



wwPDB NMR Structure Validation Summary Report ⓘ

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BMRB ID : 30858
Title : Structure of Nedd4L WW3 domain
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This is a wwPDB NMR Structure Validation Summary 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

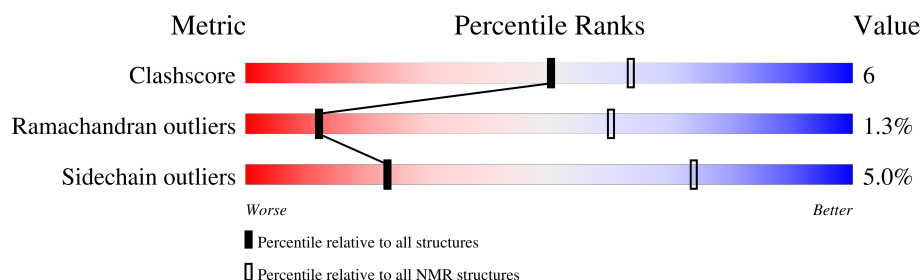
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 89%.

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	68	

2 Ensemble composition and analysis

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

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:102-A:115, A:201-A:206, A:493-A:534 (62)	1.10	20

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 5 clusters and 3 single-model clusters were found.

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

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1016 atoms, of which 470 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Angiomotin,E3 ubiquitin-protein ligase NEDD4-like.

Mol	Chain	Residues	Atoms						Trace
1	A	68	Total	C	H	N	O	S	0
			1016	345	470	97	101	3	

There are 6 discrepancies between the modelled and reference sequences:

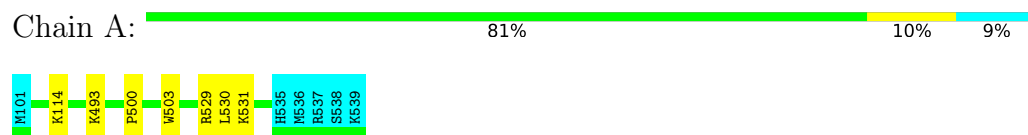
Chain	Residue	Modelled	Actual	Comment	Reference
A	201	GLY	-	linker	UNP Q4VCS5
A	202	GLY	-	linker	UNP Q4VCS5
A	203	GLY	-	linker	UNP Q4VCS5
A	204	GLY	-	linker	UNP Q4VCS5
A	205	GLY	-	linker	UNP Q4VCS5
A	206	SER	-	linker	UNP Q4VCS5

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.

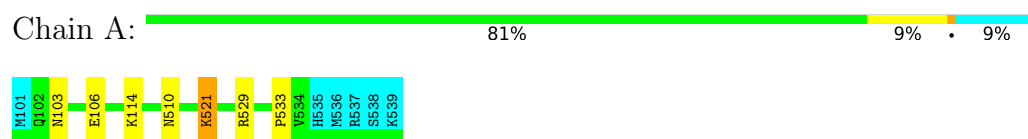
- Molecule 1: Angiomotin,E3 ubiquitin-protein ligase NEDD4-like



4.2 Residue scores for the representative (medoid) model from the NMR ensemble

The representative model is number 20. Colouring as in section 4.1 above.

- Molecule 1: Angiomotin,E3 ubiquitin-protein ligase NEDD4-like



5 Refinement protocol and experimental data overview

The models were refined using the following method: *DGSA-distance geometry simulated annealing*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *target function*.

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

Software name	Classification	Version
CYANA	refinement	
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)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	786
Number of shifts mapped to atoms	735
Number of unparsed shifts	0
Number of shifts with mapping errors	51
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	89%

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	1.04±0.04	0±0/510 (0.0± 0.1%)	0.95±0.04	0±0/695 (0.0± 0.0%)
All	All	1.04	5/10200 (0.0%)	0.95	0/13900 (0.0%)

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±0.2
All	All	0	1

All unique bond 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(Å)	Ideal(Å)	Models	
								Worst	Total
1	A	533	PRO	C-N	-8.81	1.22	1.33	10	2
1	A	506	ARG	N-CA	-5.91	1.38	1.46	4	1
1	A	515	PHE	C-N	-5.17	1.26	1.33	11	1
1	A	503	TRP	C-N	-5.08	1.26	1.33	5	1

There are no bond-angle outliers.

There are no chirality outliers.

All unique planar outliers are listed below.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	529	ARG	Sidechain	1

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	493	413	470	5±2
All	All	9860	8260	9400	107

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 6.

5 of 53 unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:494:VAL:HG21	1:A:513:PRO:HD3	0.64	1.70	7	1
1:A:500:PRO:HG2	1:A:503:TRP:CD1	0.61	2.29	19	10
1:A:529:ARG:HA	1:A:532:PHE:O	0.60	1.97	18	6
1:A:503:TRP:CZ2	1:A:528:PRO:HG3	0.60	2.31	17	4
1:A:503:TRP:CE2	1:A:528:PRO:HG3	0.57	2.34	10	2

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	62/68 (91%)	56±1 (91±2%)	5±1 (8±2%)	1±1 (1±1%)	12	60
All	All	1240/1360 (91%)	1127 (91%)	97 (8%)	16 (1%)	12	60

5 of 8 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	533	PRO	5
1	A	103	ASN	3
1	A	204	GLY	2

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Mol	Chain	Res	Type	Models (Total)
1	A	206	SER	2
1	A	497	SER	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	53/59 (90%)	50±1 (95±2%)	3±1 (5±2%)	23	74
All	All	1060/1180 (90%)	1007 (95%)	53 (5%)	23	74

5 of 13 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	529	ARG	15
1	A	521	LYS	7
1	A	493	LYS	7
1	A	496	GLN	5
1	A	504	GLU	3

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

The completeness of assignment taking into account all chemical shift lists is 89% for the well-defined parts and 85% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *NPY1_star3.2*

7.1.1 Bookkeeping

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	786
Number of shifts mapped to atoms	735
Number of unparsed shifts	0
Number of shifts with mapping errors	51
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	13

The following assigned chemical shifts were not mapped to the molecules present in the coordinate file.

- No matching atom found in the structure. First 5 (of 51) occurrences are reported below.

List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	102	GLN	HE22	0.0	0	.
1	A	103	ASN	HD22	6.926	0	.
1	A	104	ASN	HD22	7.598	0	.
1	A	107	LEU	HD12	-0.723	0.005	.
1	A	107	LEU	HD13	-0.723	0.005	.
1	A	107	LEU	HD21	0.22	0.001	.
1	A	107	LEU	HD23	0.22	0.001	.
1	A	109	THR	HG21	1.297	0.006	1
1	A	109	THR	HG23	1.297	0.006	1
1	A	115	VAL	HG12	0.914	0	.
1	A	115	VAL	HG13	0.914	0	.
1	A	115	VAL	HG21	0.945	0	.
1	A	115	VAL	HG23	0.945	0	.
1	A	494	VAL	HG12	0.854	0	.

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List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	494	VAL	HG13	0.854	0	.
1	A	494	VAL	HG21	0.904	0	.
1	A	494	VAL	HG23	0.904	0	.
1	A	495	THR	HG21	1.218	0.006	1
1	A	495	THR	HG23	1.218	0.006	1
1	A	496	GLN	HE22	7.125	0	.
1	A	499	LEU	HD12	1.042	0	.
1	A	499	LEU	HD13	1.042	0	.
1	A	499	LEU	HD21	0.861	0	.
1	A	499	LEU	HD23	0.861	0	.
1	A	507	ILE	HD12	0.672	0.008	1
1	A	507	ILE	HD13	0.672	0.008	1
1	A	507	ILE	HG13	1.299	0	.
1	A	507	ILE	HG21	0.953	0.008	1
1	A	507	ILE	HG23	0.953	0.008	1
1	A	510	ASN	HD22	5.62	0	.
1	A	516	ILE	HD12	0.363	0.006	1
1	A	516	ILE	HD13	0.363	0.006	1
1	A	516	ILE	HG13	1.165	0.007	.
1	A	516	ILE	HG21	0.23	0.005	1
1	A	516	ILE	HG23	0.23	0.005	1
1	A	520	THR	HG21	1.097	0.008	1
1	A	520	THR	HG23	1.097	0.008	1
1	A	522	THR	HG21	1.054	0.007	1
1	A	522	THR	HG23	1.054	0.007	1
1	A	523	THR	HG21	1.031	0.007	1
1	A	523	THR	HG23	1.031	0.007	1
1	A	524	THR	HG21	1.674	0.009	1
1	A	524	THR	HG23	1.674	0.009	1
1	A	530	LEU	HD12	0.764	0.005	.
1	A	530	LEU	HD13	0.764	0.005	.
1	A	530	LEU	HD21	0.919	0.008	.
1	A	530	LEU	HD23	0.919	0.008	.
1	A	534	VAL	HG12	0.871	0	.
1	A	534	VAL	HG13	0.871	0	.
1	A	534	VAL	HG21	0.911	0	.
1	A	534	VAL	HG23	0.911	0	.

7.1.2 Chemical shift referencing ⓘ

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, <i>ppm</i>	Suggested action
$^{13}\text{C}_\alpha$	66	0.33 ± 0.19	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	61	0.41 ± 0.08	None needed (< 0.5 ppm)
$^{13}\text{C}'$	55	0.25 ± 0.17	None needed (< 0.5 ppm)
^{15}N	55	0.08 ± 0.40	None needed (< 0.5 ppm)

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 89%, i.e. 736 atoms were assigned a chemical shift out of a possible 830. 0 out of 6 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	277/303 (91%)	114/124 (92%)	112/124 (90%)	51/55 (93%)
Sidechain	399/446 (89%)	268/286 (94%)	122/141 (87%)	9/19 (47%)
Aromatic	60/81 (74%)	36/40 (90%)	22/37 (59%)	2/4 (50%)
Overall	736/830 (89%)	418/450 (93%)	256/302 (85%)	62/78 (79%)

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.

List Id	Chain	Res	Type	Atom	Shift, <i>ppm</i>	Expected range, <i>ppm</i>	Z-score
1	A	102	GLN	HE21	0.00	5.02 – 9.43	-16.4
1	A	102	GLN	HE22	0.00	4.88 – 9.19	-16.3
1	A	102	GLN	HA	0.00	2.17 – 6.35	-10.2
1	A	517	ASP	HB2	0.10	1.41 – 4.01	-10.1
1	A	102	GLN	HG2	0.00	1.01 – 3.62	-8.9
1	A	102	GLN	HG3	0.00	0.91 – 3.68	-8.3
1	A	102	GLN	HB2	0.00	0.80 – 3.29	-8.2
1	A	102	GLN	HB3	0.00	0.71 – 3.33	-7.7
1	A	527	ASP	HA	2.59	3.04 – 6.12	-6.5
1	A	107	LEU	HD11	-0.72	-0.61 – 2.12	-5.4
1	A	107	LEU	HD12	-0.72	-0.61 – 2.12	-5.4
1	A	107	LEU	HD13	-0.72	-0.61 – 2.12	-5.4
1	A	108	PRO	HD3	1.64	1.76 – 5.48	-5.3

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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:

