



Full wwPDB EM Validation Report ⓘ

Mar 31, 2026 – 12:12 AM EDT

PDB ID : 9OLM / pdb_00009olm
EMDB ID : EMD-70597
Title : Structure of human TRPC3 cerebellar splice variant (isoform c)
Authors : Bell, B.; Baker, M.L.; Cordero-Morales, J.F.
Deposited on : 2025-05-12
Resolution : 2.50 Å (reported)
Based on initial model : 9OLK

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : **FAILED**
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : **NOT EXECUTED**
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.48.1

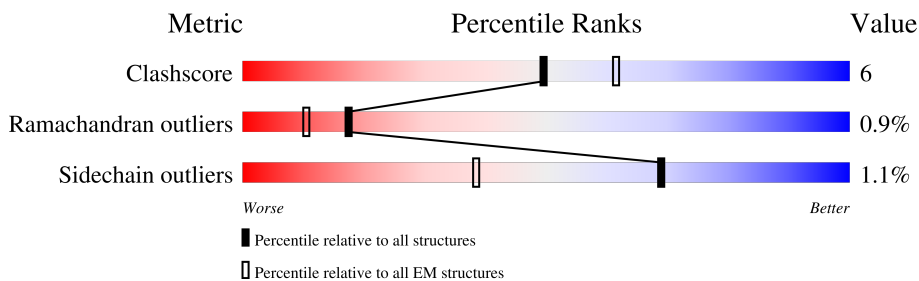
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.50 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	820	81% 9% 9%
1	B	820	81% 8% 9%
1	C	820	81% 9% 9%
1	D	820	81% 9% 9%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	UNL	B	902	-	-	X	-
2	UNL	C	902	-	-	X	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	UNL	D	902	-	-	X	-

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 24528 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 Short transient receptor potential channel 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	745	5986	3886	970	1097	33	0	0
1	B	745	5986	3886	970	1097	33	0	0
1	C	745	5986	3886	970	1097	33	0	0
1	D	745	5986	3886	970	1097	33	0	0

There are 152 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	LEU	deletion	UNP Q13507
A	?	-	ASN	deletion	UNP Q13507
A	?	-	LEU	deletion	UNP Q13507
A	?	-	PHE	deletion	UNP Q13507
A	?	-	THR	deletion	UNP Q13507
A	?	-	GLN	deletion	UNP Q13507
A	?	-	SER	deletion	UNP Q13507
A	?	-	ASN	deletion	UNP Q13507
A	?	-	SER	deletion	UNP Q13507
A	?	-	ARG	deletion	UNP Q13507
A	?	-	VAL	deletion	UNP Q13507
A	?	-	PHE	deletion	UNP Q13507
A	?	-	GLU	deletion	UNP Q13507
A	?	-	SER	deletion	UNP Q13507
A	?	-	HIS	deletion	UNP Q13507
A	?	-	SER	deletion	UNP Q13507
A	?	-	PHE	deletion	UNP Q13507
A	?	-	ASN	deletion	UNP Q13507
A	?	-	SER	deletion	UNP Q13507
A	?	-	ILE	deletion	UNP Q13507
A	?	-	LEU	deletion	UNP Q13507
A	?	-	ASN	deletion	UNP Q13507

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	GLN	deletion	UNP Q13507
A	?	-	PRO	deletion	UNP Q13507
A	?	-	THR	deletion	UNP Q13507
A	?	-	ARG	deletion	UNP Q13507
A	?	-	TYR	deletion	UNP Q13507
A	?	-	GLN	deletion	UNP Q13507
A	839	ILE	-	expression tag	UNP Q13507
A	840	SER	-	expression tag	UNP Q13507
A	841	SER	-	expression tag	UNP Q13507
A	842	LEU	-	expression tag	UNP Q13507
A	843	ARG	-	expression tag	UNP Q13507
A	844	TYR	-	expression tag	UNP Q13507
A	845	GLU	-	expression tag	UNP Q13507
A	846	LEU	-	expression tag	UNP Q13507
A	847	LEU	-	expression tag	UNP Q13507
A	848	GLU	-	expression tag	UNP Q13507
B	?	-	LEU	deletion	UNP Q13507
B	?	-	ASN	deletion	UNP Q13507
B	?	-	LEU	deletion	UNP Q13507
B	?	-	PHE	deletion	UNP Q13507
B	?	-	THR	deletion	UNP Q13507
B	?	-	GLN	deletion	UNP Q13507
B	?	-	SER	deletion	UNP Q13507
B	?	-	ASN	deletion	UNP Q13507
B	?	-	SER	deletion	UNP Q13507
B	?	-	ARG	deletion	UNP Q13507
B	?	-	VAL	deletion	UNP Q13507
B	?	-	PHE	deletion	UNP Q13507
B	?	-	GLU	deletion	UNP Q13507
B	?	-	SER	deletion	UNP Q13507
B	?	-	HIS	deletion	UNP Q13507
B	?	-	SER	deletion	UNP Q13507
B	?	-	PHE	deletion	UNP Q13507
B	?	-	ASN	deletion	UNP Q13507
B	?	-	SER	deletion	UNP Q13507
B	?	-	ILE	deletion	UNP Q13507
B	?	-	LEU	deletion	UNP Q13507
B	?	-	ASN	deletion	UNP Q13507
B	?	-	GLN	deletion	UNP Q13507
B	?	-	PRO	deletion	UNP Q13507
B	?	-	THR	deletion	UNP Q13507
B	?	-	ARG	deletion	UNP Q13507

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	TYR	deletion	UNP Q13507
B	?	-	GLN	deletion	UNP Q13507
B	839	ILE	-	expression tag	UNP Q13507
B	840	SER	-	expression tag	UNP Q13507
B	841	SER	-	expression tag	UNP Q13507
B	842	LEU	-	expression tag	UNP Q13507
B	843	ARG	-	expression tag	UNP Q13507
B	844	TYR	-	expression tag	UNP Q13507
B	845	GLU	-	expression tag	UNP Q13507
B	846	LEU	-	expression tag	UNP Q13507
B	847	LEU	-	expression tag	UNP Q13507
B	848	GLU	-	expression tag	UNP Q13507
C	?	-	LEU	deletion	UNP Q13507
C	?	-	ASN	deletion	UNP Q13507
C	?	-	LEU	deletion	UNP Q13507
C	?	-	PHE	deletion	UNP Q13507
C	?	-	THR	deletion	UNP Q13507
C	?	-	GLN	deletion	UNP Q13507
C	?	-	SER	deletion	UNP Q13507
C	?	-	ASN	deletion	UNP Q13507
C	?	-	SER	deletion	UNP Q13507
C	?	-	ARG	deletion	UNP Q13507
C	?	-	VAL	deletion	UNP Q13507
C	?	-	PHE	deletion	UNP Q13507
C	?	-	GLU	deletion	UNP Q13507
C	?	-	SER	deletion	UNP Q13507
C	?	-	HIS	deletion	UNP Q13507
C	?	-	SER	deletion	UNP Q13507
C	?	-	PHE	deletion	UNP Q13507
C	?	-	ASN	deletion	UNP Q13507
C	?	-	SER	deletion	UNP Q13507
C	?	-	ILE	deletion	UNP Q13507
C	?	-	LEU	deletion	UNP Q13507
C	?	-	ASN	deletion	UNP Q13507
C	?	-	GLN	deletion	UNP Q13507
C	?	-	PRO	deletion	UNP Q13507
C	?	-	THR	deletion	UNP Q13507
C	?	-	ARG	deletion	UNP Q13507
C	?	-	TYR	deletion	UNP Q13507
C	?	-	GLN	deletion	UNP Q13507
C	839	ILE	-	expression tag	UNP Q13507
C	840	SER	-	expression tag	UNP Q13507

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Chain	Residue	Modelled	Actual	Comment	Reference
C	841	SER	-	expression tag	UNP Q13507
C	842	LEU	-	expression tag	UNP Q13507
C	843	ARG	-	expression tag	UNP Q13507
C	844	TYR	-	expression tag	UNP Q13507
C	845	GLU	-	expression tag	UNP Q13507
C	846	LEU	-	expression tag	UNP Q13507
C	847	LEU	-	expression tag	UNP Q13507
C	848	GLU	-	expression tag	UNP Q13507
D	?	-	LEU	deletion	UNP Q13507
D	?	-	ASN	deletion	UNP Q13507
D	?	-	LEU	deletion	UNP Q13507
D	?	-	PHE	deletion	UNP Q13507
D	?	-	THR	deletion	UNP Q13507
D	?	-	GLN	deletion	UNP Q13507
D	?	-	SER	deletion	UNP Q13507
D	?	-	ASN	deletion	UNP Q13507
D	?	-	SER	deletion	UNP Q13507
D	?	-	ARG	deletion	UNP Q13507
D	?	-	VAL	deletion	UNP Q13507
D	?	-	PHE	deletion	UNP Q13507
D	?	-	GLU	deletion	UNP Q13507
D	?	-	SER	deletion	UNP Q13507
D	?	-	HIS	deletion	UNP Q13507
D	?	-	SER	deletion	UNP Q13507
D	?	-	PHE	deletion	UNP Q13507
D	?	-	ASN	deletion	UNP Q13507
D	?	-	SER	deletion	UNP Q13507
D	?	-	ILE	deletion	UNP Q13507
D	?	-	LEU	deletion	UNP Q13507
D	?	-	ASN	deletion	UNP Q13507
D	?	-	GLN	deletion	UNP Q13507
D	?	-	PRO	deletion	UNP Q13507
D	?	-	THR	deletion	UNP Q13507
D	?	-	ARG	deletion	UNP Q13507
D	?	-	TYR	deletion	UNP Q13507
D	?	-	GLN	deletion	UNP Q13507
D	839	ILE	-	expression tag	UNP Q13507
D	840	SER	-	expression tag	UNP Q13507
D	841	SER	-	expression tag	UNP Q13507
D	842	LEU	-	expression tag	UNP Q13507
D	843	ARG	-	expression tag	UNP Q13507
D	844	TYR	-	expression tag	UNP Q13507

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Chain	Residue	Modelled	Actual	Comment	Reference
D	845	GLU	-	expression tag	UNP Q13507
D	846	LEU	-	expression tag	UNP Q13507
D	847	LEU	-	expression tag	UNP Q13507
D	848	GLU	-	expression tag	UNP Q13507

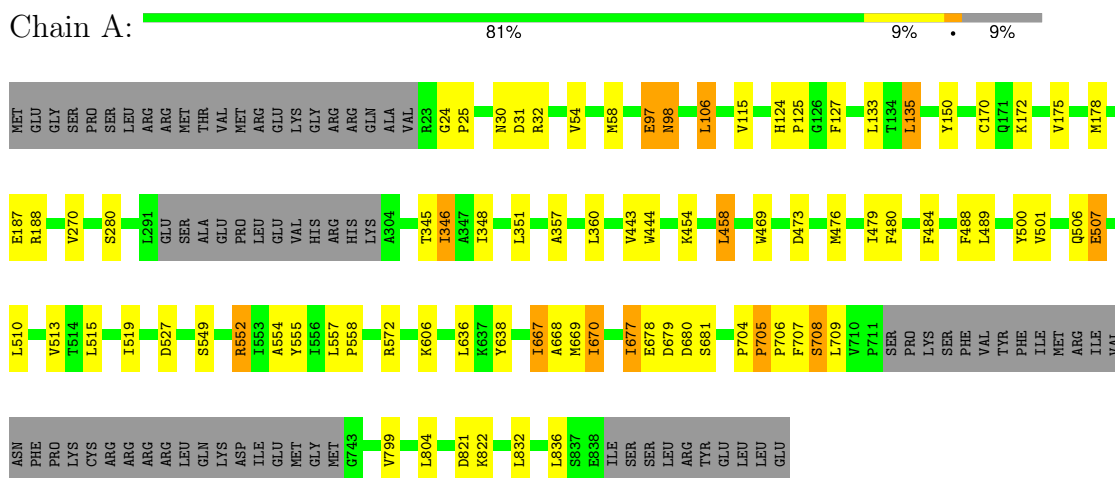
- Molecule 2 is UNKNOWN LIGAND (CCD ID: UNL) (formula:).

Mol	Chain	Residues	Atoms					AltConf
2	A	3	Total	C	N	O	P	0
			146	116	3	24	3	
2	B	3	Total	C	N	O	P	0
			146	116	3	24	3	
2	C	3	Total	C	N	O	P	0
			146	116	3	24	3	
2	D	3	Total	C	N	O	P	0
			146	116	3	24	3	

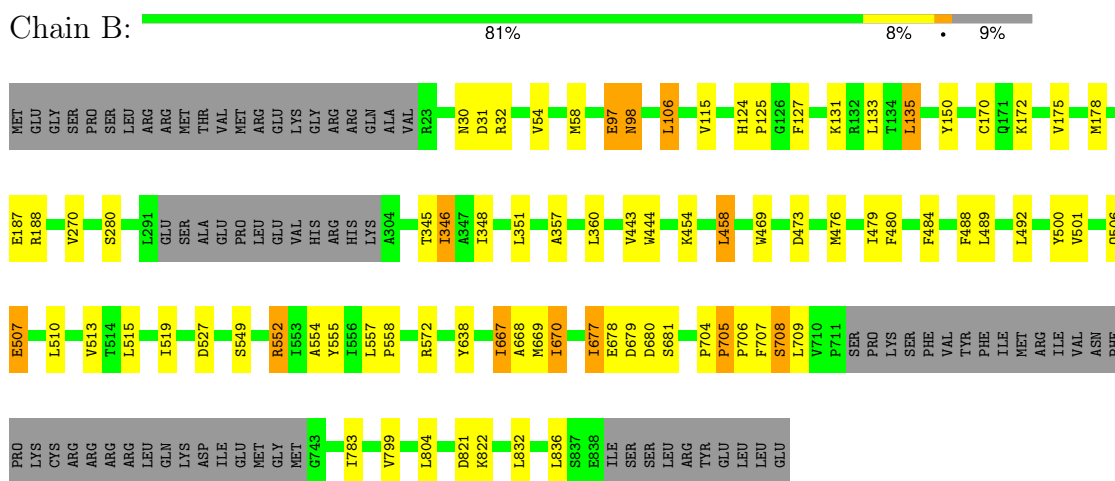
3 Residue-property plots

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.

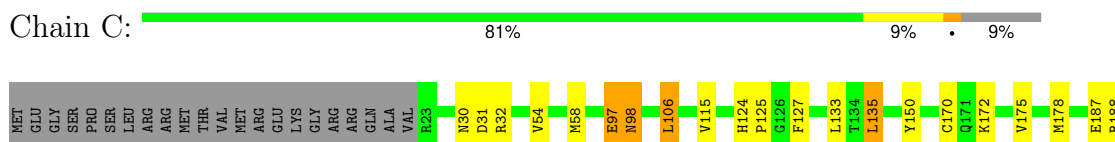
- Molecule 1: Short transient receptor potential channel 3



- Molecule 1: Short transient receptor potential channel 3



- Molecule 1: Short transient receptor potential channel 3



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	95662	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k 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: UNL

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	0.47	2/6116 (0.0%)	0.69	10/8277 (0.1%)
1	B	0.47	2/6116 (0.0%)	0.69	10/8277 (0.1%)
1	C	0.47	2/6116 (0.0%)	0.69	10/8277 (0.1%)
1	D	0.47	2/6116 (0.0%)	0.69	10/8277 (0.1%)
All	All	0.47	8/24464 (0.0%)	0.69	40/33108 (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	3
1	B	0	3
1	C	0	3
1	D	0	3
All	All	0	12

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	679	ASP	C-O	7.45	1.38	1.24
1	A	679	ASP	C-O	7.45	1.38	1.24
1	B	679	ASP	C-O	7.45	1.38	1.24
1	C	679	ASP	C-O	7.45	1.38	1.24
1	A	280	SER	C-O	-5.79	1.17	1.24
1	B	280	SER	C-O	-5.79	1.17	1.24
1	C	280	SER	C-O	-5.79	1.17	1.24
1	D	280	SER	C-O	-5.79	1.17	1.24

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	705	PRO	N-CA-C	6.98	119.22	110.70
1	B	705	PRO	N-CA-C	6.98	119.22	110.70
1	C	705	PRO	N-CA-C	6.98	119.22	110.70
1	D	705	PRO	N-CA-C	6.98	119.22	110.70
1	A	97	GLU	CA-C-N	6.89	134.69	121.54
1	A	97	GLU	C-N-CA	6.89	134.69	121.54
1	B	97	GLU	CA-C-N	6.89	134.69	121.54
1	B	97	GLU	C-N-CA	6.89	134.69	121.54
1	C	97	GLU	CA-C-N	6.89	134.69	121.54
1	C	97	GLU	C-N-CA	6.89	134.69	121.54
1	D	97	GLU	CA-C-N	6.89	134.69	121.54
1	D	97	GLU	C-N-CA	6.89	134.69	121.54
1	D	704	PRO	N-CA-C	6.12	118.16	110.70
1	B	704	PRO	N-CA-C	6.11	118.16	110.70
1	A	704	PRO	N-CA-C	6.08	118.12	110.70
1	C	704	PRO	N-CA-C	6.08	118.12	110.70
1	C	115	VAL	CA-C-O	-5.67	115.05	120.95
1	A	115	VAL	CA-C-O	-5.67	115.05	120.95
1	B	115	VAL	CA-C-O	-5.67	115.05	120.95
1	D	115	VAL	CA-C-O	-5.67	115.05	120.95
1	A	280	SER	CA-C-O	-5.61	114.60	120.55
1	B	280	SER	CA-C-O	-5.61	114.60	120.55
1	C	280	SER	CA-C-O	-5.61	114.60	120.55
1	D	280	SER	CA-C-O	-5.61	114.60	120.55
1	C	667	ILE	CA-C-O	-5.38	115.46	121.17
1	C	552	ARG	N-CA-C	-5.37	106.58	113.02
1	A	552	ARG	N-CA-C	-5.34	106.61	113.02
1	B	552	ARG	N-CA-C	-5.34	106.61	113.02
1	D	552	ARG	N-CA-C	-5.34	106.61	113.02
1	B	106	LEU	CA-C-O	-5.34	115.22	120.82
1	A	667	ILE	CA-C-O	-5.33	115.52	121.17
1	B	667	ILE	CA-C-O	-5.33	115.52	121.17
1	D	667	ILE	CA-C-O	-5.33	115.52	121.17
1	A	106	LEU	CA-C-O	-5.30	115.25	120.82
1	C	106	LEU	CA-C-O	-5.30	115.25	120.82
1	D	106	LEU	CA-C-O	-5.30	115.25	120.82
1	B	443	VAL	CA-C-O	-5.20	115.34	120.85
1	A	443	VAL	CA-C-O	-5.18	115.36	120.85
1	D	443	VAL	CA-C-O	-5.18	115.36	120.85
1	C	443	VAL	CA-C-O	-5.16	115.38	120.85

There are no chirality outliers.

All (12) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	32	ARG	Sidechain
1	A	552	ARG	Sidechain
1	A	572	ARG	Sidechain
1	B	32	ARG	Sidechain
1	B	552	ARG	Sidechain
1	B	572	ARG	Sidechain
1	C	32	ARG	Sidechain
1	C	552	ARG	Sidechain
1	C	572	ARG	Sidechain
1	D	32	ARG	Sidechain
1	D	552	ARG	Sidechain
1	D	572	ARG	Sidechain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5986	0	6034	92	0
1	B	5986	0	6034	93	0
1	C	5986	0	6034	93	0
1	D	5986	0	6034	93	0
2	A	146	0	0	7	0
2	B	146	0	0	7	0
2	C	146	0	0	7	0
2	D	146	0	0	7	0
All	All	24528	0	24136	268	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 6.

All (268) 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:822:LYS:HD2	1:D:821:ASP:OD2	1.25	1.37
1:C:821:ASP:OD2	1:D:822:LYS:HD2	1.25	1.30
1:A:821:ASP:OD2	1:B:822:LYS:HD2	1.25	1.30
1:B:821:ASP:OD2	1:C:822:LYS:HD2	1.25	1.23

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:821:ASP:OD2	1:C:822:LYS:CD	1.90	1.20
1:A:821:ASP:OD2	1:B:822:LYS:CD	1.90	1.19
1:A:822:LYS:CD	1:D:821:ASP:OD2	1.90	1.19
1:C:821:ASP:OD2	1:D:822:LYS:CD	1.90	1.19
1:A:822:LYS:NZ	1:D:822:LYS:CE	2.07	1.18
1:B:822:LYS:CE	1:C:822:LYS:NZ	2.07	1.18
1:C:822:LYS:CE	1:D:822:LYS:NZ	2.07	1.18
1:A:822:LYS:CE	1:B:822:LYS:NZ	2.07	1.17
1:A:822:LYS:HE2	1:B:822:LYS:NZ	1.65	1.11
1:B:822:LYS:HE2	1:C:822:LYS:NZ	1.65	1.09
1:A:822:LYS:NZ	1:D:822:LYS:HE2	1.65	1.08
1:C:822:LYS:HE2	1:D:822:LYS:NZ	1.65	1.05
1:C:821:ASP:OD2	1:D:822:LYS:CG	2.06	1.03
1:A:821:ASP:OD2	1:B:822:LYS:CG	2.06	1.02
1:B:821:ASP:OD2	1:C:822:LYS:CG	2.06	1.02
1:A:822:LYS:CG	1:D:821:ASP:OD2	2.06	1.01
1:C:822:LYS:CE	1:D:822:LYS:HZ2	1.69	1.01
1:A:822:LYS:HZ1	1:D:822:LYS:CE	1.74	0.99
1:A:822:LYS:HE2	1:B:822:LYS:HZ2	1.27	0.96
1:B:822:LYS:CE	1:C:822:LYS:HZ2	1.77	0.96
1:C:822:LYS:HE2	1:D:822:LYS:HZ2	1.18	0.96
1:B:822:LYS:CE	1:C:822:LYS:HZ1	1.76	0.95
1:B:822:LYS:HE2	1:C:822:LYS:HZ2	1.32	0.94
1:A:822:LYS:CE	1:B:822:LYS:HZ2	1.74	0.94
1:A:822:LYS:NZ	1:B:822:LYS:HZ1	1.67	0.93
1:C:822:LYS:NZ	1:D:822:LYS:HZ1	1.65	0.93
1:B:822:LYS:NZ	1:C:822:LYS:HZ1	1.68	0.92
1:C:821:ASP:OD2	1:D:822:LYS:HB3	1.70	0.91
1:A:822:LYS:HZ2	1:D:822:LYS:CE	1.80	0.91
1:A:821:ASP:OD2	1:B:822:LYS:HB3	1.70	0.91
1:A:822:LYS:HB3	1:D:821:ASP:OD2	1.70	0.90
1:A:822:LYS:HZ1	1:D:822:LYS:NZ	1.69	0.90
1:B:821:ASP:OD2	1:C:822:LYS:HB3	1.70	0.90
1:C:822:LYS:CE	1:D:822:LYS:HZ1	1.85	0.88
1:A:822:LYS:CE	1:B:822:LYS:HZ1	1.80	0.86
1:B:821:ASP:OD2	1:C:822:LYS:CB	2.24	0.86
1:A:822:LYS:CB	1:D:821:ASP:OD2	2.24	0.85
1:C:821:ASP:OD2	1:D:822:LYS:CB	2.24	0.85
1:A:822:LYS:HZ2	1:D:822:LYS:HE2	1.36	0.84
1:B:822:LYS:NZ	1:C:822:LYS:NZ	2.25	0.84
1:A:822:LYS:NZ	1:B:822:LYS:NZ	2.25	0.84

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:822:LYS:HZ2	1:D:822:LYS:CD	1.91	0.84
1:A:821:ASP:OD2	1:B:822:LYS:CB	2.24	0.84
1:B:822:LYS:CD	1:C:822:LYS:HZ2	1.92	0.82
1:A:822:LYS:NZ	1:D:822:LYS:NZ	2.25	0.81
1:A:822:LYS:CD	1:B:822:LYS:HZ2	1.93	0.81
1:C:822:LYS:NZ	1:D:822:LYS:NZ	2.25	0.80
1:C:822:LYS:CD	1:D:822:LYS:HZ2	1.95	0.78
1:A:822:LYS:HZ1	1:D:822:LYS:HZ1	1.31	0.78
2:C:903:UNL:C8	2:C:903:UNL:O4P	2.33	0.77
2:D:903:UNL:C8	2:D:903:UNL:O4P	2.33	0.76
1:A:822:LYS:HZ1	1:D:822:LYS:HE2	1.34	0.75
2:B:903:UNL:C8	2:B:903:UNL:O4P	2.33	0.75
2:A:902:UNL:O4P	2:A:902:UNL:C8	2.33	0.75
1:B:822:LYS:HZ1	1:C:822:LYS:HZ1	1.35	0.74
1:C:822:LYS:HZ1	1:D:822:LYS:HZ1	1.34	0.73
1:C:822:LYS:CD	1:D:822:LYS:NZ	2.51	0.73
1:A:822:LYS:CD	1:B:822:LYS:NZ	2.51	0.73
1:A:822:LYS:NZ	1:D:822:LYS:CD	2.51	0.72
1:A:822:LYS:HB3	1:D:821:ASP:CG	2.14	0.72
1:B:822:LYS:CD	1:C:822:LYS:NZ	2.51	0.72
1:A:821:ASP:CG	1:B:822:LYS:HB3	2.14	0.72
1:C:821:ASP:CG	1:D:822:LYS:HB3	2.14	0.72
1:B:821:ASP:CG	1:C:822:LYS:HB3	2.14	0.71
1:A:822:LYS:HZ1	1:B:822:LYS:HZ1	1.40	0.68
1:A:822:LYS:HZ2	1:D:822:LYS:HD3	1.59	0.68
1:A:822:LYS:HE2	1:B:822:LYS:HZ1	1.43	0.68
1:B:822:LYS:HE2	1:C:822:LYS:HZ1	1.38	0.67
1:C:822:LYS:HD3	1:D:822:LYS:NZ	2.11	0.66
1:B:822:LYS:HD3	1:C:822:LYS:HZ2	1.61	0.64
1:B:822:LYS:HD3	1:C:822:LYS:NZ	2.11	0.64
1:A:822:LYS:NZ	1:D:822:LYS:HD3	2.11	0.64
1:A:822:LYS:HD3	1:B:822:LYS:NZ	2.11	0.64
1:A:822:LYS:HD3	1:B:822:LYS:HZ2	1.65	0.60
1:A:799:VAL:HG21	1:B:804:LEU:HD22	1.87	0.57
1:C:799:VAL:HG21	1:D:804:LEU:HD22	1.87	0.57
1:A:454:LYS:O	1:A:458:LEU:HD23	2.06	0.56
1:A:554:ALA:HB2	2:A:901:UNL:C15	2.36	0.56
1:A:804:LEU:HD22	1:D:799:VAL:HG21	1.87	0.56
1:B:554:ALA:HB2	2:B:902:UNL:C15	2.36	0.56
1:D:454:LYS:O	1:D:458:LEU:HD23	2.06	0.56
1:D:554:ALA:HB2	2:D:902:UNL:C15	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:821:ASP:OD1	1:B:822:LYS:HB3	2.06	0.55
1:B:454:LYS:O	1:B:458:LEU:HD23	2.06	0.55
1:A:836:LEU:HD11	1:D:836:LEU:HD13	1.88	0.55
1:B:821:ASP:OD1	1:C:822:LYS:HB3	2.06	0.55
1:D:476:MET:HE3	1:D:549:SER:HA	1.88	0.55
1:C:454:LYS:O	1:C:458:LEU:HD23	2.06	0.55
1:C:476:MET:HE3	1:C:549:SER:HA	1.88	0.55
1:C:554:ALA:HB2	2:C:902:UNL:C15	2.36	0.55
1:B:836:LEU:HD13	1:C:836:LEU:HD11	1.88	0.55
1:C:836:LEU:HD13	1:D:836:LEU:HD11	1.88	0.55
1:A:836:LEU:HD13	1:B:836:LEU:HD11	1.88	0.55
1:A:822:LYS:HB3	1:D:821:ASP:OD1	2.06	0.55
1:B:799:VAL:HG21	1:C:804:LEU:HD22	1.87	0.55
1:C:821:ASP:OD1	1:D:822:LYS:HB3	2.06	0.54
1:B:476:MET:HE3	1:B:549:SER:HA	1.88	0.54
1:A:476:MET:HE3	1:A:549:SER:HA	1.88	0.54
1:A:133:LEU:C	1:A:135:LEU:H	2.17	0.53
1:B:133:LEU:C	1:B:135:LEU:H	2.17	0.52
1:C:133:LEU:C	1:C:135:LEU:H	2.17	0.52
1:C:822:LYS:HE2	1:D:822:LYS:HZ1	1.52	0.52
1:D:133:LEU:C	1:D:135:LEU:H	2.17	0.52
1:B:345:THR:HG22	1:B:346:ILE:H	1.75	0.52
1:A:345:THR:HG22	1:A:346:ILE:H	1.75	0.51
1:D:345:THR:HG22	1:D:346:ILE:H	1.75	0.51
1:C:345:THR:HG22	1:C:346:ILE:H	1.75	0.50
1:C:469:TRP:CD2	2:C:902:UNL:C6	2.96	0.48
1:A:97:GLU:O	1:A:98:ASN:OD1	2.31	0.48
1:A:555:TYR:CD2	2:A:901:UNL:C8	2.96	0.48
1:B:97:GLU:O	1:B:98:ASN:OD1	2.31	0.48
1:C:821:ASP:CG	1:D:822:LYS:CB	2.83	0.48
1:D:97:GLU:O	1:D:98:ASN:OD1	2.31	0.48
1:D:555:TYR:CD2	2:D:902:UNL:C8	2.96	0.48
1:D:667:ILE:O	1:D:668:ALA:C	2.57	0.48
1:B:469:TRP:CD2	2:B:902:UNL:C6	2.97	0.48
1:C:97:GLU:O	1:C:98:ASN:OD1	2.31	0.48
1:C:555:TYR:CD2	2:C:902:UNL:C8	2.96	0.48
1:A:822:LYS:CB	1:D:821:ASP:CG	2.83	0.48
1:D:469:TRP:CD2	2:D:902:UNL:C6	2.96	0.48
1:A:469:TRP:CD2	2:A:901:UNL:C6	2.96	0.48
1:B:555:TYR:CD2	2:B:902:UNL:C8	2.96	0.47
1:B:667:ILE:O	1:B:668:ALA:C	2.57	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:667:ILE:O	1:C:668:ALA:C	2.57	0.47
1:B:821:ASP:CG	1:C:822:LYS:CB	2.83	0.47
1:A:667:ILE:O	1:A:668:ALA:C	2.57	0.47
1:A:510:LEU:HA	1:A:513:VAL:CG1	2.46	0.46
1:D:510:LEU:HA	1:D:513:VAL:CG1	2.46	0.46
1:A:506:GLN:O	1:A:507:GLU:C	2.59	0.46
1:B:821:ASP:OD2	1:C:822:LYS:HG3	2.09	0.46
1:D:506:GLN:O	1:D:507:GLU:C	2.59	0.46
1:A:821:ASP:CG	1:B:822:LYS:CB	2.83	0.46
1:B:510:LEU:HA	1:B:513:VAL:CG1	2.46	0.46
1:D:30:ASN:O	1:D:31:ASP:C	2.59	0.46
1:B:510:LEU:HD23	1:B:513:VAL:HG11	1.98	0.46
1:D:510:LEU:HD23	1:D:513:VAL:HG11	1.98	0.46
1:C:510:LEU:HA	1:C:513:VAL:CG1	2.46	0.45
1:C:510:LEU:HD23	1:C:513:VAL:HG11	1.98	0.45
1:A:30:ASN:O	1:A:31:ASP:C	2.59	0.45
1:A:510:LEU:HD23	1:A:513:VAL:HG11	1.98	0.45
1:B:30:ASN:O	1:B:31:ASP:C	2.59	0.45
1:D:357:ALA:HA	1:D:360:LEU:HD23	1.99	0.45
1:C:357:ALA:HA	1:C:360:LEU:HD23	1.99	0.45
1:B:506:GLN:O	1:B:507:GLU:C	2.59	0.45
1:A:836:LEU:HD23	1:D:832:LEU:HD11	1.98	0.45
1:C:506:GLN:O	1:C:507:GLU:C	2.59	0.45
1:D:669:MET:O	1:D:670:ILE:C	2.60	0.45
1:B:480:PHE:O	1:B:484:PHE:HD1	2.00	0.45
1:C:669:MET:O	1:C:670:ILE:C	2.60	0.45
1:C:480:PHE:O	1:C:484:PHE:HD1	2.00	0.45
1:A:832:LEU:HD11	1:B:836:LEU:HD23	1.98	0.44
1:B:357:ALA:HA	1:B:360:LEU:HD23	1.99	0.44
1:C:822:LYS:HD3	1:D:822:LYS:HZ3	1.81	0.44
1:A:357:ALA:HA	1:A:360:LEU:HD23	1.99	0.44
1:B:54:VAL:O	1:B:58:MET:HG3	2.18	0.44
1:C:30:ASN:O	1:C:31:ASP:C	2.59	0.44
1:C:54:VAL:O	1:C:58:MET:HG3	2.18	0.44
1:A:705:PRO:O	1:A:706:PRO:C	2.60	0.44
1:A:804:LEU:HD22	1:D:799:VAL:CG2	2.47	0.44
1:A:480:PHE:O	1:A:484:PHE:HD1	2.00	0.44
1:A:175:VAL:HA	1:A:178:MET:HE3	1.99	0.44
1:A:799:VAL:CG2	1:B:804:LEU:HD22	2.47	0.44
1:C:175:VAL:HA	1:C:178:MET:HE3	1.99	0.44
1:C:832:LEU:HD11	1:D:836:LEU:HD23	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:175:VAL:HA	1:D:178:MET:HE3	1.99	0.44
1:B:669:MET:O	1:B:670:ILE:C	2.60	0.44
1:D:705:PRO:O	1:D:706:PRO:C	2.60	0.44
1:B:705:PRO:O	1:B:706:PRO:C	2.60	0.43
1:D:480:PHE:O	1:D:484:PHE:HD1	2.00	0.43
1:A:677:ILE:HG22	1:A:678:GLU:N	2.33	0.43
1:B:479:ILE:HD11	2:C:901:UNL:C23	2.48	0.43
1:B:677:ILE:HG22	1:B:678:GLU:N	2.33	0.43
1:C:469:TRP:CE3	2:C:902:UNL:C6	3.01	0.43
1:C:479:ILE:HD11	2:D:901:UNL:C23	2.48	0.43
1:D:469:TRP:CE3	2:D:902:UNL:C6	3.01	0.43
1:B:707:PHE:O	1:B:708:SER:C	2.61	0.43
1:C:799:VAL:CG2	1:D:804:LEU:HD22	2.47	0.43
1:D:54:VAL:O	1:D:58:MET:HG3	2.18	0.43
1:D:500:TYR:CE2	1:D:519:ILE:HD13	2.53	0.43
1:B:832:LEU:HD11	1:C:836:LEU:HD23	1.98	0.43
1:C:677:ILE:HG22	1:C:678:GLU:N	2.33	0.43
2:A:903:UNL:C23	1:D:479:ILE:HD11	2.48	0.43
1:B:799:VAL:CG2	1:C:804:LEU:HD22	2.47	0.43
1:A:500:TYR:CE2	1:A:519:ILE:HD13	2.54	0.43
1:B:500:TYR:CE2	1:B:519:ILE:HD13	2.53	0.43
1:D:133:LEU:C	1:D:135:LEU:N	2.76	0.43
1:A:54:VAL:O	1:A:58:MET:HG3	2.18	0.43
1:A:479:ILE:HD11	2:B:901:UNL:C23	2.48	0.43
1:A:669:MET:O	1:A:670:ILE:C	2.60	0.43
1:B:555:TYR:CG	2:B:902:UNL:C8	3.02	0.43
1:D:677:ILE:HG22	1:D:678:GLU:N	2.33	0.43
1:B:469:TRP:CE3	2:B:902:UNL:C6	3.01	0.43
1:C:133:LEU:C	1:C:135:LEU:N	2.76	0.43
1:C:705:PRO:O	1:C:706:PRO:C	2.60	0.43
1:A:106:LEU:HD22	1:A:127:PHE:CZ	2.54	0.43
1:B:175:VAL:HA	1:B:178:MET:HE3	1.99	0.43
1:C:500:TYR:CE2	1:C:519:ILE:HD13	2.54	0.43
1:C:555:TYR:CG	2:C:902:UNL:C8	3.02	0.43
1:C:106:LEU:HD22	1:C:127:PHE:CZ	2.54	0.42
1:D:106:LEU:HD22	1:D:127:PHE:CZ	2.54	0.42
1:A:187:GLU:O	1:A:187:GLU:HG2	2.20	0.42
1:B:488:PHE:O	1:B:489:LEU:C	2.62	0.42
1:A:469:TRP:CE3	2:A:901:UNL:C6	3.01	0.42
1:A:821:ASP:OD2	1:B:822:LYS:HG3	2.09	0.42
1:A:488:PHE:O	1:A:489:LEU:C	2.62	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:106:LEU:HD22	1:B:127:PHE:CZ	2.54	0.42
1:B:557:LEU:N	1:B:558:PRO:HD2	2.35	0.42
1:C:707:PHE:O	1:C:708:SER:C	2.62	0.42
1:A:133:LEU:C	1:A:135:LEU:N	2.76	0.42
1:A:707:PHE:O	1:A:708:SER:C	2.62	0.42
1:C:488:PHE:O	1:C:489:LEU:C	2.63	0.42
1:D:555:TYR:CG	2:D:902:UNL:C8	3.02	0.42
1:A:555:TYR:CG	2:A:901:UNL:C8	3.02	0.42
1:B:489:LEU:O	1:B:492:LEU:N	2.53	0.42
1:D:707:PHE:O	1:D:708:SER:C	2.62	0.42
1:A:24:GLY:HA2	1:A:25:PRO:HD3	1.91	0.42
1:B:133:LEU:C	1:B:135:LEU:N	2.77	0.42
1:B:187:GLU:O	1:B:187:GLU:HG2	2.20	0.42
1:B:680:ASP:OD1	1:B:681:SER:N	2.53	0.42
1:D:680:ASP:OD1	1:D:681:SER:N	2.53	0.42
1:B:124:HIS:CG	1:B:125:PRO:HD2	2.55	0.42
1:C:124:HIS:CG	1:C:125:PRO:HD2	2.55	0.41
1:D:124:HIS:CG	1:D:125:PRO:HD2	2.55	0.41
1:D:187:GLU:HG2	1:D:187:GLU:O	2.20	0.41
1:D:501:VAL:CG1	1:D:510:LEU:HD11	2.50	0.41
1:A:124:HIS:CG	1:A:125:PRO:HD2	2.55	0.41
1:A:348:ILE:HG23	1:A:351:LEU:HD11	2.02	0.41
1:A:557:LEU:N	1:A:558:PRO:HD2	2.35	0.41
1:C:489:LEU:O	1:C:492:LEU:N	2.53	0.41
1:B:473:ASP:O	1:B:476:MET:HB3	2.20	0.41
1:C:473:ASP:O	1:C:476:MET:HB3	2.20	0.41
1:D:348:ILE:HG23	1:D:351:LEU:HD11	2.02	0.41
1:D:473:ASP:O	1:D:476:MET:HB3	2.20	0.41
1:A:135:LEU:HD23	1:A:135:LEU:HA	1.81	0.41
1:C:557:LEU:N	1:C:558:PRO:HD2	2.35	0.41
1:A:680:ASP:OD1	1:A:681:SER:N	2.53	0.41
1:D:488:PHE:O	1:D:489:LEU:C	2.63	0.41
1:D:557:LEU:N	1:D:558:PRO:HD2	2.35	0.41
1:C:187:GLU:O	1:C:187:GLU:HG2	2.20	0.41
1:C:348:ILE:HG23	1:C:351:LEU:HD11	2.02	0.41
1:A:606:LYS:HG2	1:A:636:LEU:HD23	2.02	0.41
1:B:501:VAL:CG1	1:B:510:LEU:HD11	2.50	0.41
1:B:527:ASP:HB3	1:C:638:TYR:CZ	2.55	0.41
1:C:501:VAL:CG1	1:C:510:LEU:HD11	2.50	0.41
1:C:680:ASP:OD1	1:C:681:SER:N	2.53	0.41
1:D:489:LEU:O	1:D:492:LEU:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:501:VAL:CG1	1:A:510:LEU:HD11	2.50	0.41
1:C:527:ASP:HB3	1:D:638:TYR:CZ	2.55	0.41
1:A:170:CYS:HB3	1:A:172:LYS:HE2	2.03	0.41
1:A:638:TYR:CZ	1:D:527:ASP:HB3	2.55	0.41
1:C:170:CYS:HB3	1:C:172:LYS:HE2	2.03	0.41
1:B:131:LYS:HA	1:B:131:LYS:HD3	1.81	0.41
1:C:606:LYS:HG2	1:C:636:LEU:HD23	2.02	0.41
1:D:606:LYS:HG2	1:D:636:LEU:HD23	2.02	0.41
1:A:527:ASP:HB3	1:B:638:TYR:CZ	2.55	0.40
1:A:473:ASP:O	1:A:476:MET:HB3	2.20	0.40
1:C:783:ILE:HD13	1:C:783:ILE:HA	1.94	0.40
1:D:185:ARG:HE	1:D:185:ARG:HB3	1.77	0.40
1:D:530:LEU:HD23	1:D:530:LEU:HA	1.98	0.40
1:B:170:CYS:HB3	1:B:172:LYS:HE2	2.03	0.40
1:B:348:ILE:HG23	1:B:351:LEU:HD11	2.02	0.40
1:C:821:ASP:OD2	1:D:822:LYS:HG3	2.09	0.40
1:B:783:ILE:HD13	1:B:783:ILE:HA	1.94	0.40
1:D:24:GLY:HA2	1:D:25:PRO:HD3	1.91	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	739/820 (90%)	695 (94%)	37 (5%)	7 (1%)	14 28
1	B	739/820 (90%)	695 (94%)	37 (5%)	7 (1%)	14 28
1	C	739/820 (90%)	695 (94%)	37 (5%)	7 (1%)	14 28
1	D	739/820 (90%)	695 (94%)	37 (5%)	7 (1%)	14 28
All	All	2956/3280 (90%)	2780 (94%)	148 (5%)	28 (1%)	17 28

All (28) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	670	ILE
1	A	677	ILE
1	A	708	SER
1	B	670	ILE
1	B	677	ILE
1	B	708	SER
1	C	670	ILE
1	C	677	ILE
1	C	708	SER
1	D	670	ILE
1	D	677	ILE
1	D	708	SER
1	A	98	ASN
1	A	507	GLU
1	B	98	ASN
1	B	507	GLU
1	C	98	ASN
1	C	507	GLU
1	D	98	ASN
1	D	507	GLU
1	A	188	ARG
1	B	188	ARG
1	C	188	ARG
1	D	188	ARG
1	A	346	ILE
1	B	346	ILE
1	C	346	ILE
1	D	346	ILE

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	656/727 (90%)	649 (99%)	7 (1%)	70 87
1	B	656/727 (90%)	649 (99%)	7 (1%)	70 87
1	C	656/727 (90%)	649 (99%)	7 (1%)	70 87

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	656/727 (90%)	649 (99%)	7 (1%)	70	87
All	All	2624/2908 (90%)	2596 (99%)	28 (1%)	69	87

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	135	LEU
1	A	150	TYR
1	A	270	VAL
1	A	444	TRP
1	A	458	LEU
1	A	515	LEU
1	A	709	LEU
1	B	135	LEU
1	B	150	TYR
1	B	270	VAL
1	B	444	TRP
1	B	458	LEU
1	B	515	LEU
1	B	709	LEU
1	C	135	LEU
1	C	150	TYR
1	C	270	VAL
1	C	444	TRP
1	C	458	LEU
1	C	515	LEU
1	C	709	LEU
1	D	135	LEU
1	D	150	TYR
1	D	270	VAL
1	D	444	TRP
1	D	458	LEU
1	D	515	LEU
1	D	709	LEU

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	425	GLN
1	B	337	ASN
1	B	425	GLN

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Mol	Chain	Res	Type
1	C	425	GLN
1	D	425	GLN

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 12 ligands modelled in this entry, 12 are unknown - 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.