



# Full wwPDB EM Validation Report ⓘ

May 11, 2024 – 01:51 PM EDT

PDB ID : 9AYF  
EMDB ID : EMD-43990  
Title : Structure of human calcium-sensing receptor in complex with Gi1 (miniGi1) protein in detergent  
Authors : Zuo, H.; Park, J.; Frangaj, A.; Ye, J.; Lu, G.; Manning, J.J.; Asher, W.B.; Lu, Z.; Hu, G.; Wang, L.; Mendez, J.; Eng, E.; Zhang, Z.; Lin, X.; Grasucci, R.; Hendrickson, W.A.; Clarke, O.B.; Javitch, J.A.; Conigrave, A.D.; Fan, Q.R.  
Deposited on : 2024-03-07  
Resolution : 3.60 Å(reported)  
Based on initial models : 7SIL, 7WU5, 7P00

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:

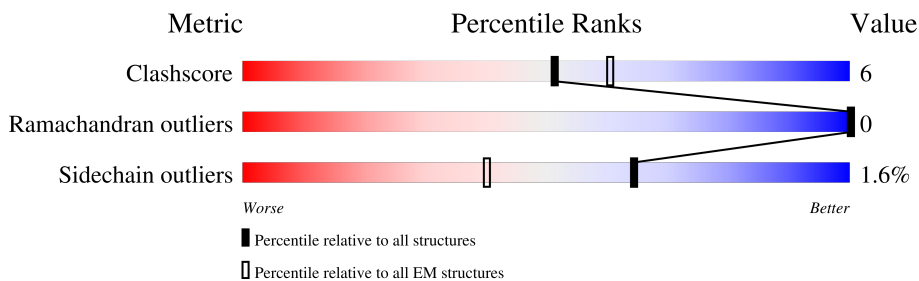
EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

# 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 3.60 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.



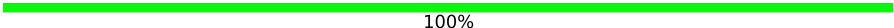

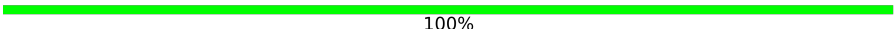
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	Q	911	73% 13% 14%
1	R	911	78% 11% 10%
2	H	297	68% 10% 22%
3	A	229	7% 68% 24% 7%
4	B	348	7% 83% 14% 7%
5	G	71	7% 66% 15% 18%
6	C	2	100%

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Mol	Chain	Length	Quality of chain
6	D	2	 100%
6	E	2	 50% 50%
6	F	2	 100%

## 2 Entry composition i

There are 12 unique types of molecules in this entry. The entry contains 19630 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 Isoform 1 of Extracellular calcium-sensing receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	Q	780	Total	C	N	O	S	0	0
			6202	4033	1005	1129	35		
1	R	816	Total	C	N	O	S	0	0
			6499	4223	1061	1179	36		

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	12	ASP	-	insertion	UNP P41180
Q	13	TYR	-	insertion	UNP P41180
Q	14	LYS	-	insertion	UNP P41180
Q	15	ASP	-	insertion	UNP P41180
Q	16	ASP	-	insertion	UNP P41180
Q	17	ASP	-	insertion	UNP P41180
Q	18	ASP	-	insertion	UNP P41180
Q	19	LYS	-	insertion	UNP P41180
R	12	ASP	-	insertion	UNP P41180
R	13	TYR	-	insertion	UNP P41180
R	14	LYS	-	insertion	UNP P41180
R	15	ASP	-	insertion	UNP P41180
R	16	ASP	-	insertion	UNP P41180
R	17	ASP	-	insertion	UNP P41180
R	18	ASP	-	insertion	UNP P41180
R	19	LYS	-	insertion	UNP P41180

- Molecule 2 is a protein called Single-chain antibody fragment scFv16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	H	232	Total	C	N	O	S	0	0
			1785	1132	295	348	10		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(i) subunit alpha-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	214	1733	1098	290	332	13	0	0

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	42	ASP	GLY	engineered mutation	UNP P63096
A	43	ASN	GLU	engineered mutation	UNP P63096
A	58	GLY	-	linker	UNP P63096
A	59	GLY	-	linker	UNP P63096
A	60	GLY	-	linker	UNP P63096
A	61	GLY	-	linker	UNP P63096
A	62	GLY	-	linker	UNP P63096
A	63	GLY	-	linker	UNP P63096
A	64	GLY	-	linker	UNP P63096
A	65	GLY	-	linker	UNP P63096
A	102	ASP	GLY	engineered mutation	UNP P63096
A	104	ALA	THR	variant	UNP P63096
A	111	ASP	ALA	engineered mutation	UNP P63096
A	?	-	ASP	deletion	UNP P63096
A	?	-	LEU	deletion	UNP P63096
A	?	-	VAL	deletion	UNP P63096
A	?	-	LEU	deletion	UNP P63096
A	?	-	ALA	deletion	UNP P63096
A	?	-	GLU	deletion	UNP P63096
A	?	-	ASP	deletion	UNP P63096
A	?	-	GLU	deletion	UNP P63096
A	?	-	GLU	deletion	UNP P63096
A	?	-	MET	deletion	UNP P63096
A	163	GLN	PRO	variant	UNP P63096
A	207	ALA	VAL	engineered mutation	UNP P63096
A	210	ILE	VAL	engineered mutation	UNP P63096

- Molecule 4 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	B	339	2607	1607	468	511	21	0	0

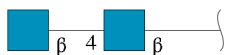
There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	MET	-	initiating methionine	UNP P62873
B	-6	ASP	-	expression tag	UNP P62873
B	-5	TYR	-	expression tag	UNP P62873
B	-4	LYS	-	expression tag	UNP P62873
B	-3	ASP	-	expression tag	UNP P62873
B	-2	ASP	-	expression tag	UNP P62873
B	-1	ASP	-	expression tag	UNP P62873
B	0	ASP	-	expression tag	UNP P62873
B	1	LYS	-	expression tag	UNP P62873

- Molecule 5 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	G	58	447	280	79	85	3	0	0

- Molecule 6 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



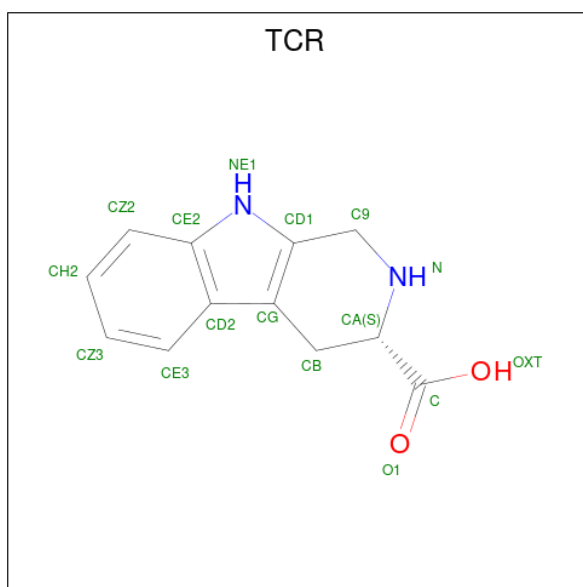
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	C	2	28	16	2	10	0	0
6	D	2	28	16	2	10	0	0
6	E	2	28	16	2	10	0	0
6	F	2	28	16	2	10	0	0

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



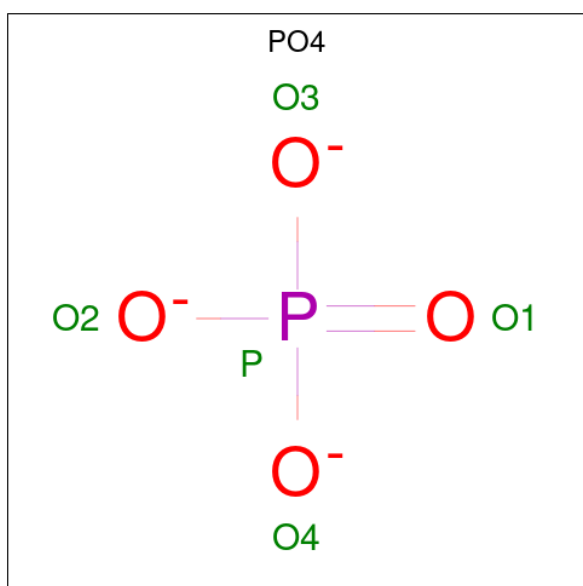
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
7	Q	1	Total	C	N	O	0
			14	8	1	5	
7	Q	1	Total	C	N	O	0
			14	8	1	5	
7	Q	1	Total	C	N	O	0
			14	8	1	5	
7	R	1	Total	C	N	O	0
			14	8	1	5	
7	R	1	Total	C	N	O	0
			14	8	1	5	
7	R	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 8 is CYCLOMETHYLTRYPTOPHAN (three-letter code: TCR) (formula:  $C_{12}H_{12}N_2O_2$ ).



Mol	Chain	Residues	Atoms			AltConf	
			Total	C	N		O
8	Q	1	16	12	2	2	0
8	R	1	16	12	2	2	0

- Molecule 9 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



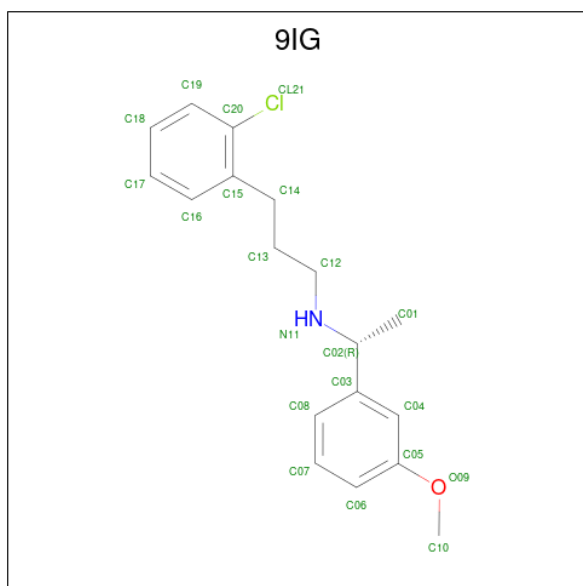
Mol	Chain	Residues	Atoms		AltConf
			Total	O P	
9	Q	1	5	4 1	0
9	R	1	5	4 1	0



- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

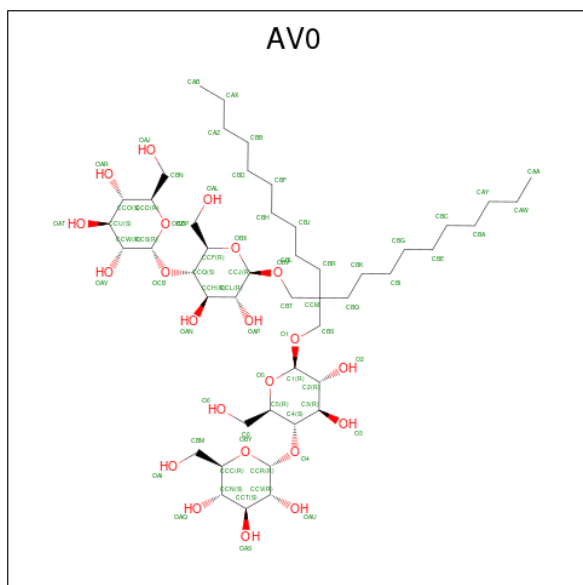
Mol	Chain	Residues	Atoms		AltConf
10	Q	4	Total	Ca	0
			4	4	
10	R	4	Total	Ca	0
			4	4	

- Molecule 11 is 3-(2-chlorophenyl)-N-[(1R)-1-(3-methoxyphenyl)ethyl]propan-1-amine (three-letter code: 9IG) (formula: C<sub>18</sub>H<sub>22</sub>ClNO).



Mol	Chain	Residues	Atoms					AltConf
11	Q	1	Total	C	Cl	N	O	0
			21	18	1	1	1	
11	R	1	Total	C	Cl	N	O	0
			21	18	1	1	1	

- Molecule 12 is Lauryl Maltose Neopentyl Glycol (three-letter code: AV0) (formula: C<sub>47</sub>H<sub>88</sub>O<sub>22</sub>).

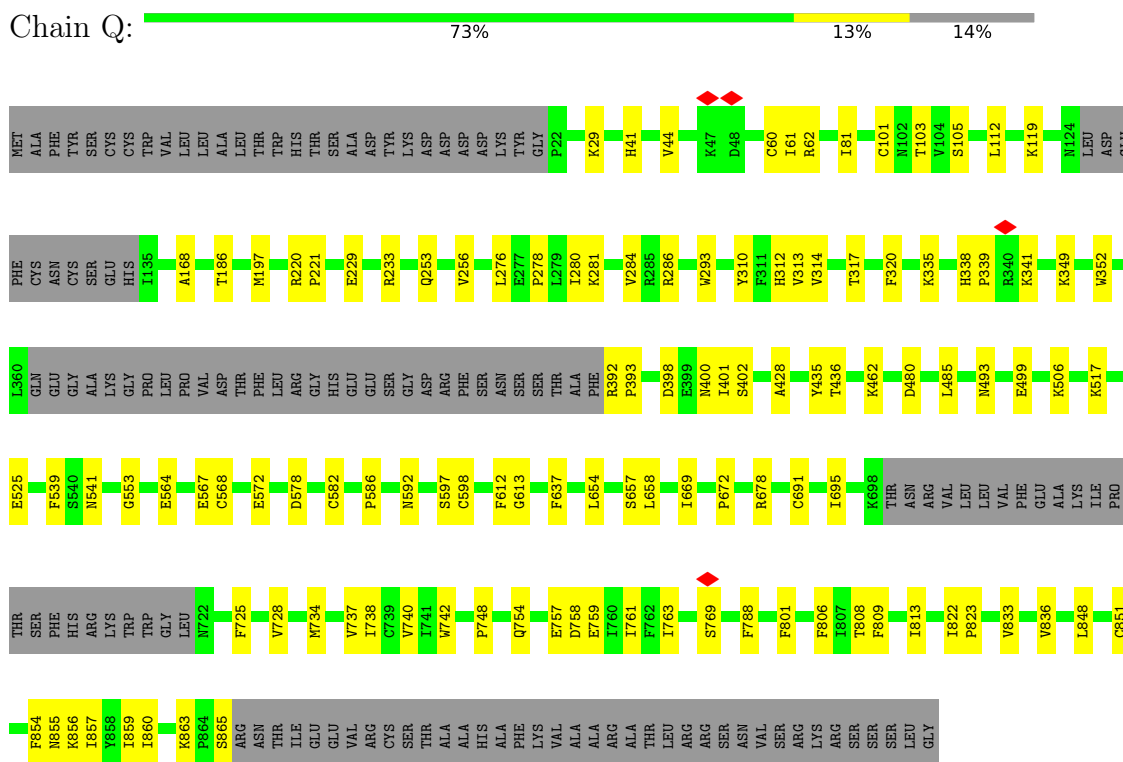


Mol	Chain	Residues	Atoms			AltConf
12	R	1	Total	C	O	0
			69	47	22	

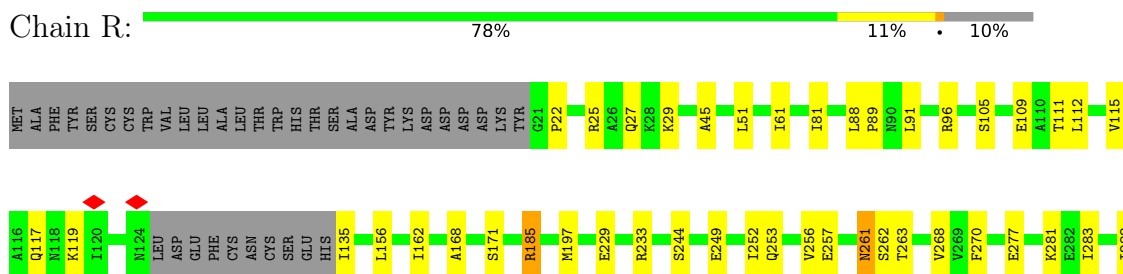
### 3 Residue-property plots i

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 and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Isoform 1 of Extracellular calcium-sensing receptor

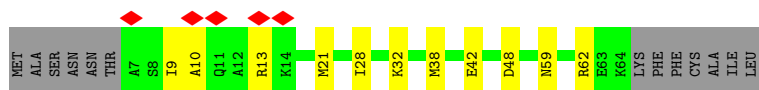


- Molecule 1: Isoform 1 of Extracellular calcium-sensing receptor





- Molecule 5: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2



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



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



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



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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	51057	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 ( $e^-/\text{\AA}^2$ )	70.14	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.285	Depositor
Minimum map value	0.000	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.040	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	432.128, 432.128, 432.128	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.844, 0.844, 0.844	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: PO4, CA, NAG, AV0, TCR, 9IG

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	Q	0.26	0/6360	0.47	0/8627
1	R	0.27	0/6666	0.51	4/9045 (0.0%)
2	H	0.26	0/1829	0.51	0/2480
3	A	0.25	0/1762	0.47	0/2362
4	B	0.25	0/2654	0.55	0/3597
5	G	0.23	0/453	0.42	0/610
All	All	0.26	0/19724	0.50	4/26721 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	R	308	PRO	CA-N-CD	-11.33	95.64	111.50
1	R	89	PRO	CA-N-CD	-11.06	96.02	111.50
1	R	308	PRO	N-CD-CG	-5.79	94.52	103.20
1	R	89	PRO	N-CD-CG	-5.47	95.00	103.20

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	Q	6202	0	6103	77	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	R	6499	0	6400	65	0
2	H	1785	0	1716	20	0
3	A	1733	0	1711	33	0
4	B	2607	0	2510	33	0
5	G	447	0	460	9	0
6	C	28	0	25	0	0
6	D	28	0	25	0	0
6	E	28	0	25	0	0
6	F	28	0	25	0	0
7	Q	42	0	39	0	0
7	R	42	0	39	0	0
8	Q	16	0	11	1	0
8	R	16	0	11	1	0
9	Q	5	0	0	0	0
9	R	5	0	0	0	0
10	Q	4	0	0	0	0
10	R	4	0	0	0	0
11	Q	21	0	0	0	0
11	R	21	0	0	0	0
12	R	69	0	0	1	0
All	All	19630	0	19100	223	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 6.

All (223) 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)
1:R:338:HIS:HD2	1:R:341:LYS:HG3	1.44	0.82
1:Q:754:GLN:HG2	1:Q:761:ILE:HG12	1.68	0.75
2:H:60:ALA:HB3	2:H:63:LYS:HB2	1.66	0.75
1:R:257:GLU:O	1:R:261:ASN:HB2	1.84	0.75
4:B:270:ILE:O	4:B:270:ILE:HG22	1.87	0.74
1:R:117:GLN:NE2	1:R:135:ILE:O	2.23	0.71
1:Q:637:PHE:HB2	1:Q:860:ILE:HD11	1.74	0.68
1:R:689:VAL:HG21	1:R:735:GLN:HG3	1.75	0.68
1:R:45:ALA:HA	1:R:61:ILE:HD11	1.77	0.67
1:Q:197:MET:HG2	1:Q:320:PHE:HE2	1.61	0.66
4:B:281:SER:HB3	5:G:48:ASP:HB2	1.76	0.66
1:R:678:ARG:HA	1:R:748:PRO:HG2	1.77	0.65
4:B:48:ARG:HH12	5:G:62:ARG:HH11	1.43	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:73:HIS:HE1	3:A:80:HIS:HB3	1.62	0.65
2:H:56:TRP:HD1	2:H:90:ILE:HD12	1.61	0.65
4:B:254:ASP:HB2	4:B:261:LEU:HD11	1.78	0.64
1:R:696:LEU:HD21	1:R:787:CYS:HA	1.80	0.64
3:A:70:VAL:HB	3:A:85:ASP:HB3	1.79	0.64
1:R:171:SER:O	1:R:185:ARG:NH2	2.30	0.63
4:B:262:MET:HE1	4:B:302:ALA:HB2	1.82	0.62
1:Q:278:PRO:HA	1:Q:281:LYS:HE2	1.80	0.62
4:B:340:ASN:ND2	5:G:59:ASN:OD1	2.32	0.61
1:R:795:ARG:O	12:R:1010:AV0:OAS	2.19	0.61
2:H:55:HIS:HB2	2:H:117:VAL:HG13	1.83	0.60
3:A:36:LEU:HD22	3:A:107:ILE:HD11	1.84	0.60
3:A:144:ASN:HA	3:A:199:THR:HB	1.83	0.59
1:Q:168:ALA:O	8:Q:1004:TCR:N	2.35	0.59
1:R:168:ALA:O	8:R:1004:TCR:N	2.35	0.59
2:H:68:VAL:HG13	2:H:84:VAL:HG21	1.85	0.58
1:Q:256:VAL:HG11	1:Q:286:ARG:HD2	1.85	0.58
1:Q:658:LEU:HD21	1:Q:848:LEU:HD22	1.86	0.58
4:B:61:MET:HG3	4:B:317:CYS:HB2	1.86	0.58
4:B:51:LEU:HD23	4:B:87:THR:HG23	1.85	0.57
1:Q:335:LYS:HA	1:Q:401:ILE:HD11	1.86	0.57
2:H:185:LEU:HA	2:H:253:LEU:HD12	1.87	0.57
4:B:170:ASP:OD1	4:B:171:ILE:N	2.39	0.56
1:R:22:PRO:O	1:R:25:ARG:NH1	2.39	0.56
1:Q:801:PHE:HE2	1:Q:859:ILE:HG13	1.69	0.56
3:A:152:LYS:HA	3:A:155:LYS:HD2	1.87	0.56
2:H:32:VAL:HG21	2:H:38:ARG:HG3	1.88	0.56
2:H:244:VAL:HG13	2:H:266:GLU:HA	1.87	0.55
1:Q:44:VAL:HA	1:Q:60:CYS:HA	1.87	0.55
1:Q:112:LEU:HD22	1:R:119:LYS:HD3	1.89	0.54
2:H:59:GLN:HB2	2:H:65:LEU:HD23	1.88	0.54
1:R:703:LEU:HD21	1:R:793:LYS:HG2	1.90	0.54
1:Q:788:PHE:HE1	1:Q:808:THR:HG23	1.72	0.53
2:H:98:THR:HG21	2:H:100:PHE:CE1	2.43	0.53
1:Q:657:SER:OG	1:Q:691:CYS:SG	2.52	0.53
1:R:767:GLU:OE2	1:R:767:GLU:N	2.41	0.53
4:B:262:MET:CE	4:B:302:ALA:HB2	2.39	0.53
1:Q:338:HIS:HB3	1:Q:341:LYS:HB2	1.90	0.52
1:R:863:LYS:O	1:R:863:LYS:HG3	2.09	0.52
4:B:270:ILE:O	4:B:270:ILE:CG2	2.56	0.52
1:Q:822:ILE:HB	1:Q:823:PRO:HD3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:742:TRP:HE1	1:R:748:PRO:HD3	1.74	0.52
1:Q:863:LYS:HG3	1:Q:863:LYS:O	2.10	0.51
1:R:229:GLU:OE1	1:R:233:ARG:NH1	2.43	0.51
1:Q:613:GLY:HA2	1:Q:669:ILE:HD11	1.92	0.51
1:Q:678:ARG:HA	1:Q:748:PRO:HG2	1.93	0.51
1:R:249:GLU:O	1:R:253:GLN:HG2	2.11	0.51
1:Q:654:LEU:HD11	1:Q:695:ILE:HG12	1.93	0.51
1:Q:833:VAL:O	1:Q:836:VAL:HG22	2.11	0.50
1:R:792:PHE:O	1:R:795:ARG:HG2	2.11	0.50
2:H:26:GLU:OE2	2:H:134:GLY:N	2.40	0.50
1:Q:253:GLN:OE1	1:Q:286:ARG:NH2	2.45	0.50
5:G:28:ILE:HG21	5:G:32:LYS:HD3	1.93	0.50
1:R:332:GLU:N	1:R:332:GLU:OE2	2.45	0.49
3:A:94:LYS:NZ	4:B:228:ASP:OD2	2.38	0.49
3:A:158:LEU:HG	3:A:162:TYR:HB2	1.94	0.49
3:A:21:ARG:O	3:A:25:GLU:HG3	2.11	0.49
2:H:58:ARG:HG2	2:H:68:VAL:HG23	1.94	0.49
3:A:112:LEU:HB2	3:A:144:ASN:O	2.12	0.49
1:Q:499:GLU:OE1	1:Q:499:GLU:N	2.46	0.49
2:H:58:ARG:HG2	2:H:68:VAL:CG2	2.43	0.49
4:B:27:ASP:OD1	4:B:28:ALA:N	2.46	0.49
1:Q:567:GLU:OE2	1:Q:568:CYS:N	2.46	0.48
1:R:268:VAL:HG22	1:R:294:LEU:HD13	1.95	0.48
3:A:206:ASN:O	3:A:210:ILE:HG13	2.13	0.48
1:Q:338:HIS:ND1	1:Q:339:PRO:HD2	2.29	0.48
1:R:782:LEU:O	1:R:786:ILE:HG12	2.13	0.48
4:B:96:ARG:HG3	4:B:96:ARG:HH11	1.78	0.48
5:G:38:MET:O	5:G:42:GLU:HG2	2.13	0.48
1:Q:112:LEU:HD13	1:R:119:LYS:HG3	1.96	0.48
1:R:338:HIS:ND1	1:R:339:PRO:HD2	2.29	0.48
1:Q:672:PRO:HD2	1:Q:763:ILE:HG22	1.95	0.48
1:Q:788:PHE:CE1	1:Q:808:THR:HG23	2.49	0.48
1:R:27:GLN:HG3	1:R:96:ARG:HG2	1.96	0.48
3:A:146:LYS:HD2	3:A:198:PHE:HB3	1.95	0.47
1:R:252:ILE:O	1:R:256:VAL:HG13	2.14	0.47
1:Q:539:PHE:CZ	1:Q:541:ASN:HB2	2.49	0.47
1:Q:41:HIS:HB2	1:Q:101:CYS:SG	2.54	0.47
1:Q:119:LYS:HD2	1:R:119:LYS:HZ3	1.79	0.47
1:R:818:TRP:O	1:R:822:ILE:HG13	2.14	0.47
1:R:869:ILE:HD12	1:R:869:ILE:H	1.79	0.47
2:H:87:ARG:NH2	2:H:110:ASP:OD2	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:118:MET:O	3:A:122:MET:HG3	2.15	0.47
1:Q:809:PHE:O	1:Q:813:ILE:HG13	2.14	0.47
3:A:129:CYS:SG	3:A:186:ASN:ND2	2.81	0.47
1:R:111:THR:O	1:R:115:VAL:HG22	2.15	0.47
2:H:37:SER:HA	2:H:103:MET:O	2.14	0.47
1:Q:392:ARG:HB2	1:Q:393:PRO:HD3	1.97	0.47
1:R:866:ARG:HA	1:R:871:GLU:HG3	1.97	0.47
4:B:153:ASP:OD1	4:B:155:ASN:N	2.46	0.47
4:B:4:LEU:HD11	5:G:9:ILE:HG12	1.97	0.46
4:B:76:ASP:OD1	4:B:76:ASP:N	2.47	0.46
1:Q:863:LYS:O	1:Q:865:SER:N	2.44	0.46
1:Q:61:ILE:HG22	1:Q:62:ARG:HG3	1.97	0.46
1:Q:338:HIS:HD2	1:Q:341:LYS:HG3	1.80	0.46
4:B:81:ILE:HD13	4:B:91:HIS:HB2	1.96	0.46
3:A:110:VAL:HG12	3:A:143:LEU:HA	1.97	0.46
3:A:153:ILE:HA	3:A:156:SER:O	2.16	0.46
3:A:151:GLU:HA	3:A:154:LYS:HD2	1.97	0.46
2:H:98:THR:CG2	2:H:100:PHE:CE1	2.99	0.46
1:Q:857:ILE:HA	1:Q:860:ILE:HG22	1.98	0.46
3:A:197:HIS:HB2	3:A:209:PHE:CE2	2.51	0.46
4:B:152:LEU:HD11	4:B:158:VAL:HG23	1.98	0.46
4:B:292:PHE:CD1	4:B:292:PHE:N	2.84	0.46
1:Q:119:LYS:HB3	1:Q:119:LYS:HE2	1.57	0.45
1:R:742:TRP:NE1	1:R:748:PRO:HD3	2.32	0.45
3:A:43:ASN:ND2	3:A:111:ASP:OD2	2.46	0.45
1:Q:462:LYS:HD3	1:R:51:LEU:HB2	1.98	0.45
1:R:546:CYS:HB3	1:R:550:THR:HG23	1.99	0.45
1:Q:572:GLU:HB3	1:Q:582:CYS:HB2	1.98	0.45
1:R:283:ILE:HG23	1:R:288:ILE:HB	1.98	0.45
1:R:800:ASN:OD1	1:R:800:ASN:N	2.50	0.45
3:A:126:ASP:OD1	3:A:130:ASN:ND2	2.50	0.45
1:Q:586:PRO:HD2	1:Q:598:CYS:SG	2.56	0.45
1:R:408:TYR:CD2	1:R:409:ILE:HG23	2.52	0.45
1:R:338:HIS:CD2	1:R:341:LYS:HG3	2.36	0.44
2:H:26:GLU:OE2	2:H:133:GLN:N	2.48	0.44
1:R:748:PRO:HB3	1:R:767:GLU:HA	2.00	0.44
4:B:217:MET:CE	4:B:218:CYS:H	2.30	0.44
1:Q:312:HIS:CD2	1:Q:313:VAL:HG23	2.52	0.44
1:R:262:SER:OG	1:R:263:THR:N	2.51	0.44
1:Q:691:CYS:O	1:Q:695:ILE:HG13	2.17	0.44
1:Q:725:PHE:O	1:Q:728:VAL:HG12	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Q:734:MET:O	1:Q:737:VAL:HG12	2.18	0.44
1:Q:855:ASN:OD1	1:Q:856:LYS:N	2.49	0.44
2:H:62:GLU:O	2:H:63:LYS:HG3	2.18	0.44
4:B:112:VAL:HG23	4:B:124:TYR:HB2	1.99	0.44
1:Q:349:LYS:HE3	1:Q:349:LYS:HB2	1.81	0.43
1:Q:854:PHE:HA	1:Q:857:ILE:HB	2.00	0.43
1:R:680:ARG:HG3	1:R:681:GLN:HG2	2.00	0.43
1:R:701:ARG:NH2	3:A:226:CYS:O	2.51	0.43
4:B:192:LEU:HD23	4:B:199:PHE:HB3	2.00	0.43
1:Q:276:LEU:HG	1:Q:280:ILE:HG12	1.99	0.43
1:R:539:PHE:CE1	1:R:541:ASN:HB2	2.53	0.43
3:A:38:LEU:HD21	3:A:46:LYS:HB2	2.00	0.43
1:Q:313:VAL:HG12	1:Q:314:VAL:HG13	1.99	0.43
1:Q:293:TRP:HB2	1:Q:317:THR:HG23	1.99	0.43
4:B:161:SER:OG	4:B:162:GLY:N	2.51	0.43
1:Q:29:LYS:HD3	1:Q:29:LYS:N	2.34	0.43
1:Q:220:ARG:HB2	1:Q:221:PRO:HD3	2.00	0.43
1:Q:801:PHE:CE2	1:Q:859:ILE:HG13	2.52	0.43
5:G:10:ALA:HA	5:G:13:ARG:HD2	2.00	0.43
1:R:81:ILE:HD13	1:R:428:ALA:HB2	2.01	0.43
1:R:197:MET:HG2	1:R:320:PHE:CE1	2.54	0.43
3:A:79:LEU:HD23	3:A:79:LEU:HA	1.85	0.43
1:Q:742:TRP:CD1	1:Q:769:SER:HB3	2.54	0.42
1:R:29:LYS:HB3	1:R:29:LYS:HE3	1.66	0.42
1:R:677:CYS:HB3	1:R:765:CYS:HB3	1.94	0.42
1:Q:103:THR:HG22	1:Q:105:SER:H	1.84	0.42
1:Q:553:GLY:N	1:Q:564:GLU:O	2.52	0.42
2:H:98:THR:CG2	2:H:100:PHE:CZ	3.02	0.42
4:B:48:ARG:HH12	5:G:62:ARG:NH1	2.13	0.42
4:B:118:ASP:O	4:B:120:ILE:HD12	2.19	0.42
1:Q:757:GLU:HG2	1:Q:759:GLU:H	1.85	0.42
1:R:422:LEU:HD23	1:R:422:LEU:HA	1.89	0.42
1:R:472:ASN:OD1	1:R:472:ASN:N	2.53	0.42
1:R:489:TYR:HB2	1:R:511:TYR:HB3	2.02	0.42
1:R:692:ILE:HG21	1:R:783:LEU:HB3	2.02	0.42
1:Q:119:LYS:HD2	1:R:119:LYS:NZ	2.34	0.42
1:Q:229:GLU:OE1	1:Q:233:ARG:NH1	2.48	0.42
1:R:88:LEU:HD22	1:R:91:LEU:HD12	2.02	0.42
5:G:9:ILE:H	5:G:9:ILE:HG13	1.58	0.42
3:A:52:GLN:HE22	3:A:76:PHE:HD2	1.68	0.42
3:A:122:MET:HB3	3:A:185:LEU:HD21	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Q:806:PHE:HB3	1:Q:851:CYS:O	2.20	0.42
1:R:567:GLU:H	1:R:567:GLU:CD	2.23	0.42
3:A:77:LYS:HE2	3:A:77:LYS:HB2	1.64	0.42
1:Q:284:VAL:HG21	1:Q:310:TYR:CD1	2.55	0.41
1:R:758:ASP:OD1	1:R:759:GLU:N	2.53	0.41
4:B:57:LYS:HD2	4:B:332:TRP:CG	2.55	0.41
1:Q:592:ASN:HD21	1:Q:597:SER:H	1.68	0.41
1:Q:734:MET:O	1:Q:738:ILE:HG22	2.20	0.41
1:R:671:GLU:HA	1:R:672:PRO:HD3	1.96	0.41
1:R:696:LEU:HD23	1:R:696:LEU:HA	1.83	0.41
3:A:106:ILE:O	3:A:139:ILE:HA	2.20	0.41
3:A:216:ASP:O	3:A:220:LYS:HG2	2.21	0.41
1:Q:737:VAL:HA	1:Q:740:VAL:HG22	2.01	0.41
1:R:162:ILE:HA	1:R:457:ALA:HB1	2.02	0.41
1:Q:695:ILE:HD11	1:Q:848:LEU:HD21	2.01	0.41
1:R:432:GLN:OE1	1:R:432:GLN:HA	2.21	0.41
1:R:616:LEU:HD13	1:R:838:VAL:HG11	2.03	0.41
3:A:215:THR:O	3:A:218:ILE:HG22	2.21	0.41
1:Q:186:THR:HA	1:Q:485:LEU:HD12	2.02	0.41
1:Q:525:GLU:H	1:Q:525:GLU:CD	2.24	0.41
3:A:20:ASP:OD1	4:B:89:LYS:NZ	2.37	0.41
4:B:197:ARG:HD3	4:B:197:ARG:HA	1.83	0.41
1:Q:400:ASN:HD21	1:Q:402:SER:HB2	1.85	0.41
1:Q:517:LYS:HE2	1:Q:517:LYS:HB3	1.68	0.41
1:R:105:SER:O	1:R:109:GLU:HG3	2.20	0.41
1:R:112:LEU:HD23	1:R:156:LEU:HD21	2.03	0.41
1:R:570:ASP:OD1	1:R:570:ASP:N	2.54	0.41
3:A:20:ASP:O	3:A:24:ARG:HG2	2.21	0.41
4:B:253:PHE:CE1	4:B:260:GLU:HB3	2.56	0.41
1:Q:339:PRO:HD3	1:Q:352:TRP:CE3	2.55	0.40
1:Q:493:ASN:HD22	1:Q:493:ASN:HA	1.72	0.40
1:R:277:GLU:HG2	1:R:281:LYS:HE3	2.03	0.40
1:R:655:LEU:HD23	1:R:655:LEU:HA	1.92	0.40
3:A:200:CYS:SG	3:A:201:ALA:N	2.94	0.40
4:B:251:ARG:HD3	4:B:260:GLU:OE1	2.21	0.40
4:B:320:VAL:HG22	4:B:327:VAL:HG22	2.02	0.40
1:Q:81:ILE:HD13	1:Q:428:ALA:HB2	2.03	0.40
1:Q:280:ILE:HD13	1:Q:280:ILE:HA	1.92	0.40
1:Q:310:TYR:O	1:Q:314:VAL:HG22	2.21	0.40
1:Q:435:TYR:HD1	1:Q:436:THR:HG23	1.86	0.40
1:Q:506:LYS:HB2	1:Q:506:LYS:HE3	1.73	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:88:PHE:CE1	2:H:103:MET:HB3	2.56	0.40
3:A:165:TYR:HB2	3:A:177:TYR:CE2	2.56	0.40
1:Q:284:VAL:HA	1:Q:313:VAL:HG21	2.03	0.40
2:H:46:GLY:O	4:B:130:GLU:HG3	2.21	0.40
3:A:53:MET:O	3:A:74:PHE:HB3	2.21	0.40

There are no symmetry-related clashes.

### 5.3 Torsion angles [i](#)

#### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	Q	772/911 (85%)	746 (97%)	26 (3%)	0	100	100
1	R	810/911 (89%)	796 (98%)	14 (2%)	0	100	100
2	H	228/297 (77%)	223 (98%)	5 (2%)	0	100	100
3	A	210/229 (92%)	206 (98%)	4 (2%)	0	100	100
4	B	337/348 (97%)	326 (97%)	11 (3%)	0	100	100
5	G	56/71 (79%)	56 (100%)	0	0	100	100
All	All	2413/2767 (87%)	2353 (98%)	60 (2%)	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	Q	678/790 (86%)	673 (99%)	5 (1%)	84	93
1	R	710/790 (90%)	694 (98%)	16 (2%)	50	76
2	H	197/239 (82%)	194 (98%)	3 (2%)	65	84
3	A	191/197 (97%)	187 (98%)	4 (2%)	53	78
4	B	282/291 (97%)	277 (98%)	5 (2%)	59	81
5	G	47/58 (81%)	46 (98%)	1 (2%)	53	78
All	All	2105/2365 (89%)	2071 (98%)	34 (2%)	64	83

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	Q	398	ASP
1	Q	480	ASP
1	Q	578	ASP
1	Q	612	PHE
1	Q	758	ASP
1	R	185	ARG
1	R	244	SER
1	R	261	ASN
1	R	270	PHE
1	R	359	HIS
1	R	507	GLU
1	R	545	ASP
1	R	570	ASP
1	R	592	ASN
1	R	605	PHE
1	R	619	PHE
1	R	688	PHE
1	R	706	PHE
1	R	787	CYS
1	R	788	PHE
1	R	800	ASN
2	H	38	ARG
2	H	176	SER
2	H	186	LEU
3	A	28	GLU
3	A	112	LEU
3	A	118	MET
3	A	216	ASP
4	B	105	TYR
4	B	161	SER

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Mol	Chain	Res	Type
4	B	217	MET
4	B	234	PHE
4	B	247	ASP
5	G	21	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	Q	735	GLN
1	R	338	HIS
3	A	73	HIS

### 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](#)

8 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	C	1	6,1	14,14,15	0.29	0	17,19,21	0.57	0
6	NAG	C	2	6	14,14,15	0.25	0	17,19,21	0.39	0
6	NAG	D	1	6,1	14,14,15	0.21	0	17,19,21	0.41	0
6	NAG	D	2	6	14,14,15	0.22	0	17,19,21	0.45	0
6	NAG	E	1	6,1	14,14,15	0.29	0	17,19,21	0.68	1 (5%)
6	NAG	E	2	6	14,14,15	0.21	0	17,19,21	0.42	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	NAG	F	1	6,1	14,14,15	0.22	0	17,19,21	0.43	0
6	NAG	F	2	6	14,14,15	0.20	0	17,19,21	0.45	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	C	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	C	2	6	-	2/6/23/26	0/1/1/1
6	NAG	D	1	6,1	-	2/6/23/26	0/1/1/1
6	NAG	D	2	6	-	2/6/23/26	0/1/1/1
6	NAG	E	1	6,1	-	1/6/23/26	0/1/1/1
6	NAG	E	2	6	-	4/6/23/26	0/1/1/1
6	NAG	F	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	F	2	6	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	E	1	NAG	C1-O5-C5	2.06	114.98	112.19

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	2	NAG	C8-C7-N2-C2
6	C	2	NAG	O7-C7-N2-C2
6	D	1	NAG	C8-C7-N2-C2
6	D	1	NAG	O7-C7-N2-C2
6	D	2	NAG	C8-C7-N2-C2
6	D	2	NAG	O7-C7-N2-C2
6	E	2	NAG	C8-C7-N2-C2
6	E	2	NAG	O7-C7-N2-C2
6	F	2	NAG	C8-C7-N2-C2
6	F	2	NAG	O7-C7-N2-C2
6	E	2	NAG	O5-C5-C6-O6
6	F	2	NAG	C4-C5-C6-O6

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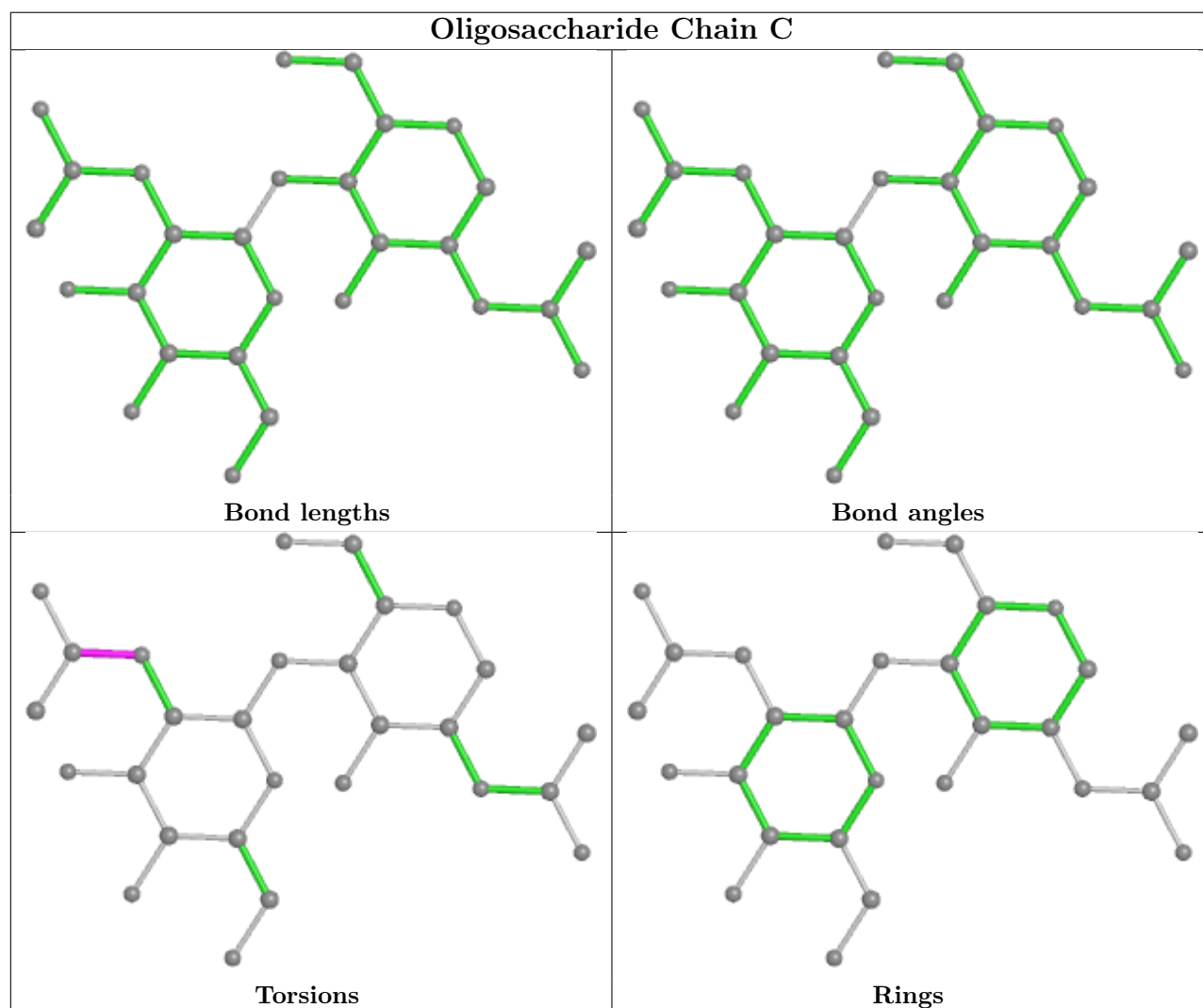
Continued from previous page...

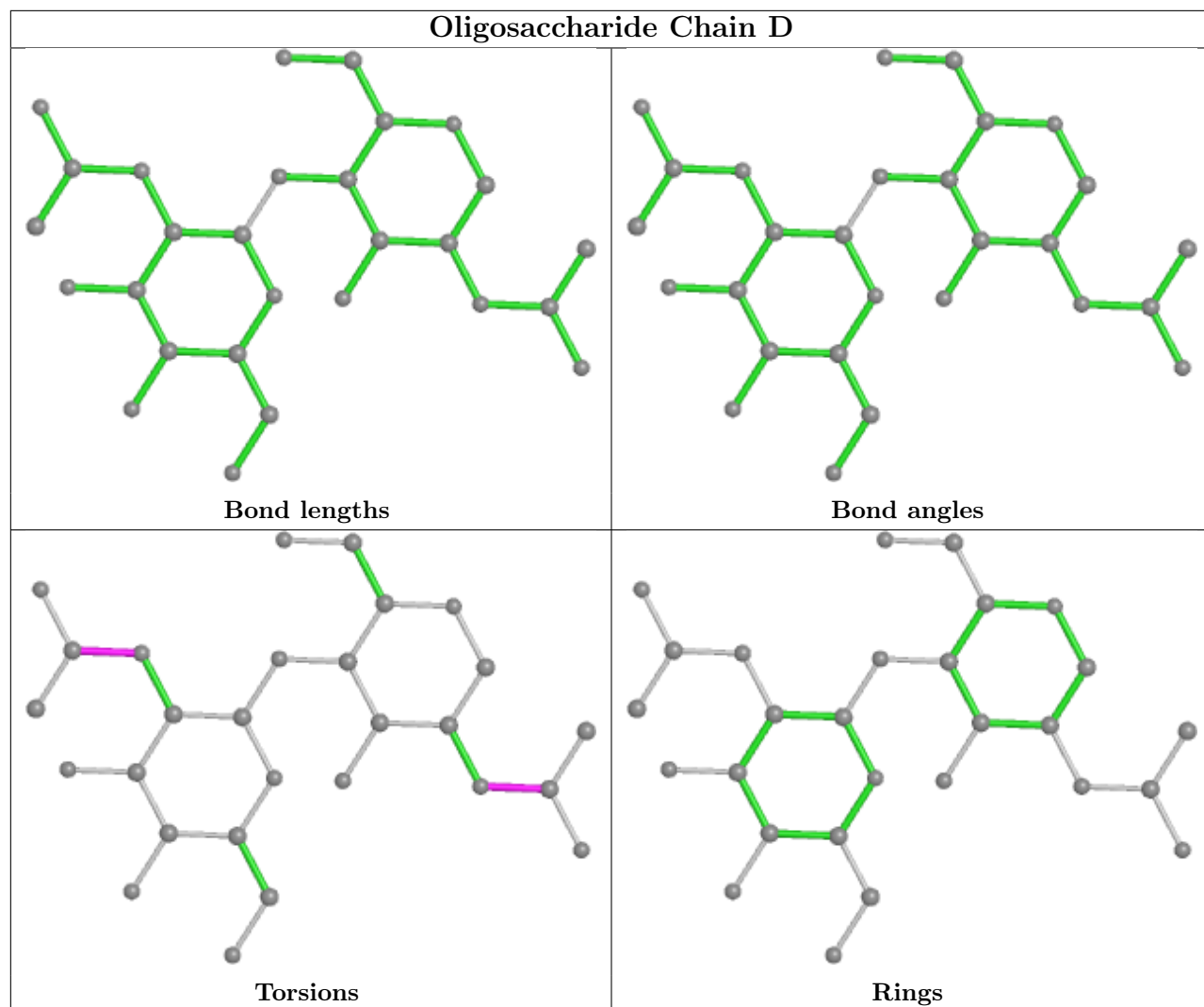
Mol	Chain	Res	Type	Atoms
6	F	2	NAG	O5-C5-C6-O6
6	E	2	NAG	C4-C5-C6-O6
6	E	1	NAG	C3-C2-N2-C7

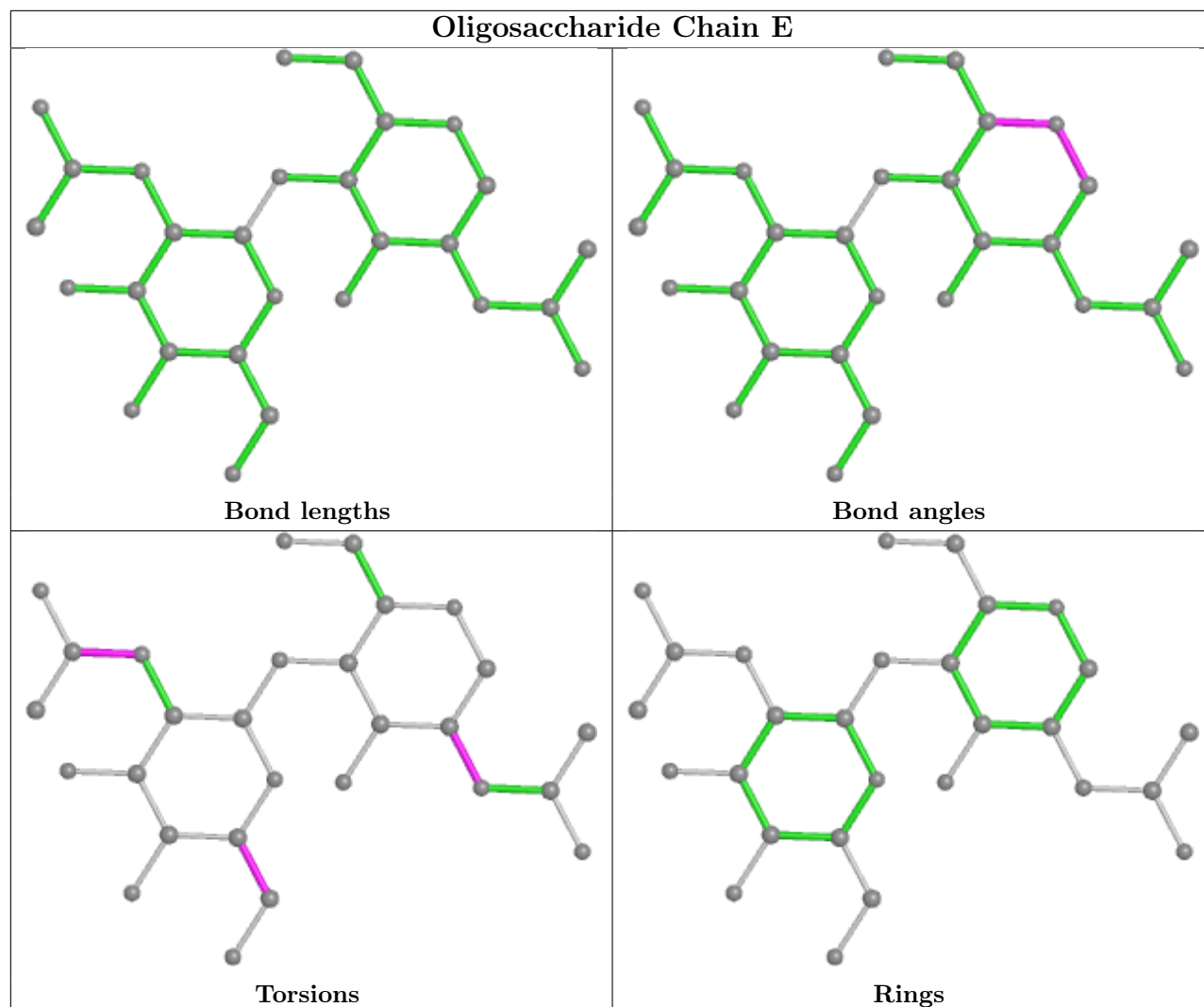
There are no ring outliers.

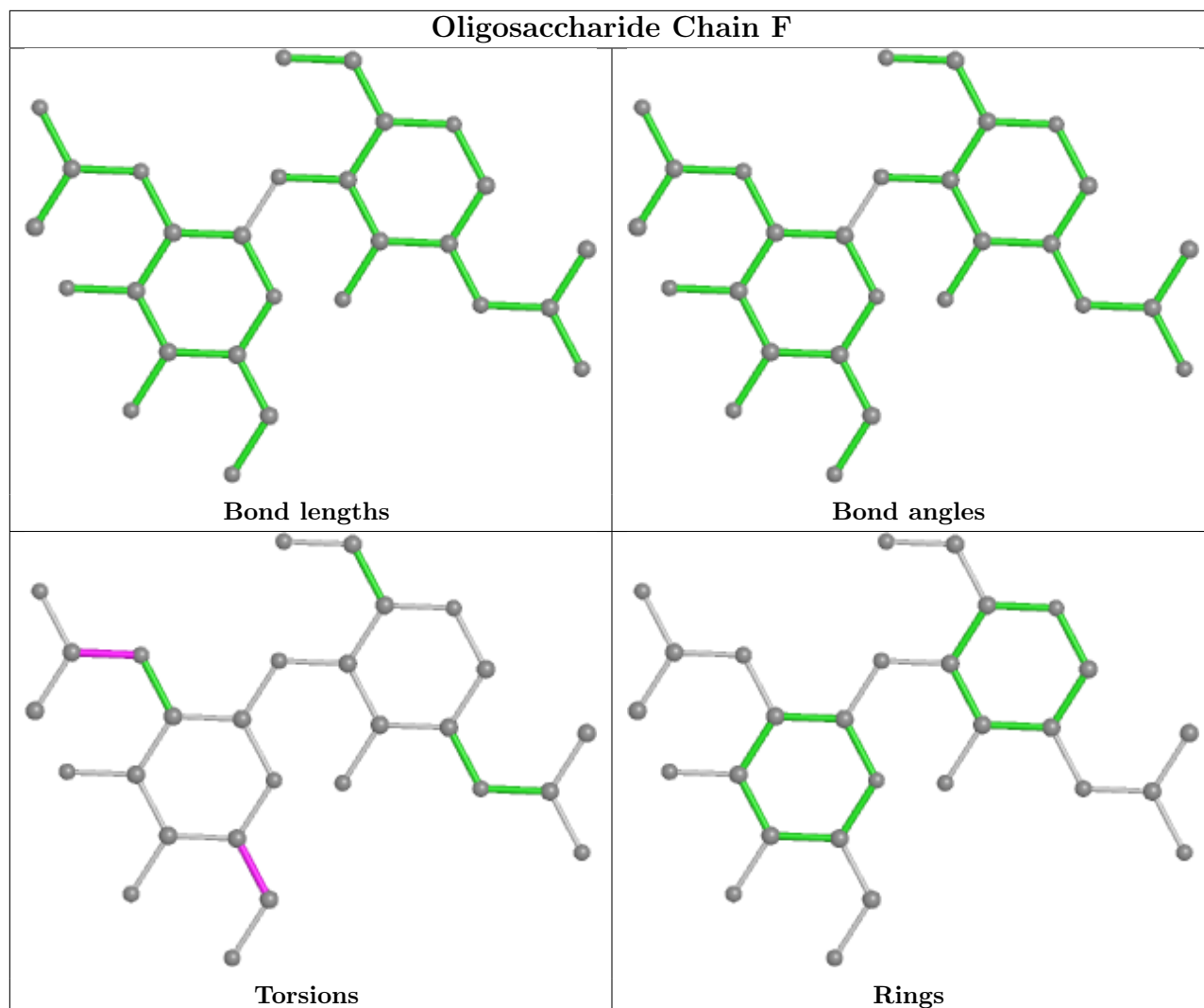
No monomer is involved in short contacts.

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









## 5.6 Ligand geometry [i](#)

Of 21 ligands modelled in this entry, 8 are monoatomic - leaving 13 for Mogul analysis.

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	$\# Z  > 2$
8	TCR	R	1004	-	16,18,18	1.71	2 (12%)	16,26,26	1.23	2 (12%)
12	AV0	R	1010	-	72,72,72	0.86	0	96,98,98	1.30	10 (10%)
7	NAG	R	1003	1	14,14,15	0.25	0	17,19,21	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	NAG	R	1002	1	14,14,15	0.19	0	17,19,21	0.41	0
7	NAG	Q	1002	1	14,14,15	0.25	0	17,19,21	0.42	0
11	9IG	Q	1010	-	22,22,22	0.78	0	26,28,28	1.04	2 (7%)
11	9IG	R	1011	-	22,22,22	0.77	0	26,28,28	1.05	2 (7%)
8	TCR	Q	1004	-	16,18,18	1.75	2 (12%)	16,26,26	1.16	2 (12%)
9	PO4	R	1005	-	4,4,4	0.98	0	6,6,6	0.43	0
7	NAG	R	1001	1	14,14,15	0.20	0	17,19,21	0.34	0
7	NAG	Q	1003	1	14,14,15	0.21	0	17,19,21	0.45	0
7	NAG	Q	1001	1	14,14,15	0.28	0	17,19,21	0.48	0
9	PO4	Q	1005	-	4,4,4	0.96	0	6,6,6	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
8	TCR	R	1004	-	-	1/4/13/13	0/3/3/3
12	AV0	R	1010	-	-	19/50/130/130	0/4/4/4
7	NAG	R	1003	1	-	2/6/23/26	0/1/1/1
7	NAG	R	1002	1	-	0/6/23/26	0/1/1/1
7	NAG	Q	1002	1	-	2/6/23/26	0/1/1/1
11	9IG	Q	1010	-	-	3/13/13/13	0/2/2/2
8	TCR	Q	1004	-	-	2/4/13/13	0/3/3/3
11	9IG	R	1011	-	-	8/13/13/13	0/2/2/2
7	NAG	R	1001	1	-	2/6/23/26	0/1/1/1
7	NAG	Q	1003	1	-	0/6/23/26	0/1/1/1
7	NAG	Q	1001	1	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	R	1004	TCR	CB-CG	-5.18	1.45	1.51
8	Q	1004	TCR	CB-CG	-5.10	1.45	1.51
8	R	1004	TCR	C9-N	2.96	1.50	1.46
8	Q	1004	TCR	C9-N	2.95	1.50	1.46

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	R	1010	AV0	CCU-CCO-CCD	-4.29	102.59	110.24
12	R	1010	AV0	O3-C3-C2	-3.77	101.63	110.35
12	R	1010	AV0	OBX-CCJ-OBV	-3.37	102.00	109.97
11	Q	1010	9IG	C06-C05-C04	2.87	124.48	120.53
11	R	1011	9IG	C06-C05-C04	2.85	124.45	120.53
8	R	1004	TCR	CD1-C9-N	-2.42	107.49	113.27
8	Q	1004	TCR	CD1-C9-N	-2.35	107.66	113.27
12	R	1010	AV0	CBM-CCC-CCN	-2.33	107.55	113.00
12	R	1010	AV0	O5-C1-O1	-2.27	104.59	109.97
12	R	1010	AV0	C1-C2-C3	-2.25	105.30	110.00
12	R	1010	AV0	CCW-CCU-CCO	-2.25	106.90	110.82
12	R	1010	AV0	CCR-O4-C4	-2.17	112.60	117.96
8	Q	1004	TCR	CZ3-CE3-CD2	-2.16	117.89	120.89
11	R	1011	9IG	C10-O09-C05	-2.14	112.86	117.51
8	R	1004	TCR	CZ3-CE3-CD2	-2.12	117.95	120.89
12	R	1010	AV0	O6-C6-C5	-2.06	104.22	111.29
11	Q	1010	9IG	C10-O09-C05	-2.04	113.09	117.51
12	R	1010	AV0	OAI-CBM-CCC	-2.01	104.41	111.29

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	R	1011	9IG	C12-C13-C14-C15
11	R	1011	9IG	C01-C02-N11-C12
11	R	1011	9IG	C03-C02-N11-C12
7	R	1001	NAG	C4-C5-C6-O6
7	Q	1002	NAG	O5-C5-C6-O6
7	R	1001	NAG	O5-C5-C6-O6
11	R	1011	9IG	C06-C05-O09-C10
11	R	1011	9IG	C04-C05-O09-C10
7	Q	1001	NAG	C4-C5-C6-O6
11	R	1011	9IG	N11-C12-C13-C14
11	Q	1010	9IG	N11-C12-C13-C14
7	Q	1001	NAG	O5-C5-C6-O6
12	R	1010	AV0	CBF-CBH-CBJ-CBL
12	R	1010	AV0	CBI-CBK-CBQ-CCM
7	Q	1002	NAG	C4-C5-C6-O6
12	R	1010	AV0	CBG-CBI-CBK-CBQ
12	R	1010	AV0	CBD-CBF-CBH-CBJ
12	R	1010	AV0	O5-C5-C6-O6
12	R	1010	AV0	CBA-CBC-CBE-CBG
12	R	1010	AV0	CAX-CAZ-CBB-CBD

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Mol	Chain	Res	Type	Atoms
12	R	1010	AV0	CBB-CBD-CBF-CBH
12	R	1010	AV0	CAY-CBA-CBC-CBE
11	Q	1010	9IG	C04-C05-O09-C10
12	R	1010	AV0	CBJ-CBL-CBR-CCM
11	Q	1010	9IG	C06-C05-O09-C10
7	R	1003	NAG	C4-C5-C6-O6
12	R	1010	AV0	OAJ-CBN-CCD-OBZ
12	R	1010	AV0	OAJ-CBN-CCD-CCO
12	R	1010	AV0	CAB-CAX-CAZ-CBB
12	R	1010	AV0	OBV-CBT-CCM-CBQ
12	R	1010	AV0	OBV-CBT-CCM-CBR
12	R	1010	AV0	C4-C5-C6-O6
12	R	1010	AV0	CBC-CBE-CBG-CBI
12	R	1010	AV0	CBE-CBG-CBI-CBK
11	R	1011	9IG	C13-C12-N11-C02
7	R	1003	NAG	O5-C5-C6-O6
8	Q	1004	TCR	OXT-C-CA-CB
8	Q	1004	TCR	O1-C-CA-CB
12	R	1010	AV0	CAA-CAW-CAY-CBA
8	R	1004	TCR	O1-C-CA-N
11	R	1011	9IG	C13-C14-C15-C16

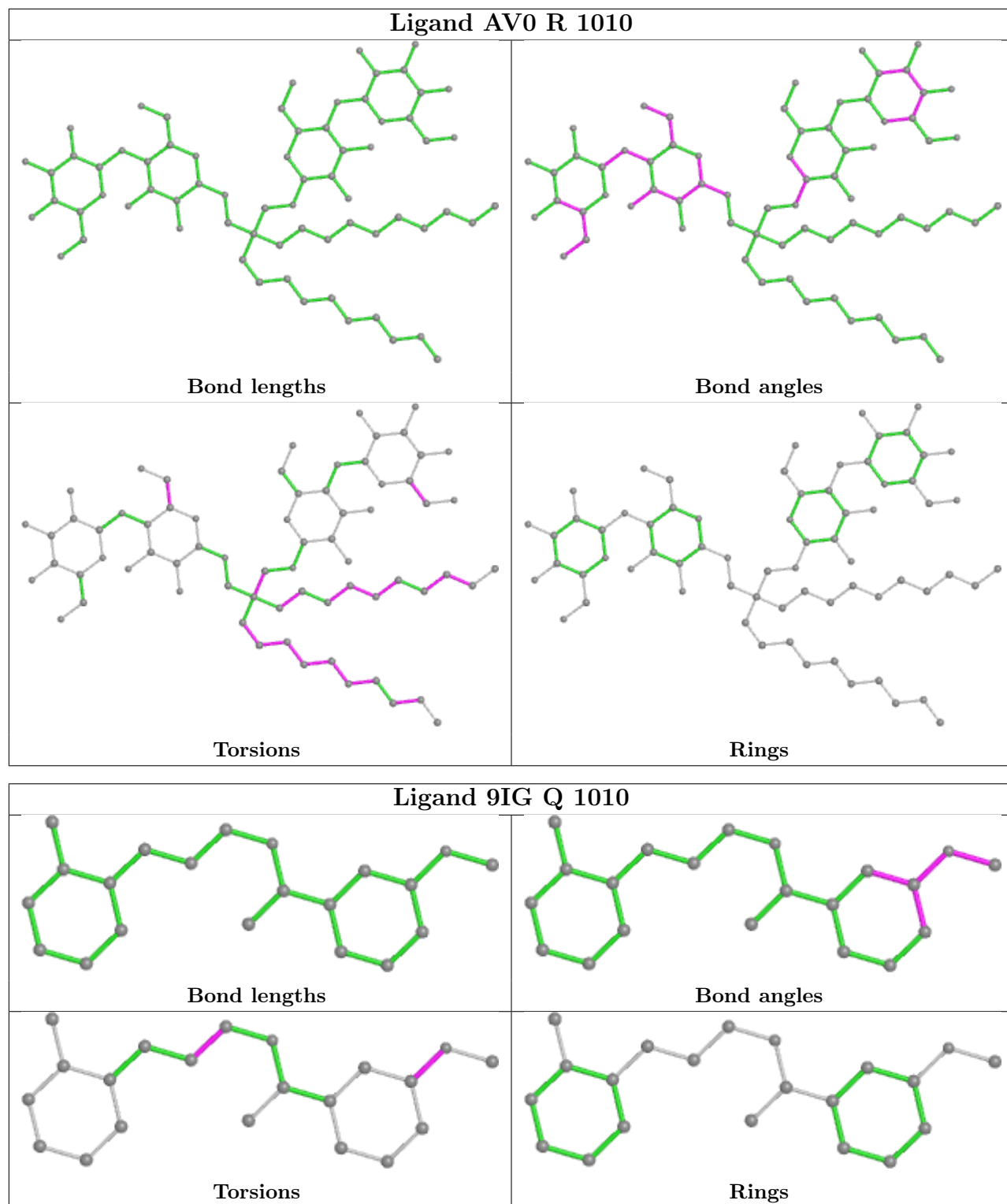
There are no ring outliers.

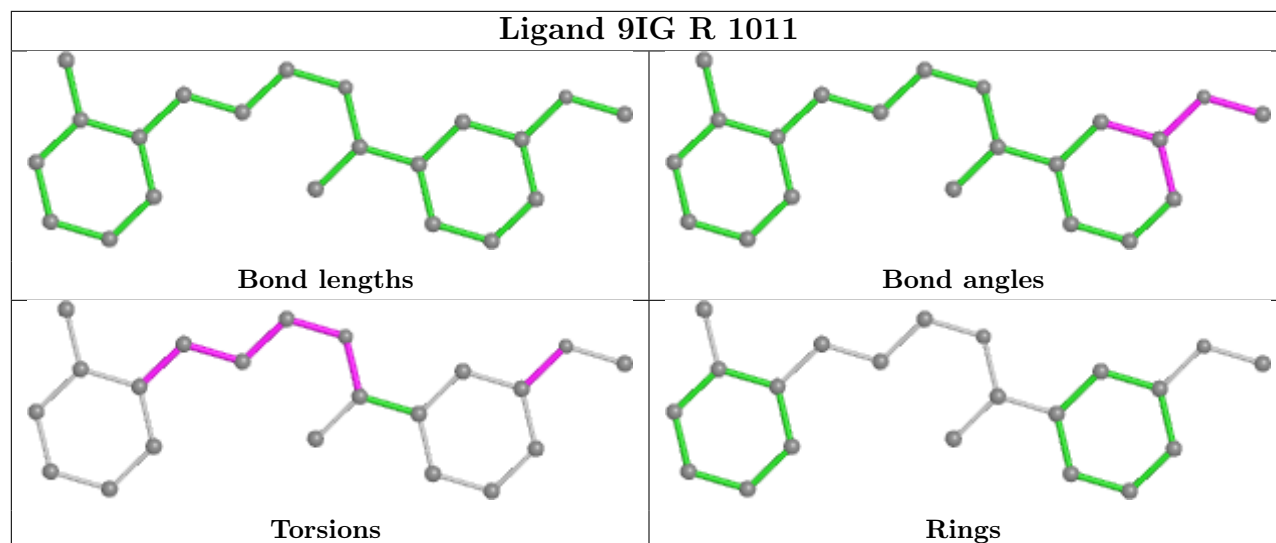
3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	R	1004	TCR	1	0
12	R	1010	AV0	1	0
8	Q	1004	TCR	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.

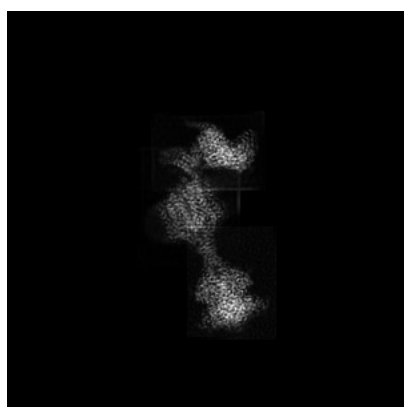
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-43990. These allow visual inspection of the internal detail of the map and identification of artifacts.

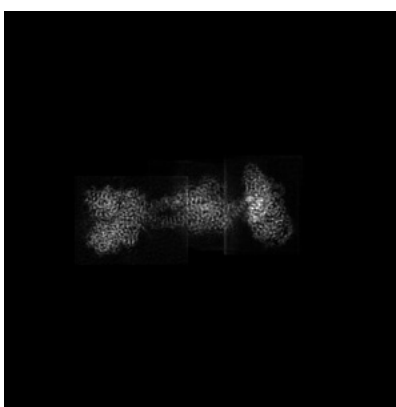
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

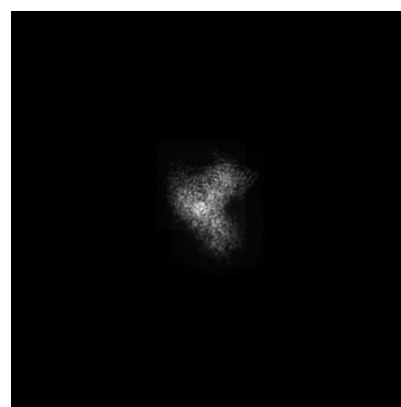
#### 6.1.1 Primary map



X



Y



Z

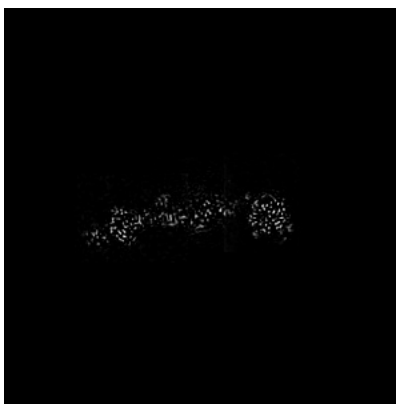
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

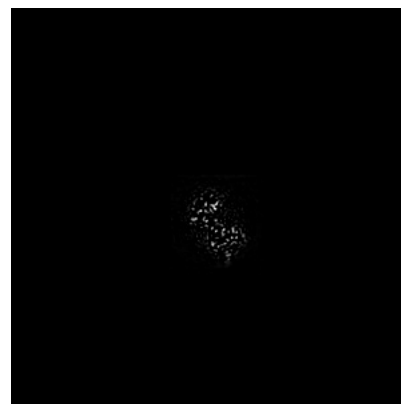
#### 6.2.1 Primary map



X Index: 256



Y Index: 256

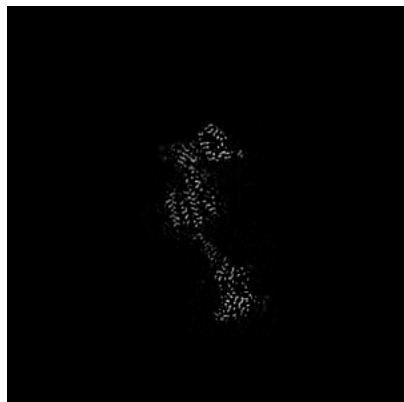


Z Index: 256

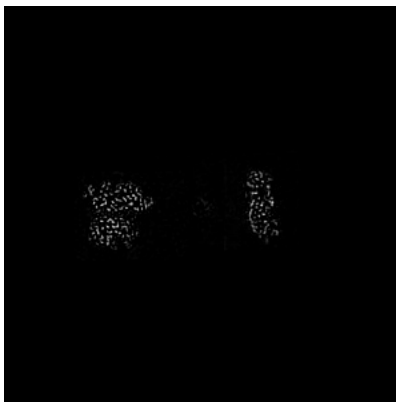
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

### 6.3.1 Primary map



X Index: 259



Y Index: 279

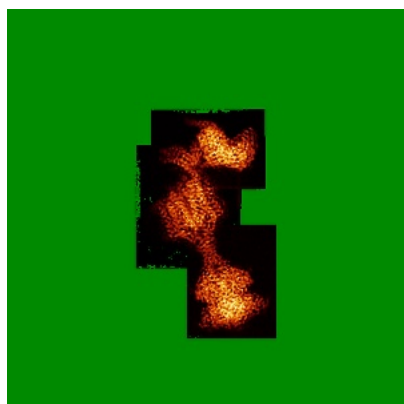


Z Index: 322

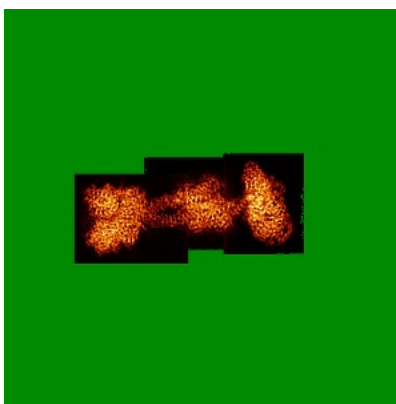
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

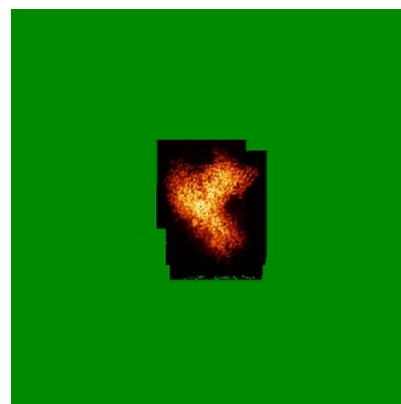
### 6.4.1 Primary map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

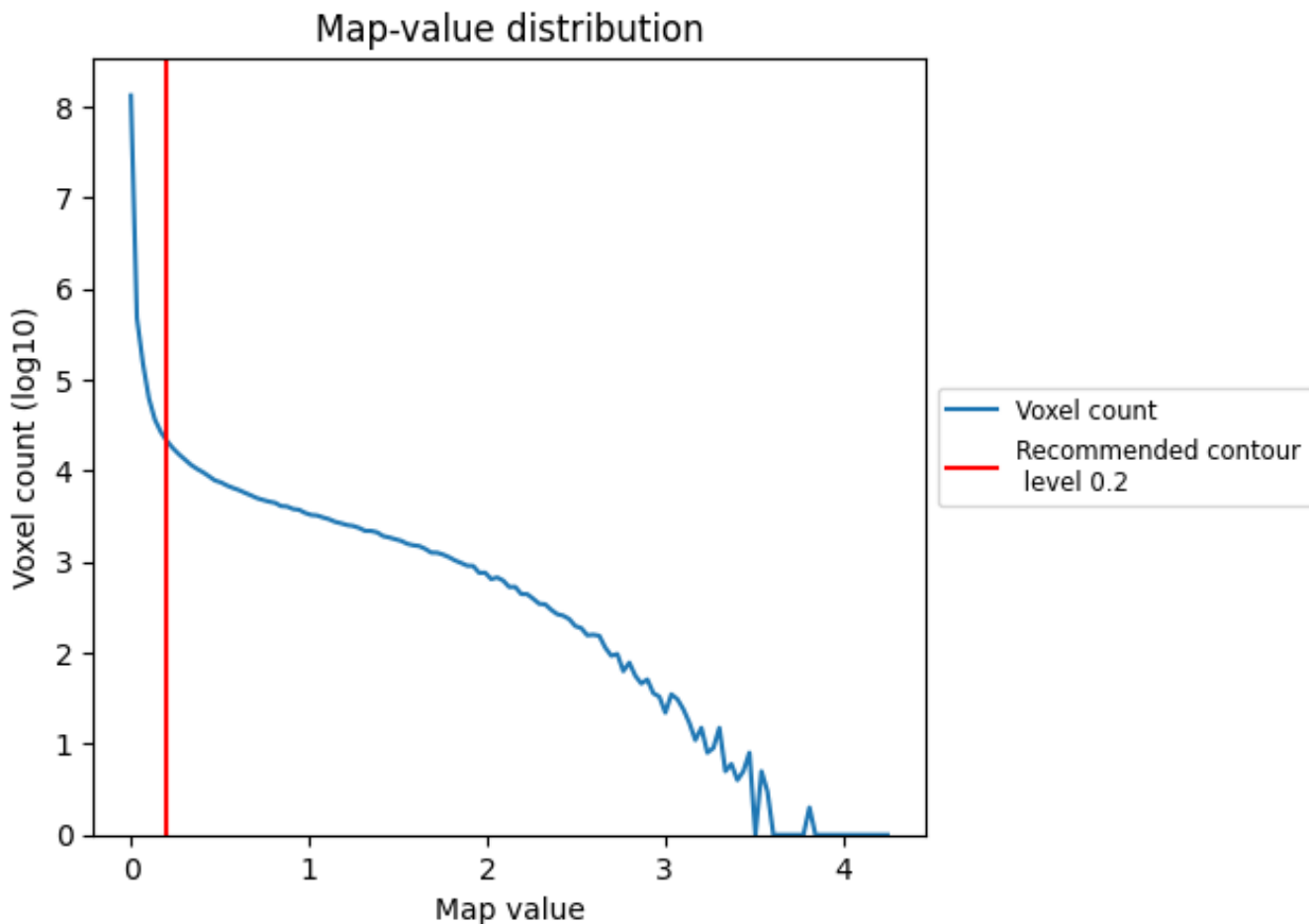
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

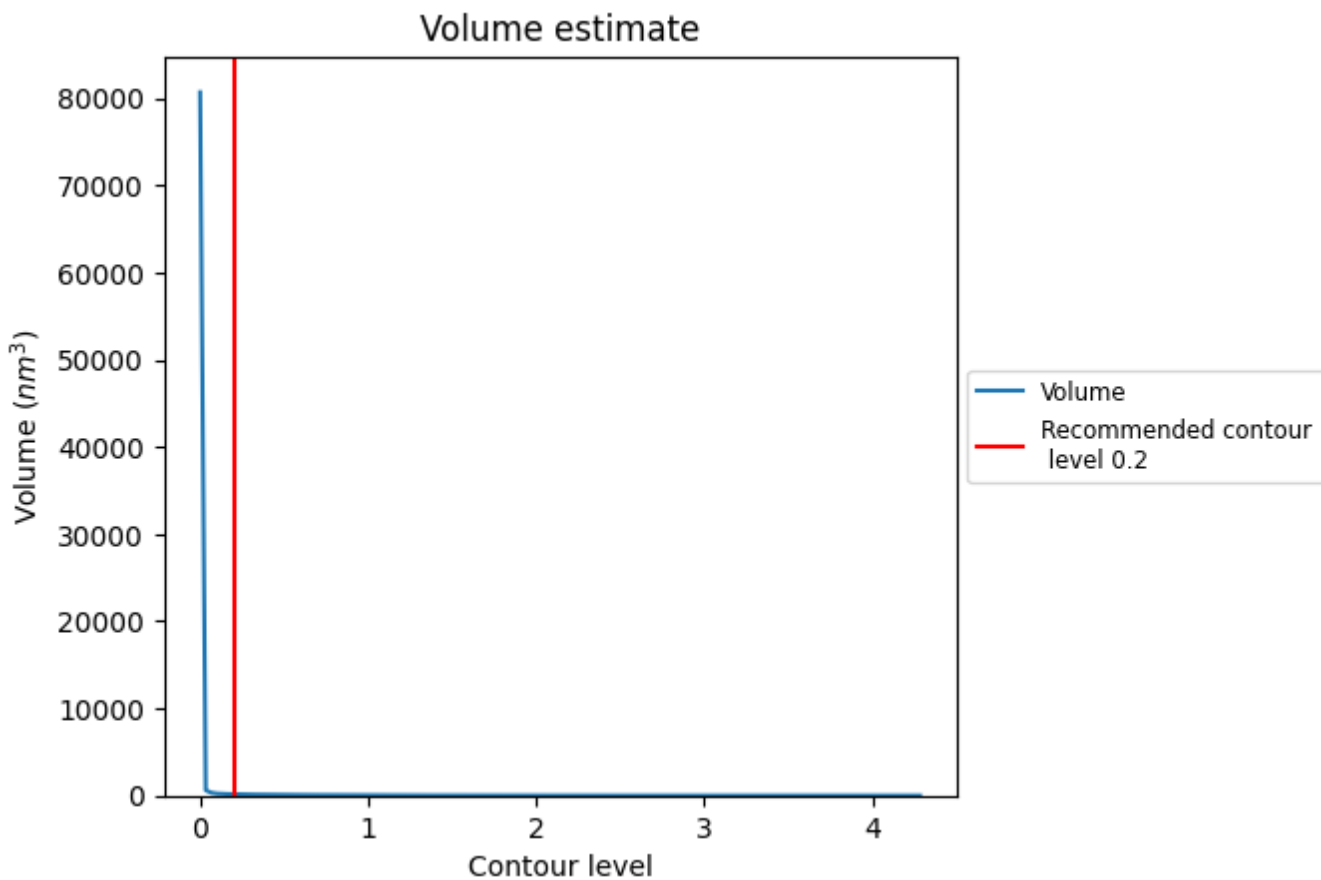
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

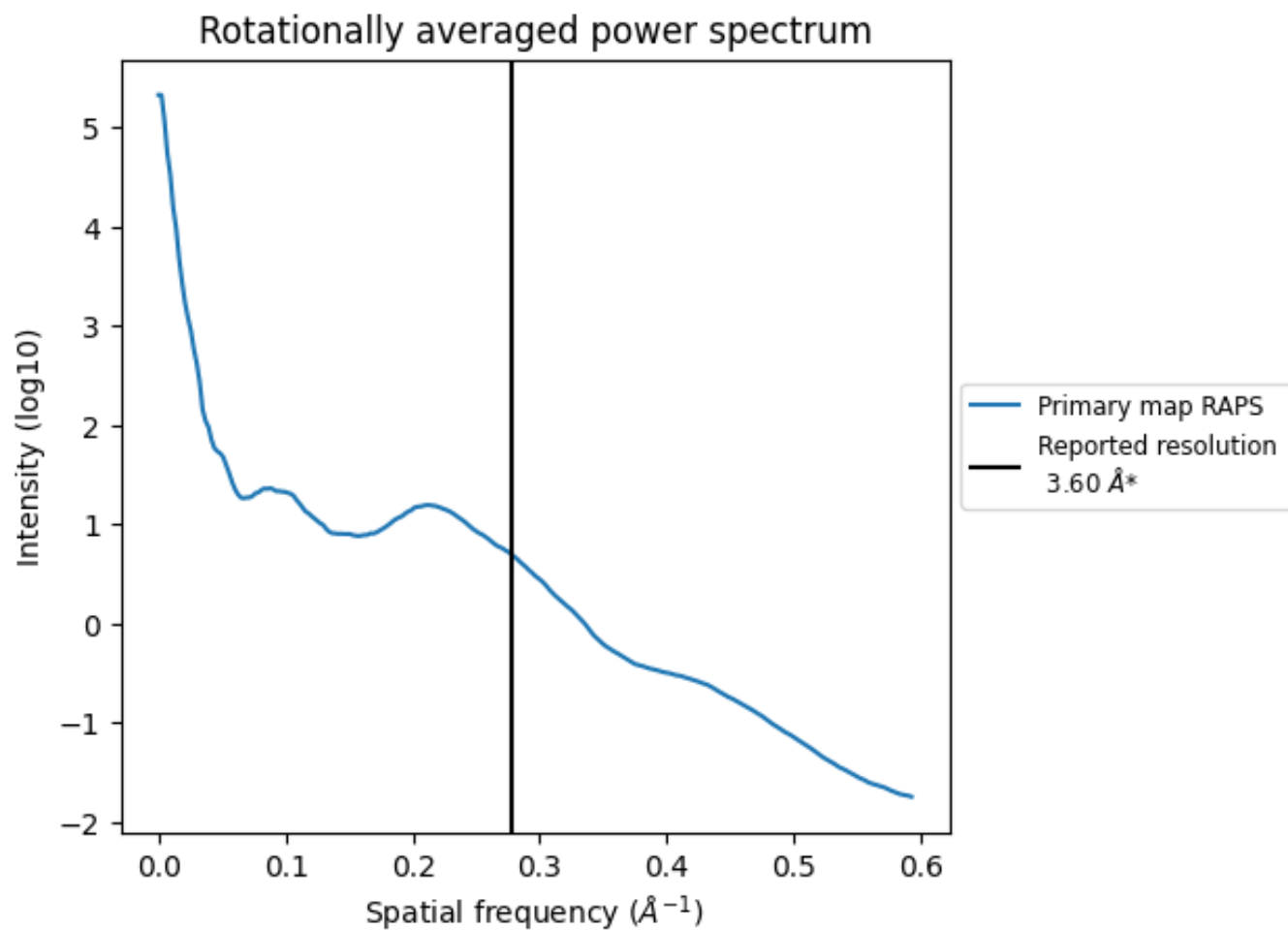
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 154 nm<sup>3</sup>; this corresponds to an approximate mass of 139 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.278 \text{\AA}^{-1}$



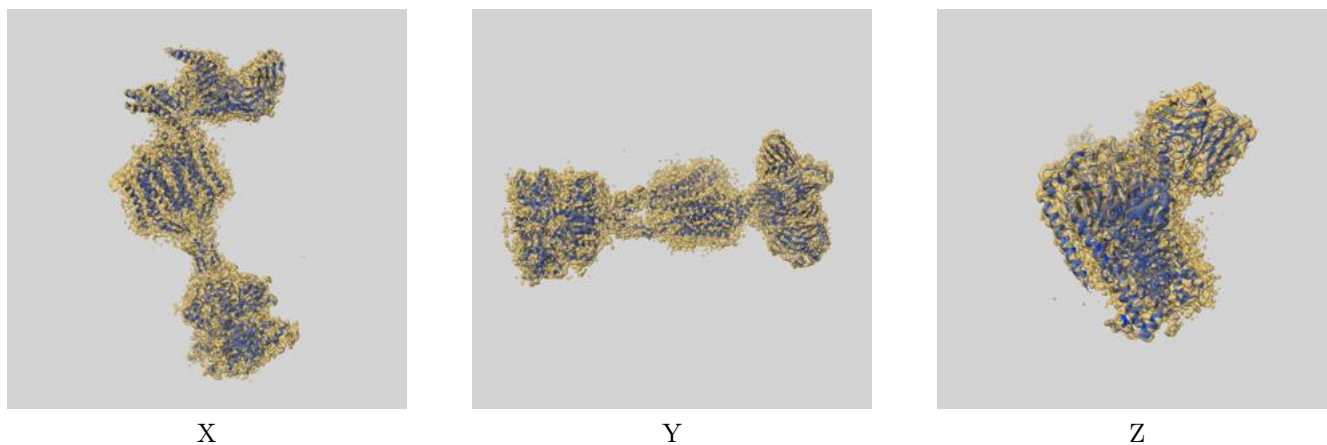
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

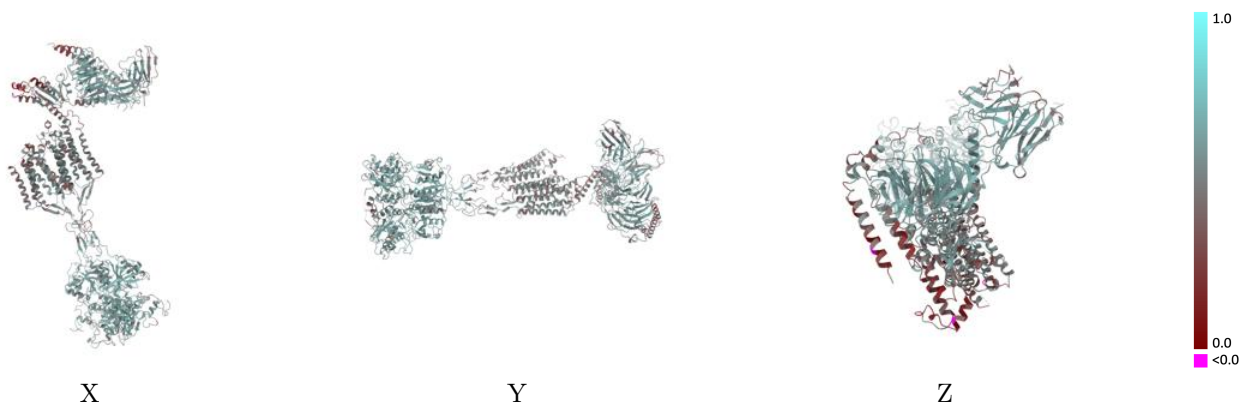
This section contains information regarding the fit between EMDB map EMD-43990 and PDB model 9AYF. Per-residue inclusion information can be found in section 3 on page 11.

### 9.1 Map-model overlay [i](#)



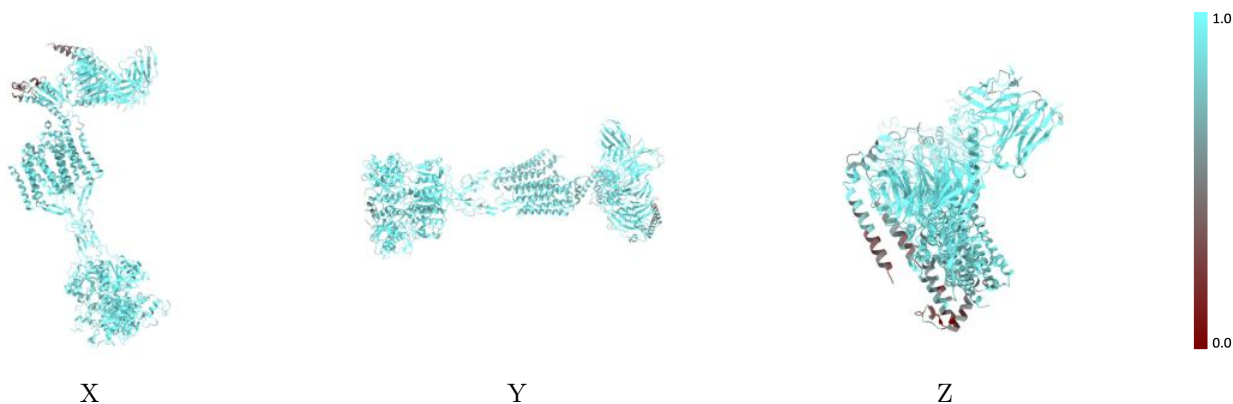
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [\(i\)](#)



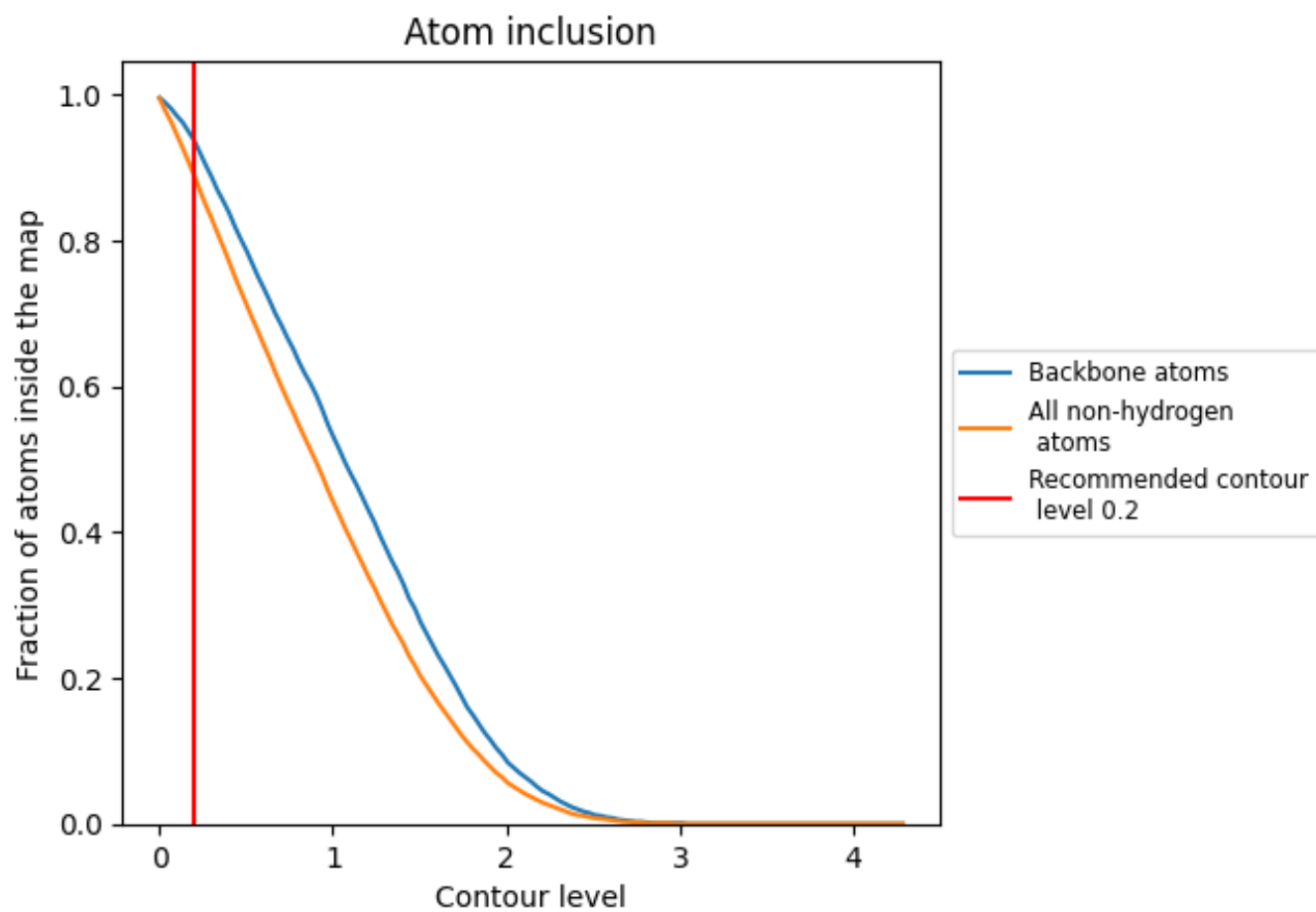
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8900	 0.5290
A	 0.7740	 0.4160
B	 0.9210	 0.5580
C	 0.7140	 0.4190
D	 0.8930	 0.5210
E	 0.7500	 0.4070
F	 0.8570	 0.5070
G	 0.7230	 0.4330
H	 0.9180	 0.5480
Q	 0.9010	 0.5380
R	 0.9020	 0.5400

