Full wwPDB NMR Structure Validation Report (i)

Apr 21, 2024 – 12:58 PM EDT

PDB ID	:	2L00
Title	:	Solution structure of the non-covalent complex of the ZNF216 A20 domain with ubiquitin
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Deposited on	:	2010-06-29

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 (i) 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 (i)) were used in the production of this report:

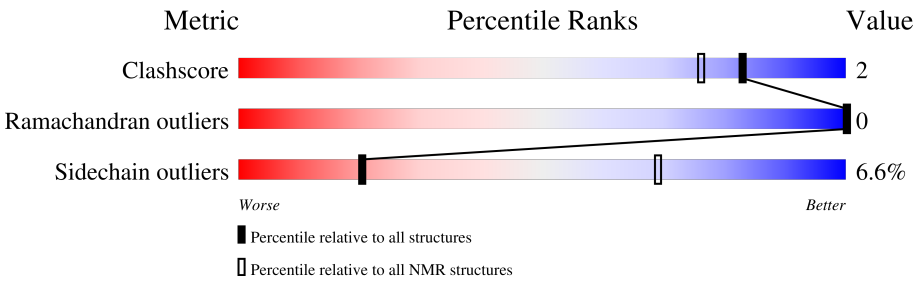
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 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	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	62	52% • • 44%
2	B	76	83% 11% 7%

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: *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:13-A:46, B:1-B:71 (105)	0.61	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. No single-model clusters were found.

Cluster number	Models
1	1, 2, 3, 4, 6, 7, 9, 10
2	5, 8

3 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 1656 atoms, of which 828 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a).

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	35	510	159	245	50	50	6	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	expression tag	UNP B5DF11
A	2	SER	-	expression tag	UNP B5DF11

- Molecule 2 is a protein called Ubiquitin.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	71	1145	353	583	94	114	1	0

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	
			Total	Zn
3	A	1	1	1

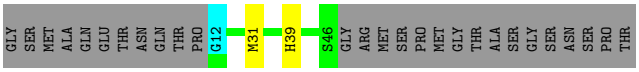
4 Residue-property plots (i)

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.

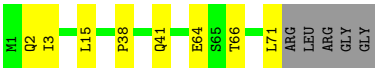
• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A:



• Molecule 2: Ubiquitin

Chain B:



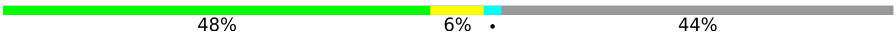
4.2 Scores per residue for each member of the ensemble

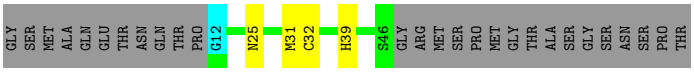
Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

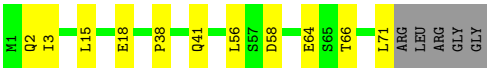
Chain A:





• Molecule 2: Ubiquitin

Chain B:



4.2.2 Score per residue for model 2

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 50% 5% • 44%

GLY SER MET ALA GLN GLU THR ASN GLN THR PRO G12 Y23 M31 H39 S46 GLY ARG MET SER PRO MET GLY THR ALA SER GLY SER ASN SER PRO THR

• Molecule 2: Ubiquitin

Chain B: 78% 14% • 7%

M1 Q2 I3 L15 P38 Q41 F45 N60 I61 E64 S65 T66 L71 ARG LEU ARG GLY GLY

4.2.3 Score per residue for model 3 (medoid)

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 52% • • 44%

GLY SER MET ALA GLN GLU THR ASN GLN THR PRO G12 M31 H39 S46 GLY ARG MET SER PRO MET GLY THR ALA SER GLY SER ASN SER PRO THR

• Molecule 2: Ubiquitin

Chain B: 79% 13% • 7%

M1 Q2 I3 L15 P38 Q41 F45 I61 E64 S65 T66 L71 ARG LEU ARG GLY GLY

4.2.4 Score per residue for model 4

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 52% • • 44%

GLY SER MET ALA GLN GLU THR ASN GLN THR PRO G12 M31 H39 S46 GLY ARG MET SER PRO MET GLY THR ALA SER GLY SER ASN SER PRO THR

• Molecule 2: Ubiquitin

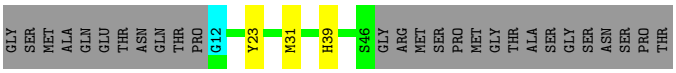
Chain B: 79% 13% • 7%

M1 Q2 I3 T7 L15 P38 Q41 E64 S65 T66 L69 V70 L71 ARG LEU ARG GLY GLY

4.2.5 Score per residue for model 5

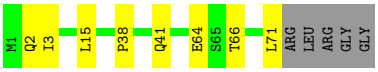
• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 50% 5% • 44%



• Molecule 2: Ubiquitin

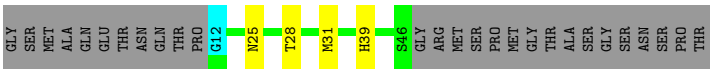
Chain B: 83% 11% 7%



4.2.6 Score per residue for model 6

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 48% 6% • 44%



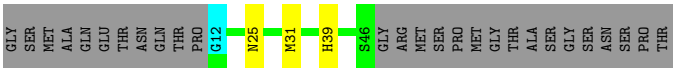
• Molecule 2: Ubiquitin

Chain B: 82% 11% • 7%

4.2.7 Score per residue for model 7

• Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 50% 5% • 44%



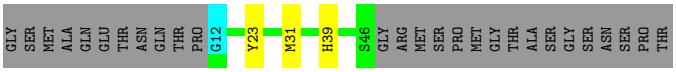
• Molecule 2: Ubiquitin

Chain B: 83% 11% 7%

4.2.8 Score per residue for model 8

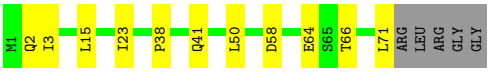
- Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 50% 5% • 44%



- Molecule 2: Ubiquitin

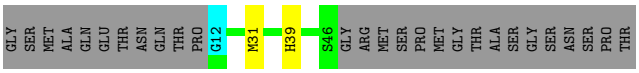
Chain B: 79% 14% 7%



4.2.9 Score per residue for model 9

- Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 52% • • 44%



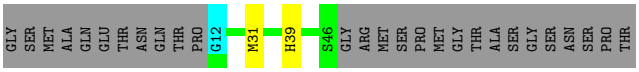
- Molecule 2: Ubiquitin

Chain B: 78% 13% • 7%

4.2.10 Score per residue for model 10

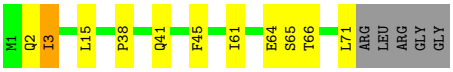
- Molecule 1: Zfand5 protein (Zinc finger protein 216 (Predicted), isoform CRA_a)

Chain A: 52% • • 44%



- Molecule 2: Ubiquitin

Chain B: 79% 13% • 7%



5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *Rigid Body Docking, molecular dynamics.*

Of the 500 calculated structures, 10 were deposited, based on the following criterion: *structures with the least restraint violations.*

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

Software name	Classification	Version
X-PLOR NIH	structure solution	2.14
X-PLOR NIH	refinement	2.14
HADDOCK	structure solution	2.0

No chemical shift data was provided.

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: ZN

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 (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	261	242	243	0±1
2	B	562	583	582	4±1
All	All	8240	8250	8244	39

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 2.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:45:PHE:CD2	2:B:61:ILE:HG12	0.59	2.33	2	4
2:B:3:ILE:HB	2:B:65:SER:O	0.55	2.00	10	5
2:B:4:PHE:O	2:B:66:THR:HA	0.49	2.07	6	2
1:A:23:TYR:CG	2:B:60:ASN:HB2	0.48	2.44	2	1
2:B:2:GLN:HA	2:B:15:LEU:O	0.47	2.10	6	10
1:A:32:CYS:HB2	2:B:58:ASP:OD1	0.44	2.12	1	1
2:B:18:GLU:O	2:B:56:LEU:HD12	0.43	2.13	1	1
2:B:7:THR:HG22	2:B:69:LEU:HD23	0.42	1.91	4	1
2:B:38:PRO:HA	2:B:41:GLN:NE2	0.42	2.30	7	10
1:A:25:ASN:HD22	1:A:28:THR:HG23	0.42	1.74	6	1
1:A:25:ASN:HB3	1:A:28:THR:OG1	0.42	2.15	6	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:23:TYR:HB2	2:B:58:ASP:C	0.40	2.36	8	1
2:B:23:ILE:HD12	2:B:50:LEU:HD13	0.40	1.93	8	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	33/62 (53%)	28±1 (85±2%)	5±1 (15±2%)	0±0 (0±0%)	100	100
2	B	69/76 (91%)	67±0 (97±0%)	2±0 (3±0%)	0±0 (0±0%)	100	100
All	All	1020/1380 (74%)	952 (93%)	68 (7%)	0 (0%)	100	100

There are no Ramachandran outliers.

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	30/51 (59%)	28±0 (92±2%)	2±0 (8±2%)	16	64
2	B	66/69 (96%)	62±0 (94±0%)	4±0 (6±0%)	22	71
All	All	960/1200 (80%)	897 (93%)	63 (7%)	20	69

All 8 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	31	MET	10
1	A	39	HIS	10
2	B	3	ILE	10

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Mol	Chain	Res	Type	Models (Total)
2	B	64	GLU	10
2	B	66	THR	10
2	B	71	LEU	10
1	A	25	ASN	2
1	A	23	TYR	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)

Of 1 ligands modelled in this entry, 1 is 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)

No chemical shift data were provided