Full wwPDB NMR Structure Validation Report (i)

Apr 21, 2024 – 03:38 AM EDT

PDB ID	:	2L5Y
BMRB ID	:	17289
Title	:	NMR structure of calcium-loaded STIM2 EF-SAM.
Authors	:	Zheng, L.; Stathopulos, P.B.; Ikura, M.
Deposited on	:	2010-11-09

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

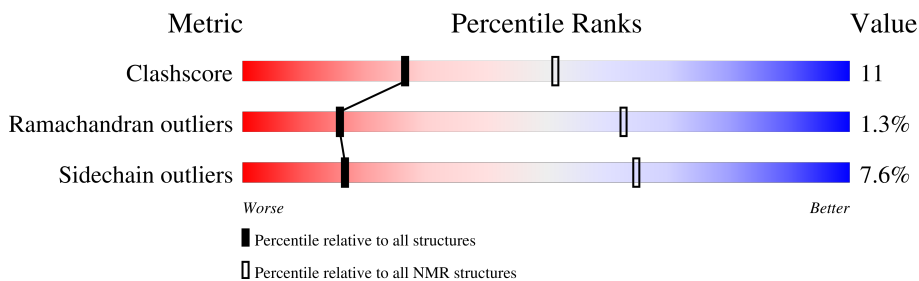|		
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 is 75%.

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	Percentile Ranks	Value
Clashscore		11
Ramachandran outliers		1.3%
Sidechain outliers		7.6%

Worse   *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all NMR structures

Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	150	57% 25% • 17%

2 Ensemble composition and analysis ⓘ

This entry contains 20 models. Model 9 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *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:66-A:171, A:188-A:205 (124)	0.60	9

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 6 clusters and 2 single-model clusters were found.

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

3 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 2469 atoms, of which 1214 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Stromal interaction molecule 2.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	150	2468	786	1214	221	243	4	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	GLY	-	expression tag	UNP Q9P246
A	-4	SER	-	expression tag	UNP Q9P246
A	-3	HIS	-	expression tag	UNP Q9P246
A	-2	MET	-	expression tag	UNP Q9P246
A	-1	ALA	-	expression tag	UNP Q9P246
A	0	SER	-	expression tag	UNP Q9P246

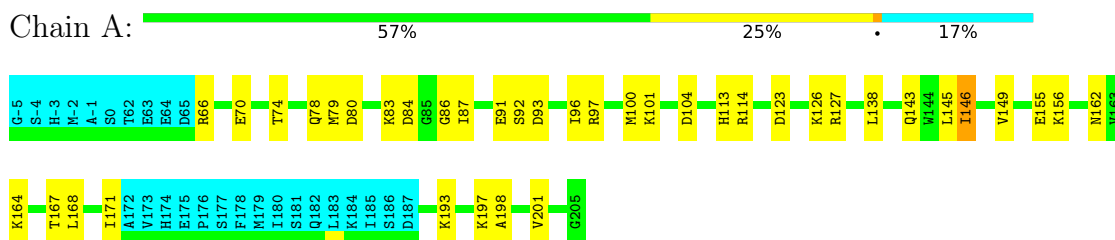- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	
			Total	Ca
2	A	1	1	1

4 Residue-property plots ⓘ

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

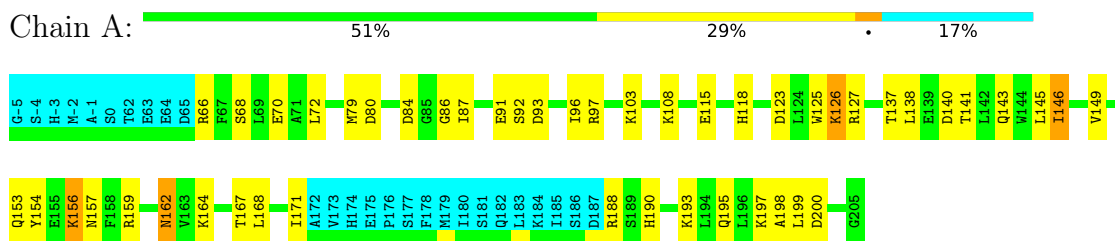• Molecule 1: Stromal interaction molecule 2

4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.
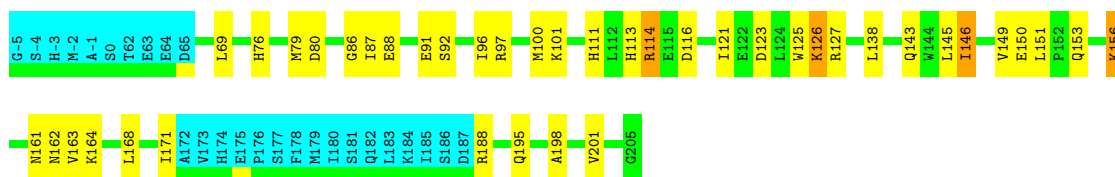
4.2.1 Score per residue for model 1

• Molecule 1: Stromal interaction molecule 2
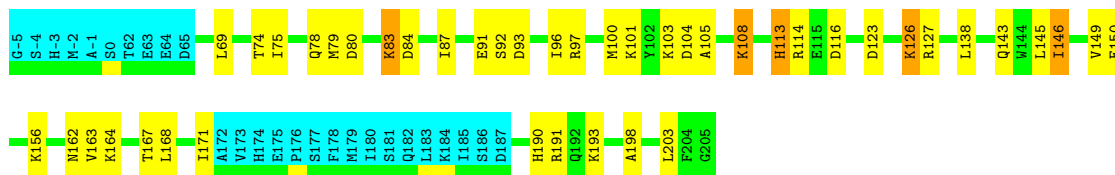

4.2.2 Score per residue for model 2

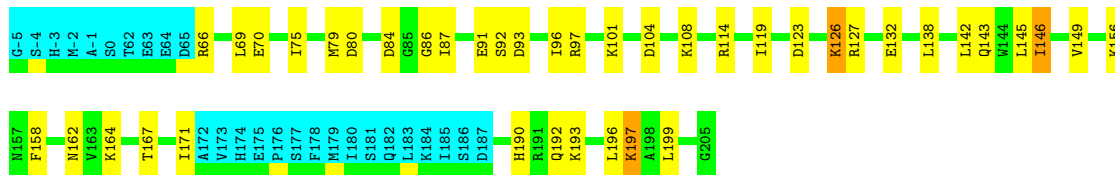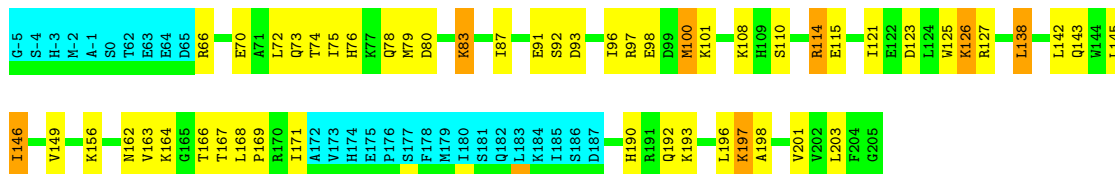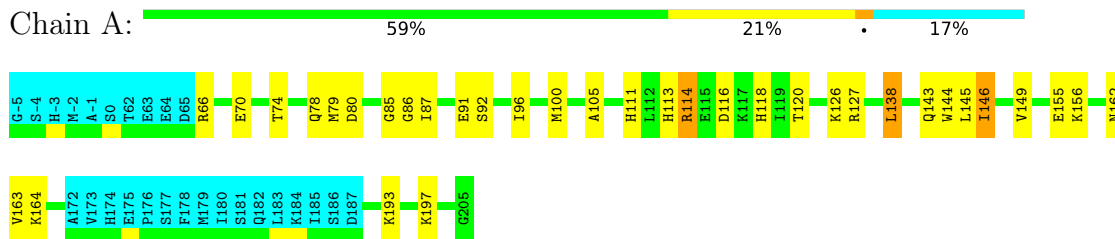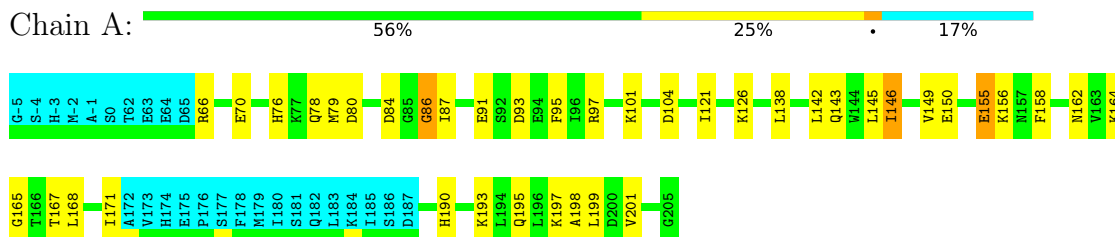• Molecule 1: Stromal interaction molecule 2

G-5 S-4 H-3 M-2 A-1 S0 T62 E63 E64 D65 L69 H76 M79 D80 G86 I87 E88 E91 S92 I96 R97 M100 K101 H111 L112 H113 R114 E115 D116 I121 E122 D123 L124 W125 K126 R127 L138 Q143 W144 L145 I146 V149 E150 L151 P152 Q153 K156

N161 N162 V163 K164 L168 I171 A172 V173 H174 E175 P176 S177 F178 M179 I180 S181 Q182 L183 K184 I185 S186 D188 Q195 A198 V201 G205

4.2.3 Score per residue for model 3

• Molecule 1: Stromal interaction molecule 2

Chain A: 53% 26% • 17%

G-5 S-4 H-3 M-2 A-1 S0 T62 E63 E64 D65 L69 T74 I75 Q78 M79 D80 K83 D84 I87 E91 S92 D93 I96 R97 M100 K101 Y102 K103 D104 A105 K108 H113 R114 E115 D116 D123 K126 R127 L138 Q143 W144 L145 I146 V149 E150

K156 N162 V163 K164 T167 L168 I171 A172 V173 H174 E175 P176 S177 F178 M179 I180 S181 Q182 L183 K184 I185 S186 D187 H190 R191 Q192 K193 A198 L203 F204 G205

4.2.4 Score per residue for model 4

• Molecule 1: Stromal interaction molecule 2

Chain A: 55% 25% • 17%

G-5 S-4 H-3 M-2 A-1 S0 T62 E63 E64 D65 R66 L69 E70 I75 M79 D80 D84 G85 G86 I87 E91 S92 D93 I96 R97 K101 D104 K108 R114 I119 D123 K126 R127 E132 L138 L142 Q143 W144 L145 I146 V149 K156

N157 F158 N162 V163 K164 T167 I171 A172 V173 H174 E175 P176 S177 F178 M179 I180 S181 Q182 L183 K184 I185 S186 D187 H190 R191 Q192 K193 L196 K197 A198 L199 G205

4.2.5 Score per residue for model 5

• Molecule 1: Stromal interaction molecule 2

Chain A: 48% 30% 5% 17%

G-5 S-4 H-3 M-2 A-1 S0 T62 E63 E64 D65 R66 E70 A71 L72 Q73 T74 I75 H76 K77 Q78 M79 D80 K83 I87 E91 S92 D93 I96 R97 E98 D99 M100 K101 K108 H109 S110 R114 E115 I121 E122 D123 L124 W125 K126 R127 L138 L142 Q143 W144 L145

I146 V149 K156 N162 V163 K164 G165 T166 T167 L168 P169 R170 I171 A172 V173 H174 E175 P176 S177 F178 M179 I180 S181 Q182 L183 K184 I185 S186 D187 H190 R191 Q192 K193 L196 K197 A198 V201 V202 L203 F204 G205

4.2.6 Score per residue for model 6

• Molecule 1: Stromal interaction molecule 2

Chain A:

59%   21%   •   17%

4.2.7 Score per residue for model 7

• Molecule 1: Stromal interaction molecule 2

Chain A:

56%   25%   •   17%

4.2.8 Score per residue for model 8

• Molecule 1: Stromal interaction molecule 2

Chain A:

54%   27%   •   17%

4.2.9 Score per residue for model 9 (medoid)

• Molecule 1: Stromal interaction molecule 2

Chain A:

56%   23%   •   17%

4.2.10 Score per residue for model 10

• Molecule 1: Stromal interaction molecule 2

Chain A: 50% 30% • 17%

4.2.11 Score per residue for model 11

• Molecule 1: Stromal interaction molecule 2

Chain A: 51% 29% • 17%

4.2.12 Score per residue for model 12

• Molecule 1: Stromal interaction molecule 2

Chain A: 52% 27% • 17%

4.2.13 Score per residue for model 13

• Molecule 1: Stromal interaction molecule 2
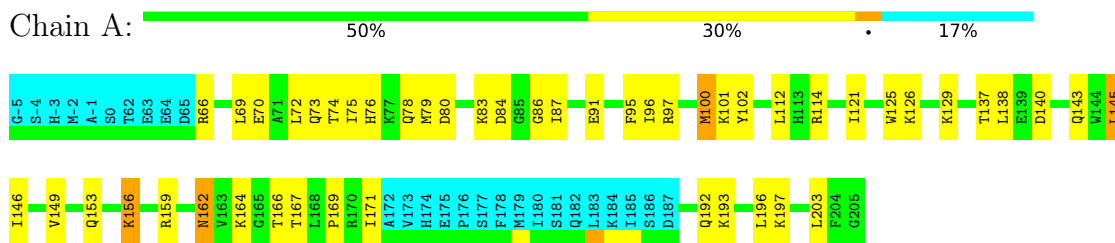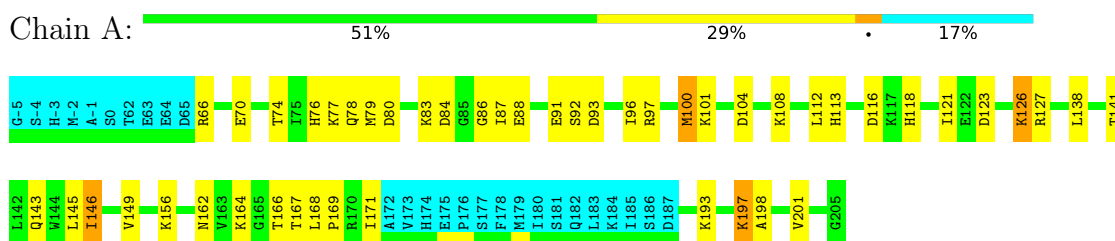
Chain A: 52% 28% • 17%

4.2.14   Score per residue for model 14

• Molecule 1: Stromal interaction molecule 2

Chain A:

4.2.15   Score per residue for model 15

• Molecule 1: Stromal interaction molecule 2

Chain A:

4.2.16   Score per residue for model 16

• Molecule 1: Stromal interaction molecule 2
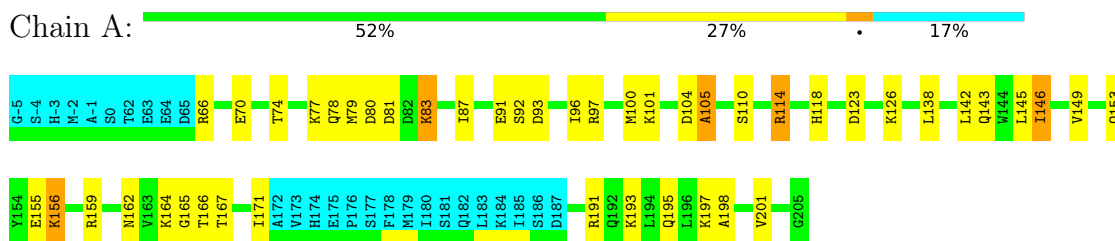
Chain A:

4.2.17   Score per residue for model 17

• Molecule 1: Stromal interaction molecule 2

Chain A:

4.2.18 Score per residue for model 18

• Molecule 1: Stromal interaction molecule 2
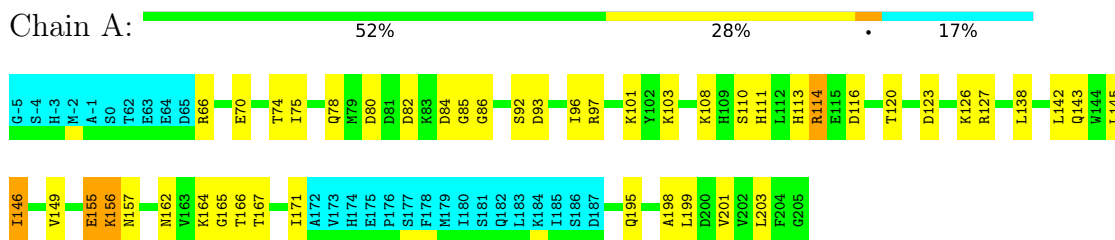
Chain A:

4.2.19 Score per residue for model 19

• Molecule 1: Stromal interaction molecule 2

Chain A:

4.2.20 Score per residue for model 20

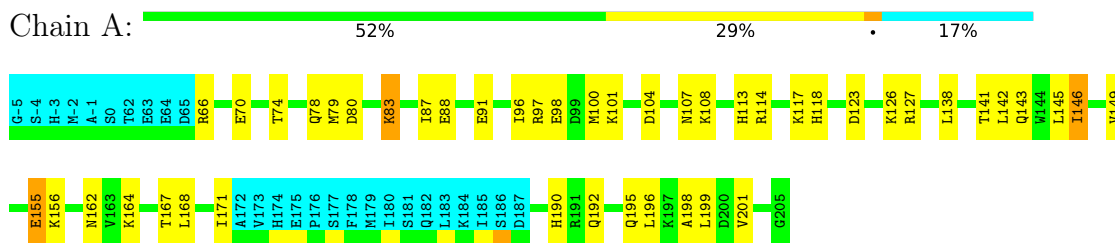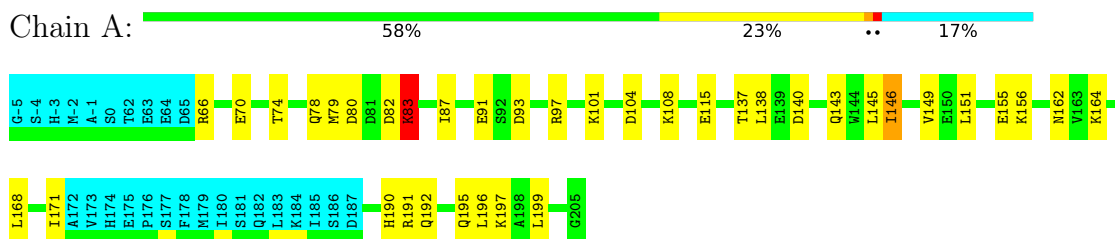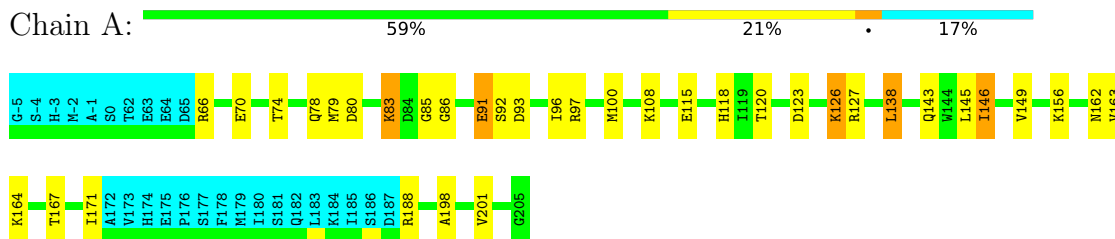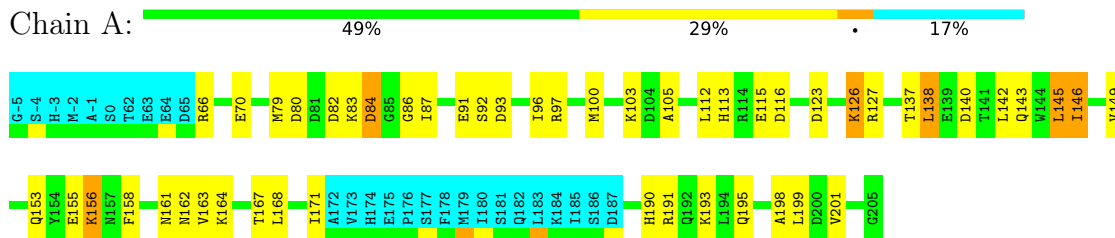• Molecule 1: Stromal interaction molecule 2

Chain A:

5 Refinement protocol and experimental data overview ⓘ

The models were refined using the following method: *torsion angle dynamics, DGSA-distance geometry simulated annealing.*

Of the 400 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy.*

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

Software name	Classification	Version
CNS	refinement	v1.1
CYANA	structure solution	v2.1

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	1529
Number of shifts mapped to atoms	1528
Number of unparsed shifts	0
Number of shifts with mapping errors	1
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	75%

6 Model quality ⓘ

6.1 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 (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	0.87±0.03	1±1/1080 (0.1± 0.1%)	0.76±0.02	0±0/1454 (0.0± 0.0%)
All	All	0.87	21/21600 (0.1%)	0.76	3/29080 (0.0%)

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	0.1±0.3
All	All	0	2

All unique bond 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(Å)	Ideal(Å)	Models	
								Worst	Total
1	A	91	GLU	CD-OE1	-7.15	1.17	1.25	9	1
1	A	86	GLY	N-CA	-6.32	1.36	1.46	4	13
1	A	84	ASP	N-CA	-5.80	1.34	1.46	10	7

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	91	GLU	OE1-CD-OE2	-7.09	114.79	123.30	9	2
1	A	83	LYS	N-CA-CB	5.24	120.03	110.60	15	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	114	ARG	Sidechain	1
1	A	188	ARG	Sidechain	1

6.2 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 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	1057	1030	1030	23±4
2	A	1	0	0	2±1
All	All	21160	20600	20600	460

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 11.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
1:A:145:LEU:O	1:A:149:VAL:HB	0.81	1.75	8	17
1:A:79:MET:O	1:A:91:GLU:HB3	0.73	1.82	16	18
1:A:142:LEU:HD11	1:A:159:ARG:HB2	0.72	1.60	12	1
1:A:80:ASP:OD1	2:A:300:CA:CA	0.67	1.71	18	20
1:A:97:ARG:O	1:A:101:LYS:HE3	0.66	1.90	15	2
1:A:110:SER:O	1:A:114:ARG:HB3	0.63	1.93	8	5
1:A:82:ASP:OD1	2:A:300:CA:CA	0.61	1.76	18	5
1:A:145:LEU:O	1:A:149:VAL:HG22	0.61	1.94	17	3
1:A:191:ARG:O	1:A:195:GLN:HB2	0.61	1.96	12	1
1:A:84:ASP:OD1	2:A:300:CA:CA	0.61	1.77	18	5
1:A:66:ARG:O	1:A:70:GLU:HB2	0.60	1.96	1	17
1:A:195:GLN:O	1:A:199:LEU:HB2	0.60	1.96	13	8
1:A:93:ASP:O	1:A:97:ARG:HG2	0.57	1.98	19	16
1:A:111:HIS:O	1:A:114:ARG:HD2	0.57	1.98	2	3
1:A:113:HIS:HA	1:A:116:ASP:O	0.57	2.00	3	8
1:A:92:SER:O	1:A:96:ILE:HG12	0.57	1.99	3	15
1:A:198:ALA:HA	1:A:201:VAL:HG22	0.55	1.75	7	11
1:A:80:ASP:HB2	1:A:87:ILE:HG12	0.55	1.78	19	16
1:A:123:ASP:O	1:A:127:ARG:HG2	0.55	2.02	11	10

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WORLDWIDE
wwPDB
PROTEIN DATA BANK

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
1:A:192:GLN:O	1:A:196:LEU:HG	0.54	2.03	15	5
1:A:97:ARG:O	1:A:101:LYS:HD2	0.53	2.04	4	3
1:A:101:LYS:HA	1:A:104:ASP:O	0.53	2.03	12	8
1:A:80:ASP:OD2	1:A:83:LYS:HA	0.53	2.04	12	7
1:A:74:THR:O	1:A:78:GLN:HG2	0.53	2.03	10	13
1:A:97:ARG:O	1:A:101:LYS:HD3	0.53	2.03	13	7
1:A:193:LYS:HG3	1:A:194:LEU:N	0.52	2.19	18	1
1:A:153:GLN:O	1:A:156:LYS:HE2	0.52	2.05	10	5
1:A:123:ASP:O	1:A:126:LYS:HG3	0.52	2.04	13	10
1:A:138:LEU:HA	1:A:163:VAL:O	0.51	2.06	2	9
1:A:117:LYS:O	1:A:119:ILE:HG13	0.51	2.05	8	1
1:A:191:ARG:O	1:A:195:GLN:HB3	0.50	2.06	17	2
1:A:149:VAL:HG21	1:A:193:LYS:HD2	0.50	1.84	17	1
1:A:88:GLU:HG3	1:A:91:GLU:OE2	0.50	2.06	18	1
1:A:149:VAL:HG12	1:A:197:LYS:HG3	0.50	1.83	15	1
1:A:138:LEU:N	1:A:164:LYS:HB3	0.50	2.22	9	1
1:A:103:LYS:HB2	1:A:103:LYS:NZ	0.50	2.22	13	3
1:A:138:LEU:O	1:A:142:LEU:HD23	0.49	2.07	19	6
1:A:80:ASP:CG	1:A:83:LYS:HA	0.49	2.28	20	7
1:A:113:HIS:CD2	1:A:117:LYS:HA	0.49	2.43	14	1
1:A:77:LYS:O	1:A:81:ASP:HA	0.48	2.08	12	2
1:A:188:ARG:HD2	1:A:188:ARG:H	0.48	1.66	2	3
1:A:137:THR:HG23	1:A:139:GLU:HG2	0.48	1.86	8	1
1:A:113:HIS:HB2	1:A:117:LYS:HG2	0.48	1.85	19	1
1:A:125:TRP:O	1:A:129:LYS:HG3	0.48	2.09	10	1
1:A:168:LEU:O	1:A:171:ILE:HG12	0.48	2.09	2	6
1:A:97:ARG:O	1:A:101:LYS:HB2	0.48	2.09	5	1
1:A:146:ILE:O	1:A:150:GLU:HA	0.48	2.09	19	5
1:A:98:GLU:O	1:A:101:LYS:HB3	0.48	2.09	19	3
1:A:149:VAL:HG11	1:A:193:LYS:HD2	0.47	1.86	18	3
1:A:143:GLN:O	1:A:146:ILE:HD13	0.47	2.09	6	16
1:A:167:THR:O	1:A:171:ILE:HG23	0.47	2.09	11	13
1:A:69:LEU:O	1:A:73:GLN:HB2	0.47	2.09	10	1
1:A:137:THR:HG22	1:A:140:ASP:OD2	0.47	2.09	17	4
1:A:96:ILE:HG22	1:A:105:ALA:HA	0.47	1.86	12	6
1:A:88:GLU:HG3	1:A:91:GLU:OE1	0.47	2.10	2	2
1:A:104:ASP:OD1	1:A:107:ASN:HB3	0.47	2.09	14	3
1:A:96:ILE:CD1	1:A:108:LYS:HE2	0.47	2.39	3	1
1:A:168:LEU:O	1:A:198:ALA:HB1	0.46	2.10	3	3
1:A:87:ILE:O	1:A:118:HIS:HA	0.46	2.10	12	7
1:A:142:LEU:CD1	1:A:159:ARG:HB2	0.46	2.35	12	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
1:A:100:MET:SD	1:A:199:LEU:HG	0.46	2.50	17	1
1:A:100:MET:SD	1:A:108:LYS:HE3	0.46	2.50	5	1
1:A:166:THR:O	1:A:169:PRO:HD2	0.46	2.11	11	2
1:A:158:PHE:HA	1:A:161:ASN:ND2	0.46	2.26	17	1
1:A:190:HIS:O	1:A:193:LYS:HG2	0.45	2.11	19	3
1:A:161:ASN:OD1	1:A:163:VAL:HG23	0.45	2.12	2	1
1:A:193:LYS:O	1:A:197:LYS:HB2	0.45	2.12	6	10
1:A:168:LEU:HB2	1:A:169:PRO:HD3	0.45	1.88	5	2
1:A:100:MET:CE	1:A:100:MET:HA	0.45	2.41	11	1
1:A:143:GLN:HA	1:A:146:ILE:CD1	0.45	2.42	5	8
1:A:192:GLN:O	1:A:196:LEU:HB3	0.45	2.12	10	1
1:A:85:GLY:CA	1:A:120:THR:HG23	0.45	2.42	16	3
1:A:142:LEU:HD12	1:A:155:GLU:HB2	0.45	1.88	13	3
1:A:159:ARG:O	1:A:162:ASN:HA	0.44	2.12	1	2
1:A:76:HIS:CE1	1:A:121:ILE:HB	0.44	2.47	2	7
1:A:140:ASP:O	1:A:143:GLN:HG2	0.44	2.12	20	2
1:A:190:HIS:HA	1:A:193:LYS:HZ2	0.44	1.72	4	2
1:A:68:SER:O	1:A:72:LEU:HG	0.44	2.13	9	4
1:A:141:THR:HG23	1:A:168:LEU:HD11	0.44	1.88	9	1
1:A:73:GLN:HA	1:A:121:ILE:CD1	0.44	2.43	5	1
1:A:154:TYR:HA	1:A:157:ASN:OD1	0.44	2.13	1	2
1:A:87:ILE:CG2	1:A:92:SER:HB3	0.44	2.43	17	1
1:A:197:LYS:O	1:A:200:ASP:HB3	0.44	2.13	1	1
1:A:69:LEU:HA	1:A:125:TRP:HE1	0.44	1.73	2	2
1:A:156:LYS:HE3	1:A:157:ASN:ND2	0.43	2.29	13	1
1:A:122:GLU:HA	1:A:125:TRP:CD2	0.43	2.49	20	1
1:A:88:GLU:HG2	1:A:91:GLU:OE1	0.43	2.13	11	2
1:A:72:LEU:HD12	1:A:125:TRP:CD1	0.43	2.49	1	3
1:A:141:THR:HG23	1:A:168:LEU:HD21	0.43	1.89	11	3
1:A:80:ASP:O	1:A:83:LYS:HG3	0.42	2.14	16	1
1:A:87:ILE:CG2	1:A:92:SER:HB2	0.42	2.44	18	1
1:A:111:HIS:O	1:A:114:ARG:HG3	0.42	2.14	13	2
1:A:145:LEU:HG	1:A:149:VAL:HG22	0.42	1.91	17	1
1:A:119:ILE:HG23	1:A:123:ASP:OD2	0.42	2.14	4	1
1:A:78:GLN:HB3	1:A:95:PHE:CD1	0.42	2.49	10	2
1:A:96:ILE:HA	1:A:100:MET:HB2	0.42	1.91	2	4
1:A:149:VAL:HG23	1:A:151:LEU:N	0.42	2.29	15	1
1:A:142:LEU:HD11	1:A:158:PHE:HB2	0.42	1.91	17	1
1:A:188:ARG:HD2	1:A:188:ARG:N	0.42	2.29	1	1
1:A:96:ILE:HG23	1:A:100:MET:HB2	0.42	1.91	16	3
1:A:75:ILE:HD12	1:A:203:LEU:HD21	0.41	1.91	9	6

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:144:TRP:CH2	1:A:197:LYS:HB3	0.41	2.50	6	1
1:A:77:LYS:HD3	1:A:83:LYS:HD2	0.41	1.92	19	2
1:A:127:ARG:NE	1:A:127:ARG:HA	0.41	2.31	9	1
1:A:75:ILE:HG21	1:A:199:LEU:HD11	0.41	1.91	4	1
1:A:145:LEU:HD21	1:A:151:LEU:O	0.40	2.16	2	1
1:A:158:PHE:CE2	1:A:193:LYS:HE3	0.40	2.51	7	1
1:A:75:ILE:HG21	1:A:199:LEU:CD1	0.40	2.45	8	1

6.3 Torsion angles ⓘ

6.3.1 Protein backbone ⓘ

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	123/150 (82%)	110±1 (90±1%)	11±1 (9±1%)	2±1 (1±1%)	16	63
All	All	2460/3000 (82%)	2202 (90%)	227 (9%)	31 (1%)	16	63

All 6 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	162	ASN	20
1	A	115	GLU	4
1	A	165	GLY	3
1	A	118	HIS	2
1	A	86	GLY	1
1	A	105	ALA	1

6.3.2 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 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	117/140 (84%)	108±2 (92±2%)	9±2 (8±2%)	17 65
All	All	2340/2800 (84%)	2162 (92%)	178 (8%)	17 65

All 29 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	146	ILE	20
1	A	156	LYS	20
1	A	164	LYS	20
1	A	126	LYS	17
1	A	138	LEU	15
1	A	83	LYS	13
1	A	114	ARG	12
1	A	155	GLU	9
1	A	108	LYS	8
1	A	100	MET	7
1	A	166	THR	4
1	A	127	ARG	4
1	A	112	LEU	4
1	A	197	LYS	3
1	A	69	LEU	2
1	A	113	HIS	2
1	A	132	GLU	2
1	A	77	LYS	2
1	A	137	THR	2
1	A	145	LEU	2
1	A	103	LYS	2
1	A	195	GLN	1
1	A	191	ARG	1
1	A	102	TYR	1
1	A	115	GLU	1
1	A	67	PHE	1
1	A	109	HIS	1
1	A	116	ASP	1
1	A	188	ARG	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

6.7 Other polymers ⓘ

There are no such molecules in this entry.

6.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

7 Chemical shift validation ⓘ

The completeness of assignment taking into account all chemical shift lists is 75% for the well-defined parts and 72% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_ chem_ shift_ list_ 1*

7.1.1 Bookkeeping ⓘ

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	1529
Number of shifts mapped to atoms	1528
Number of unparsed shifts	0
Number of shifts with mapping errors	1
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	1

The following assigned chemical shifts were not mapped to the molecules present in the coordinate file.

- No matching atom found in the structure. All 1 occurrences are reported below.

List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	-5	GLY	H	7.718	0.03	1

7.1.2 Chemical shift referencing ⓘ

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_\alpha$	136	-0.50 ± 0.22	Should be checked
$^{13}C_\beta$	132	0.40 ± 0.14	None needed (< 0.5 ppm)
$^{13}C'$	0	—	None (insufficient data)
^{15}N	131	0.28 ± 0.52	None needed (< 0.5 ppm)

7.1.3   Completeness of resonance assignments   (i)

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 75%, i.e. 1354 atoms were assigned a chemical shift out of a possible 1806. 0 out of 19 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	477/620 (77%)	241/250 (96%)	120/248 (48%)	116/122 (95%)
Sidechain	829/1021 (81%)	563/651 (86%)	260/323 (80%)	6/47 (13%)
Aromatic	48/165 (29%)	44/85 (52%)	0/69 (0%)	4/11 (36%)
Overall	1354/1806 (75%)	848/986 (86%)	380/640 (59%)	126/180 (70%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 72%, i.e. 1529 atoms were assigned a chemical shift out of a possible 2127. 0 out of 21 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	540/749 (72%)	273/302 (90%)	136/300 (45%)	131/147 (89%)
Sidechain	941/1189 (79%)	640/761 (84%)	295/379 (78%)	6/49 (12%)
Aromatic	48/189 (25%)	44/98 (45%)	0/78 (0%)	4/13 (31%)
Overall	1529/2127 (72%)	957/1161 (82%)	431/757 (57%)	141/209 (67%)

7.1.4   Statistically unusual chemical shifts   (i)

The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, ppm	Expected range, ppm	Z-score
1	A	134	HIS	HB3	1.02	$1.18 - 4.91$	-5.4

7.1.5   Random Coil Index (RCI) plots   (i)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A: