3.0
2	D	80	MET	3.0
4	G	184	ILE	3.0
3	E	77	ASP	3.0
2	D	71	THR	3.0
2	D	21	SER	3.0

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Mol	Chain	Res	Type	RSRZ
4	G	359	ILE	3.0
2	D	81	GLU	3.0
4	G	228	CYS	2.9
4	G	58	ALA	2.9
2	D	12	THR	2.9
4	G	467	THR	2.9
5	H	28	SER	2.9
5	H	22	CYS	2.9
3	E	7	SER	2.9
4	G	275	GLU	2.9
2	D	103	TRP	2.9
4	G	137	ALA	2.9
3	E	29	SER	2.9
5	H	192	TYR	2.9
4	G	411	ASN	2.9
4	G	456	ARG	2.8
3	E	35	TRP	2.8
4	G	277	ILE	2.8
3	E	89	CYS	2.8
5	H	33	TYR	2.8
3	E	19	VAL	2.8
4	G	321	GLY	2.8
2	D	46	GLU	2.8
4	G	80	ASN	2.8
2	D	20	ILE	2.8
5	H	5	GLN	2.8
5	H	95	ALA	2.8
4	G	35	TRP	2.7
5	H	186	SER	2.7
2	D	9	ALA	2.7
5	H	73	THR	2.7
5	H	32	TYR	2.7
3	E	28	CYS	2.7
2	D	34	ILE	2.7
3	E	103	LYS	2.6
2	D	4	LEU	2.6
4	G	393	SER	2.6
4	G	268	GLU	2.6
1	B	600	GLY	2.6
1	B	518	VAL	2.6
2	D	5	VAL	2.6
3	E	11	VAL	2.6

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Mol	Chain	Res	Type	RSRZ
3	E	87	TYR	2.6
6	L	48	ILE	2.6
3	E	95	SER	2.6
2	D	13	LYS	2.5
2	D	82(C)	LEU	2.5
2	D	100(D)	TRP	2.5
6	L	6	SER	2.5
2	D	69	MET	2.5
2	D	36	TRP	2.5
3	E	34	SER	2.5
2	D	44	GLY	2.5
5	H	157	LEU	2.5
1	B	609	PRO	2.5
5	H	152	TRP	2.5
3	E	100	THR	2.5
4	G	409	GLY	2.5
3	E	104	VAL	2.4
5	H	208	LYS	2.4
3	E	30	HIS	2.4
3	E	23	CYS	2.4
2	D	66	ARG	2.4
5	H	85	ALA	2.4
5	H	190	GLN	2.4
4	G	152	GLY	2.4
4	G	352	HIS	2.4
5	H	31	ASN	2.4
4	G	501	CYS	2.4
5	H	204	LYS	2.4
3	E	37	GLN	2.4
2	D	17	SER	2.4
2	D	63	PHE	2.3
4	G	354	GLY	2.3
2	D	65	ASP	2.3
4	G	356	ASN	2.3
1	B	655	LYS	2.3
3	E	36	TYR	2.3
3	E	42	ARG	2.3
3	E	16	GLY	2.3
6	L	68	GLY	2.3
3	E	98	PHE	2.3
4	G	59	LYS	2.3
5	H	100(O)	TYR	2.3

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Mol	Chain	Res	Type	RSRZ
2	D	64	GLN	2.3
3	E	18	SER	2.3
3	E	102	THR	2.3
4	G	269	GLU	2.3
4	G	358	ILE	2.3
1	B	663	LEU	2.2
3	E	88	CYS	2.2
5	H	172	GLY	2.2
3	E	85	THR	2.2
5	H	184	SER	2.2
2	D	67	VAL	2.2
3	E	17	GLN	2.2
5	H	36	TRP	2.2
4	G	430	ILE	2.2
2	D	77	ALA	2.2
2	D	93	ALA	2.2
5	H	50	TYR	2.2
5	H	11	LEU	2.2
2	D	26	GLY	2.2
5	H	57	THR	2.2
1	B	519	PHE	2.2
5	H	4	LEU	2.1
5	H	133	THR	2.1
2	D	31	PHE	2.1
5	H	194	CYS	2.1
6	L	34	GLN	2.1
2	D	57	LYS	2.1
4	G	347	LYS	2.1
3	E	4	LEU	2.1
5	H	3	GLN	2.1
5	H	142	ASP	2.1
2	D	6	GLN	2.1
5	H	77	GLN	2.1
5	H	207	LYS	2.1
5	H	69	ILE	2.1
4	G	150	MET	2.1
5	H	148	VAL	2.1
5	H	23	THR	2.1
4	G	131	CYS	2.1
4	G	239	CYS	2.1
5	H	92	CYS	2.1
1	B	641	ILE	2.1

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Mol	Chain	Res	Type	RSRZ
4	G	414	ILE	2.1
4	G	350	ARG	2.0
5	H	2	VAL	2.0
5	H	84	ALA	2.0
5	H	156	ALA	2.0
2	D	49	GLY	2.0
3	E	5	THR	2.0
4	G	211	GLU	2.0
4	G	410	SER	2.0
5	H	29	ILE	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)

SUGAR-RSR INFOmissingINFO

6.4 Ligands (i)

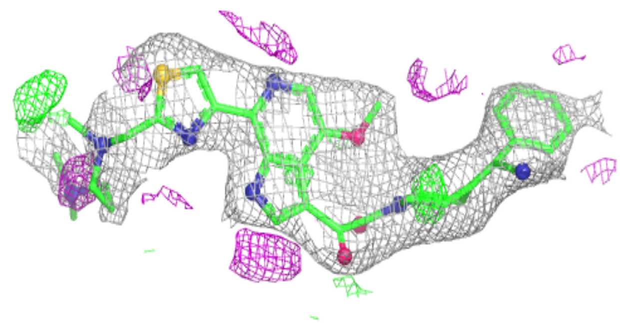
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

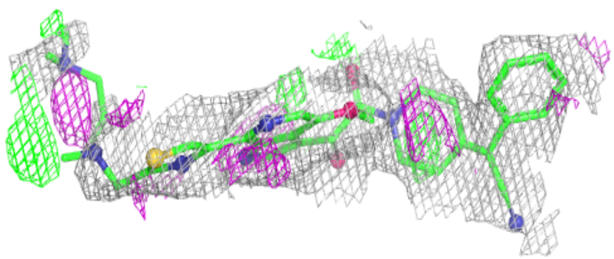
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
11	NAG	D	201	14/15	0.39	0.18	61,91,104,108	0
11	NAG	G	633	14/15	0.54	0.20	81,98,111,114	0
11	NAG	B	701	14/15	0.61	0.18	45,75,88,103	0
11	NAG	G	618	14/15	0.65	0.18	53,72,91,97	0
11	NAG	G	614	14/15	0.72	0.18	63,76,86,90	0
11	NAG	G	611	14/15	0.78	0.15	37,76,84,99	0
11	NAG	B	702	14/15	0.79	0.17	70,98,109,118	0
11	NAG	G	607	14/15	0.83	0.19	79,89,115,121	0
11	NAG	G	634	14/15	0.92	0.10	38,57,67,74	0
11	NAG	G	635	14/15	0.92	0.11	41,52,67,74	0
12	JYV	G	638	44/44	0.94	0.14	3,15,70,90	0

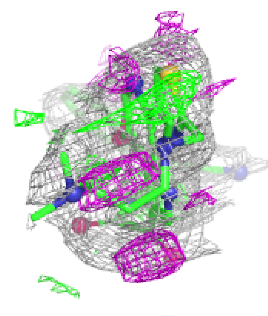
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around JYV G 638:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative) and green (positive)







6.5 Other polymers (i)

There are no such residues in this entry.