



Full wwPDB NMR Structure Validation Report ⓘ

Apr 26, 2016 – 10:49 PM BST

PDB ID : 2KAE
Title : data-driven model of MED1:DNA complex
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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
<http://wwpdb.org/validation/2016/NMRValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

Cyrange : Kirchner and Güntert (2011)
NmrClust : Kelley et al. (1996)
MolProbity : 4.02b-467
Mogul : unknown
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : rb-20027457
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20027457

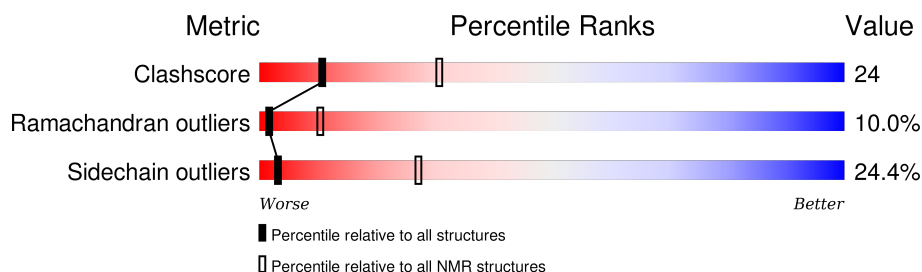
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 26%.

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	114402	11133
Ramachandran outliers	111179	9975
Sidechain outliers	111093	9958

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	71	
2	B	20	
2	C	20	

2 Ensemble composition and analysis

This entry contains 10 models. Model 10 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:112-A:162 (51)	0.25	10

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 2 clusters and 1 single-model cluster was found.

Cluster number	Models
1	3, 4, 5, 6, 8, 10
2	1, 2, 9
Single-model clusters	7

3 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2221 atoms, of which 937 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called GATA-type transcription factor.

Mol	Chain	Residues	Atoms						Trace
1	A	56	Total	C	H	N	O	S	0
			950	292	481	92	81	4	

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	104	GLY	-	EXPRESSION TAG	UNP Q9GSP3
A	105	SER	-	EXPRESSION TAG	UNP Q9GSP3
A	106	HIS	-	EXPRESSION TAG	UNP Q9GSP3
A	107	MET	-	EXPRESSION TAG	UNP Q9GSP3
A	108	ASN	-	EXPRESSION TAG	UNP Q9GSP3
A	109	LYS	-	EXPRESSION TAG	UNP Q9GSP3
A	110	LYS	-	EXPRESSION TAG	UNP Q9GSP3
A	167	GLU	-	EXPRESSION TAG	UNP Q9GSP3
A	168	THR	-	EXPRESSION TAG	UNP Q9GSP3
A	169	ASN	-	EXPRESSION TAG	UNP Q9GSP3
A	170	GLY	-	EXPRESSION TAG	UNP Q9GSP3
A	171	VAL	-	EXPRESSION TAG	UNP Q9GSP3
A	172	ASP	-	EXPRESSION TAG	UNP Q9GSP3
A	173	SER	-	EXPRESSION TAG	UNP Q9GSP3
A	174	PHE	-	EXPRESSION TAG	UNP Q9GSP3

- Molecule 2 is a DNA chain called 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DT*P*DAP*DTP*DAP*DCP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'.

Mol	Chain	Residues	Atoms						Trace
2	C	20	Total	C	H	N	O	P	0
			635	196	228	74	118	19	
2	B	20	Total	C	H	N	O	P	0
			635	196	228	74	118	19	

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

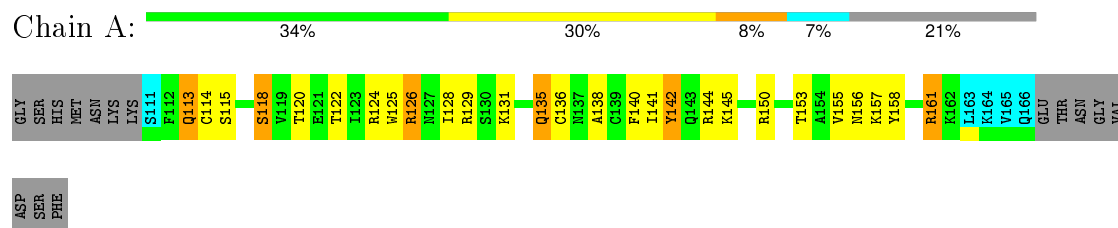
Mol	Chain	Residues	Atoms	
3	A	1	Total	Zn
			1	1

4 Residue-property plots [i](#)

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA and DNA 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: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

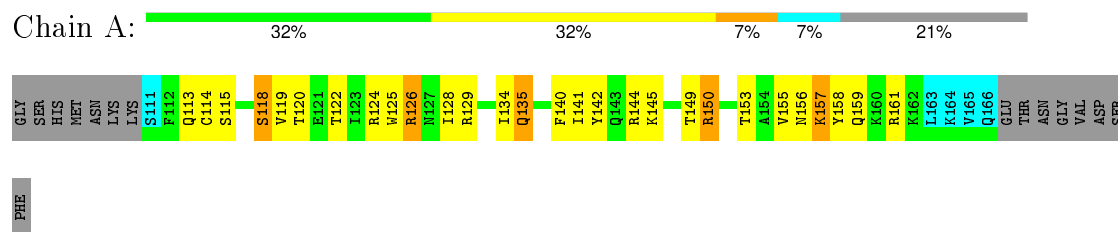


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

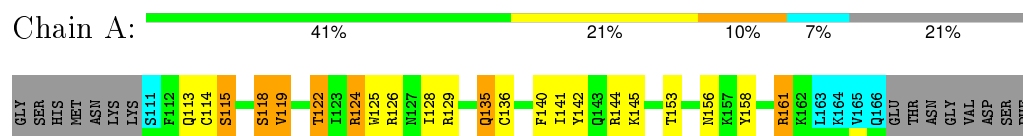


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



4.2.2 Score per residue for model 2

- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

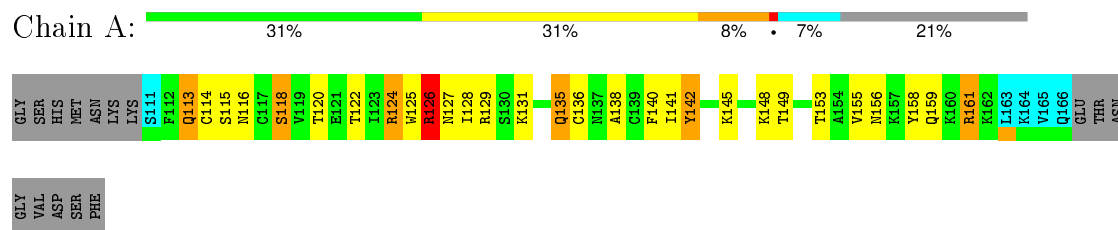


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



4.2.3 Score per residue for model 3

- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

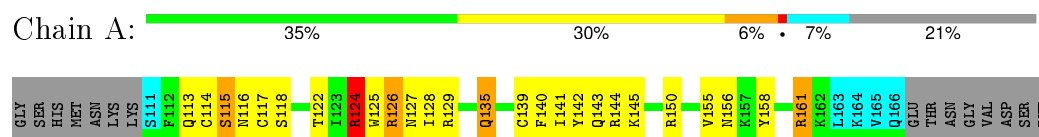


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



4.2.4 Score per residue for model 4

- Molecule 1: GATA-type transcription factor

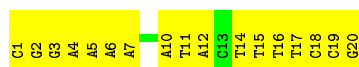


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



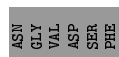
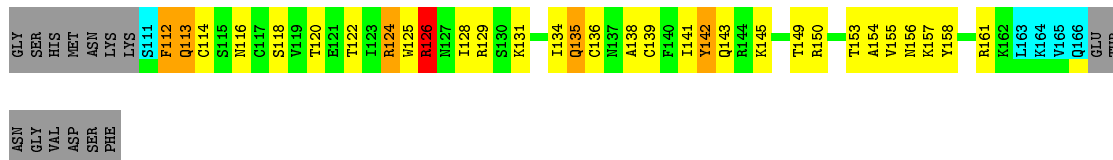
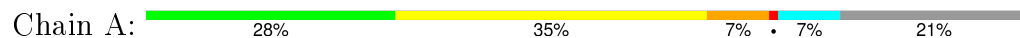
- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



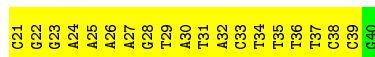


4.2.5 Score per residue for model 5

- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

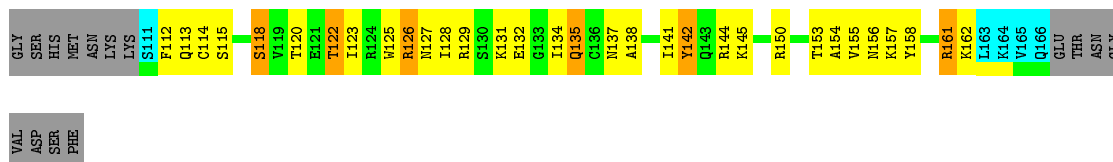


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



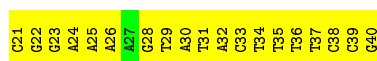
4.2.6 Score per residue for model 6

- Molecule 1: GATA-type transcription factor

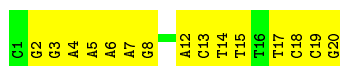


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



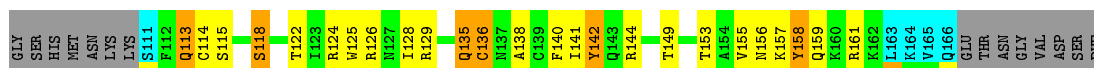
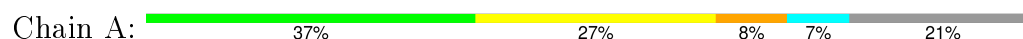


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

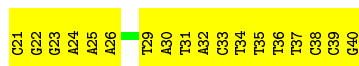


4.2.7 Score per residue for model 7

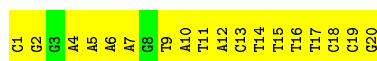
- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

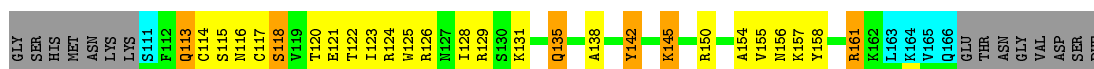


- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'



4.2.8 Score per residue for model 8

- Molecule 1: GATA-type transcription factor



- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain C:  5% 95%

G21 G22 G23 A24 A25 A26 A27 G28 T29 T30 T31 T32 A33 T34 T35 T36 T37 C38 C39 G40

- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain B:  10% 90%

C1 G2 G3 MET A4 A5 A6 A7 G8 T9 A10 T11 A12 C13 T14 T15 T16 T17 C18 C19 G20

4.2.9 Score per residue for model 9

- Molecule 1: GATA-type transcription factor

Chain A:  38% 27% 7% 7% 21%

GLY SER HIS MET ASN LYS LYS S111 C114 S115 S118 Y119 T120 E121 T122 T123 T124 R125 R126 R127 T128 R129 Q135 A138 C139 F140 I141 Y142 Q143 R144 K145 T153 A154 V155 M156 K157 Y158 Q159 K160 R161 L163 V164 V165 Q166 GLU THR ASN GLY VAL ASP SER PHE

- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain C:  25% 75%

G21 G22 G23 A24 A25 A26 T29 A30 T31 A32 C33 T34 T35 T36 T37 C38 C39 G40

- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*D CP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain B:  100%

C1 G2 G3 MET A4 A5 A6 A7 G8 T9 A10 T11 C14 A12 C13 T14 T15 T16 T17 C18 C19 G20

4.2.10 Score per residue for model 10 (medoid)

- Molecule 1: GATA-type transcription factor

Chain A:  39% 25% 6% 7% 21%


GLY SER HIS MET ASN LYS LYS S111 F112 Q113 C114 S115 S118 T122 T123 R124 N125 R126 R127 T128 R129 S130 K131 Q135 C136 T141 Y142 K145 R150 V155 N156 K157 Y158 R161 K162 L163 K164 V165 Q166 GLU THR ASN GLY VAL ASP SER PHE

- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*DCP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain C:  25% 75%

C21	G22	G23	A24	A25	A26	A30	T31	A32	C33	T34	T35	T36	T37	C38	C39	G40
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- Molecule 2: 5'-D(*DCP*DGP*DGP*DAP*DAP*DAP*DAP*DGP*DTP*DAP*DTP*DAP*DCP*DTP*DTP*DTP*DTP*DCP*DCP*DG)-3'

Chain B:  10% 90%

G1	G2	G3	A4	A5	A6	A7	G8	T9	A10	T11	A12	C13	T14	T15	T16	T17	C18	C19	G20
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5 Refinement protocol and experimental data overview

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

Of the 10 calculated structures, 10 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	

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)	BMRB entry 16812
Number of chemical shift lists	1
Total number of shifts	509
Number of shifts mapped to atoms	509
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	26%

No validations of the models with respect to experimental NMR restraints is performed at this time.

6 Model quality ⓘ

6.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section:
ZN

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	430	435	435	19±3
2	B	407	228	228	21±4
2	C	407	228	228	22±4
All	All	12450	8910	8910	519

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 24.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:161:ARG:HB2	2:B:14:DT:H73	0.68	1.66	8	8
1:A:141:ILE:HG22	2:C:29:DT:H71	0.67	1.65	6	2
1:A:119:VAL:HG23	1:A:135:GLN:HE22	0.66	1.50	2	1
1:A:161:ARG:HH22	2:B:16:DT:H71	0.64	1.52	2	3
2:B:14:DT:C2'	2:B:15:DT:H71	0.64	2.23	4	3
2:C:22:DG:H2''	2:C:23:DG:C8	0.63	2.28	6	10
2:B:12:DA:H2''	2:B:13:DC:C6	0.62	2.28	1	5
2:B:1:DC:H2''	2:B:2:DG:C8	0.62	2.30	8	9
2:C:23:DG:H2''	2:C:24:DA:C8	0.62	2.30	7	10
2:B:17:DT:H2''	2:B:18:DC:C6	0.62	2.30	3	10

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:C:32:DA:H2''	2:C:33:DC:C6	0.60	2.31	10	10
2:C:24:DA:H2''	2:C:25:DA:C8	0.59	2.32	7	10
2:B:2:DG:H2''	2:B:3:DG:C8	0.58	2.34	4	7
1:A:125:TRP:HA	1:A:135:GLN:O	0.58	1.99	7	8
2:C:38:DC:H2''	2:C:39:DC:C6	0.57	2.34	2	6
2:C:30:DA:H2''	2:C:31:DT:C6	0.57	2.34	10	8
2:C:36:DT:H2''	2:C:37:DT:C6	0.57	2.35	10	8
2:C:21:DC:H2''	2:C:22:DG:C8	0.56	2.35	1	9
2:B:14:DT:H2''	2:B:15:DT:H71	0.56	1.77	4	2
1:A:155:VAL:O	1:A:158:TYR:HB3	0.56	2.01	8	9
2:C:31:DT:H2''	2:C:32:DA:C8	0.56	2.36	1	9
1:A:141:ILE:HG21	2:C:30:DA:H62	0.55	1.61	5	3
2:C:38:DC:H2''	2:C:39:DC:C5	0.55	2.36	5	4
2:B:19:DC:H2''	2:B:20:DG:C8	0.55	2.36	6	10
2:B:3:DG:H2''	2:B:4:DA:C8	0.55	2.37	4	8
2:C:35:DT:H2''	2:C:36:DT:C6	0.55	2.37	1	10
2:B:13:DC:H2''	2:B:14:DT:C7	0.55	2.31	1	6
2:C:39:DC:H2''	2:C:40:DG:C8	0.55	2.37	1	5
2:B:10:DA:H2''	2:B:11:DT:C7	0.55	2.32	7	5
1:A:139:CYS:O	1:A:143:GLN:HB2	0.55	2.01	5	2
1:A:161:ARG:CZ	2:B:15:DT:H71	0.55	2.32	10	5
2:B:14:DT:C6	2:B:15:DT:H72	0.55	2.37	10	2
1:A:119:VAL:HG23	1:A:135:GLN:NE2	0.55	2.16	2	1
2:B:9:DT:H2''	2:B:10:DA:C8	0.54	2.38	2	7
2:B:6:DA:H2''	2:B:7:DA:C8	0.54	2.37	6	9
2:B:4:DA:H2''	2:B:5:DA:C8	0.54	2.37	5	10
2:C:39:DC:H2''	2:C:40:DG:N7	0.54	2.17	1	1
2:C:37:DT:H2''	2:C:38:DC:C6	0.54	2.38	3	8
1:A:144:ARG:HD3	2:B:11:DT:C7	0.53	2.33	9	4
1:A:141:ILE:HG21	2:C:30:DA:N6	0.53	2.18	4	5
1:A:138:ALA:O	1:A:142:TYR:HB3	0.53	2.02	3	6
1:A:145:LYS:HZ2	2:C:27:DA:H2'	0.53	1.63	8	1
1:A:141:ILE:HD13	2:C:30:DA:N6	0.53	2.19	9	3
2:B:5:DA:H2''	2:B:6:DA:C8	0.52	2.39	10	10
1:A:114:CYS:SG	1:A:115:SER:N	0.52	2.83	9	9
1:A:124:ARG:NH2	2:C:33:DC:H42	0.52	2.02	2	3
1:A:158:TYR:CE2	2:C:26:DA:N6	0.52	2.77	2	5
2:C:25:DA:C2	2:C:26:DA:C5	0.52	2.98	4	6
1:A:125:TRP:CZ3	1:A:135:GLN:HG3	0.52	2.39	1	3
2:C:28:DG:H2''	2:C:29:DT:H71	0.52	1.82	5	2
2:C:28:DG:C2'	2:C:29:DT:H71	0.51	2.36	5	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:16:DT:H2''	2:B:17:DT:C6	0.51	2.41	4	4
2:B:18:DC:H2''	2:B:19:DC:C6	0.51	2.40	9	8
2:C:37:DT:H2''	2:C:38:DC:C5	0.51	2.40	1	4
1:A:161:ARG:NH2	2:B:16:DT:H71	0.50	2.21	2	2
1:A:114:CYS:HB3	1:A:118:SER:H	0.50	1.65	7	8
2:B:11:DT:H2''	2:B:12:DA:C8	0.50	2.41	9	5
1:A:113:GLN:C	1:A:135:GLN:HB3	0.50	2.27	3	6
1:A:161:ARG:NH1	2:B:15:DT:H72	0.50	2.22	4	3
1:A:126:ARG:HG2	1:A:136:CYS:O	0.50	2.06	5	1
1:A:124:ARG:NH2	2:C:33:DC:N4	0.49	2.60	4	5
2:C:29:DT:C2	2:C:30:DA:C5	0.49	2.99	7	5
2:C:34:DT:H2''	2:C:35:DT:C6	0.49	2.42	7	6
2:C:34:DT:C2'	2:C:35:DT:H72	0.49	2.38	3	3
2:B:10:DA:H2''	2:B:11:DT:C6	0.49	2.43	10	4
1:A:114:CYS:CA	1:A:135:GLN:HB3	0.49	2.38	9	1
1:A:141:ILE:HG22	2:C:29:DT:H72	0.49	1.83	5	1
2:C:34:DT:H2''	2:C:35:DT:C7	0.49	2.38	9	4
2:C:35:DT:H2''	2:C:36:DT:H71	0.48	1.86	7	2
2:C:30:DA:C2	2:B:12:DA:C2	0.48	3.00	4	1
2:B:7:DA:C2	2:B:8:DG:C5	0.48	3.02	1	2
2:B:17:DT:H2''	2:B:18:DC:C5	0.48	2.43	7	2
2:B:13:DC:C2'	2:B:14:DT:H72	0.47	2.39	1	2
2:C:26:DA:C2	2:C:27:DA:C4	0.47	3.02	8	1
2:C:25:DA:C4	2:C:26:DA:N7	0.47	2.82	10	6
1:A:125:TRP:CZ3	1:A:135:GLN:HB2	0.47	2.44	6	6
1:A:161:ARG:NE	2:B:15:DT:H71	0.47	2.24	10	1
1:A:161:ARG:CZ	2:B:15:DT:H72	0.47	2.40	5	2
1:A:122:THR:HG21	1:A:136:CYS:HA	0.47	1.87	3	1
1:A:141:ILE:CG2	2:C:29:DT:H71	0.46	2.39	6	1
1:A:135:GLN:HE21	1:A:136:CYS:N	0.46	2.08	2	2
1:A:141:ILE:HD11	2:B:10:DA:N6	0.46	2.26	2	3
2:B:13:DC:H2''	2:B:14:DT:H72	0.46	1.86	1	2
1:A:158:TYR:HE2	2:C:26:DA:N6	0.46	2.07	10	4
1:A:161:ARG:HH22	2:B:16:DT:H73	0.46	1.71	9	1
1:A:126:ARG:HG3	1:A:134:ILE:O	0.46	2.10	5	1
1:A:161:ARG:NH2	2:B:16:DT:H73	0.46	2.26	9	1
2:C:27:DA:H2''	2:C:28:DG:C8	0.46	2.46	8	3
2:C:33:DC:C2'	2:C:34:DT:H71	0.46	2.41	3	2
1:A:157:LYS:HG3	2:B:12:DA:O5'	0.46	2.11	10	4
1:A:114:CYS:HA	1:A:135:GLN:HB3	0.46	1.87	9	1
2:C:22:DG:H2''	2:C:23:DG:N7	0.45	2.25	9	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:126:ARG:HH21	1:A:134:ILE:HD12	0.45	1.70	6	1
2:C:32:DA:H2"	2:C:33:DC:C5	0.45	2.47	3	1
1:A:137:ASN:O	1:A:141:ILE:HG12	0.45	2.11	6	1
1:A:122:THR:HB	1:A:125:TRP:CD1	0.45	2.47	6	1
2:C:31:DT:C2	2:C:32:DA:C5	0.45	3.05	10	4
2:B:10:DA:H2"	2:B:11:DT:H72	0.45	1.89	1	2
1:A:141:ILE:HG22	2:C:29:DT:C7	0.45	2.42	5	1
2:B:18:DC:H2"	2:B:19:DC:C5	0.44	2.47	2	5
1:A:126:ARG:CZ	2:B:9:DT:H2'	0.44	2.42	9	2
1:A:117:CYS:O	1:A:118:SER:HB2	0.44	2.11	8	1
2:C:21:DC:H1'	2:C:22:DG:C8	0.44	2.48	10	1
2:B:10:DA:C2'	2:B:11:DT:H72	0.44	2.42	9	1
2:B:14:DT:H2"	2:B:15:DT:C7	0.44	2.43	2	1
2:C:23:DG:H2"	2:C:24:DA:N7	0.44	2.27	7	1
2:B:19:DC:H2"	2:B:20:DG:N7	0.44	2.28	8	1
1:A:126:ARG:HD2	1:A:140:PHE:HB2	0.44	1.88	3	1
2:C:29:DT:H2"	2:C:30:DA:C8	0.44	2.47	7	4
1:A:122:THR:HG21	1:A:135:GLN:O	0.44	2.12	9	2
1:A:150:ARG:O	1:A:150:ARG:HD2	0.44	2.12	1	1
1:A:141:ILE:HB	2:C:29:DT:H72	0.44	1.90	2	1
1:A:124:ARG:NH2	2:B:7:DA:N6	0.44	2.66	8	5
1:A:123:ILE:HG23	2:C:31:DT:C7	0.43	2.43	8	2
1:A:161:ARG:HG3	2:B:15:DT:C7	0.43	2.42	6	3
1:A:126:ARG:HB3	1:A:134:ILE:O	0.43	2.13	1	1
2:C:25:DA:C2	2:C:26:DA:C4	0.43	3.07	4	2
2:C:24:DA:C4	2:C:25:DA:C5	0.43	3.07	4	2
1:A:144:ARG:HH12	2:B:12:DA:N6	0.43	2.12	6	1
1:A:158:TYR:OH	2:C:25:DA:C8	0.43	2.71	7	1
2:C:25:DA:C4	2:C:26:DA:C8	0.43	3.07	4	1
1:A:124:ARG:HH21	2:B:7:DA:N6	0.43	2.11	2	2
2:C:24:DA:H1'	2:C:25:DA:C8	0.43	2.49	4	1
1:A:158:TYR:CD2	2:B:14:DT:O4	0.42	2.72	1	3
1:A:161:ARG:NH2	2:C:25:DA:N6	0.42	2.67	3	1
2:C:34:DT:H2"	2:C:35:DT:H71	0.42	1.91	7	1
1:A:154:ALA:HB1	2:B:13:DC:N4	0.42	2.30	8	4
1:A:112:PHE:O	1:A:113:GLN:HB2	0.42	2.13	5	1
2:B:7:DA:C6	2:B:8:DG:C6	0.42	3.07	6	1
1:A:157:LYS:HG2	2:B:12:DA:H3'	0.42	1.91	1	1
2:C:34:DT:H2"	2:C:35:DT:C5	0.42	2.50	7	2
1:A:114:CYS:N	1:A:135:GLN:HB3	0.42	2.30	1	1
2:B:16:DT:C2'	2:B:17:DT:H72	0.42	2.44	2	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:124:ARG:HB2	2:C:31:DT:C7	0.42	2.45	10	1
2:C:28:DG:H2"	2:C:29:DT:C6	0.41	2.49	6	1
2:C:21:DC:C2	2:C:22:DG:C5	0.41	3.08	10	1
2:B:7:DA:C4	2:B:8:DG:N7	0.41	2.88	9	1
1:A:155:VAL:HA	1:A:158:TYR:HB3	0.41	1.91	3	2
1:A:135:GLN:HE21	1:A:136:CYS:CA	0.41	2.28	2	1
2:C:25:DA:N3	2:C:26:DA:C8	0.41	2.88	4	1
2:C:23:DG:C2'	2:C:24:DA:C8	0.41	3.04	7	1
1:A:144:ARG:HD3	2:B:11:DT:H72	0.41	1.91	4	1
1:A:126:ARG:HD3	1:A:140:PHE:CG	0.41	2.51	4	1
1:A:126:ARG:CD	1:A:140:PHE:HB2	0.41	2.45	3	1
2:C:34:DT:H2"	2:C:35:DT:H72	0.41	1.93	9	1
1:A:125:TRP:O	2:B:9:DT:C7	0.41	2.69	1	1
1:A:114:CYS:HB3	1:A:117:CYS:HB2	0.40	1.92	4	1
1:A:161:ARG:NH2	2:B:15:DT:O4	0.40	2.55	8	1
1:A:114:CYS:HB3	1:A:118:SER:N	0.40	2.32	6	1
2:C:25:DA:H1'	2:C:26:DA:C8	0.40	2.51	7	1
2:B:10:DA:H2"	2:B:11:DT:C5	0.40	2.51	3	1
2:B:11:DT:C2	2:B:12:DA:C5	0.40	3.09	1	1
1:A:144:ARG:CD	2:B:11:DT:H72	0.40	2.46	4	1
1:A:124:ARG:NH2	2:B:8:DG:O6	0.40	2.55	2	1
1:A:124:ARG:HB2	2:C:31:DT:H72	0.40	1.92	4	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	51/71 (72%)	34±1 (66±2%)	12±1 (24±2%)	5±1 (10±2%)	2	10
All	All	510/710 (72%)	338 (66%)	121 (24%)	51 (10%)	2	10

All 8 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	128	ILE	10
1	A	129	ARG	10
1	A	118	SER	9
1	A	113	GLN	8
1	A	126	ARG	5
1	A	116	ASN	4
1	A	124	ARG	3
1	A	112	PHE	2

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	48/66 (73%)	36±1 (76±2%)	12±1 (24±2%)	3	27
All	All	480/660 (73%)	363 (76%)	117 (24%)	3	27

All 27 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	156	ASN	10
1	A	142	TYR	10
1	A	135	GLN	10
1	A	145	LYS	9
1	A	122	THR	9
1	A	161	ARG	7
1	A	153	THR	7
1	A	126	ARG	6
1	A	120	THR	6
1	A	150	ARG	6
1	A	131	LYS	5
1	A	140	PHE	4
1	A	149	THR	4
1	A	115	SER	3
1	A	127	ASN	3
1	A	124	ARG	3
1	A	157	LYS	3
1	A	119	VAL	2

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Mol	Chain	Res	Type	Models (Total)
1	A	136	CYS	2
1	A	118	SER	1
1	A	132	GLU	1
1	A	158	TYR	1
1	A	121	GLU	1
1	A	160	LYS	1
1	A	159	GLN	1
1	A	113	GLN	1
1	A	148	LYS	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 carbohydrates in this entry.

6.6 Ligand geometry [i](#)

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

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 [i](#)

The completeness of assignment taking into account all chemical shift lists is 26% for the well-defined parts and 27% for the entire structure.

7.1 Chemical shift list 1

File name: BMRB entry 16812

Chemical shift list name: *assigned_chem_shift_list_1*

7.1.1 Bookkeeping [i](#)

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	509
Number of shifts mapped to atoms	509
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	4

7.1.2 Chemical shift referencing [i](#)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction \pm precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	61	-0.57 ± 0.13	Should be applied
$^{13}\text{C}_\beta$	56	0.31 ± 0.22	None needed (< 0.5 ppm)
$^{13}\text{C}'$	0	—	—
^{15}N	62	0.16 ± 0.40	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 26%, i.e. 387 atoms were assigned a chemical shift out of a possible 1488. 0 out of 3 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	195/253 (77%)	98/101 (97%)	48/102 (47%)	49/50 (98%)
Sidechain	174/397 (44%)	110/237 (46%)	62/127 (49%)	2/33 (6%)

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	Total	¹H	¹³C	¹⁵N
Aromatic	18/54 (33%)	9/28 (32%)	8/25 (32%)	1/1 (100%)
Overall	387/1488 (26%)	217/830 (26%)	118/526 (22%)	52/132 (39%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 27%, i.e. 421 atoms were assigned a chemical shift out of a possible 1554. 0 out of 5 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹H	¹³C	¹⁵N
Backbone	215/278 (77%)	108/111 (97%)	53/112 (47%)	54/55 (98%)
Sidechain	188/438 (43%)	119/261 (46%)	67/142 (47%)	2/35 (6%)
Aromatic	18/54 (33%)	9/28 (32%)	8/25 (32%)	1/1 (100%)
Overall	421/1554 (27%)	236/864 (27%)	128/551 (23%)	57/139 (41%)

7.1.4 Statistically unusual chemical shifts ⓘ

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.

Mol	Chain	Res	Type	Atom	Shift, ppm	Expected range, ppm	Z-score
1	A	122	THR	HG21	-0.92	2.29 – -0.01	-9.0
1	A	122	THR	HG23	-0.92	2.29 – -0.01	-9.0
1	A	122	THR	HG22	-0.92	2.29 – -0.01	-9.0
1	A	122	THR	CG2	15.46	27.15 – 15.95	-5.4

7.1.5 Random Coil Index (RCI) plots ⓘ

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.

Random coil index (RCI) for chain A:

