



Full wwPDB EM Validation Report ⓘ

Aug 27, 2024 – 06:14 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) : 2.38.2

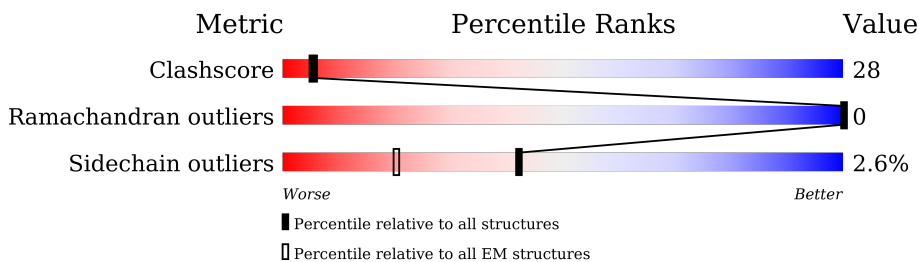
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.59 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	507	
1	B	507	

2 Entry composition

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
			Total	C	N	O	S		
1	A	315	2362	1528	411	403	20	0	0
1	B	315	2384	1543	418	402	21	0	0

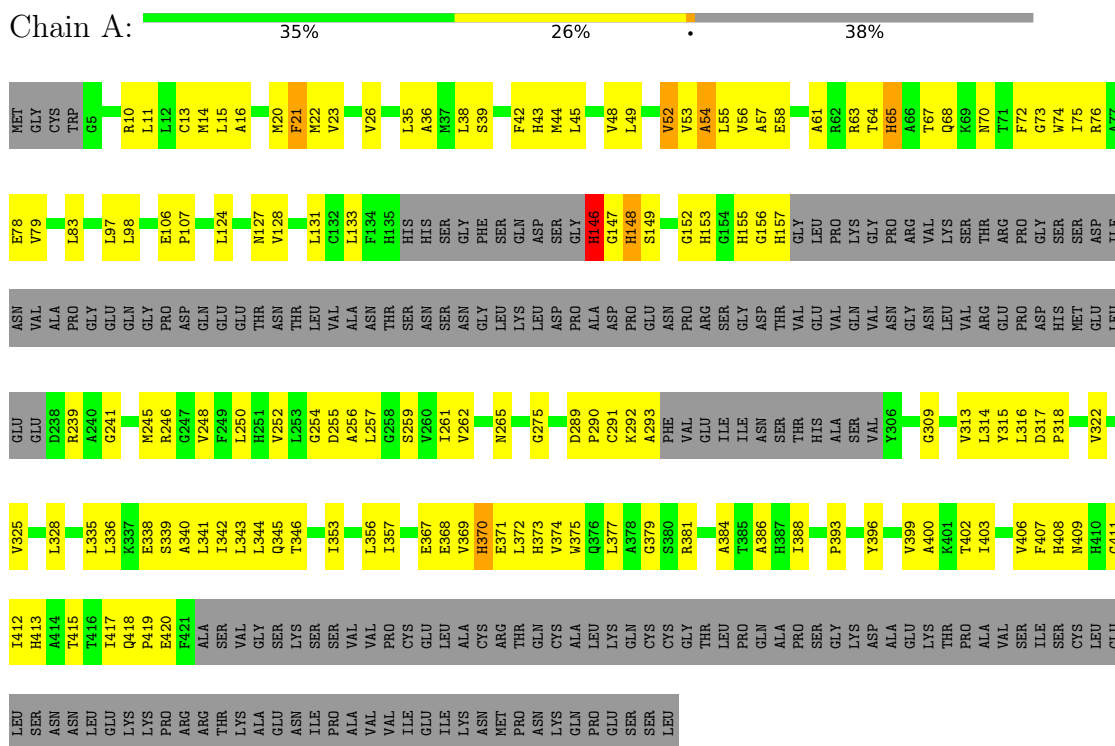
- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

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

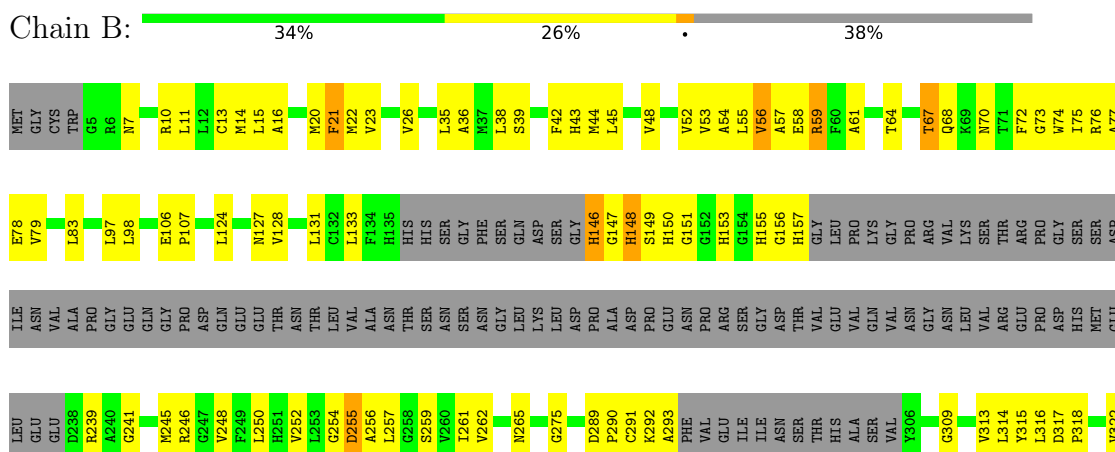
3 Residue-property plots

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-coupled zinc antiporter SLC30A1



- Molecule 1: Proton-coupled zinc antiporter SLC30A1



V325	H408	SER
L328	M409	CYS
L335	H410	LEU
L336	G411	GLU
K337	I412	LEU
E338	H413	SER
S339	A414	ASN
A340	T415	ASN
L341	I416	LEU
I342	I417	LEU
L343	Q418	LYS
L344	P419	LYS
Q345	E420	PRO
T346	F421	ARG
I353	ALA	ARG
L356	SER	THR
I357	VAL	LYS
V363	GLY	ALA
V366	SER	GLU
H370	LYS	ASN
E371	SER	ILE
L372	SER	PRO
H373	VAL	ALA
V374	VAL	VAL
W375	PRO	VAL
Q376	CYS	ILE
L377	GLU	GLU
A378	LEU	ILE
G379	ALA	LYS
S380	LEU	ASN
R381	LYS	MET
A384	GLN	PRO
T385	ASN	ASN
A386	LYS	LYS
H387	GLN	GLN
I388	PRO	PRO
K389	ALA	GLU
P393	PRO	SER
Y396	GLY	SER
V399	LYS	LEU
A400	ASP	ALA
K401	ALA	GLU
T402	GLU	LYS
I403	LYS	THR
K404	THR	PRO
D405	ALA	ALA
V406	VAL	VAL
F407	SER	ILE

4 Experimental information

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 ($e^-/\text{\AA}^2$)	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 [i](#)

5.1 Standard geometry [i](#)

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(°)	Ideal(°)
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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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.