



wwPDB EM Validation Summary Report ⓘ

Nov 13, 2022 – 01:13 AM EST

PDB ID : 6X3S
EMDB ID : EMD-22031
Title : Human GABAA receptor alpha1-beta2-gamma2 subtype in complex with bicuculline methbromide
Authors : Kim, J.J.; Gharpure, A.; Teng, J.; Zhuang, Y.; Howard, R.J.; Zhu, S.; Noviello, C.M.; Walsh, R.M.; Lindahl, E.; Hibbs, R.E.
Deposited on : 2020-05-21
Resolution : 3.12 Å(reported)

This is a wwPDB EM 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/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>.

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

EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

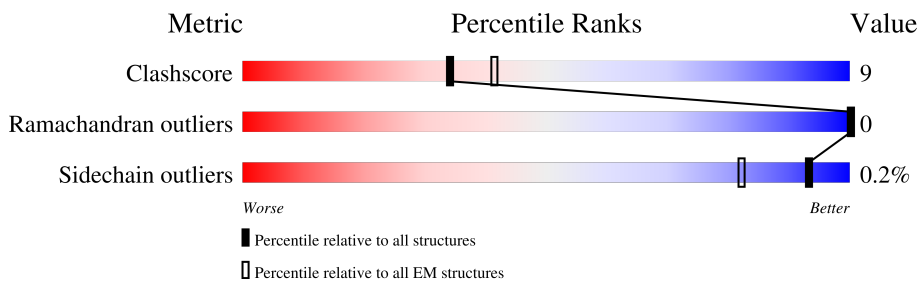
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.12 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.



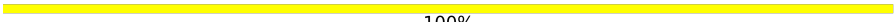
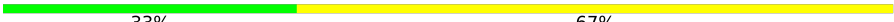
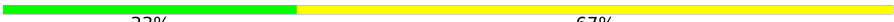
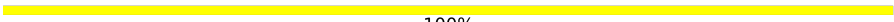
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 ≥ 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	364	
1	C	364	
2	B	358	
2	D	358	
3	E	417	
4	I	213	
4	L	213	
5	J	454	
5	K	454	

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Mol	Chain	Length	Quality of chain
6	F	3	 100%
6	H	3	 33% 67%
7	G	9	 33% 67%
8	M	2	 100%

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 17407 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 Gamma-aminobutyric acid receptor subunit beta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	334	2732	1791	440	485	16	0	0
1	C	334	2732	1791	440	485	16	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	308	SER	-	linker	UNP P47870
A	309	GLN	-	linker	UNP P47870
A	310	PRO	-	linker	UNP P47870
A	311	ALA	-	linker	UNP P47870
A	312	ARG	-	linker	UNP P47870
A	313	ALA	-	linker	UNP P47870
A	314	ALA	-	linker	UNP P47870
A	315	ALA	-	linker	UNP P47870
C	308	SER	-	linker	UNP P47870
C	309	GLN	-	linker	UNP P47870
C	310	PRO	-	linker	UNP P47870
C	311	ALA	-	linker	UNP P47870
C	312	ARG	-	linker	UNP P47870
C	313	ALA	-	linker	UNP P47870
C	314	ALA	-	linker	UNP P47870
C	315	ALA	-	linker	UNP P47870

- Molecule 2 is a protein called Gamma-aminobutyric acid receptor subunit alpha-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	338	2730	1763	461	490	16	0	0
2	D	338	2730	1763	461	490	16	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	313	SER	-	linker	UNP P14867
B	314	GLN	-	linker	UNP P14867
B	315	PRO	-	linker	UNP P14867
B	316	ALA	-	linker	UNP P14867
B	317	ARG	-	linker	UNP P14867
B	318	ALA	-	linker	UNP P14867
B	319	ALA	-	linker	UNP P14867
D	313	SER	-	linker	UNP P14867
D	314	GLN	-	linker	UNP P14867
D	315	PRO	-	linker	UNP P14867
D	316	ALA	-	linker	UNP P14867
D	317	ARG	-	linker	UNP P14867
D	318	ALA	-	linker	UNP P14867
D	319	ALA	-	linker	UNP P14867

- Molecule 3 is a protein called Gamma-aminobutyric acid type A receptor subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	333	2729	1781	448	485	15	0	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	323	SER	-	linker	UNP P18507
E	324	GLN	-	linker	UNP P18507
E	325	PRO	-	linker	UNP P18507
E	326	ALA	-	linker	UNP P18507
E	327	ARG	-	linker	UNP P18507
E	328	ALA	-	linker	UNP P18507
E	329	ALA	-	linker	UNP P18507

- Molecule 4 is a protein called Kappa Fab Light Chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	I	105	802	504	130	163	5	0	0
4	L	106	811	510	132	164	5	0	0

- Molecule 5 is a protein called IgG2b Fab Heavy Chain.

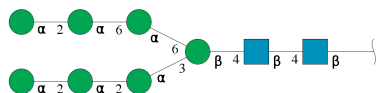
Mol	Chain	Residues	Atoms					AltConf	Trace
5	J	116	Total	C	N	O	S	0	0
			907	574	151	178	4		
5	K	117	Total	C	N	O	S	0	0
			914	578	152	180	4		

- Molecule 6 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.



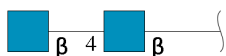
Mol	Chain	Residues	Atoms				AltConf	Trace
6	F	3	Total	C	N	O	0	0
			39	22	2	15		
6	H	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 7 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)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



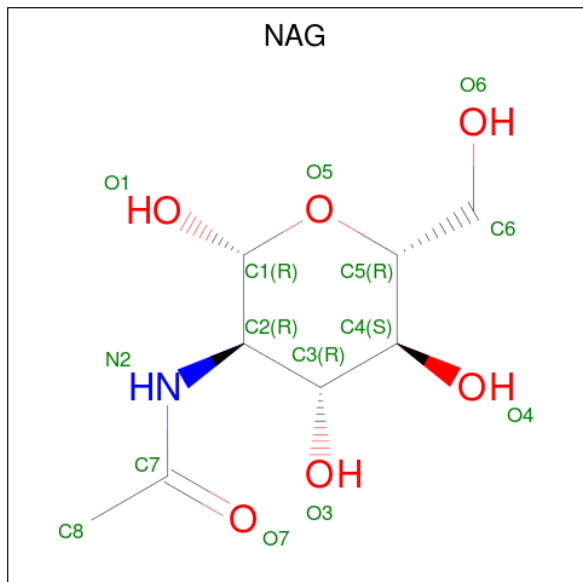
Mol	Chain	Residues	Atoms				AltConf	Trace
7	G	9	Total	C	N	O	0	0
			105	58	2	45		

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



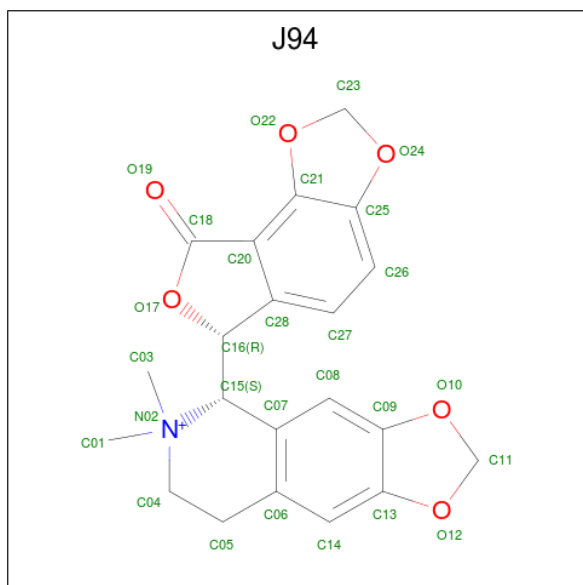
Mol	Chain	Residues	Atoms				AltConf	Trace
8	M	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



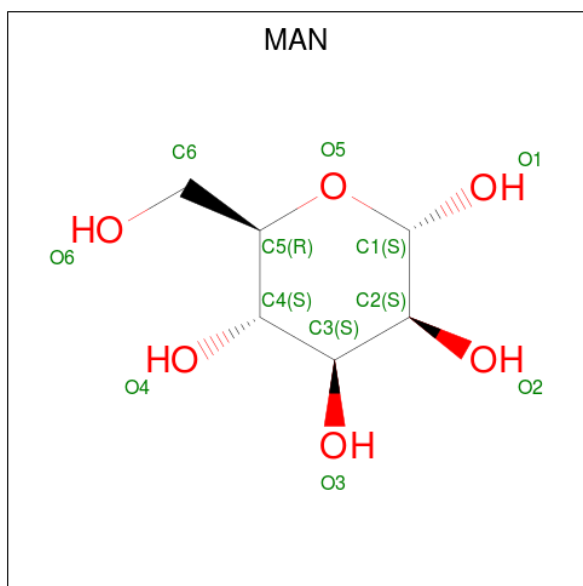
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
9	A	1	Total	C	N	O	0
			14	8	1	5	
9	C	1	Total	C	N	O	0
			14	8	1	5	
9	D	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 10 is (5S)-6,6-dimethyl-5-[(6R)-8-oxo-6,8-dihydrofuro[3,4-e][1,3]benzodioxol-6-yl]-5,6,7,8-tetrahydro[1,3]dioxolo[4,5-g]isoquinolin-6-ium (three-letter code: J94) (formula: $C_{21}H_{20}NO_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf	
			Total	C	N		O
10	A	1	28	21	1	6	0
10	C	1	28	21	1	6	0

- Molecule 11 is alpha-D-mannopyranose (three-letter code: MAN) (formula: C₆H₁₂O₆).

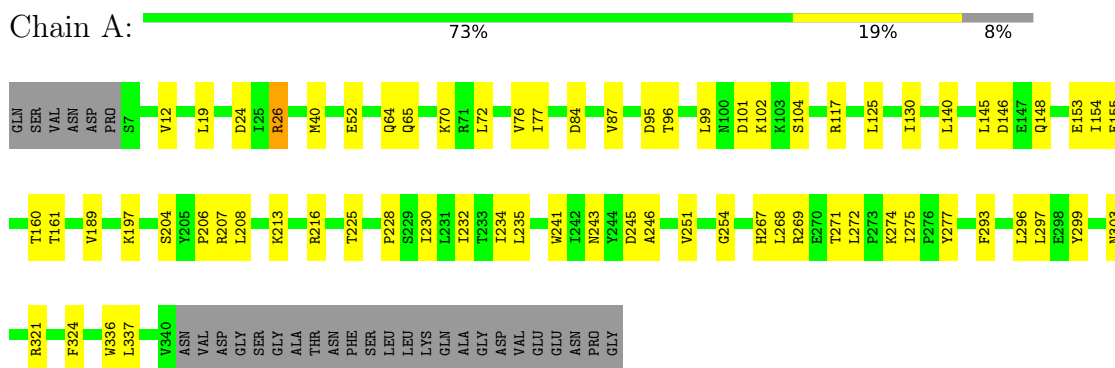


Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
11	E	1	11	6	5	0

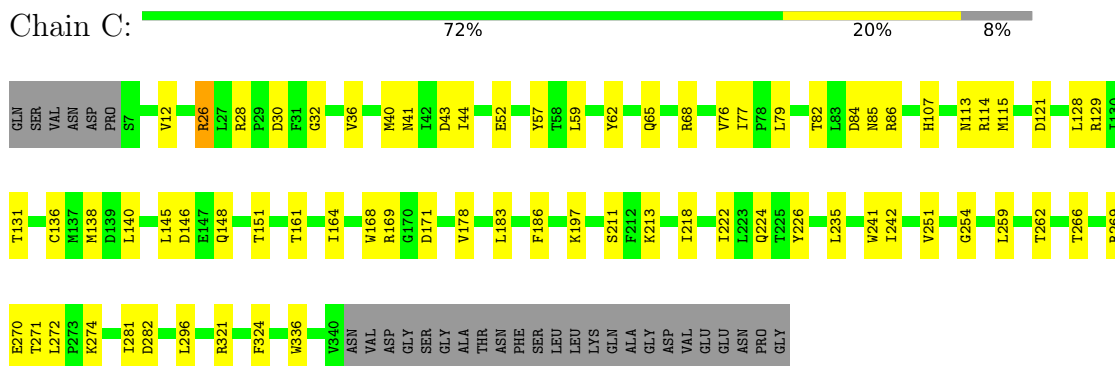
3 Residue-property plots [i](#)

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

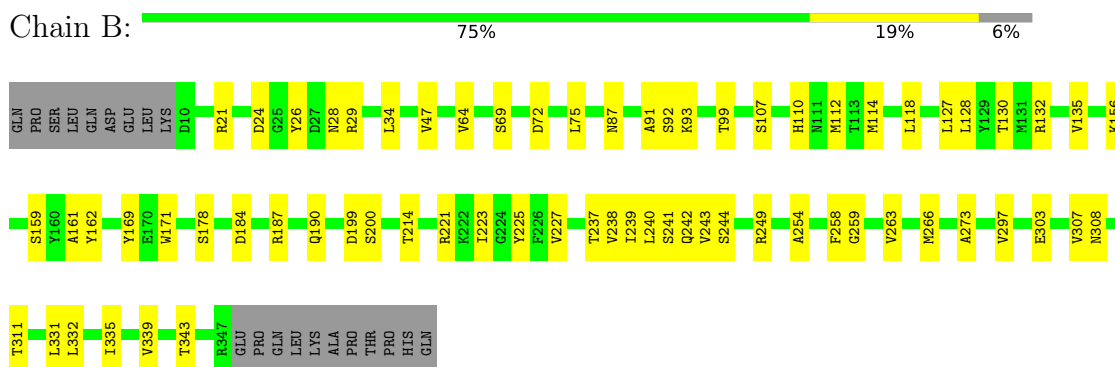
- Molecule 1: Gamma-aminobutyric acid receptor subunit beta-2



- Molecule 1: Gamma-aminobutyric acid receptor subunit beta-2



- Molecule 2: Gamma-aminobutyric acid receptor subunit alpha-1



CYS
GLU
ALA
THR
HIS
LYS
THR
SER
THR
SER
PRO
SER
ILE
VAL
LYS
SER
CYS

● Molecule 5: IgG2b Fab Heavy Chain



GLU	V2	Q6	V12	K13	P14	V18	M28	I29	K30	Y33	F34	Y35	W36	W37	K38	Q39	R40	I48	G49	R50	I51	N55	G56	D57	T58	Y60	F64	I70	T74	S88	E89	D90	T91	K99	D106	Y107	W108	G109	V114	T115	V116	S117	ALA							
LYS	THR	THR	THR	PRO	VAL	TYR	PRO	ALA	VAL	GLY	ASP	THR	THR	GLY	SER	SER	VAL	THR	GLY	CYS	VAL	LYS	THR	PHE	ASP	GLU	VAL	VAL	THR	THR	TRP	ASN	GLY	SER	SER	VAL	HIS	THR	PHE	PRO	ALA	ALA	LEU	LEU	GLN	SER	GLY	LEU		
TYR	THR	MET	SER	SER	VAL	THR	VAL	THR	THR	PRO	GLN	THR	VAL	VAL	THR	CYS	VAL	ALA	PRO	HIS	PRO	ALA	LYS	THR	VAL	ASP	GLU	GLU	PRO	SER	GLY	ILE	ASN	SER	PRO	PRO	CYS	LYS	PHE	GLU	PRO	CYS	ALA	HIS	LYS	LEU	GLN	PRO	ALA	PRO
ASN	LEU	GLY	GLY	PRO	SER	PHE	VAL	THR	THR	ILE	ASP	THR	VAL	VAL	THR	VAL	THR	PRO	LYS	PRO	ALA	THR	VAL	VAL	ASP	ASP	LEU	ASP	PRO	PRO	ASP	VAL	THR	ILE	ASN	CYS	ASN	PRO	VAL	GLU	VAL	HIS	GLN	THR	THR	GLN	THR	ALA	PRO	
ARG	GLU	ASP	TYR	ASN	THR	ARG	VAL	THR	THR	PRO	GLN	HIS	GLN	ASP	TRP	MET	SER	GLY	LYS	GLU	PHE	LYS	VAL	VAL	ASN	ASP	ASP	LEU	PRO	SER	PRO	ILE	ARG	THR	THR	SER	TRP	PHE	VAL	ARG	ALA	HIS	THR	THR	ALA	GLN	THR	GLN	THR	PRO
PRO	PRO	ALA	GLU	GLN	SER	ARG	LYS	THR	ARG	CYS	VAL	HIS	VAL	PHE	ASN	PRO	GLY	ILE	LYS	VAL	PHE	VAL	SER	ASN	GLY	THR	GLU	ASN	TYR	LYS	ASP	ALA	THR	PRO	VAL	LEU	THR	TYR	PHE	ALA	PRO	ILE	TYR	VAL	GLN	THR	TYR	ILE	PRO	MET
LYS	THR	SER	LYS	TRP	GLU	LYS	THR	ASP	THR	VAL	ARG	HIS	GLU	GLY	LEU	LYS	ASN	TYR	LYS	LEU	LYS	THR	THR	ILE	ARG	SER	PRO	GLY	LYS	THR	ASN	ALA	THR	THR	LEU	VAL	LEU	THR	PHE	ILE	TYR	SER	GLN	THR	TYR	ILE	ASN	GLY	LEU	

● Molecule 5: IgG2b Fab Heavy Chain



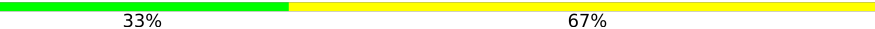
GLU	V2	L4	Q6	T29	K30	D31	T32	W36	Q39	R40	N55	G56	D57	Y60	K63	F64	A68	T69	I70	M77	L81	E89	T91	A92	Y95	R98	K99	G100	A104	M105	D106	Y107	W108	G109	Q110	T115	T116	ALA	THR	THR	THR	THR	THR													
PRO	PRO	SER	VAL	TYR	LEU	ALA	PRO	THR	THR	GLY	SER	VAL	THR	LEU	GLY	LEU	THR	THR	THR	PRO	GLY	VAL	THR	THR	ASN	THR	GLY	THR	SER	VAL	HIS	THR	PHE	PRO	ALA	ALA	LEU	LEU	GLN	SER	PRO	PRO	GLY	LEU	TYR	THR	THR	THR	THR	MET						
SER	SER	VAL	THR	PRO	SER	SER	THR	PRO	THR	THR	THR	SER	VAL	ALA	HIS	PRO	THR	THR	THR	THR	THR	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR			
GLY	GLY	PRO	VAL	PHE	ILE	PHE	PRO	PRO	THR	ASN	THR	ILE	ASP	VAL	VAL	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR		
TYR	ASN	THR	THR	ARG	VAL	VAL	SER	SER	THR	HIS	THR	THR	THR	THR	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
GLU	GLN	LEU	SER	ARG	ASP	VAL	SER	SER	THR	VAL	PHE	ASN	PRO	ASP	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
LYS	TRP	GLU	LYS	THR	ASP	SER	PHE	SER	THR	HIS	GLU	GLY	LEU	LEU	LYS	ASN	TYR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR

● Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



MAG1
MAG2
BMA3

- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:  33% 67%

MAG1
MAG2
BMA3

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

Chain G:  33% 67%

MAG1
MAG2
BMA3
MAN4
MAN5
MAN6
MAN7
MAN8
MAN9

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

Chain M:  100%

MAG1
MAG2

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	80103	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 ($e^-/\text{\AA}^2$)	85.05	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k 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: BMA, NAG, MAN, J94

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	0.31	0/2804	0.43	0/3818
1	C	0.30	0/2804	0.44	0/3818
2	B	0.33	0/2799	0.45	0/3805
2	D	0.31	0/2799	0.46	0/3805
3	E	0.31	0/2805	0.45	0/3822
4	I	0.32	0/820	0.47	0/1112
4	L	0.31	0/829	0.46	0/1123
5	J	0.28	0/928	0.46	0/1260
5	K	0.27	0/935	0.46	0/1270
All	All	0.31	0/17523	0.45	0/23833

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	A	2732	0	2741	57	0
1	C	2732	0	2741	49	0
2	B	2730	0	2724	59	0
2	D	2730	0	2724	52	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	2729	0	2714	68	0
4	I	802	0	771	12	0
4	L	811	0	784	10	0
5	J	907	0	877	19	0
5	K	914	0	884	18	0
6	F	39	0	34	2	0
6	H	39	0	34	1	0
7	G	105	0	88	10	0
8	M	28	0	25	4	0
9	A	14	0	13	0	0
9	C	14	0	13	0	0
9	D	14	0	13	1	0
10	A	28	0	20	0	0
10	C	28	0	20	1	0
11	E	11	0	10	1	0
All	All	17407	0	17230	309	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 9.

The worst 5 of 309 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:D:301:LEU:HD23	3:E:250:LEU:HD11	1.57	0.87
1:C:107:HIS:HE2	1:C:131:THR:HG1	1.30	0.79
2:B:238:VAL:HG12	2:B:242:GLN:HE22	1.47	0.79
2:B:156:LYS:HG2	2:B:214:THR:HG23	1.66	0.78
1:A:130:ILE:CG2	2:B:112:MET:HE1	2.14	0.77

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	332/364 (91%)	321 (97%)	11 (3%)	0	100	100
1	C	332/364 (91%)	321 (97%)	11 (3%)	0	100	100
2	B	336/358 (94%)	326 (97%)	10 (3%)	0	100	100
2	D	336/358 (94%)	321 (96%)	15 (4%)	0	100	100
3	E	331/417 (79%)	314 (95%)	17 (5%)	0	100	100
4	I	103/213 (48%)	96 (93%)	7 (7%)	0	100	100
4	L	104/213 (49%)	97 (93%)	7 (7%)	0	100	100
5	J	114/454 (25%)	105 (92%)	9 (8%)	0	100	100
5	K	115/454 (25%)	112 (97%)	3 (3%)	0	100	100
All	All	2103/3195 (66%)	2013 (96%)	90 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	302/326 (93%)	301 (100%)	1 (0%)	92	96
1	C	302/326 (93%)	301 (100%)	1 (0%)	92	96
2	B	300/319 (94%)	300 (100%)	0	100	100
2	D	300/319 (94%)	299 (100%)	1 (0%)	92	96
3	E	305/372 (82%)	305 (100%)	0	100	100
4	I	89/188 (47%)	89 (100%)	0	100	100
4	L	90/188 (48%)	90 (100%)	0	100	100
5	J	97/407 (24%)	97 (100%)	0	100	100
5	K	98/407 (24%)	98 (100%)	0	100	100
All	All	1883/2852 (66%)	1880 (100%)	3 (0%)	93	97

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	ARG
1	C	26	ARG
2	D	81	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 34 such sidechains are listed below:

Mol	Chain	Res	Type
4	L	37	GLN
4	L	38	GLN
5	K	39	GLN
1	C	309	GLN
1	C	41	ASN

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](#)

17 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	$\# Z > 2$
6	NAG	F	1	1,6	14,14,15	0.23	0	17,19,21	0.68	0
6	NAG	F	2	6	14,14,15	0.32	0	17,19,21	0.80	0
6	BMA	F	3	6	11,11,12	0.29	0	15,15,17	0.89	1 (6%)
7	NAG	G	1	2,7	14,14,15	0.30	0	17,19,21	0.72	0
7	NAG	G	2	7	14,14,15	0.37	0	17,19,21	0.77	0
7	BMA	G	3	7	11,11,12	0.28	0	15,15,17	1.25	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	MAN	G	4	7	11,11,12	0.27	0	15,15,17	0.94	0
7	MAN	G	5	7	11,11,12	0.19	0	15,15,17	0.93	0
7	MAN	G	6	7	11,11,12	0.26	0	15,15,17	0.71	0
7	MAN	G	7	7	11,11,12	0.18	0	15,15,17	0.81	0
7	MAN	G	8	7	11,11,12	0.27	0	15,15,17	1.27	3 (20%)
7	MAN	G	9	7	11,11,12	0.26	0	15,15,17	0.74	0
6	NAG	H	1	1,6	14,14,15	0.24	0	17,19,21	0.63	0
6	NAG	H	2	6	14,14,15	0.80	0	17,19,21	1.61	2 (11%)
6	BMA	H	3	6	11,11,12	0.31	0	15,15,17	0.69	0
8	NAG	M	1	3,8	14,14,15	0.29	0	17,19,21	0.60	0
8	NAG	M	2	8	14,14,15	0.27	0	17,19,21	0.71	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
6	NAG	F	1	1,6	-	3/6/23/26	0/1/1/1
6	NAG	F	2	6	-	2/6/23/26	0/1/1/1
6	BMA	F	3	6	-	2/2/19/22	0/1/1/1
7	NAG	G	1	2,7	-	0/6/23/26	0/1/1/1
7	NAG	G	2	7	-	4/6/23/26	0/1/1/1
7	BMA	G	3	7	-	0/2/19/22	0/1/1/1
7	MAN	G	4	7	-	2/2/19/22	0/1/1/1
7	MAN	G	5	7	-	1/2/19/22	0/1/1/1
7	MAN	G	6	7	-	2/2/19/22	0/1/1/1
7	MAN	G	7	7	-	0/2/19/22	0/1/1/1
7	MAN	G	8	7	-	0/2/19/22	0/1/1/1
7	MAN	G	9	7	-	0/2/19/22	0/1/1/1
6	NAG	H	1	1,6	-	3/6/23/26	0/1/1/1
6	NAG	H	2	6	-	2/6/23/26	0/1/1/1
6	BMA	H	3	6	-	2/2/19/22	0/1/1/1
8	NAG	M	1	3,8	-	0/6/23/26	0/1/1/1
8	NAG	M	2	8	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	H	2	NAG	C4-C3-C2	4.60	117.76	111.02
7	G	3	BMA	O5-C5-C6	3.63	112.89	107.20
7	G	8	MAN	O2-C2-C3	-2.94	104.25	110.14
7	G	8	MAN	C2-C3-C4	-2.36	106.81	110.89
6	H	2	NAG	C2-N2-C7	-2.28	119.65	122.90

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

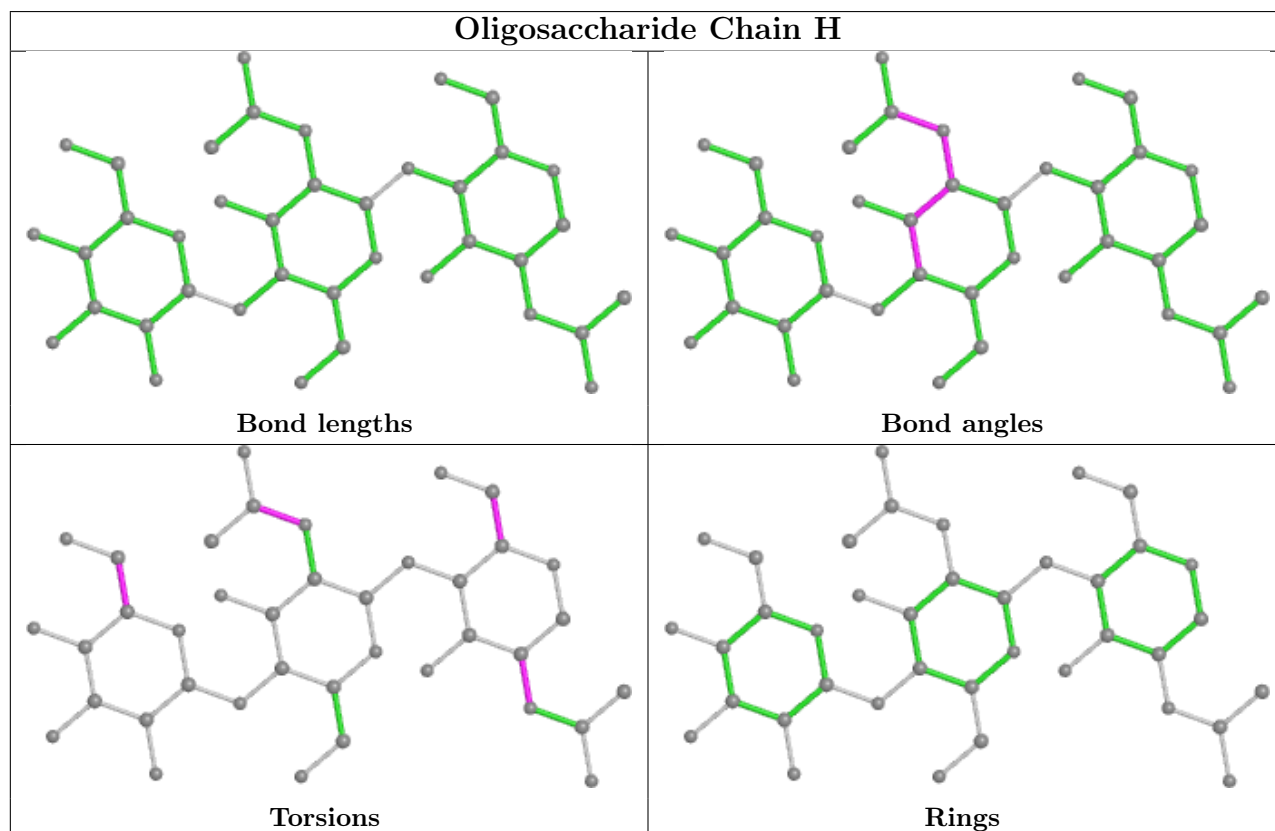
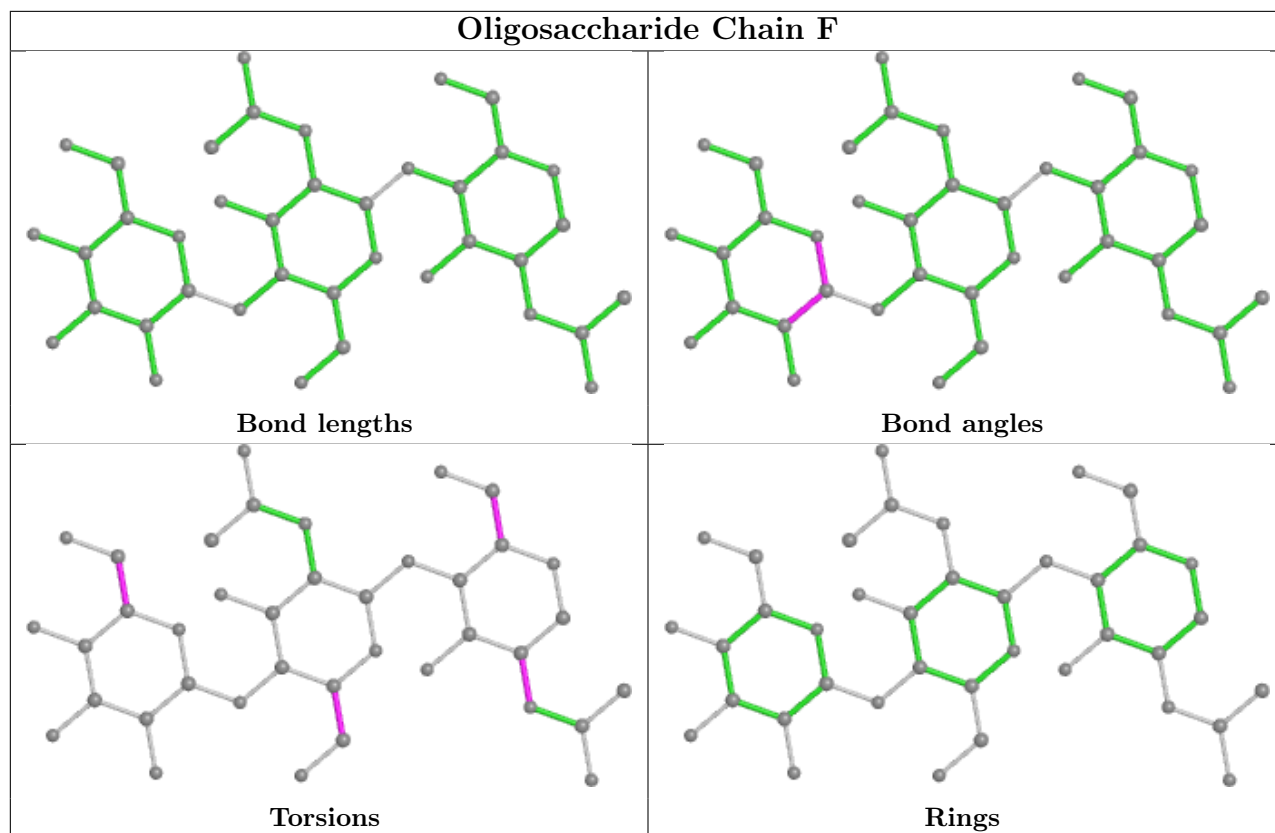
Mol	Chain	Res	Type	Atoms
6	F	3	BMA	O5-C5-C6-O6
6	H	3	BMA	O5-C5-C6-O6
7	G	6	MAN	O5-C5-C6-O6
6	F	3	BMA	C4-C5-C6-O6
6	H	3	BMA	C4-C5-C6-O6

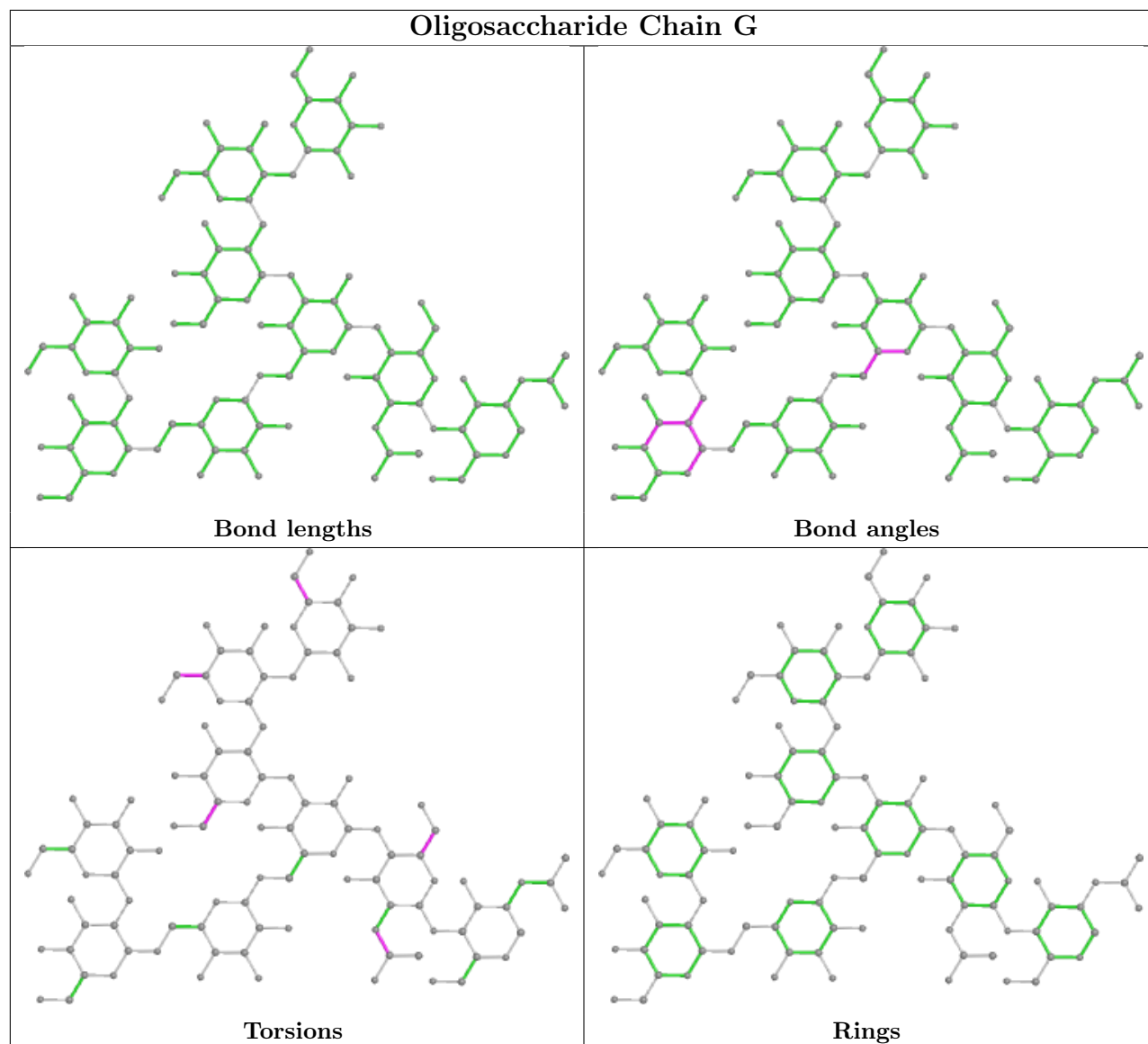
There are no ring outliers.

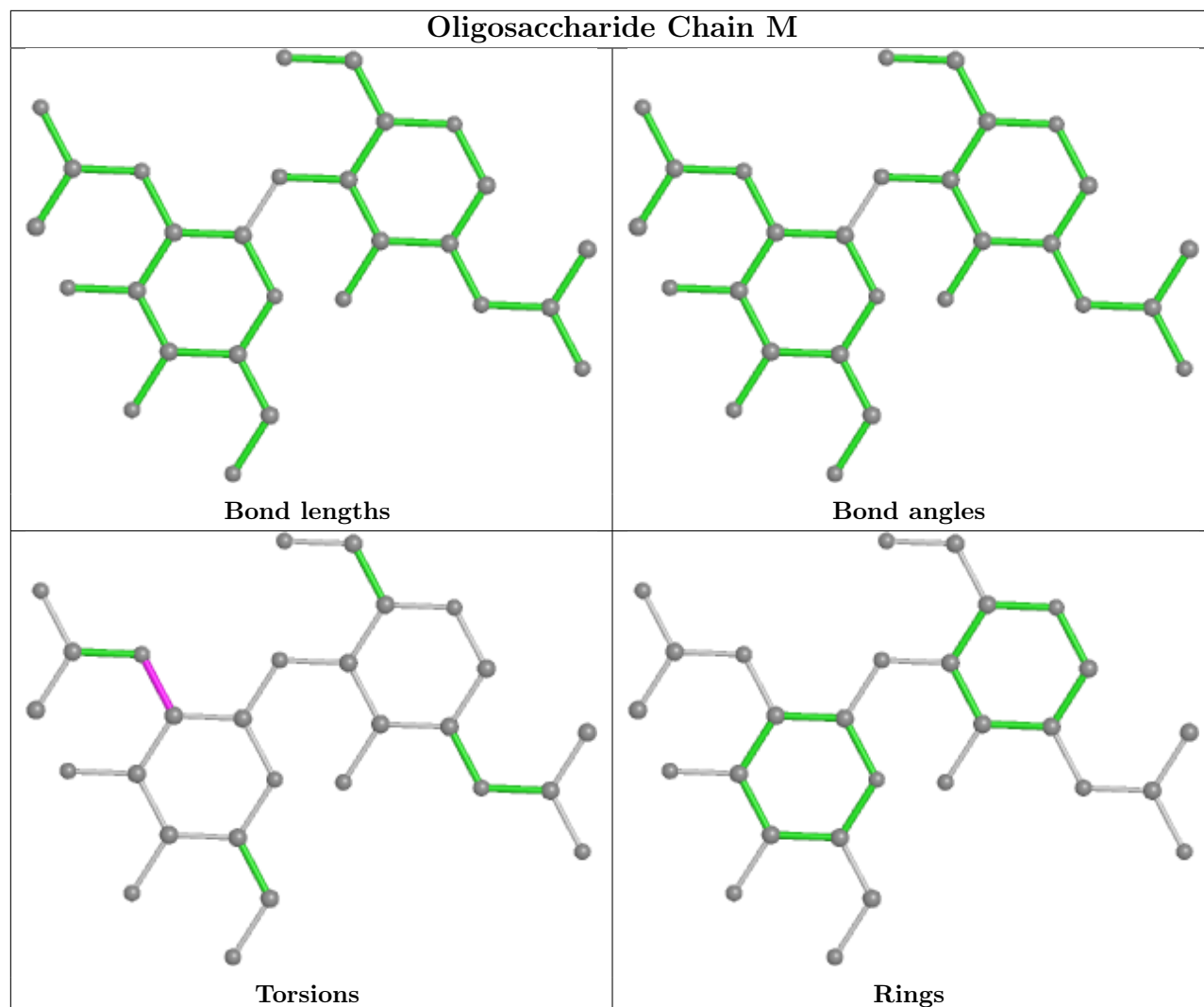
9 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	F	1	NAG	2	0
6	F	2	NAG	1	0
8	M	2	NAG	2	0
7	G	5	MAN	4	0
7	G	2	NAG	1	0
7	G	6	MAN	4	0
6	H	1	NAG	1	0
7	G	9	MAN	1	0
8	M	1	NAG	2	0

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







5.6 Ligand geometry [i](#)

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	$\# Z > 2$
10	J94	C	405	-	33,33,33	4.19	18 (54%)	48,52,52	1.88	8 (16%)
9	NAG	D	401	2	14,14,15	0.19	0	17,19,21	0.52	0
10	J94	A	405	-	33,33,33	4.22	18 (54%)	48,52,52	1.90	8 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	NAG	A	404	1	14,14,15	0.27	0	17,19,21	0.48	0
11	MAN	E	401	-	11,11,12	0.24	0	15,15,17	0.91	0
9	NAG	C	404	1	14,14,15	0.28	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
10	J94	C	405	-	-	3/4/44/44	0/6/6/6
9	NAG	D	401	2	-	1/6/23/26	0/1/1/1
10	J94	A	405	-	-	3/4/44/44	0/6/6/6
9	NAG	A	404	1	-	0/6/23/26	0/1/1/1
11	MAN	E	401	-	-	1/2/19/22	0/1/1/1
9	NAG	C	404	1	-	2/6/23/26	0/1/1/1

The worst 5 of 36 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	A	405	J94	O22-C21	-10.73	1.22	1.38
10	C	405	J94	O22-C21	-10.69	1.23	1.38
10	A	405	J94	O10-C09	-10.11	1.22	1.38
10	A	405	J94	O24-C25	-10.07	1.22	1.38
10	C	405	J94	O10-C09	-10.07	1.22	1.38

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	A	405	J94	C16-O17-C18	-7.42	106.67	111.03
10	C	405	J94	C16-O17-C18	-7.23	106.78	111.03
10	C	405	J94	O17-C18-C20	5.58	112.70	108.26
10	A	405	J94	O17-C18-C20	5.52	112.65	108.26
10	A	405	J94	O12-C11-O10	-3.68	102.21	108.08

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	C	404	NAG	O5-C5-C6-O6
9	C	404	NAG	C4-C5-C6-O6

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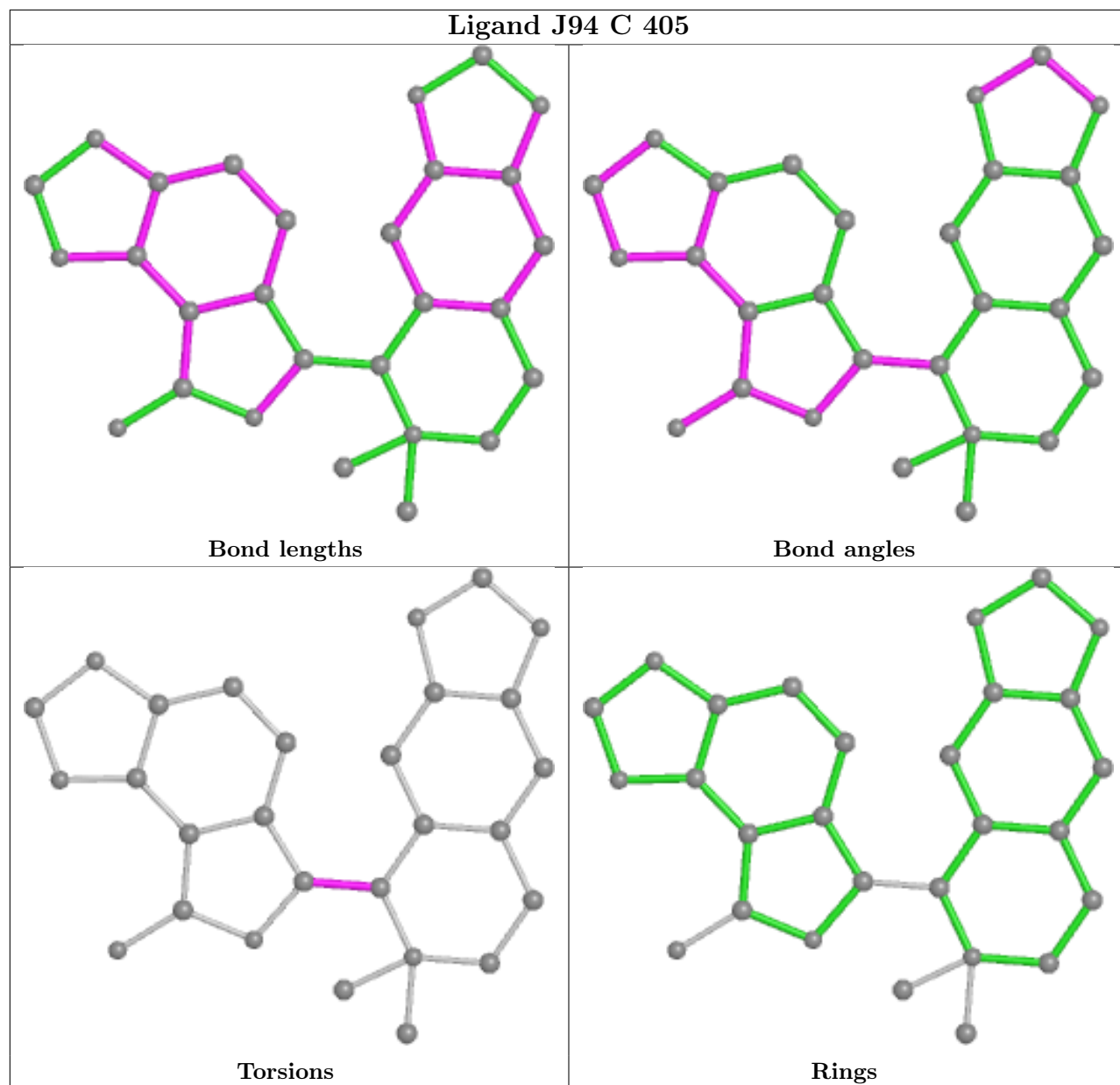
Mol	Chain	Res	Type	Atoms
9	D	401	NAG	O5-C5-C6-O6
11	E	401	MAN	O5-C5-C6-O6
10	A	405	J94	C07-C15-C16-O17

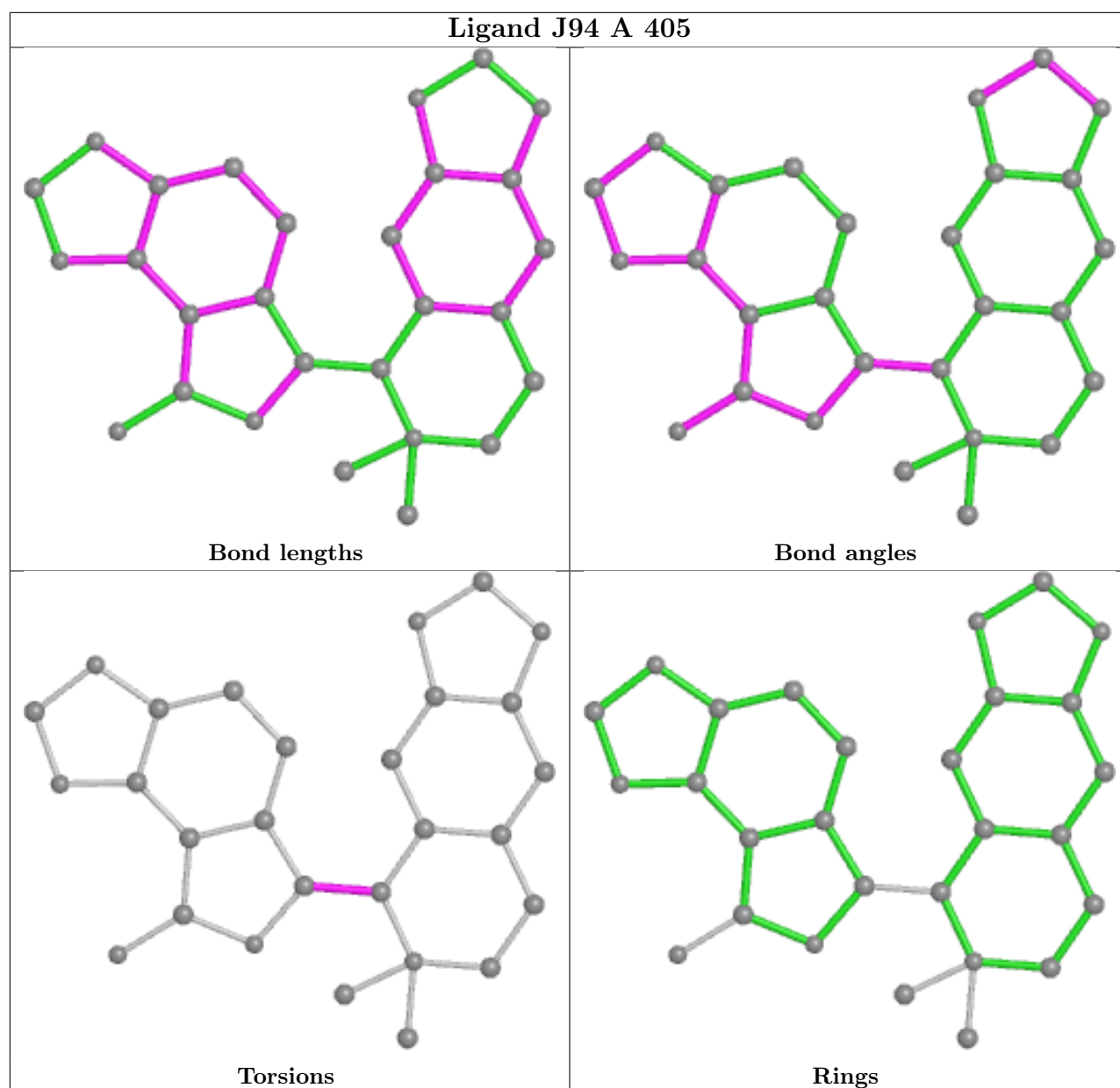
There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	C	405	J94	1	0
9	D	401	NAG	1	0
11	E	401	MAN	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.





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 Map visualisation

This section contains visualisations of the EMDB entry EMD-22031. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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 surface views

This section was not generated.

6.5 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.