



Full wwPDB NMR Structure Validation Report ⓘ

May 28, 2020 – 10:58 pm BST

PDB ID : 2LAN
Title : NMR structure of Ca²⁺-bound CaBP1 N-domain with RDC
Authors : Ames, J.
Deposited on : 2011-03-16

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 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
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : 2.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

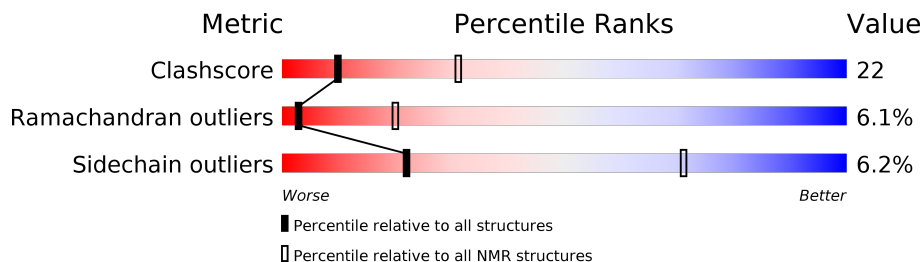
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 67%.

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	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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	167	

2 Ensemble composition and analysis

This entry contains 15 models. Model 14 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:20-A:88 (69)	0.65	14

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 6 single-model clusters were found.

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

3 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 1177 atoms, of which 574 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Calcium-binding protein 1.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	74	1176	374	574	100	120	8	0

There are 15 discrepancies between the modelled and reference sequences:

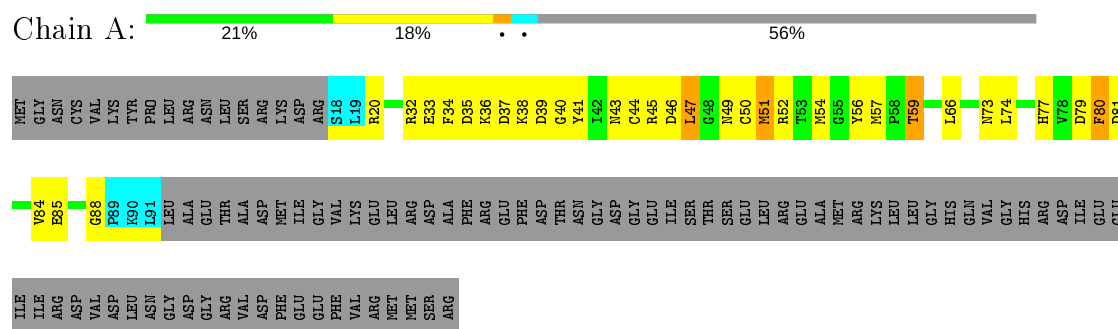
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	EXPRESSION TAG	UNP Q9NZU7
A	2	GLY	-	EXPRESSION TAG	UNP Q9NZU7
A	3	ASN	-	EXPRESSION TAG	UNP Q9NZU7
A	4	CYS	-	EXPRESSION TAG	UNP Q9NZU7
A	5	VAL	-	EXPRESSION TAG	UNP Q9NZU7
A	6	LYS	-	EXPRESSION TAG	UNP Q9NZU7
A	7	TYR	-	EXPRESSION TAG	UNP Q9NZU7
A	8	PRO	-	EXPRESSION TAG	UNP Q9NZU7
A	9	LEU	-	EXPRESSION TAG	UNP Q9NZU7
A	10	ARG	-	EXPRESSION TAG	UNP Q9NZU7
A	11	ASN	-	EXPRESSION TAG	UNP Q9NZU7
A	12	LEU	-	EXPRESSION TAG	UNP Q9NZU7
A	13	SER	-	EXPRESSION TAG	UNP Q9NZU7
A	14	ARG	-	EXPRESSION TAG	UNP Q9NZU7
A	15	LYS	-	EXPRESSION TAG	UNP Q9NZU7

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

Mol	Chain	Residues	Atoms	
2	A	1	Total	Ca
			1	1

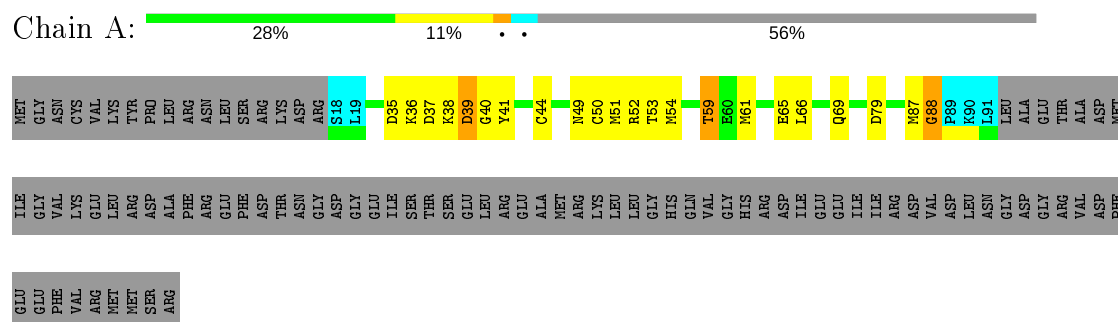
4.2.2 Score per residue for model 2

● Molecule 1: Calcium-binding protein 1



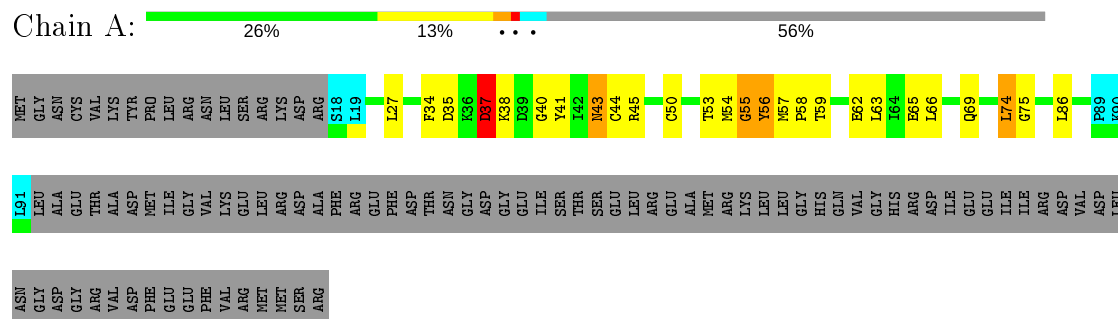
4.2.3 Score per residue for model 3

● Molecule 1: Calcium-binding protein 1



4.2.4 Score per residue for model 4

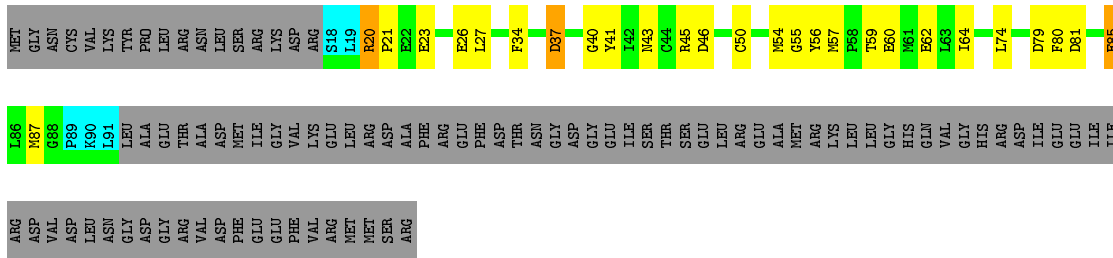
● Molecule 1: Calcium-binding protein 1



4.2.5 Score per residue for model 5

● Molecule 1: Calcium-binding protein 1

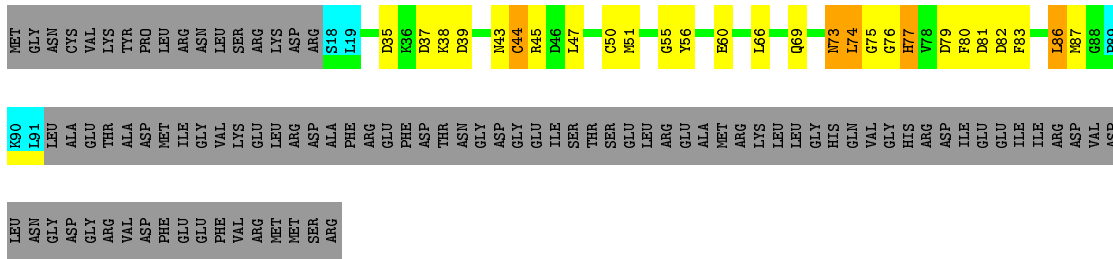
Chain A: 



4.2.6 Score per residue for model 6

- Molecule 1: Calcium-binding protein 1

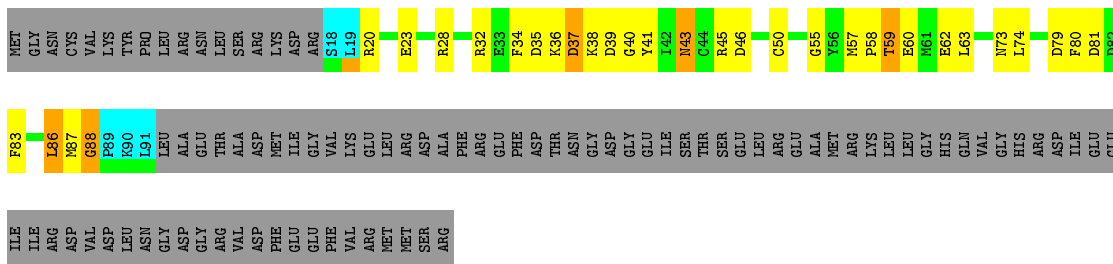
Chain A: 



4.2.7 Score per residue for model 7

- Molecule 1: Calcium-binding protein 1

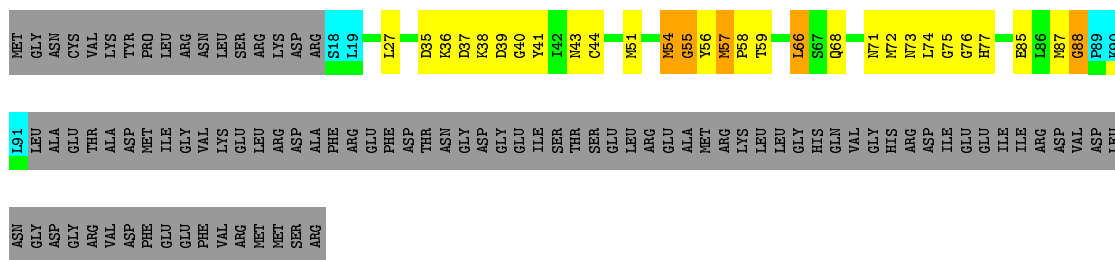
Chain A: 



4.2.8 Score per residue for model 8

- Molecule 1: Calcium-binding protein 1

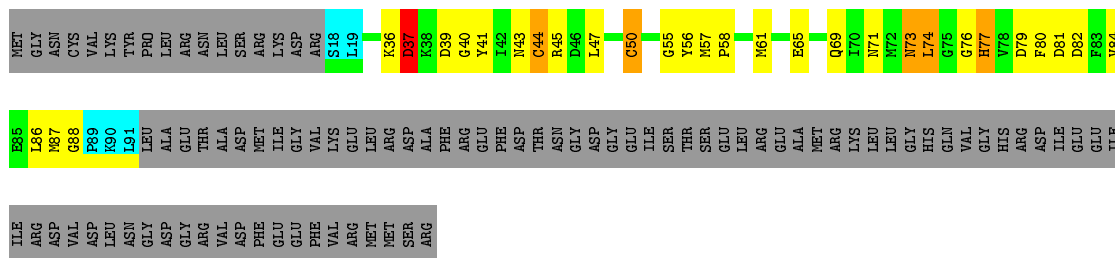
Chain A: 



4.2.9 Score per residue for model 9

- Molecule 1: Calcium-binding protein 1

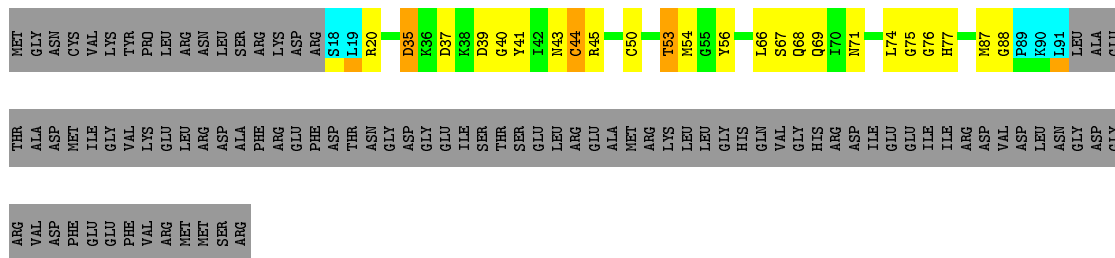
Chain A: 23% 14% 56%



4.2.10 Score per residue for model 10

- Molecule 1: Calcium-binding protein 1

Chain A: 27% 13% 56%



4.2.11 Score per residue for model 11

- Molecule 1: Calcium-binding protein 1

Chain A: 26% 11% 56%



LEU
ALA
GLU
THR
VAL
ASP
MET
ILE
GLY
VAL
LYS
LEU
LEU
ARG
ASP
ALA
PHE
ARG
GLU
PHE
ASP
THR
ASN
GLY
ASP
GLY
GLU
ILE
SER
THR
SER
GLU
LEU
ARG
GLU
ALA
MET
ARG
LYS
LEU
LEU
GLY
HIS
GLN
VAL
GLY
HIS
ARG
ASP
ILE
GLU
GLU
ILE
ILE
ARG
ASP
VAL
LEU
ASN

GLY
ASP
ARG
VAL
ASP
PHE
GLU
PHE
VAL
ARG
MET
SER
ARG

4.2.12 Score per residue for model 12

- Molecule 1: Calcium-binding protein 1

Chain A: 26% 14% ... 56%

MET
GLY
ASN
CYS
VAL
LYS
TYR
PRO
LEU
LEU
ARG
ASN
LYS
ASP
S18
L19
A30
F31
R32
E33
F34
D35
K36
D37
K38
D39
G40
M43
C44
R45
D46
L47
M51
T59
L63
Q68
Q69
I70
N71
M72
N73
L74
D79
F80
D81
V84
P89
K90

L91
LEU
ALA
THR
ALA
ASP
MET
ILE
GLY
PHE
VAL
LYS
LEU
LEU
ARG
ASP
ALA
PHE
ARG
GLU
PHE
THR
ASN
GLY
ASP
GLY
ILE
SER
THR
SER
GLU
LEU
ARG
GLN
VAL
GLY
HIS
ILE
ARG
ASP
VAL
ASP
LEU

ASN
GLY
ASP
GLY
VAL
ASP
PHE
GLU
GLY
PHE
VAL
ARG
MET
SER
ARG

4.2.13 Score per residue for model 13

- Molecule 1: Calcium-binding protein 1

Chain A: 28% 13% .. 56%

MET
GLY
ASN
VAL
LYS
TYR
PRO
LEU
LEU
ARG
ASN
SER
ARG
LYS
ASP
S18
L19
R20
E22
E23
I24
E25
K36
D37
K38
D39
G40
Y41
I42
M43
C44
R45
M49
C50
M51
Y56
N71
G75
D79
F80
D81
D82
F83
P89
K90
L91
LEU
ALA
GLU
THR

ALA
ASP
MET
ILE
GLY
VAL
LYS
GLU
LEU
ARG
ASP
PHE
ARG
GLU
ASP
THR
ASN
GLY
ASP
GLY
GLY
ILE
SER
THR
SER
GLU
LEU
VAL
GLY
HIS
GLN
VAL
ARG
ASP
ILE
GLU
GLU
ILE
ARG
ASP
VAL
ASP
LEU
ASN
GLY
ASP
GLU
THR

VAL
ASP
PHE
GLU
PHE
VAL
MET
MET
SER
ARG

4.2.14 Score per residue for model 14 (medoid)

- Molecule 1: Calcium-binding protein 1

Chain A: 22% 15% ... 56%

MET
GLY
ASN
CYS
VAL
LYS
TYR
PRO
LEU
LEU
ARG
ASN
SER
ARG
LYS
ASP
S18
L19
R20
E22
E25
R28
D35
K36
D37
G40
Y41
I42
M43
C44
R45
D46
Y56
M61
E65
L66
S67
Q68
Q69
I70
M71
L74
G75
G76
H77
V78
D79
F80
D81
D82
F83

V84
E85
L86
M87
G88
P89
K90
L91
LEU
ALA
THR
ALA
ASP
MET
ILE
GLY
VAL
LYS
LEU
LEU
ARG
ASP
PHE
ARG
GLU
PHE
THR
ASN
GLY
ASP
GLY
ILE
SER
THR
SER
GLU
LEU
ARG
GLN
VAL
GLY
HIS
ARG
ASP
ILE
GLU
GLU

ILE
ILE
ARG
ASP
VAL
ASP
LEU
ASN
GLY
ASP
GLY
ARG
VAL
ASP
PHE
GLU
GLU
PHE
VAL
ARG
MET
MET
SER
ARG

4.2.15 Score per residue for model 15

- Molecule 1: Calcium-binding protein 1

Chain A:  26% 12% • • 56%

MET
GLY
LEU
ASN
CYS
VAL
GLU
LYS
TYR
PRO
LEU
ARG
ASN
GLY
LEU
SER
ARG
LYS
ASP
ARG
ASP
ALA
S18
I19
E23
E23
G40
Y41
Y42
M43
L47
G48
N49
C50
Y56
M57
P58
M61
I64
E65
E65
Q68
G69
I70
L74
G75
G76
H77
Y78
D79
F80
D81
D82
GLU
D82
F83
L86
P87
G88
P89

R90
L91
LEU
ALA
LEU
THR
ALA
ASP
MET
ILE
GLY
VAL
LYS
GLU
LEU
LEU
ARG
ASP
ALA
PHE
ARG
GLU
PHE
ASP
THR
ASN
GLY
ASP
GLY
ILE
N49
SER
SER
GLU
LEU
ARG
GLU
ALA
MET
ARG
LYS
LEU
LEU
GLY
HIS
GLN
VAL
GLY
HIS
ARG
ASP
ILE
GLU
GLU
ILE
ILE
ARG
ASP
VAL
ASP

LEU
ASN
GLY
ASP
VAL
ASP
PHE
GLU
GLU
PHE
VAL
ARG
MET
MET
SER
ARG

5 Refinement protocol and experimental data overview

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

Of the 150 calculated structures, 15 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
X-PLOR NIH	structure solution	2.23
X-PLOR NIH	refinement	2.23

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)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1354
Number of shifts mapped to atoms	1354
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	67%

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

6 Model quality i

6.1 Standard geometry i

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

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 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	564	528	527	24±5
All	All	8475	7920	7908	359

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 22.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:75:GLY:O	1:A:77:HIS:N	0.76	2.18	15	1
1:A:43:ASN:HD22	1:A:43:ASN:H	0.68	1.30	15	4
1:A:72:MET:O	1:A:74:LEU:N	0.67	2.27	8	2
1:A:43:ASN:HD22	1:A:43:ASN:N	0.66	1.89	7	2
1:A:56:TYR:O	1:A:56:TYR:CG	0.65	2.48	4	3
1:A:70:ILE:O	1:A:74:LEU:N	0.63	2.31	15	1
1:A:43:ASN:H	1:A:43:ASN:ND2	0.63	1.91	15	1
1:A:43:ASN:HD21	1:A:45:ARG:NE	0.62	1.92	10	2
1:A:43:ASN:ND2	1:A:45:ARG:NE	0.62	2.47	10	2
1:A:68:GLN:O	1:A:71:ASN:N	0.60	2.34	12	4
1:A:34:PHE:CD2	1:A:50:CYS:SG	0.60	2.95	11	5
1:A:34:PHE:CG	1:A:50:CYS:SG	0.60	2.94	7	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:43:ASN:N	1:A:43:ASN:ND2	0.60	2.46	1	2
1:A:28:ARG:NH1	1:A:32:ARG:NH2	0.60	2.50	7	1
1:A:83:PHE:CE1	1:A:87:MET:SD	0.59	2.95	6	2
1:A:40:GLY:O	1:A:41:TYR:CG	0.59	2.56	14	5
1:A:37:ASP:OD1	1:A:38:LYS:N	0.58	2.36	3	4
1:A:47:LEU:C	1:A:47:LEU:HD23	0.58	2.18	12	2
1:A:34:PHE:CE2	1:A:50:CYS:SG	0.58	2.95	4	4
1:A:43:ASN:N	1:A:43:ASN:HD22	0.58	1.96	15	3
1:A:57:MET:N	1:A:57:MET:SD	0.58	2.75	15	1
1:A:23:GLU:OE1	1:A:23:GLU:N	0.58	2.37	15	1
1:A:43:ASN:ND2	1:A:43:ASN:N	0.58	2.50	4	3
1:A:35:ASP:OD2	1:A:38:LYS:N	0.58	2.37	7	2
1:A:28:ARG:HH12	1:A:32:ARG:NE	0.58	1.96	7	1
1:A:28:ARG:HH12	1:A:32:ARG:NH2	0.57	1.96	7	1
1:A:50:CYS:SG	1:A:51:MET:N	0.57	2.78	13	4
1:A:28:ARG:HH12	1:A:32:ARG:CZ	0.57	2.13	7	1
1:A:82:ASP:OD1	1:A:86:LEU:HD13	0.57	1.99	9	1
1:A:38:LYS:C	1:A:40:GLY:H	0.56	2.03	3	5
1:A:63:LEU:HD23	1:A:63:LEU:N	0.56	2.16	7	1
1:A:40:GLY:O	1:A:41:TYR:CD1	0.56	2.58	9	3
1:A:62:GLU:OE1	1:A:63:LEU:N	0.56	2.39	7	1
1:A:39:ASP:N	1:A:39:ASP:OD1	0.56	2.35	12	4
1:A:83:PHE:CZ	1:A:87:MET:SD	0.55	3.00	6	1
1:A:54:MET:SD	1:A:87:MET:SD	0.55	3.04	5	1
1:A:51:MET:SD	1:A:87:MET:SD	0.55	3.04	8	1
1:A:35:ASP:OD1	1:A:36:LYS:N	0.55	2.38	12	2
1:A:86:LEU:HD13	1:A:86:LEU:O	0.55	2.01	15	3
1:A:71:ASN:O	1:A:75:GLY:N	0.55	2.39	8	2
1:A:22:GLU:OE1	1:A:22:GLU:N	0.55	2.40	13	1
1:A:30:ALA:O	1:A:34:PHE:CE2	0.55	2.60	12	1
1:A:49:ASN:OD1	1:A:52:ARG:NH2	0.55	2.39	3	1
1:A:43:ASN:ND2	1:A:76:GLY:O	0.55	2.40	6	1
1:A:74:LEU:O	1:A:74:LEU:HD23	0.55	2.02	7	1
1:A:40:GLY:O	1:A:41:TYR:CD2	0.55	2.60	1	5
1:A:66:LEU:O	1:A:69:GLN:N	0.54	2.40	14	3
1:A:28:ARG:NH1	1:A:32:ARG:CZ	0.54	2.69	7	1
1:A:43:ASN:ND2	1:A:43:ASN:H	0.54	2.00	11	3
1:A:43:ASN:OD1	1:A:43:ASN:N	0.54	2.41	12	2
1:A:43:ASN:C	1:A:45:ARG:H	0.54	2.06	2	8
1:A:74:LEU:H	1:A:74:LEU:HD23	0.54	1.63	9	1
1:A:66:LEU:CD2	1:A:66:LEU:N	0.53	2.71	4	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:27:LEU:HD11	1:A:87:MET:SD	0.53	2.44	5	1
1:A:85:GLU:OE1	1:A:85:GLU:N	0.53	2.42	5	1
1:A:79:ASP:OD1	1:A:79:ASP:N	0.53	2.40	11	1
1:A:79:ASP:OD1	1:A:80:PHE:N	0.53	2.42	7	2
1:A:81:ASP:OD1	1:A:82:ASP:N	0.53	2.42	15	1
1:A:66:LEU:HD22	1:A:66:LEU:N	0.53	2.18	4	1
1:A:60:GLU:O	1:A:64:ILE:HD13	0.53	2.04	5	1
1:A:43:ASN:CG	1:A:44:CYS:N	0.53	2.62	6	2
1:A:76:GLY:O	1:A:77:HIS:CG	0.53	2.62	10	3
1:A:86:LEU:O	1:A:86:LEU:HD13	0.52	2.04	14	1
1:A:43:ASN:OD1	1:A:44:CYS:N	0.52	2.43	6	1
1:A:74:LEU:HD22	1:A:74:LEU:N	0.52	2.18	4	1
1:A:47:LEU:O	1:A:47:LEU:HD13	0.52	2.05	2	1
1:A:77:HIS:ND1	1:A:77:HIS:N	0.52	2.57	6	1
1:A:56:TYR:O	1:A:56:TYR:CD2	0.52	2.63	13	1
1:A:44:CYS:SG	1:A:71:ASN:OD1	0.52	2.67	9	4
1:A:36:LYS:O	1:A:37:ASP:CB	0.52	2.58	11	4
1:A:62:GLU:N	1:A:62:GLU:OE1	0.52	2.43	11	1
1:A:44:CYS:CB	1:A:71:ASN:HD21	0.52	2.18	13	1
1:A:74:LEU:N	1:A:74:LEU:CD2	0.52	2.72	4	2
1:A:43:ASN:HD21	1:A:45:ARG:CZ	0.51	2.19	5	2
1:A:63:LEU:CD2	1:A:63:LEU:H	0.51	2.19	7	1
1:A:23:GLU:O	1:A:26:GLU:N	0.51	2.43	5	1
1:A:46:ASP:O	1:A:50:CYS:SG	0.51	2.69	1	2
1:A:46:ASP:OD1	1:A:46:ASP:N	0.51	2.43	2	2
1:A:69:GLN:O	1:A:73:ASN:N	0.51	2.44	12	1
1:A:27:LEU:CD2	1:A:27:LEU:N	0.50	2.74	8	3
1:A:38:LYS:C	1:A:40:GLY:N	0.50	2.64	3	5
1:A:47:LEU:O	1:A:47:LEU:HD23	0.50	2.06	1	1
1:A:37:ASP:OD1	1:A:37:ASP:N	0.50	2.41	13	2
1:A:35:ASP:OD1	1:A:37:ASP:OD1	0.50	2.30	2	3
1:A:35:ASP:CG	1:A:36:LYS:N	0.50	2.64	12	2
1:A:47:LEU:O	1:A:50:CYS:SG	0.50	2.67	9	2
1:A:35:ASP:CG	1:A:36:LYS:H	0.50	2.09	12	1
1:A:56:TYR:CD2	1:A:56:TYR:O	0.50	2.65	5	2
1:A:70:ILE:O	1:A:74:LEU:O	0.50	2.30	15	1
1:A:54:MET:O	1:A:55:GLY:C	0.49	2.51	4	1
1:A:56:TYR:CD2	1:A:57:MET:N	0.49	2.79	2	1
1:A:38:LYS:O	1:A:40:GLY:N	0.49	2.45	3	5
1:A:87:MET:O	1:A:88:GLY:C	0.49	2.51	11	1
1:A:27:LEU:HD22	1:A:27:LEU:N	0.49	2.21	8	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:57:MET:O	1:A:57:MET:SD	0.49	2.70	11	1
1:A:80:PHE:O	1:A:84:VAL:HG23	0.49	2.08	12	4
1:A:37:ASP:N	1:A:37:ASP:OD1	0.49	2.46	9	3
1:A:45:ARG:CG	1:A:46:ASP:N	0.49	2.75	14	1
1:A:69:GLN:HE21	1:A:73:ASN:ND2	0.49	2.05	9	1
1:A:74:LEU:CD2	1:A:74:LEU:N	0.49	2.76	10	1
1:A:35:ASP:OD1	1:A:38:LYS:N	0.49	2.46	1	1
1:A:57:MET:N	1:A:58:PRO:CD	0.48	2.76	9	3
1:A:74:LEU:N	1:A:74:LEU:HD22	0.48	2.23	10	2
1:A:61:MET:O	1:A:65:GLU:N	0.48	2.45	15	4
1:A:20:ARG:CB	1:A:21:PRO:CD	0.48	2.92	1	2
1:A:28:ARG:NH1	1:A:32:ARG:NE	0.48	2.61	7	1
1:A:79:ASP:O	1:A:81:ASP:N	0.48	2.46	6	6
1:A:35:ASP:OD2	1:A:39:ASP:CA	0.48	2.62	3	1
1:A:51:MET:O	1:A:56:TYR:N	0.48	2.45	13	1
1:A:32:ARG:C	1:A:34:PHE:N	0.48	2.66	12	2
1:A:43:ASN:ND2	1:A:76:GLY:C	0.48	2.67	6	1
1:A:87:MET:O	1:A:88:GLY:O	0.48	2.32	7	4
1:A:63:LEU:HD23	1:A:63:LEU:H	0.48	1.69	7	1
1:A:32:ARG:O	1:A:34:PHE:N	0.47	2.47	12	2
1:A:43:ASN:H	1:A:43:ASN:HD22	0.47	1.52	11	1
1:A:74:LEU:N	1:A:74:LEU:HD12	0.47	2.23	14	1
1:A:71:ASN:O	1:A:75:GLY:CA	0.47	2.62	10	2
1:A:43:ASN:N	1:A:43:ASN:OD1	0.47	2.47	13	1
1:A:51:MET:SD	1:A:51:MET:C	0.47	2.93	2	1
1:A:66:LEU:N	1:A:66:LEU:CD2	0.47	2.78	2	1
1:A:54:MET:O	1:A:56:TYR:N	0.47	2.48	4	1
1:A:79:ASP:C	1:A:81:ASP:N	0.47	2.68	6	8
1:A:43:ASN:O	1:A:45:ARG:N	0.47	2.46	6	4
1:A:63:LEU:CD2	1:A:63:LEU:N	0.47	2.78	7	1
1:A:51:MET:SD	1:A:52:ARG:N	0.47	2.88	2	1
1:A:56:TYR:N	1:A:56:TYR:CD1	0.47	2.82	10	1
1:A:54:MET:O	1:A:55:GLY:O	0.46	2.32	8	1
1:A:25:GLU:OE1	1:A:28:ARG:CZ	0.46	2.62	14	1
1:A:56:TYR:O	1:A:57:MET:C	0.46	2.53	8	1
1:A:74:LEU:O	1:A:75:GLY:O	0.46	2.34	15	1
1:A:20:ARG:N	1:A:21:PRO:HD2	0.46	2.25	14	2
1:A:35:ASP:O	1:A:37:ASP:N	0.46	2.48	10	1
1:A:35:ASP:O	1:A:37:ASP:OD2	0.46	2.34	12	1
1:A:59:THR:O	1:A:62:GLU:N	0.46	2.48	4	2
1:A:72:MET:N	1:A:72:MET:SD	0.46	2.89	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:61:MET:O	1:A:65:GLU:CB	0.46	2.64	15	4
1:A:40:GLY:C	1:A:41:TYR:CG	0.46	2.89	9	1
1:A:35:ASP:OD2	1:A:37:ASP:OD1	0.46	2.34	4	1
1:A:56:TYR:O	1:A:58:PRO:N	0.46	2.49	8	1
1:A:64:ILE:O	1:A:68:GLN:CG	0.46	2.63	15	1
1:A:35:ASP:OD2	1:A:39:ASP:OD1	0.45	2.33	12	1
1:A:43:ASN:C	1:A:45:ARG:N	0.45	2.70	12	4
1:A:57:MET:O	1:A:62:GLU:OE1	0.45	2.34	4	1
1:A:50:CYS:O	1:A:53:THR:HG22	0.45	2.10	10	1
1:A:74:LEU:H	1:A:74:LEU:CD2	0.45	2.21	9	1
1:A:74:LEU:O	1:A:75:GLY:C	0.45	2.55	15	1
1:A:68:GLN:O	1:A:69:GLN:C	0.45	2.55	12	4
1:A:79:ASP:O	1:A:82:ASP:N	0.45	2.50	6	1
1:A:87:MET:C	1:A:87:MET:SD	0.45	2.95	10	1
1:A:55:GLY:C	1:A:57:MET:H	0.45	2.15	9	2
1:A:83:PHE:C	1:A:83:PHE:CD1	0.44	2.91	14	1
1:A:71:ASN:O	1:A:75:GLY:O	0.44	2.36	14	1
1:A:35:ASP:O	1:A:37:ASP:OD1	0.44	2.36	7	2
1:A:39:ASP:OD1	1:A:41:TYR:O	0.44	2.36	9	2
1:A:40:GLY:O	1:A:79:ASP:OD1	0.44	2.36	3	1
1:A:59:THR:OG1	1:A:62:GLU:CD	0.44	2.56	11	1
1:A:27:LEU:CD2	1:A:87:MET:SD	0.44	3.06	11	1
1:A:56:TYR:CD1	1:A:56:TYR:N	0.44	2.86	14	1
1:A:87:MET:SD	1:A:87:MET:O	0.43	2.76	9	1
1:A:22:GLU:O	1:A:26:GLU:OE1	0.43	2.35	11	1
1:A:37:ASP:OD2	1:A:39:ASP:OD2	0.43	2.36	6	1
1:A:66:LEU:C	1:A:68:GLN:N	0.43	2.72	8	1
1:A:47:LEU:CD2	1:A:70:ILE:CD1	0.43	2.96	15	1
1:A:79:ASP:OD1	1:A:81:ASP:OD2	0.43	2.37	15	1
1:A:60:GLU:N	1:A:60:GLU:OE1	0.43	2.44	6	1
1:A:51:MET:SD	1:A:63:LEU:CD1	0.43	3.07	12	1
1:A:54:MET:O	1:A:54:MET:SD	0.43	2.76	3	1
1:A:60:GLU:O	1:A:63:LEU:CD2	0.43	2.66	7	1
1:A:55:GLY:C	1:A:57:MET:N	0.43	2.72	7	2
1:A:41:TYR:CD1	1:A:79:ASP:OD1	0.43	2.71	13	1
1:A:65:GLU:O	1:A:69:GLN:OE1	0.43	2.36	4	1
1:A:43:ASN:CG	1:A:44:CYS:H	0.43	2.17	6	1
1:A:45:ARG:HG3	1:A:46:ASP:N	0.43	2.29	14	1
1:A:43:ASN:HD22	1:A:76:GLY:C	0.42	2.16	6	1
1:A:65:GLU:O	1:A:69:GLN:CB	0.42	2.67	9	1
1:A:39:ASP:OD2	1:A:41:TYR:O	0.42	2.37	10	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:43:ASN:CG	1:A:45:ARG:HE	0.42	2.17	10	1
1:A:62:GLU:OE1	1:A:62:GLU:CA	0.42	2.67	11	1
1:A:41:TYR:OH	1:A:77:HIS:CG	0.42	2.73	2	1
1:A:57:MET:C	1:A:57:MET:SD	0.42	2.98	11	1
1:A:56:TYR:CG	1:A:56:TYR:O	0.42	2.71	9	2
1:A:34:PHE:O	1:A:46:ASP:OD2	0.42	2.37	5	1
1:A:82:ASP:O	1:A:82:ASP:OD1	0.42	2.38	1	1
1:A:86:LEU:N	1:A:86:LEU:CD1	0.42	2.82	4	1
1:A:47:LEU:HD23	1:A:47:LEU:O	0.42	2.14	12	1
1:A:50:CYS:SG	1:A:83:PHE:CE1	0.42	3.13	13	1
1:A:20:ARG:O	1:A:23:GLU:N	0.42	2.49	7	1
1:A:56:TYR:CD1	1:A:56:TYR:C	0.42	2.91	4	1
1:A:37:ASP:OD1	1:A:39:ASP:OD1	0.41	2.38	8	1
1:A:76:GLY:O	1:A:77:HIS:CD2	0.41	2.74	8	1
1:A:63:LEU:N	1:A:63:LEU:CD2	0.41	2.82	4	1
1:A:77:HIS:N	1:A:77:HIS:ND1	0.41	2.66	9	1
1:A:66:LEU:O	1:A:67:SER:C	0.41	2.59	10	2
1:A:44:CYS:SG	1:A:71:ASN:ND2	0.41	2.92	13	1
1:A:27:LEU:HD22	1:A:87:MET:SD	0.41	2.56	11	1
1:A:35:ASP:OD2	1:A:40:GLY:N	0.41	2.54	3	1
1:A:73:ASN:O	1:A:74:LEU:C	0.41	2.59	6	1
1:A:57:MET:N	1:A:58:PRO:HD3	0.41	2.31	7	1
1:A:35:ASP:OD2	1:A:39:ASP:C	0.41	2.58	11	1
1:A:50:CYS:SG	1:A:83:PHE:CZ	0.41	3.14	15	1
1:A:86:LEU:HD12	1:A:86:LEU:N	0.41	2.31	4	1
1:A:36:LYS:O	1:A:45:ARG:NH2	0.41	2.53	9	1
1:A:79:ASP:OD1	1:A:82:ASP:CB	0.40	2.69	9	2
1:A:21:PRO:O	1:A:25:GLU:CG	0.40	2.69	13	1
1:A:65:GLU:OE2	1:A:65:GLU:O	0.40	2.39	15	1
1:A:66:LEU:CD1	1:A:66:LEU:C	0.40	2.90	8	1
1:A:25:GLU:OE1	1:A:28:ARG:NH2	0.40	2.55	14	1
1:A:35:ASP:CG	1:A:37:ASP:OD1	0.40	2.59	8	1
1:A:66:LEU:HD13	1:A:66:LEU:C	0.40	2.37	8	1
1:A:32:ARG:O	1:A:35:ASP:OD1	0.40	2.40	7	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	69/167 (41%)	55±2 (80±3%)	10±2 (14±3%)	4±1 (6±2%)	3	20
All	All	1035/2505 (41%)	827 (80%)	145 (14%)	63 (6%)	3	20

All 17 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	37	ASP	8
1	A	88	GLY	7
1	A	44	CYS	6
1	A	75	GLY	5
1	A	73	ASN	5
1	A	55	GLY	4
1	A	59	THR	4
1	A	39	ASP	3
1	A	74	LEU	3
1	A	20	ARG	3
1	A	76	GLY	3
1	A	54	MET	3
1	A	80	PHE	3
1	A	33	GLU	2
1	A	58	PRO	2
1	A	56	TYR	1
1	A	57	MET	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	62/148 (42%)	58±1 (94±2%)	4±1 (6±2%)	22	71
All	All	930/2220 (42%)	872 (94%)	58 (6%)	22	71

All 28 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	59	THR	7
1	A	43	ASN	5
1	A	37	ASP	4
1	A	86	LEU	4
1	A	74	LEU	3
1	A	49	ASN	3
1	A	53	THR	3
1	A	44	CYS	3
1	A	41	TYR	2
1	A	77	HIS	2
1	A	85	GLU	2
1	A	36	LYS	2
1	A	56	TYR	2
1	A	57	MET	2
1	A	72	MET	1
1	A	51	MET	1
1	A	50	CYS	1
1	A	79	ASP	1
1	A	39	ASP	1
1	A	45	ARG	1
1	A	35	ASP	1
1	A	47	LEU	1
1	A	66	LEU	1
1	A	67	SER	1
1	A	62	GLU	1
1	A	87	MET	1
1	A	20	ARG	1
1	A	61	MET	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 67% for the well-defined parts and 66% for the entire structure.

7.1 Chemical shift list 1

File name: input_cs.cif

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	1354
Number of shifts mapped to atoms	1354
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

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
$^{13}\text{C}_\alpha$	147	-0.35 ± 0.09	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	134	0.02 ± 0.12	None needed (< 0.5 ppm)
$^{13}\text{C}'$	138	-0.41 ± 0.14	None needed (< 0.5 ppm)
^{15}N	139	0.67 ± 0.23	Should be applied

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 67%, i.e. 580 atoms were assigned a chemical shift out of a possible 870. 7 out of 8 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	326/341 (96%)	131/136 (96%)	130/138 (94%)	65/67 (97%)
Sidechain	230/470 (49%)	141/276 (51%)	89/171 (52%)	0/23 (0%)

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	Total	¹ H	¹³ C	¹⁵ N
Aromatic	24/59 (41%)	24/32 (75%)	0/26 (0%)	0/1 (0%)
Overall	580/870 (67%)	296/444 (67%)	219/335 (65%)	65/91 (71%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 66%, i.e. 621 atoms were assigned a chemical shift out of a possible 936. 8 out of 10 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	349/364 (96%)	140/145 (97%)	140/148 (95%)	69/71 (97%)
Sidechain	248/513 (48%)	152/302 (50%)	96/187 (51%)	0/24 (0%)
Aromatic	24/59 (41%)	24/32 (75%)	0/26 (0%)	0/1 (0%)
Overall	621/936 (66%)	316/479 (66%)	236/361 (65%)	69/96 (72%)

7.1.4 Statistically unusual chemical shifts [i](#)

There are no statistically unusual chemical shifts.

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.

Random coil index (RCI) for chain A:

