W O R L D W I D E
wwPDB
PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 4, 2023 – 11:52 PM EDT

PDB ID : 6VZI

Title : Crystal Structure of HIV-1 CAP256 RnS-3mut-2G-SOSIP.664 Prefusion Env Trimer in Complex with Human Antibodies 3H109L and 35O22 at 3.5 Angstrom

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Deposited on : 2020-02-28

Resolution : 2.72 Å(reported)

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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 2.72 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 9915 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 gp41.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	120	Total	C	N	O	S	0	0	0
			964	620	158	178	8			

There are 11 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	535	ASN	ILE	engineered mutation	UNP W6ICH7
B	559	PRO	ILE	engineered mutation	UNP W6ICH7
B	569	GLY	THR	engineered mutation	UNP W6ICH7
B	573	PHE	ILE	engineered mutation	UNP W6ICH7
B	588	GLU	LYS	engineered mutation	UNP W6ICH7
B	589	VAL	ASP	engineered mutation	UNP W6ICH7
B	605	CYS	THR	engineered mutation	UNP W6ICH7
B	609	PRO	TYR	engineered mutation	UNP W6ICH7
B	636	GLY	ASP	engineered mutation	UNP W6ICH7
B	651	PHE	LYS	engineered mutation	UNP W6ICH7
B	655	ILE	SER	engineered mutation	UNP W6ICH7

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	107	Total	C	N	O	S	0	0	0
			818	514	135	163	6			

- Molecule 4 is a protein called Envelope glycoprotein gp160.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	G	423	3358	2116	586	630	26	0	0	0

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	204	ILE	ALA	engineered mutation	UNP A0A0N9FF17
G	302	MET	ASN	engineered mutation	UNP A0A0N9FF17
G	320	LEU	THR	engineered mutation	UNP A0A0N9FF17
G	329	PRO	ALA	engineered mutation	UNP A0A0N9FF17
G	437	PRO	SER	engineered mutation	UNP A0A0N9FF17
G	442	ASN	GLU	engineered mutation	UNP A0A0N9FF17
G	501	CYS	ALA	engineered mutation	UNP A0A0N9FF17
G	508	ARG	-	expression tag	UNP A0A0N9FF17
G	509	ARG	-	expression tag	UNP A0A0N9FF17
G	510	ARG	-	expression tag	UNP A0A0N9FF17
G	511	ARG	-	expression tag	UNP A0A0N9FF17
G	512	ARG	-	expression tag	UNP A0A0N9FF17
G	513	ARG	-	expression tag	UNP A0A0N9FF17

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	L	211	1604	1009	276	312	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
			Total	C	N	O			
7	A	6	72	40	2	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.

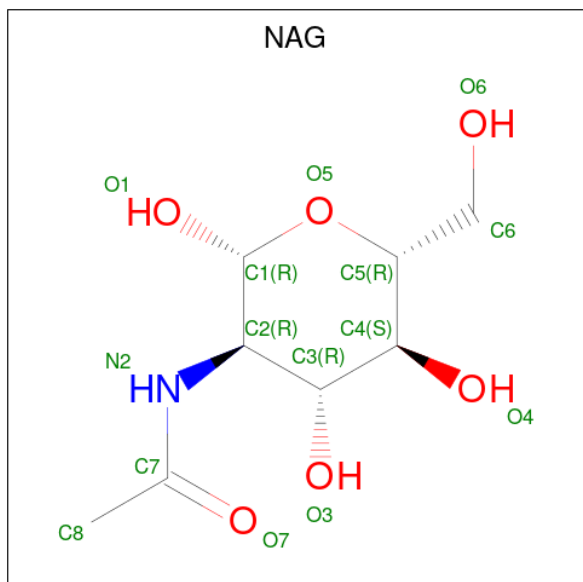| Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	C	3	Total 39	C 22	N 2	O 15	0	0	0
8	F	3	Total 39	C 22	N 2	O 15	0	0	0

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

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

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
10	J	10	Total 116	C 64	N 2	O 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	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0
11	G	1	Total 14	C 8	N 1	O 5	0	0

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α, β, γ	133.92Å 133.92Å 315.11Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	43.84 – 2.72	Depositor
% Data completeness (in resolution range)	36.3 (43.84-2.72)	Depositor
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.16 (at 2.73Å)	Xtriage
Refinement program	PHENIX 1.14_3260	Depositor
R, R_{free}	0.229 , 0.276	Depositor
Wilson B-factor (Å^2)	28.8	Xtriage
Anisotropy	0.100	Xtriage
L-test for twinning[2]	$< |L| > = 0.47$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.075 for h,-h-k,-l	Xtriage
Total number of atoms	9915	wwPDB-VP
Average B, all atoms (Å^2)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.64% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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.

4 Model quality ⓘ

4.1 Standard geometry ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles ⓘ

4.3.1 Protein backbone ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA ⓘ

MolProbity failed to run properly - this section is therefore empty.

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

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

4.5 Carbohydrates ⓘ

28 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	4,7	14,14,15	0.22	0	17,19,21	0.57	0
7	NAG	A	2	7	14,14,15	0.44	0	17,19,21	1.25	1 (5%)
7	BMA	A	3	7	11,11,12	0.66	0	15,15,17	0.71	0
7	MAN	A	4	7	11,11,12	1.05	1 (9%)	15,15,17	1.45	3 (20%)
7	MAN	A	5	7	11,11,12	1.54	3 (27%)	15,15,17	2.36	3 (20%)
7	MAN	A	6	7	11,11,12	0.70	0	15,15,17	1.10	2 (13%)
8	NAG	C	1	8,4	14,14,15	0.39	0	17,19,21	0.49	0
8	NAG	C	2	8	14,14,15	0.27	0	17,19,21	0.88	1 (5%)
8	BMA	C	3	8	11,11,12	1.01	1 (9%)	15,15,17	1.28	2 (13%)
8	NAG	F	1	8,4	14,14,15	0.25	0	17,19,21	0.49	0
8	NAG	F	2	8	14,14,15	0.44	0	17,19,21	0.39	0
8	BMA	F	3	8	11,11,12	0.71	0	15,15,17	0.76	0
9	NAG	I	1	9,4	14,14,15	0.90	1 (7%)	17,19,21	1.10	2 (11%)
9	NAG	I	2	9	14,14,15	0.25	0	17,19,21	0.50	0
10	NAG	J	1	10,4	14,14,15	0.28	0	17,19,21	1.38	2 (11%)
10	MAN	J	10	10	11,11,12	1.09	1 (9%)	15,15,17	1.00	1 (6%)
10	NAG	J	2	10	14,14,15	0.21	0	17,19,21	0.42	0
10	BMA	J	3	10	11,11,12	0.83	1 (9%)	15,15,17	1.10	1 (6%)
10	MAN	J	4	10	11,11,12	0.77	1 (9%)	15,15,17	1.42	2 (13%)
10	MAN	J	5	10	11,11,12	0.70	0	15,15,17	1.00	2 (13%)
10	MAN	J	6	10	11,11,12	0.71	0	15,15,17	0.94	2 (13%)
10	MAN	J	7	10	11,11,12	0.88	1 (9%)	15,15,17	1.20	2 (13%)
10	MAN	J	8	10	11,11,12	0.68	0	15,15,17	1.17	2 (13%)
10	MAN	J	9	10	11,11,12	0.88	0	15,15,17	1.79	3 (20%)
9	NAG	K	1	9,4	14,14,15	0.48	0	17,19,21	0.93	1 (5%)
9	NAG	K	2	9	14,14,15	0.59	0	17,19,21	0.59	0
9	NAG	M	1	9,4	14,14,15	0.61	0	17,19,21	0.89	1 (5%)
9	NAG	M	2	9	14,14,15	0.22	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
7	NAG	A	1	4,7	-	0/6/23/26	0/1/1/1
7	NAG	A	2	7	-	3/6/23/26	0/1/1/1
7	BMA	A	3	7	-	2/2/19/22	0/1/1/1

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

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	5	MAN	C1-C2	3.06	1.59	1.52
7	A	5	MAN	O5-C1	2.91	1.48	1.43
9	I	1	NAG	O5-C1	-2.82	1.39	1.43
7	A	4	MAN	C1-C2	2.78	1.58	1.52
7	A	5	MAN	O5-C5	2.61	1.48	1.43

The worst 5 of 33 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	5	MAN	C1-O5-C5	8.06	123.11	112.19
10	J	9	MAN	C1-O5-C5	5.66	119.87	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	J	1	NAG	C2-N2-C7	4.42	129.20	122.90
7	A	2	NAG	C2-N2-C7	4.24	128.94	122.90
10	J	4	MAN	C1-O5-C5	4.07	117.70	112.19

There are no chirality outliers.
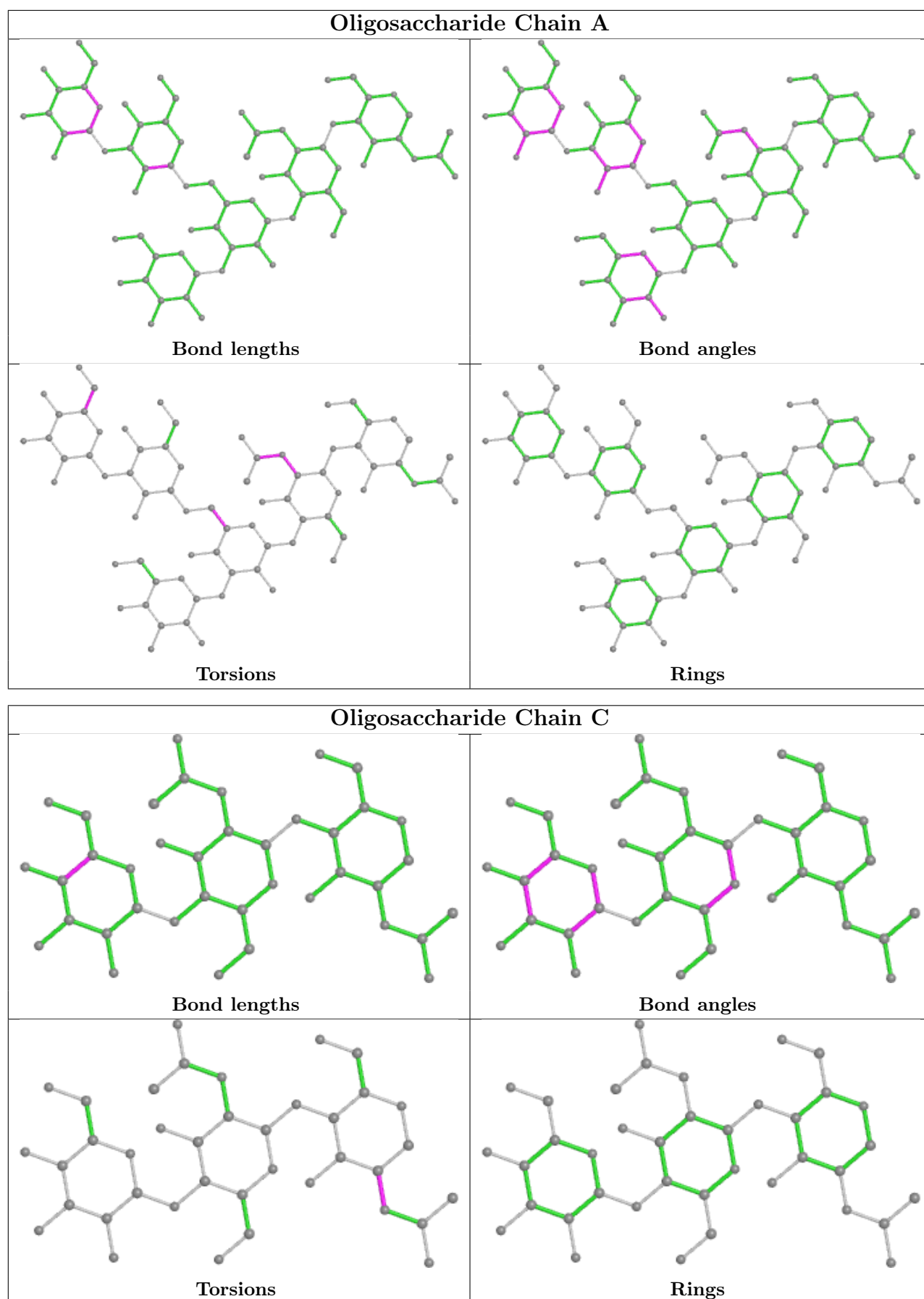
5 of 34 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	3	BMA	O5-C5-C6-O6
10	J	10	MAN	O5-C5-C6-O6
9	M	2	NAG	C4-C5-C6-O6
8	F	3	BMA	O5-C5-C6-O6
7	A	3	BMA	C4-C5-C6-O6

All (1) ring outliers are listed below:

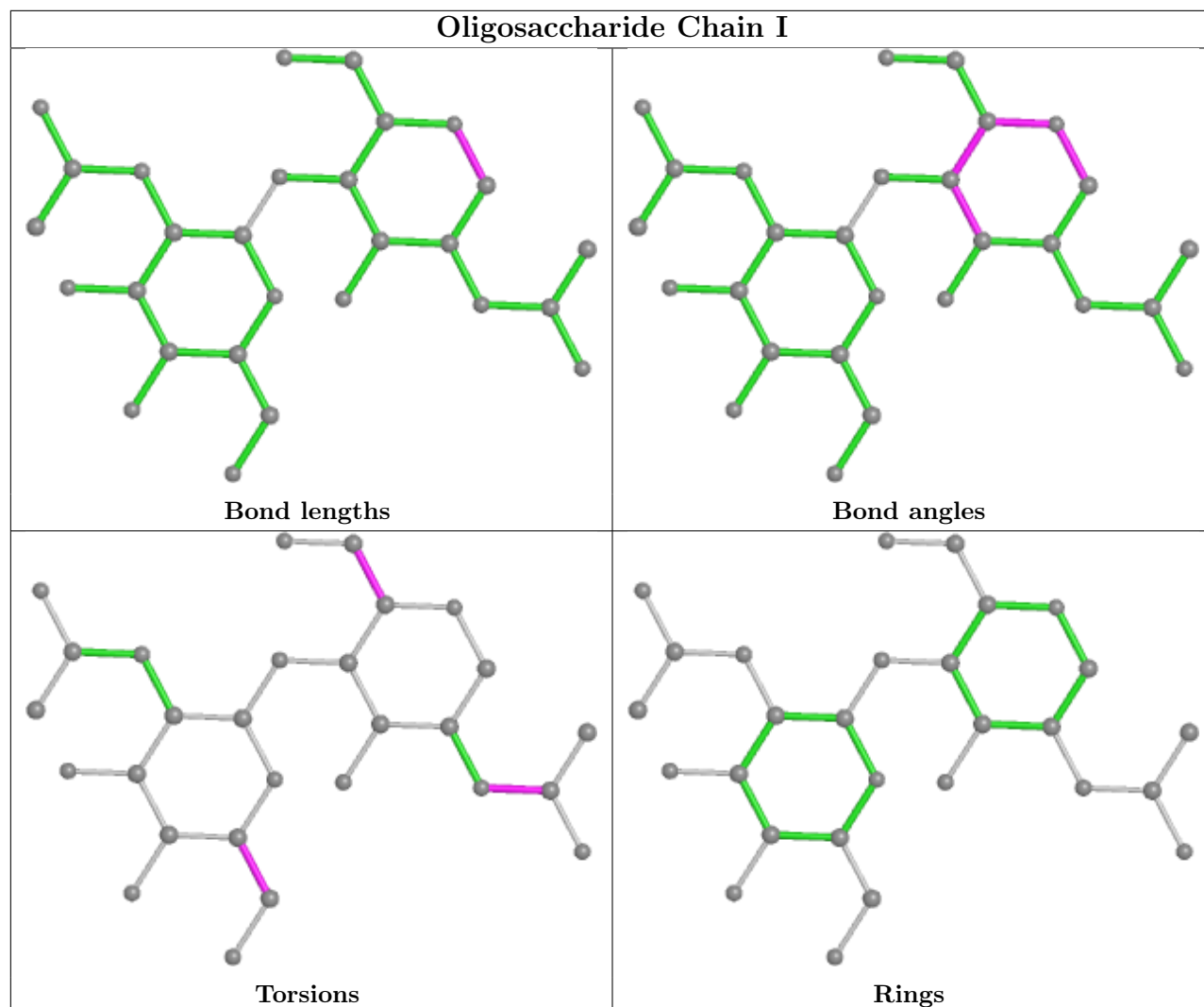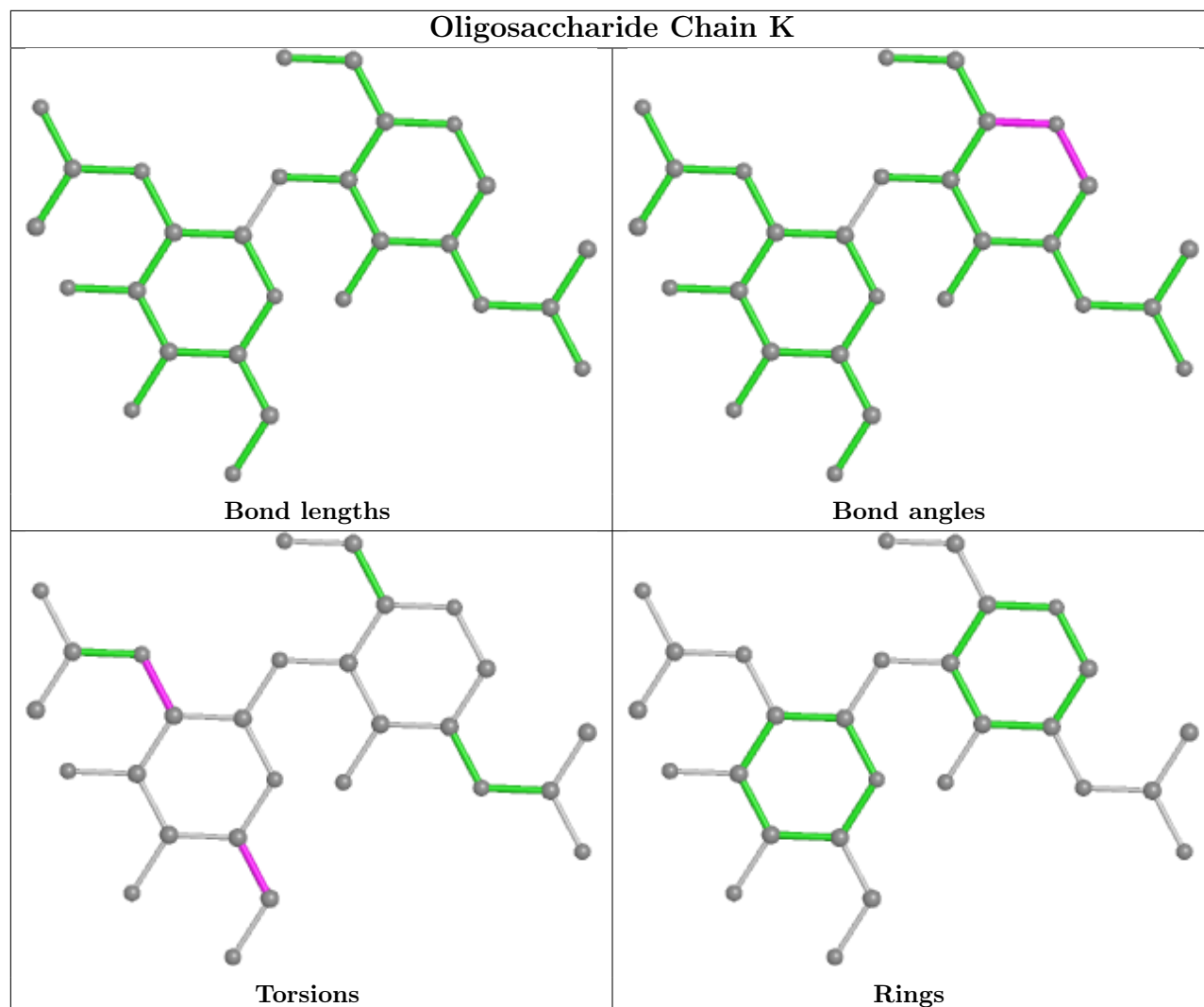| Mol	Chain	Res	Type	Atoms
10	J	9	MAN	C1-C2-C3-C4-C5-O5

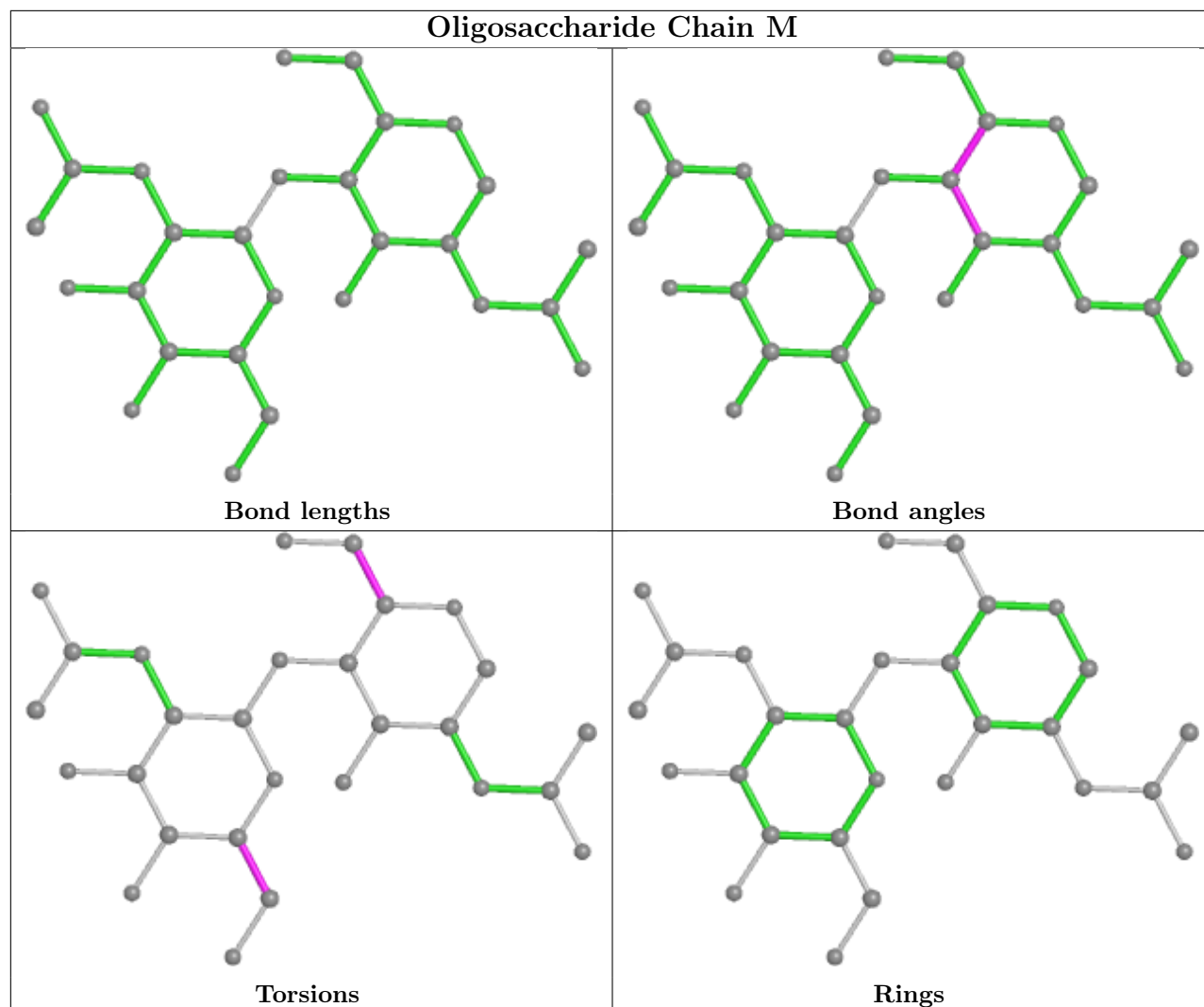No monomer is involved in short contacts.

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

Oligosaccharide Chain A

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain M

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J
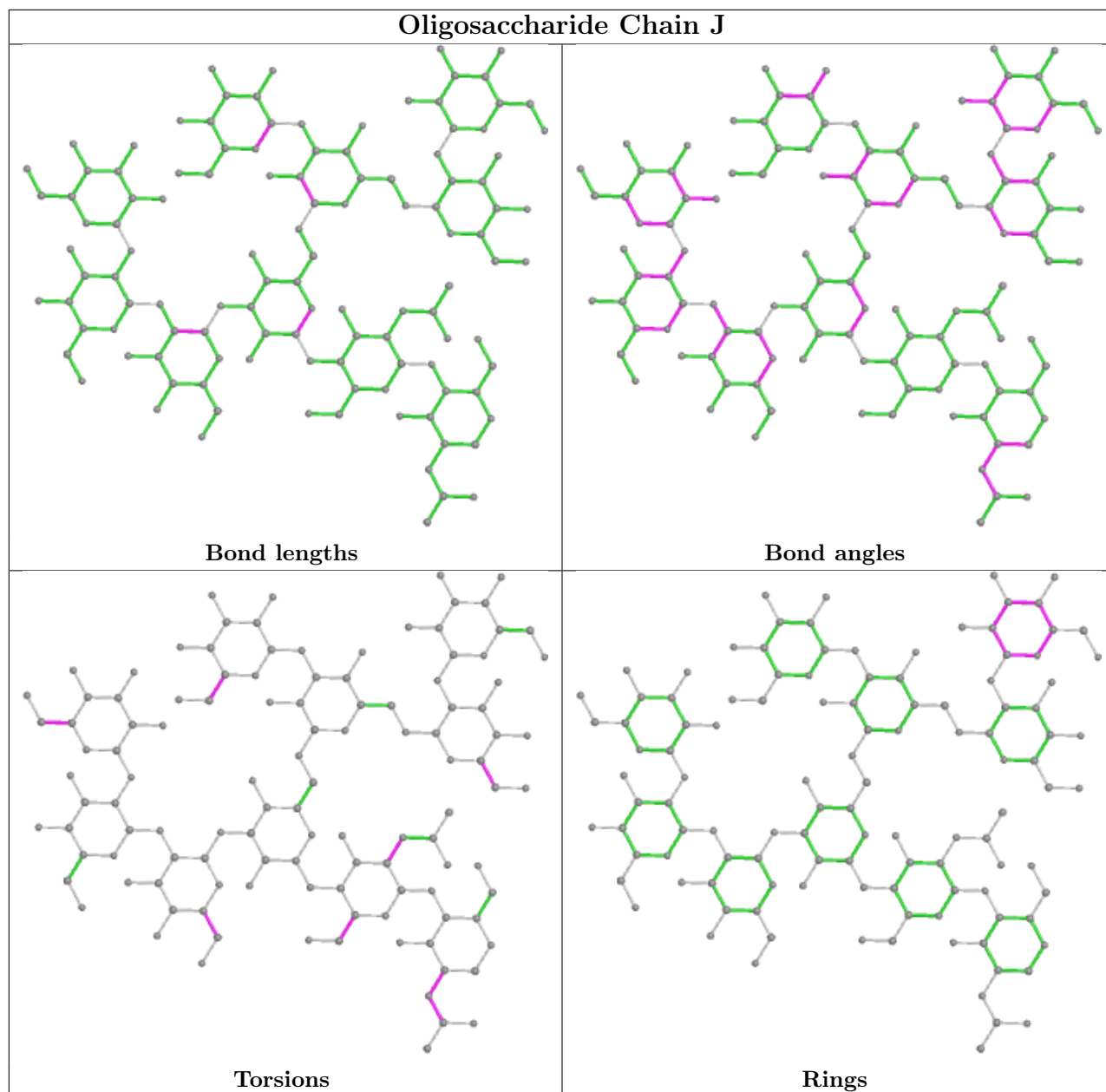

Bond lengths

Bond angles

Torsions

Rings

4.6 Ligand geometry ⓘ

8 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	632	4	14,14,15	0.39	0	17,19,21	2.13	4 (23%)
11	NAG	G	633	4	14,14,15	0.36	0	17,19,21	0.48	0
11	NAG	G	628	4	14,14,15	0.31	0	17,19,21	0.55	0
11	NAG	G	631	4	14,14,15	0.27	0	17,19,21	0.41	0
11	NAG	G	611	4	14,14,15	0.86	1 (7%)	17,19,21	0.71	0
11	NAG	G	610	4	14,14,15	0.17	0	17,19,21	0.54	0
11	NAG	G	636	4	14,14,15	0.29	0	17,19,21	0.42	0
11	NAG	G	612	4	14,14,15	0.52	0	17,19,21	0.43	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	632	4	-	5/6/23/26	0/1/1/1
11	NAG	G	633	4	-	2/6/23/26	0/1/1/1
11	NAG	G	628	4	-	2/6/23/26	0/1/1/1
11	NAG	G	631	4	-	1/6/23/26	0/1/1/1
11	NAG	G	611	4	-	1/6/23/26	0/1/1/1
11	NAG	G	610	4	-	0/6/23/26	0/1/1/1
11	NAG	G	636	4	-	3/6/23/26	0/1/1/1
11	NAG	G	612	4	-	1/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	G	611	NAG	C1-C2	2.98	1.56	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	G	632	NAG	C1-O5-C5	5.97	120.28	112.19
11	G	632	NAG	C2-N2-C7	4.54	129.36	122.90
11	G	632	NAG	C3-C4-C5	3.01	115.61	110.24
11	G	632	NAG	C1-C2-N2	2.17	114.20	110.49

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	G	632	NAG	C4-C5-C6-O6
11	G	632	NAG	O5-C5-C6-O6
11	G	632	NAG	C8-C7-N2-C2
11	G	632	NAG	O7-C7-N2-C2
11	G	636	NAG	C8-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

4.7 Other polymers ⓘ

There are no such residues in this entry.

4.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

5 Fit of model and data ⓘ

5.1 Protein, DNA and RNA chains ⓘ

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates ⓘ

EDS failed to run properly - this section is therefore empty.

5.4 Ligands ⓘ

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers ⓘ

EDS failed to run properly - this section is therefore empty.