



Full wwPDB NMR Structure Validation Report ⓘ

Mar 6, 2026 – 03:41 PM UTC

PDB ID : 1TVJ / pdb_00001tvj
Title : Solution Structure of chick cofilin
Authors : Gorbatyuk, V.Y.; Nosworthy, N.J.; Robson, S.A.; Maciejewski, M.W.; dos Remedios, C.G.; King, G.F.
Deposited on : 2004-06-29

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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

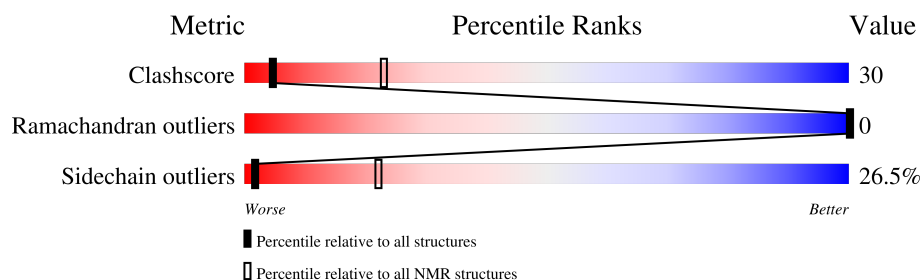
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

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	166	

2 Ensemble composition and analysis

This entry contains 20 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: *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:5-A:161 (157)	0.31	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 2 clusters and 1 single-model cluster was found.

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

3 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 2670 atoms, of which 1358 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Cofilin.

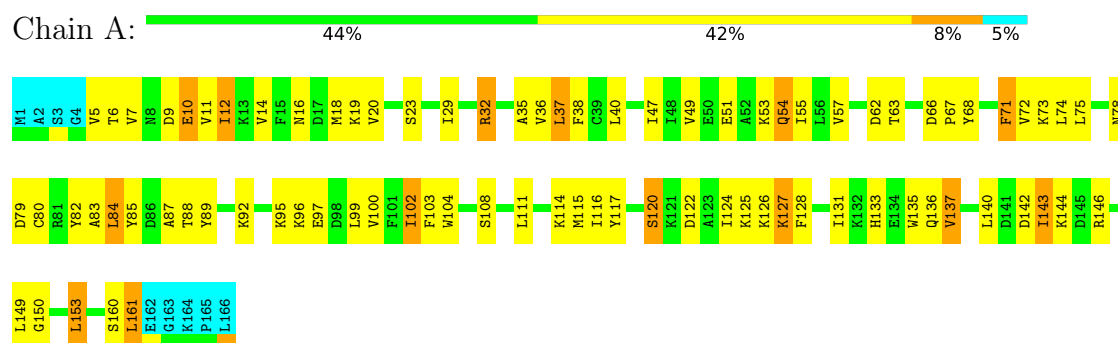
Mol	Chain	Residues	Atoms						Trace
1	A	166	Total	C	H	N	O	S	0
			2670	840	1358	214	253	5	

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: Cofilin

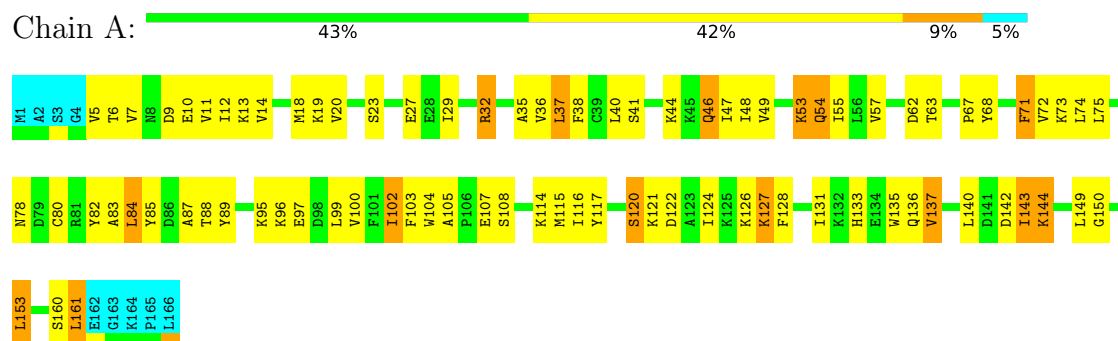


4.2 Scores per residue for each member of the ensemble

Colouring as in section [4.1](#) above.

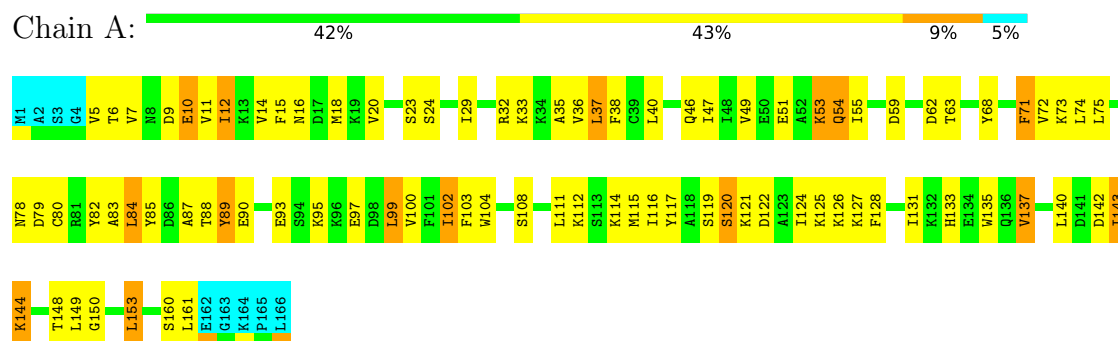
4.2.1 Score per residue for model 1

- Molecule 1: Cofilin



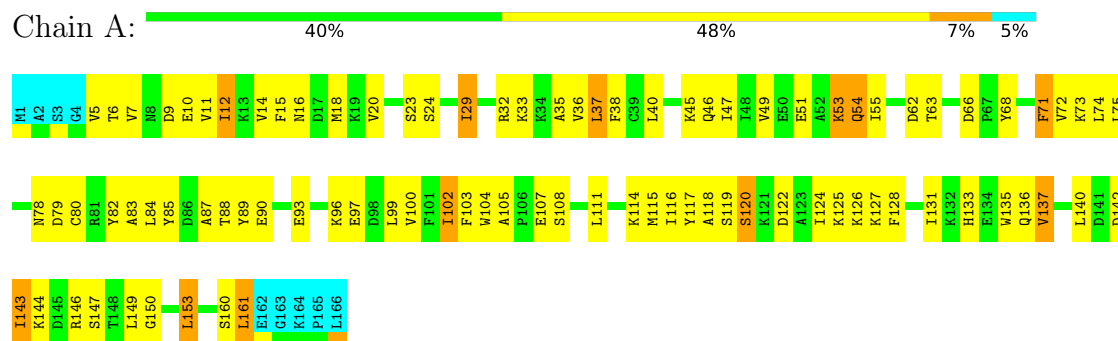
4.2.2 Score per residue for model 2

• Molecule 1: Cofilin



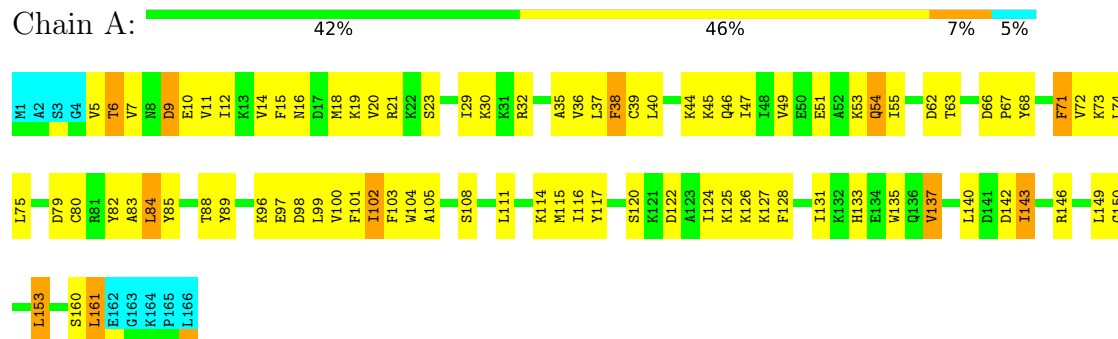
4.2.3 Score per residue for model 3 (medoid)

• Molecule 1: Cofilin



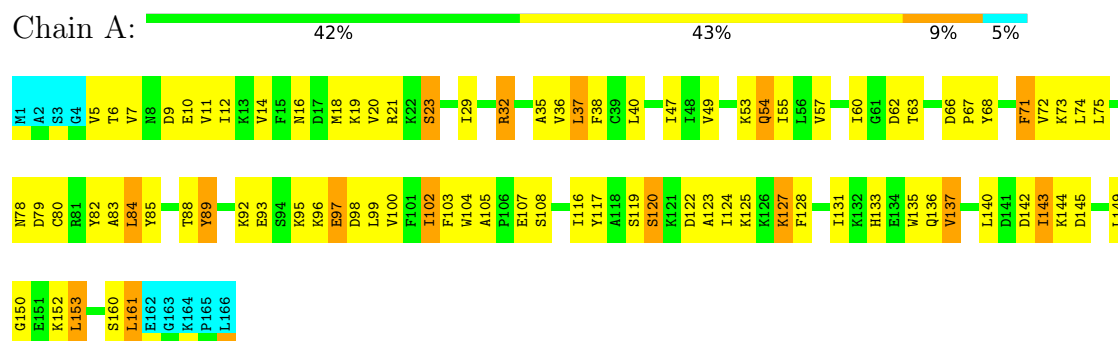
4.2.4 Score per residue for model 4

• Molecule 1: Cofilin



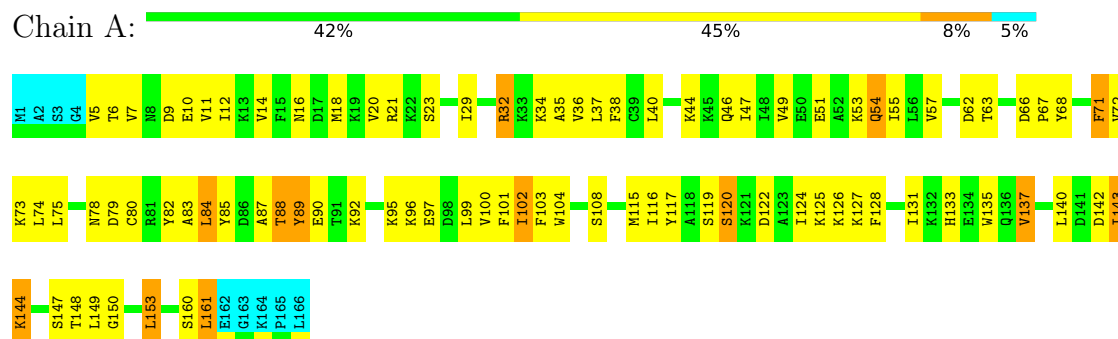
4.2.5 Score per residue for model 5

• Molecule 1: Cofilin



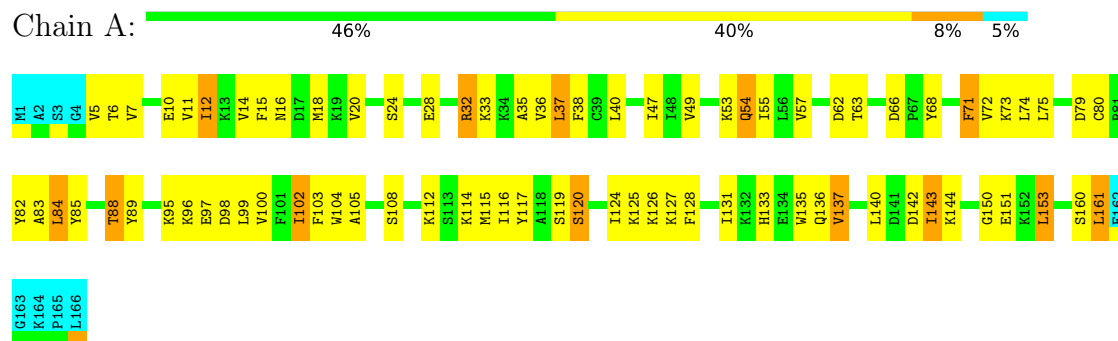
4.2.6 Score per residue for model 6

• Molecule 1: Cofilin



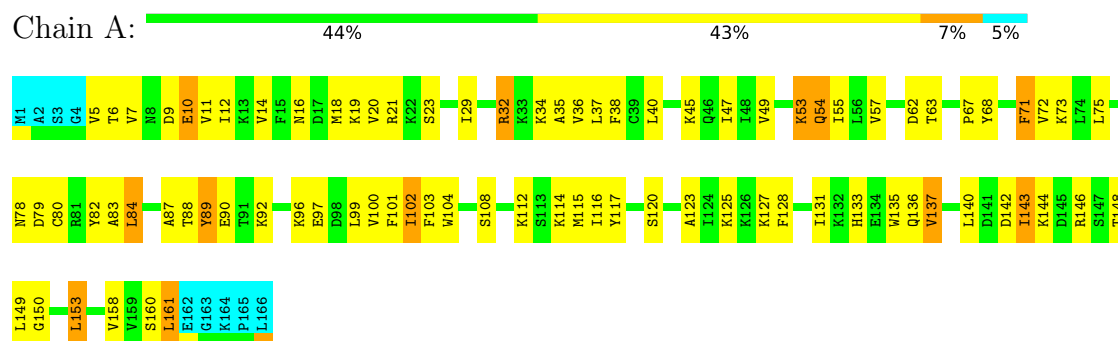
4.2.7 Score per residue for model 7

• Molecule 1: Cofilin



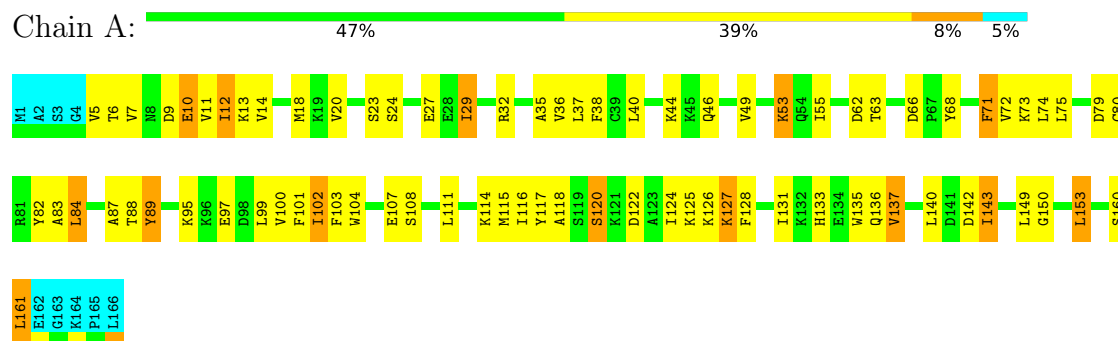
4.2.8 Score per residue for model 8

• Molecule 1: Cofilin



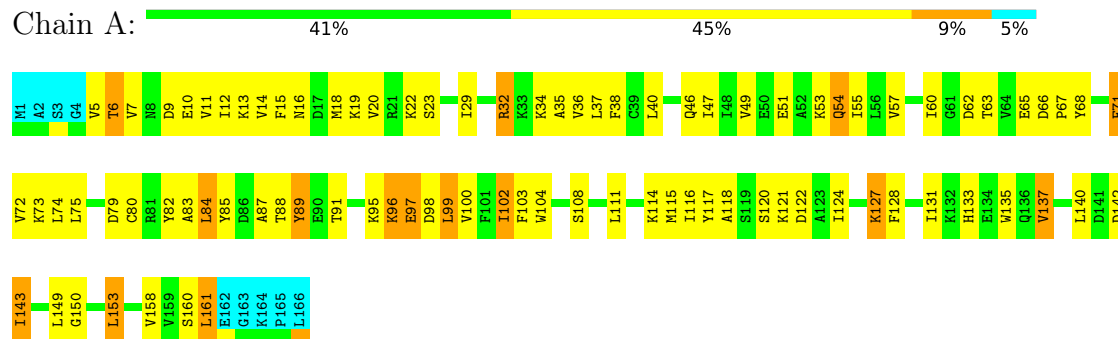
4.2.9 Score per residue for model 9

• Molecule 1: Cofilin



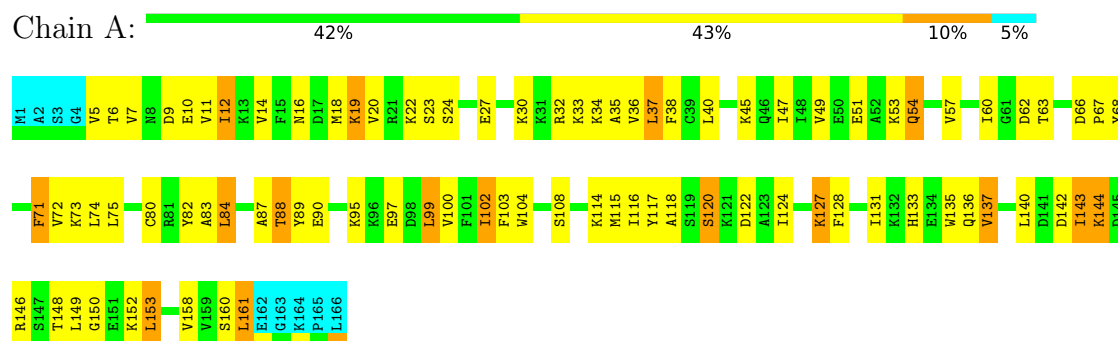
4.2.10 Score per residue for model 10

• Molecule 1: Cofilin



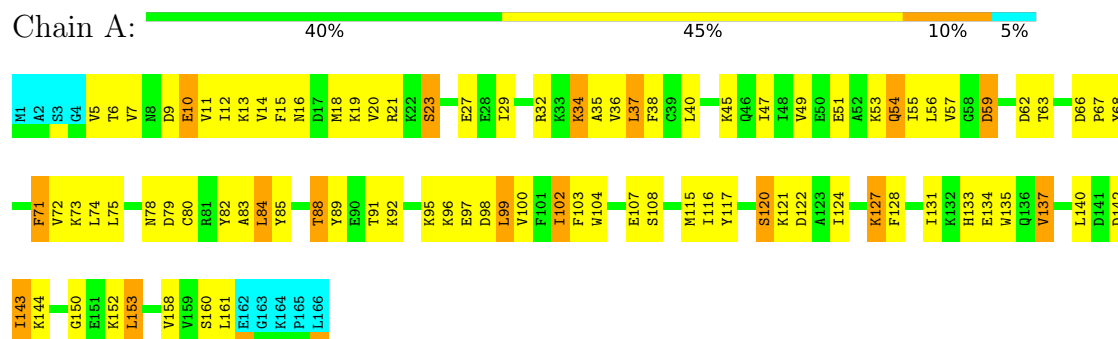
4.2.11 Score per residue for model 11

- Molecule 1: Cofilin



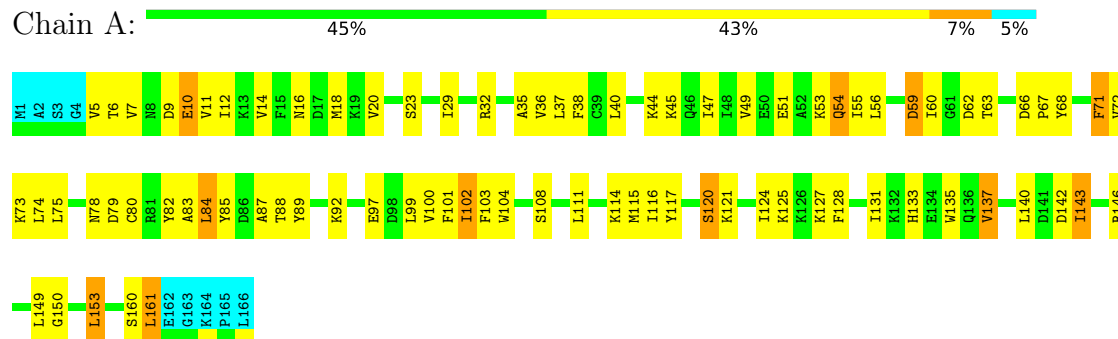
4.2.12 Score per residue for model 12

- Molecule 1: Cofilin



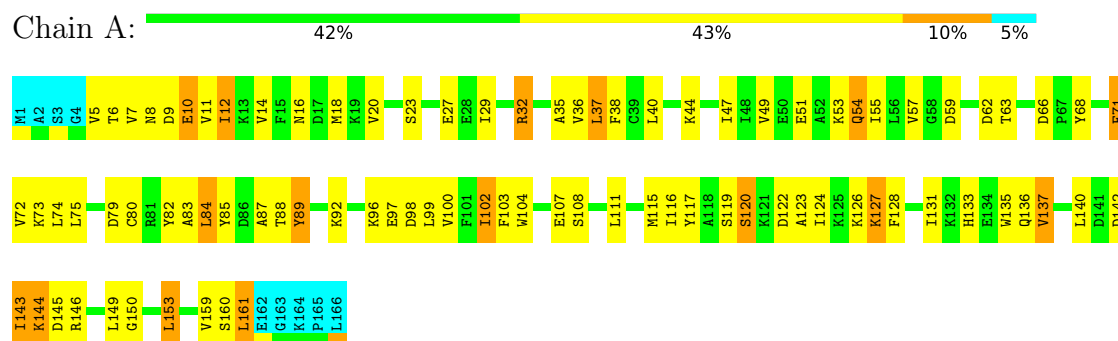
4.2.13 Score per residue for model 13

- Molecule 1: Cofilin



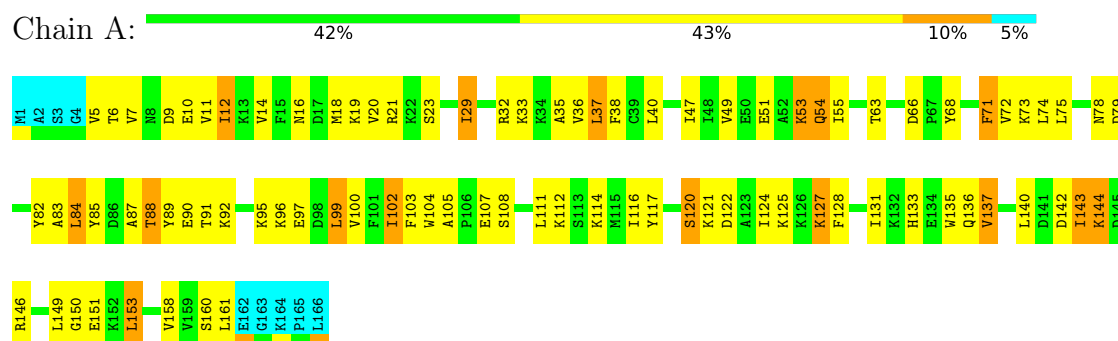
4.2.14 Score per residue for model 14

- Molecule 1: Cofilin



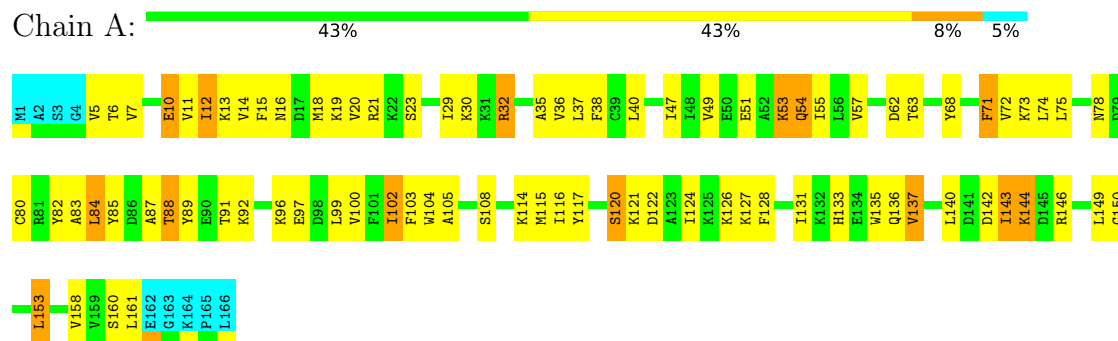
4.2.15 Score per residue for model 15

- Molecule 1: Cofilin



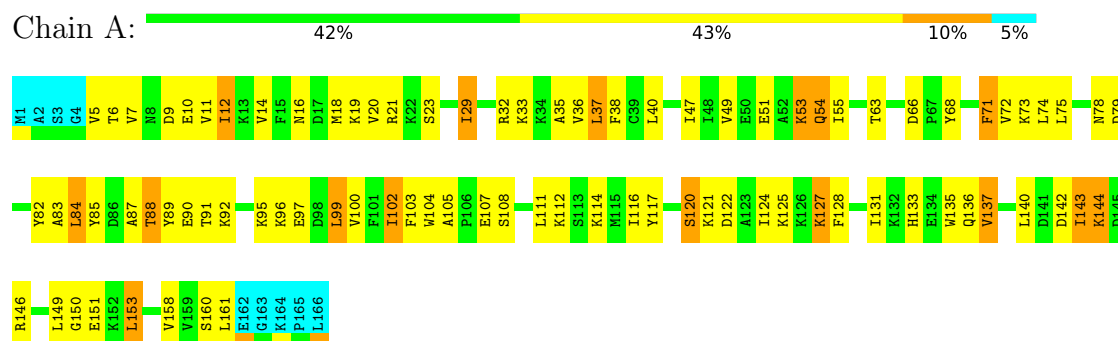
4.2.16 Score per residue for model 16

- Molecule 1: Cofilin



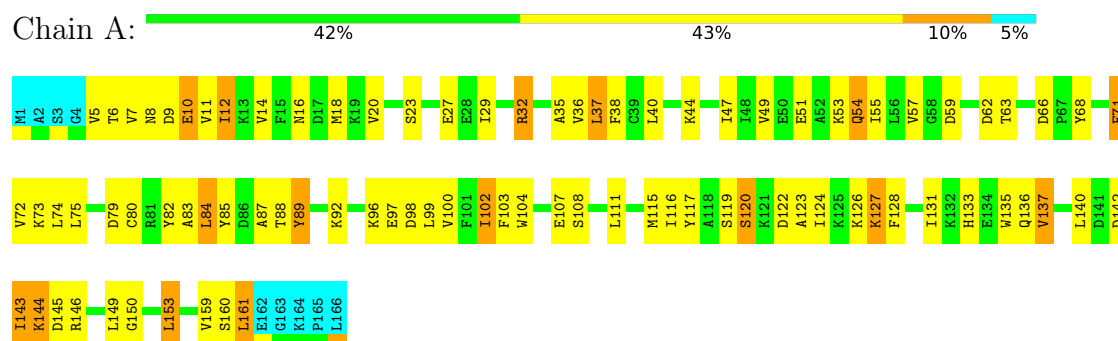
4.2.17 Score per residue for model 17

- Molecule 1: Cofilin



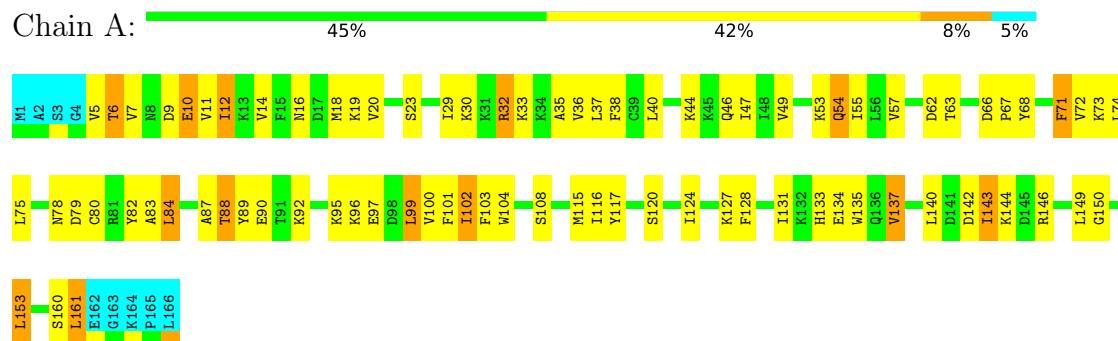
4.2.18 Score per residue for model 18

- Molecule 1: Cofilin



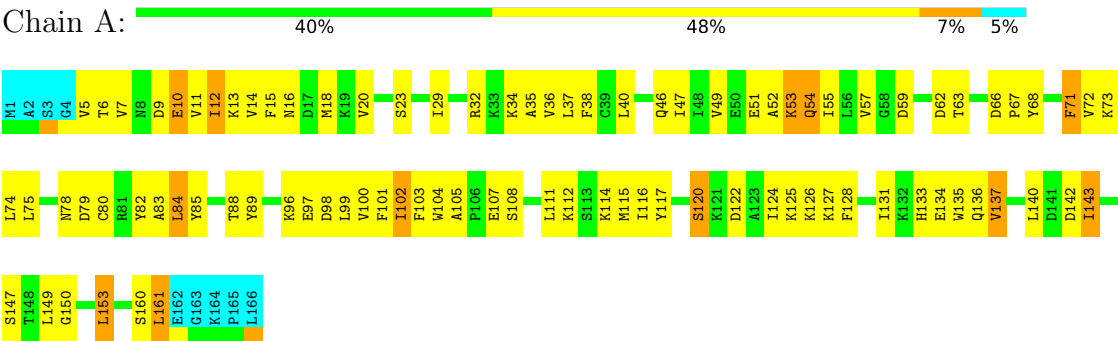
4.2.19 Score per residue for model 19

- Molecule 1: Cofilin



4.2.20 Score per residue for model 20

● Molecule 1: Cofilin



5 Refinement protocol and experimental data overview

The models were refined using the following method: *torsion angle dynamics followed by simulated annealing*.

Of the 50 calculated structures, 20 were deposited, based on the following criterion: *Structures with lowest energy, best covalent geometry, and least restraint violations*.

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

Software name	Classification	Version
DYANA	structure solution	1.5
X-PLOR	refinement	3.1

No chemical shift data was provided.

6 Model quality

6.1 Standard geometry

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

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in each chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1251	1294	1293	77±4
All	All	25020	25880	25860	1547

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 30.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:37:LEU:HD23	1:A:83:ALA:HB2	1.12	1.21	4	20
1:A:14:VAL:HG11	1:A:36:VAL:HG21	1.00	1.31	19	20
1:A:14:VAL:HG21	1:A:49:VAL:HG21	0.86	1.47	8	17
1:A:71:PHE:CZ	1:A:75:LEU:HD11	0.83	2.08	4	20
1:A:137:VAL:HG11	1:A:143:ILE:HB	0.81	1.52	19	20
1:A:37:LEU:HD23	1:A:83:ALA:CB	0.80	2.05	14	19
1:A:14:VAL:CG1	1:A:36:VAL:HG21	0.79	2.06	16	20
1:A:10:GLU:O	1:A:14:VAL:HG23	0.78	1.78	3	20
1:A:135:TRP:CZ3	1:A:149:LEU:HD13	0.78	2.14	16	18
1:A:88:THR:HG23	1:A:97:GLU:HG2	0.77	1.57	2	20
1:A:53:LYS:HG3	1:A:74:LEU:HD22	0.77	1.56	12	13
1:A:37:LEU:CD2	1:A:83:ALA:HB2	0.77	2.06	8	6
1:A:100:VAL:HG21	1:A:153:LEU:HD11	0.75	1.56	2	1
1:A:150:GLY:HA2	1:A:161:LEU:HD13	0.74	1.59	14	20

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:137:VAL:HG12	1:A:142:ASP:HB2	0.73	1.60	19	20
1:A:7:VAL:HG23	1:A:11:VAL:HG21	0.73	1.58	19	20
1:A:100:VAL:CG2	1:A:153:LEU:HD11	0.73	2.13	2	13
1:A:88:THR:HG23	1:A:97:GLU:CG	0.72	2.13	14	19
1:A:18:MET:SD	1:A:84:LEU:HD23	0.71	2.24	3	12
1:A:23:SER:HA	1:A:29:ILE:HD11	0.71	1.63	6	17
1:A:18:MET:HE1	1:A:84:LEU:O	0.71	1.84	6	12
1:A:100:VAL:HG21	1:A:153:LEU:HD21	0.71	1.60	8	19
1:A:137:VAL:HG12	1:A:142:ASP:CB	0.71	2.16	13	20
1:A:53:LYS:CG	1:A:74:LEU:HD22	0.70	2.16	12	13
1:A:68:TYR:CE1	1:A:72:VAL:HG21	0.70	2.21	7	8
1:A:89:TYR:HB3	1:A:161:LEU:HD12	0.70	1.64	12	20
1:A:75:LEU:HD12	1:A:140:LEU:CD1	0.69	2.17	11	4
1:A:35:ALA:HB3	1:A:55:ILE:HB	0.69	1.65	14	19
1:A:40:LEU:HD11	1:A:116:ILE:CG2	0.68	2.19	20	20
1:A:71:PHE:CE1	1:A:143:ILE:HD12	0.67	2.24	6	20
1:A:47:ILE:HG21	1:A:124:ILE:HD12	0.67	1.65	2	18
1:A:100:VAL:HG22	1:A:133:HIS:CB	0.67	2.20	19	20
1:A:104:TRP:CH2	1:A:140:LEU:HD23	0.66	2.25	12	16
1:A:40:LEU:HD11	1:A:116:ILE:HG23	0.66	1.67	4	19
1:A:100:VAL:HG21	1:A:153:LEU:CD2	0.66	2.21	10	17
1:A:14:VAL:HG11	1:A:36:VAL:CG2	0.65	2.20	11	2
1:A:38:PHE:CE1	1:A:49:VAL:HG22	0.65	2.27	14	6
1:A:71:PHE:HA	1:A:74:LEU:HD12	0.65	1.67	2	4
1:A:75:LEU:HD13	1:A:104:TRP:CZ3	0.64	2.26	13	17
1:A:128:PHE:O	1:A:131:ILE:HG22	0.64	1.92	7	20
1:A:71:PHE:CZ	1:A:143:ILE:HD12	0.63	2.28	6	19
1:A:14:VAL:HG13	1:A:33:LYS:HE3	0.63	1.71	11	1
1:A:32:ARG:O	1:A:57:VAL:HG23	0.62	1.94	5	10
1:A:5:VAL:HG21	1:A:116:ILE:O	0.62	1.93	3	18
1:A:137:VAL:HG11	1:A:143:ILE:CB	0.62	2.23	12	20
1:A:12:ILE:HD11	1:A:127:LYS:HG2	0.62	1.70	9	6
1:A:38:PHE:CD2	1:A:49:VAL:HG22	0.62	2.30	3	7
1:A:7:VAL:HG11	1:A:127:LYS:CG	0.62	2.24	7	2
1:A:38:PHE:CD1	1:A:49:VAL:HG22	0.61	2.30	11	8
1:A:12:ILE:HG22	1:A:16:ASN:OD1	0.61	1.96	3	1
1:A:47:ILE:HD11	1:A:120:SER:OG	0.61	1.96	19	4
1:A:7:VAL:HG11	1:A:127:LYS:HG2	0.61	1.72	7	2
1:A:10:GLU:HB3	1:A:49:VAL:HG23	0.60	1.73	16	4
1:A:12:ILE:HD11	1:A:127:LYS:CG	0.60	2.26	8	6
1:A:87:ALA:CB	1:A:153:LEU:HD13	0.60	2.27	2	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:36:VAL:HG12	1:A:54:GLN:HB3	0.60	1.74	11	19
1:A:100:VAL:HG13	1:A:133:HIS:HB3	0.59	1.74	7	17
1:A:71:PHE:CE2	1:A:75:LEU:HD11	0.58	2.33	11	5
1:A:102:ILE:HG23	1:A:135:TRP:HB3	0.58	1.76	2	20
1:A:100:VAL:HG13	1:A:133:HIS:CB	0.58	2.28	7	17
1:A:20:VAL:O	1:A:20:VAL:HG12	0.57	2.00	2	20
1:A:12:ILE:HD11	1:A:127:LYS:HG3	0.57	1.75	3	13
1:A:19:LYS:HE3	1:A:99:LEU:HD21	0.56	1.76	12	1
1:A:53:LYS:HA	1:A:74:LEU:HD22	0.56	1.76	9	6
1:A:55:ILE:HD13	1:A:67:PRO:O	0.56	2.00	12	8
1:A:75:LEU:HD13	1:A:104:TRP:CE3	0.56	2.36	11	18
1:A:47:ILE:HD11	1:A:120:SER:CB	0.56	2.30	19	1
1:A:12:ILE:N	1:A:12:ILE:HD12	0.56	2.16	19	20
1:A:38:PHE:CE2	1:A:49:VAL:HG22	0.55	2.37	15	7
1:A:100:VAL:HG23	1:A:153:LEU:HD11	0.55	1.79	11	14
1:A:87:ALA:HB3	1:A:153:LEU:CD1	0.54	2.33	10	14
1:A:35:ALA:HB2	1:A:85:TYR:CD1	0.54	2.37	14	15
1:A:75:LEU:HD12	1:A:140:LEU:HD11	0.54	1.78	11	3
1:A:7:VAL:CG2	1:A:11:VAL:HG21	0.53	2.33	11	12
1:A:100:VAL:HG22	1:A:133:HIS:HB2	0.53	1.81	6	19
1:A:16:ASN:O	1:A:20:VAL:HG23	0.52	2.04	8	18
1:A:131:ILE:HG23	1:A:131:ILE:O	0.52	2.04	2	20
1:A:9:ASP:HA	1:A:12:ILE:HD13	0.52	1.82	19	18
1:A:100:VAL:HA	1:A:131:ILE:HD11	0.51	1.81	12	12
1:A:35:ALA:O	1:A:36:VAL:HG13	0.51	2.06	10	7
1:A:82:TYR:CE1	1:A:103:PHE:CD1	0.51	2.99	16	20
1:A:40:LEU:HD23	1:A:46:GLN:O	0.50	2.05	9	8
1:A:87:ALA:HB3	1:A:153:LEU:HD12	0.50	1.82	11	3
1:A:11:VAL:HG13	1:A:38:PHE:CE2	0.50	2.42	4	5
1:A:75:LEU:HD22	1:A:104:TRP:CD2	0.50	2.42	7	6
1:A:14:VAL:HG12	1:A:18:MET:SD	0.50	2.46	19	2
1:A:102:ILE:HD13	1:A:135:TRP:CE3	0.49	2.42	11	20
1:A:71:PHE:CE1	1:A:143:ILE:CD1	0.49	2.96	7	20
1:A:5:VAL:HG12	1:A:120:SER:OG	0.49	2.08	12	16
1:A:140:LEU:O	1:A:144:LYS:N	0.49	2.45	16	12
1:A:104:TRP:HH2	1:A:140:LEU:HD22	0.49	1.68	14	3
1:A:34:LYS:HB2	1:A:57:VAL:HG22	0.49	1.85	11	6
1:A:135:TRP:CH2	1:A:143:ILE:HG12	0.48	2.43	4	20
1:A:84:LEU:HD22	1:A:101:PHE:HA	0.48	1.84	20	7
1:A:111:LEU:HD12	1:A:112:LYS:N	0.48	2.24	20	1
1:A:135:TRP:CD1	1:A:152:LYS:HZ3	0.47	2.26	5	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:71:PHE:CZ	1:A:75:LEU:CD1	0.47	2.95	6	12
1:A:35:ALA:HB2	1:A:85:TYR:HD1	0.47	1.69	13	16
1:A:53:LYS:HA	1:A:74:LEU:HD13	0.47	1.85	6	8
1:A:12:ILE:N	1:A:12:ILE:CD1	0.47	2.77	16	20
1:A:60:ILE:HG21	1:A:67:PRO:HG3	0.47	1.87	5	2
1:A:91:THR:HG22	1:A:158:VAL:HA	0.47	1.86	15	4
1:A:52:ALA:HB3	1:A:53:LYS:HE2	0.47	1.86	20	1
1:A:14:VAL:CG2	1:A:49:VAL:HG21	0.47	2.38	7	7
1:A:114:LYS:O	1:A:118:ALA:HB2	0.46	2.11	3	4
1:A:104:TRP:CH2	1:A:140:LEU:HD22	0.46	2.46	11	3
1:A:88:THR:HG23	1:A:97:GLU:HG3	0.46	1.85	14	4
1:A:37:LEU:HD12	1:A:53:LYS:HB3	0.46	1.87	8	4
1:A:103:PHE:CZ	1:A:105:ALA:HB2	0.46	2.46	4	9
1:A:38:PHE:N	1:A:38:PHE:CD1	0.46	2.84	20	5
1:A:68:TYR:CE1	1:A:72:VAL:CG2	0.46	2.99	14	12
1:A:99:LEU:N	1:A:99:LEU:HD23	0.46	2.26	19	3
1:A:153:LEU:CD2	1:A:153:LEU:N	0.45	2.79	12	19
1:A:89:TYR:CD1	1:A:89:TYR:N	0.45	2.84	14	15
1:A:7:VAL:HG11	1:A:123:ALA:O	0.45	2.12	14	4
1:A:82:TYR:CD2	1:A:124:ILE:HD12	0.45	2.46	9	1
1:A:91:THR:HG21	1:A:96:LYS:HE3	0.45	1.89	10	1
1:A:38:PHE:CE2	1:A:49:VAL:CG2	0.45	2.99	10	1
1:A:44:LYS:HD3	1:A:116:ILE:HD11	0.45	1.88	19	1
1:A:104:TRP:CH2	1:A:140:LEU:CD2	0.45	2.99	15	7
1:A:89:TYR:CD2	1:A:158:VAL:HG22	0.45	2.46	8	2
1:A:68:TYR:O	1:A:72:VAL:HG23	0.45	2.11	5	9
1:A:60:ILE:HD13	1:A:67:PRO:HG3	0.44	1.89	13	3
1:A:7:VAL:HG22	1:A:11:VAL:HB	0.44	1.89	20	9
1:A:18:MET:HE1	1:A:84:LEU:C	0.44	2.37	13	3
1:A:116:ILE:CG2	1:A:117:TYR:N	0.44	2.81	11	19
1:A:135:TRP:CZ2	1:A:148:THR:HG22	0.44	2.48	2	4
1:A:56:LEU:HD12	1:A:59:ASP:OD2	0.44	2.13	12	1
1:A:143:ILE:C	1:A:143:ILE:HD13	0.44	2.37	4	10
1:A:23:SER:CA	1:A:29:ILE:HD11	0.43	2.43	3	7
1:A:19:LYS:HD3	1:A:99:LEU:HD11	0.43	1.89	15	2
1:A:71:PHE:C	1:A:71:PHE:CD1	0.43	2.97	2	1
1:A:56:LEU:HD12	1:A:59:ASP:OD1	0.43	2.13	13	1
1:A:11:VAL:CG1	1:A:128:PHE:CE1	0.43	3.02	3	1
1:A:71:PHE:CD1	1:A:72:VAL:N	0.43	2.87	11	10
1:A:71:PHE:CD1	1:A:71:PHE:C	0.42	2.98	12	16
1:A:18:MET:HE1	1:A:85:TYR:HA	0.42	1.90	2	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:80:CYS:O	1:A:117:TYR:CE2	0.42	2.73	10	18
1:A:133:HIS:CD2	1:A:153:LEU:HD23	0.42	2.49	2	1
1:A:41:SER:OG	1:A:48:ILE:HG21	0.42	2.14	1	1
1:A:103:PHE:CE1	1:A:105:ALA:HB2	0.42	2.49	3	2
1:A:104:TRP:CH2	1:A:140:LEU:HD13	0.42	2.49	6	1
1:A:11:VAL:HG22	1:A:38:PHE:CD2	0.42	2.49	13	1
1:A:100:VAL:HG22	1:A:133:HIS:CG	0.42	2.49	15	3
1:A:53:LYS:CA	1:A:74:LEU:HD13	0.42	2.45	6	3
1:A:5:VAL:HG12	1:A:6:THR:N	0.41	2.30	19	3
1:A:124:ILE:O	1:A:128:PHE:CD2	0.41	2.73	19	7
1:A:38:PHE:CD2	1:A:49:VAL:CG2	0.41	3.03	10	1
1:A:15:PHE:CD1	1:A:128:PHE:CD1	0.41	3.09	3	1
1:A:15:PHE:CD2	1:A:127:LYS:O	0.41	2.73	20	7
1:A:7:VAL:CG2	1:A:11:VAL:CG2	0.41	2.99	11	6
1:A:7:VAL:CG2	1:A:11:VAL:CB	0.41	2.99	2	4
1:A:44:LYS:HE2	1:A:116:ILE:HD13	0.41	1.91	19	1
1:A:15:PHE:CZ	1:A:128:PHE:C	0.41	2.99	12	1
1:A:92:LYS:N	1:A:159:VAL:HG23	0.41	2.31	14	2
1:A:82:TYR:CD2	1:A:124:ILE:CD1	0.41	3.04	9	1
1:A:71:PHE:CZ	1:A:143:ILE:CD1	0.40	3.03	7	1
1:A:52:ALA:O	1:A:74:LEU:HD22	0.40	2.16	20	1
1:A:7:VAL:O	1:A:7:VAL:HG13	0.40	2.15	16	1
1:A:8:ASN:N	1:A:47:ILE:O	0.40	2.52	14	2
1:A:87:ALA:O	1:A:89:TYR:CE1	0.40	2.75	3	1
1:A:19:LYS:NZ	1:A:99:LEU:HD11	0.40	2.31	11	1
1:A:5:VAL:HG13	1:A:45:LYS:O	0.40	2.17	12	1
1:A:143:ILE:HD13	1:A:143:ILE:C	0.40	2.41	9	1

6.3 Torsion angles ⓘ

6.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the backbone conformation was analysed and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	157/166 (95%)	146±1 (93±1%)	11±1 (7±1%)	0±0 (0±0%)	100	100
All	All	3140/3320 (95%)	2917 (93%)	223 (7%)	0 (0%)	100	100

There are no Ramachandran outliers.

6.3.2 Protein sidechains ⓘ

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	141/147 (96%)	104±3 (74±2%)	37±3 (26±2%)	2	22
All	All	2820/2940 (96%)	2073 (74%)	747 (26%)	2	22

All 73 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	6	THR	20
1	A	32	ARG	20
1	A	63	THR	20
1	A	71	PHE	20
1	A	73	LYS	20
1	A	99	LEU	20
1	A	102	ILE	20
1	A	108	SER	20
1	A	137	VAL	20
1	A	143	ILE	20
1	A	153	LEU	20
1	A	160	SER	20
1	A	54	GLN	19
1	A	84	LEU	19
1	A	62	ASP	18
1	A	115	MET	17
1	A	79	ASP	17
1	A	96	LYS	16
1	A	120	SER	16
1	A	122	ASP	16
1	A	66	ASP	16
1	A	161	LEU	15
1	A	51	GLU	14
1	A	78	ASN	13
1	A	136	GLN	13
1	A	95	LYS	12

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Mol	Chain	Res	Type	Models (Total)
1	A	144	LYS	12
1	A	12	ILE	12
1	A	125	LYS	12
1	A	37	LEU	11
1	A	126	LYS	11
1	A	146	ARG	11
1	A	107	GLU	10
1	A	114	LYS	10
1	A	127	LYS	10
1	A	10	GLU	10
1	A	111	LEU	10
1	A	53	LYS	9
1	A	92	LYS	9
1	A	19	LYS	8
1	A	121	LYS	8
1	A	89	TYR	8
1	A	90	GLU	8
1	A	21	ARG	8
1	A	98	ASP	8
1	A	88	THR	8
1	A	44	LYS	7
1	A	119	SER	7
1	A	13	LYS	6
1	A	27	GLU	6
1	A	33	LYS	6
1	A	59	ASP	6
1	A	24	SER	5
1	A	112	LYS	5
1	A	45	LYS	5
1	A	29	ILE	4
1	A	30	LYS	4
1	A	93	GLU	3
1	A	147	SER	3
1	A	23	SER	3
1	A	145	ASP	3
1	A	151	GLU	3
1	A	134	GLU	3
1	A	46	GLN	2
1	A	97	GLU	2
1	A	22	LYS	2
1	A	152	LYS	2
1	A	9	ASP	1

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Mol	Chain	Res	Type	Models (Total)
1	A	38	PHE	1
1	A	39	CYS	1
1	A	28	GLU	1
1	A	65	GLU	1
1	A	34	LYS	1

6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates [i](#)

There are no oligosaccharides 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

No chemical shift data were provided