Full wwPDB NMR Structure Validation Report (i)

Oct 10, 2021 – 04:17 PM EDT

PDB ID	:	2KF6
Title	:	Barnase bound to d(CGAC) high pressure
Authors	:	Williamson, M.P.; Wilton, D.J.
Deposited on	:	2009-02-11

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 (i) symbol.

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

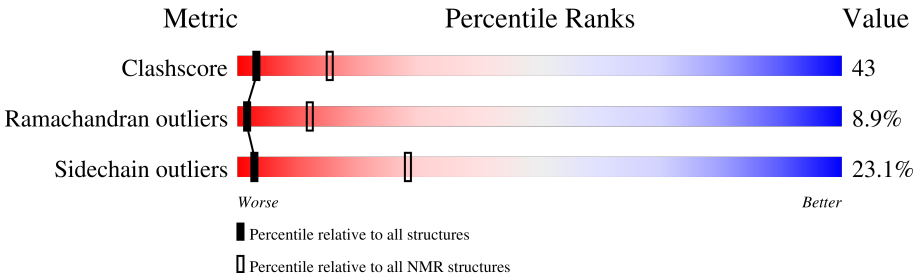
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.23.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment is 19%.

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	110	33% 45% 18% • •

2 Ensemble composition and analysis (i)

This entry contains 10 models. Model 3 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *all equally good*.

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

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:3-A:110 (108)	0.06	3

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 2 single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1691 atoms, of which 832 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Ribonuclease.

Mol	Chain	Residues	Atoms					Trace
			Total	C	H	N	O	
1	A	108	1691	544	832	148	167	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	102	ALA	HIS	engineered mutation	UNP P00648

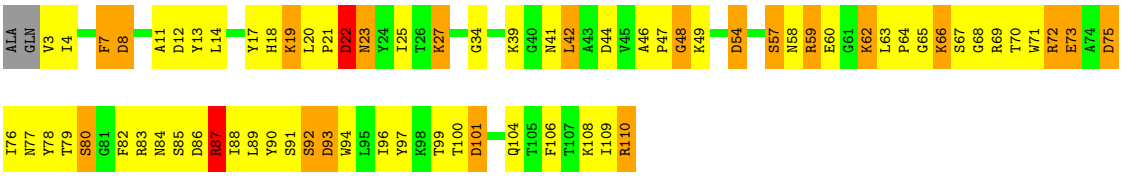
4 Residue-property plots (i)

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: Ribonuclease

Chain A: 33% 45% 18%



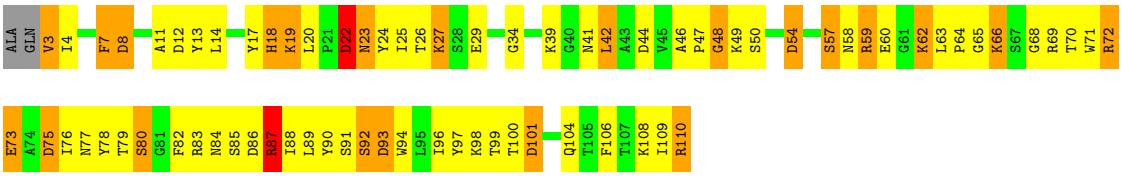
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

• Molecule 1: Ribonuclease

Chain A: 30% 46% 20%



4.2.2 Score per residue for model 2

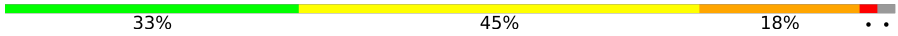
• Molecule 1: Ribonuclease

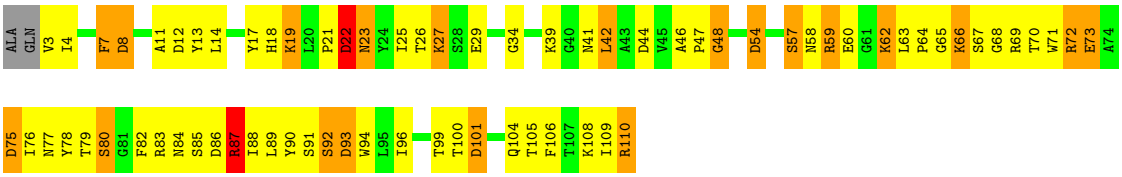
Chain A: 34% 45% 17%

4.2.3 Score per residue for model 3 (medoid)

- Molecule 1: Ribonuclease

Chain A:

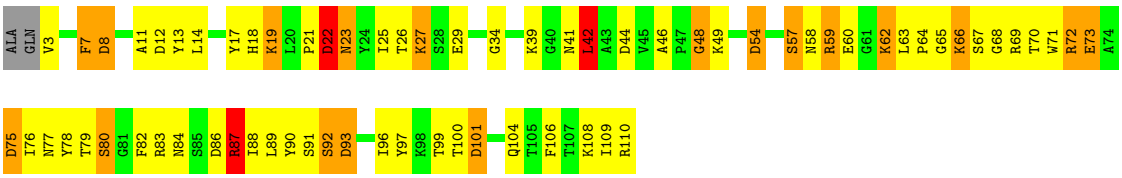




4.2.4 Score per residue for model 4

- Molecule 1: Ribonuclease

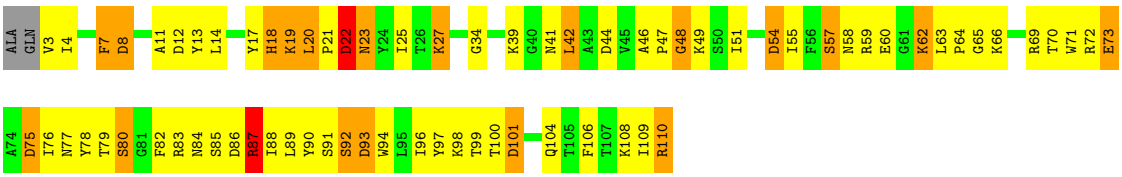
Chain A:



4.2.5 Score per residue for model 5

- Molecule 1: Ribonuclease

Chain A:



4.2.6 Score per residue for model 6

- Molecule 1: Ribonuclease

Chain A: 33% 45% 18%

ALA GLN V3 I4 F7 D8 A11 D12 Y13 L14 Y17 H18 K19 L20 P21 D22 N23 Y24 I25 T26 K27 G34 K39 G40 N41 L42 A43 D44 V45 A46 P47 G48 D54 S57 N58 R59 E60 G61 K62 L63 P64 G65 K66 S67 G68 R69 T70 W71 R72 E73 A74 D75 I76

N77 Y78 T79 S80 G81 F82 R83 N84 S85 D86 R87 I88 L89 Y90 S91 S92 D93 W94 L95 I96 Y97 K98 T99 T100 D101 Q104 T105 F106 T107 K108 I109 R110

4.2.7 Score per residue for model 7

- Molecule 1: Ribonuclease

Chain A: 34% 44% 18%

ALA GLN V3 I4 F7 D8 A11 D12 Y13 L14 Y17 H18 K19 L20 P21 D22 N23 Y24 I25 T26 K27 S28 E29 G34 K39 G40 N41 L42 A43 D44 V45 A46 P47 G48 K49 D54 S57 N58 R59 E60 G61 K62 L63 P64 G65 K66 S67 G68 R69 T70 W71 R72 E73

A74 D75 Y78 T79 S80 G81 F82 R83 N84 S85 D86 R87 I88 L89 Y90 S91 S92 D93 W94 L95 I96 Y97 K98 T99 T100 D101 Q104 T105 F106 T107 K108 I109 R110

4.2.8 Score per residue for model 8

- Molecule 1: Ribonuclease

Chain A: 33% 45% 18%

ALA GLN V3 I4 F7 D8 A11 D12 Y13 L14 Q15 T16 Y17 H18 K19 L20 P21 D22 N23 Y24 I25 T26 K27 L33 G34 K39 G40 N41 L42 A43 D44 V45 A46 P47 G48 K49 D54 S57 N58 R59 E60 G61 K62 L63 P64 G65 K66 S67 G68 R69 T70 W71 R72 E73

A74 D75 I76 N77 Y78 T79 S80 G81 F82 R83 N84 S85 D86 R87 I88 L89 Y90 S91 S92 D93 W94 L95 I96 Y97 K98 T99 T100 D101 Q104 T105 F106 T107 K108 I109 R110

4.2.9 Score per residue for model 9

- Molecule 1: Ribonuclease

Chain A: 35% 44% 18%

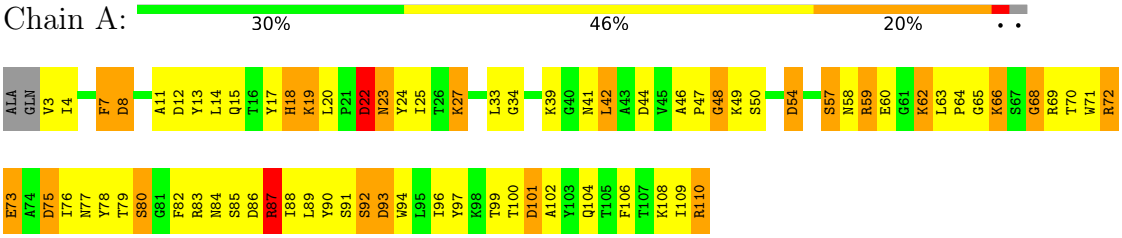
ALA GLN V3 F7 D8 A11 D12 Y13 L14 Y17 H18 K19 L20 P21 D22 N23 Y24 I25 T26 K27 K39 L42 A43 D44 V45 A46 P47 G48 I51 D54 S57 N58 R59 E60 G61 K62 L63 P64 G65 K66 S67 G68 R69 T70 W71 R72 E73 A74 D75 I76 N77 Y78

T79 S80 G81 F82 R83 N84 S85 D86 R87 I88 L89 Y90 S91 S92 D93 W94 L95 I96 Y97 K98 T99 T100 D101 A102 Y103 Q104 T105 F106 T107 K108 I109 R110

4.2.10 Score per residue for model 10

- Molecule 1: Ribonuclease

Chain A:



5 Refinement protocol and experimental data overview (i)

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

Of the 50 calculated structures, 10 were deposited, based on the following criterion: *10 randomly selected*.

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

Software name	Classification	Version
X-PLOR	structure solution	.
X-PLOR	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)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	356
Number of shifts mapped to atoms	356
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	19%

6 Model quality (i)

6.1 Standard geometry (i)

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

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	1.8±0.4
All	All	0	18

There are no bond-length outliers.

There are no bond-angle outliers.

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	87	ARG	Sidechain	10
1	A	59	ARG	Sidechain	8

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	859	832	831	72±4
All	All	8590	8320	8310	719

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 43.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:ALA:HB1	1:A:96:ILE:HD13	0.90	1.44	10	10
1:A:87:ARG:NH1	1:A:87:ARG:HG2	0.78	1.92	7	10
1:A:3:VAL:N	1:A:23:ASN:OD1	0.70	2.24	5	10
1:A:57:SER:OG	1:A:59:ARG:NH1	0.69	2.24	1	10
1:A:14:LEU:O	1:A:18:HIS:ND1	0.69	2.22	10	10
1:A:96:ILE:CG2	1:A:109:ILE:HD11	0.68	2.18	5	10
1:A:96:ILE:HG22	1:A:109:ILE:HD11	0.67	1.66	7	10
1:A:11:ALA:CB	1:A:96:ILE:HD13	0.67	2.20	2	5
1:A:62:LYS:NZ	1:A:62:LYS:O	0.66	2.28	8	10
1:A:87:ARG:HG2	1:A:87:ARG:HH11	0.66	1.50	10	10
1:A:27:LYS:NZ	1:A:73:GLU:OE2	0.66	2.28	4	10
1:A:42:LEU:HD23	1:A:78:TYR:CZ	0.66	2.26	1	8
1:A:79:THR:OG1	1:A:80:SER:N	0.65	2.29	4	10
1:A:65:GLY:O	1:A:69:ARG:NH2	0.65	2.26	1	10
1:A:3:VAL:N	1:A:22:ASP:O	0.64	2.30	1	10
1:A:70:THR:OG1	1:A:92:SER:CB	0.64	2.45	3	10
1:A:13:TYR:OH	1:A:19:LYS:NZ	0.62	2.24	3	10
1:A:87:ARG:NH1	1:A:87:ARG:CG	0.62	2.62	7	10
1:A:59:ARG:HB2	1:A:59:ARG:CZ	0.62	2.23	7	10
1:A:87:ARG:HH11	1:A:87:ARG:CG	0.61	2.08	10	10
1:A:17:TYR:O	1:A:19:LYS:N	0.60	2.34	6	10
1:A:72:ARG:HB2	1:A:90:TYR:CE1	0.60	2.32	7	7
1:A:88:ILE:O	1:A:89:LEU:HD22	0.59	1.98	5	10
1:A:108:LYS:NZ	1:A:110:ARG:O	0.59	2.34	6	10
1:A:19:LYS:NZ	1:A:22:ASP:OD2	0.59	2.34	1	10
1:A:63:LEU:HD21	1:A:106:PHE:CD2	0.58	2.33	6	9
1:A:62:LYS:NZ	1:A:106:PHE:CD1	0.58	2.70	2	10
1:A:75:ASP:OD1	1:A:87:ARG:NE	0.58	2.36	9	10
1:A:72:ARG:HB2	1:A:90:TYR:CZ	0.58	2.34	1	3
1:A:27:LYS:NZ	1:A:54:ASP:OD1	0.57	2.31	8	6
1:A:72:ARG:NE	1:A:90:TYR:CZ	0.57	2.73	7	6
1:A:34:GLY:O	1:A:41:ASN:ND2	0.57	2.35	3	9
1:A:64:PRO:HD2	1:A:71:TRP:CZ2	0.56	2.35	5	8
1:A:46:ALA:O	1:A:48:GLY:N	0.56	2.34	7	10
1:A:72:ARG:NE	1:A:90:TYR:OH	0.56	2.36	5	4
1:A:86:ASP:OD1	1:A:100:THR:HG22	0.56	2.01	6	10
1:A:106:PHE:CD1	1:A:106:PHE:N	0.55	2.74	2	10
1:A:27:LYS:NZ	1:A:54:ASP:OD2	0.55	2.32	3	2
1:A:42:LEU:O	1:A:46:ALA:N	0.55	2.38	9	8
1:A:97:TYR:CE2	1:A:108:LYS:HB2	0.55	2.37	10	9
1:A:69:ARG:HH11	1:A:93:ASP:CG	0.54	2.06	6	10
1:A:70:THR:HG1	1:A:92:SER:CB	0.54	2.15	2	9

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:75:ASP:CG	1:A:87:ARG:HH21	0.54	2.04	5	10
1:A:72:ARG:CB	1:A:90:TYR:CE1	0.54	2.91	7	6
1:A:8:ASP:CG	1:A:110:ARG:HH22	0.53	2.05	10	10
1:A:69:ARG:NH1	1:A:93:ASP:CG	0.53	2.62	6	10
1:A:58:ASN:ND2	1:A:63:LEU:O	0.52	2.42	5	10
1:A:17:TYR:C	1:A:19:LYS:H	0.52	2.07	10	10
1:A:66:LYS:NZ	1:A:68:GLY:O	0.51	2.32	9	9
1:A:27:LYS:HZ2	1:A:54:ASP:CG	0.51	2.07	3	7
1:A:57:SER:CB	1:A:59:ARG:HH12	0.51	2.17	1	9
1:A:101:ASP:CG	1:A:104:GLN:HB2	0.50	2.27	1	10
1:A:18:HIS:CG	1:A:94:TRP:CZ2	0.50	3.00	9	3
1:A:85:SER:OG	1:A:100:THR:O	0.49	2.30	2	8
1:A:27:LYS:HZ1	1:A:73:GLU:CD	0.49	2.10	8	5
1:A:67:SER:O	1:A:67:SER:OG	0.49	2.29	7	6
1:A:64:PRO:O	1:A:71:TRP:NE1	0.49	2.34	6	4
1:A:71:TRP:CZ2	1:A:91:SER:HB3	0.49	2.42	10	9
1:A:46:ALA:HB1	1:A:49:LYS:HB2	0.49	1.84	1	6
1:A:88:ILE:HD11	1:A:96:ILE:HG21	0.49	1.83	9	6
1:A:110:ARG:HG2	1:A:110:ARG:HH11	0.49	1.68	10	10
1:A:8:ASP:OD2	1:A:110:ARG:NH2	0.49	2.34	7	4
1:A:60:GLU:CD	1:A:60:GLU:N	0.49	2.66	5	10
1:A:78:TYR:CG	1:A:79:THR:N	0.49	2.81	7	10
1:A:91:SER:OG	1:A:93:ASP:OD2	0.49	2.30	2	9
1:A:82:PHE:CD2	1:A:83:ARG:N	0.49	2.80	10	10
1:A:70:THR:OG1	1:A:92:SER:HB3	0.49	2.08	5	9
1:A:7:PHE:CE2	1:A:76:ILE:HG21	0.48	2.43	4	7
1:A:7:PHE:CZ	1:A:76:ILE:HG21	0.48	2.44	10	8
1:A:21:PRO:O	1:A:23:ASN:N	0.48	2.45	6	7
1:A:14:LEU:HD21	1:A:20:LEU:HA	0.47	1.85	8	3
1:A:19:LYS:HG2	1:A:19:LYS:O	0.47	2.08	2	5
1:A:70:THR:OG1	1:A:92:SER:OG	0.47	2.32	3	2
1:A:4:ILE:H	1:A:23:ASN:CG	0.46	2.14	2	8
1:A:77:ASN:HD22	1:A:86:ASP:CG	0.46	2.12	3	7
1:A:75:ASP:OD1	1:A:83:ARG:NH1	0.46	2.48	6	9
1:A:19:LYS:O	1:A:20:LEU:C	0.46	2.52	10	2
1:A:8:ASP:HB3	1:A:110:ARG:NH2	0.46	2.25	2	1
1:A:8:ASP:CB	1:A:110:ARG:NH2	0.46	2.78	2	1
1:A:42:LEU:HD23	1:A:78:TYR:CE2	0.46	2.44	1	1
1:A:101:ASP:OD1	1:A:101:ASP:N	0.46	2.49	3	10
1:A:57:SER:CB	1:A:59:ARG:NH1	0.45	2.79	1	2
1:A:59:ARG:CZ	1:A:59:ARG:CB	0.45	2.93	7	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:42:LEU:HD11	1:A:51:ILE:HD11	0.45	1.88	9	1
1:A:71:TRP:CE2	1:A:91:SER:HB3	0.45	2.46	1	6
1:A:69:ARG:NH1	1:A:93:ASP:OD1	0.45	2.37	8	1
1:A:59:ARG:NH1	1:A:59:ARG:CG	0.44	2.79	5	7
1:A:110:ARG:HG2	1:A:110:ARG:NH1	0.44	2.28	2	5
1:A:26:THR:OG1	1:A:29:GLU:OE1	0.44	2.33	3	4
1:A:44:ASP:OD1	1:A:44:ASP:N	0.43	2.49	6	2
1:A:15:GLN:HG3	1:A:96:ILE:HD11	0.43	1.89	8	2
1:A:24:TYR:CD1	1:A:50:SER:O	0.43	2.72	1	2
1:A:20:LEU:HD23	1:A:21:PRO:HD2	0.43	1.89	2	1
1:A:93:ASP:O	1:A:94:TRP:HB2	0.43	2.14	8	3
1:A:110:ARG:NH1	1:A:110:ARG:CG	0.43	2.80	2	1
1:A:19:LYS:O	1:A:19:LYS:HG2	0.43	2.13	3	1
1:A:18:HIS:HB3	1:A:94:TRP:CZ2	0.43	2.49	8	5
1:A:101:ASP:O	1:A:102:ALA:HB3	0.43	2.14	10	2
1:A:22:ASP:O	1:A:23:ASN:HB3	0.43	2.14	10	2
1:A:60:GLU:N	1:A:60:GLU:OE1	0.42	2.50	5	1
1:A:34:GLY:C	1:A:41:ASN:HD21	0.42	2.14	2	5
1:A:80:SER:O	1:A:80:SER:OG	0.42	2.37	10	1
1:A:4:ILE:O	1:A:23:ASN:ND2	0.41	2.53	5	2
1:A:65:GLY:O	1:A:66:LYS:HB3	0.41	2.16	3	1
1:A:72:ARG:HH12	1:A:92:SER:HA	0.41	1.76	1	2
1:A:17:TYR:C	1:A:19:LYS:N	0.41	2.73	10	1
1:A:101:ASP:OD2	1:A:105:THR:HG23	0.41	2.15	3	1
1:A:109:ILE:HG13	1:A:110:ARG:N	0.41	2.31	3	1
1:A:98:LYS:NZ	1:A:98:LYS:HB2	0.41	2.31	5	2
1:A:51:ILE:O	1:A:75:ASP:HB2	0.41	2.15	5	1
1:A:7:PHE:CZ	1:A:98:LYS:NZ	0.41	2.86	9	2
1:A:24:TYR:CE1	1:A:74:ALA:HB1	0.41	2.51	2	2
1:A:66:LYS:HB3	1:A:69:ARG:NH2	0.40	2.32	1	1
1:A:101:ASP:CB	1:A:104:GLN:HB2	0.40	2.46	3	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	106/110 (96%)	82±1 (77±1%)	15±1 (14±1%)	9±1 (9±1%)	1 12
All	All	1060/1100 (96%)	817 (77%)	149 (14%)	94 (9%)	1 12

All 11 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	7	PHE	10
1	A	22	ASP	10
1	A	23	ASN	10
1	A	39	LYS	10
1	A	42	LEU	10
1	A	48	GLY	10
1	A	66	LYS	10
1	A	84	ASN	10
1	A	47	PRO	9
1	A	18	HIS	4
1	A	68	GLY	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	90/91 (99%)	69±1 (77±1%)	21±1 (23±1%)	3 28
All	All	900/910 (99%)	692 (77%)	208 (23%)	3 28

All 26 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	12	ASP	10
1	A	19	LYS	10
1	A	22	ASP	10
1	A	25	ILE	10
1	A	27	LYS	10
1	A	44	ASP	10
1	A	54	ASP	10

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Mol	Chain	Res	Type	Models (Total)
1	A	57	SER	10
1	A	62	LYS	10
1	A	73	GLU	10
1	A	75	ASP	10
1	A	80	SER	10
1	A	87	ARG	10
1	A	92	SER	10
1	A	93	ASP	10
1	A	99	THR	10
1	A	101	ASP	10
1	A	110	ARG	9
1	A	8	ASP	8
1	A	72	ARG	7
1	A	20	LEU	5
1	A	59	ARG	3
1	A	3	VAL	2
1	A	33	LEU	2
1	A	42	LEU	1
1	A	55	ILE	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 monosaccharides in this entry.

6.6 Ligand geometry (i)

There are no ligands in this entry.

6.7 Other polymers (i)

There are no such molecules in this entry.

6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

7 Chemical shift validation (i)

The completeness of assignment taking into account all chemical shift lists is 19% for the well-defined parts and 19% 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 (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	356
Number of shifts mapped to atoms	356
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	6

7.1.2 Chemical shift referencing (i)

No chemical shift referencing corrections were calculated (not enough data).

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 19%, i.e. 254 atoms were assigned a chemical shift out of a possible 1320. 0 out of 11 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	**^{1}H**	**^{13}C**	**^{15}N**
Backbone	137/534 (26%)	137/213 (64%)	0/216 (0%)	0/105 (0%)
Sidechain	117/651 (18%)	117/381 (31%)	0/235 (0%)	0/35 (0%)
Aromatic	0/135 (0%)	0/70 (0%)	0/61 (0%)	0/4 (0%)
Overall	254/1320 (19%)	254/664 (38%)	0/512 (0%)	0/144 (0%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 19%, i.e. 254 atoms were assigned a chemical shift out of a possible 1320. 0 out of 11 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

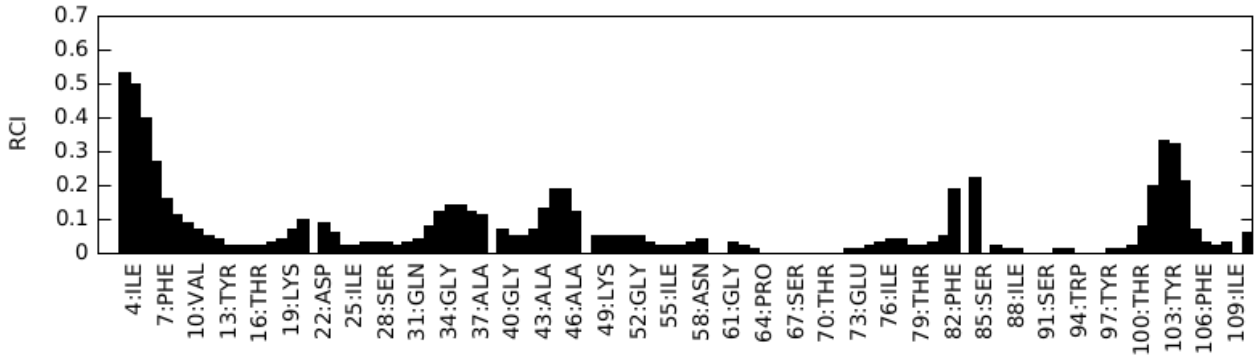
	Total	^{1}H	^{13}C	^{15}N
Backbone	137/534 (26%)	137/213 (64%)	0/216 (0%)	0/105 (0%)
Sidechain	117/651 (18%)	117/381 (31%)	0/235 (0%)	0/35 (0%)
Aromatic	0/135 (0%)	0/70 (0%)	0/61 (0%)	0/4 (0%)
Overall	254/1320 (19%)	254/664 (38%)	0/512 (0%)	0/144 (0%)

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.

Mol	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	98	LYS	HE3	1.31	3.86 – 1.96	-8.4
1	A	76	ILE	HG21	-0.79	2.13 – -0.57	-5.8
1	A	76	ILE	HG22	-0.79	2.13 – -0.57	-5.8
1	A	76	ILE	HG23	-0.79	2.13 – -0.57	-5.8
1	A	63	LEU	HG	-0.22	3.16 – -0.14	-5.2
1	A	72	ARG	HB3	0.35	3.17 – 0.37	-5.1

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: