Full wwPDB EM Validation Report ⓘ

Mar 24, 2025 – 02:19 PM JST

PDB ID	:	9J34
EMDB ID	:	EMD-61105
Title	:	Cryo-EM structure of Arabidopsis CNGC1
Authors	:	Wang, J.P.; Zhang, P.; Zhang, X.
Deposited on	:	2024-08-07
Resolution	:	2.51 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:

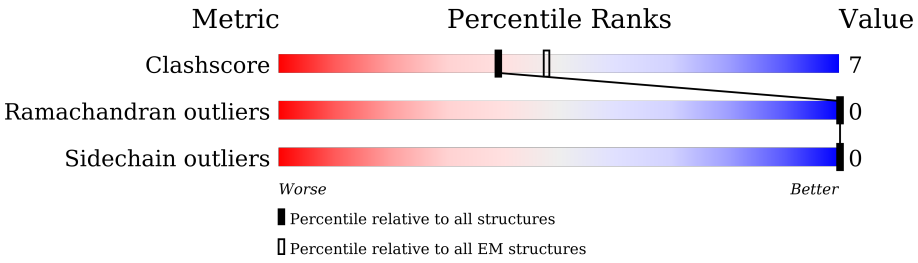
EMDB validation analysis	:	FAILED
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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 2.51 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	716	59% 11% • 30%
1	B	716	58% 11% • 30%
1	C	716	59% 10% • 30%
1	D	716	60% 10% 30%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 16427 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 Cyclic nucleotide-gated ion channel 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	D	502	Total	C	N	O	S	0	0
			4104	2675	678	725	26		
1	A	502	Total	C	N	O	S	0	0
			4104	2675	678	725	26		
1	B	502	Total	C	N	O	S	0	0
			4104	2675	678	725	26		
1	C	502	Total	C	N	O	S	0	0
			4104	2675	678	725	26		

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
2	A	3	Total	Ca	0
			3	3	

- Molecule 3 is water.

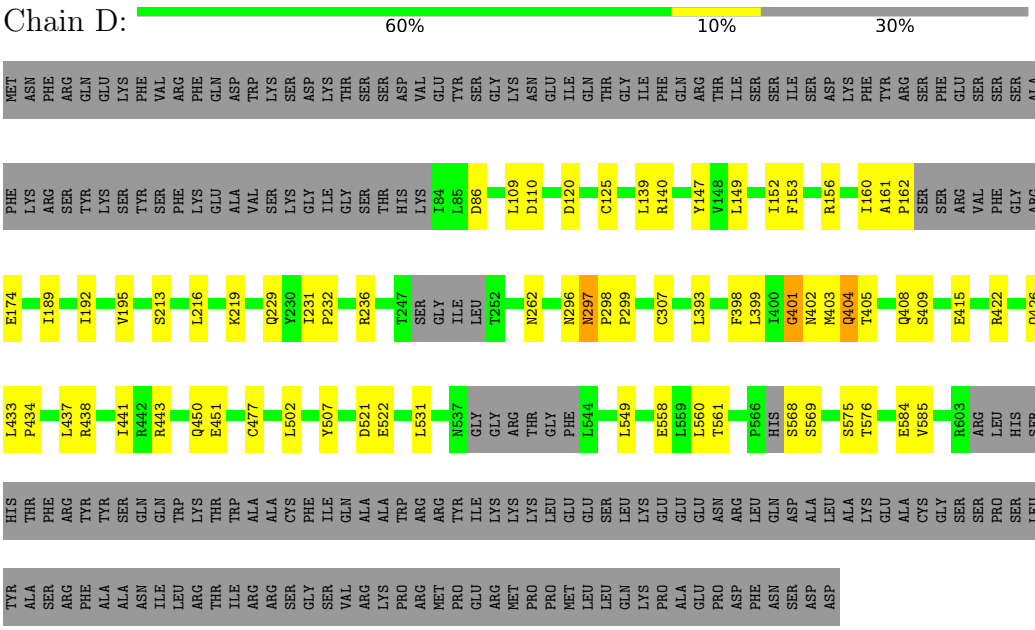
Mol	Chain	Residues	Atoms		AltConf
3	D	2	Total	O	0
			2	2	
3	A	2	Total	O	0
			2	2	
3	B	2	Total	O	0
			2	2	
3	C	2	Total	O	0
			2	2	

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.

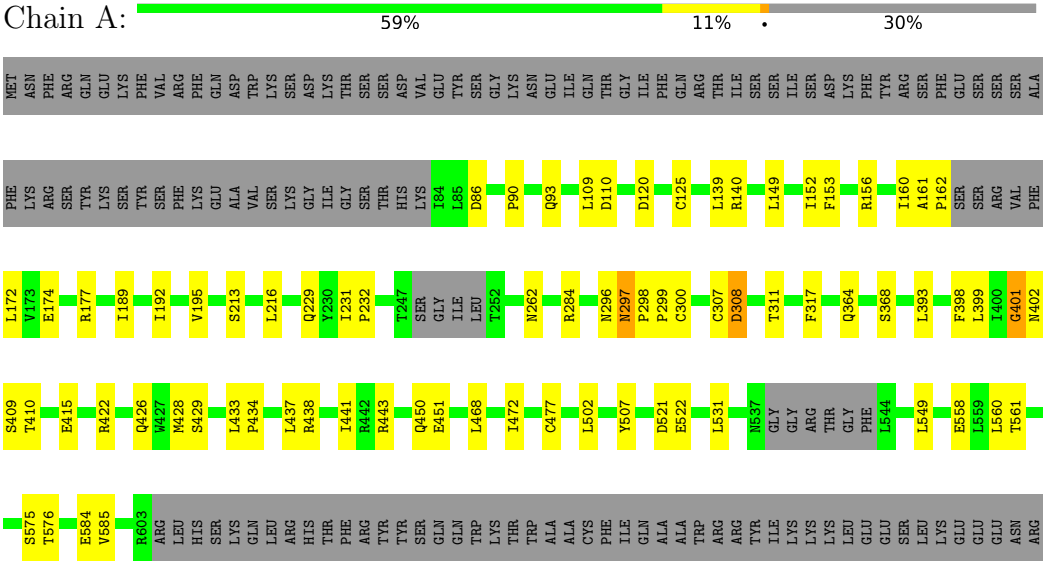
• Molecule 1: Cyclic nucleotide-gated ion channel 1

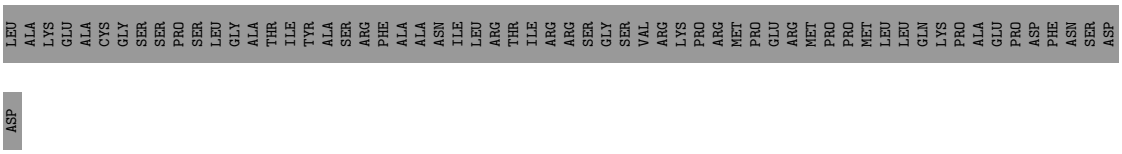
Chain D:



• Molecule 1: Cyclic nucleotide-gated ion channel 1

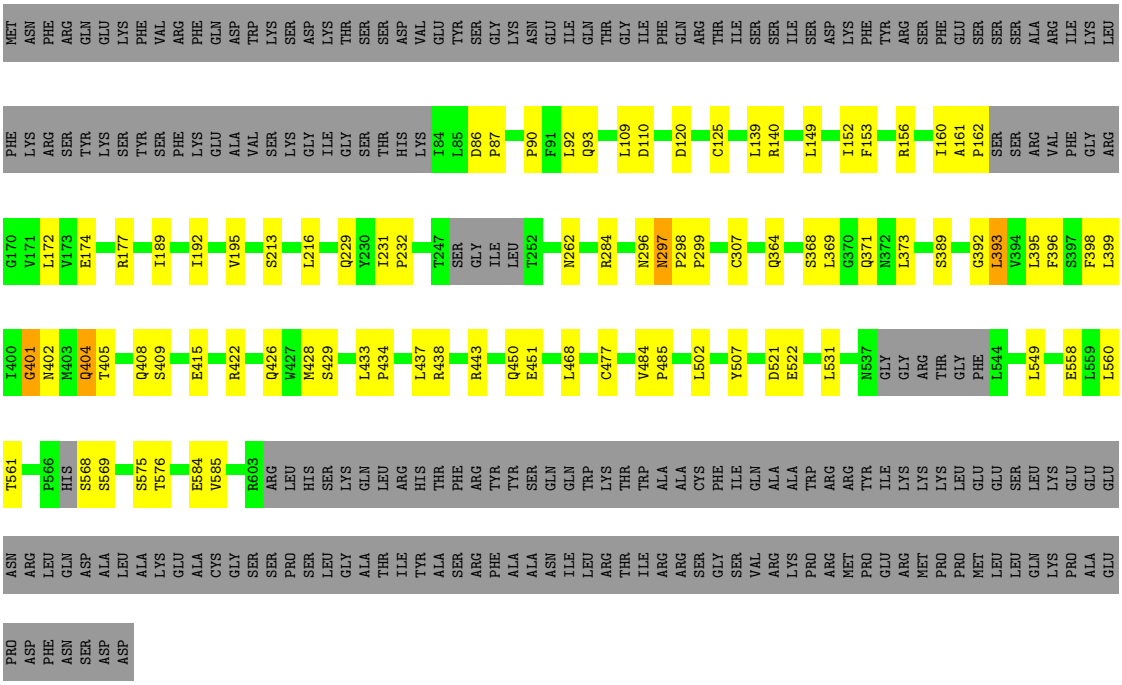
Chain A:





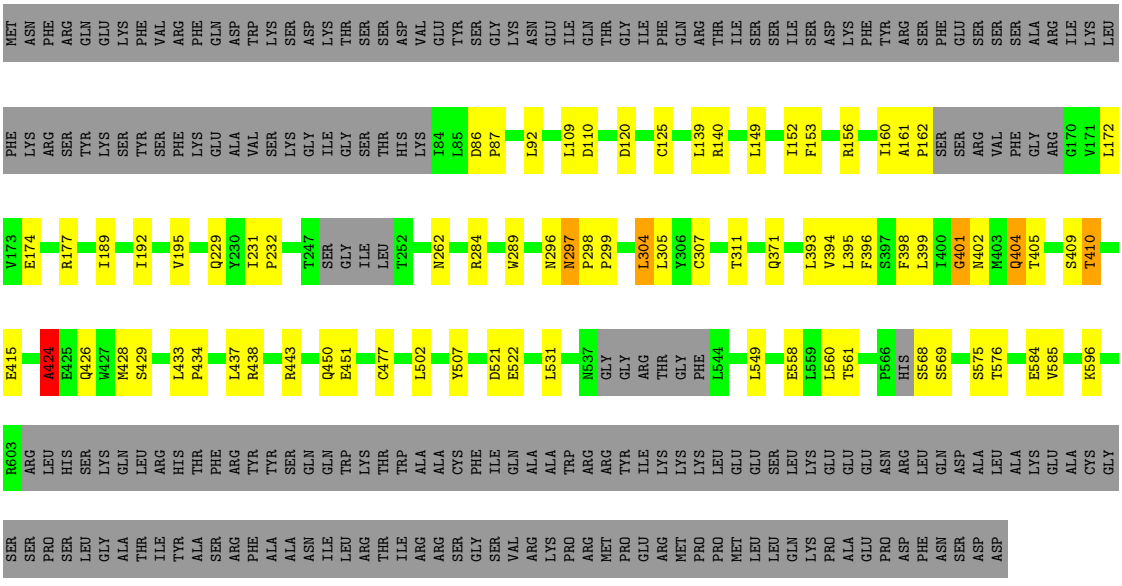
• Molecule 1: Cyclic nucleotide-gated ion channel 1

Chain B:



• Molecule 1: Cyclic nucleotide-gated ion channel 1

Chain C:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	594717	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	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: CA

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	0.64	5/4202 (0.1%)	0.73	9/5689 (0.2%)
1	B	0.61	6/4202 (0.1%)	0.69	8/5689 (0.1%)
1	C	0.64	7/4202 (0.2%)	0.68	8/5689 (0.1%)
1	D	0.57	4/4202 (0.1%)	0.67	6/5689 (0.1%)
All	All	0.62	22/16808 (0.1%)	0.69	31/22756 (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	1
1	C	0	1
All	All	0	2

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	308	ASP	C-N	13.30	1.59	1.34
1	C	304	LEU	C-N	8.69	1.54	1.34
1	B	404	GLN	CA-CB	-7.31	1.37	1.53
1	B	404	GLN	N-CA	-7.23	1.31	1.46
1	C	410	THR	C-N	6.73	1.49	1.34
1	D	401	GLY	C-O	-6.04	1.14	1.23
1	B	401	GLY	C-O	-6.02	1.14	1.23
1	A	404	GLN	N-CA	-5.99	1.34	1.46
1	C	401	GLY	C-O	-5.94	1.14	1.23
1	A	401	GLY	C-O	-5.92	1.14	1.23
1	C	396	PHE	N-CA	-5.92	1.34	1.46
1	B	396	PHE	N-CA	-5.91	1.34	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	404	GLN	N-CA	-5.78	1.34	1.46
1	A	404	GLN	CA-CB	-5.51	1.41	1.53
1	C	424	ALA	C-N	5.48	1.46	1.34
1	D	404	GLN	CA-CB	-5.26	1.42	1.53
1	C	404	GLN	N-CA	-5.13	1.36	1.46
1	C	399	LEU	CA-CB	-5.09	1.42	1.53
1	B	399	LEU	CA-CB	-5.06	1.42	1.53
1	D	399	LEU	CA-CB	-5.03	1.42	1.53
1	B	393	LEU	C-O	-5.00	1.13	1.23
1	A	399	LEU	CA-CB	-5.00	1.42	1.53

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	311	THR	O-C-N	15.09	146.85	122.70
1	A	311	THR	CA-C-N	-11.30	92.33	117.20
1	C	307	CYS	CA-CB-SG	9.07	130.32	114.00
1	B	404	GLN	CA-CB-CG	-8.79	94.07	113.40
1	D	307	CYS	C-N-CA	8.21	142.22	121.70
1	B	307	CYS	C-N-CA	8.21	142.22	121.70
1	A	311	THR	C-N-CA	-8.13	101.37	121.70
1	A	307	CYS	CA-CB-SG	7.67	127.81	114.00
1	A	174	GLU	CA-CB-CG	7.37	129.61	113.40
1	D	174	GLU	CA-CB-CG	7.34	129.56	113.40
1	B	174	GLU	CA-CB-CG	7.32	129.51	113.40
1	C	174	GLU	CA-CB-CG	7.32	129.50	113.40
1	C	297	ASN	N-CA-C	-6.72	92.86	111.00
1	D	297	ASN	N-CA-C	-6.66	93.03	111.00
1	B	393	LEU	CA-CB-CG	6.60	130.47	115.30
1	B	297	ASN	N-CA-C	-6.56	93.28	111.00
1	C	394	VAL	O-C-N	-5.96	113.16	122.70
1	A	404	GLN	CA-CB-CG	-5.71	100.84	113.40
1	B	392	GLY	O-C-N	-5.62	113.72	122.70
1	C	395	LEU	CA-CB-CG	5.61	128.20	115.30
1	C	393	LEU	CA-CB-CG	5.57	128.11	115.30
1	D	393	LEU	CA-CB-CG	5.55	128.07	115.30
1	A	393	LEU	CA-CB-CG	5.54	128.05	115.30
1	A	297	ASN	N-CA-C	-5.41	96.39	111.00
1	B	395	LEU	CA-CB-CG	5.36	127.63	115.30
1	C	297	ASN	C-N-CD	5.27	139.47	128.40
1	D	297	ASN	C-N-CD	5.20	139.31	128.40
1	C	426	GLN	CA-CB-CG	5.13	124.69	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	426	GLN	CA-CB-CG	5.12	124.67	113.40
1	A	426	GLN	CA-CB-CG	5.12	124.66	113.40
1	D	426	GLN	CA-CB-CG	5.11	124.64	113.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	308	ASP	Mainchain
1	C	424	ALA	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	4104	0	4127	64	0
1	B	4104	0	4127	69	0
1	C	4104	0	4127	61	0
1	D	4104	0	4127	56	0
2	A	3	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
All	All	16427	0	16508	231	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 7.

All (231) 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:160:ILE:CG2	1:A:172:LEU:HD23	1.47	1.45
1:D:160:ILE:CG2	1:D:172:LEU:HD23	1.47	1.44
1:B:160:ILE:CG2	1:B:172:LEU:HD23	1.47	1.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:160:ILE:CG2	1:C:172:LEU:HD23	1.47	1.42
1:A:160:ILE:CG2	1:A:172:LEU:CD2	2.22	1.18
1:B:160:ILE:CG2	1:B:172:LEU:CD2	2.22	1.17
1:C:160:ILE:CG2	1:C:172:LEU:CD2	2.22	1.17
1:D:160:ILE:CG2	1:D:172:LEU:CD2	2.22	1.16
1:A:161:ALA:HB1	1:A:162:PRO:HD2	1.35	1.06
1:C:161:ALA:HB1	1:C:162:PRO:HD2	1.35	1.05
1:B:161:ALA:HB1	1:B:162:PRO:HD2	1.35	1.04
1:C:160:ILE:HG22	1:C:172:LEU:CD2	1.87	1.03
1:D:161:ALA:HB1	1:D:162:PRO:HD2	1.35	1.03
1:D:160:ILE:HG22	1:D:172:LEU:CD2	1.87	1.01
1:A:160:ILE:HG22	1:A:172:LEU:CD2	1.87	1.01
1:B:160:ILE:HG22	1:B:172:LEU:CD2	1.87	0.98
1:A:86:ASP:HB3	1:A:172:LEU:HD13	1.45	0.97
1:C:86:ASP:HB3	1:C:172:LEU:HD13	1.45	0.96
1:D:86:ASP:HB3	1:D:172:LEU:HD13	1.46	0.95
1:B:86:ASP:HB3	1:B:172:LEU:HD13	1.46	0.95
1:C:160:ILE:HG23	1:C:172:LEU:CD2	1.96	0.94
1:A:160:ILE:HG23	1:A:172:LEU:CD2	1.96	0.94
1:B:160:ILE:HG23	1:B:172:LEU:CD2	1.96	0.93
1:B:160:ILE:HG22	1:B:172:LEU:HD23	0.93	0.92
1:C:160:ILE:HG22	1:C:172:LEU:HD23	0.93	0.92
1:B:160:ILE:HG23	1:B:172:LEU:HD23	1.52	0.91
1:A:160:ILE:HG22	1:A:172:LEU:HD23	0.93	0.91
1:D:160:ILE:HG22	1:D:172:LEU:HD23	0.93	0.91
1:D:160:ILE:HG23	1:D:172:LEU:HD23	1.52	0.90
1:D:160:ILE:HG23	1:D:172:LEU:CD2	1.96	0.90
1:A:160:ILE:HG23	1:A:172:LEU:HD23	1.52	0.90
1:C:160:ILE:HG23	1:C:172:LEU:HD23	1.52	0.88
1:B:369:LEU:HD13	1:B:393:LEU:HD23	1.60	0.82
1:C:262:ASN:HD22	1:C:402:ASN:HD22	1.27	0.82
1:B:86:ASP:CB	1:B:172:LEU:HD13	2.10	0.81
1:A:86:ASP:CB	1:A:172:LEU:HD13	2.10	0.81
1:C:86:ASP:CB	1:C:172:LEU:HD13	2.10	0.80
1:D:86:ASP:CB	1:D:172:LEU:HD13	2.10	0.80
1:D:262:ASN:HD22	1:D:402:ASN:HD22	1.27	0.80
1:D:558:GLU:OE2	1:D:576:THR:HG23	1.83	0.78
1:A:558:GLU:OE2	1:A:576:THR:HG23	1.83	0.78
1:C:558:GLU:OE2	1:C:576:THR:HG23	1.83	0.78
1:A:262:ASN:HD22	1:A:402:ASN:HD22	1.30	0.78
1:B:262:ASN:HD22	1:B:402:ASN:HD22	1.29	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:404:GLN:NE2	1:C:404:GLN:HG2	1.98	0.78
1:B:558:GLU:OE2	1:B:576:THR:HG23	1.83	0.77
1:D:560:LEU:HD12	1:D:561:THR:N	2.00	0.77
1:C:560:LEU:HD12	1:C:561:THR:N	2.00	0.77
1:B:161:ALA:HB1	1:B:162:PRO:CD	2.14	0.77
1:A:560:LEU:HD12	1:A:561:THR:N	2.00	0.77
1:B:560:LEU:HD12	1:B:561:THR:N	2.00	0.77
1:C:161:ALA:HB1	1:C:162:PRO:CD	2.14	0.77
1:A:161:ALA:HB1	1:A:162:PRO:CD	2.14	0.74
1:B:404:GLN:HE22	1:C:404:GLN:HG2	1.54	0.73
1:B:404:GLN:O	1:B:404:GLN:HG2	1.88	0.73
1:D:161:ALA:HB1	1:D:162:PRO:CD	2.14	0.72
1:A:297:ASN:HB2	1:A:298:PRO:HD3	1.73	0.70
1:A:422:ARG:NH2	1:B:409:SER:O	2.24	0.70
1:B:422:ARG:NH2	1:C:409:SER:O	2.25	0.69
1:D:86:ASP:HB3	1:D:172:LEU:CD1	2.24	0.68
1:A:86:ASP:HB3	1:A:172:LEU:CD1	2.23	0.67
1:D:262:ASN:HD22	1:D:402:ASN:ND2	1.93	0.66
1:C:401:GLY:O	1:C:405:THR:HG23	1.96	0.66
1:D:262:ASN:ND2	1:D:402:ASN:HD22	1.94	0.66
1:B:297:ASN:HB2	1:B:298:PRO:HD3	1.78	0.65
1:A:300:CYS:HB2	1:A:317:PHE:CZ	2.32	0.65
1:D:86:ASP:CB	1:D:172:LEU:CD1	2.76	0.64
1:A:86:ASP:CB	1:A:172:LEU:CD1	2.76	0.64
1:B:86:ASP:CB	1:B:172:LEU:CD1	2.76	0.64
1:C:86:ASP:CB	1:C:172:LEU:CD1	2.76	0.64
1:B:401:GLY:O	1:B:405:THR:HG23	1.99	0.63
1:C:86:ASP:HB3	1:C:172:LEU:CD1	2.23	0.63
1:C:297:ASN:HB2	1:C:298:PRO:HD3	1.78	0.63
1:D:409:SER:HA	1:C:415:GLU:OE2	1.98	0.62
1:B:86:ASP:HB3	1:B:172:LEU:CD1	2.24	0.62
1:A:262:ASN:HD21	1:A:398:PHE:HB3	1.65	0.61
1:B:262:ASN:HD22	1:B:402:ASN:ND2	1.98	0.61
1:C:262:ASN:HD22	1:C:402:ASN:ND2	1.97	0.61
1:D:401:GLY:O	1:D:405:THR:HG23	2.00	0.61
1:A:262:ASN:HD22	1:A:402:ASN:ND2	1.99	0.61
1:A:401:GLY:O	1:A:405:THR:HG23	2.00	0.61
1:D:297:ASN:HB2	1:D:298:PRO:HD3	1.82	0.61
1:C:262:ASN:HD21	1:C:398:PHE:HB3	1.66	0.60
1:B:262:ASN:HD21	1:B:398:PHE:HB3	1.66	0.60
1:B:369:LEU:HD13	1:B:393:LEU:CD2	2.31	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:415:GLU:OE2	1:B:409:SER:HA	2.02	0.60
1:B:415:GLU:OE2	1:C:409:SER:HA	2.01	0.60
1:D:404:GLN:O	1:D:404:GLN:HG2	2.03	0.58
1:A:262:ASN:ND2	1:A:402:ASN:HD22	2.02	0.58
1:B:389:SER:O	1:B:393:LEU:HG	2.04	0.57
1:B:262:ASN:ND2	1:B:402:ASN:HD22	2.00	0.56
1:C:262:ASN:ND2	1:C:402:ASN:HD22	1.98	0.56
1:C:568:SER:OG	1:C:569:SER:N	2.39	0.56
1:D:477:CYS:HB3	1:D:502:LEU:HD12	1.88	0.56
1:A:568:SER:OG	1:A:569:SER:N	2.39	0.56
1:C:477:CYS:HB3	1:C:502:LEU:HD12	1.88	0.56
1:B:568:SER:OG	1:B:569:SER:N	2.39	0.56
1:B:521:ASP:OD1	1:B:522:GLU:N	2.39	0.55
1:C:521:ASP:OD1	1:C:522:GLU:N	2.39	0.55
1:D:110:ASP:OD1	1:D:140:ARG:NH1	2.39	0.55
1:A:521:ASP:OD1	1:A:522:GLU:N	2.39	0.55
1:D:109:LEU:HD13	1:D:139:LEU:HB3	1.89	0.55
1:A:110:ASP:OD1	1:A:140:ARG:NH1	2.39	0.55
1:B:110:ASP:OD1	1:B:140:ARG:NH1	2.39	0.55
1:A:450:GLN:NE2	1:A:451:GLU:OE2	2.40	0.55
1:A:477:CYS:HB3	1:A:502:LEU:HD12	1.88	0.55
1:D:521:ASP:OD1	1:D:522:GLU:N	2.39	0.55
1:B:450:GLN:NE2	1:B:451:GLU:OE2	2.40	0.55
1:C:450:GLN:NE2	1:C:451:GLU:OE2	2.40	0.55
1:C:109:LEU:HD13	1:C:139:LEU:HB3	1.89	0.55
1:D:450:GLN:NE2	1:D:451:GLU:OE2	2.40	0.54
1:D:568:SER:OG	1:D:569:SER:N	2.39	0.54
1:B:477:CYS:HB3	1:B:502:LEU:HD12	1.88	0.54
1:C:404:GLN:O	1:C:404:GLN:HG3	2.06	0.54
1:C:110:ASP:OD1	1:C:140:ARG:NH1	2.39	0.54
1:D:296:ASN:HB2	1:D:299:PRO:HA	1.90	0.54
1:D:404:GLN:CD	1:C:404:GLN:HE22	2.11	0.54
1:B:443:ARG:NH2	1:B:584:GLU:OE1	2.41	0.54
1:A:443:ARG:NH2	1:A:584:GLU:OE1	2.41	0.54
1:B:109:LEU:HD13	1:B:139:LEU:HB3	1.89	0.54
1:B:161:ALA:CB	1:B:162:PRO:HD2	2.24	0.53
1:C:304:LEU:HD22	1:C:311:THR:HG21	1.90	0.53
1:A:109:LEU:HD13	1:A:139:LEU:HB3	1.89	0.53
1:C:296:ASN:HB2	1:C:299:PRO:HA	1.90	0.53
1:D:262:ASN:HD21	1:D:398:PHE:HB3	1.74	0.53
1:C:443:ARG:NH2	1:C:584:GLU:OE1	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:443:ARG:NH2	1:D:584:GLU:OE1	2.41	0.52
1:B:296:ASN:HB2	1:B:299:PRO:HA	1.90	0.52
1:A:300:CYS:HB2	1:A:317:PHE:HZ	1.73	0.52
1:A:189:ILE:HA	1:A:192:ILE:HG22	1.93	0.51
1:D:422:ARG:NH2	1:A:409:SER:O	2.44	0.51
1:C:189:ILE:HA	1:C:192:ILE:HG22	1.93	0.51
1:A:404:GLN:O	1:A:404:GLN:HG2	2.10	0.51
1:B:404:GLN:HE21	1:B:408:GLN:NE2	2.09	0.51
1:D:189:ILE:HA	1:D:192:ILE:HG22	1.93	0.50
1:A:161:ALA:CB	1:A:162:PRO:CD	2.87	0.50
1:B:189:ILE:HA	1:B:192:ILE:HG22	1.93	0.50
1:A:296:ASN:HB2	1:A:299:PRO:HA	1.93	0.49
1:A:368:SER:HB3	1:B:371:GLN:HG2	1.95	0.49
1:B:558:GLU:OE1	1:B:575:SER:HA	2.13	0.49
1:C:558:GLU:OE1	1:C:575:SER:HA	2.13	0.49
1:A:507:TYR:HB2	1:A:585:VAL:HB	1.95	0.49
1:B:507:TYR:HB2	1:B:585:VAL:HB	1.95	0.49
1:D:558:GLU:OE1	1:D:575:SER:HA	2.13	0.48
1:A:558:GLU:OE1	1:A:575:SER:HA	2.12	0.48
1:A:364:GLN:NE2	1:B:373:LEU:O	2.45	0.48
1:D:161:ALA:CB	1:D:162:PRO:HD2	2.25	0.48
1:C:160:ILE:CG2	1:C:172:LEU:HD21	2.36	0.48
1:D:507:TYR:HB2	1:D:585:VAL:HB	1.95	0.48
1:C:507:TYR:HB2	1:C:585:VAL:HB	1.95	0.48
1:B:531:LEU:HB2	1:B:549:LEU:HB2	1.97	0.47
1:A:231:ILE:HG13	1:A:232:PRO:HD3	1.96	0.47
1:A:429:SER:HB3	1:A:438:ARG:HH12	1.80	0.47
1:A:531:LEU:HB2	1:A:549:LEU:HB2	1.97	0.47
1:C:409:SER:OG	1:C:410:THR:HG23	2.15	0.47
1:B:231:ILE:HG13	1:B:232:PRO:HD3	1.96	0.47
1:D:160:ILE:CG2	1:D:172:LEU:HD21	2.36	0.46
1:D:427:TRP:HH2	1:A:472:ILE:HG21	1.79	0.46
1:D:531:LEU:HB2	1:D:549:LEU:HB2	1.97	0.46
1:D:231:ILE:HG13	1:D:232:PRO:HD3	1.96	0.46
1:D:429:SER:HB3	1:D:438:ARG:HH12	1.80	0.46
1:C:424:ALA:O	1:C:428:MET:HG3	2.16	0.46
1:C:231:ILE:HG13	1:C:232:PRO:HD3	1.96	0.46
1:C:531:LEU:HB2	1:C:549:LEU:HB2	1.97	0.46
1:A:300:CYS:HB2	1:A:317:PHE:CE1	2.51	0.45
1:B:404:GLN:HE22	1:C:404:GLN:CG	2.26	0.45
1:B:429:SER:HB3	1:B:438:ARG:HH12	1.80	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:160:ILE:CG2	1:B:172:LEU:HD21	2.36	0.45
1:B:434:PRO:HD2	1:B:437:LEU:HD12	1.98	0.45
1:C:429:SER:HB3	1:C:438:ARG:HH12	1.80	0.45
1:A:434:PRO:HD2	1:A:437:LEU:HD12	1.98	0.45
1:B:364:GLN:NE2	1:C:371:GLN:O	2.50	0.45
1:A:409:SER:OG	1:A:410:THR:HG23	2.16	0.45
1:C:434:PRO:HD2	1:C:437:LEU:HD12	1.98	0.44
1:B:153:PHE:HE1	1:B:156:ARG:HH21	1.65	0.44
1:C:192:ILE:HA	1:C:195:VAL:HG12	2.00	0.44
1:D:434:PRO:HD2	1:D:437:LEU:HD12	1.98	0.44
1:B:560:LEU:HD12	1:B:560:LEU:C	2.38	0.44
1:C:560:LEU:HD12	1:C:560:LEU:C	2.38	0.44
1:D:153:PHE:HE1	1:D:156:ARG:HH21	1.65	0.44
1:A:153:PHE:HE1	1:A:156:ARG:HH21	1.65	0.43
1:D:192:ILE:HA	1:D:195:VAL:HG12	2.00	0.43
1:B:368:SER:HB3	1:C:371:GLN:HG2	2.01	0.43
1:C:153:PHE:HE1	1:C:156:ARG:HH21	1.65	0.43
1:A:192:ILE:HA	1:A:195:VAL:HG12	2.00	0.43
1:B:192:ILE:HA	1:B:195:VAL:HG12	2.00	0.43
1:D:560:LEU:HD12	1:D:560:LEU:C	2.38	0.42
1:B:149:LEU:HD12	1:B:152:ILE:HD11	2.01	0.42
1:A:560:LEU:HD12	1:A:560:LEU:C	2.38	0.42
1:A:441:ILE:HG12	1:B:468:LEU:HD21	2.02	0.42
1:C:149:LEU:HD12	1:C:152:ILE:HD11	2.01	0.42
1:B:177:ARG:HA	1:B:177:ARG:HD3	1.92	0.42
1:D:428:MET:HG2	1:D:433:LEU:HD12	2.02	0.42
1:B:160:ILE:HG23	1:B:172:LEU:HD22	1.96	0.42
1:A:149:LEU:HD12	1:A:152:ILE:HD11	2.01	0.42
1:D:415:GLU:OE2	1:A:409:SER:HA	2.20	0.41
1:D:441:ILE:HG12	1:A:468:LEU:HD21	2.02	0.41
1:C:120:ASP:HB3	1:C:125:CYS:SG	2.61	0.41
1:A:428:MET:HG2	1:A:433:LEU:HD12	2.02	0.41
1:C:177:ARG:HD3	1:C:177:ARG:HA	1.92	0.41
1:D:149:LEU:HD12	1:D:152:ILE:HD11	2.01	0.41
1:A:160:ILE:CG2	1:A:172:LEU:HD21	2.36	0.41
1:B:120:ASP:HB3	1:B:125:CYS:SG	2.61	0.41
1:D:120:ASP:HB3	1:D:125:CYS:SG	2.61	0.41
1:A:120:ASP:HB3	1:A:125:CYS:SG	2.61	0.41
1:B:428:MET:HG2	1:B:433:LEU:HD12	2.02	0.41
1:A:213:SER:OG	1:A:216:LEU:HB3	2.21	0.41
1:A:284:ARG:HA	1:A:284:ARG:HD2	1.90	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:484:VAL:HA	1:B:485:PRO:HD3	1.95	0.41
1:C:428:MET:HG2	1:C:433:LEU:HD12	2.01	0.41
1:C:284:ARG:HD2	1:C:284:ARG:HA	1.90	0.41
1:D:140:ARG:NH2	1:D:229:GLN:OE1	2.54	0.41
1:D:213:SER:OG	1:D:216:LEU:HB3	2.21	0.41
1:A:422:ARG:CZ	1:B:409:SER:O	2.68	0.41
1:B:87:PRO:HA	1:B:92:LEU:HD22	2.03	0.41
1:A:140:ARG:NH2	1:A:229:GLN:OE1	2.54	0.41
1:A:160:ILE:HG23	1:A:172:LEU:HD22	1.95	0.41
1:A:177:ARG:HD3	1:A:177:ARG:HA	1.92	0.41
1:C:87:PRO:HA	1:C:92:LEU:HD22	2.03	0.41
1:B:213:SER:OG	1:B:216:LEU:HB3	2.21	0.41
1:C:596:LYS:HA	1:C:596:LYS:HD3	1.99	0.41
1:B:140:ARG:NH2	1:B:229:GLN:OE1	2.54	0.40
1:D:404:GLN:HE21	1:D:408:GLN:NE2	2.20	0.40
1:A:90:PRO:HA	1:A:93:GLN:HG2	2.04	0.40
1:B:90:PRO:HA	1:B:93:GLN:HG2	2.04	0.40
1:C:289:TRP:HB3	1:C:305:LEU:HD22	2.03	0.40
1:D:219:LYS:HE2	1:D:219:LYS:HB3	1.96	0.40
1:D:403:MET:HE3	1:D:403:MET:HB2	1.88	0.40
1:B:284:ARG:HA	1:B:284:ARG:HD2	1.90	0.40
1:C:140:ARG:NH2	1:C:229:GLN:OE1	2.54	0.40
1:D:147:TYR:CZ	1:D:236:ARG:HD2	2.57	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	492/716 (69%)	476 (97%)	16 (3%)	0	100	100
1	B	492/716 (69%)	476 (97%)	16 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	492/716 (69%)	475 (96%)	17 (4%)	0	100	100
1	D	492/716 (69%)	476 (97%)	16 (3%)	0	100	100
All	All	1968/2864 (69%)	1903 (97%)	65 (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	452/640 (71%)	452 (100%)	0	100	100
1	B	452/640 (71%)	452 (100%)	0	100	100
1	C	452/640 (71%)	452 (100%)	0	100	100
1	D	452/640 (71%)	452 (100%)	0	100	100
All	All	1808/2560 (71%)	1808 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	262	ASN
1	D	408	GLN
1	D	446	GLN
1	D	537	ASN
1	A	262	ASN
1	A	404	GLN
1	A	408	GLN
1	A	446	GLN
1	A	537	ASN
1	B	262	ASN
1	B	408	GLN
1	B	446	GLN

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Mol	Chain	Res	Type
1	B	537	ASN
1	C	262	ASN
1	C	404	GLN
1	C	446	GLN
1	C	537	ASN

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

Of 3 ligands modelled in this entry, 3 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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.