



Full wwPDB NMR Structure Validation Report ⓘ

Mar 25, 2026 – 12:18 AM UTC

PDB ID : 1JI8 / pdb_00001ji8
Title : Solution Structure of Pyrobaculum Aerophilum DsrC/gamma subunit of dissimilatory sulfite reductase
Authors : Cort, J.R.; Kennedy, M.A.; Northeast Structural Genomics Consortium (NESG)
Deposited on : 2001-06-29

This is a Full wwPDB NMR Structure 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/NMRValidationReportHelp>

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:

MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
wwPDB-RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
wwPDB-ShiftChecker : v1.2
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

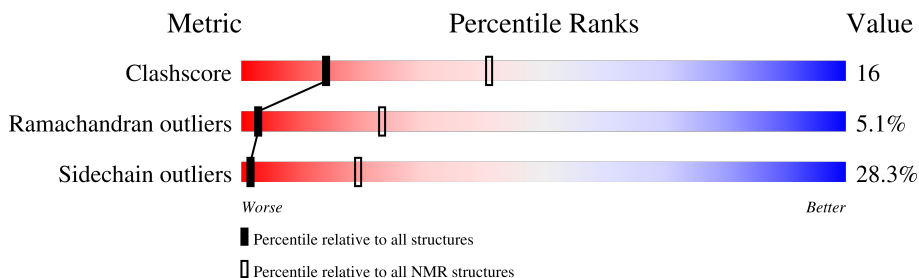
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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)	NMR archive (#Entries)
Clashscore	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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	111	 31% 58% 8%

2 Ensemble composition and analysis

This entry contains 20 models. Model 15 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average, fewest violations, lowest energy*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:3-A:104 (102)	1.14	15

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 4 clusters and 1 single-model cluster was found.

Cluster number	Models
1	1, 3, 6, 7, 8, 10, 12, 13, 15, 16, 18
2	4, 5, 20
3	2, 9, 14
4	17, 19
Single-model clusters	11

3 Entry composition

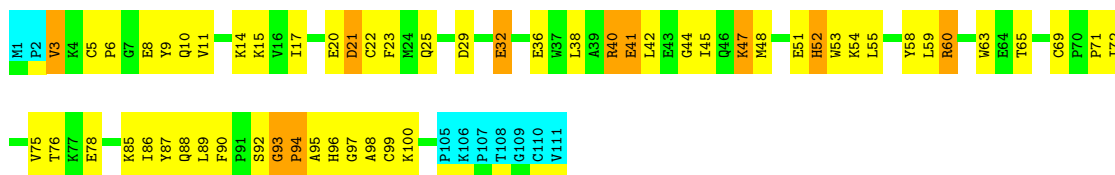
There is only 1 type of molecule in this entry. The entry contains 1757 atoms, of which 868 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called dissimilatory siroheme-sulfite reductase.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	111	1757	573	868	142	165	9	0

There are 20 discrepancies between the modelled and reference sequences:

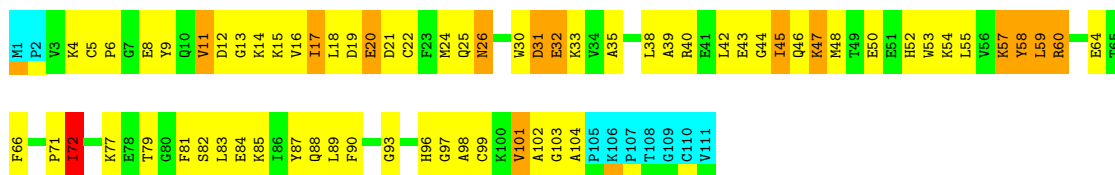
Chain	Residue	Modelled	Actual	Comment	Reference
A	10	GLN	LYS	conflict	UNP Q8ZUX1
A	13	GLY	ASP	conflict	UNP Q8ZUX1
A	14	LYS	VAL	conflict	UNP Q8ZUX1
A	15	LYS	THR	conflict	UNP Q8ZUX1
A	16	VAL	ILE	conflict	UNP Q8ZUX1
A	21	ASP	GLU	conflict	UNP Q8ZUX1
A	24	MET	LEU	conflict	UNP Q8ZUX1
A	25	GLN	SER	conflict	UNP Q8ZUX1
A	29	ASP	VAL	conflict	UNP Q8ZUX1
A	31	ASP	ASN	conflict	UNP Q8ZUX1
A	38	LEU	MET	conflict	UNP Q8ZUX1
A	51	GLU	ASP	conflict	UNP Q8ZUX1
A	55	LEU	VAL	conflict	UNP Q8ZUX1
A	66	PHE	TYR	conflict	UNP Q8ZUX1
A	68	THR	VAL	conflict	UNP Q8ZUX1
A	75	VAL	LEU	conflict	UNP Q8ZUX1
A	76	THR	LEU	conflict	UNP Q8ZUX1
A	82	SER	THR	conflict	UNP Q8ZUX1
A	85	LYS	GLN	conflict	UNP Q8ZUX1
A	96	HIS	ASN	conflict	UNP Q8ZUX1



4.2.3 Score per residue for model 3

- Molecule 1: dissimilatory siroheme-sulfite reductase

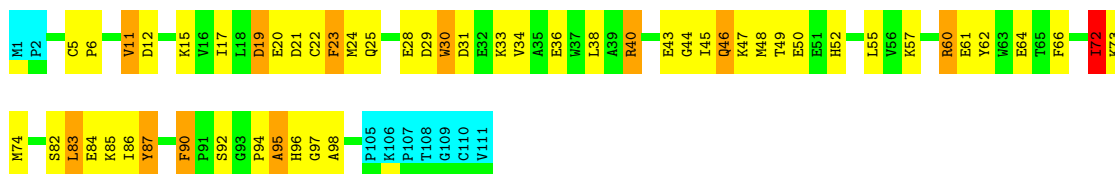
Chain A: 31% 49% 12% 8%



4.2.4 Score per residue for model 4

- Molecule 1: dissimilatory siroheme-sulfite reductase

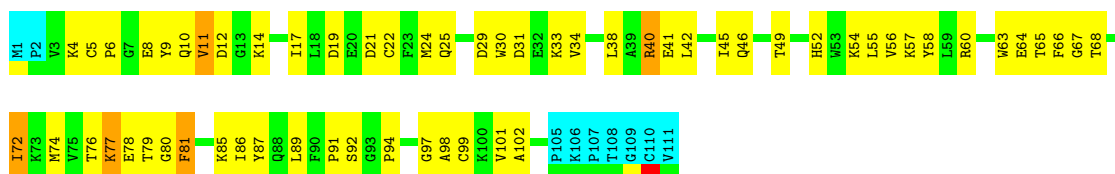
Chain A: 43% 38% 10% 8%



4.2.5 Score per residue for model 5

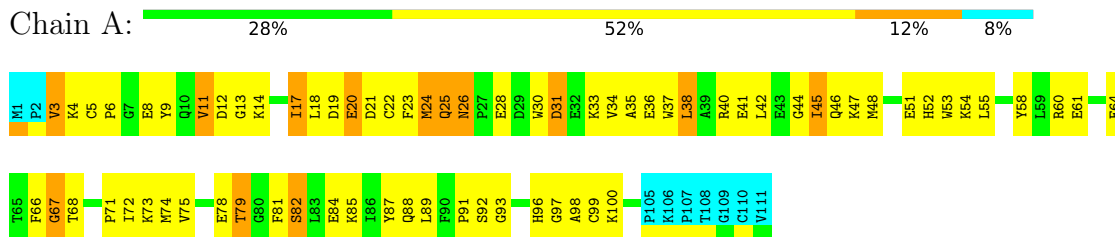
- Molecule 1: dissimilatory siroheme-sulfite reductase

Chain A: 38% 50% 5% 8%



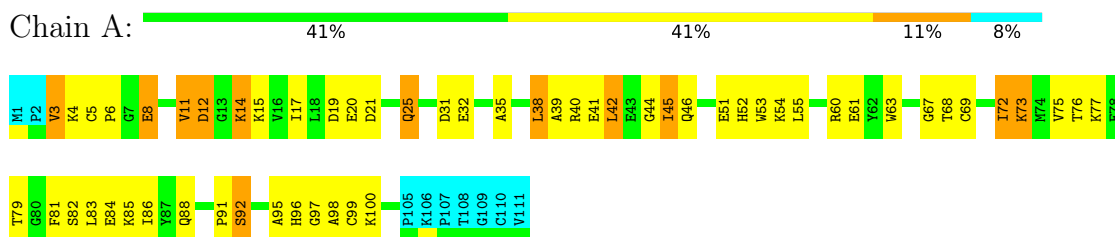
4.2.6 Score per residue for model 6

- Molecule 1: dissimilatory siroheme-sulfite reductase



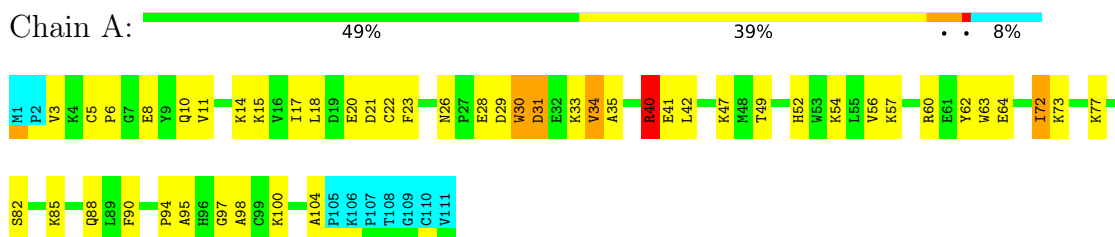
4.2.7 Score per residue for model 7

- Molecule 1: dissimilatory siroheme-sulfite reductase



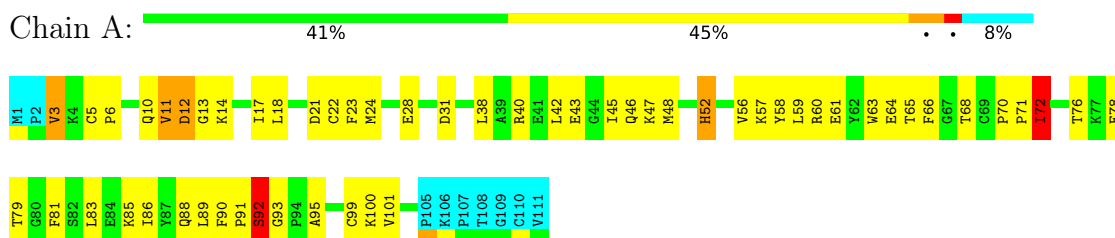
4.2.8 Score per residue for model 8

- Molecule 1: dissimilatory siroheme-sulfite reductase



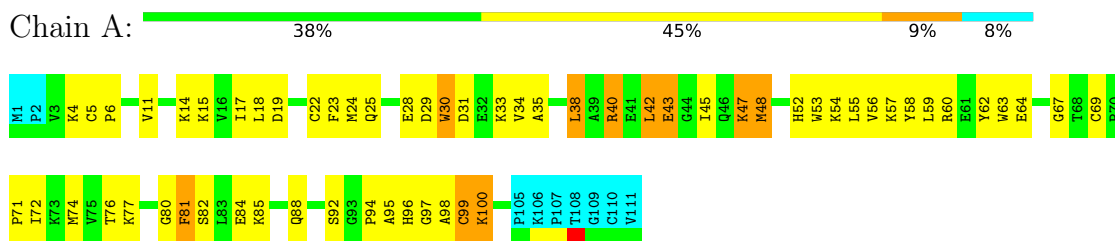
4.2.9 Score per residue for model 9

- Molecule 1: dissimilatory siroheme-sulfite reductase



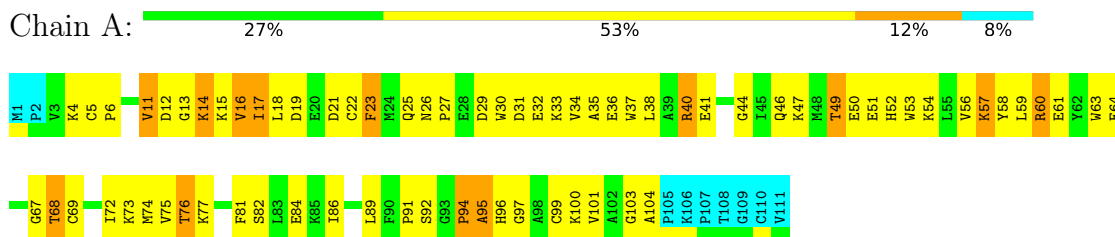
4.2.10 Score per residue for model 10

- Molecule 1: dissimilatory siroheme-sulfite reductase



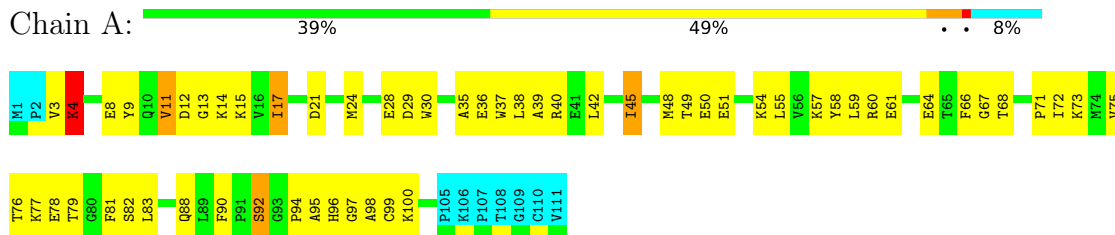
4.2.11 Score per residue for model 11

- Molecule 1: dissimilatory siroheme-sulfite reductase



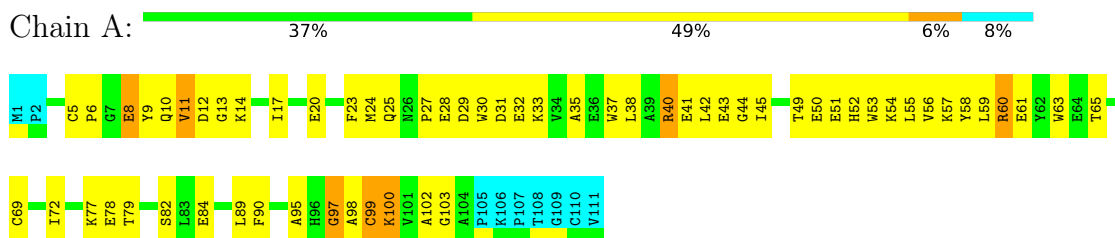
4.2.12 Score per residue for model 12

- Molecule 1: dissimilatory siroheme-sulfite reductase



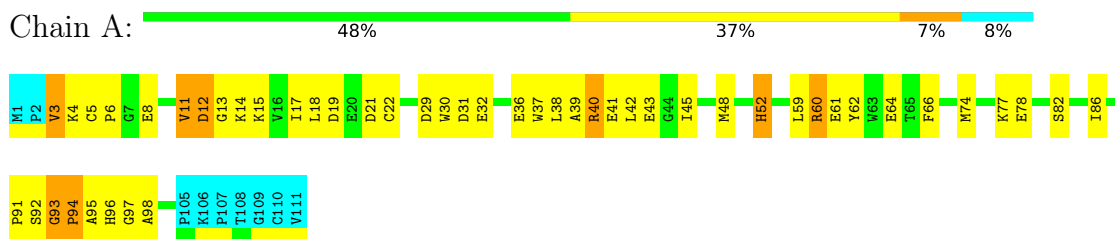
4.2.13 Score per residue for model 13

- Molecule 1: dissimilatory siroheme-sulfite reductase



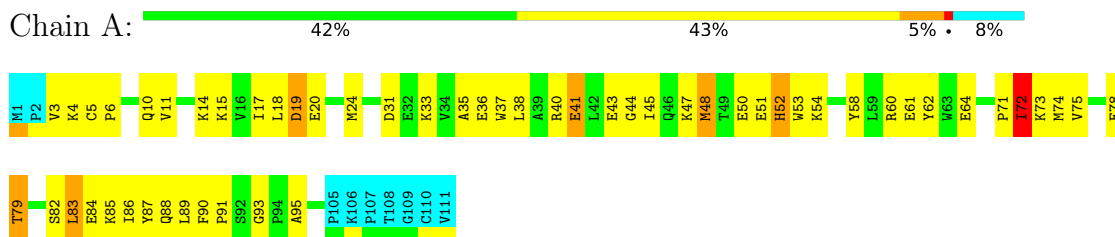
4.2.14 Score per residue for model 14

- Molecule 1: dissimilatory siroheme-sulfite reductase



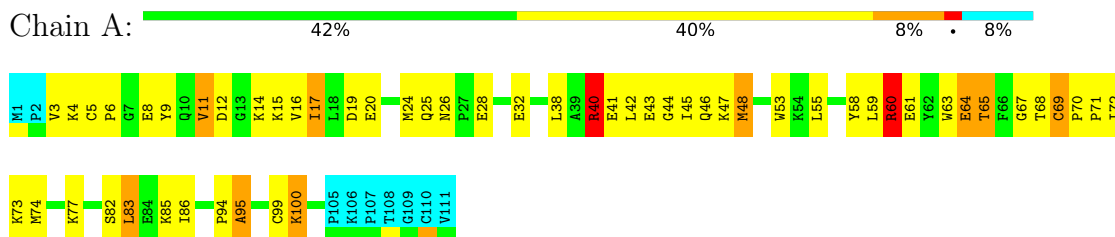
4.2.15 Score per residue for model 15 (medoid)

- Molecule 1: dissimilatory siroheme-sulfite reductase



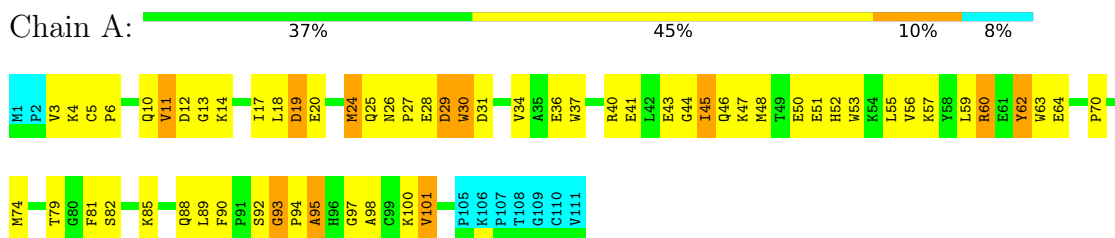
4.2.16 Score per residue for model 16

- Molecule 1: dissimilatory siroheme-sulfite reductase



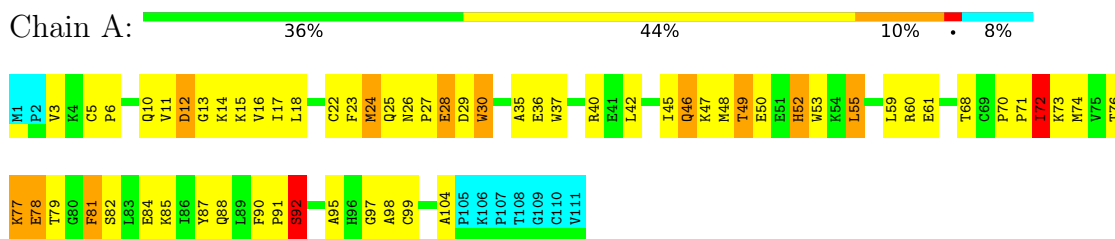
4.2.17 Score per residue for model 17

- Molecule 1: dissimilatory siroheme-sulfite reductase



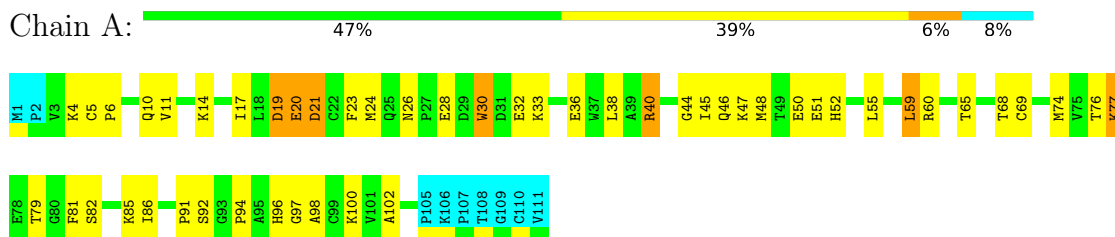
4.2.18 Score per residue for model 18

- Molecule 1: dissimilatory siroheme-sulfite reductase



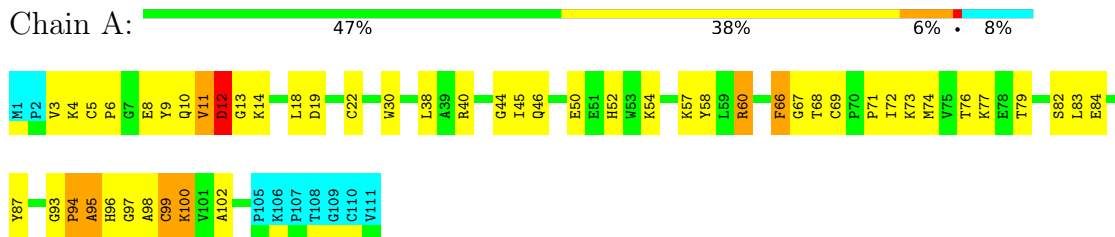
4.2.19 Score per residue for model 19

- Molecule 1: dissimilatory siroheme-sulfite reductase



4.2.20 Score per residue for model 20

- Molecule 1: dissimilatory siroheme-sulfite reductase



5 Refinement protocol and experimental data overview

The models were refined using the following method: *distance geometry and simulated annealing*.

Of the 24 calculated structures, 20 were deposited, based on the following criterion: *structures with the least restraint violations, structures with the lowest energy*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
X-PLOR	structure solution	3.84
X-PLOR	refinement	3.84

No chemical shift data was provided.

6 Model quality i

6.1 Standard geometry i

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 (average) 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	1.43±0.01	0±0/850 (0.0± 0.0%)	1.51±0.02	3±1/1151 (0.3± 0.1%)
All	All	1.43	1/17000 (0.0%)	1.51	67/23020 (0.3%)

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	Planarity
1	A	0.0±0.0	2.0±0.0
All	All	0	40

All unique bond outliers are listed below.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)	Models	
								Worst	Total
1	A	90	PHE	N-CA	5.19	1.49	1.46	4	1

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	3	VAL	N-CA-CB	-8.10	105.00	111.64	6	8
1	A	45	ILE	N-CA-CB	-6.42	104.97	111.90	12	8
1	A	11	VAL	N-CA-CB	-6.36	104.96	112.40	14	15
1	A	17	ILE	N-CA-CB	-6.15	105.03	112.35	16	16
1	A	70	PRO	O-C-N	6.02	123.98	121.15	9	1
1	A	72	ILE	N-CA-CB	-5.69	104.97	112.36	10	5
1	A	16	VAL	N-CA-CB	-5.56	104.98	112.10	11	2
1	A	56	VAL	N-CA-CB	-5.46	104.89	110.62	5	1
1	A	101	VAL	N-CA-CB	-5.42	104.93	110.62	11	4
1	A	34	VAL	N-CA-CB	-5.28	104.86	110.62	6	4

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	26	ASN	N-CA-CB	-5.11	104.94	110.71	3	2
1	A	86	ILE	N-CA-CB	-5.03	104.93	110.51	9	1

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	40	ARG	Sidechain	20
1	A	60	ARG	Sidechain	20

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	826	799	799	26±7
All	All	16520	15980	15980	510

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 16.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:49:THR:HG22	1:A:52:HIS:ND1	0.89	1.81	13	2
1:A:82:SER:O	1:A:86:ILE:HD12	0.82	1.75	7	2
1:A:58:TYR:CE2	1:A:75:VAL:HG13	0.81	2.10	6	1
1:A:79:THR:HG22	1:A:81:PHE:CD1	0.78	2.14	17	1
1:A:16:VAL:HG22	1:A:24:MET:HE3	0.77	1.55	18	1
1:A:52:HIS:O	1:A:56:VAL:HG23	0.75	1.81	10	4
1:A:18:LEU:HD22	1:A:22:CYS:C	0.73	2.09	9	4
1:A:55:LEU:O	1:A:59:LEU:HD12	0.71	1.86	19	1
1:A:24:MET:SD	1:A:38:LEU:HD11	0.70	2.27	19	1
1:A:17:ILE:O	1:A:17:ILE:HG23	0.70	1.85	11	1
1:A:52:HIS:CE1	1:A:89:LEU:HD22	0.69	2.22	15	5
1:A:72:ILE:HG21	1:A:86:ILE:CD1	0.69	2.17	16	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:39:ALA:HB1	1:A:45:ILE:HD12	0.66	1.65	12	4
1:A:99:CYS:SG	1:A:104:ALA:HB3	0.63	2.33	18	2
1:A:94:PRO:O	1:A:98:ALA:HB3	0.63	1.94	8	1
1:A:16:VAL:CG2	1:A:24:MET:HE3	0.62	2.24	18	1
1:A:52:HIS:NE2	1:A:89:LEU:HD22	0.62	2.10	11	2
1:A:52:HIS:CE1	1:A:89:LEU:CD2	0.61	2.83	11	2
1:A:56:VAL:HG21	1:A:101:VAL:HG11	0.60	1.72	17	1
1:A:35:ALA:HB3	1:A:53:TRP:CH2	0.59	2.32	10	4
1:A:30:TRP:CZ2	1:A:35:ALA:HB2	0.59	2.33	12	4
1:A:94:PRO:O	1:A:95:ALA:HB3	0.58	1.98	16	2
1:A:30:TRP:CD2	1:A:31:ASP:N	0.58	2.72	17	4
1:A:58:TYR:CD1	1:A:58:TYR:C	0.58	2.82	20	2
1:A:63:TRP:NE1	1:A:104:ALA:HB1	0.57	2.13	8	1
1:A:11:VAL:HG22	1:A:37:TRP:CD2	0.57	2.34	11	2
1:A:45:ILE:O	1:A:45:ILE:HG22	0.57	1.98	5	2
1:A:63:TRP:O	1:A:63:TRP:CE3	0.57	2.58	17	4
1:A:11:VAL:CG2	1:A:37:TRP:CD2	0.57	2.87	11	1
1:A:18:LEU:HD22	1:A:22:CYS:CA	0.57	2.30	9	3
1:A:14:LYS:CD	1:A:34:VAL:HG21	0.56	2.29	11	1
1:A:48:MET:SD	1:A:53:TRP:CZ2	0.56	2.99	3	2
1:A:55:LEU:CD1	1:A:81:PHE:CE2	0.56	2.88	18	1
1:A:8:GLU:C	1:A:9:TYR:CD2	0.56	2.84	6	1
1:A:8:GLU:O	1:A:9:TYR:CD2	0.56	2.60	12	3
1:A:17:ILE:HD12	1:A:17:ILE:N	0.55	2.15	3	2
1:A:39:ALA:HB1	1:A:45:ILE:CD1	0.55	2.31	14	1
1:A:8:GLU:O	1:A:9:TYR:CG	0.55	2.60	6	3
1:A:30:TRP:CE3	1:A:31:ASP:N	0.55	2.75	5	5
1:A:24:MET:HE2	1:A:34:VAL:CG1	0.55	2.32	17	1
1:A:32:GLU:OE2	1:A:53:TRP:CZ2	0.54	2.61	3	1
1:A:16:VAL:C	1:A:17:ILE:HD12	0.54	2.26	3	1
1:A:30:TRP:CD1	1:A:102:ALA:O	0.54	2.61	5	2
1:A:23:PHE:CD2	1:A:24:MET:O	0.54	2.61	18	1
1:A:93:GLY:O	1:A:96:HIS:CD2	0.54	2.60	3	1
1:A:83:LEU:HD21	1:A:87:TYR:CE2	0.54	2.38	4	1
1:A:3:VAL:HG11	1:A:18:LEU:CD1	0.54	2.33	17	2
1:A:72:ILE:HG21	1:A:86:ILE:HD13	0.54	1.80	16	1
1:A:8:GLU:O	1:A:9:TYR:CD1	0.53	2.62	13	3
1:A:3:VAL:HG13	1:A:3:VAL:O	0.53	2.02	2	1
1:A:18:LEU:HD22	1:A:22:CYS:HA	0.53	1.81	3	6
1:A:72:ILE:HG13	1:A:76:THR:HG23	0.53	1.81	7	1
1:A:32:GLU:OE2	1:A:53:TRP:CE2	0.52	2.62	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:35:ALA:HB3	1:A:53:TRP:HH2	0.52	1.64	10	3
1:A:14:LYS:CD	1:A:34:VAL:CG2	0.52	2.87	11	1
1:A:24:MET:HG2	1:A:38:LEU:HD11	0.52	1.81	6	1
1:A:17:ILE:O	1:A:17:ILE:CG2	0.52	2.57	11	1
1:A:55:LEU:HD13	1:A:81:PHE:CE2	0.52	2.39	18	1
1:A:72:ILE:HG12	1:A:83:LEU:HD11	0.52	1.82	9	1
1:A:96:HIS:CD2	1:A:97:GLY:N	0.52	2.78	14	2
1:A:94:PRO:O	1:A:96:HIS:N	0.51	2.43	20	4
1:A:48:MET:HE2	1:A:52:HIS:HB3	0.51	1.80	17	1
1:A:30:TRP:NE1	1:A:102:ALA:O	0.51	2.44	20	1
1:A:11:VAL:O	1:A:13:GLY:N	0.51	2.43	12	7
1:A:48:MET:SD	1:A:53:TRP:CE2	0.51	3.03	3	1
1:A:58:TYR:CE2	1:A:79:THR:HG23	0.51	2.39	13	1
1:A:11:VAL:O	1:A:14:LYS:CG	0.51	2.58	16	1
1:A:6:PRO:CB	1:A:18:LEU:O	0.51	2.59	18	1
1:A:72:ILE:HG22	1:A:72:ILE:O	0.51	2.06	13	2
1:A:72:ILE:O	1:A:72:ILE:HG23	0.51	2.06	2	5
1:A:18:LEU:CD2	1:A:22:CYS:C	0.51	2.81	9	2
1:A:72:ILE:O	1:A:72:ILE:CG1	0.51	2.59	18	3
1:A:26:ASN:N	1:A:27:PRO:CD	0.51	2.74	17	2
1:A:18:LEU:HD23	1:A:23:PHE:O	0.50	2.07	6	1
1:A:3:VAL:HG12	1:A:9:TYR:CE2	0.50	2.41	16	1
1:A:5:CYS:SG	1:A:22:CYS:N	0.50	2.85	3	3
1:A:30:TRP:CE3	1:A:30:TRP:C	0.50	2.90	14	2
1:A:94:PRO:HB2	1:A:98:ALA:HB2	0.50	1.82	2	1
1:A:11:VAL:HG22	1:A:37:TRP:CE2	0.49	2.41	12	1
1:A:49:THR:HG22	1:A:52:HIS:CE1	0.49	2.42	13	1
1:A:72:ILE:HD11	1:A:83:LEU:CD1	0.49	2.37	9	1
1:A:32:GLU:HG3	1:A:33:LYS:N	0.49	2.22	11	1
1:A:24:MET:HE1	1:A:34:VAL:HG12	0.49	1.83	1	1
1:A:29:ASP:OD1	1:A:29:ASP:N	0.49	2.45	12	2
1:A:76:THR:O	1:A:80:GLY:N	0.49	2.46	10	1
1:A:48:MET:SD	1:A:52:HIS:CG	0.49	3.06	18	2
1:A:63:TRP:O	1:A:63:TRP:CD2	0.49	2.66	16	2
1:A:5:CYS:SG	1:A:18:LEU:HD13	0.49	2.48	11	1
1:A:49:THR:CG2	1:A:52:HIS:ND1	0.48	2.67	13	1
1:A:91:PRO:O	1:A:92:SER:C	0.48	2.56	9	3
1:A:8:GLU:C	1:A:9:TYR:CG	0.48	2.91	3	5
1:A:72:ILE:HD11	1:A:86:ILE:HD13	0.48	1.84	5	2
1:A:30:TRP:NE1	1:A:35:ALA:HB2	0.48	2.22	6	1
1:A:32:GLU:CG	1:A:33:LYS:N	0.48	2.76	11	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:12:ASP:O	1:A:13:GLY:C	0.48	2.57	14	4
1:A:20:GLU:O	1:A:21:ASP:CB	0.48	2.62	8	5
1:A:24:MET:HE2	1:A:26:ASN:ND2	0.48	2.24	18	1
1:A:24:MET:CG	1:A:38:LEU:HD11	0.48	2.39	6	1
1:A:65:THR:HG22	1:A:66:PHE:CD2	0.48	2.43	9	1
1:A:37:TRP:CE2	1:A:41:GLU:OE1	0.48	2.67	1	1
1:A:21:ASP:O	1:A:22:CYS:C	0.48	2.57	5	6
1:A:40:ARG:O	1:A:44:GLY:N	0.48	2.46	11	2
1:A:97:GLY:O	1:A:98:ALA:C	0.48	2.57	3	14
1:A:3:VAL:HG23	1:A:9:TYR:CE2	0.48	2.44	2	1
1:A:47:LYS:O	1:A:48:MET:C	0.48	2.57	10	7
1:A:103:GLY:O	1:A:104:ALA:HB2	0.48	2.08	3	1
1:A:63:TRP:CD1	1:A:67:GLY:HA2	0.47	2.44	5	2
1:A:19:ASP:O	1:A:20:GLU:C	0.47	2.57	19	3
1:A:81:PHE:O	1:A:82:SER:C	0.47	2.57	10	2
1:A:62:TYR:CG	1:A:70:PRO:HG3	0.47	2.44	17	1
1:A:5:CYS:HA	1:A:6:PRO:C	0.47	2.34	18	19
1:A:3:VAL:HG12	1:A:4:LYS:N	0.47	2.24	7	1
1:A:49:THR:HG23	1:A:50:GLU:N	0.47	2.24	18	1
1:A:17:ILE:O	1:A:25:GLN:CB	0.47	2.62	6	1
1:A:96:HIS:O	1:A:97:GLY:C	0.47	2.57	11	2
1:A:10:GLN:C	1:A:11:VAL:HG23	0.47	2.33	15	1
1:A:3:VAL:HG11	1:A:41:GLU:OE1	0.47	2.09	2	1
1:A:11:VAL:O	1:A:12:ASP:C	0.47	2.57	1	4
1:A:99:CYS:O	1:A:100:LYS:C	0.47	2.57	20	6
1:A:58:TYR:CE1	1:A:79:THR:CG2	0.47	2.98	9	1
1:A:72:ILE:CG1	1:A:83:LEU:CD1	0.47	2.92	9	1
1:A:30:TRP:O	1:A:30:TRP:CE3	0.47	2.68	18	1
1:A:78:GLU:O	1:A:79:THR:C	0.47	2.57	18	1
1:A:23:PHE:O	1:A:24:MET:C	0.47	2.57	4	3
1:A:21:ASP:HB3	1:A:23:PHE:CD1	0.47	2.45	6	1
1:A:80:GLY:O	1:A:81:PHE:C	0.47	2.58	10	1
1:A:59:LEU:O	1:A:60:ARG:C	0.47	2.58	3	1
1:A:55:LEU:CD1	1:A:81:PHE:CD2	0.47	2.98	18	1
1:A:87:TYR:O	1:A:90:PHE:O	0.47	2.33	4	4
1:A:38:LEU:HD23	1:A:42:LEU:CD1	0.47	2.40	7	1
1:A:103:GLY:O	1:A:104:ALA:C	0.47	2.57	11	1
1:A:94:PRO:O	1:A:95:ALA:O	0.47	2.33	17	1
1:A:26:ASN:O	1:A:26:ASN:ND2	0.46	2.49	3	1
1:A:29:ASP:O	1:A:30:TRP:O	0.46	2.33	18	5
1:A:11:VAL:HG22	1:A:37:TRP:CG	0.46	2.45	11	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:16:VAL:HG22	1:A:26:ASN:HD21	0.46	1.70	11	1
1:A:23:PHE:CE2	1:A:24:MET:O	0.46	2.68	18	1
1:A:30:TRP:CE3	1:A:31:ASP:CA	0.46	2.98	3	2
1:A:94:PRO:O	1:A:98:ALA:CB	0.46	2.63	8	1
1:A:63:TRP:CE3	1:A:63:TRP:C	0.46	2.94	17	2
1:A:98:ALA:O	1:A:99:CYS:C	0.46	2.57	1	1
1:A:38:LEU:HD23	1:A:38:LEU:O	0.46	2.10	15	1
1:A:37:TRP:O	1:A:41:GLU:OE1	0.46	2.34	6	2
1:A:32:GLU:HG3	1:A:53:TRP:CZ2	0.46	2.45	13	2
1:A:58:TYR:CZ	1:A:79:THR:HG22	0.46	2.45	9	1
1:A:80:GLY:O	1:A:82:SER:N	0.46	2.48	10	1
1:A:82:SER:O	1:A:83:LEU:C	0.46	2.57	15	2
1:A:51:GLU:N	1:A:51:GLU:CD	0.46	2.74	1	1
1:A:101:VAL:O	1:A:102:ALA:C	0.46	2.59	3	1
1:A:86:ILE:CG2	1:A:94:PRO:HB3	0.46	2.40	5	3
1:A:95:ALA:O	1:A:99:CYS:SG	0.46	2.74	11	2
1:A:29:ASP:O	1:A:30:TRP:C	0.46	2.59	14	2
1:A:75:VAL:O	1:A:79:THR:OG1	0.46	2.34	15	3
1:A:37:TRP:CZ2	1:A:41:GLU:OE1	0.45	2.68	1	1
1:A:63:TRP:CG	1:A:67:GLY:HA2	0.45	2.46	5	1
1:A:76:THR:O	1:A:77:LYS:C	0.45	2.59	20	5
1:A:11:VAL:O	1:A:12:ASP:CB	0.45	2.63	13	2
1:A:95:ALA:O	1:A:96:HIS:C	0.45	2.57	14	2
1:A:63:TRP:CG	1:A:63:TRP:O	0.45	2.68	13	1
1:A:10:GLN:C	1:A:11:VAL:CG2	0.45	2.89	15	1
1:A:92:SER:O	1:A:93:GLY:O	0.45	2.33	14	3
1:A:58:TYR:CE1	1:A:75:VAL:HG13	0.45	2.47	1	1
1:A:49:THR:HG23	1:A:52:HIS:H	0.45	1.70	8	2
1:A:38:LEU:HD23	1:A:38:LEU:C	0.45	2.35	15	1
1:A:74:MET:SD	1:A:74:MET:C	0.45	2.99	17	1
1:A:68:THR:HG22	1:A:69:CYS:H	0.45	1.70	20	1
1:A:64:GLU:O	1:A:65:THR:C	0.45	2.60	5	2
1:A:75:VAL:O	1:A:79:THR:CB	0.45	2.65	7	1
1:A:12:ASP:C	1:A:12:ASP:OD1	0.45	2.57	9	1
1:A:45:ILE:O	1:A:46:GLN:C	0.45	2.58	6	7
1:A:58:TYR:CD2	1:A:75:VAL:HG13	0.45	2.46	11	2
1:A:52:HIS:O	1:A:56:VAL:CG2	0.45	2.65	9	2
1:A:19:ASP:CB	1:A:25:GLN:OE1	0.45	2.64	3	1
1:A:17:ILE:O	1:A:25:GLN:HB3	0.45	2.12	6	1
1:A:16:VAL:HG13	1:A:24:MET:HB3	0.45	1.89	16	1
1:A:91:PRO:O	1:A:92:SER:CB	0.45	2.64	18	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:40:ARG:O	1:A:41:GLU:C	0.45	2.58	2	1
1:A:66:PHE:O	1:A:67:GLY:C	0.45	2.60	12	2
1:A:79:THR:O	1:A:80:GLY:C	0.45	2.57	5	1
1:A:95:ALA:O	1:A:97:GLY:N	0.45	2.50	14	1
1:A:18:LEU:O	1:A:19:ASP:O	0.45	2.34	17	1
1:A:55:LEU:HD12	1:A:81:PHE:CZ	0.45	2.46	18	1
1:A:11:VAL:O	1:A:14:LYS:HG3	0.45	2.12	16	2
1:A:37:TRP:CZ2	1:A:41:GLU:OE2	0.44	2.70	15	1
1:A:8:GLU:OE2	1:A:17:ILE:CG1	0.44	2.64	16	1
1:A:58:TYR:C	1:A:58:TYR:CD1	0.44	2.94	2	1
1:A:40:ARG:CD	1:A:41:GLU:OE2	0.44	2.64	8	1
1:A:14:LYS:HD3	1:A:34:VAL:HG21	0.44	1.90	11	1
1:A:16:VAL:HG13	1:A:24:MET:HG2	0.44	1.90	18	1
1:A:81:PHE:N	1:A:81:PHE:CD1	0.44	2.85	3	1
1:A:60:ARG:O	1:A:61:GLU:C	0.44	2.59	13	3
1:A:6:PRO:CA	1:A:18:LEU:O	0.44	2.66	18	1
1:A:69:CYS:SG	1:A:69:CYS:O	0.44	2.75	13	1
1:A:50:GLU:HG3	1:A:51:GLU:N	0.44	2.28	12	1
1:A:44:GLY:O	1:A:45:ILE:C	0.44	2.59	15	1
1:A:29:ASP:OD1	1:A:29:ASP:O	0.44	2.36	2	1
1:A:55:LEU:HD11	1:A:81:PHE:CD2	0.44	2.48	6	1
1:A:44:GLY:O	1:A:46:GLN:N	0.43	2.51	20	2
1:A:48:MET:HB3	1:A:53:TRP:NE1	0.43	2.27	16	1
1:A:15:LYS:HG2	1:A:17:ILE:HD11	0.43	1.89	3	1
1:A:57:LYS:O	1:A:58:TYR:C	0.43	2.61	3	1
1:A:36:GLU:HG3	1:A:48:MET:CG	0.43	2.44	14	1
1:A:38:LEU:O	1:A:42:LEU:HD13	0.43	2.14	16	1
1:A:10:GLN:N	1:A:10:GLN:CD	0.43	2.76	18	1
1:A:75:VAL:O	1:A:76:THR:C	0.43	2.60	2	1
1:A:50:GLU:CG	1:A:51:GLU:N	0.43	2.81	12	1
1:A:79:THR:C	1:A:81:PHE:N	0.43	2.75	5	1
1:A:79:THR:HB	1:A:81:PHE:CD1	0.43	2.48	3	1
1:A:26:ASN:N	1:A:27:PRO:HD3	0.43	2.28	11	2
1:A:30:TRP:CE2	1:A:35:ALA:HB2	0.43	2.48	6	2
1:A:63:TRP:CD2	1:A:63:TRP:O	0.43	2.72	9	1
1:A:94:PRO:O	1:A:95:ALA:C	0.43	2.59	20	2
1:A:76:THR:HG23	1:A:77:LYS:N	0.43	2.29	5	1
1:A:86:ILE:H	1:A:86:ILE:HD12	0.43	1.73	19	1
1:A:26:ASN:O	1:A:26:ASN:CG	0.43	2.61	19	2
1:A:18:LEU:HD22	1:A:22:CYS:O	0.43	2.13	9	1
1:A:72:ILE:HD11	1:A:83:LEU:HD12	0.43	1.91	9	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:67:GLY:C	1:A:68:THR:OG1	0.43	2.62	11	1
1:A:16:VAL:HG13	1:A:24:MET:CB	0.43	2.42	16	1
1:A:24:MET:SD	1:A:26:ASN:CB	0.42	3.07	6	1
1:A:20:GLU:O	1:A:21:ASP:HB3	0.42	2.13	8	2
1:A:62:TYR:C	1:A:62:TYR:CD1	0.42	2.97	8	1
1:A:30:TRP:O	1:A:31:ASP:OD1	0.42	2.37	14	2
1:A:72:ILE:HG21	1:A:83:LEU:HD13	0.42	1.92	7	1
1:A:90:PHE:CE1	1:A:101:VAL:HG21	0.42	2.48	9	1
1:A:95:ALA:C	1:A:97:GLY:N	0.42	2.77	14	1
1:A:94:PRO:O	1:A:95:ALA:CB	0.42	2.65	16	1
1:A:53:TRP:HA	1:A:53:TRP:CE3	0.42	2.48	6	3
1:A:11:VAL:O	1:A:14:LYS:HB2	0.42	2.13	10	2
1:A:10:GLN:HA	1:A:14:LYS:O	0.42	2.15	2	2
1:A:52:HIS:O	1:A:53:TRP:C	0.42	2.63	3	1
1:A:6:PRO:HA	1:A:18:LEU:O	0.42	2.14	18	1
1:A:19:ASP:OD2	1:A:25:GLN:OE1	0.42	2.37	7	1
1:A:37:TRP:O	1:A:41:GLU:HG3	0.42	2.14	17	1
1:A:53:TRP:CE3	1:A:53:TRP:HA	0.42	2.49	17	1
1:A:86:ILE:HG23	1:A:94:PRO:HG3	0.42	1.91	2	1
1:A:90:PHE:CE1	1:A:97:GLY:HA3	0.42	2.50	2	1
1:A:71:PRO:HB3	1:A:95:ALA:HB2	0.42	1.91	16	1
1:A:73:LYS:O	1:A:76:THR:OG1	0.42	2.38	7	2
1:A:3:VAL:O	1:A:4:LYS:CB	0.42	2.68	12	1
1:A:82:SER:O	1:A:84:GLU:N	0.42	2.53	15	1
1:A:82:SER:C	1:A:84:GLU:N	0.42	2.77	15	1
1:A:91:PRO:O	1:A:92:SER:HB2	0.42	2.14	7	1
1:A:86:ILE:CG2	1:A:94:PRO:HG3	0.42	2.45	11	1
1:A:36:GLU:OE1	1:A:36:GLU:C	0.42	2.63	12	1
1:A:24:MET:HE2	1:A:34:VAL:HG11	0.42	1.90	17	1
1:A:55:LEU:O	1:A:59:LEU:CD1	0.42	2.65	19	1
1:A:17:ILE:N	1:A:17:ILE:CD1	0.42	2.83	3	1
1:A:79:THR:O	1:A:81:PHE:N	0.42	2.53	5	1
1:A:3:VAL:HG11	1:A:37:TRP:CH2	0.42	2.50	14	1
1:A:17:ILE:O	1:A:24:MET:O	0.41	2.38	6	1
1:A:42:LEU:CD2	1:A:100:LYS:NZ	0.41	2.83	16	1
1:A:57:LYS:CD	1:A:57:LYS:C	0.41	2.93	20	1
1:A:24:MET:HE1	1:A:34:VAL:HG13	0.41	1.92	5	1
1:A:18:LEU:HD23	1:A:23:PHE:C	0.41	2.40	6	1
1:A:38:LEU:HD23	1:A:42:LEU:HD13	0.41	1.91	10	2
1:A:11:VAL:O	1:A:12:ASP:O	0.41	2.38	20	2
1:A:17:ILE:HG12	1:A:18:LEU:N	0.41	2.30	15	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:8:GLU:OE2	1:A:17:ILE:HG12	0.41	2.16	16	1
1:A:19:ASP:N	1:A:19:ASP:OD1	0.41	2.49	7	1
1:A:96:HIS:O	1:A:100:LYS:HB2	0.41	2.14	7	1
1:A:21:ASP:HB3	1:A:23:PHE:CD2	0.41	2.50	8	1
1:A:68:THR:HG22	1:A:69:CYS:N	0.41	2.30	20	1
1:A:52:HIS:NE2	1:A:89:LEU:HB3	0.41	2.29	3	1
1:A:72:ILE:CG1	1:A:83:LEU:HD11	0.41	2.45	9	1
1:A:6:PRO:HD3	1:A:20:GLU:CG	0.41	2.46	4	1
1:A:29:ASP:O	1:A:30:TRP:HB3	0.41	2.15	4	2
1:A:27:PRO:O	1:A:28:GLU:C	0.41	2.63	18	1
1:A:68:THR:O	1:A:70:PRO:HD3	0.41	2.16	18	1
1:A:3:VAL:CG2	1:A:41:GLU:HG3	0.41	2.45	7	1
1:A:34:VAL:O	1:A:35:ALA:C	0.41	2.64	8	1
1:A:65:THR:HG22	1:A:66:PHE:CE2	0.41	2.50	9	1
1:A:49:THR:HG22	1:A:50:GLU:H	0.41	1.76	11	1
1:A:63:TRP:O	1:A:67:GLY:N	0.41	2.54	10	1
1:A:3:VAL:HG21	1:A:41:GLU:CG	0.41	2.46	15	1
1:A:69:CYS:N	1:A:70:PRO:CD	0.41	2.84	16	1
1:A:71:PRO:CA	1:A:95:ALA:HB2	0.41	2.45	16	1
1:A:40:ARG:O	1:A:42:LEU:N	0.41	2.53	2	1
1:A:76:THR:CG2	1:A:77:LYS:N	0.41	2.82	5	1
1:A:8:GLU:OE1	1:A:8:GLU:O	0.41	2.39	7	1
1:A:72:ILE:HG13	1:A:72:ILE:O	0.41	2.16	7	1
1:A:72:ILE:O	1:A:72:ILE:HG13	0.41	2.15	15	1
1:A:11:VAL:O	1:A:14:LYS:CB	0.41	2.69	10	1
1:A:43:GLU:OE1	1:A:43:GLU:C	0.41	2.64	10	1
1:A:53:TRP:O	1:A:57:LYS:HB2	0.41	2.17	11	1
1:A:97:GLY:O	1:A:99:CYS:N	0.41	2.53	13	1
1:A:11:VAL:HG21	1:A:37:TRP:CZ3	0.41	2.50	18	1
1:A:99:CYS:SG	1:A:104:ALA:CB	0.41	3.06	18	1
1:A:40:ARG:C	1:A:42:LEU:N	0.40	2.78	2	1
1:A:3:VAL:HG13	1:A:9:TYR:CE2	0.40	2.51	6	1
1:A:52:HIS:CG	1:A:89:LEU:HD22	0.40	2.51	9	1
1:A:97:GLY:C	1:A:99:CYS:N	0.40	2.78	13	1
1:A:33:LYS:O	1:A:37:TRP:HB2	0.40	2.16	1	1
1:A:21:ASP:C	1:A:23:PHE:N	0.40	2.78	11	1
1:A:48:MET:HB3	1:A:53:TRP:CD1	0.40	2.52	16	1
1:A:11:VAL:O	1:A:12:ASP:HB3	0.40	2.17	9	1
1:A:57:LYS:C	1:A:57:LYS:HD3	0.40	2.41	20	1
1:A:25:GLN:C	1:A:27:PRO:HD3	0.40	2.41	13	1
1:A:43:GLU:OE1	1:A:45:ILE:CD1	0.40	2.69	15	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:95:ALA:O	1:A:99:CYS:HB2	0.40	2.16	16	1
1:A:30:TRP:CZ2	1:A:102:ALA:HA	0.40	2.51	19	1

6.3 Torsion angles [\(i\)](#)

6.3.1 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 NMR 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	102/111 (92%)	80±4 (79±4%)	16±4 (16±4%)	5±2 (5±2%)	3	23
All	All	2040/2220 (92%)	1608 (79%)	328 (16%)	104 (5%)	3	23

All 23 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	95	ALA	14
1	A	71	PRO	10
1	A	12	ASP	10
1	A	93	GLY	8
1	A	44	GLY	8
1	A	19	ASP	8
1	A	72	ILE	6
1	A	30	TRP	6
1	A	91	PRO	5
1	A	92	SER	5
1	A	94	PRO	4
1	A	81	PHE	3
1	A	67	GLY	3
1	A	45	ILE	3
1	A	4	LYS	2
1	A	66	PHE	2
1	A	48	MET	1
1	A	97	GLY	1
1	A	99	CYS	1
1	A	103	GLY	1

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Mol	Chain	Res	Type	Models (Total)
1	A	73	LYS	1
1	A	49	THR	1
1	A	79	THR	1

6.3.2 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 NMR 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	88/96 (92%)	63±3 (72±4%)	25±3 (28±4%)	1	19
All	All	1760/1920 (92%)	1262 (72%)	498 (28%)	1	19

All 66 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	85	LYS	15
1	A	38	LEU	14
1	A	14	LYS	14
1	A	54	LYS	13
1	A	59	LEU	13
1	A	64	GLU	13
1	A	28	GLU	12
1	A	42	LEU	12
1	A	77	LYS	11
1	A	15	LYS	11
1	A	55	LEU	11
1	A	88	GLN	11
1	A	4	LYS	11
1	A	82	SER	11
1	A	74	MET	11
1	A	47	LYS	10
1	A	25	GLN	10
1	A	31	ASP	10
1	A	57	LYS	10
1	A	100	LYS	10
1	A	24	MET	9
1	A	43	GLU	9

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Mol	Chain	Res	Type	Models (Total)
1	A	61	GLU	9
1	A	73	LYS	9
1	A	78	GLU	9
1	A	33	LYS	9
1	A	84	GLU	9
1	A	50	GLU	8
1	A	20	GLU	8
1	A	36	GLU	8
1	A	51	GLU	8
1	A	52	HIS	8
1	A	40	ARG	8
1	A	68	THR	8
1	A	23	PHE	7
1	A	69	CYS	7
1	A	99	CYS	7
1	A	92	SER	7
1	A	81	PHE	6
1	A	32	GLU	6
1	A	41	GLU	6
1	A	60	ARG	6
1	A	87	TYR	6
1	A	72	ILE	6
1	A	83	LEU	6
1	A	10	GLN	6
1	A	19	ASP	5
1	A	21	ASP	5
1	A	65	THR	5
1	A	8	GLU	5
1	A	58	TYR	5
1	A	46	GLN	5
1	A	48	MET	5
1	A	62	TYR	5
1	A	90	PHE	5
1	A	29	ASP	4
1	A	66	PHE	4
1	A	79	THR	3
1	A	76	THR	3
1	A	12	ASP	3
1	A	26	ASN	2
1	A	49	THR	2
1	A	17	ILE	1
1	A	96	HIS	1

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Mol	Chain	Res	Type	Models (Total)
1	A	86	ILE	1
1	A	89	LEU	1

6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.6 Ligand geometry [i](#)

There are no ligands in this entry.

6.7 Other polymers [i](#)

There are no such molecules in this entry.

6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided