Full wwPDB EM Validation Report ⓘ

Oct 7, 2024 – 02:27 PM JST

PDB ID	:	8ZSZ
EMDB ID	:	EMD-60435
Title	:	Cryo-EM structure of human ZnT1, in the presence of zinc, determined in outward-facing conformation
Authors	:	Ma, J.; Zheng, S.
Deposited on	:	2024-06-06
Resolution	:	3.59 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:

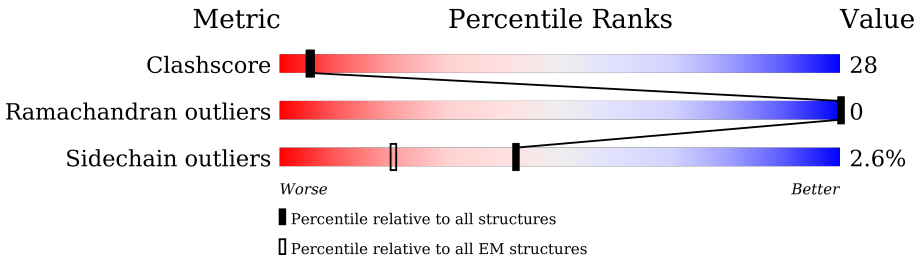
EMDB validation analysis	:	FAILED
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.59 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 <=5%

Mol	Chain	Length	Quality of chain
1	A	507	35% 26% • 38%
1	B	507	34% 26% • 38%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 4754 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-coupled zinc antiporter SLC30A1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	315	Total 2362	C 1528	N 411	O 403	S 20	0	0
1	B	315	Total 2384	C 1543	N 418	O 402	S 21	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

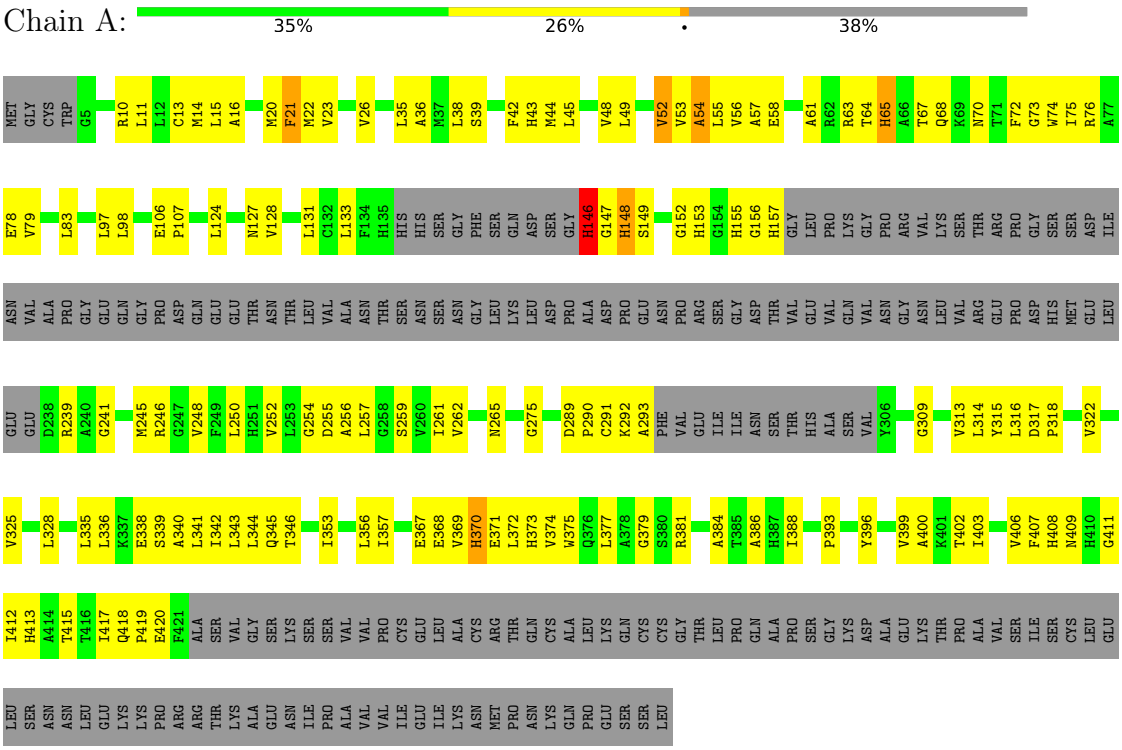
Mol	Chain	Residues	Atoms		AltConf
2	A	4	Total 4	Zn 4	0
2	B	4	Total 4	Zn 4	0

3 Residue-property plots (i)

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

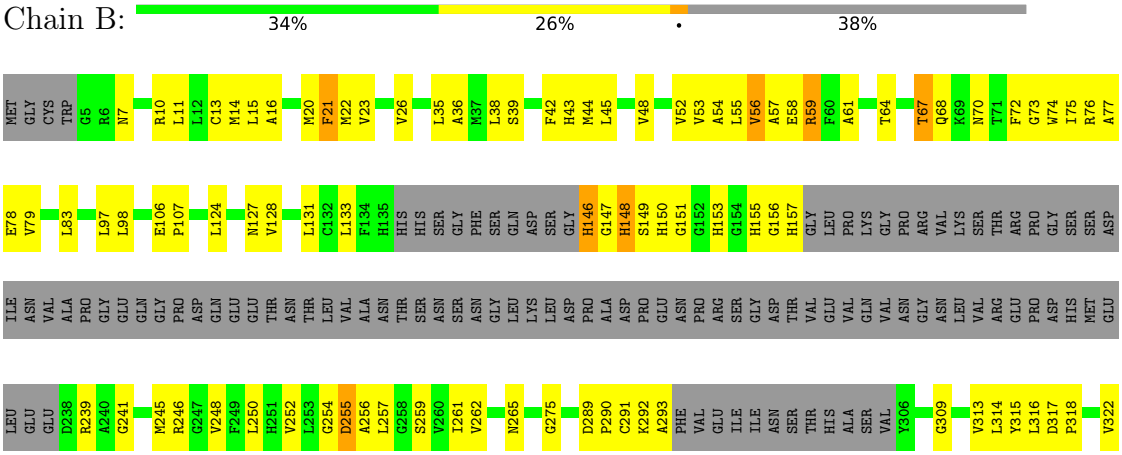
• Molecule 1: Proton-coupled zinc antiporter SLC30A1

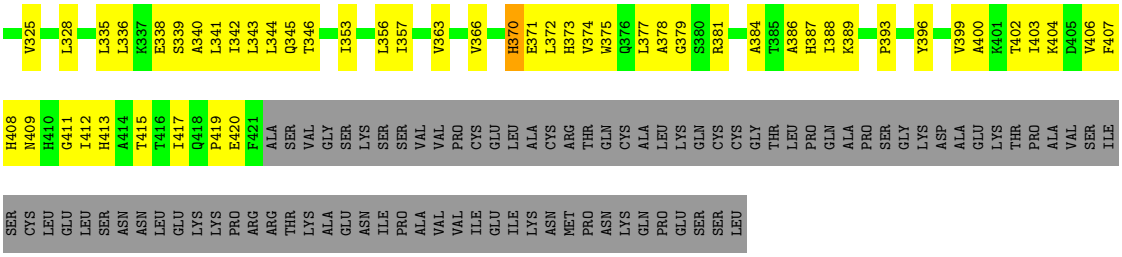
Chain A:



• Molecule 1: Proton-coupled zinc antiporter SLC30A1

Chain B:




V325 L328 L335 L336 K337 E338 S339 A340 L341 I342 L343 L344 Q345 T346 I353 L356 I357 V363 V366 H370 E371 L372 H373 V374 W375 Q376 L377 A378 G379 S380 R381 A384 T385 A386 H387 I388 K389 P393 Y396 V399 A400 K401 T402 I403 K404 D405 V406 F407
H408 N409 H410 G411 I412 H413 A414 T415 T416 I417 Q418 P419 E420 F421 ALA SER VAL GLY SER LYS SER SER VAL VAL PRO CYS GLU LEU ALA CYS ARG THR GLN CYS ALA LEU LYS GLN CYS CYS GLY THR LEU PRO GLN ALA PRO SER GLY LYS ASP ALA GLU LYS THR PRO ALA VAL SER ILE
SER CYS LEU GLU LEU SER ASN ASN LEU GLU LYS LYS PRO ARG ARG THR LYS ALA GLU ASN ILE PRO ALA VAL VAL ILE GLU ILE LYS ASN MET PRO ASN LYS GLN PRO GLU SER SER LEU

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	359002	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1230	Depositor
Maximum defocus (nm)	5800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k 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: ZN

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	0.79	1/2414 (0.0%)	0.86	3/3290 (0.1%)
1	B	0.85	1/2436 (0.0%)	0.88	2/3314 (0.1%)
All	All	0.82	2/4850 (0.0%)	0.87	5/6604 (0.1%)

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	4
1	B	0	4
All	All	0	8

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	59	ARG	C-O	5.27	1.33	1.23
1	A	54	ALA	CA-C	-5.09	1.39	1.52

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	375	TRP	CA-CB-CG	7.35	127.66	113.70
1	B	375	TRP	CA-CB-CG	7.33	127.62	113.70
1	B	56	VAL	N-CA-C	-6.98	92.14	111.00
1	A	65	HIS	N-CA-C	5.17	124.96	111.00
1	A	146	HIS	CB-CA-C	5.14	120.67	110.40

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	314	LEU	Mainchain
1	A	336	LEU	Mainchain
1	A	340	ALA	Mainchain
1	A	411	GLY	Mainchain
1	B	314	LEU	Mainchain
1	B	336	LEU	Mainchain
1	B	340	ALA	Mainchain
1	B	411	GLY	Mainchain

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	2362	0	2329	147	0
1	B	2384	0	2383	143	0
2	A	4	0	0	0	0
2	B	4	0	0	0	0
All	All	4754	0	4712	264	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 28.

All (264) 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:A:149:SER:HB3	1:A:381:ARG:HG2	1.34	1.10
1:B:64:THR:HG23	1:B:75:ILE:HD11	1.30	1.07
1:A:64:THR:HG23	1:A:75:ILE:HD11	1.33	1.04
1:B:149:SER:HB3	1:B:381:ARG:HG2	1.35	1.04
1:A:419:PRO:HG2	1:B:419:PRO:HG2	1.48	0.95
1:A:419:PRO:HD3	1:B:419:PRO:HD3	1.50	0.94
1:A:384:ALA:HB3	1:A:412:ILE:HG21	1.61	0.81
1:A:72:PHE:O	1:A:146:HIS:N	2.14	0.81
1:B:61:ALA:HB2	1:B:78:GLU:HB2	1.63	0.80
1:A:393:PRO:O	1:A:396:TYR:HB3	1.81	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:393:PRO:O	1:B:396:TYR:HB3	1.81	0.79
1:A:345:GLN:HE22	1:B:345:GLN:HE22	1.31	0.77
1:B:11:LEU:HD23	1:B:55:LEU:HG	1.66	0.77
1:A:61:ALA:HB2	1:A:78:GLU:HB2	1.66	0.75
1:B:291:CYS:SG	1:B:292:LYS:N	2.60	0.74
1:A:98:LEU:HD11	1:B:45:LEU:HD23	1.69	0.74
1:A:11:LEU:HD23	1:A:55:LEU:HG	1.69	0.73
1:B:72:PHE:O	1:B:146:HIS:N	2.23	0.72
1:A:131:LEU:HD12	1:A:252:VAL:HG12	1.72	0.72
1:A:149:SER:CB	1:A:381:ARG:HA	2.20	0.71
1:A:146:HIS:CD2	1:B:373:HIS:CE1	2.78	0.71
1:A:70:ASN:ND2	1:A:73:GLY:O	2.23	0.71
1:A:419:PRO:HD3	1:B:419:PRO:CD	2.20	0.70
1:B:131:LEU:HD12	1:B:252:VAL:HG12	1.72	0.70
1:A:149:SER:HB3	1:A:381:ARG:CG	2.19	0.70
1:A:344:LEU:HD13	1:B:74:TRP:CZ3	2.27	0.69
1:A:291:CYS:SG	1:A:292:LYS:N	2.65	0.69
1:B:70:ASN:OD1	1:B:73:GLY:N	2.22	0.68
1:B:246:ARG:HG2	1:B:335:LEU:HD11	1.77	0.66
1:A:246:ARG:HG2	1:A:335:LEU:HD11	1.77	0.66
1:B:384:ALA:CB	1:B:412:ILE:HG21	2.26	0.66
1:B:54:ALA:O	1:B:57:ALA:HB3	1.96	0.66
1:A:11:LEU:CD2	1:A:55:LEU:HG	2.27	0.65
1:B:396:TYR:CZ	1:B:419:PRO:HG3	2.32	0.64
1:A:55:LEU:O	1:A:56:VAL:C	2.33	0.64
1:B:11:LEU:CD2	1:B:55:LEU:HG	2.26	0.64
1:B:16:ALA:O	1:B:20:MET:HG2	1.98	0.63
1:B:76:ARG:HA	1:B:79:VAL:HG22	1.81	0.63
1:A:42:PHE:C	1:A:44:MET:N	2.42	0.63
1:B:366:VAL:HG13	1:B:388:ILE:HG23	1.80	0.63
1:A:55:LEU:O	1:A:58:GLU:N	2.32	0.62
1:A:55:LEU:C	1:A:57:ALA:N	2.44	0.62
1:A:16:ALA:O	1:A:20:MET:HG2	1.98	0.62
1:A:76:ARG:HA	1:A:79:VAL:HG22	1.81	0.62
1:A:370:HIS:CE1	1:A:371:GLU:HG3	2.35	0.61
1:A:408:HIS:CE1	1:A:413:HIS:CD2	2.87	0.61
1:B:58:GLU:OE2	1:B:245:MET:HE1	2.00	0.61
1:A:373:HIS:CE1	1:B:146:HIS:CD2	2.88	0.61
1:A:76:ARG:NH1	1:A:342:ILE:O	2.34	0.60
1:A:98:LEU:HD11	1:B:45:LEU:CD2	2.31	0.60
1:A:344:LEU:HD13	1:B:74:TRP:HZ3	1.64	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:369:VAL:HG12	1:A:388:ILE:CD1	2.31	0.60
1:B:76:ARG:NH1	1:B:342:ILE:O	2.34	0.60
1:B:370:HIS:CE1	1:B:371:GLU:HG3	2.37	0.59
1:A:35:LEU:HD22	1:B:106:GLU:HG3	1.83	0.59
1:A:106:GLU:HG3	1:B:35:LEU:HD22	1.83	0.59
1:B:408:HIS:O	1:B:409:ASN:C	2.35	0.58
1:A:408:HIS:O	1:A:409:ASN:C	2.40	0.58
1:A:42:PHE:C	1:A:44:MET:H	2.07	0.58
1:A:368:GLU:HG2	1:A:369:VAL:N	2.19	0.58
1:B:265:ASN:ND2	1:B:317:ASP:HB2	2.19	0.58
1:B:384:ALA:HB3	1:B:412:ILE:HG21	1.84	0.58
1:A:265:ASN:ND2	1:A:317:ASP:HB2	2.19	0.58
1:B:75:ILE:HD12	1:B:75:ILE:H	1.69	0.58
1:B:404:LYS:NZ	1:B:415:THR:OG1	2.27	0.57
1:A:396:TYR:CZ	1:A:419:PRO:HG3	2.39	0.57
1:B:149:SER:O	1:B:150:HIS:C	2.40	0.57
1:A:149:SER:OG	1:A:381:ARG:HA	2.05	0.57
1:B:15:LEU:HD11	1:B:48:VAL:HG13	1.87	0.56
1:A:155:HIS:CD2	1:A:408:HIS:CE1	2.93	0.56
1:B:406:VAL:O	1:B:407:PHE:C	2.41	0.56
1:B:257:LEU:O	1:B:261:ILE:HG12	2.06	0.55
1:A:257:LEU:O	1:A:261:ILE:HG12	2.06	0.55
1:A:155:HIS:HD2	1:A:408:HIS:CE1	2.25	0.55
1:A:146:HIS:HD2	1:B:373:HIS:CE1	2.22	0.54
1:B:58:GLU:OE2	1:B:245:MET:CE	2.54	0.54
1:A:399:VAL:O	1:A:402:THR:OG1	2.19	0.54
1:A:356:LEU:HD23	1:A:372:LEU:HD21	1.90	0.54
1:B:399:VAL:O	1:B:402:THR:OG1	2.19	0.54
1:B:246:ARG:HD3	1:B:335:LEU:HD21	1.91	0.53
1:A:65:HIS:O	1:A:65:HIS:CG	2.60	0.53
1:A:246:ARG:HD3	1:A:335:LEU:HD21	1.91	0.53
1:A:64:THR:HG23	1:A:75:ILE:CD1	2.23	0.53
1:A:419:PRO:CG	1:B:419:PRO:HG2	2.29	0.53
1:A:64:THR:CG2	1:A:75:ILE:HD11	2.24	0.52
1:B:356:LEU:HD23	1:B:372:LEU:HD21	1.90	0.52
1:A:127:ASN:HB3	1:A:256:ALA:HB2	1.91	0.52
1:B:127:ASN:HB3	1:B:256:ALA:HB2	1.91	0.52
1:A:15:LEU:HD11	1:A:48:VAL:HG13	1.91	0.52
1:B:36:ALA:O	1:B:39:SER:HB2	2.10	0.52
1:A:239:ARG:HB3	1:A:379:GLY:HA2	1.92	0.51
1:B:386:ALA:HB3	1:B:417:ILE:HG23	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:372:LEU:HD12	1:A:386:ALA:HB2	1.93	0.51
1:A:373:HIS:CE1	1:B:146:HIS:HD2	2.29	0.51
1:A:322:VAL:O	1:A:325:VAL:HG22	2.11	0.51
1:A:419:PRO:CD	1:B:419:PRO:CD	2.89	0.51
1:B:7:ASN:HB2	1:B:58:GLU:OE2	2.11	0.51
1:B:322:VAL:O	1:B:325:VAL:HG22	2.11	0.51
1:A:155:HIS:CD2	1:A:408:HIS:ND1	2.79	0.50
1:B:408:HIS:CD2	1:B:413:HIS:HA	2.46	0.50
1:A:292:LYS:O	1:A:293:ALA:C	2.49	0.50
1:A:13:CYS:HB3	1:A:14:MET:HE2	1.94	0.50
1:A:406:VAL:O	1:A:407:PHE:C	2.47	0.50
1:B:70:ASN:ND2	1:B:73:GLY:O	2.44	0.50
1:B:83:LEU:HD22	1:B:343:LEU:HD12	1.93	0.50
1:A:48:VAL:O	1:A:52:VAL:HG13	2.12	0.50
1:B:239:ARG:HB3	1:B:379:GLY:HA2	1.92	0.50
1:B:146:HIS:CD2	1:B:146:HIS:O	2.64	0.50
1:B:384:ALA:HB2	1:B:412:ILE:HG21	1.93	0.50
1:A:107:PRO:HB3	1:A:315:TYR:HE1	1.77	0.50
1:B:406:VAL:C	1:B:408:HIS:N	2.56	0.50
1:A:147:GLY:C	1:A:148:HIS:CG	2.85	0.49
1:A:36:ALA:O	1:A:39:SER:HB2	2.12	0.49
1:A:83:LEU:HD22	1:A:343:LEU:HD12	1.93	0.49
1:B:48:VAL:O	1:B:52:VAL:HG13	2.12	0.49
1:A:20:MET:O	1:A:23:VAL:HG22	2.13	0.49
1:A:313:VAL:O	1:A:316:LEU:HB3	2.13	0.49
1:A:386:ALA:HB3	1:A:417:ILE:HG23	1.95	0.49
1:A:44:MET:O	1:A:45:LEU:C	2.49	0.49
1:B:372:LEU:HD12	1:B:386:ALA:HB2	1.94	0.49
1:B:53:VAL:O	1:B:54:ALA:C	2.46	0.48
1:B:64:THR:CG2	1:B:75:ILE:HD11	2.22	0.48
1:B:64:THR:HG23	1:B:75:ILE:CD1	2.22	0.48
1:A:10:ARG:O	1:A:14:MET:HG2	2.14	0.48
1:B:292:LYS:O	1:B:293:ALA:C	2.51	0.48
1:B:74:TRP:O	1:B:77:ALA:N	2.40	0.48
1:B:107:PRO:HB3	1:B:315:TYR:HE1	1.77	0.48
1:B:149:SER:CB	1:B:381:ARG:HA	2.43	0.48
1:B:353:ILE:O	1:B:357:ILE:HG12	2.14	0.48
1:B:396:TYR:O	1:B:400:ALA:N	2.42	0.48
1:B:52:VAL:O	1:B:56:VAL:HG23	2.13	0.47
1:B:341:LEU:HB3	1:B:346:THR:HG21	1.96	0.47
1:A:146:HIS:CD2	1:A:146:HIS:O	2.67	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:313:VAL:O	1:B:316:LEU:HB3	2.13	0.47
1:B:384:ALA:HB2	1:B:412:ILE:HD13	1.94	0.47
1:B:10:ARG:O	1:B:14:MET:HG2	2.14	0.47
1:A:341:LEU:HB3	1:A:346:THR:HG21	1.96	0.47
1:B:20:MET:O	1:B:23:VAL:HG22	2.13	0.47
1:A:10:ARG:HB3	1:A:133:LEU:HD21	1.97	0.47
1:A:156:GLY:O	1:A:157:HIS:C	2.52	0.47
1:A:407:PHE:CE2	1:A:417:ILE:HD12	2.50	0.47
1:A:407:PHE:HE2	1:A:417:ILE:HD12	1.79	0.47
1:B:387:HIS:ND1	1:B:420:GLU:OE2	2.45	0.47
1:A:35:LEU:O	1:A:38:LEU:HB2	2.15	0.47
1:A:353:ILE:O	1:A:357:ILE:HG12	2.14	0.47
1:B:10:ARG:HB3	1:B:133:LEU:HD21	1.97	0.47
1:B:147:GLY:C	1:B:148:HIS:CG	2.87	0.47
1:B:389:LYS:HD3	1:B:420:GLU:O	2.15	0.47
1:A:63:ARG:HB2	1:A:74:TRP:HD1	1.81	0.47
1:A:146:HIS:CE1	1:A:148:HIS:CD2	3.03	0.47
1:A:250:LEU:HD12	1:A:335:LEU:HD12	1.97	0.46
1:A:254:GLY:HA2	1:A:328:LEU:HD11	1.97	0.46
1:A:54:ALA:O	1:A:57:ALA:HB3	2.16	0.46
1:A:367:GLU:OE2	1:A:367:GLU:N	2.49	0.46
1:B:254:GLY:HA2	1:B:328:LEU:HD11	1.97	0.46
1:B:149:SER:OG	1:B:381:ARG:HA	2.15	0.46
1:A:344:LEU:HD13	1:B:74:TRP:CE3	2.50	0.46
1:B:13:CYS:HB3	1:B:14:MET:HE2	1.97	0.46
1:B:22:MET:O	1:B:26:VAL:HG13	2.16	0.46
1:B:250:LEU:HD12	1:B:335:LEU:HD12	1.97	0.46
1:B:156:GLY:O	1:B:157:HIS:C	2.54	0.45
1:B:396:TYR:OH	1:B:419:PRO:HG3	2.16	0.45
1:A:53:VAL:HG12	1:A:53:VAL:O	2.16	0.45
1:A:377:LEU:HB3	1:A:381:ARG:HB2	1.98	0.45
1:B:149:SER:C	1:B:151:GLY:N	2.66	0.45
1:B:377:LEU:HB3	1:B:381:ARG:HB2	1.98	0.45
1:B:248:VAL:O	1:B:252:VAL:HG23	2.17	0.45
1:B:259:SER:HA	1:B:262:VAL:HG12	1.99	0.45
1:A:149:SER:HB3	1:A:381:ARG:HA	1.98	0.45
1:A:344:LEU:HA	1:A:344:LEU:HD23	1.70	0.45
1:A:419:PRO:O	1:A:420:GLU:C	2.53	0.45
1:B:23:VAL:HA	1:B:26:VAL:HG22	1.99	0.45
1:A:396:TYR:O	1:A:400:ALA:N	2.42	0.45
1:B:147:GLY:O	1:B:148:HIS:C	2.54	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:317:ASP:HB3	1:A:318:PRO:HD3	2.00	0.44
1:B:35:LEU:O	1:B:38:LEU:HB2	2.16	0.44
1:A:22:MET:O	1:A:26:VAL:HG13	2.16	0.44
1:A:248:VAL:O	1:A:252:VAL:HG23	2.17	0.44
1:B:317:ASP:HB3	1:B:318:PRO:HD3	2.00	0.44
1:A:23:VAL:HA	1:A:26:VAL:HG22	1.99	0.44
1:A:418:GLN:HA	1:A:419:PRO:HD3	1.86	0.44
1:A:419:PRO:CD	1:B:419:PRO:HD3	2.34	0.44
1:A:153:HIS:NE2	1:A:155:HIS:CE1	2.85	0.44
1:A:259:SER:HA	1:A:262:VAL:HG12	1.99	0.44
1:B:388:ILE:HG12	1:B:417:ILE:CG2	2.48	0.44
1:A:146:HIS:O	1:A:146:HIS:CG	2.70	0.44
1:A:55:LEU:O	1:A:57:ALA:N	2.48	0.44
1:B:363:VAL:HG21	1:B:406:VAL:HG21	1.98	0.44
1:A:49:LEU:HD12	1:A:49:LEU:HA	1.71	0.43
1:A:420:GLU:CD	1:B:157:HIS:CD2	2.91	0.43
1:B:76:ARG:HH21	1:B:377:LEU:HA	1.83	0.43
1:B:374:VAL:HG22	1:B:384:ALA:CB	2.49	0.43
1:B:146:HIS:CE1	1:B:148:HIS:CD2	3.06	0.43
1:A:265:ASN:HD22	1:A:317:ASP:HB2	1.83	0.43
1:B:404:LYS:HZ3	1:B:415:THR:HG1	1.56	0.43
1:A:76:ARG:NE	1:B:345:GLN:HE21	2.17	0.43
1:A:76:ARG:HH21	1:A:377:LEU:HA	1.83	0.43
1:B:44:MET:N	1:B:44:MET:SD	2.85	0.43
1:B:344:LEU:HD23	1:B:344:LEU:HA	1.70	0.43
1:A:345:GLN:HE21	1:B:76:ARG:NE	2.17	0.42
1:A:388:ILE:HG12	1:A:417:ILE:HG22	2.00	0.42
1:B:43:HIS:CD2	1:B:255:ASP:OD2	2.71	0.42
1:B:289:ASP:N	1:B:290:PRO:HD3	2.34	0.42
1:B:386:ALA:O	1:B:417:ILE:HA	2.19	0.42
1:B:335:LEU:O	1:B:339:SER:N	2.41	0.42
1:B:404:LYS:HE2	1:B:404:LYS:HB2	1.67	0.42
1:A:67:THR:HG22	1:A:68:GLN:H	1.85	0.42
1:B:388:ILE:HG12	1:B:417:ILE:HG22	2.01	0.42
1:A:153:HIS:O	1:A:413:HIS:HD2	2.02	0.42
1:A:386:ALA:O	1:A:417:ILE:HA	2.18	0.42
1:A:75:ILE:HD12	1:A:75:ILE:H	1.85	0.42
1:B:23:VAL:O	1:B:26:VAL:HG22	2.20	0.42
1:B:275:GLY:HA2	1:B:309:GLY:H	1.84	0.42
1:A:42:PHE:O	1:A:43:HIS:C	2.53	0.42
1:A:289:ASP:N	1:A:290:PRO:HD3	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:400:ALA:HA	1:A:403:ILE:HD12	2.01	0.42
1:A:415:THR:HB	1:A:417:ILE:HD11	2.02	0.42
1:B:265:ASN:HD22	1:B:317:ASP:HB2	1.83	0.42
1:B:315:TYR:C	1:B:318:PRO:HD2	2.40	0.42
1:A:374:VAL:HG22	1:A:384:ALA:CB	2.49	0.42
1:A:406:VAL:C	1:A:408:HIS:N	2.67	0.42
1:B:22:MET:HG3	1:B:44:MET:HB3	2.01	0.42
1:B:78:GLU:OE2	1:B:241:GLY:HA2	2.20	0.42
1:A:384:ALA:CB	1:A:412:ILE:HG21	2.41	0.42
1:B:14:MET:HE1	1:B:133:LEU:HD13	2.01	0.41
1:B:313:VAL:O	1:B:316:LEU:CB	2.68	0.41
1:A:35:LEU:HD22	1:B:106:GLU:CG	2.50	0.41
1:A:63:ARG:HB2	1:A:74:TRP:CD1	2.56	0.41
1:A:72:PHE:CE1	1:B:373:HIS:CE1	3.09	0.41
1:B:97:LEU:HD23	1:B:98:LEU:HD12	2.03	0.41
1:B:153:HIS:CE1	1:B:155:HIS:NE2	2.88	0.41
1:A:23:VAL:O	1:A:26:VAL:HG22	2.19	0.41
1:A:97:LEU:HD23	1:A:98:LEU:HD12	2.03	0.41
1:A:259:SER:O	1:A:262:VAL:HG12	2.20	0.41
1:A:152:GLY:O	1:A:153:HIS:C	2.57	0.41
1:A:275:GLY:HA2	1:A:309:GLY:H	1.84	0.41
1:B:22:MET:HG2	1:B:44:MET:HB2	2.01	0.41
1:B:124:LEU:O	1:B:128:VAL:HG23	2.20	0.41
1:A:72:PHE:CE1	1:B:373:HIS:ND1	2.89	0.41
1:B:67:THR:HG22	1:B:68:GLN:H	1.85	0.41
1:A:21:PHE:O	1:A:21:PHE:CD1	2.74	0.41
1:B:259:SER:O	1:B:262:VAL:HG12	2.20	0.41
1:B:338:GLU:O	1:B:342:ILE:HG12	2.21	0.41
1:B:400:ALA:HA	1:B:403:ILE:HD12	2.01	0.41
1:A:106:GLU:CG	1:B:35:LEU:HD22	2.51	0.41
1:A:407:PHE:O	1:A:408:HIS:C	2.56	0.41
1:B:241:GLY:O	1:B:245:MET:HG2	2.21	0.41
1:A:124:LEU:O	1:A:128:VAL:HG23	2.21	0.41
1:A:146:HIS:O	1:A:148:HIS:CD2	2.74	0.41
1:A:313:VAL:O	1:A:316:LEU:CB	2.68	0.41
1:A:315:TYR:C	1:A:318:PRO:HD2	2.40	0.41
1:B:21:PHE:O	1:B:21:PHE:CD1	2.74	0.40
1:B:155:HIS:CD2	1:B:408:HIS:CE1	3.09	0.40
1:A:335:LEU:O	1:A:339:SER:N	2.41	0.40
1:A:399:VAL:O	1:A:403:ILE:HG13	2.22	0.40
1:A:98:LEU:HD23	1:B:42:PHE:HB3	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:241:GLY:O	1:A:245:MET:HG2	2.21	0.40
1:B:55:LEU:O	1:B:56:VAL:C	2.55	0.40
1:A:338:GLU:O	1:A:342:ILE:HG12	2.21	0.40
1:A:374:VAL:HG22	1:A:384:ALA:HB2	2.04	0.40
1:B:75:ILE:HG22	1:B:378:ALA:CB	2.52	0.40
1:B:146:HIS:O	1:B:146:HIS:CG	2.74	0.40
1:A:78:GLU:OE2	1:A:241:GLY:HA2	2.20	0.40
1:A:388:ILE:HG13	1:A:403:ILE:HD13	2.03	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	307/507 (61%)	299 (97%)	8 (3%)	0	100	100
1	B	307/507 (61%)	300 (98%)	7 (2%)	0	100	100
All	All	614/1014 (61%)	599 (98%)	15 (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	A	245/433 (57%)	239 (98%)	6 (2%)	44	67

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	B	250/433 (58%)	243 (97%)	7 (3%)	38 64
All	All	495/866 (57%)	482 (97%)	13 (3%)	42 65

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	PHE
1	A	52	VAL
1	A	146	HIS
1	A	148	HIS
1	A	255	ASP
1	A	370	HIS
1	B	21	PHE
1	B	59	ARG
1	B	67	THR
1	B	146	HIS
1	B	148	HIS
1	B	255	ASP
1	B	370	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	155	HIS
1	A	345	GLN
1	A	409	ASN
1	B	345	GLN
1	B	409	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.