



Full wwPDB NMR Structure Validation Report ⓘ

May 28, 2020 – 11:28 pm BST

PDB ID : 2M28
Title : NMR structure of Ca²⁺ bound CaBP4 C-domain
Authors : Ames, J.B.
Deposited on : 2012-12-17

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

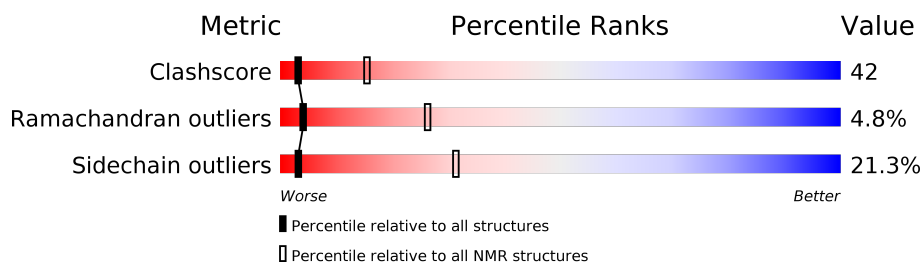
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 65%.

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	171	 8% 19% 5% 10% 58%

2 Ensemble composition and analysis i

This entry contains 14 models. Model 13 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:204-A:232, A:244-A:269 (55)	0.40	13

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 3 clusters and 2 single-model clusters were found.

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

3 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 1126 atoms, of which 555 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Calcium-binding protein 4.

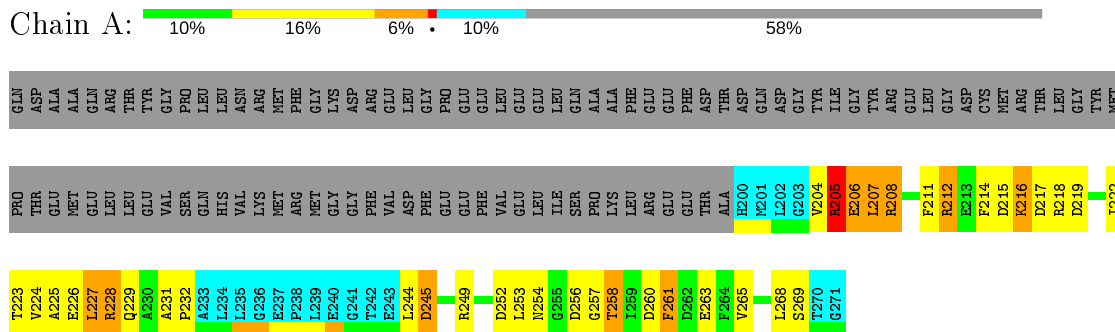
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	72	1124	352	555	98	114	5	0

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

Mol	Chain	Residues	Atoms	
2	A	2	Total	Ca
			2	2

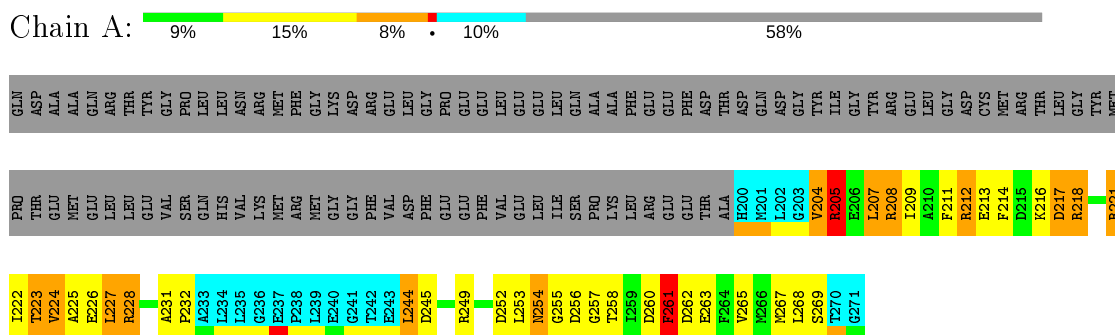
4.2.2 Score per residue for model 2

- Molecule 1: Calcium-binding protein 4



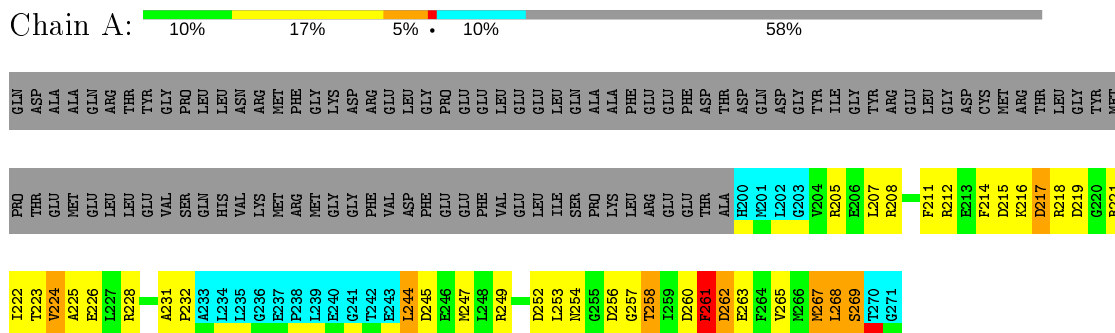
4.2.3 Score per residue for model 3

- Molecule 1: Calcium-binding protein 4



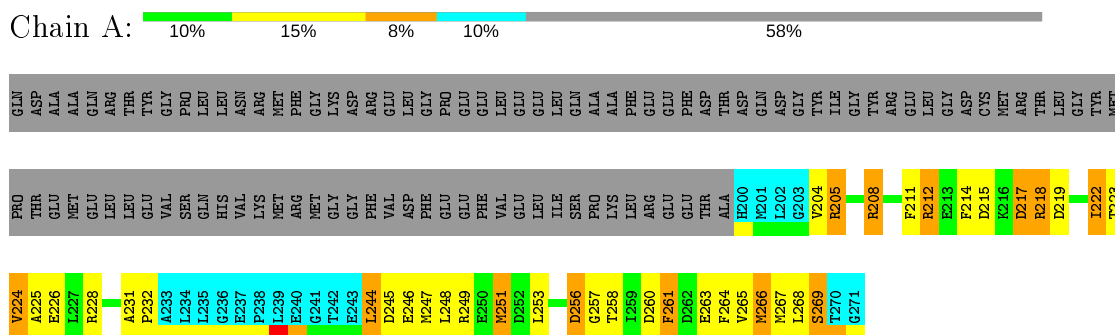
4.2.4 Score per residue for model 4

- Molecule 1: Calcium-binding protein 4



4.2.5 Score per residue for model 5

- Molecule 1: Calcium-binding protein 4



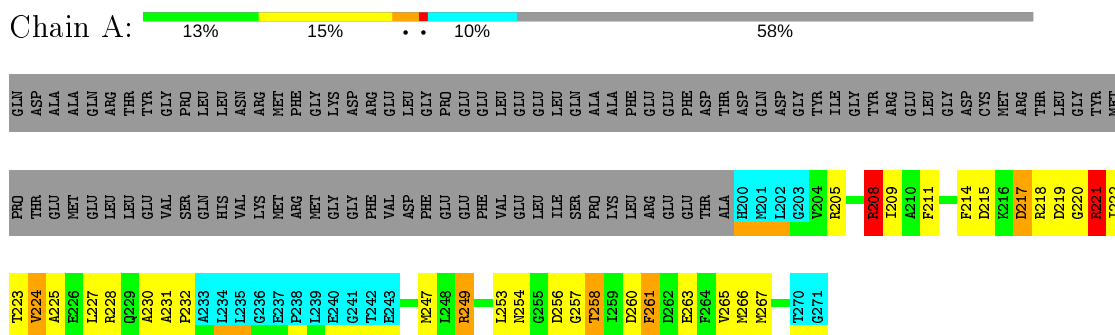
4.2.6 Score per residue for model 6

- Molecule 1: Calcium-binding protein 4



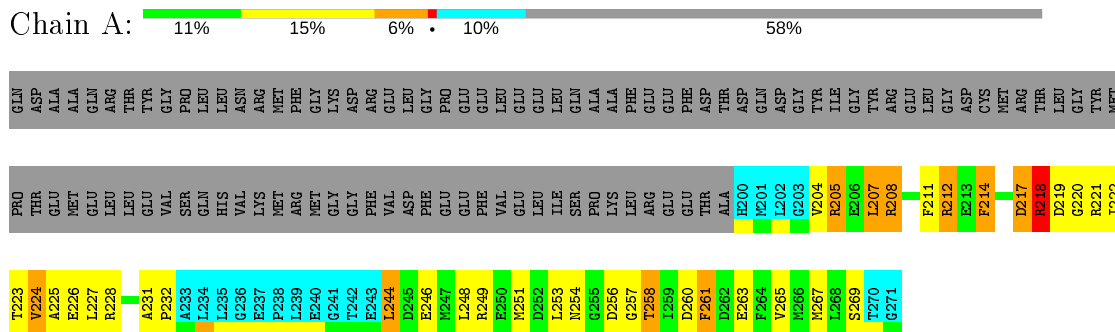
4.2.7 Score per residue for model 7

- Molecule 1: Calcium-binding protein 4



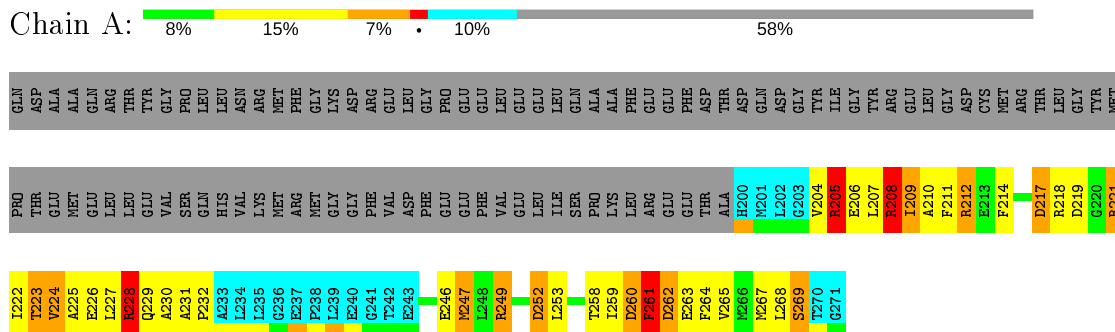
4.2.8 Score per residue for model 8

- Molecule 1: Calcium-binding protein 4



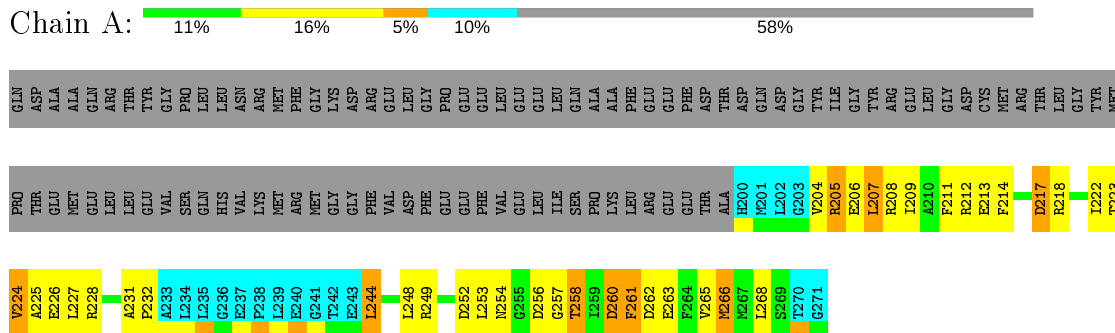
4.2.9 Score per residue for model 9

- Molecule 1: Calcium-binding protein 4



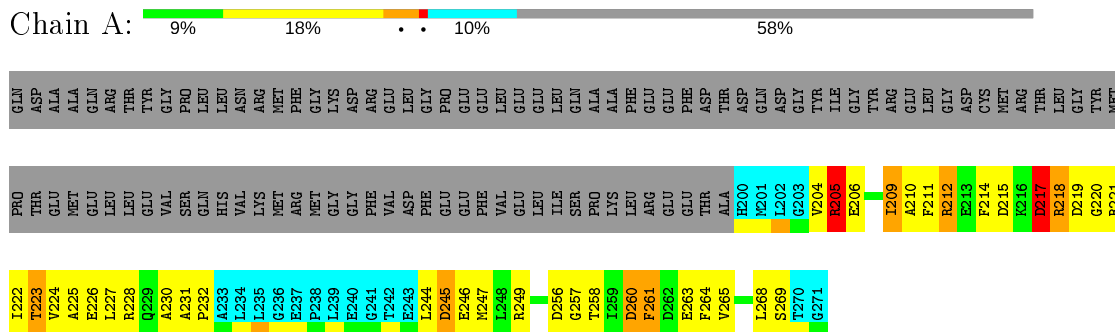
4.2.10 Score per residue for model 10

- Molecule 1: Calcium-binding protein 4



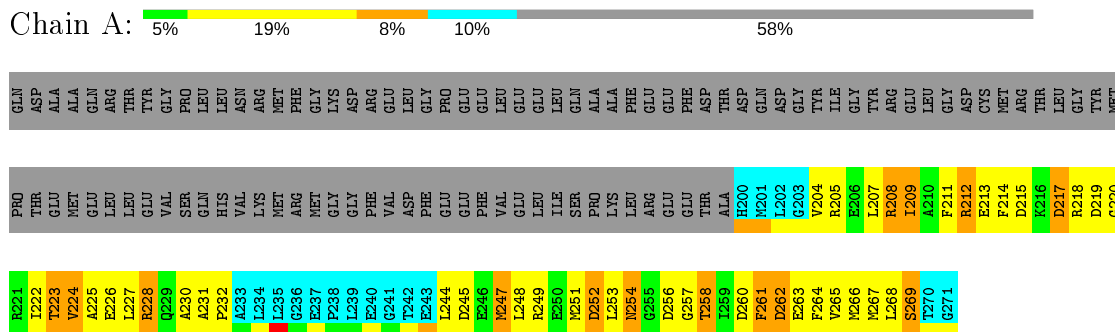
4.2.11 Score per residue for model 11

- Molecule 1: Calcium-binding protein 4



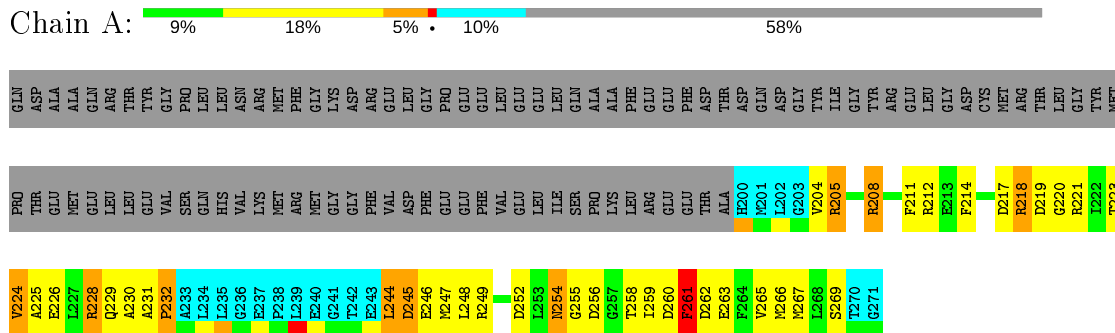
4.2.12 Score per residue for model 12

- Molecule 1: Calcium-binding protein 4



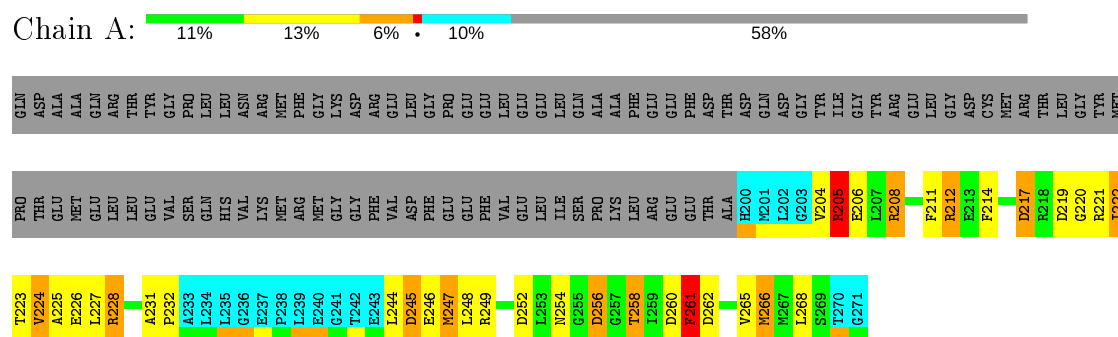
4.2.13 Score per residue for model 13 (medoid)

- Molecule 1: Calcium-binding protein 4



4.2.14 Score per residue for model 14

• Molecule 1: Calcium-binding protein 4



5 Refinement protocol and experimental data overview

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

Of the 70 calculated structures, 14 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	
X-PLOR NIH	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)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1462
Number of shifts mapped to atoms	1462
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	65%

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.

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	6.1±0.7
All	All	0	86

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	228	ARG	Sidechain	14
1	A	205	ARG	Sidechain	13
1	A	212	ARG	Sidechain	13
1	A	249	ARG	Sidechain	13
1	A	218	ARG	Sidechain	12
1	A	208	ARG	Sidechain	11
1	A	221	ARG	Sidechain	10

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	449	439	439	37±6
All	All	6314	6146	6146	522

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 42.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:244:LEU:H	1:A:244:LEU:HD13	0.99	1.11	4	1
1:A:223:THR:HG22	1:A:258:THR:HG22	0.86	1.47	10	11
1:A:244:LEU:HD22	1:A:245:ASP:N	0.82	1.87	4	1
1:A:244:LEU:H	1:A:244:LEU:CD1	0.77	1.91	4	1
1:A:244:LEU:N	1:A:244:LEU:HD13	0.76	1.94	4	1
1:A:231:ALA:N	1:A:232:PRO:CD	0.76	2.48	9	14
1:A:223:THR:HG22	1:A:258:THR:CG2	0.75	2.11	14	6
1:A:208:ARG:NH2	1:A:212:ARG:NE	0.72	2.37	3	1
1:A:211:PHE:CD2	1:A:222:ILE:HD11	0.72	2.20	14	8
1:A:214:PHE:CD1	1:A:214:PHE:N	0.69	2.61	6	9
1:A:268:LEU:CD1	1:A:268:LEU:N	0.69	2.56	14	5
1:A:254:ASN:HD22	1:A:255:GLY:N	0.67	1.87	3	1
1:A:214:PHE:N	1:A:214:PHE:CD1	0.67	2.62	9	5
1:A:228:ARG:HH11	1:A:228:ARG:CG	0.66	2.02	9	1
1:A:207:LEU:N	1:A:207:LEU:CD2	0.66	2.59	3	2
1:A:268:LEU:N	1:A:268:LEU:CD1	0.66	2.58	9	2
1:A:219:ASP:OD1	1:A:221:ARG:N	0.65	2.29	7	1
1:A:256:ASP:OD1	1:A:257:GLY:N	0.65	2.29	1	10
1:A:253:LEU:N	1:A:263:GLU:OE1	0.63	2.31	7	2
1:A:254:ASN:H	1:A:254:ASN:ND2	0.63	1.92	3	1
1:A:244:LEU:HD12	1:A:245:ASP:N	0.63	2.08	2	2
1:A:256:ASP:OD1	1:A:258:THR:N	0.63	2.32	1	1
1:A:219:ASP:OD1	1:A:220:GLY:N	0.63	2.32	12	7
1:A:252:ASP:C	1:A:253:LEU:HD12	0.62	2.14	9	3
1:A:252:ASP:OD1	1:A:255:GLY:N	0.62	2.32	13	1
1:A:254:ASN:ND2	1:A:263:GLU:OE1	0.62	2.31	12	1
1:A:227:LEU:O	1:A:231:ALA:N	0.61	2.33	8	8
1:A:261:PHE:O	1:A:265:VAL:HG23	0.61	1.96	12	13
1:A:256:ASP:N	1:A:256:ASP:OD1	0.61	2.33	8	2
1:A:215:ASP:OD1	1:A:218:ARG:N	0.61	2.34	7	1
1:A:231:ALA:HB3	1:A:232:PRO:HD3	0.60	1.72	14	1
1:A:254:ASN:HD22	1:A:254:ASN:H	0.60	1.39	3	1
1:A:207:LEU:CD2	1:A:207:LEU:N	0.59	2.64	1	2
1:A:205:ARG:NH1	1:A:208:ARG:NE	0.59	2.51	8	1
1:A:231:ALA:N	1:A:232:PRO:HD2	0.58	2.12	7	14
1:A:208:ARG:NH2	1:A:212:ARG:CD	0.58	2.67	3	1
1:A:248:LEU:HD21	1:A:257:GLY:HA2	0.58	1.75	8	1
1:A:219:ASP:OD1	1:A:219:ASP:N	0.58	2.34	9	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:244:LEU:N	1:A:244:LEU:CD1	0.57	2.67	11	2
1:A:262:ASP:N	1:A:262:ASP:OD1	0.57	2.37	12	1
1:A:252:ASP:OD2	1:A:256:ASP:N	0.57	2.37	6	3
1:A:266:MET:SD	1:A:266:MET:C	0.57	2.83	10	1
1:A:260:ASP:O	1:A:262:ASP:N	0.57	2.37	3	6
1:A:268:LEU:HD12	1:A:268:LEU:N	0.57	2.13	14	6
1:A:253:LEU:N	1:A:263:GLU:OE2	0.57	2.37	8	1
1:A:223:THR:O	1:A:225:ALA:N	0.57	2.38	9	14
1:A:227:LEU:O	1:A:230:ALA:N	0.56	2.37	9	2
1:A:205:ARG:CD	1:A:205:ARG:H	0.56	2.13	14	2
1:A:207:LEU:HD23	1:A:207:LEU:N	0.56	2.15	8	2
1:A:258:THR:HG22	1:A:259:ILE:H	0.55	1.60	9	2
1:A:217:ASP:N	1:A:217:ASP:OD1	0.55	2.40	10	3
1:A:217:ASP:C	1:A:218:ARG:CG	0.55	2.75	3	4
1:A:254:ASN:ND2	1:A:254:ASN:N	0.55	2.53	3	1
1:A:252:ASP:O	1:A:253:LEU:HD12	0.55	2.00	4	3
1:A:244:LEU:O	1:A:247:MET:N	0.55	2.40	12	4
1:A:223:THR:C	1:A:225:ALA:N	0.55	2.59	3	14
1:A:262:ASP:OD1	1:A:263:GLU:N	0.55	2.40	4	1
1:A:223:THR:CG2	1:A:258:THR:HG23	0.55	2.32	13	1
1:A:228:ARG:NH1	1:A:228:ARG:CG	0.54	2.67	9	1
1:A:260:ASP:OD1	1:A:261:PHE:N	0.54	2.40	2	2
1:A:205:ARG:HH11	1:A:208:ARG:HE	0.54	1.46	8	1
1:A:204:VAL:O	1:A:206:GLU:N	0.54	2.40	9	4
1:A:254:ASN:O	1:A:254:ASN:ND2	0.54	2.40	2	1
1:A:256:ASP:OD2	1:A:258:THR:OG1	0.54	2.26	14	6
1:A:223:THR:O	1:A:226:GLU:N	0.53	2.41	5	13
1:A:207:LEU:N	1:A:207:LEU:HD22	0.53	2.19	12	3
1:A:262:ASP:CG	1:A:263:GLU:N	0.53	2.61	4	1
1:A:260:ASP:O	1:A:263:GLU:N	0.53	2.41	8	9
1:A:217:ASP:OD1	1:A:217:ASP:N	0.53	2.41	12	3
1:A:245:ASP:OD1	1:A:245:ASP:N	0.53	2.41	12	1
1:A:260:ASP:C	1:A:262:ASP:N	0.53	2.62	3	6
1:A:211:PHE:CG	1:A:222:ILE:HD11	0.53	2.38	6	8
1:A:204:VAL:CG1	1:A:261:PHE:CZ	0.53	2.91	5	1
1:A:251:MET:O	1:A:267:MET:SD	0.53	2.66	12	1
1:A:205:ARG:CD	1:A:205:ARG:N	0.53	2.71	14	2
1:A:266:MET:O	1:A:266:MET:SD	0.52	2.67	10	1
1:A:205:ARG:HH11	1:A:208:ARG:NE	0.52	2.02	8	1
1:A:216:LYS:NZ	1:A:229:GLN:O	0.52	2.41	2	1
1:A:254:ASN:HD22	1:A:255:GLY:H	0.52	1.48	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:262:ASP:OD1	1:A:262:ASP:N	0.51	2.42	14	1
1:A:256:ASP:CG	1:A:258:THR:OG1	0.51	2.48	14	4
1:A:251:MET:SD	1:A:267:MET:CE	0.51	2.99	8	1
1:A:256:ASP:C	1:A:256:ASP:OD1	0.51	2.50	1	1
1:A:264:PHE:CZ	1:A:268:LEU:CD2	0.50	2.94	1	1
1:A:205:ARG:NH1	1:A:208:ARG:CZ	0.50	2.74	8	1
1:A:244:LEU:N	1:A:244:LEU:HD12	0.50	2.20	11	1
1:A:266:MET:SD	1:A:266:MET:O	0.50	2.69	14	1
1:A:252:ASP:OD2	1:A:257:GLY:N	0.50	2.44	12	2
1:A:228:ARG:O	1:A:232:PRO:CG	0.50	2.58	14	3
1:A:261:PHE:O	1:A:265:VAL:CG2	0.50	2.60	3	12
1:A:254:ASN:HD22	1:A:254:ASN:N	0.50	2.00	3	2
1:A:263:GLU:O	1:A:265:VAL:N	0.50	2.45	11	1
1:A:254:ASN:N	1:A:254:ASN:ND2	0.50	2.59	10	2
1:A:215:ASP:C	1:A:217:ASP:H	0.50	2.10	4	2
1:A:254:ASN:CG	1:A:263:GLU:OE2	0.49	2.50	4	1
1:A:256:ASP:CG	1:A:258:THR:HG1	0.49	2.10	14	1
1:A:244:LEU:O	1:A:246:GLU:N	0.49	2.46	11	3
1:A:260:ASP:OD1	1:A:260:ASP:N	0.49	2.45	3	2
1:A:204:VAL:C	1:A:206:GLU:N	0.49	2.65	9	4
1:A:251:MET:SD	1:A:267:MET:HE1	0.49	2.48	8	1
1:A:262:ASP:OD1	1:A:262:ASP:C	0.49	2.50	4	1
1:A:268:LEU:N	1:A:268:LEU:HD12	0.49	2.23	9	1
1:A:263:GLU:C	1:A:265:VAL:N	0.49	2.66	11	1
1:A:260:ASP:N	1:A:260:ASP:OD1	0.48	2.45	14	1
1:A:256:ASP:OD1	1:A:258:THR:OG1	0.48	2.31	1	1
1:A:221:ARG:NH1	1:A:223:THR:CG2	0.48	2.76	7	1
1:A:215:ASP:OD2	1:A:218:ARG:N	0.48	2.46	1	1
1:A:221:ARG:NH1	1:A:260:ASP:OD2	0.48	2.46	3	1
1:A:244:LEU:C	1:A:244:LEU:HD22	0.48	2.29	4	1
1:A:224:VAL:HG13	1:A:225:ALA:N	0.48	2.24	10	7
1:A:209:ILE:CG2	1:A:210:ALA:N	0.48	2.77	11	2
1:A:223:THR:CG2	1:A:258:THR:HG22	0.47	2.33	1	4
1:A:216:LYS:C	1:A:217:ASP:OD1	0.47	2.51	6	2
1:A:260:ASP:N	1:A:263:GLU:OE2	0.47	2.45	5	1
1:A:223:THR:O	1:A:224:VAL:C	0.47	2.53	13	14
1:A:209:ILE:O	1:A:213:GLU:CG	0.47	2.63	12	4
1:A:215:ASP:OD2	1:A:219:ASP:OD1	0.47	2.31	2	3
1:A:209:ILE:HG22	1:A:210:ALA:N	0.47	2.25	9	3
1:A:215:ASP:CG	1:A:219:ASP:OD1	0.47	2.53	12	1
1:A:248:LEU:O	1:A:252:ASP:N	0.47	2.48	10	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:215:ASP:OD2	1:A:217:ASP:OD1	0.47	2.32	11	1
1:A:254:ASN:ND2	1:A:255:GLY:N	0.47	2.62	3	1
1:A:204:VAL:HG13	1:A:261:PHE:CZ	0.46	2.45	5	1
1:A:244:LEU:HD23	1:A:244:LEU:N	0.46	2.26	8	1
1:A:211:PHE:CZ	1:A:222:ILE:HG13	0.46	2.46	5	4
1:A:211:PHE:CZ	1:A:222:ILE:CG1	0.46	2.98	5	2
1:A:244:LEU:O	1:A:245:ASP:C	0.46	2.53	14	6
1:A:258:THR:HG22	1:A:259:ILE:N	0.46	2.25	9	2
1:A:228:ARG:O	1:A:232:PRO:CD	0.46	2.64	13	2
1:A:267:MET:SD	1:A:268:LEU:CD1	0.46	3.04	4	2
1:A:217:ASP:OD1	1:A:219:ASP:OD1	0.46	2.33	13	1
1:A:260:ASP:O	1:A:261:PHE:C	0.45	2.54	2	10
1:A:246:GLU:CG	1:A:247:MET:N	0.45	2.78	9	1
1:A:254:ASN:N	1:A:263:GLU:OE2	0.45	2.49	10	1
1:A:217:ASP:CG	1:A:217:ASP:O	0.45	2.53	14	1
1:A:217:ASP:O	1:A:219:ASP:N	0.45	2.49	8	3
1:A:208:ARG:HH22	1:A:212:ARG:NE	0.45	2.06	3	1
1:A:265:VAL:O	1:A:266:MET:C	0.45	2.55	10	4
1:A:208:ARG:O	1:A:212:ARG:N	0.45	2.48	14	2
1:A:254:ASN:ND2	1:A:263:GLU:OE2	0.45	2.49	10	1
1:A:254:ASN:CG	1:A:256:ASP:OD2	0.45	2.55	12	1
1:A:260:ASP:C	1:A:262:ASP:H	0.45	2.14	13	3
1:A:246:GLU:HG3	1:A:247:MET:N	0.45	2.27	9	1
1:A:252:ASP:OD2	1:A:256:ASP:OD1	0.45	2.34	4	1
1:A:268:LEU:H	1:A:268:LEU:CD1	0.44	2.25	12	2
1:A:227:LEU:O	1:A:231:ALA:HB2	0.44	2.12	6	1
1:A:265:VAL:O	1:A:269:SER:N	0.44	2.43	2	2
1:A:214:PHE:CB	1:A:222:ILE:HG21	0.44	2.42	7	1
1:A:253:LEU:CD1	1:A:253:LEU:N	0.44	2.80	1	1
1:A:204:VAL:O	1:A:204:VAL:CG1	0.44	2.66	12	1
1:A:217:ASP:C	1:A:219:ASP:N	0.44	2.70	9	3
1:A:204:VAL:O	1:A:205:ARG:C	0.44	2.54	2	5
1:A:219:ASP:OD1	1:A:219:ASP:C	0.44	2.56	7	1
1:A:264:PHE:CZ	1:A:268:LEU:HD21	0.44	2.47	1	1
1:A:224:VAL:CG1	1:A:225:ALA:N	0.44	2.80	10	3
1:A:211:PHE:CE2	1:A:222:ILE:HG13	0.44	2.47	14	1
1:A:247:MET:N	1:A:247:MET:SD	0.43	2.91	4	1
1:A:265:VAL:HG12	1:A:269:SER:OG	0.43	2.13	5	1
1:A:264:PHE:CE2	1:A:268:LEU:CD2	0.43	3.01	9	1
1:A:244:LEU:C	1:A:246:GLU:N	0.43	2.71	11	3
1:A:265:VAL:O	1:A:267:MET:N	0.43	2.51	5	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:204:VAL:CG1	1:A:204:VAL:O	0.43	2.67	1	4
1:A:211:PHE:CD1	1:A:211:PHE:C	0.43	2.91	4	3
1:A:248:LEU:O	1:A:251:MET:N	0.43	2.51	12	1
1:A:205:ARG:HD2	1:A:205:ARG:N	0.43	2.29	13	1
1:A:228:ARG:NH1	1:A:229:GLN:NE2	0.43	2.67	13	1
1:A:227:LEU:O	1:A:231:ALA:CB	0.43	2.67	8	4
1:A:204:VAL:HG11	1:A:261:PHE:CE2	0.43	2.49	2	2
1:A:260:ASP:O	1:A:264:PHE:N	0.43	2.46	12	1
1:A:204:VAL:HG12	1:A:204:VAL:O	0.42	2.13	11	1
1:A:207:LEU:CD1	1:A:265:VAL:HG13	0.42	2.43	9	1
1:A:265:VAL:O	1:A:269:SER:CB	0.42	2.67	12	2
1:A:211:PHE:C	1:A:211:PHE:CD1	0.42	2.93	3	2
1:A:207:LEU:N	1:A:207:LEU:HD23	0.42	2.29	4	2
1:A:261:PHE:CD1	1:A:265:VAL:HG23	0.42	2.49	7	1
1:A:206:GLU:N	1:A:206:GLU:CD	0.42	2.69	14	1
1:A:253:LEU:C	1:A:254:ASN:HD22	0.42	2.17	10	1
1:A:217:ASP:OD1	1:A:219:ASP:CG	0.42	2.57	13	1
1:A:214:PHE:HB2	1:A:222:ILE:HG21	0.42	1.91	7	1
1:A:244:LEU:CD2	1:A:244:LEU:C	0.42	2.88	4	1
1:A:247:MET:O	1:A:251:MET:N	0.42	2.44	5	1
1:A:254:ASN:HD21	1:A:263:GLU:CG	0.42	2.28	13	1
1:A:205:ARG:HD3	1:A:205:ARG:H	0.42	1.75	14	1
1:A:254:ASN:OD1	1:A:254:ASN:N	0.42	2.52	12	1
1:A:256:ASP:OD1	1:A:256:ASP:N	0.41	2.48	4	1
1:A:264:PHE:CD1	1:A:264:PHE:C	0.41	2.93	6	1
1:A:217:ASP:O	1:A:218:ARG:C	0.41	2.58	7	2
1:A:268:LEU:H	1:A:268:LEU:HD13	0.41	1.74	9	1
1:A:204:VAL:O	1:A:204:VAL:HG12	0.41	2.14	1	2
1:A:207:LEU:HD23	1:A:207:LEU:H	0.41	1.76	3	1
1:A:254:ASN:OD1	1:A:256:ASP:CG	0.41	2.59	2	1
1:A:268:LEU:O	1:A:269:SER:C	0.41	2.59	5	1
1:A:215:ASP:OD2	1:A:218:ARG:CA	0.41	2.69	1	1
1:A:244:LEU:O	1:A:248:LEU:N	0.41	2.44	10	1
1:A:256:ASP:O	1:A:256:ASP:OD1	0.41	2.39	14	1
1:A:208:ARG:O	1:A:209:ILE:C	0.41	2.60	7	2
1:A:215:ASP:CG	1:A:217:ASP:OD1	0.40	2.59	1	1
1:A:211:PHE:CE2	1:A:222:ILE:CG1	0.40	3.03	14	1
1:A:215:ASP:C	1:A:217:ASP:N	0.40	2.75	4	1
1:A:226:GLU:O	1:A:230:ALA:N	0.40	2.54	11	1
1:A:208:ARG:HH22	1:A:212:ARG:CZ	0.40	2.28	3	1
1:A:263:GLU:O	1:A:264:PHE:C	0.40	2.60	5	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	55/171 (32%)	43±2 (79±3%)	9±2 (17±3%)	3±1 (5±2%)	4	26
All	All	770/2394 (32%)	605 (79%)	128 (17%)	37 (5%)	4	26

All 10 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	224	VAL	12
1	A	269	SER	7
1	A	261	PHE	6
1	A	245	ASP	3
1	A	205	ARG	3
1	A	217	ASP	2
1	A	204	VAL	1
1	A	266	MET	1
1	A	218	ARG	1
1	A	264	PHE	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	48/145 (33%)	38±2 (79±4%)	10±2 (21±4%)	3	31
All	All	672/2030 (33%)	529 (79%)	143 (21%)	3	31

All 37 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	261	PHE	12
1	A	217	ASP	11
1	A	258	THR	9
1	A	244	LEU	8
1	A	254	ASN	7
1	A	267	MET	6
1	A	208	ARG	6
1	A	212	ARG	6
1	A	247	MET	4
1	A	209	ILE	4
1	A	205	ARG	4
1	A	227	LEU	4
1	A	228	ARG	4
1	A	223	THR	4
1	A	207	LEU	4
1	A	260	ASP	4
1	A	252	ASP	3
1	A	248	LEU	3
1	A	229	GLN	3
1	A	256	ASP	3
1	A	253	LEU	3
1	A	266	MET	3
1	A	214	PHE	3
1	A	262	ASP	3
1	A	218	ARG	2
1	A	222	ILE	2
1	A	221	ARG	2
1	A	268	LEU	2
1	A	216	LYS	2
1	A	249	ARG	2
1	A	219	ASP	2
1	A	246	GLU	2
1	A	245	ASP	2
1	A	251	MET	1
1	A	206	GLU	1
1	A	232	PRO	1
1	A	269	SER	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 2 ligands modelled in this entry, 2 are 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 65% 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	1462
Number of shifts mapped to atoms	1462
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	1

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
$^{13}\text{C}_\alpha$	162	-0.26 ± 0.09	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	145	0.54 ± 0.15	Should be applied
$^{13}\text{C}'$	150	-0.37 ± 0.14	None needed (< 0.5 ppm)
^{15}N	156	0.93 ± 0.32	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 65%, i.e. 465 atoms were assigned a chemical shift out of a possible 710. 6 out of 9 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	272/273 (100%)	108/109 (99%)	110/110 (100%)	54/54 (100%)
Sidechain	178/401 (44%)	95/233 (41%)	83/144 (58%)	0/24 (0%)

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	Total	¹ H	¹³ C	¹⁵ N
Aromatic	15/36 (42%)	15/20 (75%)	0/16 (0%)	0/0 (—%)
Overall	465/710 (65%)	218/362 (60%)	193/270 (71%)	54/78 (69%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 66%, i.e. 584 atoms were assigned a chemical shift out of a possible 887. 7 out of 13 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	348/356 (98%)	138/142 (97%)	142/144 (99%)	68/70 (97%)
Sidechain	221/488 (45%)	119/283 (42%)	102/181 (56%)	0/24 (0%)
Aromatic	15/43 (35%)	15/24 (62%)	0/18 (0%)	0/1 (0%)
Overall	584/887 (66%)	272/449 (61%)	244/343 (71%)	68/95 (72%)

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	159	TYR	C	120.70	185.42 – 165.42	-27.4

7.1.5 Random Coil Index (RCI) plots [i](#)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.

Random coil index (RCI) for chain A:

