



## Full wwPDB EM Validation Report ⓘ

Apr 2, 2025 – 02:50 am BST

PDB ID : 6QKZ / pdb\_00006qkz  
EMDB ID : EMD-4575  
Title : Full length GluA1/2-gamma8 complex  
Authors : Herguedas, B.; Garcia-Nafria, J.; Greger, I.G.  
Deposited on : 2019-01-30  
Resolution : 6.30 Å(reported)  
Based on initial models : 3SAJ, 6QKC, 3H5V

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>  
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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev117  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.42

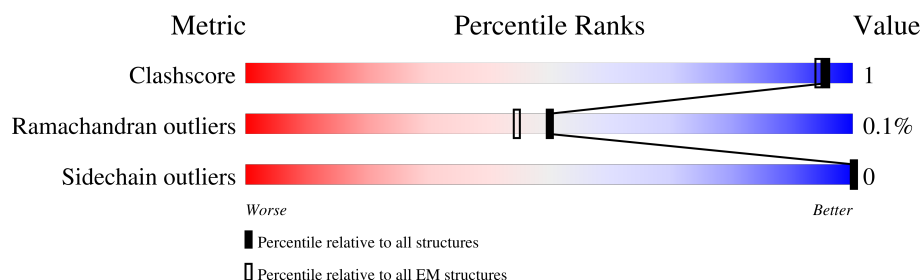
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 6.30 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.



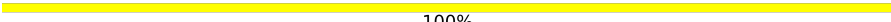
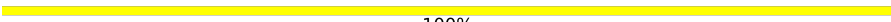
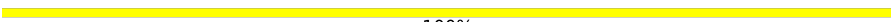
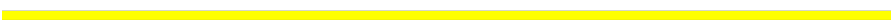

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	897	84% 15%
1	C	897	84% 15%
2	B	839	92% 8%
2	D	839	91% 8%
3	I	423	38% 62%
3	J	423	38% 62%
4	E	3	100%
4	K	3	100%
5	F	2	100%

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Mol	Chain	Length	Quality of chain
5	G	2	 100%
5	H	2	 100%
5	L	2	 100%
5	M	2	 100%
5	N	2	 100%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 13949 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 GluA1.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	A	759	Total	C	N	O	0	0
			3052	1526	763	763		
1	C	759	Total	C	N	O	0	0
			3052	1526	763	763		

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	ALA	-	expression tag	UNP P19490
A	-6	ASP	-	expression tag	UNP P19490
A	-5	TYR	-	expression tag	UNP P19490
A	-4	LYS	-	expression tag	UNP P19490
A	-3	ASP	-	expression tag	UNP P19490
A	-2	ASP	-	expression tag	UNP P19490
A	-1	ASP	-	expression tag	UNP P19490
A	0	ASP	-	expression tag	UNP P19490
A	1	LYS	-	expression tag	UNP P19490
C	-7	ALA	-	expression tag	UNP P19490
C	-6	ASP	-	expression tag	UNP P19490
C	-5	TYR	-	expression tag	UNP P19490
C	-4	LYS	-	expression tag	UNP P19490
C	-3	ASP	-	expression tag	UNP P19490
C	-2	ASP	-	expression tag	UNP P19490
C	-1	ASP	-	expression tag	UNP P19490
C	0	ASP	-	expression tag	UNP P19490
C	1	LYS	-	expression tag	UNP P19490

- Molecule 2 is a protein called Glutamate receptor 2.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	B	772	Total	C	N	O	0	0
			3091	1546	773	772		

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Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	772	Total	C	N	O	0	0
			3092	1546	773	773		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	586	ARG	GLN	conflict	UNP P19491
D	586	ARG	GLN	conflict	UNP P19491

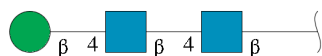
- Molecule 3 is a protein called Voltage-dependent calcium channel gamma-8 subunit.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	I	162	Total	C	N	O	0	0
			648	324	162	162		
3	J	162	Total	C	N	O	0	0
			648	324	162	162		

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	0	GLY	-	expression tag	UNP Q8VHW5
I	116	SER	ALA	conflict	UNP Q8VHW5
I	417	LEU	-	expression tag	UNP Q8VHW5
I	418	GLU	-	expression tag	UNP Q8VHW5
I	419	VAL	-	expression tag	UNP Q8VHW5
I	420	LEU	-	expression tag	UNP Q8VHW5
I	421	PHE	-	expression tag	UNP Q8VHW5
I	422	GLN	-	expression tag	UNP Q8VHW5
J	0	GLY	-	expression tag	UNP Q8VHW5
J	116	SER	ALA	conflict	UNP Q8VHW5
J	417	LEU	-	expression tag	UNP Q8VHW5
J	418	GLU	-	expression tag	UNP Q8VHW5
J	419	VAL	-	expression tag	UNP Q8VHW5
J	420	LEU	-	expression tag	UNP Q8VHW5
J	421	PHE	-	expression tag	UNP Q8VHW5
J	422	GLN	-	expression tag	UNP Q8VHW5

- Molecule 4 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.



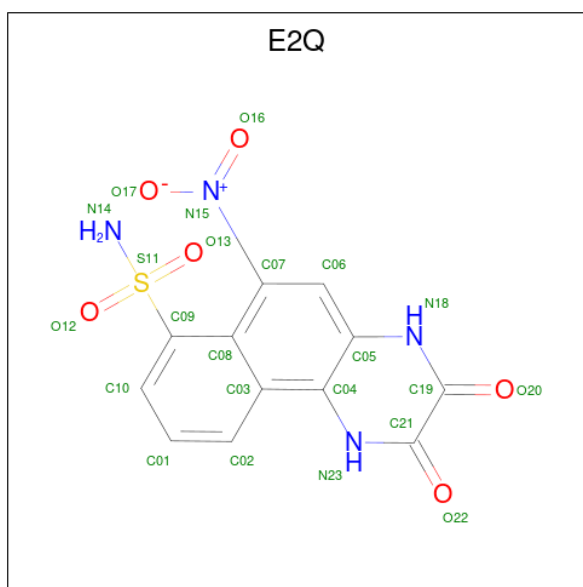
Mol	Chain	Residues	Atoms				AltConf	Trace
4	E	3	Total	C	N	O	0	0
			39	22	2	15		
4	K	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



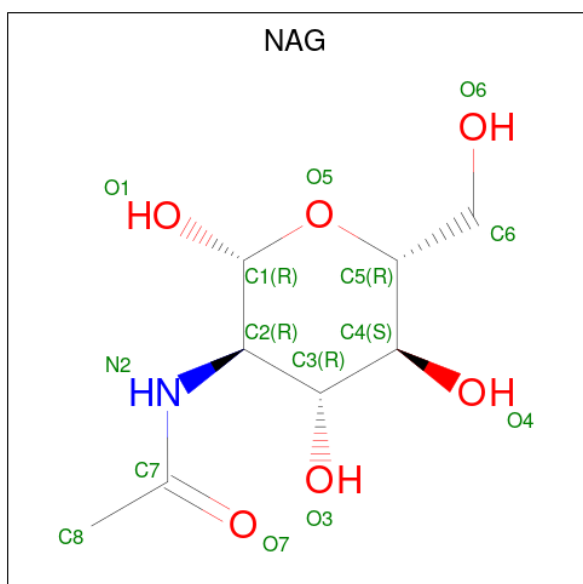
Mol	Chain	Residues	Atoms				AltConf	Trace
5	F	2	Total	C	N	O	0	0
			28	16	2	10		
5	G	2	Total	C	N	O	0	0
			28	16	2	10		
5	H	2	Total	C	N	O	0	0
			28	16	2	10		
5	L	2	Total	C	N	O	0	0
			28	16	2	10		
5	M	2	Total	C	N	O	0	0
			28	16	2	10		
5	N	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 6 is 6-nitro-2,3-bis(oxidanylidene)-1,4-dihydrobenzo[f]quinoxaline-7-sulfonamide (CCD ID: E2Q) (formula: C<sub>12</sub>H<sub>8</sub>N<sub>4</sub>O<sub>6</sub>S).



Mol	Chain	Residues	Atoms					AltConf
6	A	1	Total	C	N	O	S	0
			23	12	4	6	1	
6	B	1	Total	C	N	O	S	0
			23	12	4	6	1	
6	C	1	Total	C	N	O	S	0
			23	12	4	6	1	
6	D	1	Total	C	N	O	S	0
			23	12	4	6	1	

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula:  $C_8H_{15}NO_6$ ).



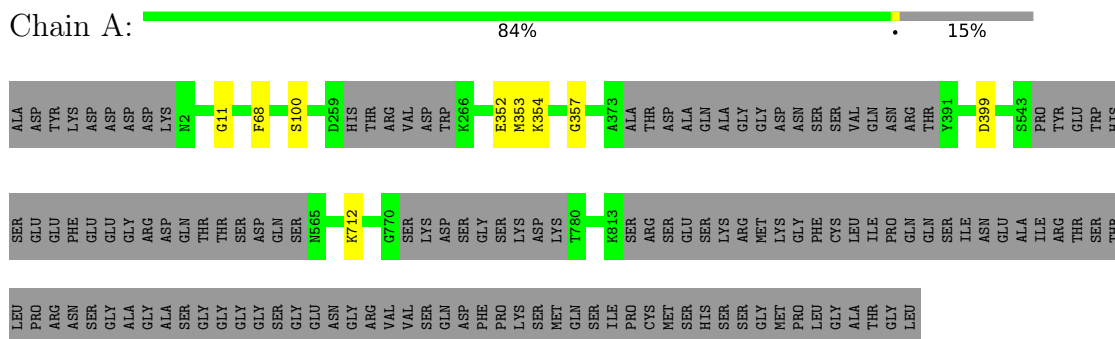
Mol	Chain	Residues	Atoms				AltConf
7	A	1	Total	C	N	O	0
			14	8	1	5	
7	C	1	Total	C	N	O	0
			14	8	1	5	



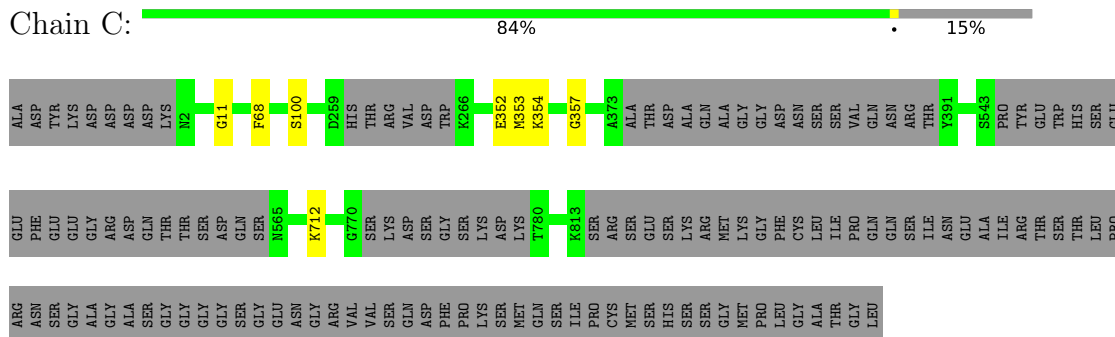
### 3 Residue-property plots

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. 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. 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.

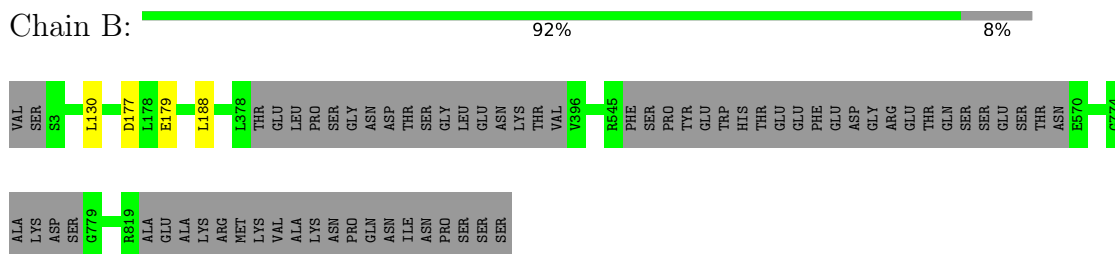
- Molecule 1: GluA1



- Molecule 1: GluA1

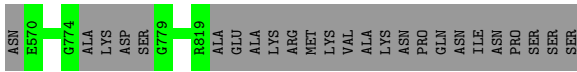


- Molecule 2: Glutamate receptor 2

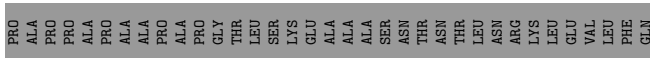


- Molecule 2: Glutamate receptor 2

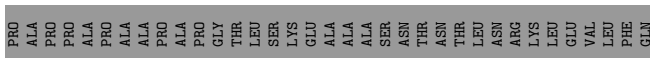




- Chain I:  38% 62%



- Chain J:  38% 62%



- Chain E:  100%



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

Chain K:  100%

MAG1  
MAG2  
EMJ3

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  100%

MAG1  
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  100%

MAG1  
MAG2

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	183881	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	32	Depositor
Minimum defocus (nm)	-200	Depositor
Maximum defocus (nm)	-900	Depositor
Magnification	105000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

## 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, E2Q, BMA

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	0.38	0/3047	0.57	1/3804 (0.0%)
1	C	0.38	0/3047	0.57	1/3804 (0.0%)
2	B	0.33	0/3087	0.51	0/3852
2	D	0.33	0/3088	0.51	0/3854
3	I	0.32	0/644	0.49	0/798
3	J	0.32	0/644	0.49	0/798
All	All	0.36	0/13557	0.53	2/16910 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	100	SER	N-CA-C	-5.31	96.66	111.00
1	A	100	SER	N-CA-C	-5.30	96.69	111.00

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	A	3052	0	856	4	0
1	C	3052	0	856	4	0
2	B	3091	0	877	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	3092	0	878	3	0
3	I	648	0	191	0	0
3	J	648	0	191	0	0
4	E	39	0	34	0	0
4	K	39	0	34	0	0
5	F	28	0	25	0	0
5	G	28	0	25	0	0
5	H	28	0	25	0	0
5	L	28	0	25	0	0
5	M	28	0	25	0	0
5	N	28	0	25	0	0
6	A	23	0	0	1	0
6	B	23	0	0	1	0
6	C	23	0	0	1	0
6	D	23	0	0	1	0
7	A	14	0	13	0	0
7	C	14	0	13	0	0
All	All	13949	0	4093	17	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 1.

All (17) 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)
2:B:130:LEU:O	2:B:188:LEU:O	2.20	0.60
1:A:11:GLY:HA2	1:A:68:PHE:O	2.02	0.60
2:D:130:LEU:O	2:D:188:LEU:O	2.20	0.60
1:C:11:GLY:HA2	1:C:68:PHE:O	2.02	0.60
1:A:353:MET:CA	1:A:357:GLY:O	2.59	0.51
1:A:352:GLU:O	1:A:357:GLY:O	2.30	0.50
1:C:353:MET:CA	1:C:357:GLY:O	2.59	0.49
1:C:352:GLU:O	1:C:357:GLY:O	2.30	0.49
1:A:354:LYS:O	1:A:357:GLY:N	2.49	0.46
1:C:354:LYS:O	1:C:357:GLY:N	2.49	0.45
6:B:901:E2Q:O17	6:B:901:E2Q:O13	2.35	0.45
6:A:901:E2Q:O13	6:A:901:E2Q:O17	2.35	0.44
6:C:901:E2Q:O17	6:C:901:E2Q:O13	2.35	0.44
6:D:901:E2Q:O13	6:D:901:E2Q:O17	2.35	0.44
2:B:177:ASP:C	2:B:179:GLU:N	2.71	0.43
2:D:177:ASP:C	2:D:179:GLU:N	2.71	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:308:ASP:C	2:D:310:LEU:H	2.25	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 PDB entries followed by that with respect to all EM entries.

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	749/897 (84%)	691 (92%)	56 (8%)	2 (0%)	37	72
1	C	749/897 (84%)	695 (93%)	53 (7%)	1 (0%)	48	83
2	B	764/839 (91%)	719 (94%)	45 (6%)	0	100	100
2	D	764/839 (91%)	720 (94%)	44 (6%)	0	100	100
3	I	154/423 (36%)	142 (92%)	11 (7%)	1 (1%)	22	60
3	J	154/423 (36%)	141 (92%)	12 (8%)	1 (1%)	22	60
All	All	3334/4318 (77%)	3108 (93%)	221 (7%)	5 (0%)	50	83

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	399	ASP
3	I	155	ASN
3	J	155	ASN
1	A	712	LYS
1	C	712	LYS

### 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 PDB entries followed by that with respect to all EM entries.



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	4/765 (0%)	4 (100%)	0	100	100
1	C	4/765 (0%)	4 (100%)	0	100	100
2	D	1/718 (0%)	1 (100%)	0	100	100
All	All	9/2248 (0%)	9 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 ⓘ

18 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
4	NAG	E	1	4,1	14,14,15	0.68	0	17,19,21	1.99	4 (23%)
4	NAG	E	2	4	14,14,15	0.70	0	17,19,21	1.65	7 (41%)
4	BMA	E	3	4	11,11,12	0.59	0	15,15,17	1.64	2 (13%)
5	NAG	F	1	5,1	14,14,15	1.54	1 (7%)	17,19,21	1.27	1 (5%)
5	NAG	F	2	5	14,14,15	0.79	0	17,19,21	2.00	4 (23%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	G	1	5,1	14,14,15	1.50	1 (7%)	17,19,21	1.26	2 (11%)
5	NAG	G	2	5	14,14,15	0.62	0	17,19,21	1.14	2 (11%)
5	NAG	H	1	5,2	14,14,15	0.47	0	17,19,21	1.75	3 (17%)
5	NAG	H	2	5	14,14,15	0.42	0	17,19,21	1.36	2 (11%)
4	NAG	K	1	4,1	14,14,15	0.68	0	17,19,21	1.99	4 (23%)
4	NAG	K	2	4	14,14,15	0.70	0	17,19,21	1.65	6 (35%)
4	BMA	K	3	4	11,11,12	0.59	0	15,15,17	1.64	2 (13%)
5	NAG	L	1	5,1	14,14,15	1.54	1 (7%)	17,19,21	1.27	1 (5%)
5	NAG	L	2	5	14,14,15	0.78	0	17,19,21	2.01	4 (23%)
5	NAG	M	1	5,1	14,14,15	1.50	1 (7%)	17,19,21	1.25	2 (11%)
5	NAG	M	2	5	14,14,15	0.60	0	17,19,21	1.13	2 (11%)
5	NAG	N	1	5,2	14,14,15	0.49	0	17,19,21	1.75	3 (17%)
5	NAG	N	2	5	14,14,15	0.43	0	17,19,21	1.36	2 (11%)

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	NAG	E	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	0/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
5	NAG	F	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	F	2	5	-	0/6/23/26	0/1/1/1
5	NAG	G	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	G	2	5	-	0/6/23/26	0/1/1/1
5	NAG	H	1	5,2	-	0/6/23/26	0/1/1/1
5	NAG	H	2	5	-	4/6/23/26	0/1/1/1
4	NAG	K	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	K	2	4	-	0/6/23/26	0/1/1/1
4	BMA	K	3	4	-	0/2/19/22	0/1/1/1
5	NAG	L	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	L	2	5	-	0/6/23/26	0/1/1/1
5	NAG	M	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	M	2	5	-	0/6/23/26	0/1/1/1
5	NAG	N	1	5,2	-	0/6/23/26	0/1/1/1
5	NAG	N	2	5	-	4/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	F	1	NAG	O5-C1	-5.51	1.34	1.43
5	L	1	NAG	O5-C1	-5.51	1.34	1.43
5	G	1	NAG	O5-C1	-5.35	1.35	1.43
5	M	1	NAG	O5-C1	-5.35	1.35	1.43

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	N	1	NAG	C1-O5-C5	5.04	119.02	112.19
5	H	1	NAG	C1-O5-C5	5.01	118.98	112.19
4	E	1	NAG	O4-C4-C5	-4.39	98.41	109.30
4	K	1	NAG	O4-C4-C5	-4.38	98.41	109.30
5	F	2	NAG	C2-N2-C7	4.38	129.14	122.90
5	L	2	NAG	C4-C3-C2	4.34	117.39	111.02
5	L	2	NAG	C2-N2-C7	4.32	129.05	122.90
5	F	2	NAG	C4-C3-C2	4.30	117.32	111.02
5	H	2	NAG	C1-O5-C5	4.24	117.94	112.19
5	N	2	NAG	C1-O5-C5	4.24	117.94	112.19
4	E	1	NAG	O5-C1-C2	-4.05	104.89	111.29
4	K	1	NAG	O5-C1-C2	-4.02	104.94	111.29
4	E	1	NAG	C6-C5-C4	-3.71	104.32	113.00
4	K	1	NAG	C6-C5-C4	-3.70	104.33	113.00
4	E	1	NAG	C1-O5-C5	3.34	116.72	112.19
4	K	1	NAG	C1-O5-C5	3.33	116.70	112.19
5	L	1	NAG	O5-C1-C2	-3.32	106.05	111.29
5	F	1	NAG	O5-C1-C2	-3.30	106.08	111.29
5	H	1	NAG	C4-C3-C2	-3.27	106.22	111.02
5	N	1	NAG	C4-C3-C2	-3.25	106.25	111.02
4	K	2	NAG	O5-C5-C4	-3.22	102.99	110.83
4	E	2	NAG	O5-C5-C4	-3.21	103.01	110.83
4	K	3	BMA	O5-C5-C4	-3.21	103.03	110.83
4	E	3	BMA	O5-C5-C4	-3.19	103.06	110.83
5	L	2	NAG	O7-C7-N2	3.05	127.56	121.95
5	F	2	NAG	O7-C7-N2	3.01	127.49	121.95
4	E	3	BMA	O2-C2-C1	-2.82	103.39	109.15
4	K	3	BMA	O2-C2-C1	-2.82	103.39	109.15
5	N	2	NAG	O5-C5-C6	2.73	111.48	107.20
5	G	2	NAG	O5-C5-C6	2.72	111.47	107.20
5	H	2	NAG	O5-C5-C6	2.71	111.45	107.20
5	M	2	NAG	O5-C5-C6	2.70	111.44	107.20
5	N	1	NAG	C2-N2-C7	-2.68	119.09	122.90
5	H	1	NAG	C2-N2-C7	-2.68	119.09	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	M	1	NAG	C1-O5-C5	-2.28	109.10	112.19
5	G	1	NAG	C1-O5-C5	-2.25	109.14	112.19
4	E	2	NAG	O4-C4-C3	-2.17	105.32	110.35
4	K	2	NAG	O4-C4-C3	-2.17	105.32	110.35
5	G	1	NAG	O5-C1-C2	-2.16	107.87	111.29
5	M	1	NAG	O5-C1-C2	-2.16	107.87	111.29
5	L	2	NAG	C8-C7-N2	-2.13	112.49	116.10
4	E	2	NAG	O4-C4-C5	-2.12	104.04	109.30
4	K	2	NAG	O4-C4-C5	-2.12	104.04	109.30
4	E	2	NAG	O3-C3-C4	-2.09	105.52	110.35
4	K	2	NAG	O3-C3-C2	2.08	113.78	109.47
5	G	2	NAG	C2-N2-C7	2.08	125.87	122.90
5	F	2	NAG	C8-C7-N2	-2.08	112.58	116.10
4	K	2	NAG	O3-C3-C4	-2.07	105.56	110.35
4	E	2	NAG	O3-C3-C2	2.07	113.75	109.47
5	M	2	NAG	C2-N2-C7	2.06	125.84	122.90
4	E	2	NAG	C8-C7-N2	2.05	119.58	116.10
4	K	2	NAG	C8-C7-N2	2.04	119.56	116.10
4	E	2	NAG	O7-C7-C8	-2.02	118.30	122.06

There are no chirality outliers.

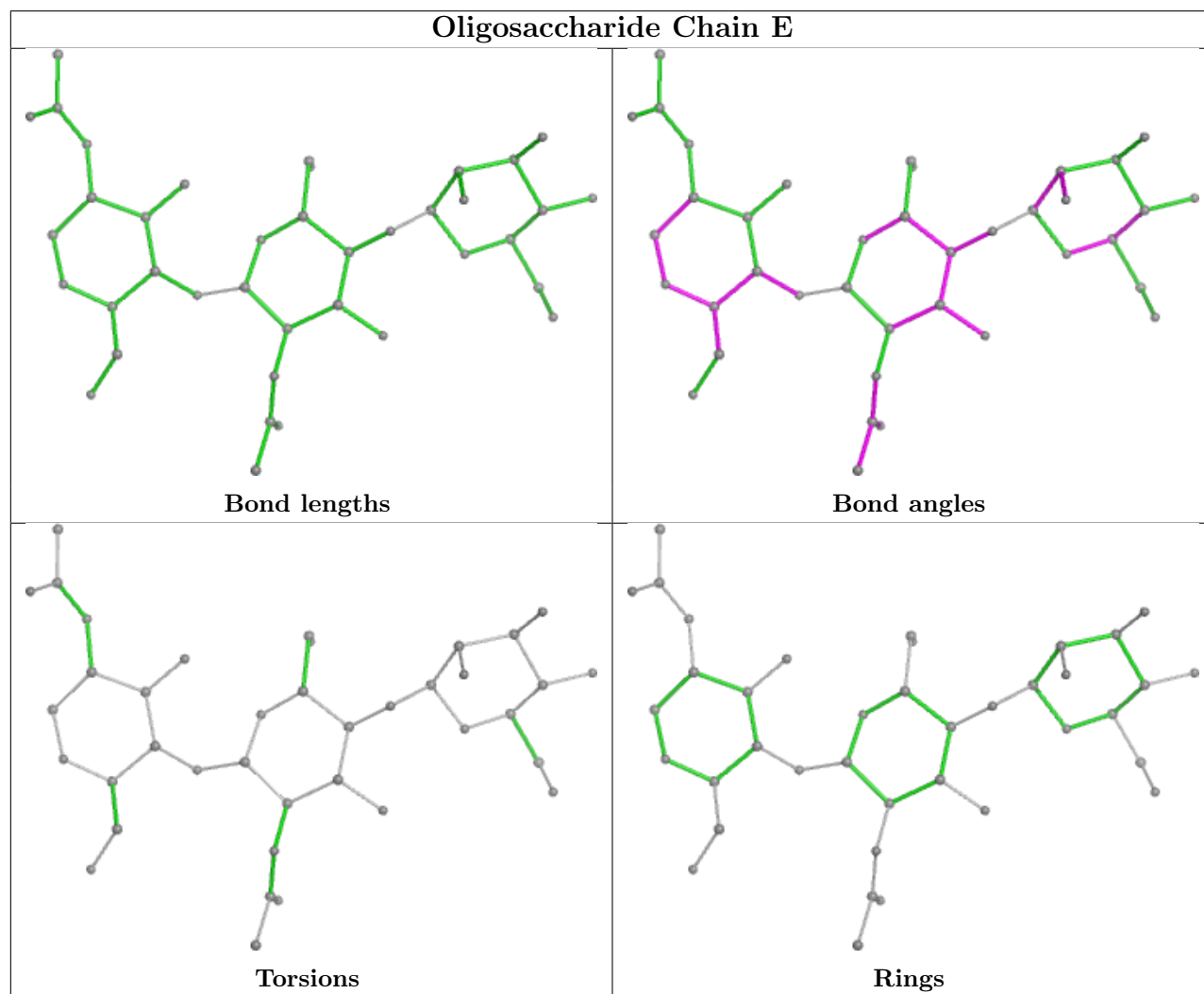
All (16) torsion outliers are listed below:

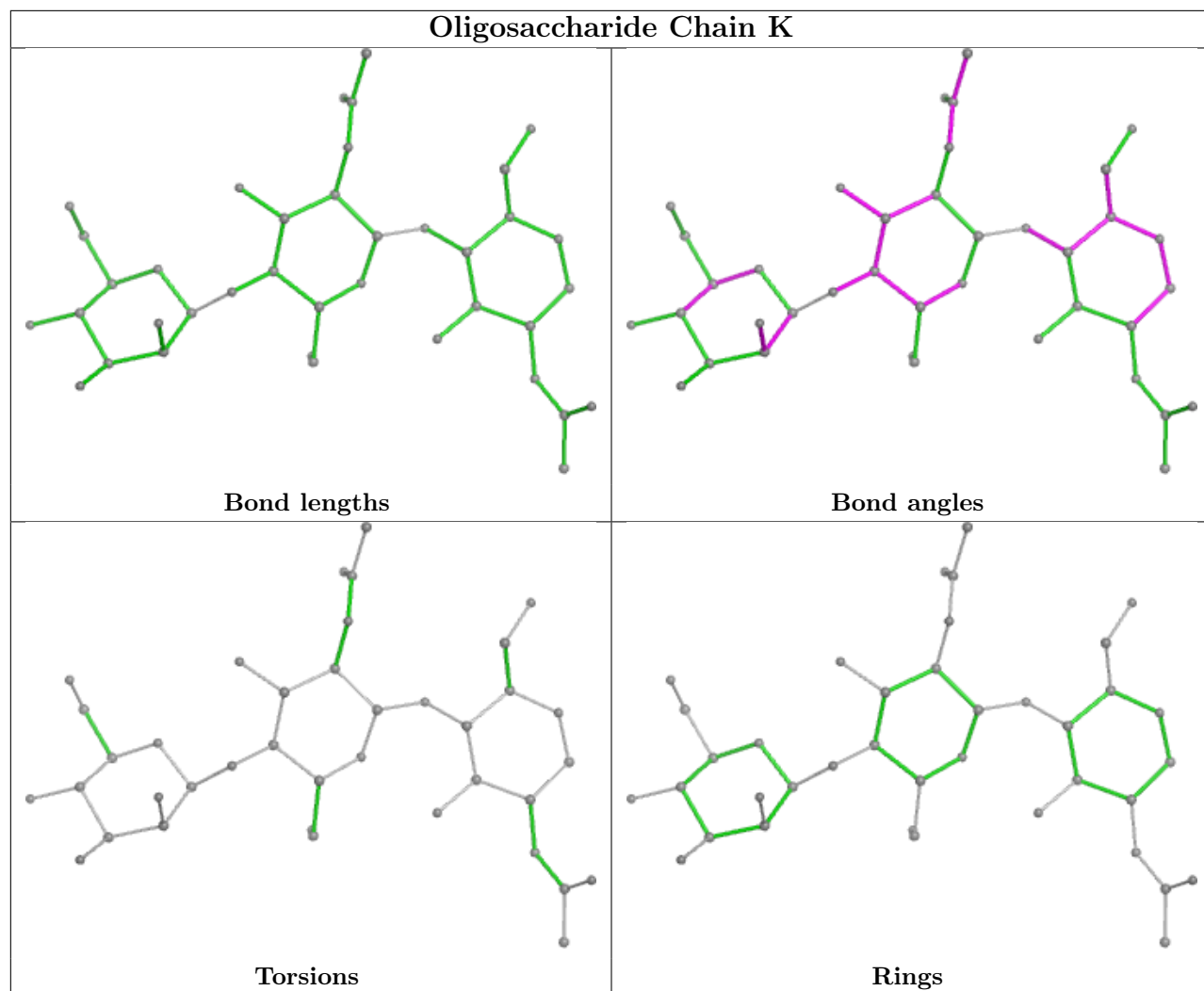
Mol	Chain	Res	Type	Atoms
5	F	1	NAG	C4-C5-C6-O6
5	L	1	NAG	C4-C5-C6-O6
5	G	1	NAG	O5-C5-C6-O6
5	H	2	NAG	O5-C5-C6-O6
5	M	1	NAG	O5-C5-C6-O6
5	N	2	NAG	O5-C5-C6-O6
5	H	2	NAG	C4-C5-C6-O6
5	N	2	NAG	C4-C5-C6-O6
5	F	1	NAG	O5-C5-C6-O6
5	L	1	NAG	O5-C5-C6-O6
5	G	1	NAG	C4-C5-C6-O6
5	M	1	NAG	C4-C5-C6-O6
5	H	2	NAG	C8-C7-N2-C2
5	N	2	NAG	C8-C7-N2-C2
5	H	2	NAG	O7-C7-N2-C2
5	N	2	NAG	O7-C7-N2-C2

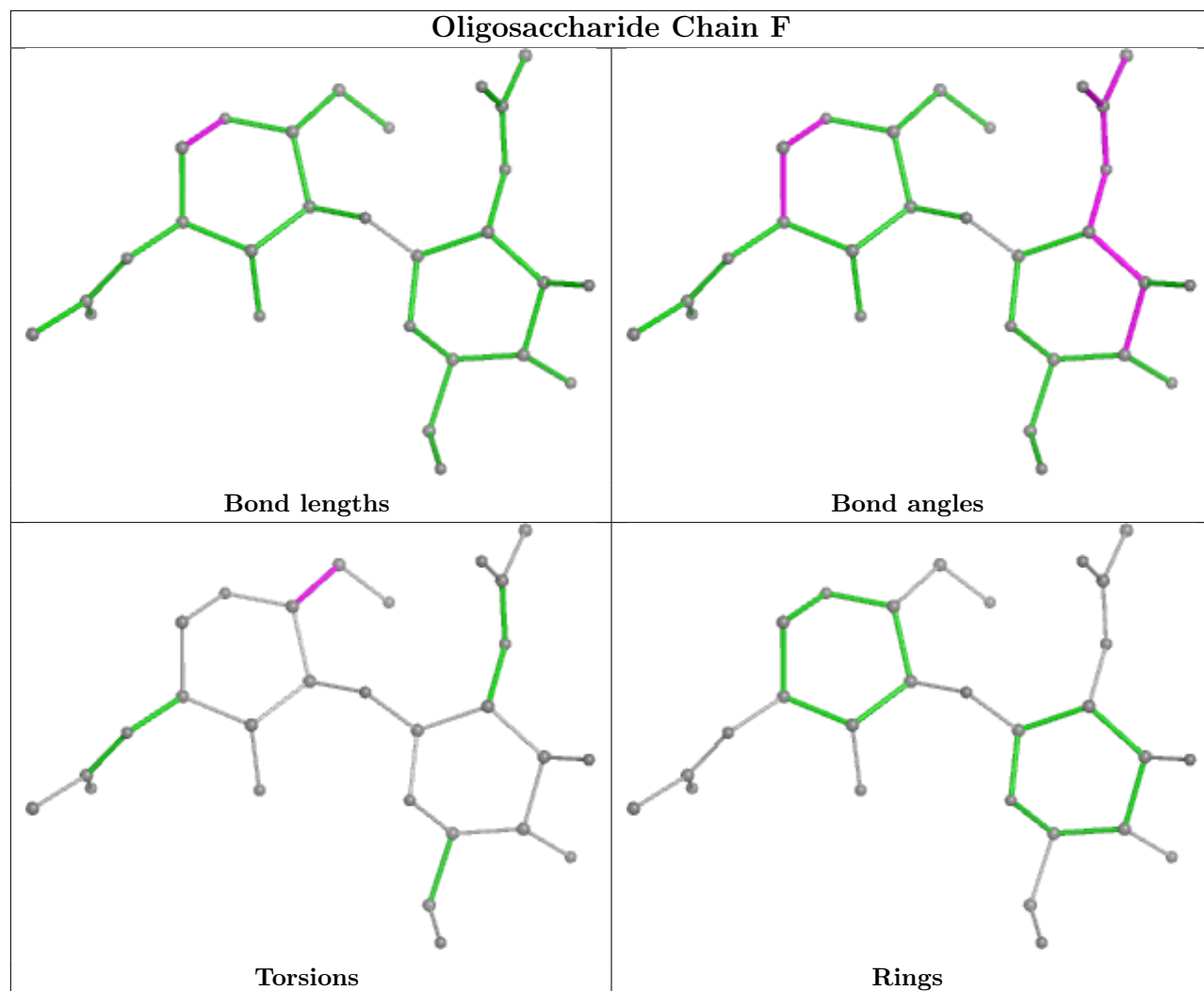
There are no ring outliers.

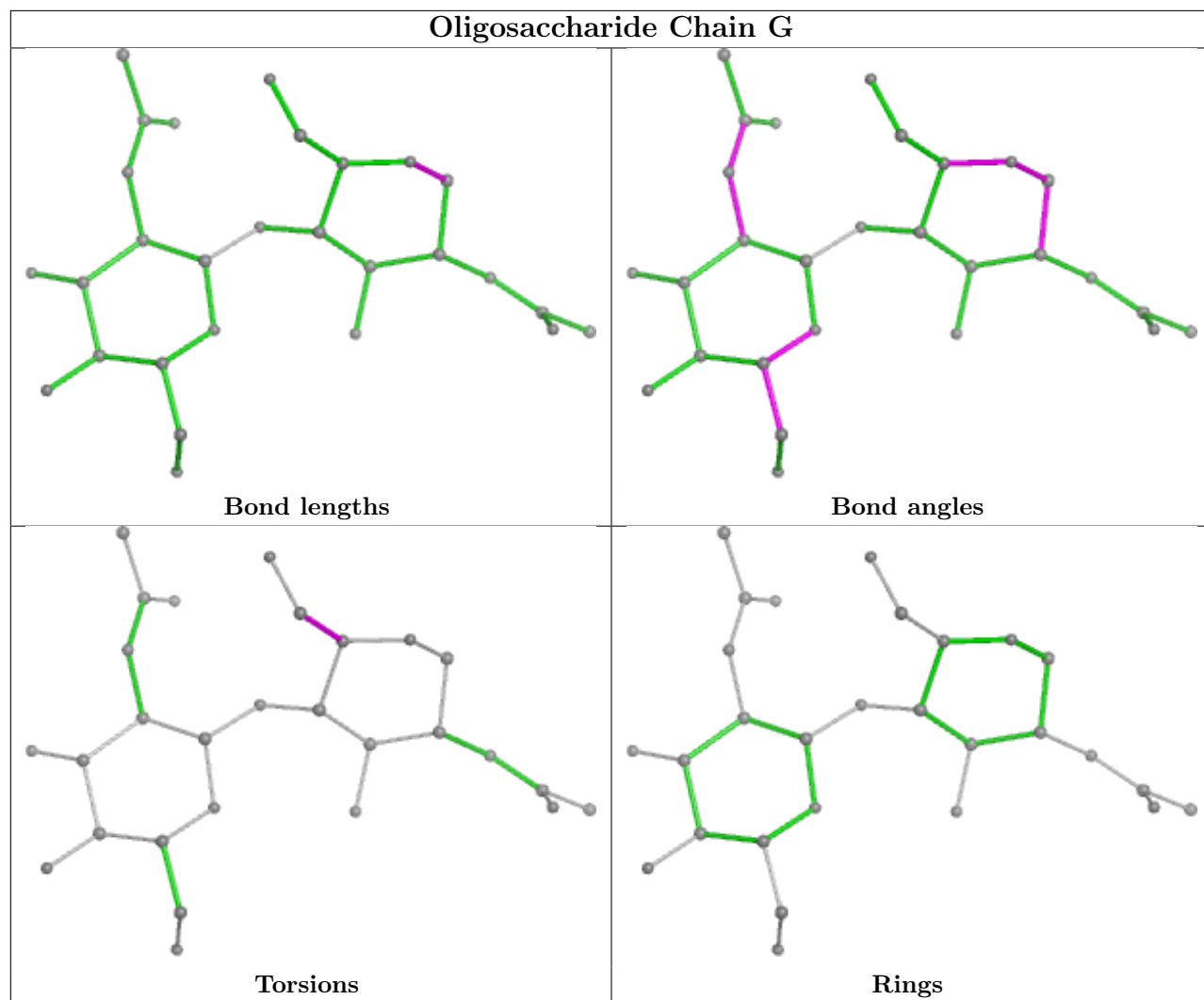
No monomer is involved in short contacts.

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



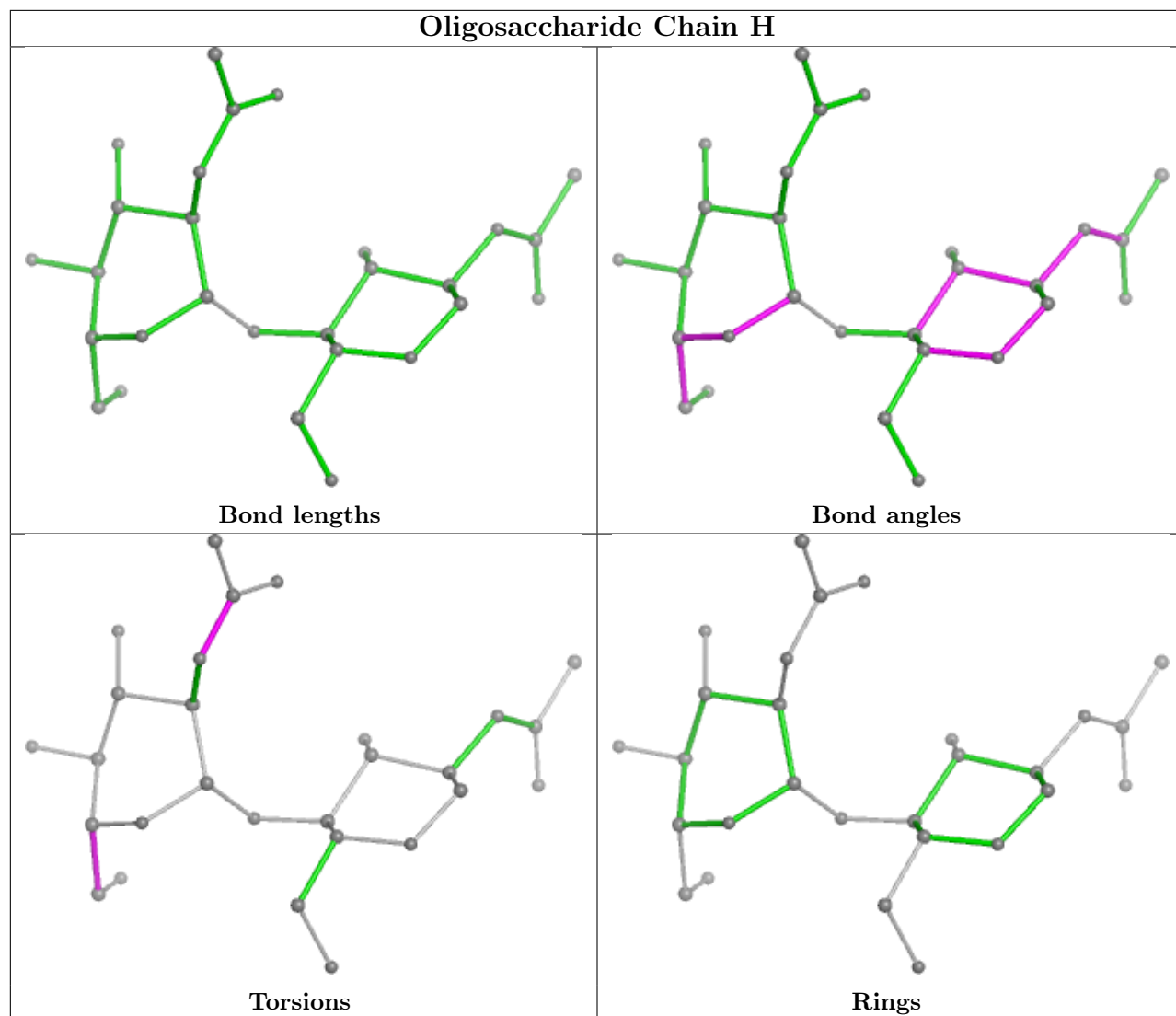


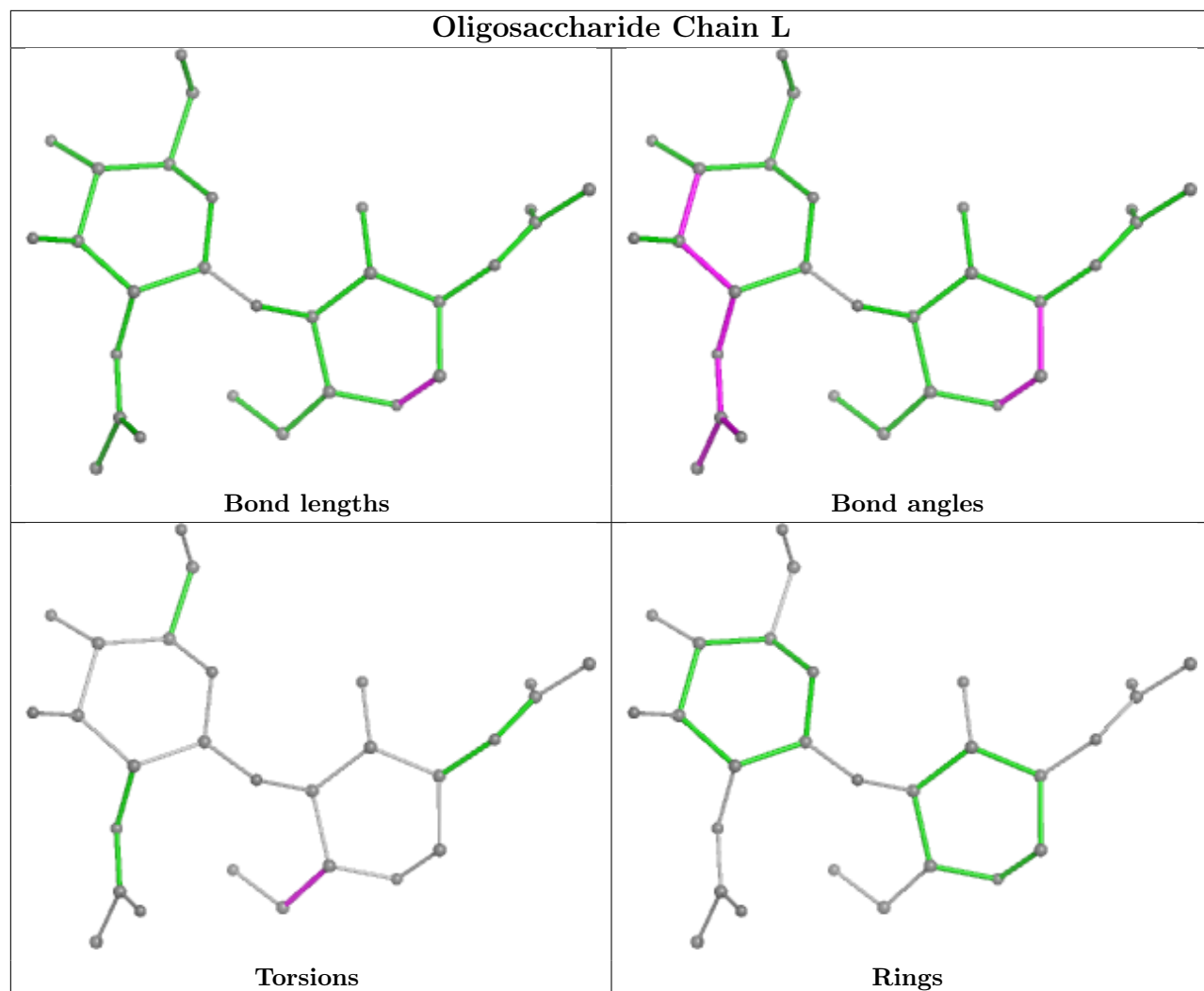




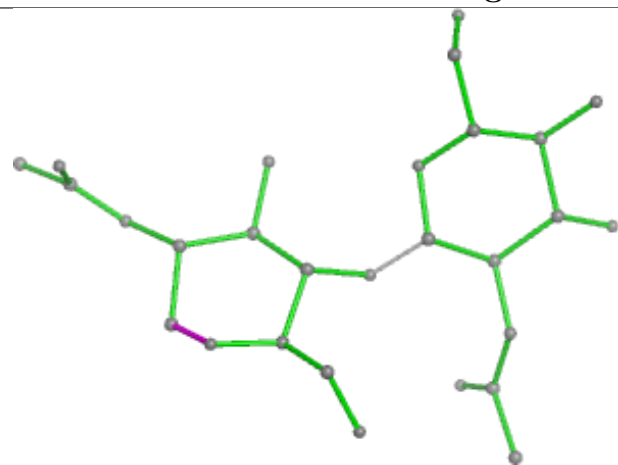


## Oligosaccharide Chain H

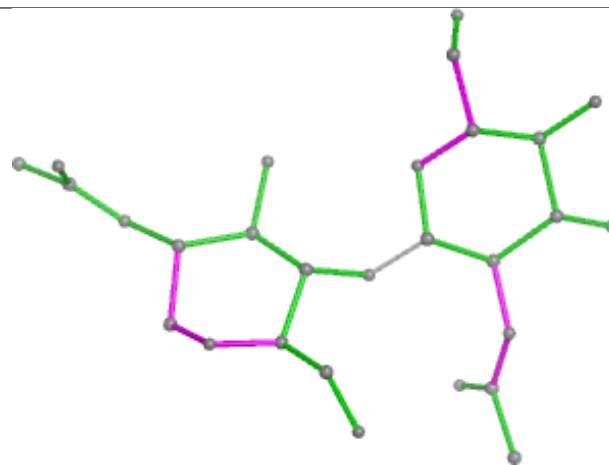




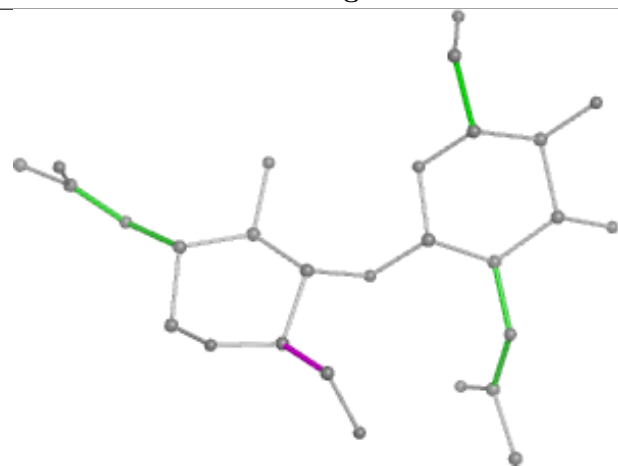
## Oligosaccharide Chain M



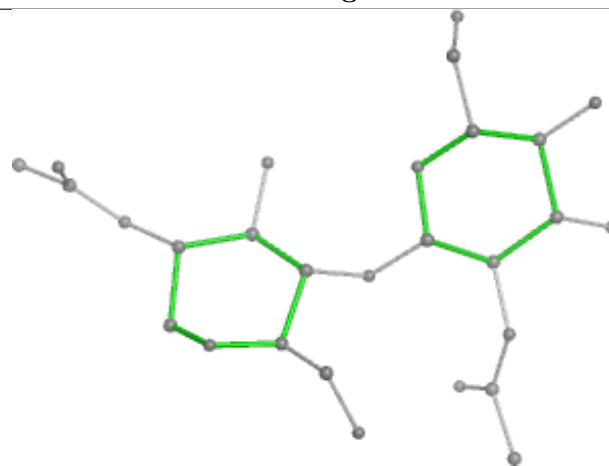
Bond lengths



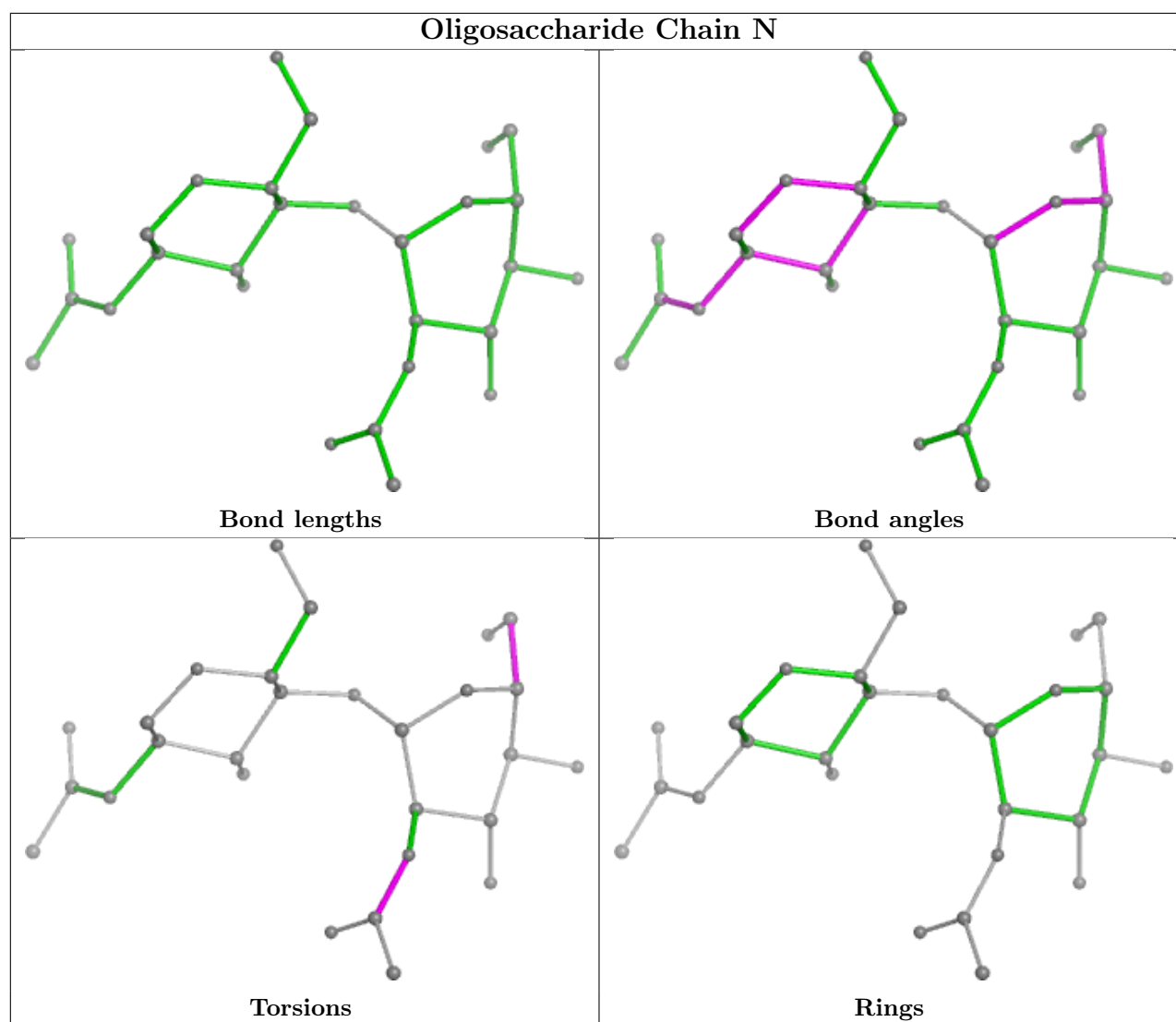
Bond angles



Torsions



Rings



## 5.6 Ligand geometry [i](#)

6 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
6	E2Q	D	901	-	24,25,25	3.47	8 (33%)	32,39,39	2.21	11 (34%)
6	E2Q	C	901	-	24,25,25	3.47	8 (33%)	32,39,39	2.25	12 (37%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	E2Q	B	901	-	24,25,25	3.47	8 (33%)	32,39,39	2.21	11 (34%)
7	NAG	C	909	1	14,14,15	1.28	1 (7%)	17,19,21	3.52	11 (64%)
6	E2Q	A	901	-	24,25,25	3.48	8 (33%)	32,39,39	2.25	12 (37%)
7	NAG	A	909	1	14,14,15	1.28	1 (7%)	17,19,21	3.53	11 (64%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	E2Q	D	901	-	-	2/8/10/10	0/3/3/3
6	E2Q	C	901	-	-	2/8/10/10	0/3/3/3
6	E2Q	B	901	-	-	2/8/10/10	0/3/3/3
7	NAG	C	909	1	-	2/6/23/26	0/1/1/1
6	E2Q	A	901	-	-	2/8/10/10	0/3/3/3
7	NAG	A	909	1	-	2/6/23/26	0/1/1/1

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	901	E2Q	C09-S11	-11.29	1.61	1.77
6	C	901	E2Q	C09-S11	-11.26	1.61	1.77
6	B	901	E2Q	C09-S11	-11.24	1.61	1.77
6	D	901	E2Q	C09-S11	-11.23	1.61	1.77
6	D	901	E2Q	O16-N15	10.01	1.39	1.22
6	A	901	E2Q	O16-N15	9.97	1.39	1.22
6	C	901	E2Q	O16-N15	9.95	1.39	1.22
6	B	901	E2Q	O16-N15	9.94	1.39	1.22
7	C	909	NAG	O5-C5	4.55	1.52	1.43
7	A	909	NAG	O5-C5	4.53	1.52	1.43
6	C	901	E2Q	S11-N14	-3.96	1.52	1.60
6	D	901	E2Q	S11-N14	-3.96	1.52	1.60
6	A	901	E2Q	S11-N14	-3.95	1.52	1.60
6	B	901	E2Q	S11-N14	-3.94	1.52	1.60
6	A	901	E2Q	C07-N15	-2.90	1.40	1.45
6	C	901	E2Q	C07-N15	-2.88	1.40	1.45
6	B	901	E2Q	C07-N15	-2.88	1.40	1.45
6	D	901	E2Q	C07-N15	-2.87	1.40	1.45
6	C	901	E2Q	O12-S11	2.59	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	901	E2Q	O12-S11	2.59	1.48	1.43
6	D	901	E2Q	O12-S11	2.58	1.48	1.43
6	A	901	E2Q	O13-S11	2.56	1.48	1.43
6	A	901	E2Q	C10-C09	2.56	1.40	1.37
6	A	901	E2Q	O12-S11	2.55	1.48	1.43
6	D	901	E2Q	C10-C09	2.54	1.40	1.37
6	B	901	E2Q	O13-S11	2.53	1.48	1.43
6	C	901	E2Q	C10-C09	2.52	1.40	1.37
6	C	901	E2Q	O13-S11	2.50	1.48	1.43
6	B	901	E2Q	C10-C09	2.49	1.40	1.37
6	D	901	E2Q	O13-S11	2.46	1.48	1.43
6	A	901	E2Q	C05-N18	-2.29	1.36	1.39
6	C	901	E2Q	C05-N18	-2.27	1.36	1.39
6	B	901	E2Q	C05-N18	-2.27	1.36	1.39
6	D	901	E2Q	C05-N18	-2.26	1.36	1.39

All (68) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	901	E2Q	O13-S11-O12	-7.40	106.60	118.76
6	A	901	E2Q	O13-S11-O12	-7.38	106.62	118.76
7	C	909	NAG	C2-N2-C7	7.36	133.38	122.90
7	A	909	NAG	C2-N2-C7	7.33	133.34	122.90
6	B	901	E2Q	O13-S11-O12	-7.22	106.89	118.76
6	D	901	E2Q	O13-S11-O12	-7.21	106.91	118.76
7	A	909	NAG	O5-C1-C2	-6.25	101.43	111.29
7	C	909	NAG	O5-C1-C2	-6.20	101.50	111.29
7	C	909	NAG	O5-C5-C6	-6.01	97.79	107.20
7	A	909	NAG	O5-C5-C6	-6.00	97.80	107.20
7	A	909	NAG	O5-C5-C4	-4.56	99.73	110.83
7	C	909	NAG	O5-C5-C4	-4.55	99.75	110.83
7	A	909	NAG	C1-C2-N2	-4.55	102.71	110.49
7	C	909	NAG	C1-C2-N2	-4.50	102.80	110.49
6	B	901	E2Q	C02-C03-C04	-4.16	117.29	124.78
6	D	901	E2Q	C02-C03-C04	-4.16	117.29	124.78
6	C	901	E2Q	C02-C03-C04	-4.13	117.34	124.78
6	A	901	E2Q	C02-C03-C04	-4.11	117.39	124.78
6	D	901	E2Q	C05-N18-C19	-3.52	120.32	124.80
6	A	901	E2Q	C05-N18-C19	-3.51	120.34	124.80
6	C	901	E2Q	C05-N18-C19	-3.50	120.34	124.80
6	B	901	E2Q	C05-N18-C19	-3.48	120.36	124.80
6	A	901	E2Q	C08-C09-S11	3.27	125.84	121.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	901	E2Q	C08-C09-S11	3.26	125.83	121.67
7	A	909	NAG	O4-C4-C5	-3.17	101.44	109.30
6	B	901	E2Q	C08-C09-S11	3.16	125.70	121.67
7	C	909	NAG	O4-C4-C5	-3.15	101.47	109.30
6	D	901	E2Q	C08-C09-S11	3.13	125.66	121.67
6	C	901	E2Q	O13-S11-C09	2.83	111.42	107.28
6	A	901	E2Q	O13-S11-C09	2.82	111.41	107.28
6	A	901	E2Q	C04-C05-N18	2.81	121.49	118.63
6	C	901	E2Q	C04-C05-N18	2.78	121.46	118.63
6	D	901	E2Q	C04-C05-N18	2.70	121.38	118.63
6	D	901	E2Q	C21-C19-N18	2.68	118.72	116.82
6	B	901	E2Q	C21-C19-N18	2.67	118.71	116.82
6	C	901	E2Q	C21-C19-N18	2.66	118.71	116.82
6	A	901	E2Q	C21-C19-N18	2.65	118.70	116.82
6	B	901	E2Q	C04-C05-N18	2.63	121.31	118.63
6	A	901	E2Q	O13-S11-N14	2.61	111.24	107.36
6	C	901	E2Q	O13-S11-N14	2.60	111.22	107.36
6	B	901	E2Q	O12-S11-C09	2.53	110.98	107.28
6	D	901	E2Q	O12-S11-C09	2.52	110.98	107.28
6	B	901	E2Q	O13-S11-N14	2.52	111.10	107.36
6	D	901	E2Q	O13-S11-N14	2.51	111.09	107.36
7	A	909	NAG	O4-C4-C3	-2.43	104.74	110.35
7	C	909	NAG	O4-C4-C3	-2.41	104.77	110.35
6	D	901	E2Q	O13-S11-C09	2.41	110.81	107.28
6	D	901	E2Q	C19-C21-N23	2.41	118.53	116.82
6	B	901	E2Q	C19-C21-N23	2.40	118.52	116.82
7	C	909	NAG	O7-C7-N2	2.40	126.36	121.95
7	A	909	NAG	O7-C7-N2	2.39	126.35	121.95
6	A	901	E2Q	C19-C21-N23	2.37	118.50	116.82
6	B	901	E2Q	O13-S11-C09	2.37	110.75	107.28
6	C	901	E2Q	O12-S11-C09	2.33	110.70	107.28
6	A	901	E2Q	O12-S11-C09	2.33	110.69	107.28
6	C	901	E2Q	C19-C21-N23	2.32	118.47	116.82
7	A	909	NAG	C4-C3-C2	-2.22	107.77	111.02
7	C	909	NAG	C4-C3-C2	-2.19	107.80	111.02
7	A	909	NAG	C1-O5-C5	2.18	115.15	112.19
7	C	909	NAG	C1-O5-C5	2.14	115.10	112.19
7	A	909	NAG	C6-C5-C4	-2.12	108.03	113.00
7	C	909	NAG	C6-C5-C4	-2.12	108.04	113.00
6	B	901	E2Q	C04-C03-C08	2.08	121.75	117.08
6	C	901	E2Q	C04-C03-C08	2.05	121.69	117.08
6	D	901	E2Q	C04-C03-C08	2.05	121.68	117.08

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	901	E2Q	C10-C09-S11	-2.05	114.72	117.53
6	A	901	E2Q	C10-C09-S11	-2.04	114.72	117.53
6	A	901	E2Q	C04-C03-C08	2.03	121.64	117.08

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	901	E2Q	C06-C07-N15-O16
6	A	901	E2Q	C08-C07-N15-O16
6	B	901	E2Q	C06-C07-N15-O16
6	B	901	E2Q	C08-C07-N15-O16
6	C	901	E2Q	C06-C07-N15-O16
6	C	901	E2Q	C08-C07-N15-O16
6	D	901	E2Q	C06-C07-N15-O16
6	D	901	E2Q	C08-C07-N15-O16
7	A	909	NAG	C3-C2-N2-C7
7	C	909	NAG	C3-C2-N2-C7
7	A	909	NAG	O5-C5-C6-O6
7	C	909	NAG	O5-C5-C6-O6

There are no ring outliers.

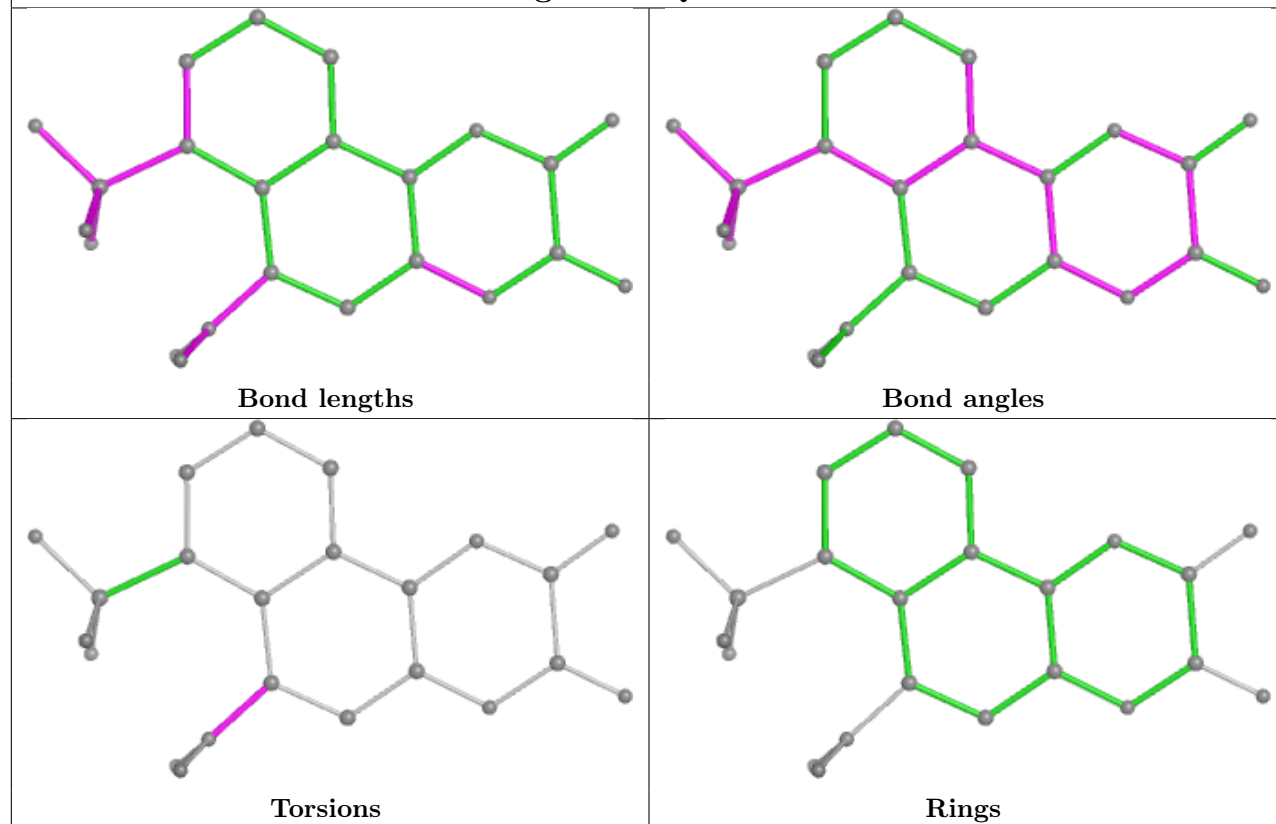
4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	901	E2Q	1	0
6	C	901	E2Q	1	0
6	B	901	E2Q	1	0
6	A	901	E2Q	1	0

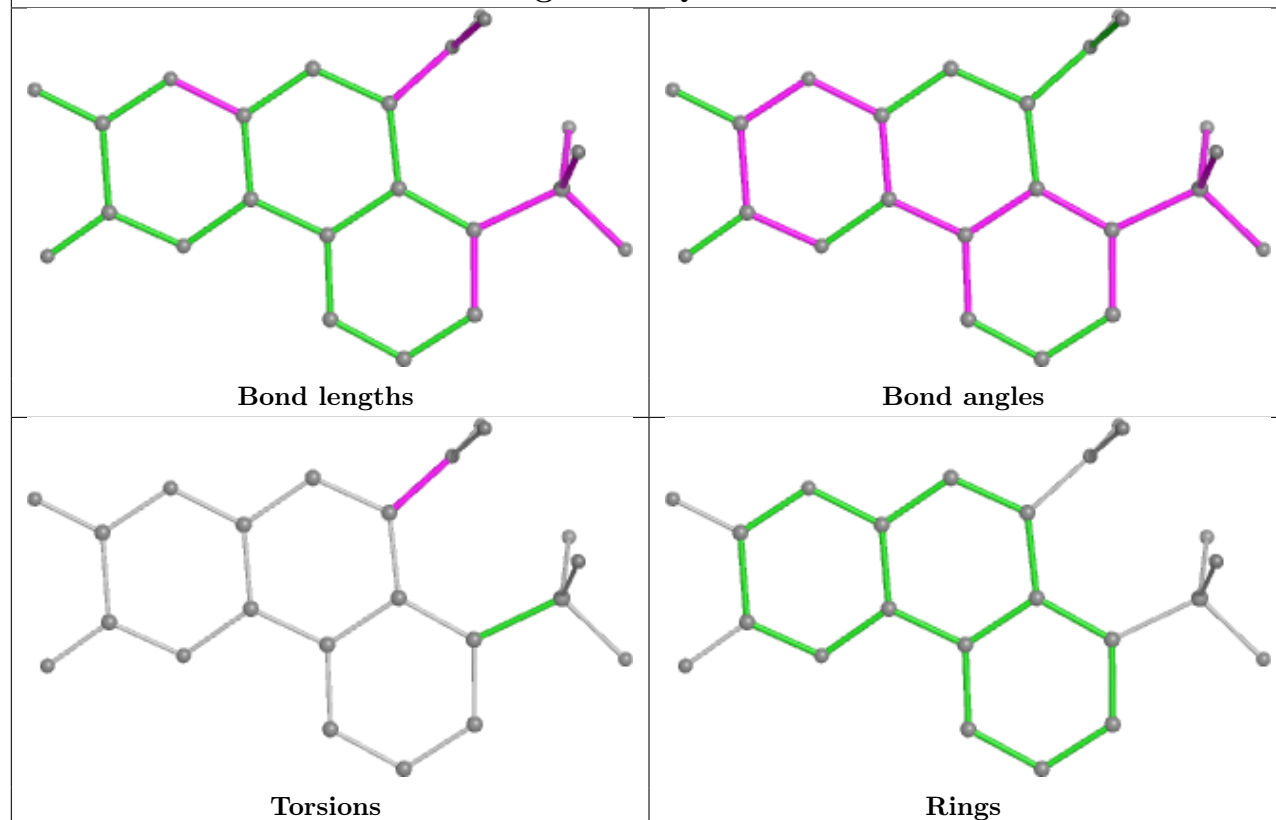
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 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.



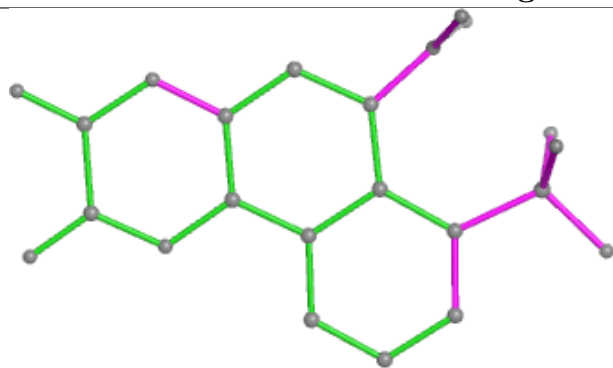
## Ligand E2Q D 901



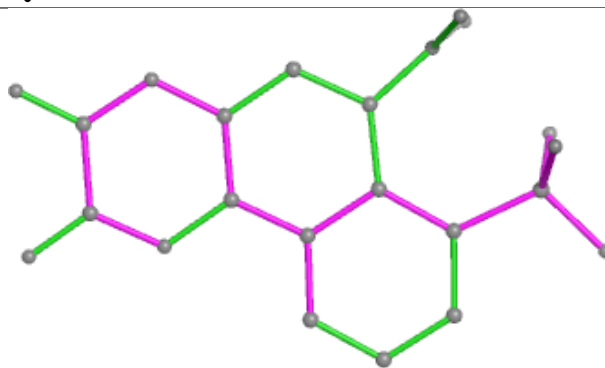
## Ligand E2Q C 901



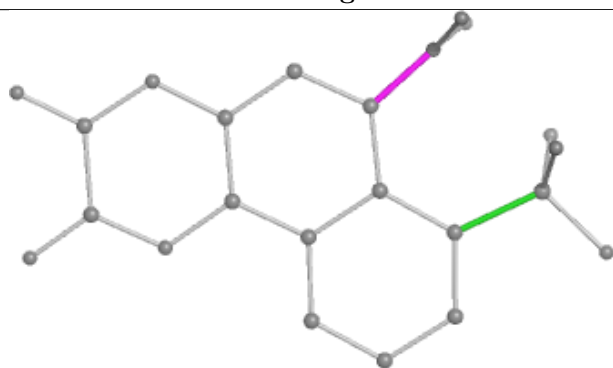
## Ligand E2Q B 901



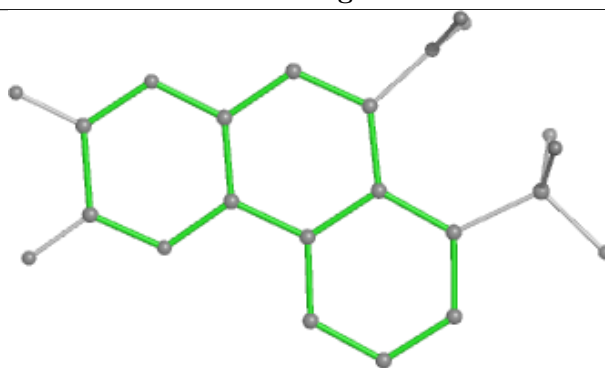
Bond lengths



Bond angles

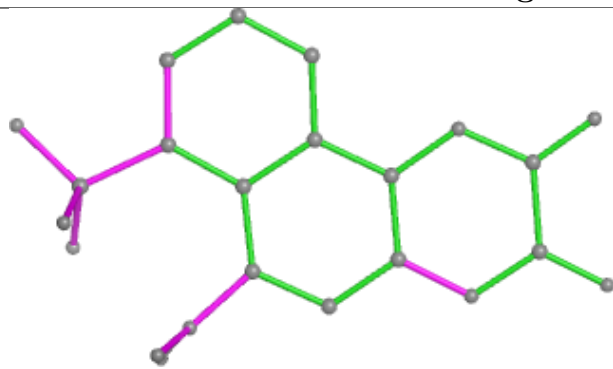


Torsions

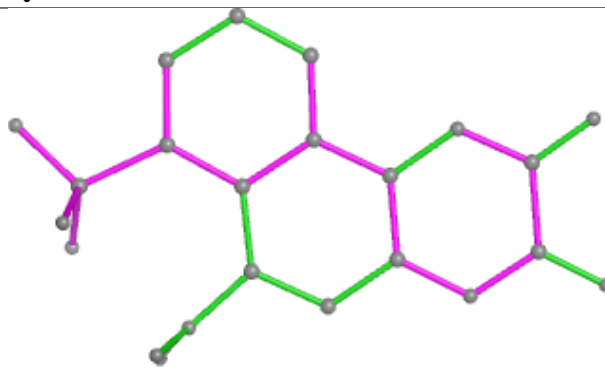


Rings

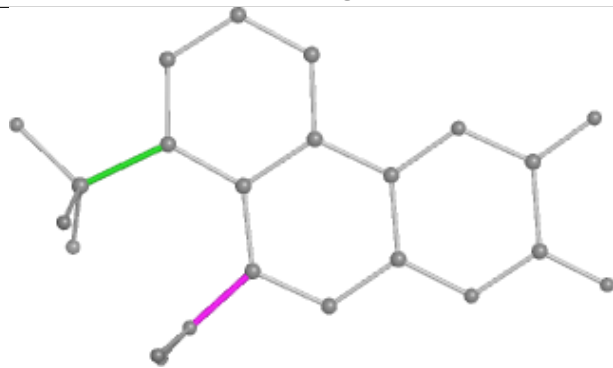
## Ligand E2Q A 901



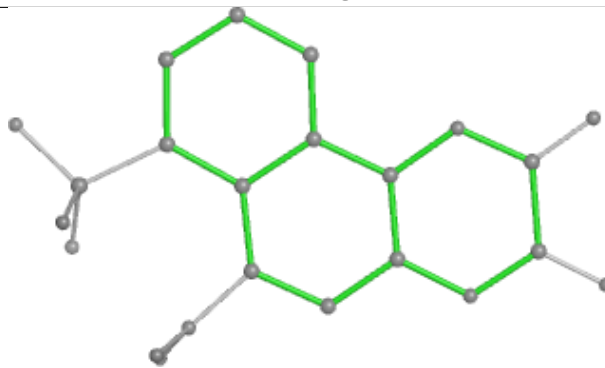
Bond lengths



Bond angles



Torsions



Rings

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4575. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections

This section was not generated.

### 6.2 Central slices

This section was not generated.

### 6.3 Largest variance slices

This section was not generated.

### 6.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

### 6.5 Orthogonal surface views

This section was not generated.

### 6.6 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis ⓘ

This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution ⓘ

This section was not generated.

### 7.2 Volume estimate versus contour level ⓘ

This section was not generated.

### 7.3 Rotationally averaged power spectrum ⓘ

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit

This section was not generated.