



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

Jan 13, 2018 – 02:23 PM EST

PDB ID : 6BOB
EMDB ID: : EMD-7123
Title : Cryo-EM structure of rat TRPV6* in nanodiscs
Authors : McGoldrick, L.L.; Singh, A.K.; Saotome, K.; Yelshanskaya, M.V.; Twomey, E.C.; Grassucci, R.A.; Sobolevsky, A.I.
Deposited on : 2017-11-18
Resolution : 3.90 Å(reported)

This is a Full wwPDB/EMDatabank EM Map/Model Validation Report
for a publicly released PDB/EMDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<http://wwpdb.org/validation/2016/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

MolProbity : 4.02b-467
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20030736

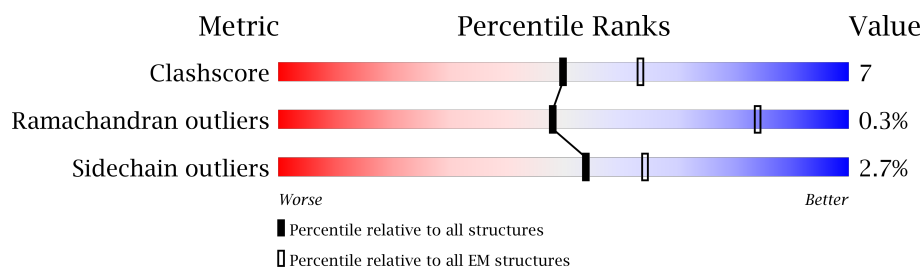
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 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	125131	1336
Ramachandran outliers	121729	1120
Sidechain outliers	121581	1026

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	672	
1	B	672	
1	C	672	
1	D	672	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 19340 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 Transient receptor potential cation channel subfamily V member 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	603	Total	C	N	O	S	0	0
			4835	3131	811	859	34		
1	B	603	Total	C	N	O	S	0	0
			4835	3131	811	859	34		
1	C	603	Total	C	N	O	S	0	0
			4835	3131	811	859	34		
1	D	603	Total	C	N	O	S	0	0
			4835	3131	811	859	34		

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	62	TYR	ILE	conflict	UNP Q9R186
A	92	ASN	LEU	conflict	UNP Q9R186
A	96	GLN	MET	conflict	UNP Q9R186
A	669	LEU	-	expression tag	UNP Q9R186
A	670	VAL	-	expression tag	UNP Q9R186
A	671	PRO	-	expression tag	UNP Q9R186
A	672	ARG	-	expression tag	UNP Q9R186
B	62	TYR	ILE	conflict	UNP Q9R186
B	92	ASN	LEU	conflict	UNP Q9R186
B	96	GLN	MET	conflict	UNP Q9R186
B	669	LEU	-	expression tag	UNP Q9R186
B	670	VAL	-	expression tag	UNP Q9R186
B	671	PRO	-	expression tag	UNP Q9R186
B	672	ARG	-	expression tag	UNP Q9R186
C	62	TYR	ILE	conflict	UNP Q9R186
C	92	ASN	LEU	conflict	UNP Q9R186
C	96	GLN	MET	conflict	UNP Q9R186
C	669	LEU	-	expression tag	UNP Q9R186
C	670	VAL	-	expression tag	UNP Q9R186
C	671	PRO	-	expression tag	UNP Q9R186
C	672	ARG	-	expression tag	UNP Q9R186

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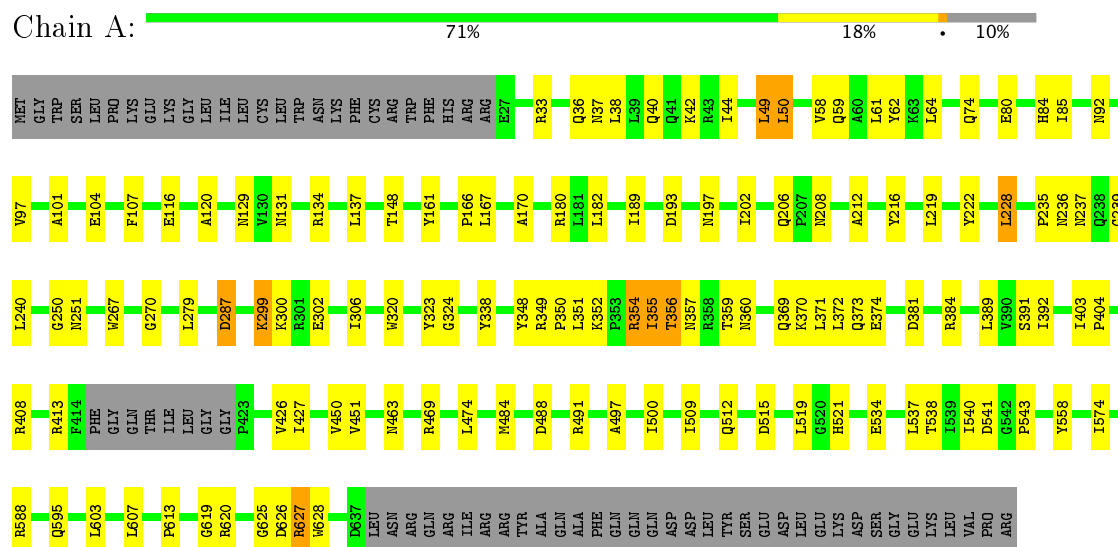
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Chain	Residue	Modelled	Actual	Comment	Reference
D	62	TYR	ILE	conflict	UNP Q9R186
D	92	ASN	LEU	conflict	UNP Q9R186
D	96	GLN	MET	conflict	UNP Q9R186
D	669	LEU	-	expression tag	UNP Q9R186
D	670	VAL	-	expression tag	UNP Q9R186
D	671	PRO	-	expression tag	UNP Q9R186
D	672	ARG	-	expression tag	UNP Q9R186

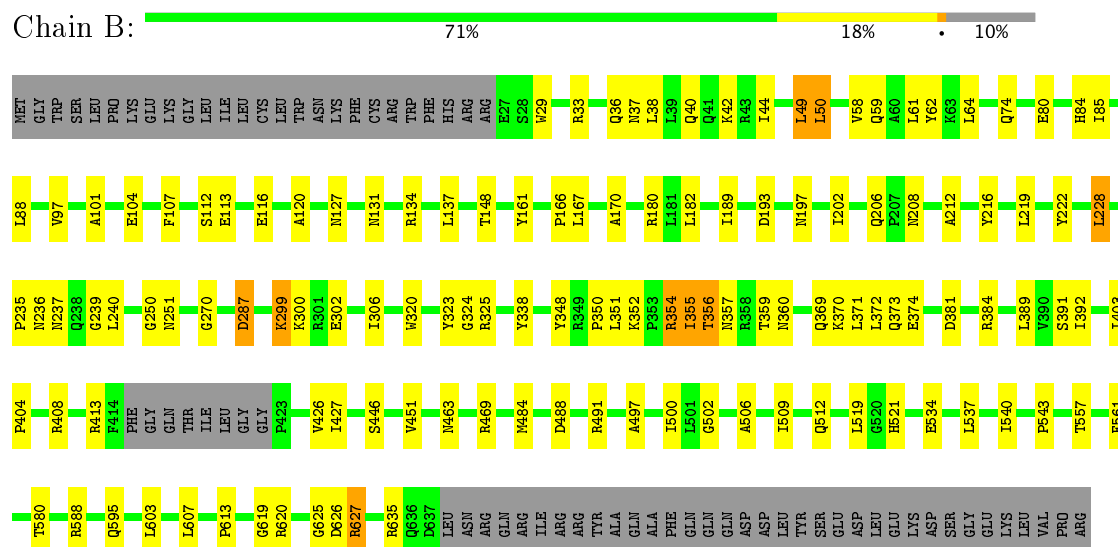
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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: Transient receptor potential cation channel subfamily V member 6

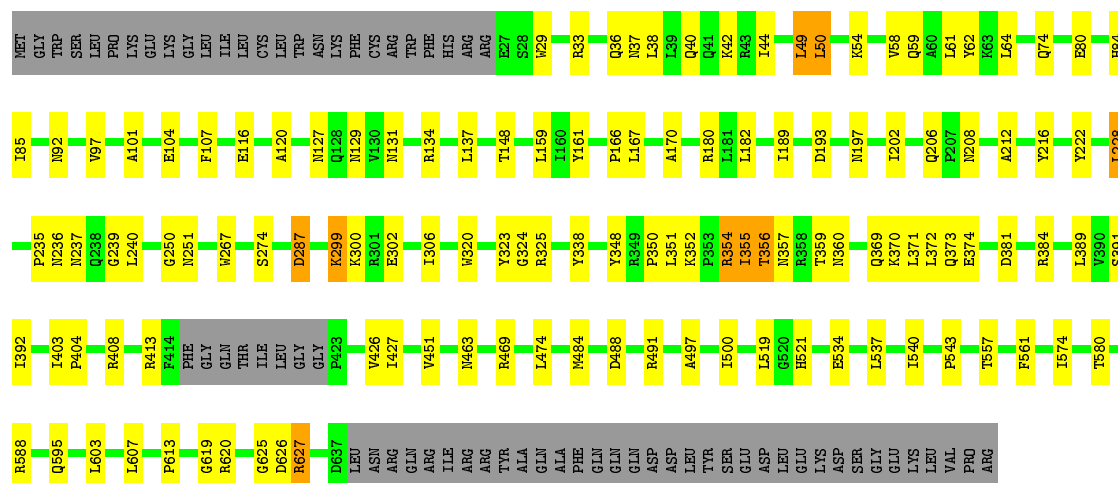


- Molecule 1: Transient receptor potential cation channel subfamily V member 6



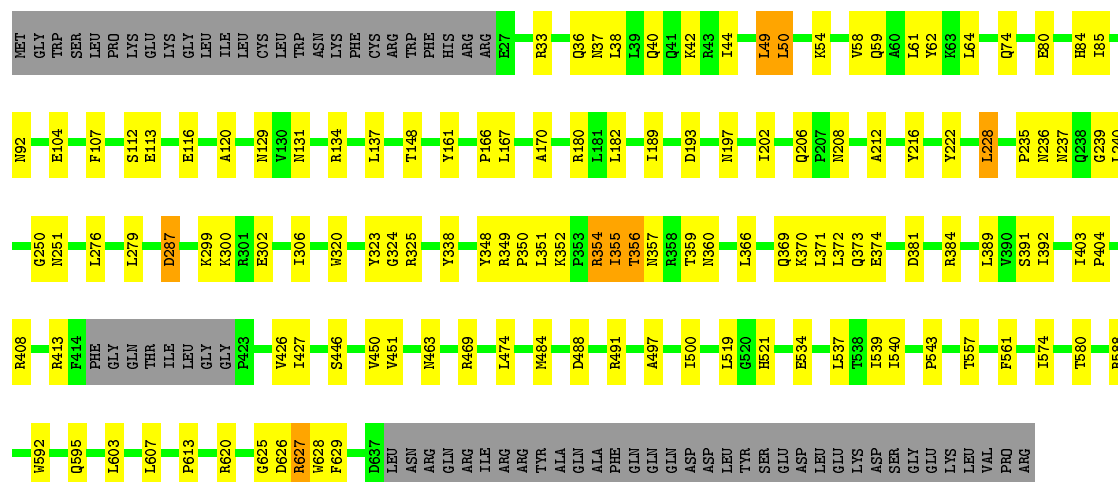
- Molecule 1: Transient receptor potential cation channel subfamily V member 6

Chain C:  71% 17% 10%



• Molecule 1: Transient receptor potential cation channel subfamily V member 6

Chain D:  71% 18% 10%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	20808	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	67	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	GATAN K2 SUMMIT (4k 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	$\# Z > 2$	RMSZ	$\# Z > 2$
1	A	0.37	0/4947	0.63	4/6717 (0.1%)
1	B	0.37	0/4947	0.63	4/6717 (0.1%)
1	C	0.37	0/4947	0.63	4/6717 (0.1%)
1	D	0.37	0/4947	0.63	4/6717 (0.1%)
All	All	0.37	0/19788	0.63	16/26868 (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	2
1	B	0	2
1	C	0	2
1	D	0	2
All	All	0	8

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	228	LEU	CA-CB-CG	8.67	135.23	115.30
1	D	228	LEU	CA-CB-CG	8.66	135.23	115.30
1	A	228	LEU	CA-CB-CG	8.66	135.22	115.30
1	B	228	LEU	CA-CB-CG	8.65	135.19	115.30
1	D	49	LEU	CA-CB-CG	6.67	130.64	115.30
1	A	49	LEU	CA-CB-CG	6.66	130.63	115.30
1	B	49	LEU	CA-CB-CG	6.66	130.61	115.30
1	C	49	LEU	CA-CB-CG	6.66	130.61	115.30
1	A	287	ASP	CB-CG-OD1	6.28	123.95	118.30
1	B	287	ASP	CB-CG-OD1	6.22	123.89	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	287	ASP	CB-CG-OD1	6.18	123.86	118.30
1	C	287	ASP	CB-CG-OD1	6.17	123.86	118.30
1	A	50	LEU	CA-CB-CG	5.04	126.90	115.30
1	D	50	LEU	CA-CB-CG	5.04	126.90	115.30
1	B	50	LEU	CA-CB-CG	5.04	126.88	115.30
1	C	50	LEU	CA-CB-CG	5.03	126.88	115.30

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	354	ARG	Peptide
1	A	356	THR	Peptide
1	B	354	ARG	Peptide
1	B	356	THR	Peptide
1	C	354	ARG	Peptide
1	C	356	THR	Peptide
1	D	354	ARG	Peptide
1	D	356	THR	Peptide

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	4835	0	4874	73	0
1	B	4835	0	4874	73	0
1	C	4835	0	4874	68	0
1	D	4835	0	4874	72	0
All	All	19340	0	19496	266	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 (266) 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:D:351:LEU:HA	1:D:370:LYS:HA	1.81	0.63
1:A:474:LEU:HB3	1:B:491:ARG:HB2	1.81	0.63
1:A:351:LEU:HA	1:A:370:LYS:HA	1.81	0.62
1:C:351:LEU:HA	1:C:370:LYS:HA	1.81	0.62
1:B:351:LEU:HA	1:B:370:LYS:HA	1.81	0.61
1:A:348:TYR:O	1:A:384:ARG:NH1	2.33	0.61
1:C:202:ILE:O	1:C:206:GLN:NE2	2.35	0.60
1:B:202:ILE:O	1:B:206:GLN:NE2	2.35	0.60
1:C:348:TYR:O	1:C:384:ARG:NH1	2.33	0.60
1:D:348:TYR:O	1:D:384:ARG:NH1	2.33	0.60
1:A:512:GLN:OE1	1:D:349:ARG:NH2	2.34	0.59
1:D:202:ILE:O	1:D:206:GLN:NE2	2.35	0.59
1:B:348:TYR:O	1:B:384:ARG:NH1	2.33	0.59
1:D:355:ILE:HG22	1:D:369:GLN:HG2	1.85	0.59
1:A:202:ILE:O	1:A:206:GLN:NE2	2.35	0.58
1:B:355:ILE:HG22	1:B:369:GLN:HG2	1.85	0.58
1:A:349:ARG:NH2	1:B:512:GLN:OE1	2.37	0.58
1:C:355:ILE:HG22	1:C:369:GLN:HG2	1.85	0.58
1:A:574:ILE:HG23	1:D:580:THR:HG21	1.86	0.57
1:A:355:ILE:HG22	1:A:369:GLN:HG2	1.85	0.57
1:C:625:GLY:O	1:C:627:ARG:NH1	2.38	0.57
1:B:625:GLY:O	1:B:627:ARG:NH1	2.38	0.56
1:D:625:GLY:O	1:D:627:ARG:NH1	2.38	0.56
1:A:625:GLY:O	1:A:627:ARG:NH1	2.38	0.56
1:D:84:HIS:HD2	1:D:120:ALA:HB2	1.71	0.56
1:D:426:VAL:HG23	1:D:427:ILE:HG13	1.88	0.56
1:C:84:HIS:HD2	1:C:120:ALA:HB2	1.71	0.56
1:A:426:VAL:HG23	1:A:427:ILE:HG13	1.88	0.55
1:C:426:VAL:HG23	1:C:427:ILE:HG13	1.88	0.55
1:B:426:VAL:HG23	1:B:427:ILE:HG13	1.88	0.55
1:B:84:HIS:HD2	1:B:120:ALA:HB2	1.71	0.55
1:B:180:ARG:NH1	1:B:222:TYR:OH	2.40	0.55
1:A:33:ARG:O	1:A:37:ASN:ND2	2.40	0.55
1:C:180:ARG:NH1	1:C:222:TYR:OH	2.40	0.55
1:C:469:ARG:HD2	1:C:595:GLN:HB3	1.89	0.55
1:A:84:HIS:HD2	1:A:120:ALA:HB2	1.71	0.54
1:D:180:ARG:NH1	1:D:222:TYR:OH	2.40	0.54
1:D:469:ARG:HD2	1:D:595:GLN:HB3	1.89	0.54
1:A:38:LEU:O	1:A:42:LYS:N	2.40	0.54
1:A:180:ARG:NH1	1:A:222:TYR:OH	2.40	0.54
1:A:323:TYR:OH	1:A:613:PRO:O	2.26	0.54
1:B:33:ARG:O	1:B:37:ASN:ND2	2.40	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:469:ARG:HD2	1:B:595:GLN:HB3	1.89	0.54
1:D:33:ARG:O	1:D:37:ASN:ND2	2.40	0.54
1:B:38:LEU:O	1:B:42:LYS:N	2.41	0.54
1:C:33:ARG:O	1:C:37:ASN:ND2	2.40	0.54
1:B:323:TYR:OH	1:B:613:PRO:O	2.26	0.54
1:B:235:PRO:HB2	1:B:239:GLY:HA2	1.91	0.53
1:C:38:LEU:O	1:C:42:LYS:N	2.41	0.53
1:A:389:LEU:HA	1:A:392:ILE:HG22	1.90	0.53
1:B:212:ALA:O	1:B:216:TYR:N	2.42	0.53
1:C:620:ARG:NH1	1:C:626:ASP:OD1	2.42	0.53
1:D:323:TYR:OH	1:D:613:PRO:O	2.26	0.53
1:D:193:ASP:OD1	1:D:197:ASN:N	2.37	0.53
1:D:389:LEU:HA	1:D:392:ILE:HG22	1.91	0.53
1:A:212:ALA:O	1:A:216:TYR:N	2.42	0.53
1:A:469:ARG:HD2	1:A:595:GLN:HB3	1.89	0.53
1:D:38:LEU:O	1:D:42:LYS:N	2.41	0.53
1:D:620:ARG:NH1	1:D:626:ASP:OD1	2.42	0.53
1:C:235:PRO:HB2	1:C:239:GLY:HA2	1.91	0.53
1:D:131:ASN:HD22	1:D:134:ARG:HH22	1.57	0.53
1:D:212:ALA:O	1:D:216:TYR:N	2.42	0.53
1:A:131:ASN:HD22	1:A:134:ARG:HH22	1.57	0.53
1:A:381:ASP:OD1	1:A:384:ARG:NH2	2.42	0.53
1:C:389:LEU:HA	1:C:392:ILE:HG22	1.91	0.53
1:A:235:PRO:HB2	1:A:239:GLY:HA2	1.91	0.52
1:A:620:ARG:NH1	1:A:626:ASP:OD1	2.42	0.52
1:C:381:ASP:OD1	1:C:384:ARG:NH2	2.42	0.52
1:B:270:GLY:H	1:C:127:ASN:HD21	1.55	0.52
1:D:235:PRO:HB2	1:D:239:GLY:HA2	1.91	0.52
1:C:323:TYR:OH	1:C:613:PRO:O	2.26	0.52
1:D:381:ASP:OD1	1:D:384:ARG:NH2	2.42	0.52
1:B:381:ASP:OD1	1:B:384:ARG:NH2	2.42	0.52
1:B:131:ASN:HD22	1:B:134:ARG:HH22	1.57	0.52
1:B:620:ARG:NH1	1:B:626:ASP:OD1	2.42	0.52
1:C:131:ASN:HD22	1:C:134:ARG:HH22	1.57	0.52
1:B:389:LEU:HA	1:B:392:ILE:HG22	1.91	0.51
1:A:36:GLN:O	1:A:40:GLN:N	2.38	0.51
1:C:403:ILE:HG13	1:C:404:PRO:HD3	1.93	0.51
1:A:403:ILE:HG13	1:A:404:PRO:HD3	1.93	0.51
1:A:300:LYS:NZ	1:A:302:GLU:OE2	2.40	0.51
1:C:193:ASP:OD1	1:C:197:ASN:N	2.37	0.51
1:A:497:ALA:HA	1:A:500:ILE:HG22	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:300:LYS:NZ	1:B:302:GLU:OE2	2.40	0.50
1:B:497:ALA:HA	1:B:500:ILE:HG22	1.93	0.50
1:C:212:ALA:O	1:C:216:TYR:N	2.42	0.50
1:B:236:ASN:H	1:B:240:LEU:H	1.59	0.50
1:D:236:ASN:H	1:D:240:LEU:H	1.59	0.50
1:D:403:ILE:HG13	1:D:404:PRO:HD3	1.93	0.50
1:D:497:ALA:HA	1:D:500:ILE:HG22	1.93	0.50
1:A:515:ASP:HB2	1:D:366:LEU:HG	1.93	0.50
1:C:36:GLN:O	1:C:40:GLN:N	2.38	0.50
1:B:580:THR:HG21	1:C:574:ILE:HG23	1.93	0.49
1:A:167:LEU:HD21	1:A:189:ILE:HD13	1.95	0.49
1:D:167:LEU:HD21	1:D:189:ILE:HD13	1.95	0.49
1:C:497:ALA:HA	1:C:500:ILE:HG22	1.93	0.49
1:A:236:ASN:H	1:A:240:LEU:H	1.59	0.49
1:B:403:ILE:HG13	1:B:404:PRO:HD3	1.93	0.49
1:D:166:PRO:O	1:D:170:ALA:N	2.46	0.49
1:B:166:PRO:O	1:B:170:ALA:N	2.46	0.49
1:B:338:TYR:OH	1:B:391:SER:O	2.27	0.49
1:C:236:ASN:H	1:C:240:LEU:H	1.59	0.49
1:D:236:ASN:OD1	1:D:240:LEU:N	2.46	0.49
1:A:193:ASP:OD1	1:A:197:ASN:N	2.37	0.49
1:C:167:LEU:HD21	1:C:189:ILE:HD13	1.95	0.49
1:D:161:TYR:OH	1:D:193:ASP:OD2	2.29	0.49
1:A:509:ILE:HG22	1:D:450:VAL:HG13	1.94	0.48
1:B:193:ASP:OD1	1:B:197:ASN:N	2.37	0.48
1:A:491:ARG:HB2	1:D:474:LEU:HB3	1.94	0.48
1:A:236:ASN:OD1	1:A:240:LEU:N	2.46	0.48
1:B:167:LEU:HD21	1:B:189:ILE:HD13	1.95	0.48
1:B:236:ASN:OD1	1:B:240:LEU:N	2.46	0.48
1:A:371:LEU:HD12	1:A:374:GLU:HB2	1.96	0.48
1:C:161:TYR:OH	1:C:193:ASP:OD2	2.29	0.48
1:C:236:ASN:OD1	1:C:240:LEU:N	2.46	0.48
1:C:534:GLU:HB3	1:C:540:ILE:HD12	1.96	0.48
1:A:534:GLU:HB3	1:A:540:ILE:HD12	1.96	0.48
1:B:36:GLN:O	1:B:40:GLN:N	2.38	0.48
1:B:352:LYS:HE2	1:B:371:LEU:HA	1.96	0.48
1:D:371:LEU:HD12	1:D:374:GLU:HB2	1.96	0.48
1:B:161:TYR:OH	1:B:193:ASP:OD2	2.29	0.48
1:B:534:GLU:HB3	1:B:540:ILE:HD12	1.96	0.48
1:C:166:PRO:O	1:C:170:ALA:N	2.46	0.48
1:A:538:THR:HG23	1:D:539:ILE:HG22	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:PRO:O	1:A:170:ALA:N	2.46	0.47
1:B:371:LEU:HD12	1:B:374:GLU:HB2	1.96	0.47
1:C:371:LEU:HD12	1:C:374:GLU:HB2	1.96	0.47
1:A:450:VAL:HG13	1:B:509:ILE:HG22	1.97	0.47
1:A:320:TRP:HA	1:A:324:GLY:HA3	1.96	0.47
1:A:352:LYS:HE2	1:A:371:LEU:HA	1.96	0.47
1:C:338:TYR:OH	1:C:391:SER:O	2.27	0.47
1:D:534:GLU:HB3	1:D:540:ILE:HD12	1.96	0.47
1:B:58:VAL:HA	1:B:61:LEU:HD12	1.97	0.47
1:C:58:VAL:HA	1:C:61:LEU:HD12	1.97	0.47
1:D:36:GLN:O	1:D:40:GLN:N	2.38	0.47
1:A:603:LEU:HA	1:A:607:LEU:HD13	1.97	0.47
1:B:635:ARG:HD2	1:C:159:LEU:HB3	1.96	0.47
1:D:603:LEU:HA	1:D:607:LEU:HD13	1.97	0.47
1:C:116:GLU:O	1:C:148:THR:N	2.48	0.47
1:C:352:LYS:HE2	1:C:371:LEU:HA	1.96	0.47
1:D:58:VAL:HA	1:D:61:LEU:HD12	1.97	0.47
1:B:104:GLU:HA	1:B:107:PHE:HD2	1.80	0.46
1:B:320:TRP:HA	1:B:324:GLY:HA3	1.96	0.46
1:C:80:GLU:HG3	1:C:85:ILE:HD11	1.97	0.46
1:D:116:GLU:O	1:D:148:THR:N	2.48	0.46
1:A:541:ASP:HA	1:D:539:ILE:O	2.15	0.46
1:C:488:ASP:HA	1:C:491:ARG:HG2	1.98	0.46
1:D:352:LYS:HE2	1:D:371:LEU:HA	1.96	0.46
1:A:116:GLU:O	1:A:148:THR:N	2.48	0.46
1:A:354:ARG:O	1:A:356:THR:N	2.49	0.46
1:A:58:VAL:HA	1:A:61:LEU:HD12	1.97	0.46
1:C:300:LYS:NZ	1:C:302:GLU:OE2	2.40	0.46
1:A:161:TYR:OH	1:A:193:ASP:OD2	2.29	0.46
1:B:488:ASP:HA	1:B:491:ARG:HG2	1.98	0.46
1:C:104:GLU:HA	1:C:107:PHE:HD2	1.80	0.46
1:D:320:TRP:HA	1:D:324:GLY:HA3	1.96	0.46
1:A:488:ASP:HA	1:A:491:ARG:HG2	1.97	0.46
1:B:354:ARG:O	1:B:356:THR:N	2.49	0.46
1:C:320:TRP:HA	1:C:324:GLY:HA3	1.96	0.46
1:C:603:LEU:HA	1:C:607:LEU:HD13	1.97	0.46
1:D:80:GLU:HG3	1:D:85:ILE:HD11	1.97	0.46
1:C:354:ARG:O	1:C:356:THR:N	2.49	0.46
1:D:354:ARG:O	1:D:356:THR:N	2.49	0.46
1:D:338:TYR:OH	1:D:391:SER:O	2.27	0.46
1:B:603:LEU:HA	1:B:607:LEU:HD13	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:372:LEU:HD23	1:B:373:GLN:HB2	1.99	0.45
1:D:372:LEU:HD23	1:D:373:GLN:HB2	1.99	0.45
1:D:488:ASP:HA	1:D:491:ARG:HG2	1.97	0.45
1:A:372:LEU:HD23	1:A:373:GLN:HB2	1.98	0.45
1:B:116:GLU:O	1:B:148:THR:N	2.48	0.45
1:C:372:LEU:HD23	1:C:373:GLN:HB2	1.98	0.45
1:D:59:GLN:HA	1:D:62:TYR:HD2	1.81	0.45
1:A:104:GLU:HA	1:A:107:PHE:HD2	1.80	0.45
1:C:474:LEU:HB3	1:D:491:ARG:HB2	1.97	0.45
1:B:350:PRO:HB2	1:B:371:LEU:HB2	1.99	0.45
1:A:59:GLN:HA	1:A:62:TYR:HD2	1.81	0.45
1:A:350:PRO:HB2	1:A:371:LEU:HB2	1.99	0.45
1:A:270:GLY:H	1:B:127:ASN:HD21	1.64	0.45
1:B:557:THR:O	1:B:561:PHE:N	2.48	0.45
1:B:80:GLU:HG3	1:B:85:ILE:HD11	1.97	0.45
1:A:80:GLU:HG3	1:A:85:ILE:HD11	1.97	0.45
1:C:580:THR:HG21	1:D:574:ILE:HG23	1.98	0.45
1:C:59:GLN:HA	1:C:62:TYR:HD2	1.81	0.45
1:A:354:ARG:HH12	1:A:359:THR:HG22	1.82	0.44
1:B:521:HIS:CE1	1:B:543:PRO:HA	2.53	0.44
1:B:44:ILE:HG13	1:B:50:LEU:HB3	2.00	0.44
1:B:59:GLN:HA	1:B:62:TYR:HD2	1.81	0.44
1:A:521:HIS:CE1	1:A:543:PRO:HA	2.53	0.44
1:D:44:ILE:HG13	1:D:50:LEU:HB3	2.00	0.44
1:C:350:PRO:HB2	1:C:371:LEU:HB2	1.99	0.44
1:D:104:GLU:HA	1:D:107:PHE:HD2	1.80	0.44
1:D:521:HIS:CE1	1:D:543:PRO:HA	2.53	0.44
1:D:537:LEU:HD23	1:D:537:LEU:HA	1.84	0.44
1:C:44:ILE:HG13	1:C:50:LEU:HB3	2.00	0.44
1:A:44:ILE:HG13	1:A:50:LEU:HB3	2.00	0.44
1:D:300:LYS:NZ	1:D:302:GLU:OE2	2.40	0.44
1:D:354:ARG:HH12	1:D:359:THR:HG22	1.82	0.44
1:D:350:PRO:HB2	1:D:371:LEU:HB2	1.99	0.44
1:A:92:ASN:OD1	1:A:129:ASN:ND2	2.48	0.43
1:C:521:HIS:CE1	1:C:543:PRO:HA	2.53	0.43
1:A:137:LEU:HD21	1:A:182:LEU:HD23	2.00	0.43
1:B:354:ARG:HH12	1:B:359:THR:HG22	1.82	0.43
1:B:537:LEU:HA	1:B:537:LEU:HD23	1.84	0.43
1:C:137:LEU:HD21	1:C:182:LEU:HD23	2.01	0.43
1:C:97:VAL:O	1:C:101:ALA:N	2.43	0.43
1:B:137:LEU:HD21	1:B:182:LEU:HD23	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:338:TYR:OH	1:A:391:SER:O	2.27	0.43
1:C:354:ARG:HH12	1:C:359:THR:HG22	1.82	0.43
1:C:557:THR:O	1:C:561:PHE:N	2.48	0.43
1:D:137:LEU:HD21	1:D:182:LEU:HD23	2.00	0.43
1:B:250:GLY:HA2	1:B:306:ILE:HD11	2.01	0.43
1:B:370:LYS:NZ	1:B:446:SER:O	2.41	0.42
1:C:250:GLY:HA2	1:C:306:ILE:HD11	2.01	0.42
1:C:320:TRP:O	1:C:325:ARG:N	2.39	0.42
1:A:250:GLY:HA2	1:A:306:ILE:HD11	2.01	0.42
1:A:267:TRP:HB2	1:B:88:LEU:HD21	2.02	0.42
1:D:557:THR:O	1:D:561:PHE:N	2.48	0.42
1:D:236:ASN:OD1	1:D:239:GLY:N	2.53	0.42
1:A:97:VAL:O	1:A:101:ALA:N	2.43	0.42
1:B:270:GLY:H	1:C:127:ASN:ND2	2.17	0.42
1:C:92:ASN:OD1	1:C:129:ASN:ND2	2.48	0.42
1:B:236:ASN:OD1	1:B:239:GLY:N	2.53	0.42
1:A:474:LEU:HD23	1:B:491:ARG:HA	2.02	0.42
1:D:250:GLY:HA2	1:D:306:ILE:HD11	2.01	0.42
1:B:502:GLY:O	1:B:506:ALA:N	2.50	0.42
1:C:236:ASN:OD1	1:C:239:GLY:N	2.53	0.42
1:D:49:LEU:HB3	1:D:64:LEU:HD22	2.02	0.41
1:A:49:LEU:HB3	1:A:64:LEU:HD22	2.02	0.41
1:A:537:LEU:HA	1:A:537:LEU:HD23	1.84	0.41
1:D:92:ASN:OD1	1:D:129:ASN:ND2	2.48	0.41
1:B:97:VAL:O	1:B:101:ALA:N	2.43	0.41
1:B:49:LEU:HB3	1:B:64:LEU:HD22	2.01	0.41
1:D:519:LEU:HD11	1:D:543:PRO:HB3	2.03	0.41
1:A:236:ASN:OD1	1:A:239:GLY:N	2.53	0.41
1:C:49:LEU:HB3	1:C:64:LEU:HD22	2.02	0.41
1:C:50:LEU:HD11	1:C:74:GLN:HG2	2.03	0.41
1:B:219:LEU:HA	1:B:219:LEU:HD13	1.90	0.41
1:C:44:ILE:HD11	1:C:54:LYS:HB2	2.03	0.41
1:D:50:LEU:HD11	1:D:74:GLN:HG2	2.03	0.41
1:A:519:LEU:HD11	1:A:543:PRO:HB3	2.03	0.41
1:C:537:LEU:HD23	1:C:537:LEU:HA	1.84	0.41
1:D:320:TRP:O	1:D:325:ARG:N	2.39	0.41
1:C:519:LEU:HD11	1:C:543:PRO:HB3	2.03	0.41
1:D:112:SER:OG	1:D:113:GLU:N	2.54	0.41
1:D:44:ILE:HD11	1:D:54:LYS:HB2	2.03	0.41
1:A:619:GLY:HA3	1:A:626:ASP:HA	2.03	0.41
1:B:29:TRP:CH2	1:B:33:ARG:HD2	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:299:LYS:HD2	1:B:299:LYS:H	1.86	0.40
1:C:299:LYS:HD2	1:C:299:LYS:H	1.86	0.40
1:C:619:GLY:HA3	1:C:626:ASP:HA	2.03	0.40
1:D:279:LEU:HB3	1:D:628:TRP:O	2.21	0.40
1:D:370:LYS:NZ	1:D:446:SER:O	2.41	0.40
1:B:320:TRP:O	1:B:325:ARG:N	2.39	0.40
1:B:619:GLY:HA3	1:B:626:ASP:HA	2.03	0.40
1:C:29:TRP:CH2	1:C:33:ARG:HD2	2.56	0.40
1:D:469:ARG:O	1:D:592:TRP:NE1	2.49	0.40
1:A:219:LEU:HA	1:A:219:LEU:HD13	1.90	0.40
1:A:279:LEU:HB3	1:A:628:TRP:O	2.21	0.40
1:A:299:LYS:HD2	1:A:299:LYS:H	1.86	0.40
1:B:519:LEU:HD11	1:B:543:PRO:HB3	2.03	0.40
1:A:50:LEU:HD11	1:A:74:GLN:HG2	2.03	0.40
1:B:112:SER:OG	1:B:113:GLU:N	2.54	0.40
1:B:50:LEU:HD11	1:B:74:GLN:HG2	2.03	0.40
1:C:267:TRP:O	1:C:274:SER:OG	2.32	0.40
1:D:276:LEU:HD11	1:D:629:PHE:HB3	2.03	0.40
1:A:558:TYR:OH	1:D:539:ILE:HD12	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	599/672 (89%)	532 (89%)	65 (11%)	2 (0%)	44	80
1	B	599/672 (89%)	530 (88%)	67 (11%)	2 (0%)	44	80
1	C	599/672 (89%)	529 (88%)	68 (11%)	2 (0%)	44	80
1	D	599/672 (89%)	530 (88%)	67 (11%)	2 (0%)	44	80
All	All	2396/2688 (89%)	2121 (88%)	267 (11%)	8 (0%)	48	80

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	287	ASP
1	A	355	ILE
1	B	287	ASP
1	B	355	ILE
1	C	287	ASP
1	C	355	ILE
1	D	287	ASP
1	D	355	ILE

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	523/584 (90%)	509 (97%)	14 (3%)	50	77
1	B	523/584 (90%)	509 (97%)	14 (3%)	50	77
1	C	523/584 (90%)	509 (97%)	14 (3%)	50	77
1	D	523/584 (90%)	509 (97%)	14 (3%)	50	77
All	All	2092/2336 (90%)	2036 (97%)	56 (3%)	54	77

All (56) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	208	ASN
1	A	228	LEU
1	A	237	ASN
1	A	251	ASN
1	A	299	LYS
1	A	357	ASN
1	A	360	ASN
1	A	408	ARG
1	A	413	ARG
1	A	451	VAL
1	A	463	ASN
1	A	484	MET

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Mol	Chain	Res	Type
1	A	588	ARG
1	A	627	ARG
1	B	208	ASN
1	B	228	LEU
1	B	237	ASN
1	B	251	ASN
1	B	299	LYS
1	B	357	ASN
1	B	360	ASN
1	B	408	ARG
1	B	413	ARG
1	B	451	VAL
1	B	463	ASN
1	B	484	MET
1	B	588	ARG
1	B	627	ARG
1	C	208	ASN
1	C	228	LEU
1	C	237	ASN
1	C	251	ASN
1	C	299	LYS
1	C	357	ASN
1	C	360	ASN
1	C	408	ARG
1	C	413	ARG
1	C	451	VAL
1	C	463	ASN
1	C	484	MET
1	C	588	ARG
1	C	627	ARG
1	D	208	ASN
1	D	228	LEU
1	D	237	ASN
1	D	251	ASN
1	D	299	LYS
1	D	357	ASN
1	D	360	ASN
1	D	408	ARG
1	D	413	ARG
1	D	451	VAL
1	D	463	ASN
1	D	484	MET

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Mol	Chain	Res	Type
1	D	588	ARG
1	D	627	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (49) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	ASN
1	A	91	ASN
1	A	127	ASN
1	A	131	ASN
1	A	208	ASN
1	A	237	ASN
1	A	251	ASN
1	A	309	GLN
1	A	357	ASN
1	A	360	ASN
1	A	463	ASN
1	A	521	HIS
1	B	37	ASN
1	B	91	ASN
1	B	127	ASN
1	B	131	ASN
1	B	208	ASN
1	B	237	ASN
1	B	251	ASN
1	B	309	GLN
1	B	357	ASN
1	B	360	ASN
1	B	463	ASN
1	B	521	HIS
1	C	37	ASN
1	C	91	ASN
1	C	118	GLN
1	C	127	ASN
1	C	131	ASN
1	C	208	ASN
1	C	237	ASN
1	C	251	ASN
1	C	309	GLN
1	C	357	ASN
1	C	360	ASN
1	C	463	ASN

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Mol	Chain	Res	Type
1	C	521	HIS
1	D	37	ASN
1	D	91	ASN
1	D	127	ASN
1	D	131	ASN
1	D	208	ASN
1	D	237	ASN
1	D	251	ASN
1	D	309	GLN
1	D	357	ASN
1	D	360	ASN
1	D	463	ASN
1	D	521	HIS

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 carbohydrates 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.