



Full wwPDB EM Validation Report ⓘ

Jun 26, 2025 – 12:08 AM JST

PDB ID : 8H8D / pdb_00008h8d
EMDB ID : EMD-34543
Title : Structure of *Xenopus tropicalis* acid-sensitive outwardly rectifying channel ASOR trimer bound with tRNA (intermediate state)
Authors : Chi, P.; Wang, X.; Li, J.; Li, K.; Zhang, Y.; Geng, J.; Wu, J.; Deng, D.
Deposited on : 2022-10-22
Resolution : 4.26 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**
MolProbity : 4-5-2 with Phenix2.0rc1
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) : 2.44

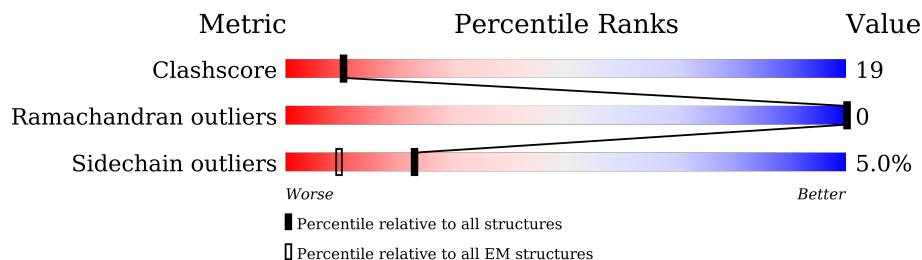
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.26 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 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	352	
1	B	352	
1	C	352	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 7054 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.

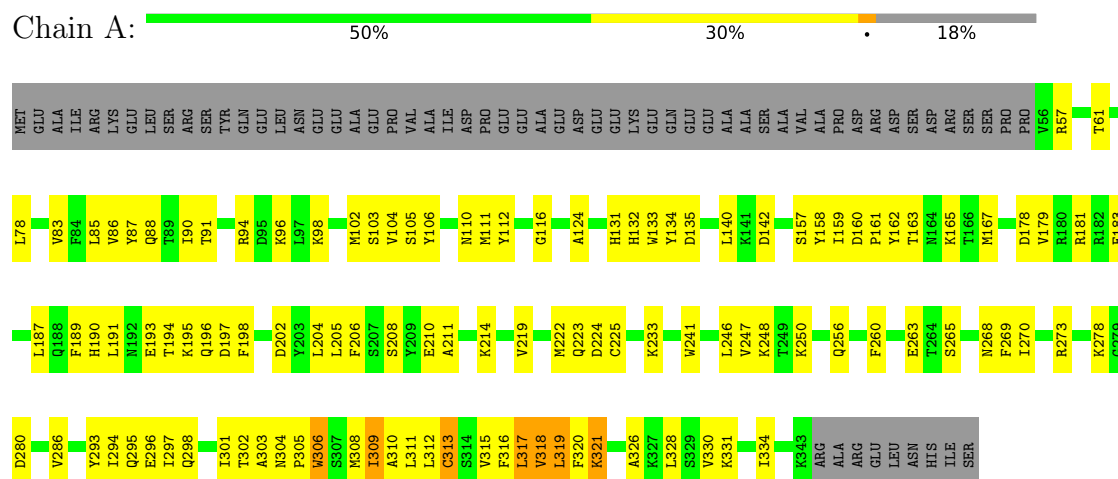
- Molecule 1 is a protein called Proton-activated chloride channel.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	288	Total	C	N	O	S	0	0
			2366	1536	398	419	13		
1	B	283	Total	C	N	O	S	0	0
			2337	1521	389	414	13		
1	C	285	Total	C	N	O	S	0	0
			2351	1530	392	416	13		

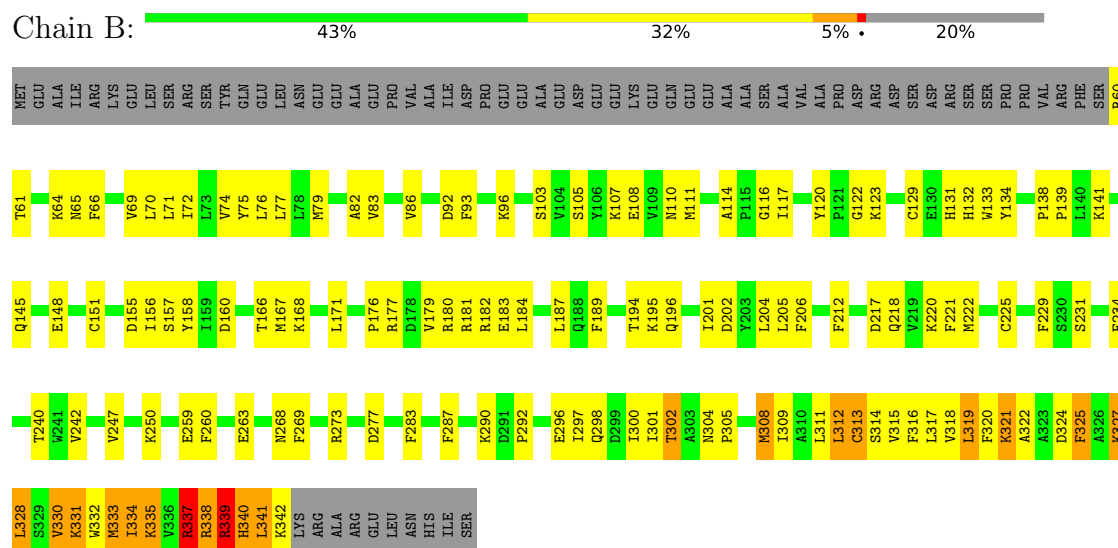
3 Residue-property plots

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



• Molecule 1: Proton-activated chloride channel



• Molecule 1: Proton-activated chloride channel



MET	GLU	ALA	ILE	ARG	LYS	GLU	LEU	SER	ARG	SER	TYR	GLN	GLU	LEU	ASN	GLU	GLU	ALA	GLU	PRO	VAL	ALA	ILE	ASP	PRO	GLU	GLU	ALA	ASP	GLU	GLU	LYS	GLU	GLN	GLU	GLU	ALA	ALA	SER	ALA	VAL	ALA	PRO	ASP	ARG	ASP	SER	PRO	VAL	ARG	PHE	SER	ARG
T61	Q174	P175	F67	M79	V83	V86	T89	D92	K96	P100	V101	M102	K107	E108	V109	N110	M111	Y112	D113	A114	P115	A124	C129	E130	H131	H132	D135	P138	P139	L140	T150	Q154	D155	I156	S157	Y158	T159	D160	P161	Y162	T163	M167	K168	H169									
	R176	R177	D178	V179	R180	R181	F186	L187	Q188	L191	R192	E193	T194	K195	Q196	D197	D202	Y203	L204	L205	F206	S207	L213	K214	Q218	V219	K220	F221	M222	Q223	D224	F229	S230	S231	M232	K233	F234	G237	F238	R239	M244	K250	G254	S255	Q256	E263							
V267	N268	F269	R272	R273	G279	D280	Q281	L282	F283	F284	V285	V289	P292	Q298	D299	T302	A303	N304	S307	M308	I309	A310	L311	V315	V318	K321	F325	A326	K327	K331	T334	R337	R338	R339	K342	A345	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	53188	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 ($e^-/\text{\AA}^2$)	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 [i](#)

5.1 Standard geometry [i](#)

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	0.27	0/2429	0.57	2/3283 (0.1%)
1	B	0.38	0/2400	0.65	0/3246
1	C	0.15	0/2414	0.42	0/3264
All	All	0.28	0/7243	0.56	2/9793 (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
1	B	0	2

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	159	ILE	CA-C-N	7.59	131.27	120.49
1	A	159	ILE	C-N-CA	7.59	131.27	120.49

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	337	ARG	Sidechain
1	B	339	ARG	Sidechain

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	2366	0	2348	83	0
1	B	2337	0	2331	114	0
1	C	2351	0	2349	78	0
All	All	7054	0	7028	263	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 19.

All (263) 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:B:334:ILE:HG23	1:B:338:ARG:HE	1.37	0.88
1:A:316:PHE:HA	1:A:319:LEU:HD23	1.56	0.88
1:B:339:ARG:HA	1:B:342:LYS:HD2	1.60	0.84
1:A:197:ASP:OD2	1:A:198:PHE:N	2.15	0.79
1:A:222:MET:SD	1:A:223:GLN:NE2	2.57	0.78
1:A:308:MET:HA	1:A:311:LEU:HD12	1.68	0.76
1:C:239:ARG:HG3	1:C:284:PHE:HB2	1.68	0.75
1:B:181:ARG:O	1:B:181:ARG:NH1	2.19	0.75
1:A:318:VAL:O	1:A:321:LYS:HG3	1.89	0.73
1:A:304:ASN:HD21	1:A:306:TRP:CD1	2.07	0.72
1:B:268:ASN:OD1	1:B:269:PHE:N	2.23	0.71
1:A:112:TYR:HE2	1:A:294:ILE:HD11	1.56	0.69
1:B:105:SER:HB2	1:B:296:GLU:HB3	1.74	0.68
1:A:87:TYR:O	1:A:91:THR:HG23	1.94	0.68
1:C:204:LEU:HD12	1:C:205:LEU:H	1.59	0.67
1:B:263:GLU:OE2	1:B:290:LYS:NZ	2.25	0.67
1:B:61:THR:HG23	1:B:337:ARG:HD2	1.77	0.66
1:A:133:TRP:CE3	1:A:134:TYR:HB2	2.32	0.65
1:B:337:ARG:HH22	1:B:341:LEU:HD11	1.61	0.65
1:B:195:LYS:HA	1:C:273:ARG:HH21	1.62	0.65
1:A:306:TRP:HA	1:A:309:ILE:HD13	1.78	0.65
1:B:337:ARG:HH12	1:B:340:HIS:CD2	2.15	0.65
1:B:134:TYR:O	1:B:182:ARG:NH2	2.31	0.64
1:C:107:LYS:NZ	1:C:108:GLU:O	2.27	0.64
1:C:157:SER:OG	1:C:167:MET:SD	2.56	0.64
1:A:273:ARG:HH21	1:C:195:LYS:HA	1.63	0.63
1:B:314:SER:O	1:B:318:VAL:HG13	1.99	0.63
1:B:158:TYR:HB3	1:B:222:MET:HE2	1.80	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:247:VAL:HG23	1:A:295:GLN:HB3	1.82	0.62
1:B:181:ARG:O	1:B:182:ARG:HD3	2.00	0.62
1:B:340:HIS:HD2	1:B:341:LEU:HD13	1.65	0.62
1:C:250:LYS:NZ	1:C:254:GLY:O	2.27	0.62
1:A:193:GLU:OE1	1:A:278:LYS:NZ	2.33	0.62
1:A:308:MET:O	1:A:312:LEU:HG	2.01	0.61
1:C:111:MET:SD	1:C:113:ASP:N	2.72	0.61
1:C:129:CYS:HB2	1:C:150:THR:H	1.65	0.61
1:A:157:SER:OG	1:A:167:MET:SD	2.53	0.61
1:A:102:MET:HE1	1:A:104:VAL:HG13	1.82	0.61
1:C:202:ASP:OD1	1:C:203:TYR:N	2.34	0.61
1:A:124:ALA:HB2	1:A:191:LEU:HB2	1.82	0.60
1:A:142:ASP:N	1:A:142:ASP:OD1	2.34	0.60
1:A:96:LYS:HG2	1:A:303:ALA:HB2	1.83	0.60
1:B:205:LEU:HB3	1:B:260:PHE:HD2	1.65	0.60
1:A:248:LYS:HZ2	1:A:256:GLN:HB3	1.67	0.60
1:C:188:GLN:HB2	1:C:284:PHE:HD1	1.65	0.60
1:C:263:GLU:OE2	1:C:263:GLU:N	2.34	0.60
1:A:313:CYS:HA	1:A:316:PHE:CD1	2.37	0.60
1:A:202:ASP:HA	1:A:233:LYS:HA	1.84	0.60
1:B:156:ILE:HB	1:B:158:TYR:HE1	1.66	0.59
1:C:174:GLN:NE2	1:C:175:GLY:O	2.35	0.59
1:A:106:TYR:HE1	1:A:295:GLN:HG2	1.67	0.59
1:A:270:ILE:HD11	1:C:197:ASP:HA	1.85	0.59
1:C:156:ILE:HD12	1:C:158:TYR:HE2	1.68	0.59
1:C:167:MET:HE2	1:C:167:MET:HA	1.84	0.59
1:C:132:HIS:ND1	1:C:135:ASP:HB3	2.18	0.59
1:B:196:GLN:HA	1:C:140:LEU:HD21	1.83	0.59
1:A:317:LEU:HD21	1:C:318:VAL:HB	1.84	0.58
1:B:187:LEU:HB3	1:B:189:PHE:HE1	1.69	0.58
1:B:315:VAL:O	1:B:318:VAL:HG22	2.02	0.58
1:B:145:GLN:NE2	1:B:148:GLU:OE1	2.33	0.58
1:A:163:THR:O	1:A:165:LYS:NZ	2.36	0.58
1:C:186:PHE:HE2	1:C:284:PHE:HB3	1.69	0.57
1:C:233:LYS:HD2	1:C:234:PHE:H	1.68	0.57
1:B:316:PHE:HA	1:B:319:LEU:HD21	1.87	0.56
1:B:116:GLY:HA3	1:B:206:PHE:CE1	2.40	0.56
1:C:83:VAL:HA	1:C:86:VAL:HG12	1.87	0.56
1:C:237:GLY:H	1:C:283:PHE:HB3	1.69	0.56
1:B:189:PHE:HB2	1:B:283:PHE:HB2	1.86	0.56
1:B:181:ARG:CZ	1:B:183:GLU:HA	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:110:ASN:OD1	1:B:111:MET:N	2.38	0.56
1:B:334:ILE:O	1:B:338:ARG:HG2	2.06	0.56
1:B:92:ASP:O	1:B:96:LYS:HG2	2.06	0.55
1:B:160:ASP:HB3	1:B:166:THR:HB	1.88	0.55
1:C:179:VAL:HG11	1:C:292:PRO:HB3	1.88	0.55
1:C:250:LYS:NZ	1:C:256:GLN:OE1	2.32	0.55
1:B:217:ASP:HB3	1:B:220:LYS:HB2	1.89	0.55
1:C:160:ASP:OD1	1:C:163:THR:N	2.27	0.55
1:B:114:ALA:HB2	1:B:177:ARG:HD2	1.88	0.55
1:C:311:LEU:O	1:C:315:VAL:HG22	2.07	0.55
1:C:204:LEU:HD11	1:C:229:PHE:HB3	1.89	0.54
1:C:239:ARG:HH21	1:C:267:VAL:HG21	1.72	0.54
1:B:204:LEU:HD11	1:B:229:PHE:HB2	1.87	0.54
1:A:110:ASN:OD1	1:A:111:MET:N	2.40	0.54
1:C:96:LYS:HB3	1:C:302:THR:HG21	1.88	0.54
1:A:328:LEU:O	1:A:331:LYS:HG3	2.07	0.54
1:B:132:HIS:O	1:B:181:ARG:NH2	2.41	0.54
1:A:204:LEU:HD12	1:A:205:LEU:N	2.22	0.54
1:A:195:LYS:HA	1:B:273:ARG:HH21	1.70	0.54
1:C:111:MET:SD	1:C:112:TYR:N	2.81	0.53
1:A:309:ILE:HG12	1:A:310:ALA:N	2.22	0.53
1:C:279:GLY:O	1:C:281:GLN:NE2	2.37	0.53
1:B:83:VAL:HA	1:B:86:VAL:HG12	1.91	0.53
1:B:158:TYR:O	1:B:168:LYS:N	2.34	0.52
1:C:204:LEU:HD13	1:C:231:SER:HA	1.91	0.52
1:B:133:TRP:O	1:B:181:ARG:NH1	2.42	0.52
1:C:107:LYS:HG3	1:C:109:VAL:HG13	1.91	0.52
1:B:225:CYS:HB3	1:B:229:PHE:HE2	1.75	0.52
1:C:308:MET:HA	1:C:311:LEU:HD13	1.91	0.52
1:A:158:TYR:HB2	1:A:222:MET:HE3	1.91	0.52
1:B:60:ARG:HB3	1:B:337:ARG:CZ	2.39	0.52
1:B:64:LYS:HB3	1:B:333:MET:HE3	1.91	0.52
1:B:204:LEU:HD13	1:B:231:SER:HA	1.92	0.52
1:A:132:HIS:HB3	1:A:135:ASP:HB3	1.92	0.52
1:B:117:ILE:HG21	1:B:287:PHE:CE2	2.45	0.51
1:B:205:LEU:HB3	1:B:260:PHE:CD2	2.45	0.51
1:A:83:VAL:HA	1:A:86:VAL:HG12	1.92	0.51
1:B:331:LYS:HG3	1:B:332:TRP:N	2.25	0.51
1:A:305:PRO:HB2	1:A:306:TRP:CE3	2.44	0.51
1:A:319:LEU:HG	1:A:320:PHE:N	2.25	0.51
1:C:130:GLU:OE2	1:C:132:HIS:N	2.43	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:78:LEU:HD11	1:A:319:LEU:HD12	1.90	0.51
1:C:102:MET:HA	1:C:299:ASP:HA	1.93	0.51
1:C:250:LYS:HB2	1:C:298:GLN:HA	1.92	0.51
1:B:60:ARG:HB3	1:B:337:ARG:NH2	2.26	0.51
1:B:96:LYS:NZ	1:B:302:THR:OG1	2.43	0.51
1:B:156:ILE:HB	1:B:158:TYR:CE1	2.46	0.51
1:A:263:GLU:OE1	1:A:263:GLU:N	2.44	0.51
1:C:124:ALA:HB2	1:C:191:LEU:HB2	1.92	0.51
1:A:190:HIS:HE1	1:A:280:ASP:HA	1.77	0.50
1:C:315:VAL:HA	1:C:318:VAL:HG12	1.93	0.50
1:A:133:TRP:HA	1:A:183:GLU:HA	1.93	0.50
1:B:120:TYR:CZ	1:B:168:LYS:HD2	2.47	0.50
1:A:194:THR:O	1:A:196:GLN:NE2	2.45	0.50
1:A:103:SER:OG	1:C:100:PRO:O	2.25	0.50
1:A:187:LEU:HB3	1:A:189:PHE:HE2	1.77	0.50
1:B:316:PHE:O	1:B:319:LEU:HG	2.12	0.50
1:B:139:PRO:O	1:B:141:LYS:NZ	2.32	0.49
1:B:181:ARG:HH12	1:B:182:ARG:HH11	1.60	0.49
1:A:160:ASP:OD2	1:A:163:THR:N	2.32	0.49
1:B:110:ASN:HA	1:B:180:ARG:CZ	2.43	0.49
1:B:313:CYS:HA	1:B:316:PHE:CD1	2.47	0.49
1:B:340:HIS:CD2	1:B:341:LEU:HD13	2.48	0.49
1:B:129:CYS:O	1:B:131:HIS:ND1	2.43	0.49
1:A:161:PRO:HG2	1:A:162:TYR:CD1	2.49	0.48
1:C:234:PHE:CZ	1:C:285:VAL:HB	2.48	0.48
1:C:181:ARG:HH11	1:C:181:ARG:HA	1.78	0.48
1:B:184:LEU:O	1:B:184:LEU:HD12	2.14	0.48
1:B:204:LEU:HD12	1:B:205:LEU:H	1.79	0.48
1:A:204:LEU:HD12	1:A:205:LEU:H	1.79	0.48
1:A:167:MET:HE2	1:A:167:MET:HA	1.94	0.48
1:C:156:ILE:HD12	1:C:158:TYR:CE2	2.48	0.48
1:B:212:PHE:HE1	1:B:221:PHE:HB3	1.79	0.47
1:C:112:TYR:CG	1:C:177:ARG:HB3	2.49	0.47
1:B:182:ARG:O	1:B:182:ARG:HG2	2.15	0.47
1:A:250:LYS:HB3	1:A:298:GLN:HA	1.95	0.47
1:B:96:LYS:HE2	1:B:302:THR:HG21	1.97	0.47
1:B:321:LYS:HA	1:B:324:ASP:OD2	2.14	0.47
1:C:115:PRO:HB3	1:C:207:SER:HA	1.97	0.47
1:B:179:VAL:HG11	1:B:292:PRO:HB3	1.96	0.47
1:B:327:LYS:HE2	1:B:327:LYS:HB3	1.47	0.47
1:A:140:LEU:HD22	1:C:196:GLN:HE22	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:161:PRO:HG3	1:C:223:GLN:HG2	1.97	0.47
1:B:74:VAL:HA	1:B:77:LEU:HG	1.95	0.47
1:A:78:LEU:HD11	1:A:319:LEU:CD1	2.45	0.47
1:A:98:LYS:HA	1:A:98:LYS:HD3	1.68	0.46
1:B:313:CYS:SG	1:B:314:SER:N	2.87	0.46
1:C:96:LYS:HE2	1:C:302:THR:HG21	1.96	0.46
1:A:246:LEU:HD12	1:A:247:VAL:N	2.30	0.46
1:B:71:LEU:O	1:B:74:VAL:HG12	2.15	0.46
1:B:330:VAL:O	1:B:333:MET:HE2	2.15	0.46
1:B:339:ARG:H	1:B:339:ARG:HG2	1.43	0.46
1:B:321:LYS:HG3	1:B:322:ALA:N	2.30	0.46
1:C:321:LYS:HZ3	1:C:325:PHE:HE1	1.59	0.46
1:B:181:ARG:NH2	1:B:183:GLU:HA	2.30	0.46
1:B:201:ILE:HB	1:B:234:PHE:CE2	2.50	0.46
1:C:110:ASN:HA	1:C:180:ARG:CZ	2.46	0.46
1:C:86:VAL:HA	1:C:89:THR:HG22	1.98	0.46
1:A:305:PRO:O	1:A:309:ILE:HG23	2.16	0.46
1:B:65:ASN:O	1:B:69:VAL:HG23	2.16	0.46
1:A:241:TRP:HB3	1:A:265:SER:OG	2.15	0.46
1:A:268:ASN:OD1	1:A:269:PHE:N	2.48	0.46
1:B:93:PHE:CE1	1:B:308:MET:HG2	2.51	0.46
1:B:218:GLN:OE1	1:B:218:GLN:N	2.38	0.46
1:B:338:ARG:HG2	1:B:338:ARG:H	1.48	0.46
1:B:129:CYS:HB3	1:B:151:CYS:HB3	1.73	0.46
1:B:325:PHE:O	1:B:328:LEU:HB3	2.16	0.46
1:B:133:TRP:HA	1:B:133:TRP:CE3	2.51	0.45
1:C:268:ASN:OD1	1:C:269:PHE:N	2.48	0.45
1:A:241:TRP:CE3	1:A:286:VAL:HG11	2.51	0.45
1:A:273:ARG:NH1	1:C:193:GLU:OE1	2.45	0.45
1:B:79:MET:O	1:B:83:VAL:HG13	2.17	0.45
1:C:213:LEU:HB2	1:C:214:LYS:NZ	2.32	0.45
1:B:332:TRP:HA	1:B:332:TRP:CE3	2.52	0.45
1:C:339:ARG:HH12	1:C:342:LYS:HZ2	1.63	0.45
1:B:72:ILE:O	1:B:75:TYR:HB2	2.17	0.45
1:B:83:VAL:HA	1:B:86:VAL:CG1	2.47	0.44
1:B:122:GLY:C	1:B:123:LYS:HD2	2.42	0.44
1:C:154:GLN:HE22	1:C:156:ILE:HG23	1.81	0.44
1:B:103:SER:OG	1:B:298:GLN:O	2.29	0.44
1:C:79:MET:SD	1:C:79:MET:N	2.90	0.44
1:C:220:LYS:NZ	1:C:224:ASP:HB3	2.33	0.44
1:A:330:VAL:O	1:A:334:ILE:HG12	2.16	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:66:PHE:O	1:B:70:LEU:HG	2.17	0.44
1:C:321:LYS:NZ	1:C:325:PHE:HE1	2.15	0.44
1:B:76:LEU:HA	1:B:79:MET:HG2	1.98	0.44
1:B:338:ARG:O	1:B:342:LYS:HG3	2.18	0.44
1:A:273:ARG:NH2	1:C:194:THR:O	2.51	0.44
1:B:82:ALA:O	1:B:86:VAL:HG12	2.17	0.43
1:B:250:LYS:HE2	1:B:250:LYS:HB2	1.82	0.43
1:A:219:VAL:O	1:A:223:GLN:HG2	2.18	0.43
1:A:246:LEU:HB2	1:A:260:PHE:HE1	1.83	0.43
1:B:247:VAL:HG22	1:B:259:GLU:HB3	1.99	0.43
1:A:210:GLU:CD	1:A:210:GLU:H	2.26	0.43
1:B:277:ASP:O	1:C:272:ARG:NH1	2.51	0.43
1:A:297:ILE:HD13	1:A:297:ILE:HA	1.83	0.43
1:B:305:PRO:O	1:B:308:MET:HG3	2.18	0.43
1:B:212:PHE:CE1	1:B:221:PHE:HB3	2.54	0.43
1:C:237:GLY:N	1:C:283:PHE:HB3	2.33	0.43
1:B:337:ARG:NH2	1:B:341:LEU:HD11	2.32	0.43
1:C:92:ASP:O	1:C:96:LYS:HG2	2.19	0.43
1:B:60:ARG:HB3	1:B:337:ARG:NH1	2.34	0.42
1:A:224:ASP:OD1	1:A:225:CYS:N	2.52	0.42
1:C:250:LYS:HD3	1:C:250:LYS:HA	1.95	0.42
1:B:138:PRO:HA	1:B:139:PRO:HD3	1.92	0.42
1:B:176:PRO:HB3	1:B:183:GLU:O	2.20	0.42
1:C:158:TYR:O	1:C:168:LYS:N	2.53	0.42
1:A:106:TYR:CE1	1:A:295:GLN:HG2	2.51	0.42
1:A:112:TYR:HE1	1:A:179:VAL:HB	1.85	0.42
1:A:116:GLY:HA3	1:A:206:PHE:CZ	2.54	0.42
1:C:244:MET:HE2	1:C:289:TRP:CD1	2.55	0.42
1:C:132:HIS:CE1	1:C:138:PRO:HA	2.55	0.42
1:A:131:HIS:HB3	1:A:183:GLU:OE2	2.20	0.42
1:A:326:ALA:O	1:A:330:VAL:HG23	2.20	0.42
1:B:131:HIS:HE1	1:B:151:CYS:HB3	1.85	0.42
1:B:157:SER:HB3	1:B:167:MET:SD	2.60	0.42
1:B:297:ILE:HD13	1:B:297:ILE:HA	1.87	0.42
1:A:210:GLU:O	1:A:214:LYS:NZ	2.51	0.41
1:A:248:LYS:HD2	1:A:248:LYS:HA	1.78	0.41
1:A:308:MET:N	1:A:308:MET:SD	2.92	0.41
1:B:202:ASP:C	1:B:202:ASP:OD1	2.63	0.41
1:B:308:MET:HE2	1:B:308:MET:HB2	1.58	0.41
1:A:116:GLY:HA3	1:A:206:PHE:CE1	2.55	0.41
1:A:293:TYR:O	1:A:294:ILE:HD13	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:155:ASP:HB2	1:B:171:LEU:HA	2.02	0.41
1:C:307:SER:O	1:C:310:ALA:N	2.53	0.41
1:A:57:ARG:NH2	1:A:61:THR:OG1	2.46	0.41
1:A:105:SER:OG	1:A:296:GLU:HB2	2.19	0.41
1:A:90:ILE:O	1:A:94:ARG:HG2	2.20	0.41
1:B:71:LEU:HD13	1:B:330:VAL:HG23	2.03	0.41
1:B:187:LEU:HB3	1:B:189:PHE:CE1	2.51	0.41
1:B:240:THR:HG22	1:B:242:VAL:HG23	2.03	0.41
1:B:222:MET:SD	1:B:222:MET:C	3.03	0.41
1:C:327:LYS:HE2	1:C:327:LYS:HB3	1.85	0.41
1:A:85:LEU:O	1:A:88:GLN:HG3	2.21	0.41
1:A:208:SER:HG	1:A:211:ALA:H	1.67	0.41
1:A:305:PRO:HB2	1:A:306:TRP:CZ3	2.56	0.41
1:B:107:LYS:NZ	1:B:108:GLU:O	2.54	0.41
1:B:335:LYS:HG2	1:B:339:ARG:HE	1.86	0.41
1:B:337:ARG:HG3	1:B:338:ARG:N	2.30	0.41
1:C:67:PHE:HZ	1:C:337:ARG:HE	1.68	0.41
1:C:110:ASN:OD1	1:C:110:ASN:N	2.51	0.41
1:B:308:MET:HG3	1:B:308:MET:H	1.64	0.41
1:B:120:TYR:CE1	1:B:168:LYS:HD2	2.57	0.40
1:C:304:ASN:HB2	1:C:308:MET:HG3	2.04	0.40
1:A:178:ASP:CG	1:A:181:ARG:H	2.29	0.40
1:C:331:LYS:O	1:C:334:ILE:HG22	2.21	0.40
1:A:187:LEU:HB3	1:A:189:PHE:CE2	2.57	0.40
1:B:308:MET:O	1:B:312:LEU:HG	2.22	0.40
1:C:218:GLN:HA	1:C:221:PHE:HB3	2.03	0.40
1:A:96:LYS:CB	1:A:303:ALA:HB2	2.51	0.40
1:B:194:THR:O	1:C:273:ARG:NH2	2.54	0.40
1:C:138:PRO:HA	1:C:139:PRO:HD3	1.96	0.40
1:C:155:ASP:OD1	1:C:169:HIS:NE2	2.44	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	286/352 (81%)	275 (96%)	11 (4%)	0	100	100
1	B	281/352 (80%)	269 (96%)	12 (4%)	0	100	100
1	C	283/352 (80%)	267 (94%)	16 (6%)	0	100	100
All	All	850/1056 (80%)	811 (95%)	39 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	262/321 (82%)	252 (96%)	10 (4%)	28	50
1	B	261/321 (81%)	235 (90%)	26 (10%)	6	21
1	C	262/321 (82%)	259 (99%)	3 (1%)	70	80
All	All	785/963 (82%)	746 (95%)	39 (5%)	23	43

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	301	ILE
1	A	302	THR
1	A	306	TRP
1	A	309	ILE
1	A	313	CYS
1	A	315	VAL
1	A	317	LEU
1	A	318	VAL
1	A	319	LEU
1	A	321	LYS
1	B	300	ILE
1	B	301	ILE
1	B	302	THR

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Mol	Chain	Res	Type
1	B	304	ASN
1	B	308	MET
1	B	309	ILE
1	B	311	LEU
1	B	312	LEU
1	B	313	CYS
1	B	317	LEU
1	B	319	LEU
1	B	320	PHE
1	B	321	LYS
1	B	325	PHE
1	B	327	LYS
1	B	328	LEU
1	B	330	VAL
1	B	331	LYS
1	B	333	MET
1	B	334	ILE
1	B	335	LYS
1	B	337	ARG
1	B	338	ARG
1	B	339	ARG
1	B	340	HIS
1	B	341	LEU
1	C	178	ASP
1	C	289	TRP
1	C	325	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	145	GLN
1	A	149	ASN
1	A	164	ASN
1	B	149	ASN
1	B	340	HIS
1	C	88	GLN
1	C	295	GLN

5.3.3 RNA ⓘ

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](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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.