



Full wwPDB NMR Structure Validation Report ⓘ

Mar 5, 2026 – 04:13 PM UTC

PDB ID : 2AAV / pdb_00002aav
Title : Solution NMR structure of Filamin A domain 17
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Deposited on : 2005-07-14

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<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

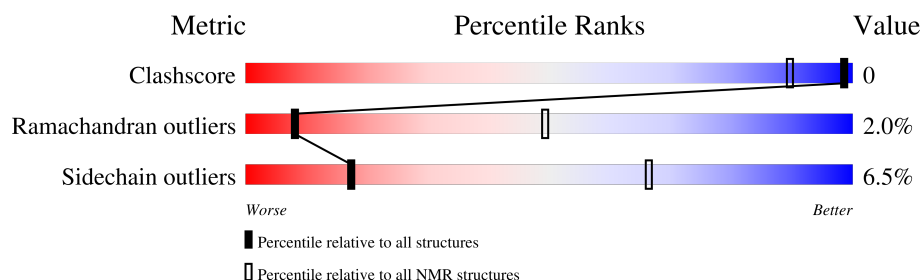
1 Overall quality at a glance

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	98	

2 Ensemble composition and analysis

This entry contains 20 models. Model 7 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

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:1868-A:1894, A:1898-A:1956 (86)	1.07	7

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 1 single-model cluster was found.

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

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1385 atoms, of which 679 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Filamin A.

Mol	Chain	Residues	Atoms						Trace
1	A	98	Total	C	H	N	O	S	0
			1385	438	679	118	146	4	

There are 4 discrepancies between the modelled and reference sequences:

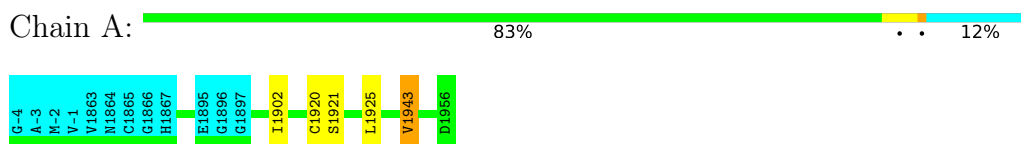
Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	cloning artifact	UNP P21333
A	-3	ALA	-	cloning artifact	UNP P21333
A	-2	MET	-	cloning artifact	UNP P21333
A	-1	VAL	-	cloning artifact	UNP P21333

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: Filamin A

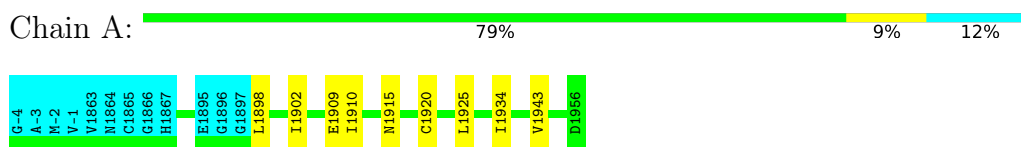


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

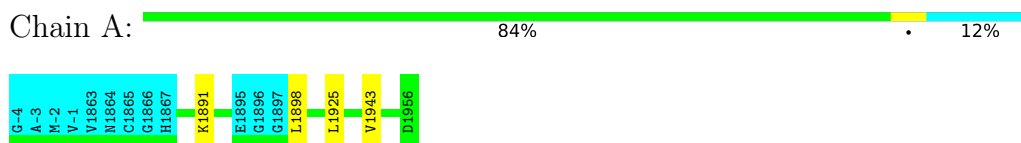
4.2.1 Score per residue for model 1

- Molecule 1: Filamin A



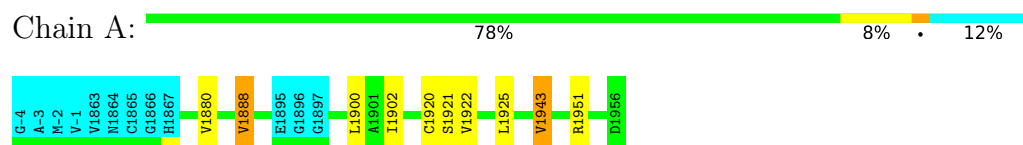
4.2.2 Score per residue for model 2

- Molecule 1: Filamin A



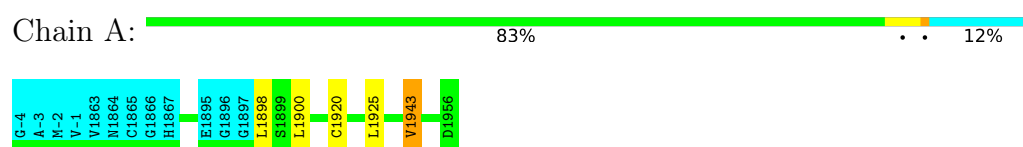
4.2.3 Score per residue for model 3

- Molecule 1: Filamin A



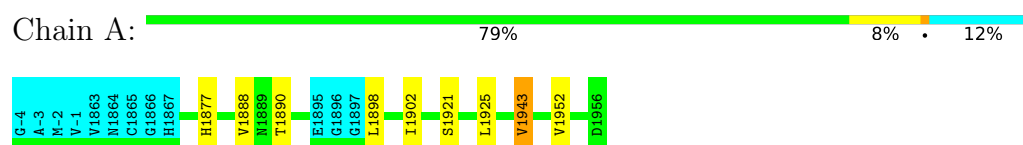
4.2.4 Score per residue for model 4

- Molecule 1: Filamin A



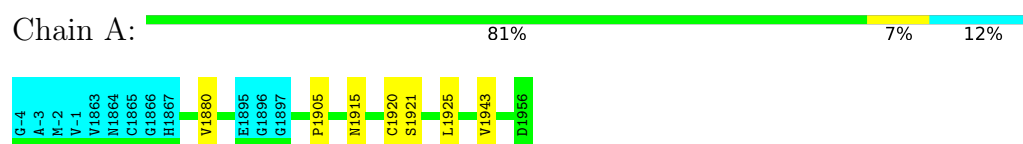
4.2.5 Score per residue for model 5

- Molecule 1: Filamin A



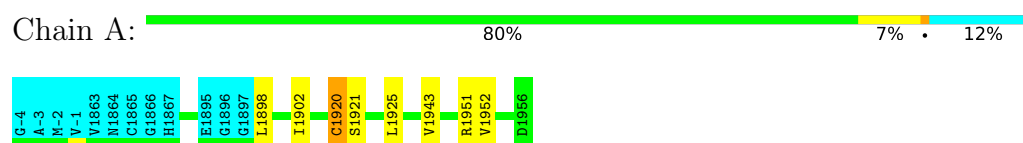
4.2.6 Score per residue for model 6

- Molecule 1: Filamin A



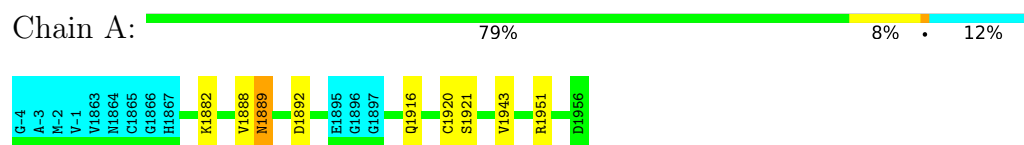
4.2.7 Score per residue for model 7 (medoid)

- Molecule 1: Filamin A



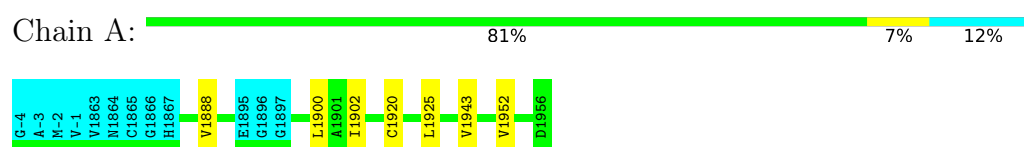
4.2.8 Score per residue for model 8

- Molecule 1: Filamin A



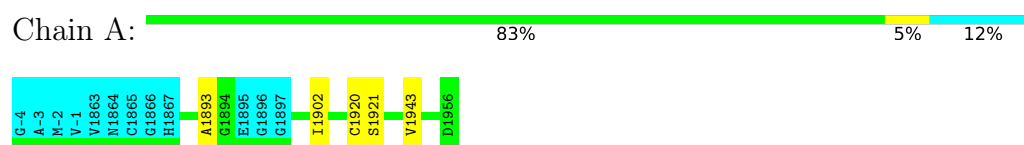
4.2.9 Score per residue for model 9

- Molecule 1: Filamin A



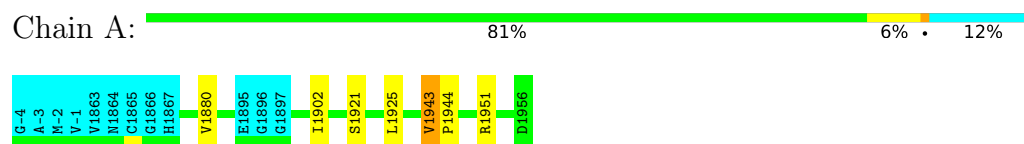
4.2.10 Score per residue for model 10

- Molecule 1: Filamin A



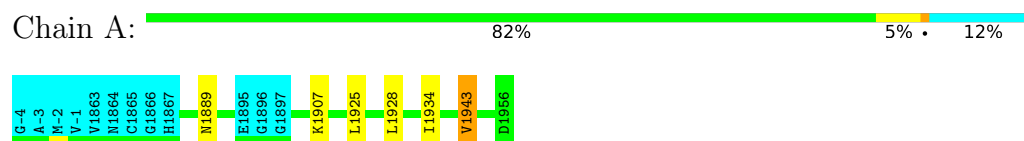
4.2.11 Score per residue for model 11

- Molecule 1: Filamin A



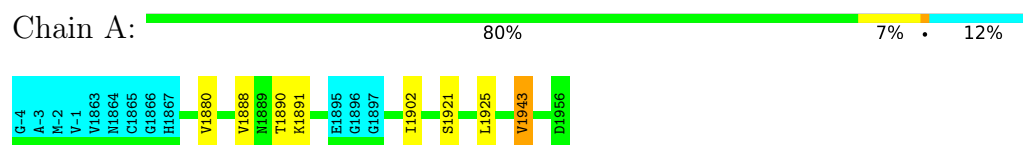
4.2.12 Score per residue for model 12

- Molecule 1: Filamin A



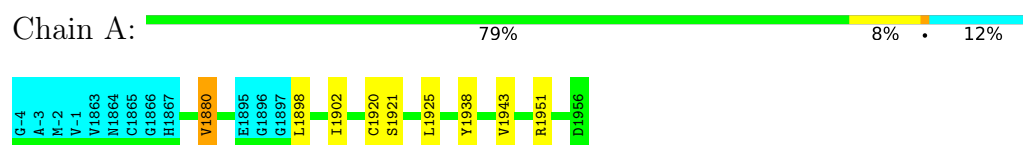
4.2.13 Score per residue for model 13

- Molecule 1: Filamin A



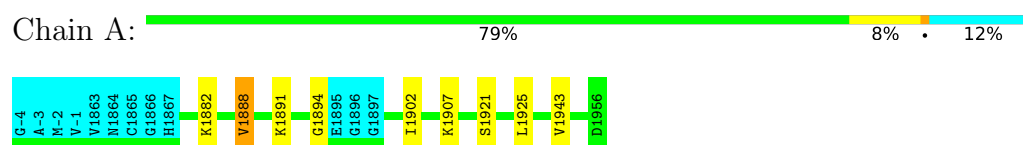
4.2.14 Score per residue for model 14

- Molecule 1: Filamin A



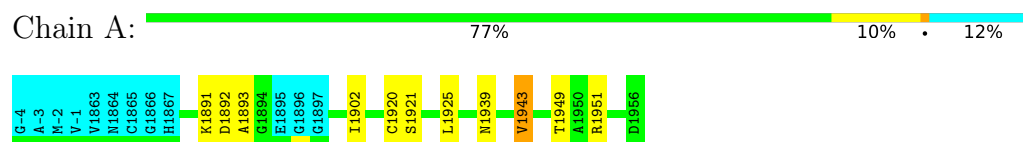
4.2.15 Score per residue for model 15

- Molecule 1: Filamin A



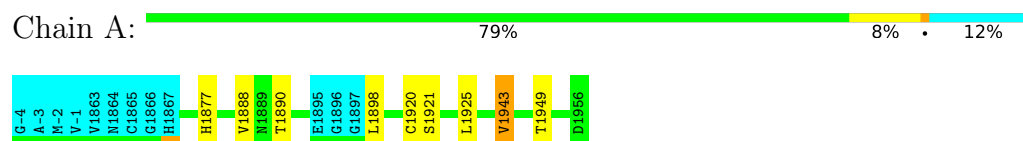
4.2.16 Score per residue for model 16

- Molecule 1: Filamin A



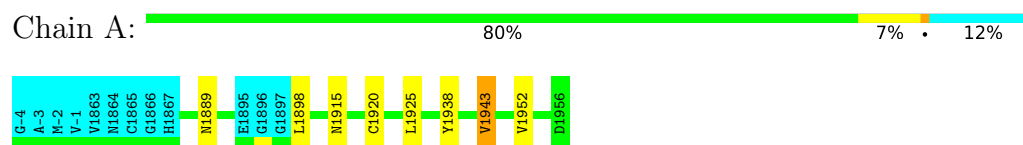
4.2.17 Score per residue for model 17

- Molecule 1: Filamin A



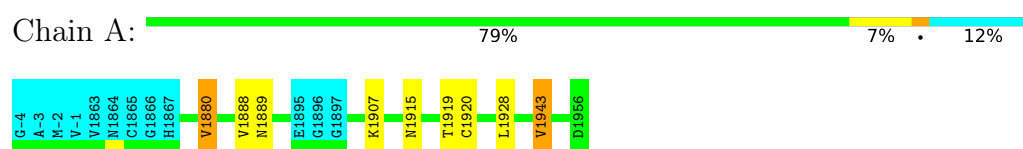
4.2.18 Score per residue for model 18

- Molecule 1: Filamin A



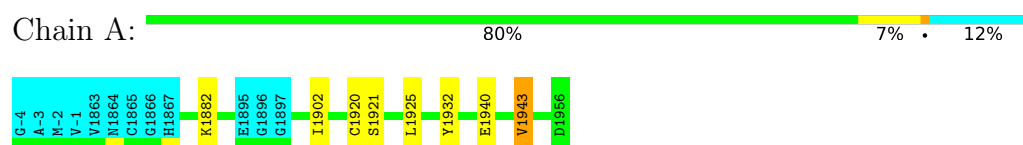
4.2.19 Score per residue for model 19

- Molecule 1: Filamin A



4.2.20 Score per residue for model 20

- Molecule 1: Filamin A



5 Refinement protocol and experimental data overview

The models were refined using the following method: *The structure calculations were made with the program CYANA 2.0 using the automated NOE assignment and structure calculation algorithm. The structure refinement of the 20 final CYANA structures was made with AMBER 8.0 program using the generalized Born continuum solvent model.*

Of the 300 calculated structures, 20 were deposited, based on the following criterion: *structures with favorable non-bond energy.*

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

Software name	Classification	Version
CYANA	structure solution	2.0
Amber	refinement	8.0

No chemical shift data was provided.

6 Model quality i

6.1 Standard geometry i

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	0.97±0.02	0±0/644 (0.0± 0.0%)	1.54±0.03	3±2/881 (0.4± 0.3%)
All	All	0.97	0/12880 (0.0%)	1.54	68/17620 (0.4%)

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	0.1±0.3
All	All	0	2

There are no bond-length outliers.

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	1888	VAL	CA-CB-CG1	9.28	126.17	110.40	3	1
1	A	1943	VAL	CA-C-N	6.65	126.34	119.82	3	7
1	A	1943	VAL	C-N-CA	6.65	126.34	119.82	3	7
1	A	1943	VAL	CA-CB-CG1	6.33	121.17	110.40	12	4
1	A	1951	ARG	CA-C-N	6.33	129.05	120.63	11	6
1	A	1951	ARG	C-N-CA	6.33	129.05	120.63	11	6
1	A	1892	ASP	CA-C-N	6.08	128.35	120.44	8	2
1	A	1892	ASP	C-N-CA	6.08	128.35	120.44	8	2
1	A	1920	CYS	CA-C-N	5.86	132.73	121.54	17	4
1	A	1920	CYS	C-N-CA	5.86	132.73	121.54	17	4
1	A	1915	ASN	CA-C-N	5.58	128.07	120.54	6	2
1	A	1915	ASN	C-N-CA	5.58	128.07	120.54	6	2
1	A	1877	HIS	CB-CG-CD2	-5.56	123.98	131.20	5	1
1	A	1916	GLN	OE1-CD-NE2	-5.49	117.11	122.60	8	1
1	A	1877	HIS	CA-C-N	5.47	126.41	121.82	17	1

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	1877	HIS	C-N-CA	5.47	126.41	121.82	17	1
1	A	1938	TYR	CA-C-N	5.46	131.97	121.54	14	1
1	A	1938	TYR	C-N-CA	5.46	131.97	121.54	14	1
1	A	1880	VAL	CA-CB-CG1	5.32	119.44	110.40	19	3
1	A	1882	LYS	CB-CA-C	5.26	116.78	108.84	20	1
1	A	1909	GLU	CA-C-N	5.22	131.37	121.97	1	1
1	A	1909	GLU	C-N-CA	5.22	131.37	121.97	1	1
1	A	1891	LYS	N-CA-C	5.22	117.65	111.33	13	1
1	A	1890	THR	CA-C-N	5.19	127.54	120.54	17	2
1	A	1890	THR	C-N-CA	5.19	127.54	120.54	17	2
1	A	1905	PRO	CA-C-N	5.14	129.99	121.86	6	1
1	A	1905	PRO	C-N-CA	5.14	129.99	121.86	6	1
1	A	1919	THR	CA-C-N	5.11	130.51	122.34	19	1
1	A	1919	THR	C-N-CA	5.11	130.51	122.34	19	1

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	1938	TYR	Sidechain	1
1	A	1932	TYR	Sidechain	1

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	630	609	609	0±1
All	All	12600	12180	12180	6

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 0.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:1888:VAL:HG12	1:A:1920:CYS:HB3	0.74	1.57	3	1
1:A:1888:VAL:CG2	1:A:1920:CYS:H	0.58	2.11	19	1
1:A:1888:VAL:HG12	1:A:1920:CYS:CB	0.56	2.29	3	1
1:A:1900:LEU:HD11	1:A:1922:VAL:HG21	0.53	1.79	3	1
1:A:1888:VAL:HG21	1:A:1920:CYS:CB	0.42	2.44	19	1
1:A:1920:CYS:SG	1:A:1922:VAL:HG23	0.42	2.55	3	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	85/98 (87%)	75±2 (89±3%)	8±2 (9±3%)	2±1 (2±1%)	8	49
All	All	1700/1960 (87%)	1506 (89%)	160 (9%)	34 (2%)	8	49

All 13 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	1921	SER	13
1	A	1952	VAL	3
1	A	1907	LYS	3
1	A	1891	LYS	2
1	A	1888	VAL	2
1	A	1889	ASN	2
1	A	1893	ALA	2
1	A	1949	THR	2
1	A	1910	ILE	1
1	A	1915	ASN	1
1	A	1944	PRO	1
1	A	1894	GLY	1
1	A	1940	GLU	1

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	71/78 (91%)	66±1 (94±2%)	5±1 (6±2%)	17 66
All	All	1420/1560 (91%)	1328 (94%)	92 (6%)	17 66

All 17 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	1943	VAL	20
1	A	1925	LEU	17
1	A	1902	ILE	12
1	A	1920	CYS	9
1	A	1898	LEU	8
1	A	1880	VAL	5
1	A	1888	VAL	5
1	A	1889	ASN	3
1	A	1934	ILE	2
1	A	1900	LEU	2
1	A	1882	LYS	2
1	A	1928	LEU	2
1	A	1890	THR	1
1	A	1952	VAL	1
1	A	1891	LYS	1
1	A	1939	ASN	1
1	A	1915	ASN	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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