



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 2, 2023 – 02:51 PM EDT

PDB ID : 6NNF
Title : Crystal Structure of HIV-1 BG505 SOSIP.664 Prefusion Env Trimer Bound to VRC01 FR3-03 scFv in Complex with Crystallization Chaperones 3H109L Fab and 35O22 scFv at 3.5 Angstrom
Authors : Lai, Y.-T.; Kwong, P.D.
Deposited on : 2019-01-14
Resolution : 2.76 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : **FAILED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

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 2.76 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 14 unique types of molecules in this entry. The entry contains 11926 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
			Total	C	N	O	S			
1	B	130	1030	655	177	192	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.

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	112	851	533	141	171	6	0	0	0

- Molecule 4 is a protein called Envelope glycoprotein gp120.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	G	431	3400	2140	601	632	27	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	engineered mutation	UNP Q2N0S6

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Chain	Residue	Modelled	Actual	Comment	Reference
G	501	CYS	ALA	engineered mutation	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
			Total	C	N	O	S			
5	H	227	1721	1096	279	340	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 a protein called VRC01 FR3-03 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	U	126	1010	636	183	183	8	0	0	0

- Molecule 8 is a protein called VRC01 FR3-03 light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
8	V	97	751	474	129	146	2	0	0	0

- Molecule 9 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			
9	A	6	72	40	2	30	0	0	0

- Molecule 10 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
10	C	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	I	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	K	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	M	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	N	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	P	2	Total	C	N	O	0	0	0
			28	16	2	10			
10	Q	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 11 is an oligosaccharide called 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
11	F	5	Total	C	N	O	0	0	0
			61	34	2	25			

- Molecule 12 is an oligosaccharide called 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
12	J	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 13 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-(1-6)-[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
13	O	10	Total	C	N	O	0	0	0
			116	64	2	50			

- Molecule 14 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
14	B	1	Total 14	C 8	N 1	O 5	0	0
14	B	1	Total 14	C 8	N 1	O 5	0	0
14	G	1	Total 14	C 8	N 1	O 5	0	0
14	G	1	Total 14	C 8	N 1	O 5	0	0
14	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	130.87Å 130.87Å 315.19Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.84 – 2.76	Depositor
% Data completeness (in resolution range)	34.8 (42.84-2.76)	Depositor
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.90 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.14_3260	Depositor
R, R_{free}	0.242 , 0.298	Depositor
Wilson B-factor (Å ²)	33.4	Xtrriage
Anisotropy	0.018	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.089 for h,-h-k,-l	Xtrriage
Total number of atoms	11926	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.38% 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.

4 Model quality [i](#)

4.1 Standard geometry [i](#)

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

4.2 Too-close contacts [i](#)

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

4.3 Torsion angles [i](#)

4.3.1 Protein backbone [i](#)

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

4.3.2 Protein sidechains [i](#)

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

4.3.3 RNA [i](#)

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

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

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

4.5 Carbohydrates [i](#)

39 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
9	NAG	A	1	9,4	14,14,15	0.32	0	17,19,21	0.47	0
9	NAG	A	2	9	14,14,15	0.41	0	17,19,21	1.27	1 (5%)
9	BMA	A	3	9	11,11,12	0.59	0	15,15,17	0.68	0
9	MAN	A	4	9	11,11,12	1.07	1 (9%)	15,15,17	1.09	1 (6%)
9	MAN	A	5	9	11,11,12	1.62	2 (18%)	15,15,17	1.97	4 (26%)
9	MAN	A	6	9	11,11,12	0.63	0	15,15,17	0.98	2 (13%)
10	NAG	C	1	10,4	14,14,15	0.23	0	17,19,21	0.45	0
10	NAG	C	2	10	14,14,15	0.25	0	17,19,21	0.43	0
11	NAG	F	1	11,4	14,14,15	0.25	0	17,19,21	0.41	0
11	NAG	F	2	11	14,14,15	0.20	0	17,19,21	0.38	0
11	BMA	F	3	11	11,11,12	0.61	0	15,15,17	0.73	0
11	MAN	F	4	11	11,11,12	0.76	1 (9%)	15,15,17	1.13	2 (13%)
11	MAN	F	5	11	11,11,12	0.69	0	15,15,17	1.04	2 (13%)
10	NAG	I	1	10,4	14,14,15	0.33	0	17,19,21	0.46	0
10	NAG	I	2	10	14,14,15	0.23	0	17,19,21	0.39	0
12	NAG	J	1	12,4	14,14,15	0.23	0	17,19,21	0.46	0
12	NAG	J	2	12	14,14,15	0.25	0	17,19,21	0.50	0
12	BMA	J	3	12	11,11,12	1.11	2 (18%)	15,15,17	1.18	1 (6%)
12	MAN	J	4	12	11,11,12	0.63	0	15,15,17	1.04	2 (13%)
10	NAG	K	1	10,4	14,14,15	0.27	0	17,19,21	0.39	0
10	NAG	K	2	10	14,14,15	0.21	0	17,19,21	0.46	0
10	NAG	M	1	10,4	14,14,15	0.23	0	17,19,21	0.44	0
10	NAG	M	2	10	14,14,15	0.24	0	17,19,21	0.41	0
10	NAG	N	1	10,4	14,14,15	0.28	0	17,19,21	0.44	0
10	NAG	N	2	10	14,14,15	0.22	0	17,19,21	0.50	0
13	NAG	O	1	13,4	14,14,15	0.43	0	17,19,21	1.41	2 (11%)
13	MAN	O	10	13	11,11,12	1.06	0	15,15,17	1.17	2 (13%)
13	NAG	O	2	13	14,14,15	0.24	0	17,19,21	0.44	0
13	BMA	O	3	13	11,11,12	0.92	0	15,15,17	0.92	0
13	MAN	O	4	13	11,11,12	0.82	1 (9%)	15,15,17	1.40	2 (13%)
13	MAN	O	5	13	11,11,12	0.73	0	15,15,17	0.93	1 (6%)
13	MAN	O	6	13	11,11,12	0.65	0	15,15,17	0.88	1 (6%)
13	MAN	O	7	13	11,11,12	0.70	0	15,15,17	1.06	2 (13%)
13	MAN	O	8	13	11,11,12	0.74	0	15,15,17	1.00	1 (6%)
13	MAN	O	9	13	11,11,12	0.82	1 (9%)	15,15,17	1.34	2 (13%)
10	NAG	P	1	10,4	14,14,15	0.33	0	17,19,21	0.46	0
10	NAG	P	2	10	14,14,15	0.25	0	17,19,21	0.50	0
10	NAG	Q	1	10,4	14,14,15	0.96	1 (7%)	17,19,21	1.60	1 (5%)
10	NAG	Q	2	10	14,14,15	0.22	0	17,19,21	0.42	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
9	NAG	A	1	9,4	-	0/6/23/26	0/1/1/1
9	NAG	A	2	9	-	5/6/23/26	0/1/1/1
9	BMA	A	3	9	-	2/2/19/22	0/1/1/1
9	MAN	A	4	9	-	2/2/19/22	0/1/1/1
9	MAN	A	5	9	-	1/2/19/22	0/1/1/1
9	MAN	A	6	9	-	0/2/19/22	0/1/1/1
10	NAG	C	1	10,4	-	0/6/23/26	0/1/1/1
10	NAG	C	2	10	-	2/6/23/26	0/1/1/1
11	NAG	F	1	11,4	-	1/6/23/26	0/1/1/1
11	NAG	F	2	11	-	0/6/23/26	0/1/1/1
11	BMA	F	3	11	-	2/2/19/22	0/1/1/1
11	MAN	F	4	11	-	0/2/19/22	0/1/1/1
11	MAN	F	5	11	-	2/2/19/22	0/1/1/1
10	NAG	I	1	10,4	-	2/6/23/26	0/1/1/1
10	NAG	I	2	10	-	2/6/23/26	0/1/1/1
12	NAG	J	1	12,4	-	2/6/23/26	0/1/1/1
12	NAG	J	2	12	-	2/6/23/26	0/1/1/1
12	BMA	J	3	12	-	0/2/19/22	0/1/1/1
12	MAN	J	4	12	-	2/2/19/22	0/1/1/1
10	NAG	K	1	10,4	-	1/6/23/26	0/1/1/1
10	NAG	K	2	10	-	0/6/23/26	0/1/1/1
10	NAG	M	1	10,4	-	0/6/23/26	0/1/1/1
10	NAG	M	2	10	-	0/6/23/26	0/1/1/1
10	NAG	N	1	10,4	-	2/6/23/26	0/1/1/1
10	NAG	N	2	10	-	2/6/23/26	0/1/1/1
13	NAG	O	1	13,4	-	3/6/23/26	0/1/1/1
13	MAN	O	10	13	-	2/2/19/22	0/1/1/1
13	NAG	O	2	13	-	2/6/23/26	0/1/1/1
13	BMA	O	3	13	-	0/2/19/22	0/1/1/1
13	MAN	O	4	13	-	2/2/19/22	0/1/1/1
13	MAN	O	5	13	-	2/2/19/22	0/1/1/1
13	MAN	O	6	13	-	0/2/19/22	0/1/1/1
13	MAN	O	7	13	-	0/2/19/22	0/1/1/1
13	MAN	O	8	13	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	MAN	O	9	13	-	2/2/19/22	0/1/1/1
10	NAG	P	1	10,4	-	2/6/23/26	0/1/1/1
10	NAG	P	2	10	-	0/6/23/26	0/1/1/1
10	NAG	Q	1	10,4	-	4/6/23/26	0/1/1/1
10	NAG	Q	2	10	-	0/6/23/26	0/1/1/1

The worst 5 of 9 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	5	MAN	C1-C2	4.60	1.62	1.52
10	Q	1	NAG	O5-C1	3.45	1.49	1.43
13	O	4	MAN	C1-C2	2.52	1.58	1.52
13	O	9	MAN	C1-C2	2.35	1.57	1.52
9	A	4	MAN	O5-C1	-2.26	1.40	1.43

The worst 5 of 29 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	Q	1	NAG	C1-O5-C5	6.23	120.63	112.19
13	O	1	NAG	C2-N2-C7	4.51	129.32	122.90
9	A	5	MAN	C1-O5-C5	4.48	118.26	112.19
9	A	5	MAN	C1-C2-C3	4.36	115.03	109.67
9	A	2	NAG	C2-N2-C7	4.33	129.07	122.90

There are no chirality outliers.

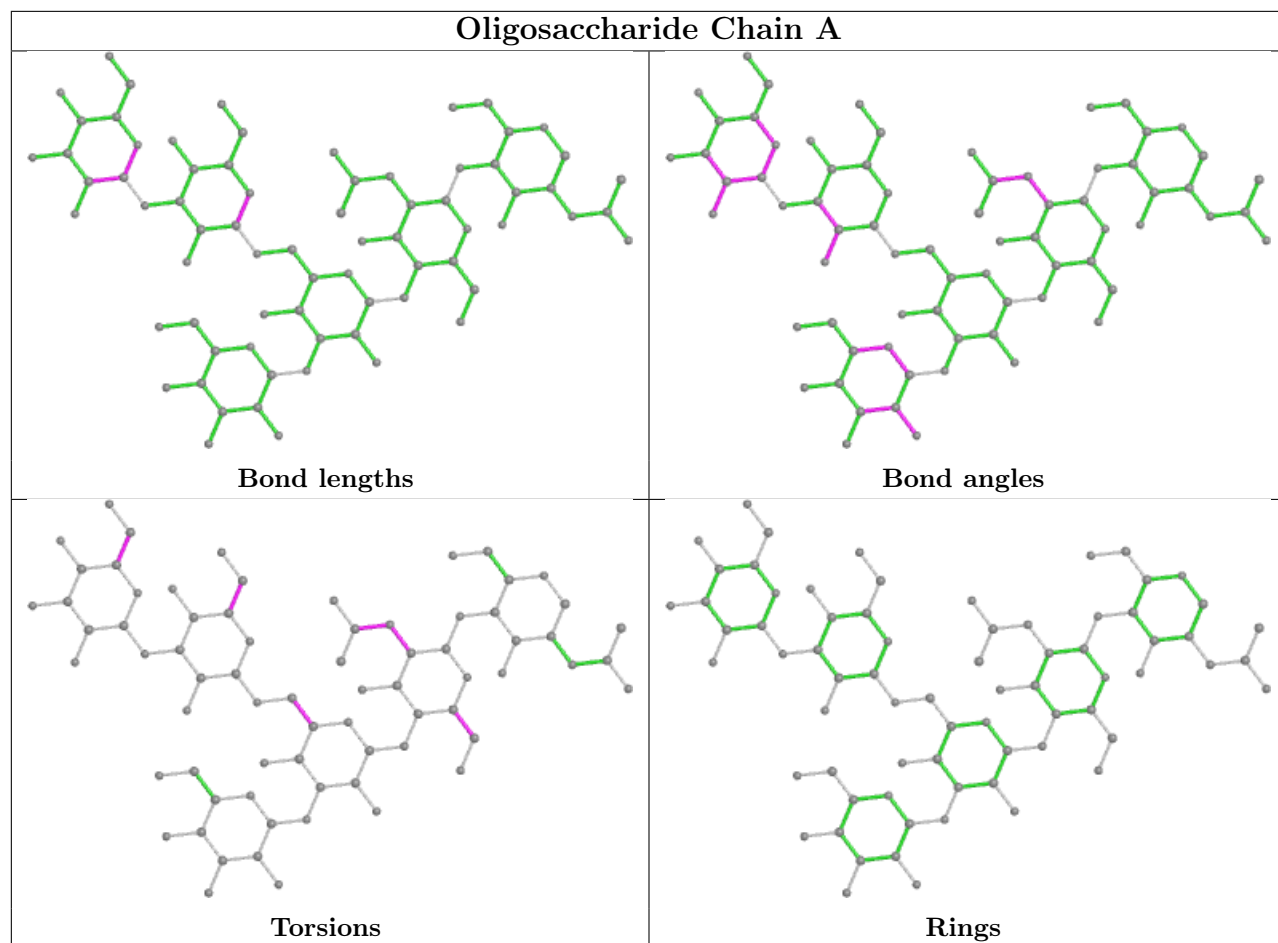
5 of 51 torsion outliers are listed below:

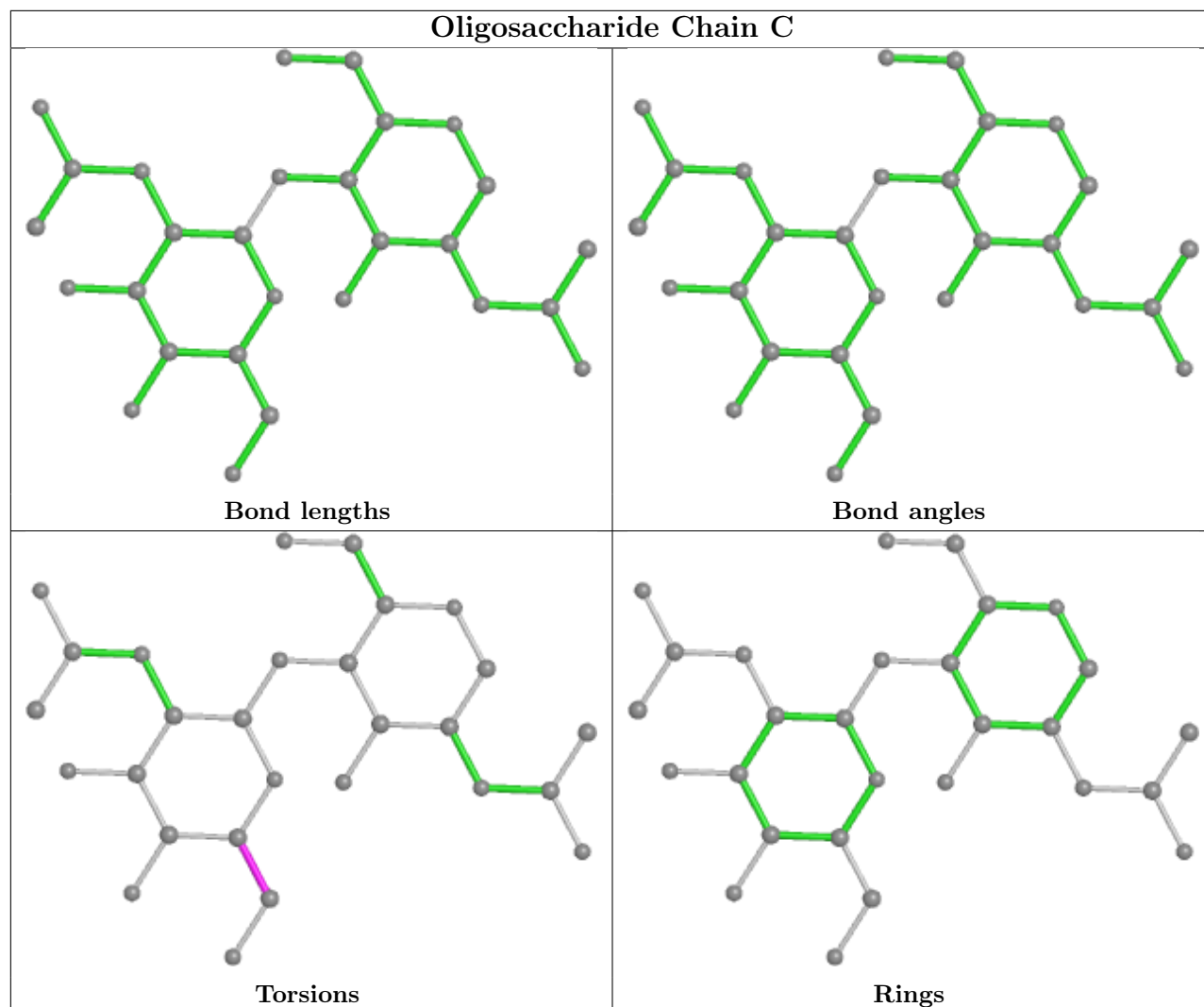
Mol	Chain	Res	Type	Atoms
13	O	2	NAG	O5-C5-C6-O6
9	A	3	BMA	O5-C5-C6-O6
11	F	3	BMA	C4-C5-C6-O6
10	I	2	NAG	O5-C5-C6-O6
10	Q	1	NAG	O5-C5-C6-O6

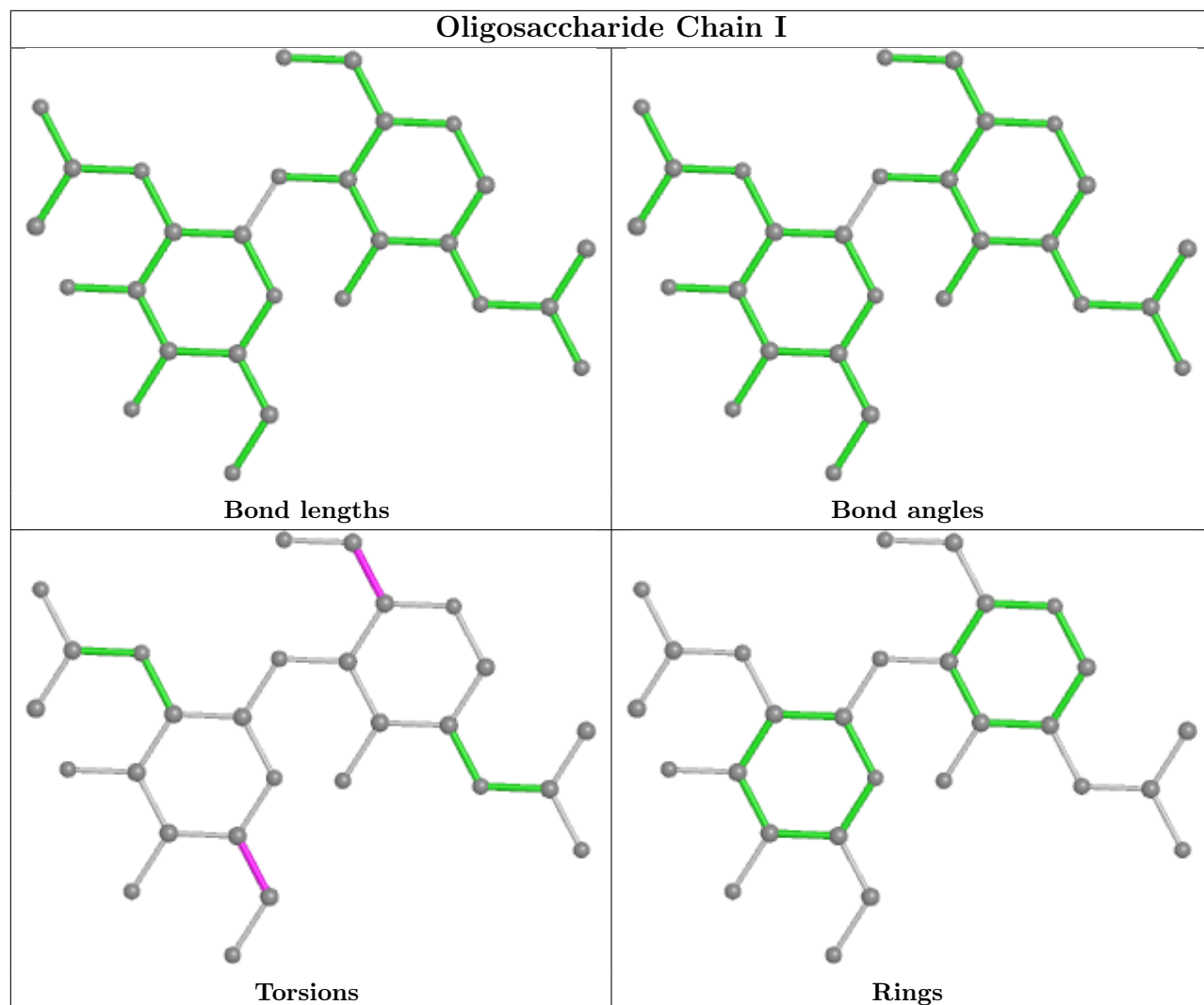
There are no ring outliers.

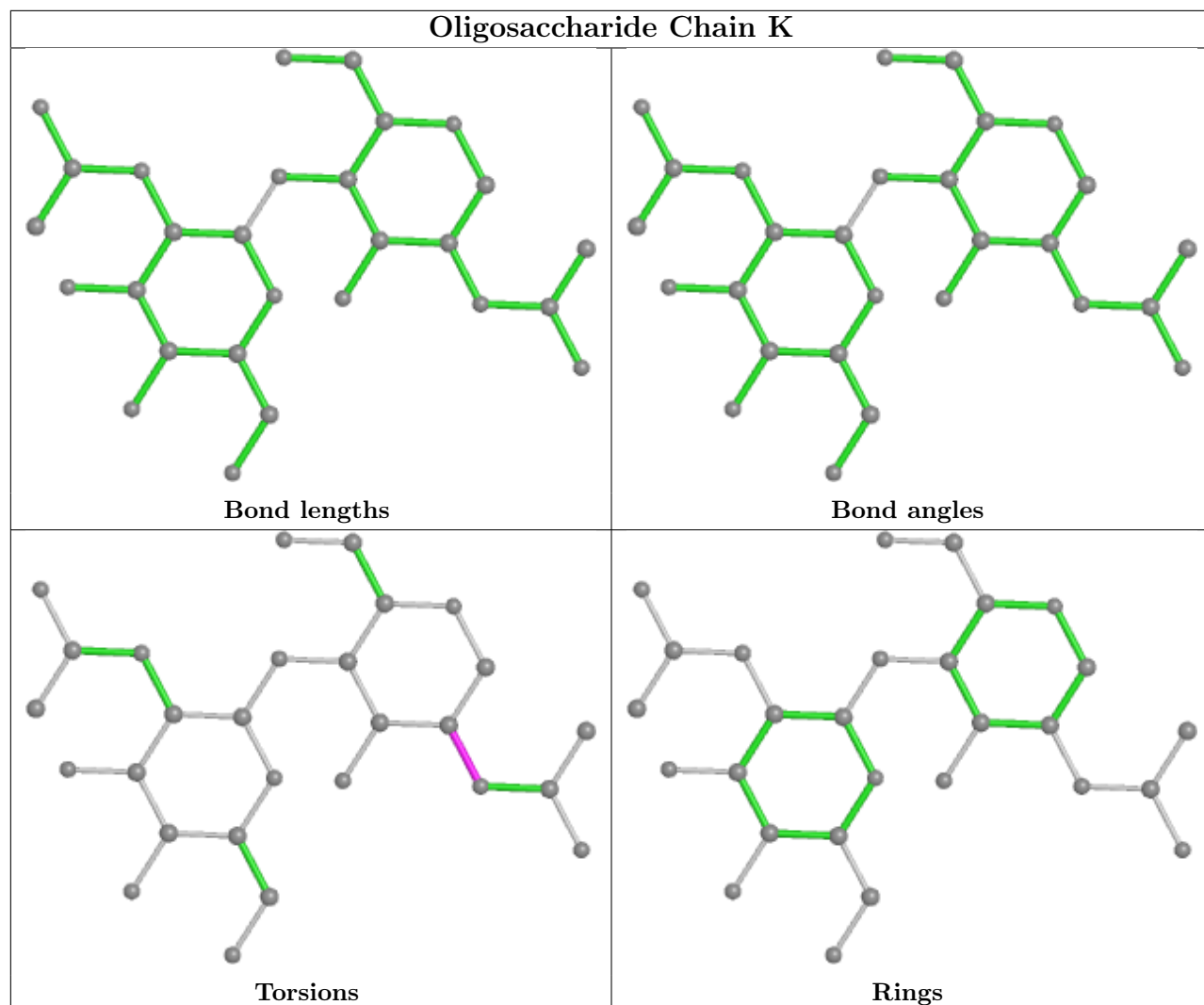
No monomer is involved in short contacts.

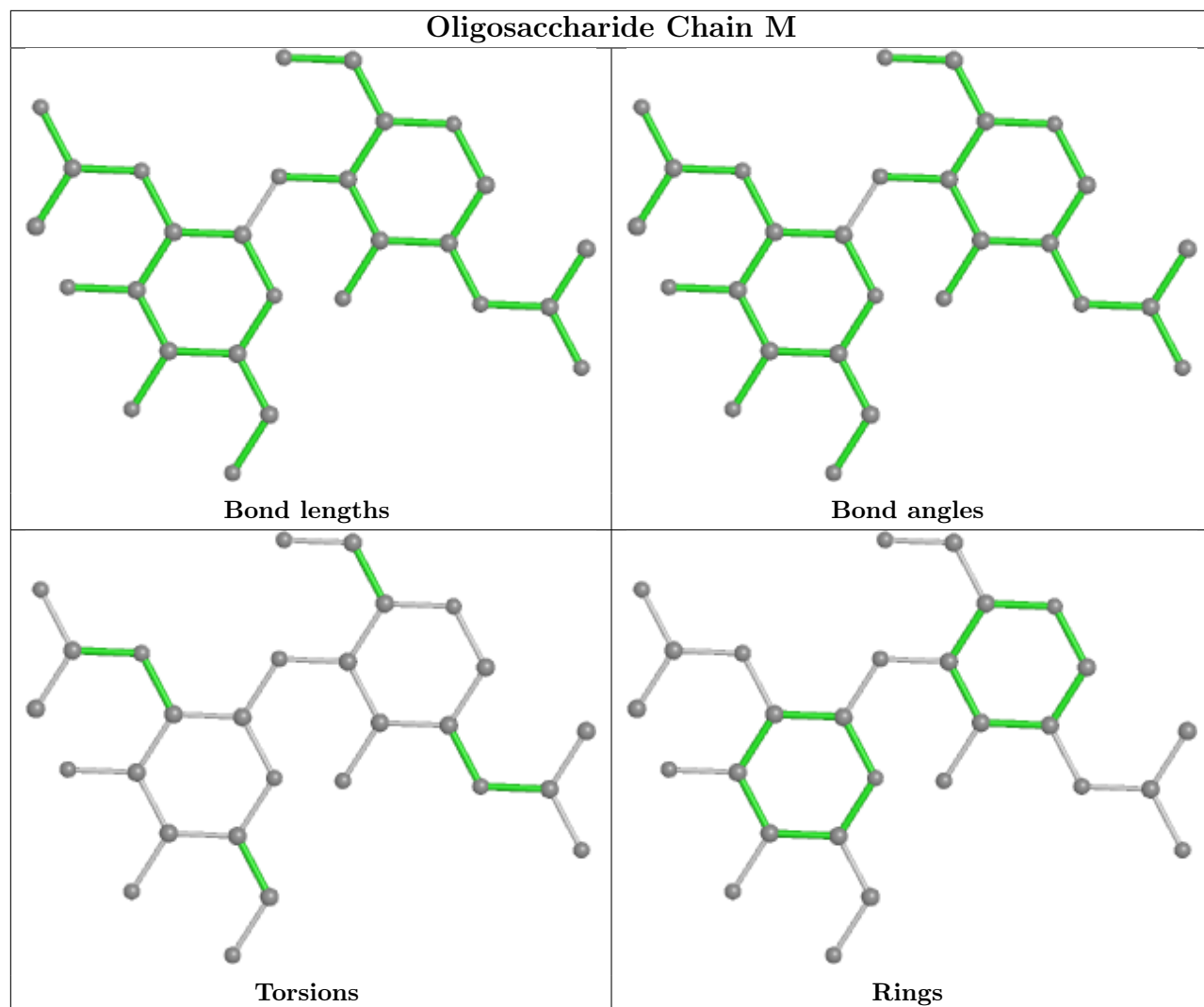
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

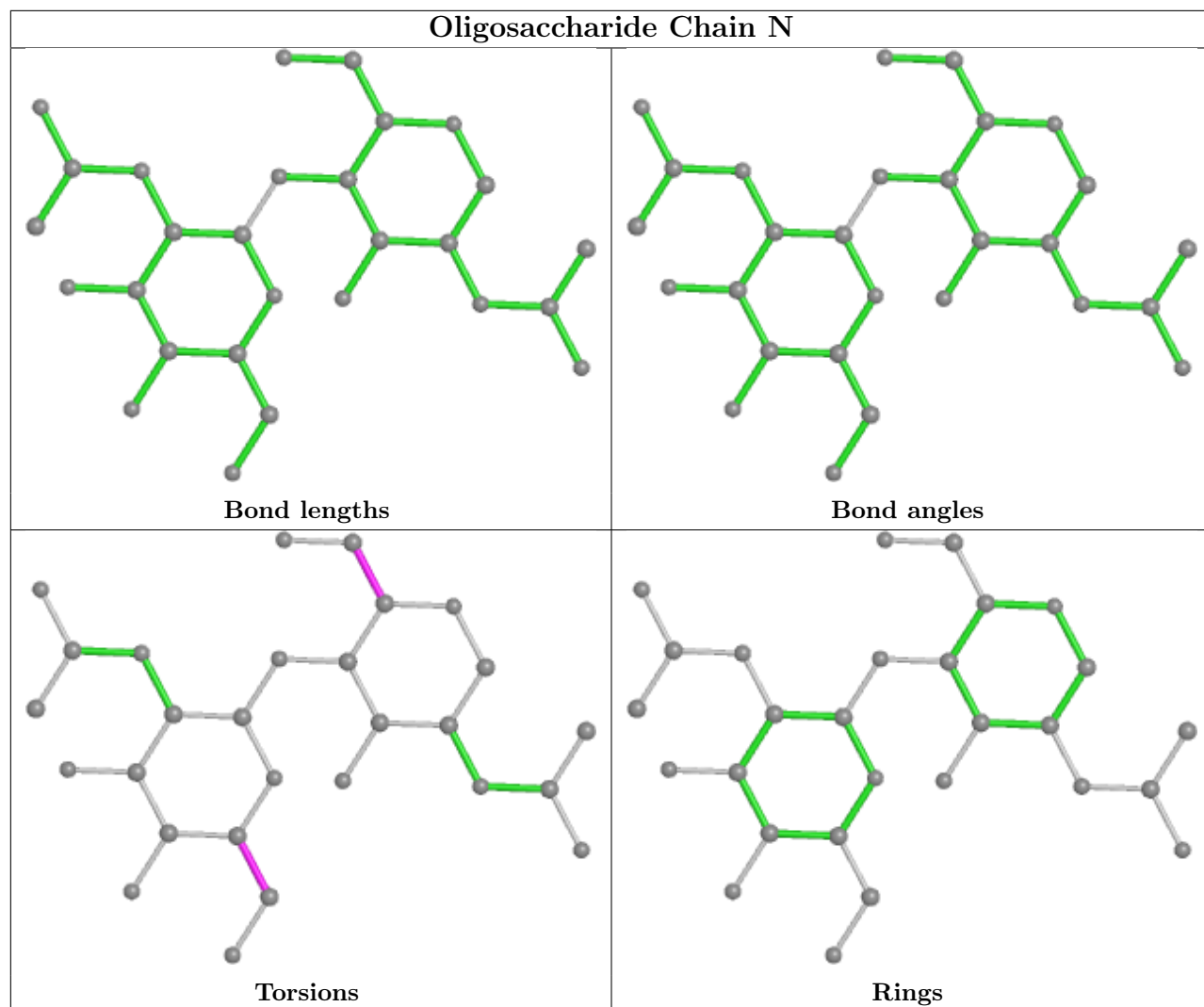


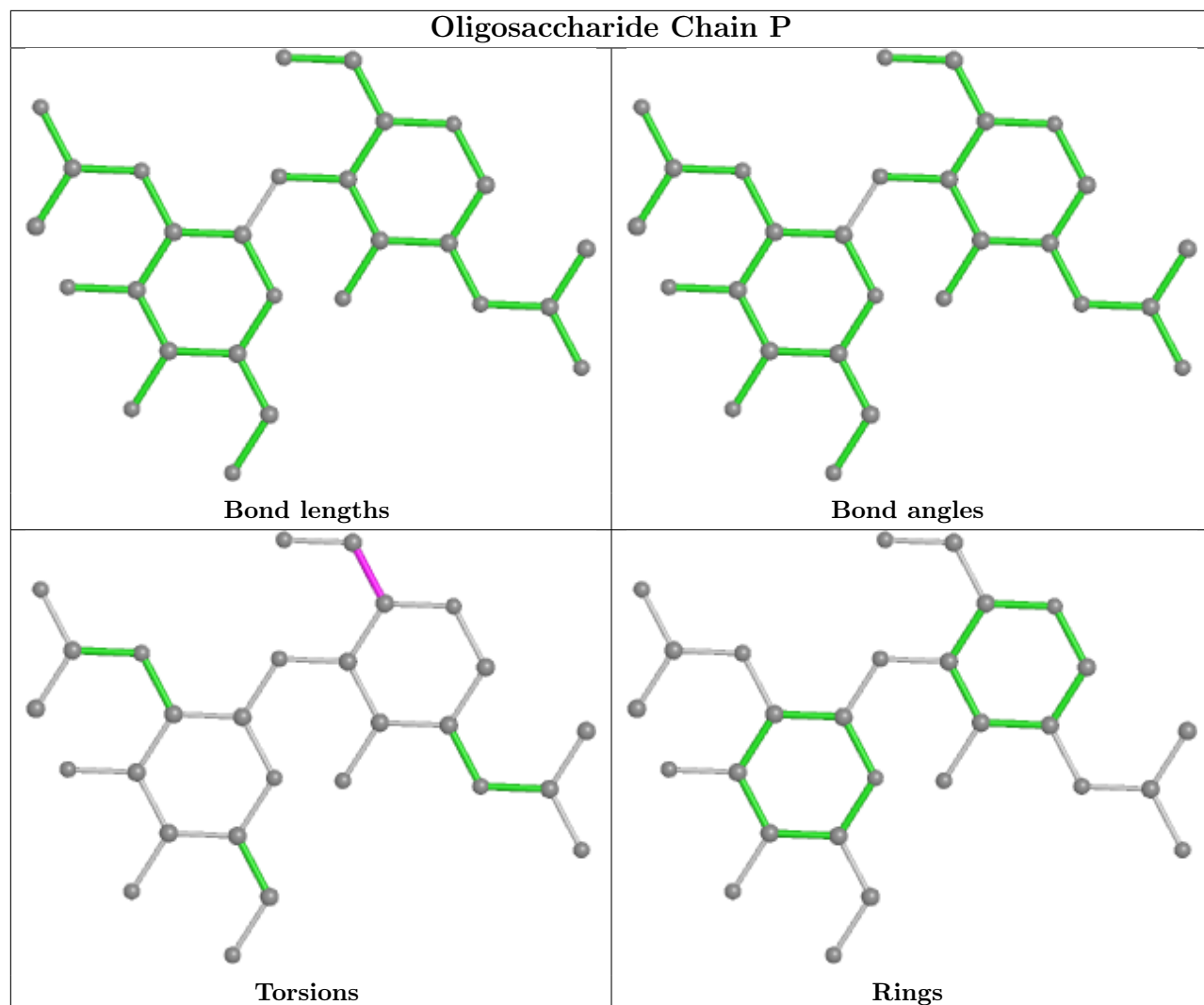


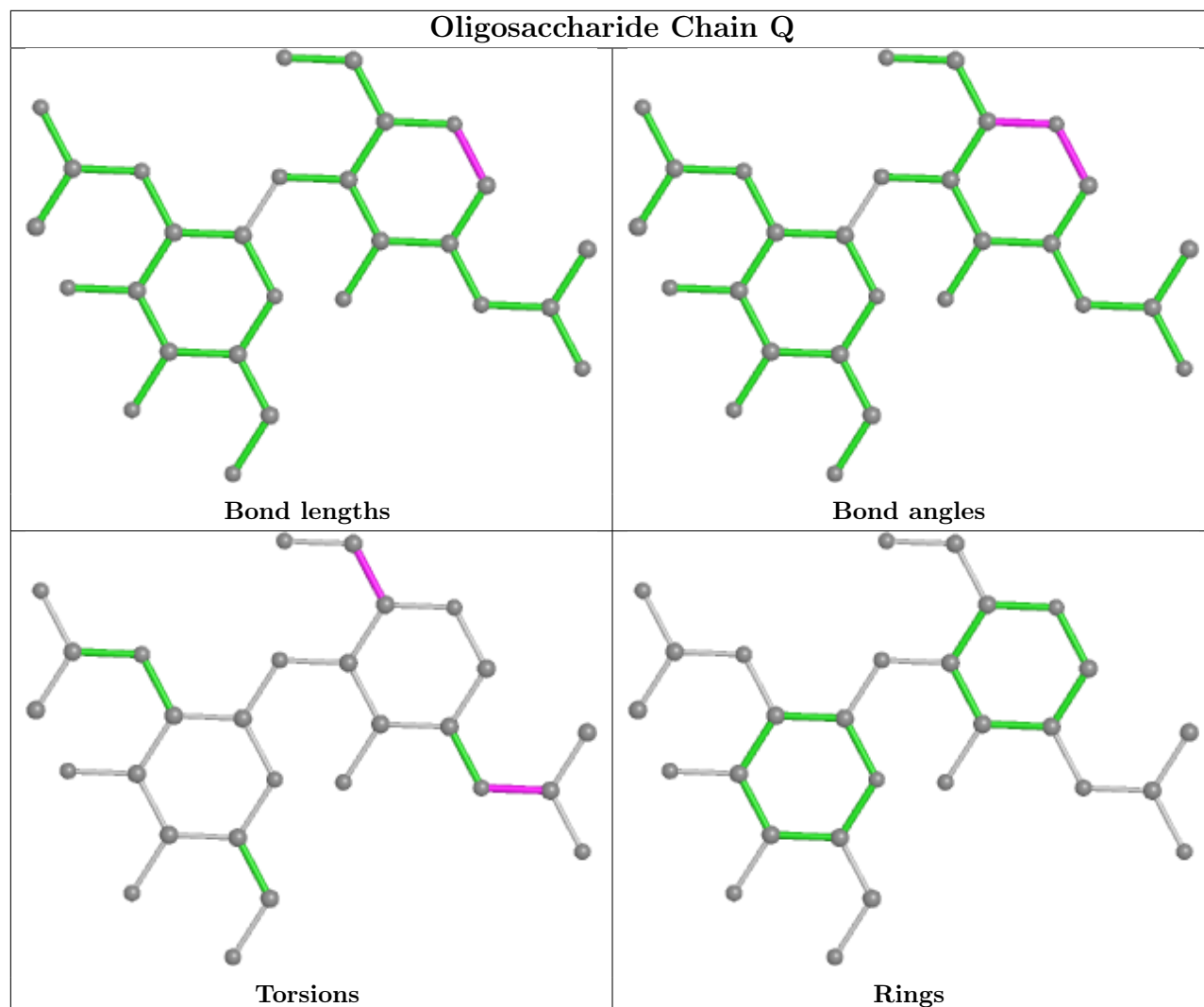


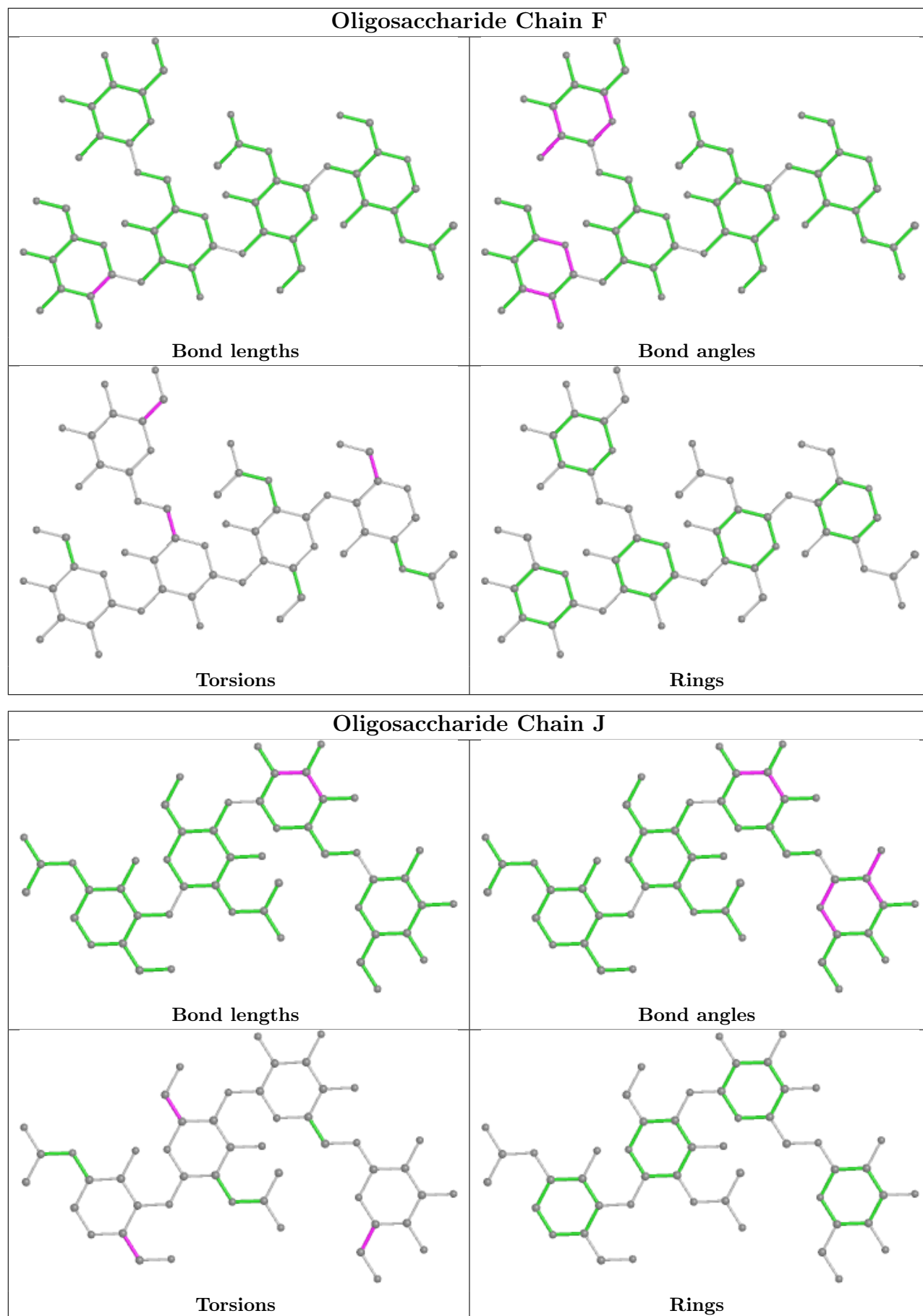


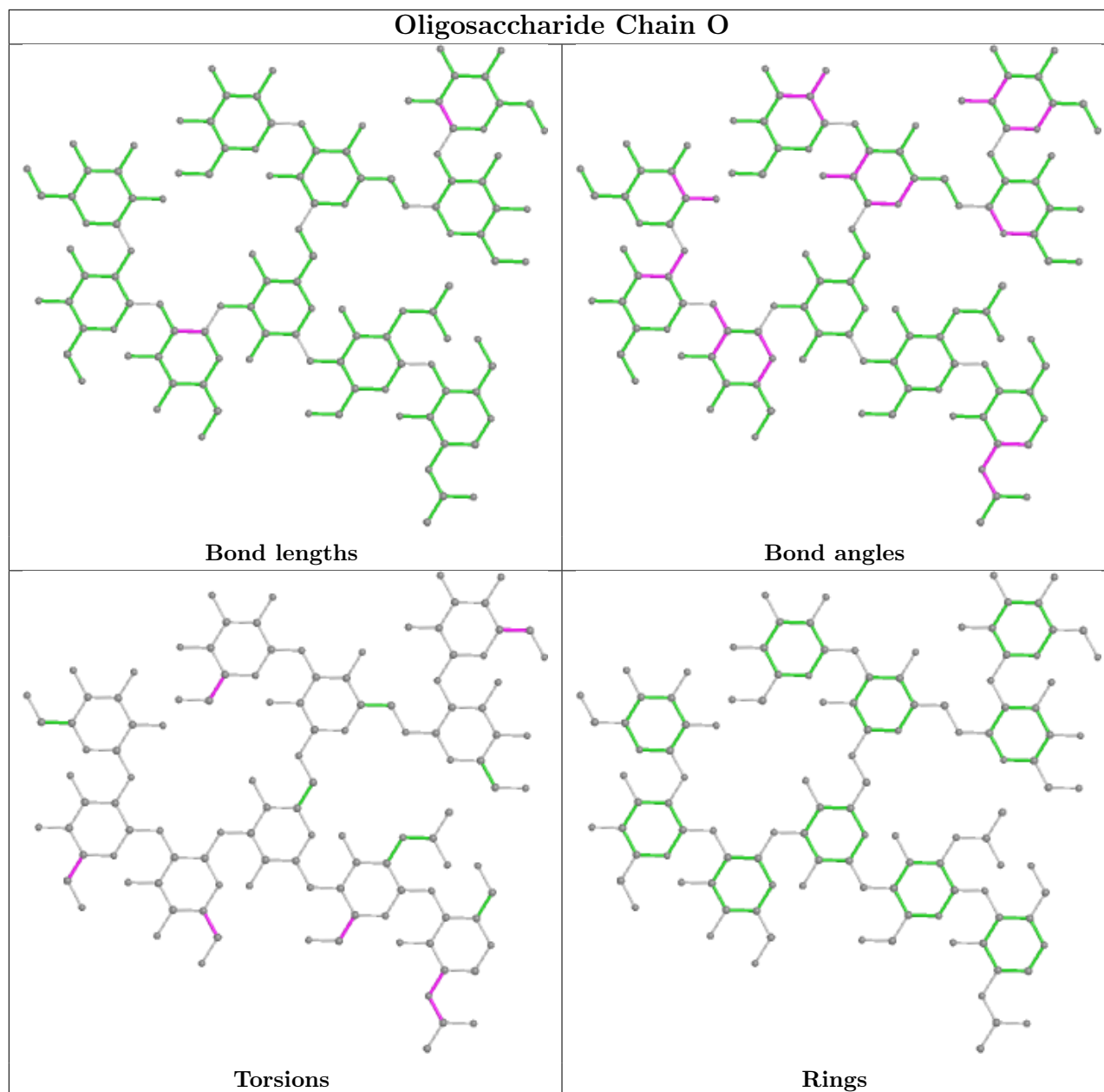












4.6 Ligand geometry [i](#)

5 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
14	NAG	B	702	1	14,14,15	0.29	0	17,19,21	0.45	0
14	NAG	G	617	4	14,14,15	0.31	0	17,19,21	0.45	0
14	NAG	B	701	1	14,14,15	0.34	0	17,19,21	0.54	0
14	NAG	G	614	4	14,14,15	0.27	0	17,19,21	0.44	0
14	NAG	G	638	4	14,14,15	0.20	0	17,19,21	0.44	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
14	NAG	B	702	1	-	1/6/23/26	0/1/1/1
14	NAG	G	617	4	-	2/6/23/26	0/1/1/1
14	NAG	B	701	1	-	0/6/23/26	0/1/1/1
14	NAG	G	614	4	-	1/6/23/26	0/1/1/1
14	NAG	G	638	4	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
14	G	617	NAG	O5-C5-C6-O6
14	G	617	NAG	C4-C5-C6-O6
14	B	702	NAG	O5-C5-C6-O6
14	G	614	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

4.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

4.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

5 Fit of model and data [i](#)

5.1 Protein, DNA and RNA chains [i](#)

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

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

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

5.3 Carbohydrates [i](#)

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

5.4 Ligands [i](#)

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

5.5 Other polymers [i](#)

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