WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Oct 16, 2024 – 12:08 AM JST

PDB ID	:	8H8F
EMDB ID	:	EMD-34545
Title	:	Structure of Xenopus tropicalis acid-sensitive outwardly rectifying channel ASOR (resting state)
Authors	:	Chi, P.; Wang, X.; Li, J.; Li, K.; Zhang, Y.; Geng, J.; Wu, J.; Deng, D.
Deposited on	:	2022-10-22
Resolution	:	3.48 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 (i) 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 (i)) were used in the production of this report:

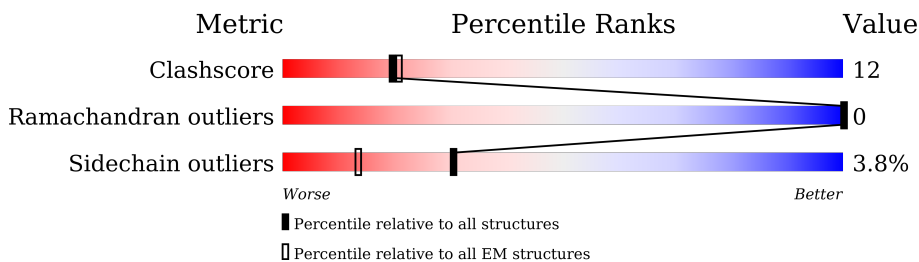|		
EMDB validation analysis	:	FAILED
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.48 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	Percentile Ranks	Value
Clashscore		12
Ramachandran outliers		0
Sidechain outliers		3.8%

Worse   *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures

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

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

Mol	Chain	Length	Quality of chain			
1	A	352	48%	21%	•	29%
1	B	352	50%	20%	•	29%
1	C	352	50%	21%		29%

2 Entry composition ⓘ

There is only 1 type of molecule in this entry. The entry contains 6168 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.
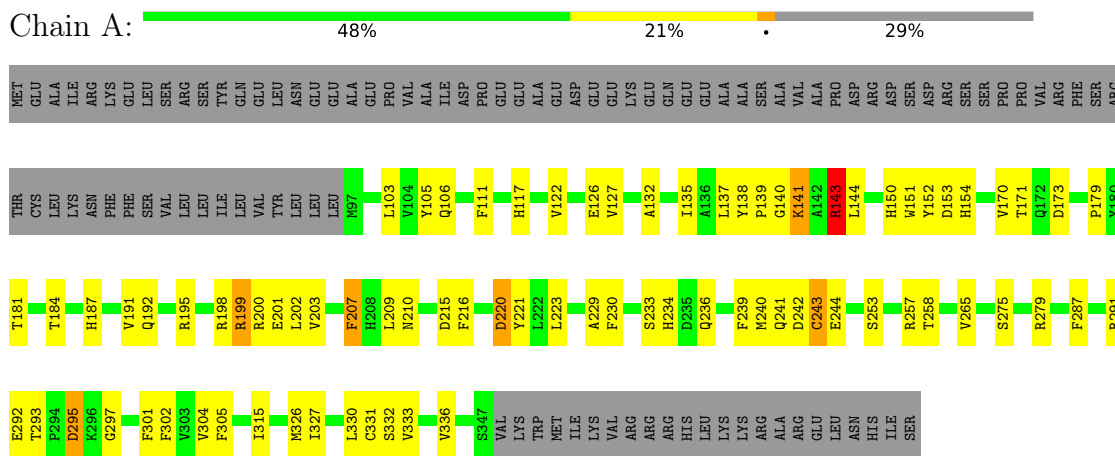
- Molecule 1 is a protein called Proton-activated chloride channel.

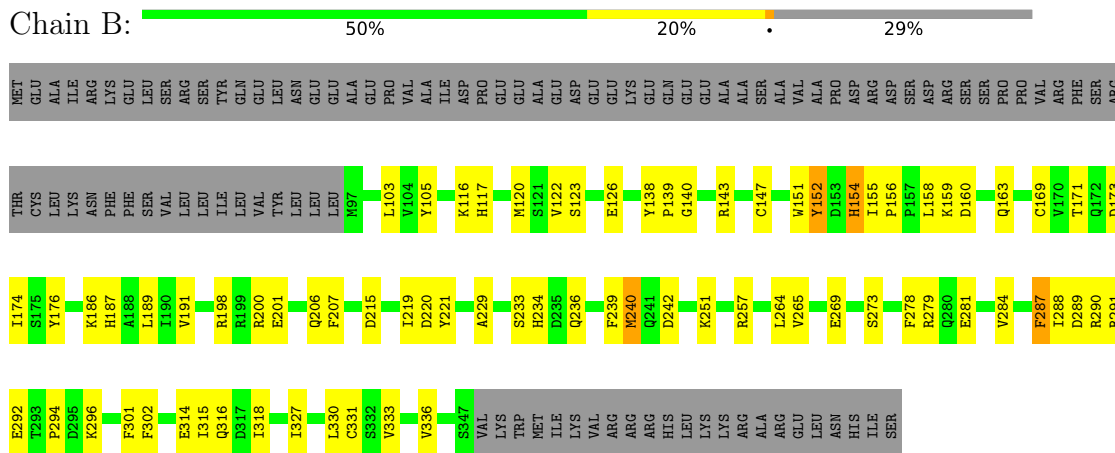| Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	251	Total	C	N	O	S	0	0
			2056	1330	337	378	11		
1	B	251	Total	C	N	O	S	0	0
			2056	1330	337	378	11		
1	C	251	Total	C	N	O	S	0	0
			2056	1330	337	378	11		

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
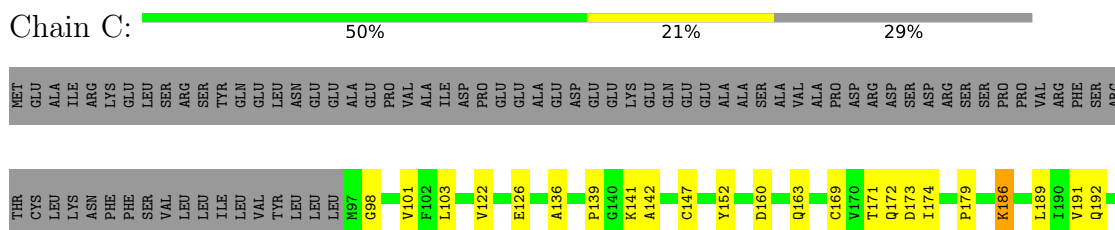
• Molecule 1: Proton-activated chloride channel

Chain A:

• Molecule 1: Proton-activated chloride channel

Chain B:

• Molecule 1: Proton-activated chloride channel

Chain C:

R195 R198 R199 L202 F207 H208 L209 T212 K213 F216 I219 D220 Y221 L222 A229 F230 S233 H234 D235 Q236 F239 M240 Q241 D242 C243 E244 F247 S248 S249 W250 K251 F252 F256 R257 T258 W259 V265 E269 S273 R279 Q280 E281 V285

I288 E292 T293 P294 D295 K296 G297 D298 F301 F302 I315 I327 L330 C331 S332 V333 F334 L335 V336 S347 VAL LYS TRP MET ILE LYS VAL ARG ARG HIS LEU LYS LYS ARG ALA ARG GLU LEU ASN HIS ILE SER

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	172281	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	0.28	0/2113	0.50	0/2861
1	B	0.28	0/2113	0.52	0/2861
1	C	0.26	0/2113	0.49	0/2861
All	All	0.27	0/6339	0.50	0/8583

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
1	A	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	143	ARG	Sidechain

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	A	2056	0	2005	65	0
1	B	2056	0	2005	49	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	2056	0	2005	51	0
All	All	6168	0	6015	150	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 12.

All (150) 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:C:281:GLU:N	1:C:281:GLU:OE1	2.14	0.81
1:A:140:GLY:HA2	1:A:187:HIS:NE2	1.99	0.78
1:C:171:THR:HG22	1:C:191:VAL:HG12	1.66	0.77
1:B:327:ILE:HD12	1:B:330:LEU:HD21	1.68	0.74
1:B:171:THR:HG22	1:B:191:VAL:HG12	1.69	0.73
1:B:159:LYS:HG2	1:B:206:GLN:OE1	1.92	0.69
1:A:257:ARG:HG3	1:C:216:PHE:CE2	2.30	0.66
1:B:126:GLU:OE1	1:B:198:ARG:NH2	2.27	0.66
1:B:234:HIS:O	1:B:236:GLN:NE2	2.29	0.65
1:C:220:ASP:OD1	1:C:221:TYR:N	2.31	0.64
1:C:265:VAL:HG21	1:C:279:ARG:HE	1.63	0.62
1:C:207:PHE:HB2	1:C:301:PHE:HB2	1.80	0.62
1:C:257:ARG:HG2	1:C:302:PHE:HB2	1.81	0.62
1:A:127:VAL:O	1:A:198:ARG:NH2	2.32	0.62
1:C:234:HIS:O	1:C:236:GLN:NE2	2.33	0.61
1:A:327:ILE:HD12	1:A:330:LEU:HD21	1.82	0.60
1:C:122:VAL:HG12	1:C:315:ILE:HG12	1.84	0.59
1:A:236:GLN:HA	1:A:239:PHE:HB3	1.85	0.58
1:B:336:VAL:HG23	1:C:335:LEU:HD22	1.85	0.58
1:A:295:ASP:N	1:A:295:ASP:OD1	2.35	0.57
1:C:152:TYR:HD1	1:C:199:ARG:HB3	1.69	0.57
1:A:291:ARG:NH2	1:C:212:THR:O	2.36	0.57
1:A:234:HIS:O	1:A:236:GLN:NE2	2.37	0.57
1:C:222:LEU:HD12	1:C:249:SER:HB3	1.86	0.57
1:B:207:PHE:HB2	1:B:301:PHE:HB2	1.85	0.57
1:C:192:GLN:OE1	1:C:195:ARG:NH2	2.33	0.56
1:C:172:GLN:HG3	1:C:174:ILE:HD11	1.88	0.56
1:A:265:VAL:HG21	1:A:279:ARG:HE	1.72	0.55
1:A:135:ILE:HG23	1:A:223:LEU:CD2	2.37	0.55
1:C:327:ILE:HD12	1:C:330:LEU:HD21	1.88	0.55
1:B:152:TYR:O	1:B:200:ARG:NH2	2.40	0.55
1:B:120:MET:HG2	1:C:122:VAL:HG22	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:111:PHE:CE1	1:A:326:MET:HE2	2.42	0.54
1:A:117:HIS:HE1	1:B:318:ILE:HG21	1.71	0.54
1:C:179:PRO:HD2	1:C:244:GLU:OE2	2.07	0.54
1:A:132:ALA:HB2	1:A:195:ARG:HG2	1.88	0.54
1:B:333:VAL:HA	1:B:336:VAL:HG12	1.90	0.54
1:B:103:LEU:HD23	1:B:333:VAL:HG21	1.89	0.53
1:B:173:ASP:HB3	1:B:189:LEU:HG	1.90	0.53
1:C:179:PRO:HD3	1:C:241:GLN:HG2	1.90	0.53
1:A:103:LEU:HD23	1:A:333:VAL:HG21	1.90	0.53
1:B:160:ASP:OD1	1:B:163:GLN:HB2	2.10	0.52
1:A:291:ARG:HH22	1:C:213:LYS:HA	1.75	0.52
1:B:257:ARG:HG2	1:B:302:PHE:HB2	1.92	0.52
1:B:155:ILE:HD12	1:B:156:PRO:HD2	1.92	0.52
1:A:137:LEU:O	1:A:139:PRO:HD3	2.10	0.52
1:A:326:MET:HG3	1:A:327:ILE:N	2.24	0.52
1:A:215:ASP:O	1:B:288:ILE:HG12	2.10	0.51
1:B:229:ALA:O	1:B:233:SER:OG	2.28	0.51
1:B:294:PRO:HB2	1:B:296:LYS:HG2	1.93	0.51
1:A:179:PRO:HG3	1:A:241:GLN:HB3	1.92	0.50
1:A:257:ARG:HG2	1:A:302:PHE:HB2	1.94	0.50
1:C:229:ALA:O	1:C:233:SER:OG	2.30	0.50
1:A:150:HIS:HB2	1:A:202:LEU:HG	1.93	0.50
1:A:229:ALA:O	1:A:233:SER:OG	2.29	0.50
1:B:140:GLY:HA2	1:B:187:HIS:NE2	2.26	0.50
1:C:126:GLU:OE1	1:C:198:ARG:NH2	2.46	0.49
1:C:160:ASP:HB3	1:C:163:GLN:HE22	1.77	0.49
1:C:139:PRO:HA	1:C:219:ILE:HD12	1.93	0.49
1:A:239:PHE:HA	1:A:242:ASP:OD1	2.12	0.48
1:C:243:CYS:O	1:C:247:PHE:N	2.38	0.48
1:A:297:GLY:O	1:B:290:ARG:NH1	2.47	0.48
1:A:117:HIS:CE1	1:B:318:ILE:HG21	2.48	0.48
1:A:111:PHE:O	1:A:111:PHE:CD2	2.66	0.48
1:A:333:VAL:HA	1:A:336:VAL:HG12	1.95	0.48
1:B:220:ASP:OD1	1:B:221:TYR:N	2.47	0.48
1:A:173:ASP:OD1	1:A:173:ASP:N	2.47	0.47
1:A:103:LEU:O	1:A:106:GLN:HG3	2.15	0.47
1:A:126:GLU:HG2	1:A:198:ARG:HH22	1.79	0.47
1:B:122:VAL:HG12	1:B:315:ILE:HG12	1.96	0.47
1:A:135:ILE:HG23	1:A:223:LEU:HD22	1.97	0.47
1:B:269:GLU:OE2	1:B:273:SER:OG	2.32	0.47
1:C:292:GLU:HG3	1:C:294:PRO:HD3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:103:LEU:HD13	1:C:333:VAL:HG21	1.98	0.46
1:C:208:HIS:HE1	1:C:298:ASP:HB3	1.80	0.46
1:B:265:VAL:HG21	1:B:279:ARG:HE	1.80	0.46
1:B:220:ASP:HA	1:B:251:LYS:HA	1.97	0.46
1:B:292:GLU:HG3	1:B:294:PRO:HD3	1.96	0.46
1:A:152:TYR:HD1	1:A:199:ARG:HB3	1.80	0.46
1:A:170:VAL:HB	1:A:192:GLN:HB3	1.96	0.46
1:A:207:PHE:HB2	1:A:301:PHE:HB2	1.97	0.46
1:A:141:LYS:HA	1:A:141:LYS:HD2	1.49	0.45
1:B:138:TYR:HD2	1:B:220:ASP:HB3	1.81	0.45
1:C:219:ILE:HB	1:C:252:PHE:CZ	2.51	0.45
1:C:258:THR:O	1:C:258:THR:OG1	2.32	0.45
1:A:241:GLN:O	1:A:244:GLU:HG3	2.16	0.45
1:A:253:SER:HB3	1:B:284:VAL:O	2.16	0.45
1:B:147:CYS:HB3	1:B:169:CYS:HB2	1.58	0.45
1:A:111:PHE:CE1	1:A:326:MET:CE	2.99	0.45
1:C:173:ASP:HB3	1:C:189:LEU:HG	1.98	0.45
1:A:153:ASP:O	1:A:200:ARG:NH1	2.49	0.45
1:A:292:GLU:HG2	1:A:293:THR:N	2.32	0.45
1:C:333:VAL:HA	1:C:336:VAL:HG12	1.98	0.45
1:B:151:TRP:HA	1:B:201:GLU:HG3	1.99	0.45
1:B:291:ARG:N	1:B:291:ARG:HD2	2.31	0.45
1:C:186:LYS:NZ	1:C:244:GLU:OE1	2.28	0.45
1:A:243:CYS:SG	1:A:244:GLU:N	2.90	0.44
1:A:336:VAL:HG21	1:B:331:CYS:SG	2.57	0.44
1:A:126:GLU:OE1	1:A:198:ARG:NH1	2.50	0.44
1:A:135:ILE:HG21	1:A:305:PHE:CZ	2.52	0.44
1:A:151:TRP:HA	1:A:201:GLU:HG3	1.98	0.44
1:B:154:HIS:HA	1:B:200:ARG:HH12	1.82	0.44
1:C:202:LEU:HD22	1:C:259:TRP:CH2	2.52	0.44
1:C:294:PRO:HB2	1:C:296:LYS:HG2	2.00	0.44
1:C:220:ASP:HA	1:C:251:LYS:HA	1.99	0.44
1:A:202:LEU:HB2	1:A:304:VAL:HG13	2.00	0.44
1:A:209:LEU:HD12	1:A:210:ASN:N	2.33	0.44
1:B:155:ILE:HG13	1:B:156:PRO:O	2.17	0.44
1:A:122:VAL:HG12	1:A:315:ILE:HG12	1.99	0.44
1:B:154:HIS:CD2	1:B:154:HIS:H	2.33	0.44
1:C:136:ALA:HB3	1:C:222:LEU:HB3	2.00	0.44
1:A:138:TYR:HD2	1:A:220:ASP:HB2	1.81	0.44
1:B:330:LEU:O	1:B:333:VAL:HG12	2.18	0.44
1:A:138:TYR:CD2	1:A:220:ASP:HB2	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:154:HIS:HA	1:A:200:ARG:NH1	2.33	0.43
1:C:147:CYS:HB3	1:C:169:CYS:HB2	1.53	0.43
1:A:203:VAL:HG22	1:A:305:PHE:HB2	2.01	0.43
1:B:176:TYR:CD1	1:B:240:MET:HG3	2.52	0.43
1:C:152:TYR:CD1	1:C:199:ARG:HB3	2.52	0.43
1:A:137:LEU:HD23	1:A:221:TYR:HB3	2.00	0.43
1:A:258:THR:O	1:A:258:THR:OG1	2.35	0.43
1:B:123:SER:N	1:B:314:GLU:O	2.50	0.43
1:B:174:ILE:HB	1:B:176:TYR:CE2	2.54	0.43
1:C:139:PRO:HG3	1:C:189:LEU:HD22	2.00	0.43
1:B:139:PRO:HG3	1:B:189:LEU:HD22	2.01	0.43
1:A:143:ARG:H	1:A:143:ARG:HG3	1.64	0.42
1:C:173:ASP:OD1	1:C:173:ASP:N	2.43	0.42
1:A:181:THR:OG1	1:A:184:THR:OG1	2.28	0.42
1:B:139:PRO:HA	1:B:219:ILE:HD13	2.02	0.42
1:B:264:LEU:HB2	1:B:278:PHE:HE1	1.84	0.42
1:A:171:THR:HG22	1:A:191:VAL:HG12	2.01	0.42
1:A:331:CYS:SG	1:C:336:VAL:HG21	2.59	0.42
1:A:111:PHE:HE1	1:A:326:MET:HE2	1.82	0.42
1:C:230:PHE:HD2	1:C:239:PHE:HD2	1.68	0.42
1:A:240:MET:HE3	1:A:241:GLN:HG3	2.02	0.42
1:A:216:PHE:CE1	1:B:287:PHE:HB2	2.54	0.42
1:C:160:ASP:O	1:C:163:GLN:NE2	2.53	0.41
1:B:116:LYS:HG3	1:B:117:HIS:CD2	2.55	0.41
1:A:150:HIS:O	1:A:201:GLU:HA	2.21	0.41
1:B:239:PHE:HA	1:B:242:ASP:OD1	2.20	0.41
1:A:332:SER:OG	1:C:332:SER:OG	2.39	0.41
1:B:215:ASP:HA	1:C:288:ILE:HD11	2.03	0.41
1:A:179:PRO:HG2	1:A:244:GLU:OE2	2.21	0.41
1:A:330:LEU:O	1:A:333:VAL:HG12	2.20	0.41
1:C:142:ALA:HB2	1:C:209:LEU:HB2	2.02	0.41
1:C:269:GLU:OE2	1:C:273:SER:OG	2.37	0.41
1:C:330:LEU:O	1:C:333:VAL:HG12	2.21	0.41
1:B:236:GLN:O	1:B:239:PHE:HB3	2.21	0.40
1:C:98:GLY:HA2	1:C:101:VAL:HG12	2.03	0.40
1:C:256:PHE:HB2	1:C:285:VAL:O	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	249/352 (71%)	241 (97%)	8 (3%)	0	100	100
1	B	249/352 (71%)	238 (96%)	11 (4%)	0	100	100
1	C	249/352 (71%)	243 (98%)	6 (2%)	0	100	100
All	All	747/1056 (71%)	722 (97%)	25 (3%)	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	229/321 (71%)	217 (95%)	12 (5%)	19	48
1	B	229/321 (71%)	218 (95%)	11 (5%)	21	51
1	C	229/321 (71%)	226 (99%)	3 (1%)	65	80
All	All	687/963 (71%)	661 (96%)	26 (4%)	30	57

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	105	TYR
1	A	141	LYS
1	A	143	ARG
1	A	144	LEU
1	A	199	ARG

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Mol	Chain	Res	Type
1	A	207	PHE
1	A	220	ASP
1	A	230	PHE
1	A	243	CYS
1	A	275	SER
1	A	287	PHE
1	A	295	ASP
1	B	105	TYR
1	B	143	ARG
1	B	152	TYR
1	B	154	HIS
1	B	158	LEU
1	B	186	LYS
1	B	240	MET
1	B	281	GLU
1	B	287	PHE
1	B	289	ASP
1	B	316	GLN
1	C	141	LYS
1	C	186	LYS
1	C	240	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	236	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 ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.