



Full wwPDB EM Validation Report ⓘ

Apr 26, 2026 – 12:10 AM JST

PDB ID : 9X2M / pdb_00009x2m
EMDB ID : EMD-66479
Title : Gut transporter with sorbitol
Authors : Deng, T.; Ge, X.; Wang, J.
Deposited on : 2025-10-06
Resolution : 3.44 Å(reported)

This is a Full wwPDB EM Validation 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 : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : **NOT EXECUTED**
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

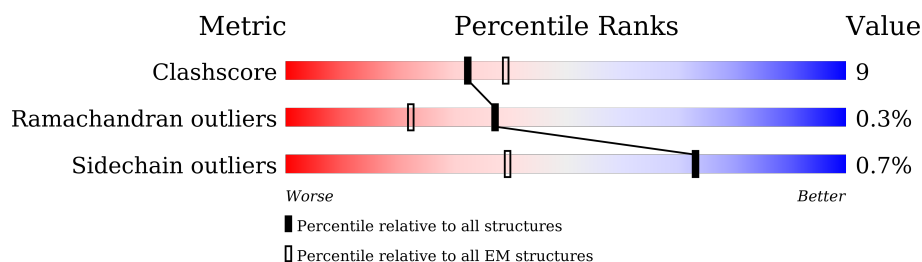
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.44 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	229148	23984
Ramachandran outliers	224038	23583
Sidechain outliers	223484	23102

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	1	319	
1	E	319	
1	F	319	
2	2	187	
2	A	187	
2	B	187	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7880 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.

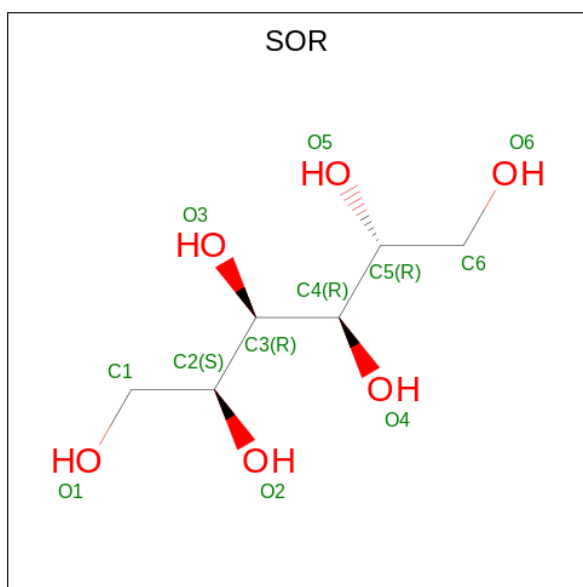
- Molecule 1 is a protein called PTS system glucitol/sorbitol-specific EIIB component.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	1	166	Total	C	N	O	S	0	0
			1206	800	195	205	6		
1	E	166	Total	C	N	O	S	0	0
			1206	800	195	205	6		
1	F	171	Total	C	N	O	S	0	0
			1239	821	201	210	7		

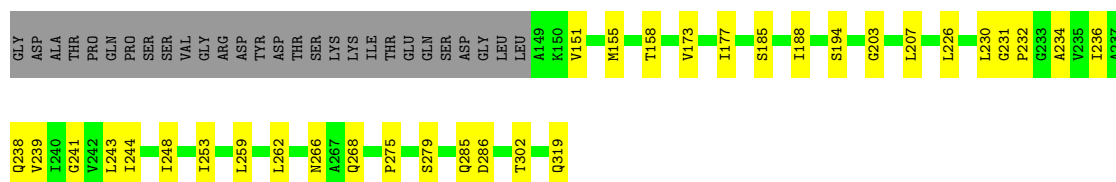
- Molecule 2 is a protein called PTS system glucitol/sorbitol-specific EIIC component.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	2	178	Total	C	N	O	S	0	0
			1387	915	224	237	11		
2	A	180	Total	C	N	O	S	0	0
			1403	926	227	239	11		
2	B	180	Total	C	N	O	S	0	0
			1403	926	227	239	11		

- Molecule 3 is sorbitol (CCD ID: SOR) (formula: C₆H₁₄O₆) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
3	2	1	Total	C	O	0
			12	6	6	
3	A	1	Total	C	O	0
			12	6	6	
3	B	1	Total	C	O	0
			12	6	6	



- Molecule 2: PTS system glucitol/sorbitol-specific EIIC component

Chain 2: 76% 19% 5%



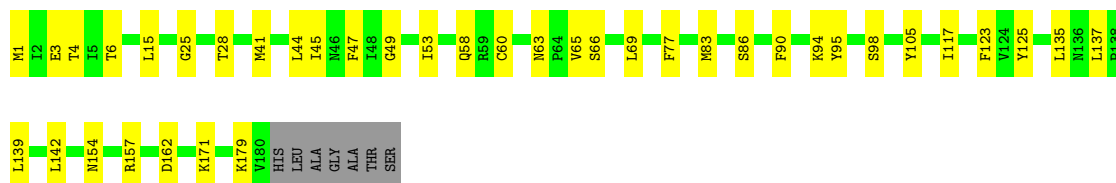
- Molecule 2: PTS system glucitol/sorbitol-specific EIIC component

Chain A: 72% 22% ..



- Molecule 2: PTS system glucitol/sorbitol-specific EIIC component

Chain B: 75% 21% .



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	237825	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48.23	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SOR

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	1	0.12	0/1235	0.32	0/1692
1	E	0.14	0/1235	0.37	0/1692
1	F	0.14	0/1268	0.39	0/1735
2	2	0.15	0/1424	0.35	0/1934
2	A	0.39	2/1440 (0.1%)	0.53	2/1955 (0.1%)
2	B	0.12	0/1440	0.33	0/1955
All	All	0.20	2/8042 (0.0%)	0.39	2/10963 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	A	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	72	PRO	C-O	-6.10	1.16	1.24
2	A	72	PRO	N-CA	-5.05	1.40	1.47

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	76	THR	N-CA-C	-7.78	102.81	114.64
2	A	138	PRO	CA-N-CD	-5.47	104.34	112.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	81	ASN	Peptide

5.2 Too-close contacts

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	1	1206	0	1271	24	0
1	E	1206	0	1271	20	0
1	F	1239	0	1310	22	0
2	2	1387	0	1418	27	0
2	A	1403	0	1440	35	0
2	B	1403	0	1440	25	0
3	2	12	0	14	1	0
3	A	12	0	14	1	0
3	B	12	0	14	1	0
All	All	7880	0	8192	137	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.

All (137) 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)
1:1:223:PHE:HB3	1:1:226:LEU:HB3	1.63	0.80
2:B:15:LEU:HD11	1:F:194:SER:HB3	1.63	0.80
2:A:104:SER:OG	1:E:299:ARG:NH2	2.20	0.74
2:A:81:ASN:O	2:A:83:MET:N	2.22	0.73
2:A:135:LEU:HB2	2:A:137:LEU:HD23	1.71	0.73
1:1:299:ARG:NH2	2:2:101:ALA:O	2.23	0.71
2:2:135:LEU:HB2	2:2:137:LEU:HD23	1.76	0.68
2:A:1:MET:HG2	2:A:2:ILE:HG13	1.75	0.66
2:B:157:ARG:HG3	1:F:302:THR:HG21	1.77	0.66
2:A:62:GLY:O	2:A:67:ARG:NH1	2.30	0.64
3:A:201:SOR:H3	1:E:270:ALA:HB2	1.79	0.64
2:A:70:LEU:O	2:A:71:LEU:C	2.40	0.63
1:F:266:ASN:O	1:F:268:GLN:NE2	2.32	0.62
1:F:236:ILE:HD12	1:F:236:ILE:H	1.66	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:88:GLY:O	2:A:96:LYS:NZ	2.33	0.60
2:B:65:VAL:O	2:B:69:LEU:HB2	2.02	0.60
1:1:260:PRO:HG3	1:1:311:TRP:HA	1.84	0.60
2:A:71:LEU:O	2:A:73:CYS:N	2.35	0.60
1:1:287:THR:HA	2:2:176:LEU:HD23	1.83	0.59
2:2:60:CYS:HB2	2:2:66:SER:HB2	1.83	0.59
2:B:83:MET:O	2:B:86:SER:OG	2.15	0.59
1:1:269:ALA:O	1:1:299:ARG:NH1	2.36	0.58
2:2:63:ASN:OD1	2:2:66:SER:OG	2.19	0.58
2:B:135:LEU:HB2	2:B:137:LEU:HD23	1.86	0.58
2:A:81:ASN:ND2	2:A:118:ASN:OD1	2.37	0.57
2:2:41:MET:O	2:2:45:ILE:HG23	2.04	0.57
2:B:105:TYR:HB3	2:B:154:ASN:HD21	1.69	0.57
2:A:102:ALA:HB2	2:A:158:GLY:HA3	1.87	0.56
2:B:47:PHE:HZ	1:F:158:THR:HG23	1.69	0.56
2:A:71:LEU:O	2:A:72:PRO:C	2.48	0.56
1:F:275:PRO:O	1:F:279:SER:OG	2.21	0.55
1:E:216:MET:HE3	1:E:220:ILE:HG13	1.87	0.55
1:E:272:ASP:OD1	1:E:272:ASP:N	2.36	0.54
2:2:161:THR:HA	2:2:164:THR:HG22	1.89	0.54
2:A:94:LYS:HG3	2:A:95:TYR:CD1	2.43	0.54
2:A:73:CYS:HB2	2:A:110:MET:HE3	1.90	0.53
2:A:81:ASN:HB3	2:A:82:PRO:HD3	1.90	0.53
1:E:266:ASN:O	1:E:268:GLN:NE2	2.42	0.53
1:F:234:ALA:O	1:F:238:GLN:NE2	2.41	0.53
2:A:73:CYS:HA	2:A:76:THR:HG22	1.89	0.53
1:F:259:LEU:HD12	1:F:262:LEU:HD12	1.92	0.52
2:A:160:VAL:O	2:A:164:THR:HG22	2.09	0.51
2:A:51:HIS:ND1	2:A:51:HIS:O	2.44	0.51
1:1:163:PHE:HE2	1:1:167:ARG:HH21	1.59	0.51
2:B:58:GLN:OE1	2:B:90:PHE:HB3	2.11	0.50
1:E:239:VAL:O	1:E:243:LEU:HG	2.11	0.50
2:A:73:CYS:O	2:A:73:CYS:SG	2.70	0.50
3:B:201:SOR:O1	3:B:201:SOR:O3	2.28	0.49
2:2:81:ASN:HD21	3:2:201:SOR:H11	1.77	0.49
2:B:1:MET:O	2:B:4:THR:HG22	2.13	0.48
1:F:239:VAL:O	1:F:243:LEU:HD13	2.14	0.48
2:A:81:ASN:O	2:A:83:MET:HE3	2.13	0.48
2:B:60:CYS:HB3	2:B:66:SER:HB2	1.95	0.48
2:A:76:THR:O	2:A:117:ILE:HD12	2.13	0.47
2:A:119:PRO:HA	2:A:122:LEU:HD22	1.94	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:1:302:THR:HG21	2:2:160:VAL:HG11	1.95	0.47
1:E:235:VAL:HA	1:E:238:GLN:HE21	1.79	0.47
1:F:185:SER:O	1:F:188:ILE:HG22	2.14	0.47
1:F:173:VAL:HA	1:F:177:ILE:HB	1.97	0.46
2:2:110:MET:HG2	2:2:147:LEU:HD13	1.95	0.46
1:F:259:LEU:HA	1:F:262:LEU:HD12	1.97	0.46
2:B:139:LEU:HD23	1:F:319:GLN:HE22	1.80	0.46
2:B:49:GLY:O	2:B:53:ILE:HG13	2.16	0.46
1:1:201:ALA:HB1	1:1:247:GLN:NE2	2.30	0.46
2:A:27:VAL:HG13	2:A:31:LEU:HD22	1.98	0.46
1:E:302:THR:HG22	1:E:302:THR:O	2.16	0.46
1:F:231:GLY:N	1:F:232:PRO:HD3	2.32	0.45
1:E:199:TRP:HA	1:E:199:TRP:CE3	2.52	0.45
1:E:222:SER:O	1:E:222:SER:OG	2.35	0.45
1:1:240:ILE:O	1:1:244:ILE:HG22	2.17	0.45
2:A:124:VAL:HG23	1:E:238:GLN:HG2	1.97	0.45
1:1:158:THR:HG23	2:2:47:PHE:HZ	1.82	0.45
1:1:282:GLU:N	1:1:282:GLU:OE2	2.50	0.45
2:B:171:LYS:HB2	2:B:171:LYS:HE2	1.76	0.45
1:E:274:ILE:HG21	1:E:292:VAL:HG22	1.98	0.45
1:E:288:VAL:O	1:E:292:VAL:HG23	2.16	0.45
2:B:123:PHE:HB2	1:F:238:GLN:HG2	1.98	0.44
1:F:226:LEU:HG	1:F:230:LEU:HD11	1.99	0.44
1:1:222:SER:O	1:1:222:SER:OG	2.23	0.44
1:1:238:GLN:OE1	2:2:123:PHE:HB2	2.17	0.44
1:1:243:LEU:O	1:1:247:GLN:HG2	2.17	0.44
1:E:224:PRO:HD3	1:E:300:PHE:HD2	1.83	0.44
1:F:248:ILE:HG12	1:F:253:ILE:HB	2.00	0.44
1:F:285:GLN:CD	1:F:286:ASP:H	2.26	0.44
2:A:73:CYS:HB2	2:A:110:MET:CE	2.47	0.44
2:B:98:SER:OG	2:B:162:ASP:OD1	2.23	0.44
1:1:259:LEU:HB3	1:1:314:SER:HB2	2.00	0.43
2:A:68:TYR:HA	2:A:72:PRO:HG2	1.99	0.43
2:B:77:PHE:HD1	2:B:117:ILE:HD11	1.82	0.43
1:1:158:THR:HG23	2:2:47:PHE:CZ	2.53	0.43
1:E:292:VAL:HB	1:E:293:PRO:HD3	1.99	0.43
2:2:137:LEU:HD13	2:2:137:LEU:HA	1.88	0.43
2:B:179:LYS:HD3	2:B:179:LYS:HA	1.80	0.43
2:2:34:LEU:HD12	2:2:34:LEU:HA	1.86	0.43
2:A:161:THR:O	2:A:165:THR:HB	2.18	0.43
2:2:3:GLU:OE2	2:2:3:GLU:N	2.27	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:63:ASN:N	2:B:63:ASN:OD1	2.52	0.43
1:E:306:THR:HA	1:E:309:ILE:HG22	2.00	0.43
1:1:234:ALA:O	1:1:238:GLN:NE2	2.43	0.43
2:2:1:MET:HB2	2:2:2:ILE:H	1.63	0.43
2:2:71:LEU:HB3	2:2:72:PRO:HD3	2.00	0.43
2:A:68:TYR:CE1	2:A:98:SER:HB3	2.54	0.43
1:F:236:ILE:HA	1:F:239:VAL:HG22	2.01	0.43
1:F:241:GLY:O	1:F:244:ILE:HG22	2.19	0.43
1:E:238:GLN:O	1:E:242:VAL:HG23	2.18	0.43
2:2:132:LEU:HD12	2:2:132:LEU:HA	1.92	0.42
2:B:94:LYS:HG3	2:B:95:TYR:CD2	2.54	0.42
1:1:285:GLN:CD	1:1:286:ASP:H	2.27	0.42
2:B:65:VAL:O	2:B:69:LEU:CB	2.66	0.42
2:A:63:ASN:OD1	2:A:63:ASN:N	2.53	0.42
1:E:274:ILE:HD12	1:E:292:VAL:HG13	2.01	0.42
2:A:41:MET:O	2:A:45:ILE:HG23	2.19	0.42
1:1:169:THR:HG23	2:2:38:LEU:HB3	2.01	0.42
2:2:10:GLU:OE1	2:2:10:GLU:N	2.52	0.42
2:2:87:LEU:HD23	2:2:87:LEU:HA	1.88	0.42
1:F:155:MET:N	1:F:155:MET:SD	2.93	0.42
2:2:93:GLU:HA	2:2:96:LYS:HE3	2.01	0.42
2:A:71:LEU:HB3	2:A:72:PRO:HD3	2.00	0.42
1:1:193:ALA:HB2	2:2:18:LYS:HG2	2.01	0.41
1:F:203:GLY:O	1:F:207:LEU:HD13	2.20	0.41
2:A:122:LEU:H	2:A:122:LEU:HD23	1.85	0.41
1:1:183:PHE:CD2	1:E:162:LEU:HB3	2.56	0.41
2:A:137:LEU:HD13	2:A:137:LEU:HA	1.81	0.41
1:1:250:LEU:HD23	1:1:250:LEU:HA	1.90	0.41
1:1:282:GLU:OE2	2:2:89:ARG:HG2	2.20	0.41
2:A:7:HIS:O	2:A:10:GLU:HG2	2.20	0.41
2:B:41:MET:O	2:B:45:ILE:HG23	2.20	0.41
2:B:3:GLU:HA	2:B:6:THR:HG22	2.03	0.41
1:E:191:ILE:HD13	1:E:191:ILE:HA	1.93	0.41
2:2:109:SER:OG	2:2:150:GLY:HA3	2.22	0.41
2:A:56:PHE:O	2:A:59:ARG:HG2	2.21	0.41
2:B:44:LEU:HD12	2:B:44:LEU:HA	1.86	0.41
1:1:155:MET:HE3	1:1:155:MET:HB3	1.80	0.40
2:B:25:GLY:HA2	2:B:28:THR:HB	2.03	0.40
2:B:125:TYR:HE1	2:B:142:LEU:HD23	1.87	0.40
2:2:14:GLY:HA2	2:2:17:GLN:HB2	2.02	0.40
2:A:81:ASN:HB3	2:A:82:PRO:CD	2.52	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	1	164/319 (51%)	149 (91%)	14 (8%)	1 (1%)	21	52
1	E	164/319 (51%)	150 (92%)	14 (8%)	0	100	100
1	F	169/319 (53%)	154 (91%)	14 (8%)	1 (1%)	21	52
2	2	176/187 (94%)	160 (91%)	16 (9%)	0	100	100
2	A	178/187 (95%)	157 (88%)	20 (11%)	1 (1%)	21	52
2	B	178/187 (95%)	166 (93%)	12 (7%)	0	100	100
All	All	1029/1518 (68%)	936 (91%)	90 (9%)	3 (0%)	37	66

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1	282	GLU
1	F	151	VAL
2	A	82	PRO

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	1	128/249 (51%)	128 (100%)	0	100	100
1	E	128/249 (51%)	127 (99%)	1 (1%)	73	77

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	131/249 (53%)	131 (100%)	0	100	100
2	2	150/156 (96%)	149 (99%)	1 (1%)	76	78
2	A	152/156 (97%)	148 (97%)	4 (3%)	40	63
2	B	152/156 (97%)	152 (100%)	0	100	100
All	All	841/1215 (69%)	835 (99%)	6 (1%)	73	78

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	2	50	GLN
2	A	72	PRO
2	A	74	ILE
2	A	121	GLU
2	A	137	LEU
1	E	266	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
2	2	42	ASN
2	2	50	GLN
2	2	81	ASN
2	B	154	ASN
1	E	268	GLN
1	F	268	GLN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

3 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
3	SOR	A	201	-	11,11,11	0.53	0	14,14,14	0.53	0
3	SOR	B	201	-	11,11,11	0.55	0	14,14,14	0.56	0
3	SOR	2	201	-	11,11,11	0.55	0	14,14,14	0.59	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
3	SOR	A	201	-	-	6/16/16/16	-
3	SOR	B	201	-	-	8/16/16/16	-
3	SOR	2	201	-	-	0/16/16/16	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	201	SOR	C2-C3-C4-C5
3	B	201	SOR	C2-C3-C4-O4
3	B	201	SOR	O3-C3-C4-C5
3	B	201	SOR	O3-C3-C4-O4
3	A	201	SOR	O1-C1-C2-C3
3	A	201	SOR	C1-C2-C3-O3
3	A	201	SOR	O2-C2-C3-O3
3	A	201	SOR	C1-C2-C3-C4
3	A	201	SOR	O2-C2-C3-C4

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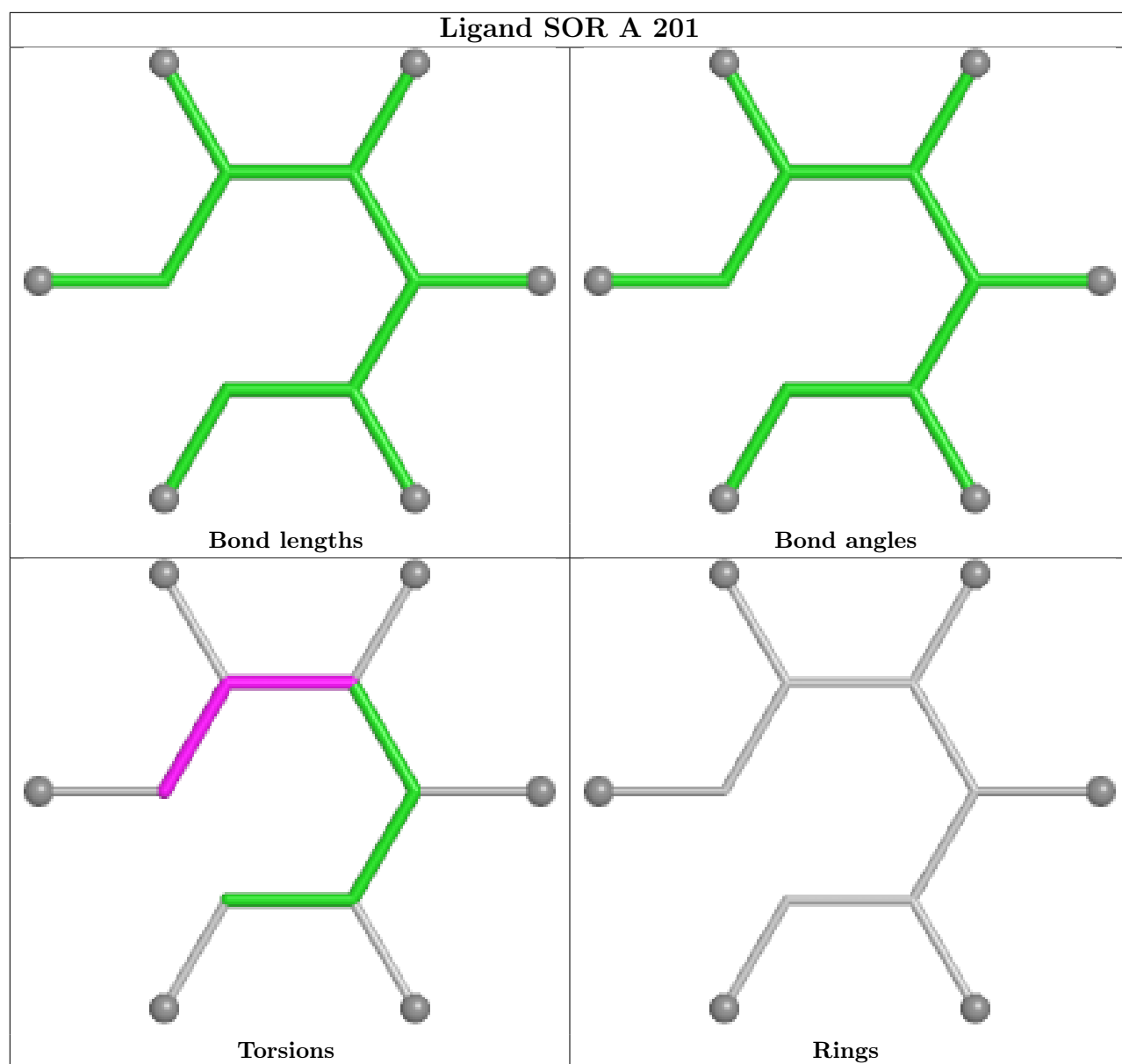
Mol	Chain	Res	Type	Atoms
3	B	201	SOR	C3-C4-C5-C6
3	B	201	SOR	O1-C1-C2-C3
3	B	201	SOR	O4-C4-C5-O5
3	A	201	SOR	O1-C1-C2-O2
3	B	201	SOR	O4-C4-C5-C6

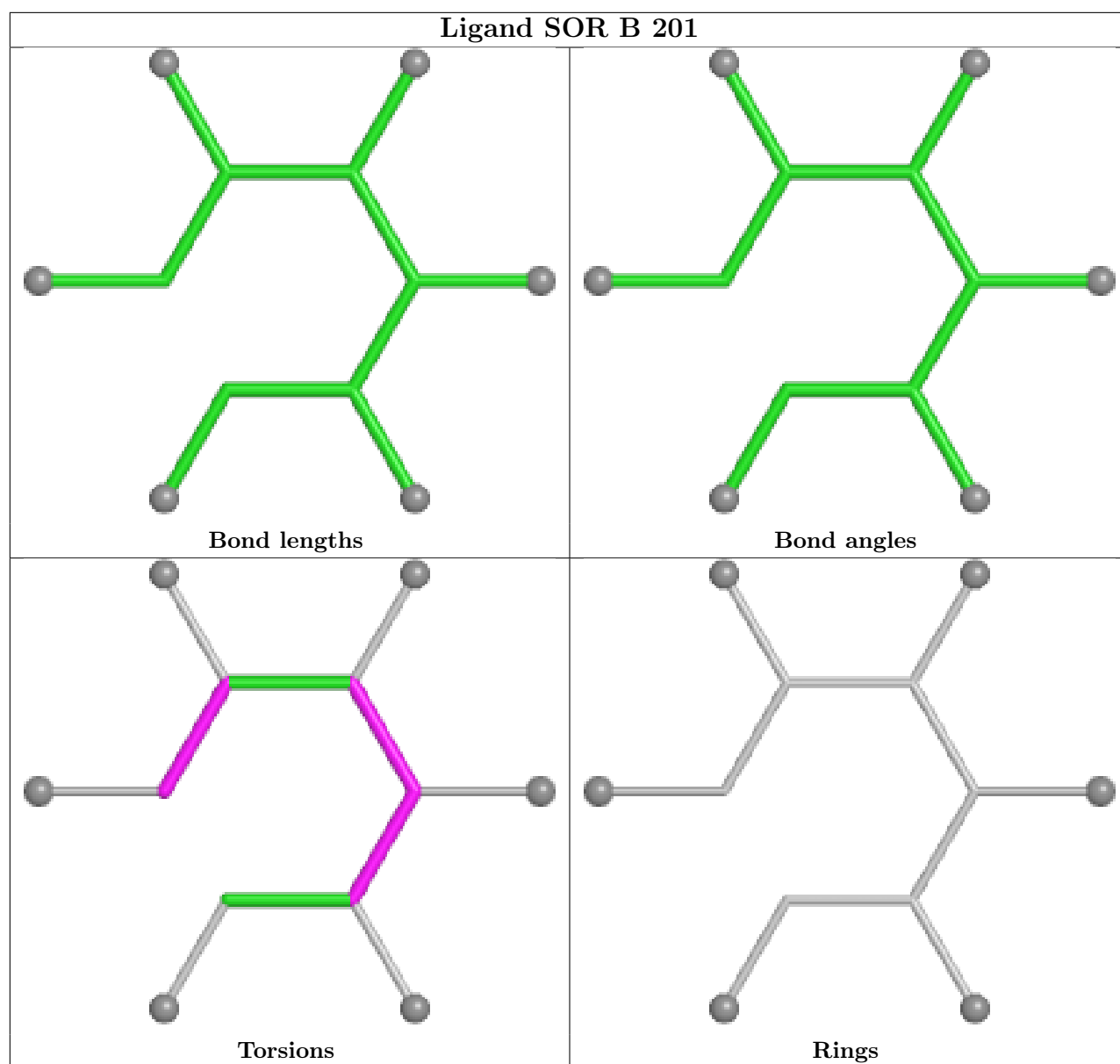
There are no ring outliers.

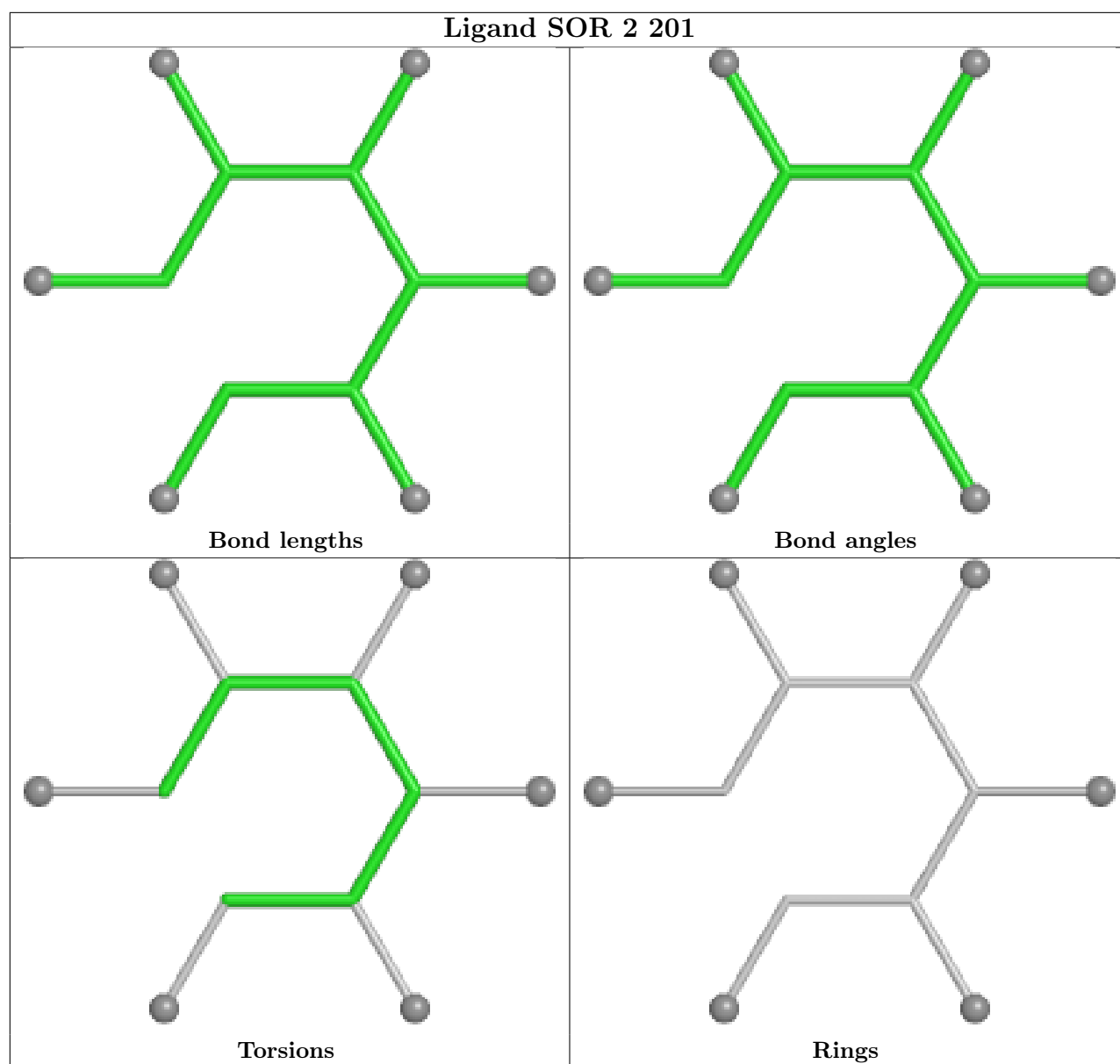
3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	201	SOR	1	0
3	B	201	SOR	1	0
3	2	201	SOR	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.