



# Full wwPDB NMR Structure Validation Report ⓘ

May 31, 2020 – 10:14 pm BST

PDB ID : 6FW4  
Title : Protein-protein interactions and conformational changes : Importance of the hydrophobic cavity of TolA C-terminal domain  
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Deposited on : 2018-03-05

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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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

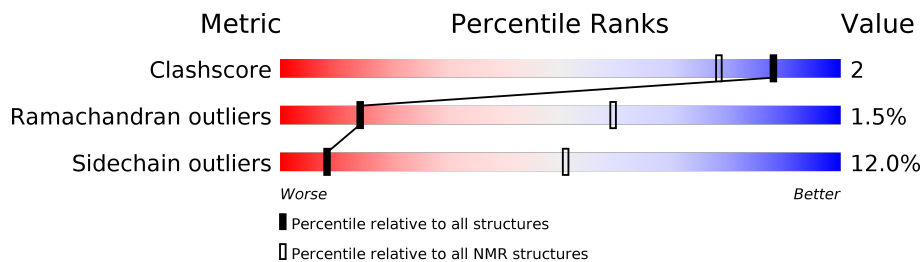
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*SOLUTION NMR*

The overall completeness of chemical shifts assignment is 83%.

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  $\geq 3$ , 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	101	

## 2 Ensemble composition and analysis

This entry contains 20 models. Model 19 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:34-A:120 (87)	0.30	19

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 5 single-model clusters were found.

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

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1578 atoms, of which 806 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called TolA protein.

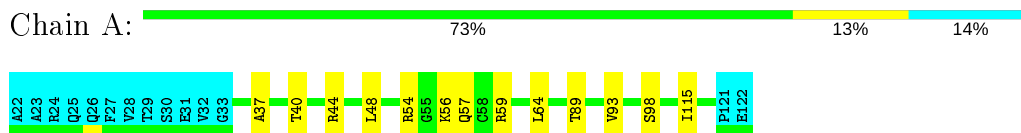
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	101	1578	485	806	140	145	2	0

## 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: TolA protein

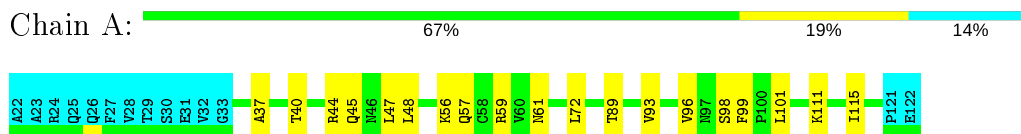


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

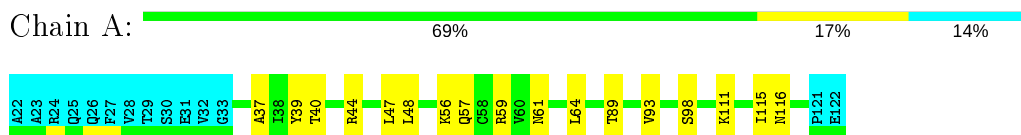
#### 4.2.1 Score per residue for model 1

- Molecule 1: TolA protein



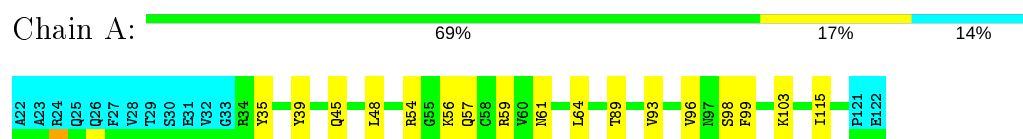
#### 4.2.2 Score per residue for model 2

- Molecule 1: TolA protein



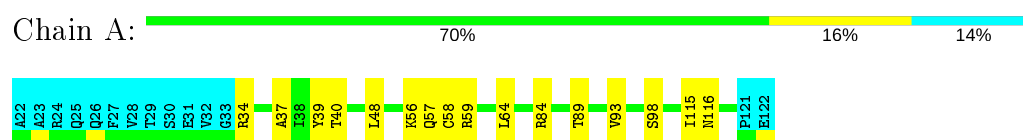
### 4.2.3 Score per residue for model 3

- Molecule 1: TolA protein



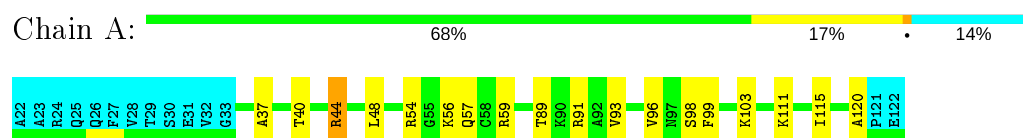
### 4.2.4 Score per residue for model 4

- Molecule 1: TolA protein



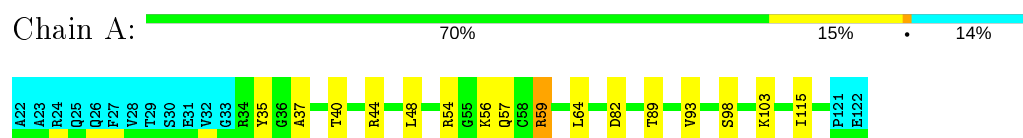
### 4.2.5 Score per residue for model 5

- Molecule 1: TolA protein



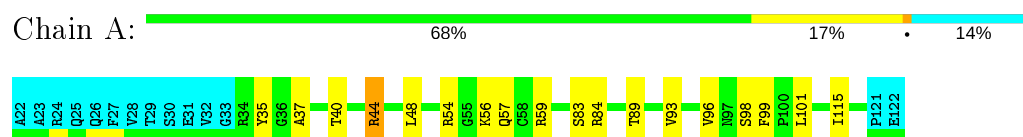
### 4.2.6 Score per residue for model 6

- Molecule 1: TolA protein



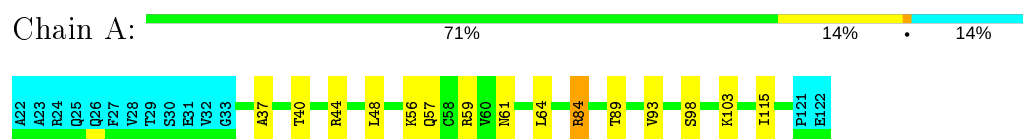
### 4.2.7 Score per residue for model 7

- Molecule 1: TolA protein



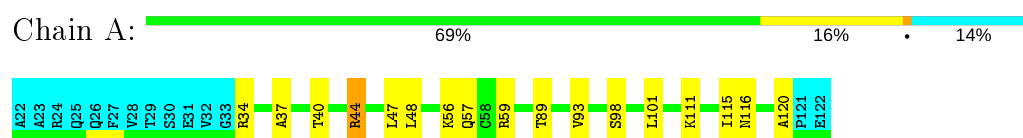
### 4.2.8 Score per residue for model 8

- Molecule 1: TolA protein



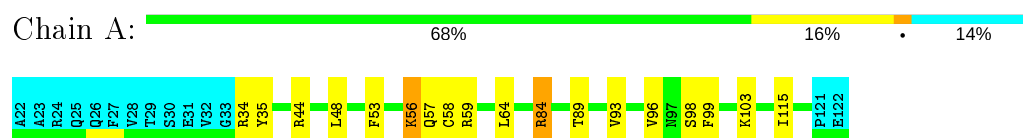
### 4.2.9 Score per residue for model 9

- Molecule 1: TolA protein



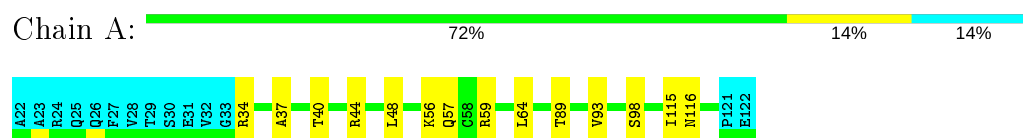
### 4.2.10 Score per residue for model 10

- Molecule 1: TolA protein



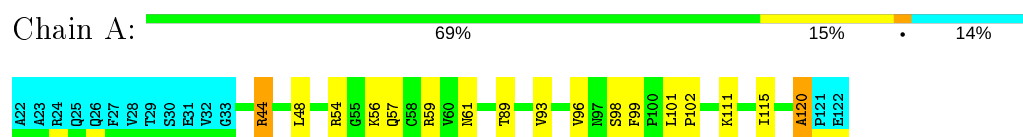
### 4.2.11 Score per residue for model 11

- Molecule 1: TolA protein



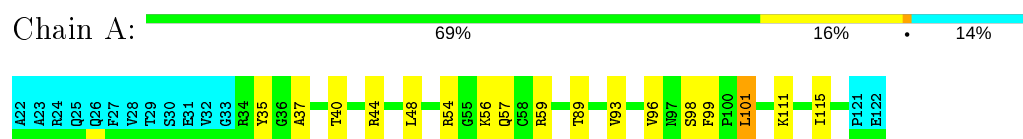
### 4.2.12 Score per residue for model 12

- Molecule 1: TolA protein



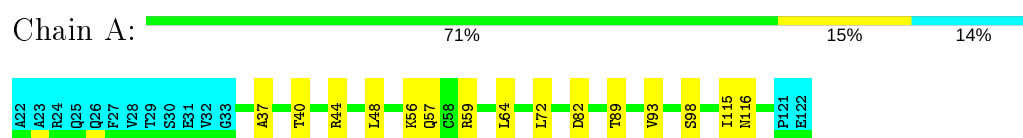
### 4.2.13 Score per residue for model 13

- Molecule 1: TolA protein



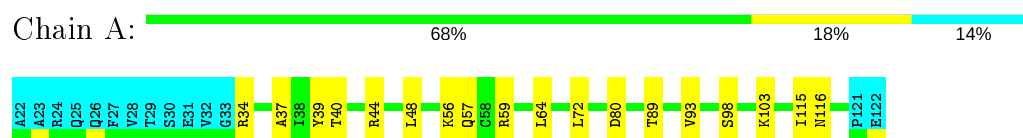
### 4.2.14 Score per residue for model 14

- Molecule 1: TolA protein



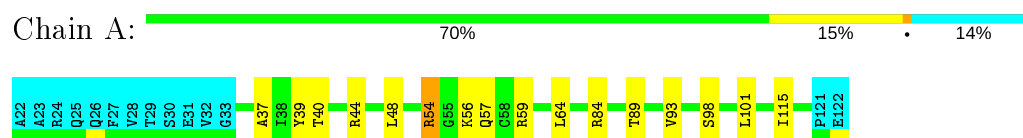
### 4.2.15 Score per residue for model 15

- Molecule 1: TolA protein



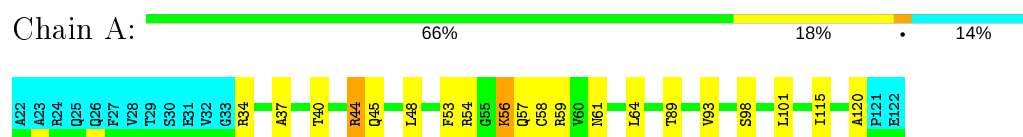
### 4.2.16 Score per residue for model 16

- Molecule 1: TolA protein



### 4.2.17 Score per residue for model 17

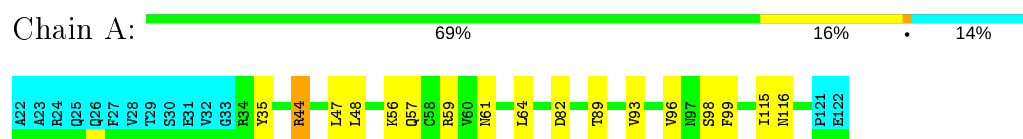
- Molecule 1: TolA protein





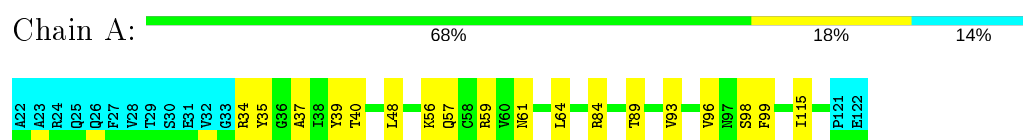
### 4.2.18 Score per residue for model 18

- Molecule 1: TolA protein



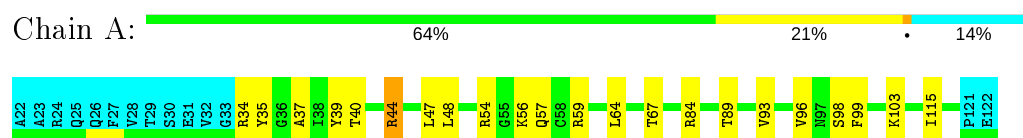
### 4.2.19 Score per residue for model 19 (medoid)

- Molecule 1: TolA protein



### 4.2.20 Score per residue for model 20

- Molecule 1: TolA protein



## 5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *distance geometry, molecular dynamics*.

Of the 100 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
Amber	refinement	
CYANA	structure calculation	

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 6 of this report.

Chemical shift file(s)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1410
Number of shifts mapped to atoms	1182
Number of unparsed shifts	0
Number of shifts with mapping errors	228
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	83%

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

COVALENT-GEOMETRY INFOmissingINFO

### 5.1 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	666	706	706	3±1
All	All	13320	14120	14120	51

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 2.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:96:VAL:HG21	1:A:99:PHE:CZ	0.62	2.29	1	10
1:A:89:THR:O	1:A:93:VAL:HG23	0.61	1.94	10	20
1:A:101:LEU:HD23	1:A:101:LEU:H	0.53	1.64	17	1
1:A:101:LEU:H	1:A:101:LEU:HD23	0.53	1.62	16	1
1:A:37:ALA:HA	1:A:40:THR:HG22	0.47	1.86	8	16
1:A:101:LEU:H	1:A:101:LEU:HD22	0.44	1.73	13	1
1:A:53:PHE:HA	1:A:56:LYS:HE2	0.43	1.89	17	2

## 5.2 Torsion angles [i](#)

### 5.2.1 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	87/101 (86%)	80±2 (92±2%)	5±2 (6±2%)	1±1 (1±1%)	14	59
All	All	1740/2020 (86%)	1605 (92%)	109 (6%)	26 (1%)	14	59

All 4 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	98	SER	20
1	A	120	ALA	4
1	A	102	PRO	1
1	A	83	SER	1

### 5.2.2 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	74/85 (87%)	65±1 (88±2%)	9±1 (12±2%)	8	51
All	All	1480/1700 (87%)	1302 (88%)	178 (12%)	8	51

All 20 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	57	GLN	20
1	A	59	ARG	20
1	A	115	ILE	20
1	A	56	LYS	20
1	A	48	LEU	20
1	A	64	LEU	14
1	A	44	ARG	10
1	A	61	ASN	8
1	A	103	LYS	7
1	A	116	ASN	7
1	A	111	LYS	6
1	A	101	LEU	5
1	A	54	ARG	4
1	A	47	LEU	4
1	A	45	GLN	3
1	A	72	LEU	3
1	A	58	CYS	3
1	A	84	ARG	2
1	A	80	ASP	1
1	A	67	THR	1

### 5.2.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.4 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 5.5 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.6 Other polymers [i](#)

There are no such molecules in this entry.

## 5.7 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Chemical shift validation i

The completeness of assignment taking into account all chemical shift lists is 83% for the well-defined parts and 83% for the entire structure.

### 6.1 Chemical shift list 1

File name: input\_cs.cif

Chemical shift list name: *assigned\_chem\_shift\_list\_1*

#### 6.1.1 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	1410
Number of shifts mapped to atoms	1182
Number of unparsed shifts	0
Number of shifts with mapping errors	228
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.

- Residue not found in structure. All 228 occurrences are reported below.

Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	13	LEU	CB	41.568	0.3	1
A	6	LEU	HG	1.261	0.02	1
A	19	GLN	HE21	7.523	0.02	1
A	16	GLU	HB3	1.826	0.02	2
A	17	SER	HB3	3.766	0.02	2
A	17	SER	HA	4.268	0.02	1
A	3	PHE	HE1	7.137	0.02	1
A	12	SER	C	174.611	0.3	1
A	6	LEU	HD21	0.702	0.02	2
A	9	ILE	HG22	0.826	0.02	1
A	12	SER	HB3	3.778	0.02	1
A	10	PHE	HB3	2.881	0.02	2
A	17	SER	H	8.142	0.02	1
A	16	GLU	HA	4.095	0.02	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	10	PHE	CD2	131.327	0.3	1
A	18	GLN	N	121.877	0.3	1
A	13	LEU	CD1	24.469	0.3	1
A	10	PHE	HE1	7.178	0.02	1
A	13	LEU	N	123.994	0.3	1
A	3	PHE	HA	4.435	0.02	1
A	2	GLU	N	119.356	0.3	1
A	18	GLN	C	176.888	0.3	1
A	9	ILE	HD12	0.594	0.02	1
A	6	LEU	CD1	22.711	0.3	1
A	7	ASN	ND2	111.427	0.3	1
A	15	GLU	HB3	1.839	0.02	2
A	6	LEU	H	7.924	0.02	1
A	7	ASN	C	174.801	0.3	1
A	9	ILE	CG1	26.271	0.3	1
A	1	ALA	CB	18.396	0.3	1
A	11	GLY	H	8.118	0.02	1
A	10	PHE	HD1	7.159	0.02	1
A	19	GLN	N	120.152	0.3	1
A	2	GLU	HG3	1.983	0.02	2
A	17	SER	C	175.316	0.3	1
A	3	PHE	CE2	131.327	0.3	1
A	3	PHE	H	7.959	0.02	1
A	14	SER	H	8.203	0.02	1
A	17	SER	CA	58.693	0.3	1
A	6	LEU	HB3	1.408	0.02	2
A	12	SER	HA	4.336	0.02	1
A	3	PHE	HB3	2.886	0.02	2
A	18	GLN	HE22	6.763	0.02	1
A	19	GLN	HG3	2.271	0.02	1
A	3	PHE	HD1	7.02	0.02	1
A	10	PHE	HZ	7.115	0.02	1
A	19	GLN	NE2	113.3	0.3	1
A	6	LEU	CD2	24.415	0.3	1
A	4	ALA	HB1	1.262	0.02	1
A	6	LEU	HA	4.118	0.02	1
A	17	SER	N	116.32	0.3	1
A	7	ASN	HB3	2.519	0.02	2
A	1	ALA	N	128.788	0.3	1
A	10	PHE	H	8.128	0.02	1
A	18	GLN	HA	4.129	0.02	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	3	PHE	CD1	131.987	0.3	1
A	1	ALA	HB1	1.243	0.02	1
A	9	ILE	CG2	16.685	0.3	1
A	16	GLU	C	177.24	0.3	1
A	16	GLU	HB2	1.918	0.02	2
A	13	LEU	HD11	0.73	0.02	1
A	3	PHE	HE2	7.137	0.02	1
A	6	LEU	HD22	0.702	0.02	2
A	9	ILE	HG23	0.826	0.02	1
A	2	GLU	HA	3.995	0.02	1
A	9	ILE	HG13	0.877	0.02	2
A	12	SER	HB2	3.778	0.02	1
A	1	ALA	HA	4.094	0.02	1
A	15	GLU	CA	57.116	0.3	1
A	10	PHE	CD1	131.327	0.3	1
A	14	SER	HA	4.293	0.02	1
A	5	ALA	N	122.422	0.3	1
A	13	LEU	CD2	22.843	0.3	1
A	2	GLU	CB	29.102	0.3	1
A	5	ALA	HA	4.099	0.02	1
A	16	GLU	CG	35.528	0.3	1
A	15	GLU	N	123.307	0.3	1
A	2	GLU	CG	35.481	0.3	1
A	11	GLY	HA2	3.804	0.02	1
A	4	ALA	HA	4.069	0.02	1
A	15	GLU	HA	4.094	0.02	1
A	18	GLN	NE2	112.763	0.3	1
A	7	ASN	H	8.094	0.02	1
A	1	ALA	HB2	1.243	0.02	1
A	9	ILE	HD13	0.594	0.02	1
A	2	GLU	HB3	1.593	0.02	1
A	10	PHE	C	176.427	0.3	1
A	9	ILE	H	7.788	0.02	1
A	19	GLN	CB	30.994	0.3	1
A	11	GLY	HA3	3.804	0.02	1
A	10	PHE	CA	57.525	0.3	1
A	14	SER	HB3	3.745	0.02	2
A	10	PHE	CE1	131.884	0.3	1
A	18	GLN	CG	33.095	0.3	1
A	2	GLU	C	176.644	0.3	1
A	13	LEU	C	177.457	0.3	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	15	GLU	CB	29.376	0.3	1
A	18	GLN	H	8.219	0.02	1
A	4	ALA	CB	18.41	0.3	1
A	16	GLU	HG2	2.148	0.02	1
A	13	LEU	CG	26.339	0.3	1
A	15	GLU	HG3	2.112	0.02	2
A	13	LEU	H	8.217	0.02	1
A	10	PHE	HD2	7.159	0.02	1
A	2	GLU	CA	56.649	0.3	1
A	16	GLU	CB	29.348	0.3	1
A	18	GLN	HB2	1.972	0.02	2
A	3	PHE	CE1	131.327	0.3	1
A	13	LEU	HB2	1.452	0.02	1
A	17	SER	CB	62.78	0.3	1
A	6	LEU	HB2	1.527	0.02	2
A	5	ALA	HB1	1.253	0.02	1
A	3	PHE	HB2	3.03	0.02	2
A	6	LEU	HD13	0.777	0.02	2
A	19	GLN	C	176.535	0.3	1
A	4	ALA	N	124.881	0.3	1
A	3	PHE	C	175.831	0.3	1
A	19	GLN	CA	56.77	0.3	1
A	13	LEU	HD23	0.73	0.02	1
A	16	GLU	N	121.348	0.3	1
A	6	LEU	CG	26.118	0.3	1
A	3	PHE	CD2	131.987	0.3	1
A	7	ASN	CA	52.807	0.3	1
A	5	ALA	HB3	1.253	0.02	1
A	15	GLU	CG	35.609	0.3	1
A	4	ALA	CA	52.288	0.3	1
A	15	GLU	C	177.24	0.3	1
A	11	GLY	CA	44.96	0.3	1
A	13	LEU	HD12	0.73	0.02	1
A	3	PHE	N	120.515	0.3	1
A	16	GLU	CA	57.012	0.3	1
A	9	ILE	CA	61.208	0.3	1
A	6	LEU	HD23	0.702	0.02	2
A	11	GLY	C	174.178	0.3	1
A	9	ILE	HG12	1.01	0.02	2
A	5	ALA	H	7.981	0.02	1
A	8	ASP	CB	40.423	0.3	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	12	SER	N	115.85	0.3	1
A	11	GLY	N	110.211	0.3	1
A	8	ASP	HB3	2.472	0.02	2
A	9	ILE	N	120.073	0.3	1
A	7	ASN	HA	4.528	0.02	1
A	18	GLN	HG3	2.275	0.02	1
A	4	ALA	HB3	1.262	0.02	1
A	13	LEU	HG	1.531	0.02	1
A	3	PHE	CB	38.622	0.3	1
A	7	ASN	N	118.479	0.3	1
A	14	SER	CB	63.27	0.3	1
A	6	LEU	CB	41.568	0.3	1
A	19	GLN	HB3	1.932	0.02	1
A	1	ALA	HB3	1.243	0.02	1
A	18	GLN	CA	56.362	0.3	1
A	10	PHE	HA	4.516	0.02	1
A	2	GLU	HB2	1.593	0.02	1
A	13	LEU	CA	54.661	0.3	1
A	1	ALA	H	8.221	0.02	1
A	17	SER	HB2	3.822	0.02	2
A	8	ASP	HA	4.447	0.02	1
A	10	PHE	CB	38.459	0.3	1
A	14	SER	HB2	3.828	0.02	2
A	10	PHE	CE2	131.884	0.3	1
A	10	PHE	CZ	130.376	0.3	1
A	9	ILE	HB	1.588	0.02	1
A	10	PHE	HB2	3.114	0.02	2
A	7	ASN	HB2	2.637	0.02	2
A	8	ASP	N	120.817	0.3	1
A	16	GLU	HG3	2.148	0.02	1
A	15	GLU	HG2	2.141	0.02	2
A	6	LEU	N	120.587	0.3	1
A	18	GLN	HB3	1.901	0.02	2
A	5	ALA	CA	52.102	0.3	1
A	10	PHE	HE2	7.178	0.02	1
A	21	ASN	CA	53.846	0.3	1
A	13	LEU	HB3	1.452	0.02	1
A	7	ASN	HD22	6.423	0.02	1
A	6	LEU	HD12	0.777	0.02	2
A	6	LEU	CA	54.988	0.3	1
A	21	ASN	C	176.075	0.3	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	10	PHE	N	122.433	0.3	1
A	5	ALA	HB2	1.253	0.02	1
A	9	ILE	HD11	0.594	0.02	1
A	6	LEU	C	177.24	0.3	1
A	12	SER	H	8.1	0.02	1
A	15	GLU	HB2	1.945	0.02	2
A	13	LEU	HD22	0.73	0.02	1
A	7	ASN	CB	38.503	0.3	1
A	19	GLN	CG	33.897	0.3	1
A	1	ALA	C	178.703	0.3	1
A	9	ILE	HA	3.905	0.02	1
A	12	SER	CB	63.188	0.3	1
A	19	GLN	HE22	6.822	0.02	1
A	5	ALA	C	177.972	0.3	1
A	2	GLU	H	8.447	0.02	1
A	13	LEU	HD13	0.73	0.02	1
A	1	ALA	CA	52.535	0.3	1
A	9	ILE	CB	37.722	0.3	1
A	2	GLU	HG2	1.866	0.02	2
A	9	ILE	HG21	0.826	0.02	1
A	8	ASP	H	8.112	0.02	1
A	9	ILE	C	176.373	0.3	1
A	19	GLN	HA	4.084	0.02	1
A	13	LEU	HA	4.255	0.02	1
A	7	ASN	HD21	7.267	0.02	1
A	4	ALA	H	7.96	0.02	1
A	14	SER	N	116.833	0.3	1
A	8	ASP	HB2	2.519	0.02	2
A	18	GLN	HE21	7.368	0.02	1
A	6	LEU	HD11	0.777	0.02	2
A	19	GLN	HG2	2.271	0.02	1
A	3	PHE	HD2	7.02	0.02	1
A	16	GLU	H	8.404	0.02	1
A	18	GLN	HG2	2.275	0.02	1
A	14	SER	C	174.855	0.3	1
A	5	ALA	CB	18.396	0.3	1
A	4	ALA	HB2	1.262	0.02	1
A	19	GLN	H	8.2	0.02	1
A	9	ILE	CD1	12.547	0.3	1
A	3	PHE	CA	57.28	0.3	1
A	8	ASP	C	176.373	0.3	1

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Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	14	SER	CA	57.793	0.3	1
A	13	LEU	HD21	0.73	0.02	1
A	19	GLN	HB2	1.932	0.02	1
A	15	GLU	H	8.454	0.02	1
A	18	GLN	CB	28.233	0.3	1
A	21	ASN	CB	37.908	0.3	1
A	8	ASP	CA	53.679	0.3	1
A	4	ALA	C	177.403	0.3	1
A	12	SER	CA	57.793	0.3	1

### 6.1.2 Chemical shift referencing [i](#)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	116	0.44 $\pm$ 0.22	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	108	0.81 $\pm$ 0.09	Should be applied
$^{13}\text{C}'$	113	0.21 $\pm$ 0.11	None needed (< 0.5 ppm)
$^{15}\text{N}$	112	-0.48 $\pm$ 0.34	None needed (< 0.5 ppm)

### 6.1.3 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 83%, i.e. 894 atoms were assigned a chemical shift out of a possible 1071. 11 out of 21 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	$^1\text{H}$	$^{13}\text{C}$	$^{15}\text{N}$
Backbone	399/427 (93%)	157/170 (92%)	165/174 (95%)	77/83 (93%)
Sidechain	465/610 (76%)	294/354 (83%)	165/222 (74%)	6/34 (18%)
Aromatic	30/34 (88%)	18/18 (100%)	12/16 (75%)	0/0 (—%)
Overall	894/1071 (83%)	469/542 (87%)	342/412 (83%)	83/117 (71%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 83%, i.e. 1019 atoms were assigned a chemical shift out of a possible 1235. 13 out of 23 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	$^1\text{H}$	$^{13}\text{C}$	$^{15}\text{N}$
Backbone	458/495 (93%)	180/197 (91%)	189/202 (94%)	89/96 (93%)
Sidechain	522/697 (75%)	329/405 (81%)	185/253 (73%)	8/39 (21%)

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	Total	<sup>1</sup> H	<sup>13</sup> C	<sup>15</sup> N
Aromatic	39/43 (91%)	23/23 (100%)	16/20 (80%)	0/0 (—%)
Overall	1019/1235 (83%)	532/625 (85%)	390/475 (82%)	97/135 (72%)

#### 6.1.4 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.

Mol	Chain	Res	Type	Atom	Shift, ppm	Expected range, ppm	Z-score
1	A	118	THR	CG2	27.28	27.15 – 15.95	5.1

#### 6.1.5 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:

