



# Full wwPDB NMR Structure Validation Report ⓘ

Apr 27, 2016 – 05:14 AM BST

PDB ID : 2YRA  
Title : Solution structure of the zinc finger domains (1-87) from human F-box only protein  
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Deposited on : 2007-04-02

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/NMRValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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
Mogul	:	unknown
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	rb-20027457
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20027457

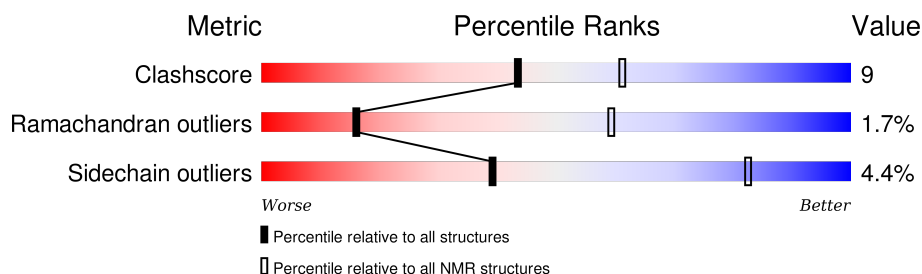
# 1 Overall quality at a glance

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	114402	11133
Ramachandran outliers	111179	9975
Sidechain outliers	111093	9958

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  $\geq 3$ , 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	74	

## 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: *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:744-A:757, A:763-A:802 (54)	0.24	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 3 clusters and 1 single-model cluster was found.

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

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1044 atoms, of which 492 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Seizure 6-like protein isoform 3.

Mol	Chain	Residues	Atoms						Trace
1	A	74	Total	C	H	N	O	S	0
			1044	335	492	91	122	4	

There are 13 discrepancies between the modelled and reference sequences:

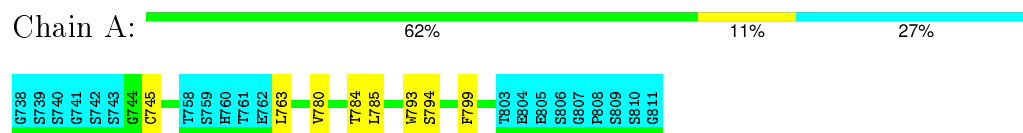
Chain	Residue	Modelled	Actual	Comment	Reference
A	738	GLY	-	EXPRESSION TAG	UNP Q9BYH1
A	739	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	740	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	741	GLY	-	EXPRESSION TAG	UNP Q9BYH1
A	742	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	743	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	744	GLY	-	EXPRESSION TAG	UNP Q9BYH1
A	806	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	807	GLY	-	EXPRESSION TAG	UNP Q9BYH1
A	808	PRO	-	EXPRESSION TAG	UNP Q9BYH1
A	809	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	810	SER	-	EXPRESSION TAG	UNP Q9BYH1
A	811	GLY	-	EXPRESSION TAG	UNP Q9BYH1

## 4 Residue-property plots

### 4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA and DNA 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: Seizure 6-like protein isoform 3

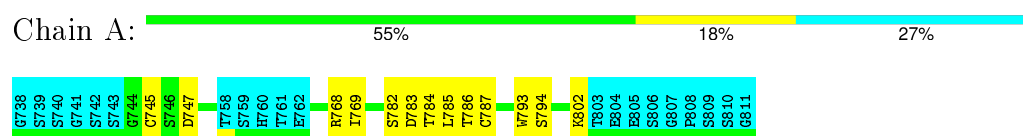


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

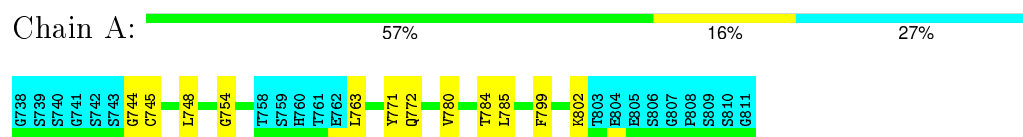
#### 4.2.1 Score per residue for model 1

- Molecule 1: Seizure 6-like protein isoform 3



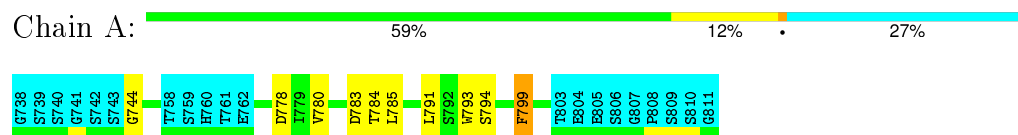
#### 4.2.2 Score per residue for model 2

- Molecule 1: Seizure 6-like protein isoform 3



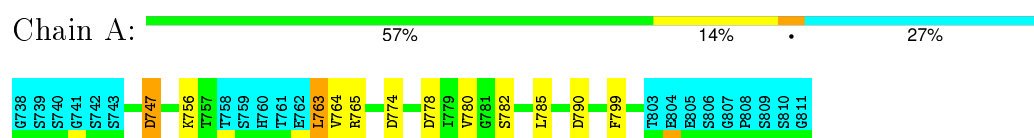
### 4.2.3 Score per residue for model 3

- Molecule 1: Seizure 6-like protein isoform 3



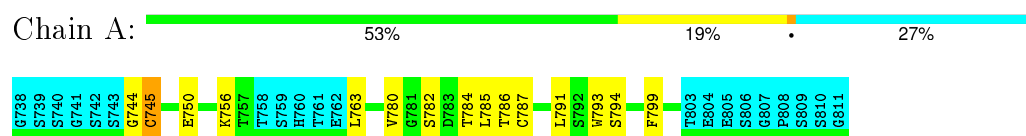
### 4.2.4 Score per residue for model 4

- Molecule 1: Seizure 6-like protein isoform 3



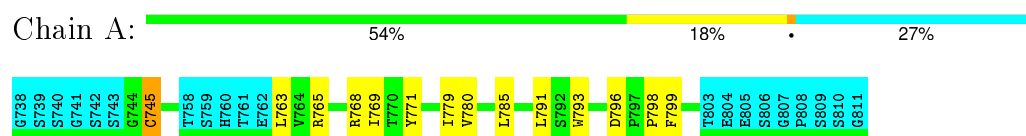
### 4.2.5 Score per residue for model 5

- Molecule 1: Seizure 6-like protein isoform 3



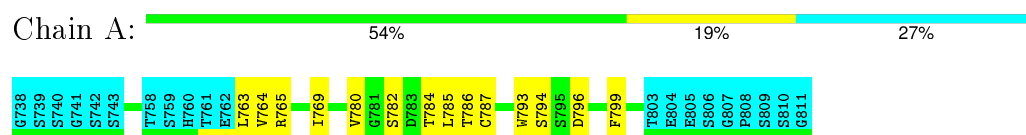
### 4.2.6 Score per residue for model 6

- Molecule 1: Seizure 6-like protein isoform 3



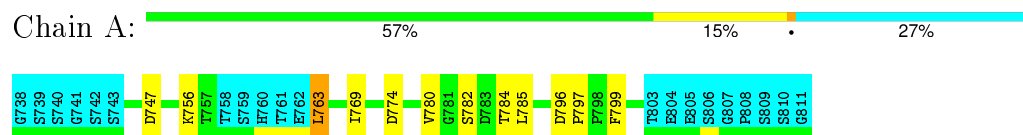
### 4.2.7 Score per residue for model 7

- Molecule 1: Seizure 6-like protein isoform 3



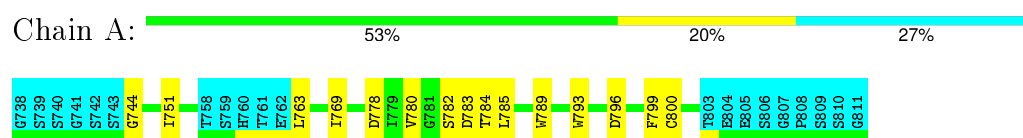
### 4.2.8 Score per residue for model 8

- Molecule 1: Seizure 6-like protein isoform 3



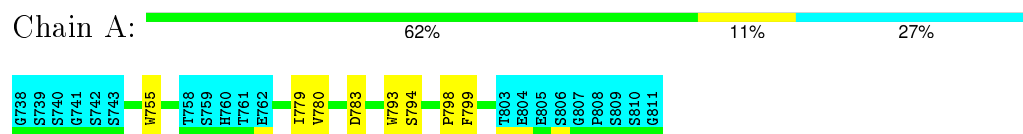
### 4.2.9 Score per residue for model 9

- Molecule 1: Seizure 6-like protein isoform 3



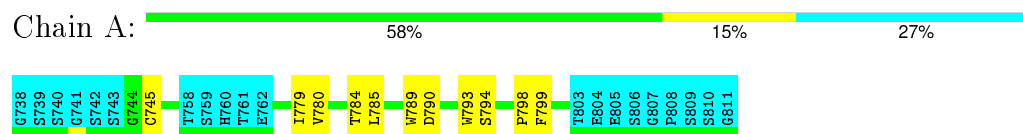
### 4.2.10 Score per residue for model 10

- Molecule 1: Seizure 6-like protein isoform 3



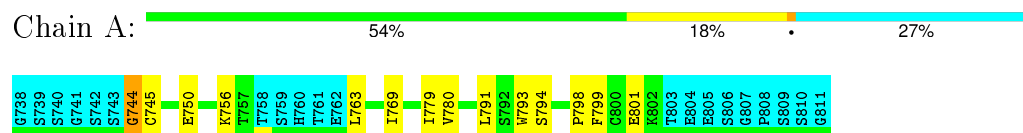
### 4.2.11 Score per residue for model 11

- Molecule 1: Seizure 6-like protein isoform 3



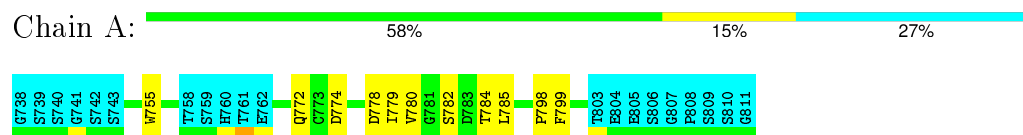
### 4.2.12 Score per residue for model 12

- Molecule 1: Seizure 6-like protein isoform 3



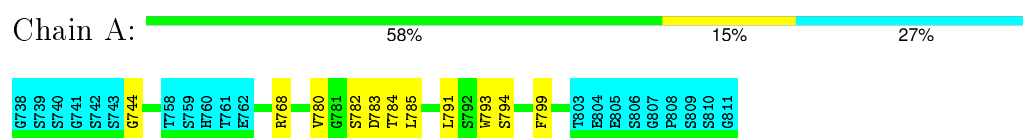
### 4.2.13 Score per residue for model 13

- Molecule 1: Seizure 6-like protein isoform 3



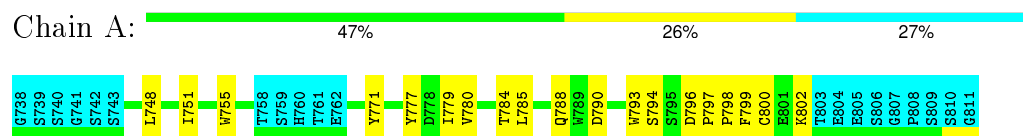
### 4.2.14 Score per residue for model 14

- Molecule 1: Seizure 6-like protein isoform 3



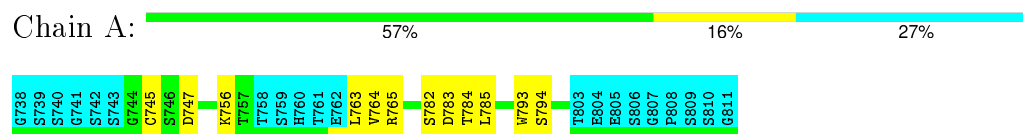
### 4.2.15 Score per residue for model 15

- Molecule 1: Seizure 6-like protein isoform 3



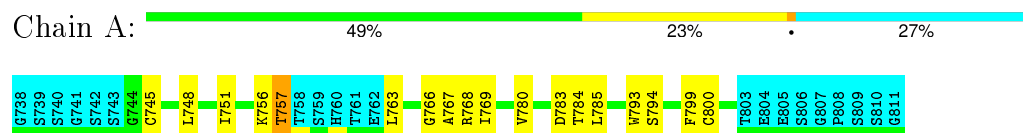
### 4.2.16 Score per residue for model 16

- Molecule 1: Seizure 6-like protein isoform 3



### 4.2.17 Score per residue for model 17

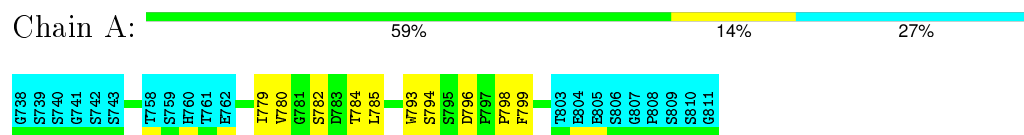
- Molecule 1: Seizure 6-like protein isoform 3





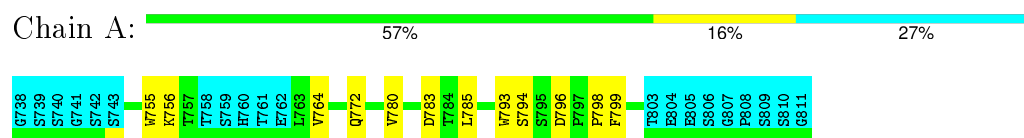
#### 4.2.18 Score per residue for model 18

- Molecule 1: Seizure 6-like protein isoform 3



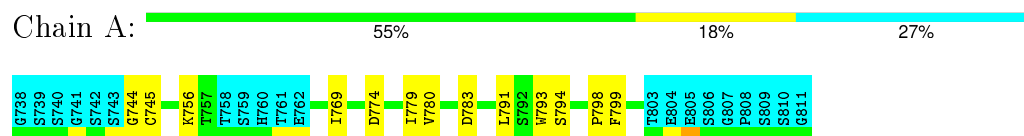
#### 4.2.19 Score per residue for model 19

- Molecule 1: Seizure 6-like protein isoform 3



#### 4.2.20 Score per residue for model 20 (medoid)

- Molecule 1: Seizure 6-like protein isoform 3



## 5 Refinement protocol and experimental data overview ⓘ

The models were refined using the following method: *torsion angle dynamics*.

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

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

Software name	Classification	Version
CYANA	structure solution	2.0.17
CYANA	refinement	2.0.17

No chemical shift data was provided. No validations of the models with respect to experimental NMR restraints is performed at this time.

## 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	423	387	387	7±2
All	All	8460	7740	7740	138

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 9.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:784:THR:C	1:A:785:LEU:HD12	0.73	2.01	2	14
1:A:785:LEU:HD11	1:A:798:PRO:HD3	0.70	1.62	19	1
1:A:744:GLY:HA2	1:A:791:LEU:HD22	0.65	1.68	12	3
1:A:763:LEU:HD21	1:A:769:ILE:HD11	0.64	1.68	8	1
1:A:769:ILE:CG1	1:A:793:TRP:CH2	0.63	2.82	1	2
1:A:763:LEU:CD2	1:A:769:ILE:HD11	0.62	2.25	8	1
1:A:769:ILE:HD11	1:A:793:TRP:CH2	0.61	2.30	12	1
1:A:751:ILE:HD11	1:A:800:CYS:SG	0.60	2.35	9	3
1:A:756:LYS:HE3	1:A:769:ILE:HG21	0.58	1.75	20	1
1:A:785:LEU:HD21	1:A:797:PRO:HA	0.57	1.76	8	2
1:A:782:SER:O	1:A:785:LEU:HD11	0.55	2.02	9	6
1:A:771:TYR:CE2	1:A:785:LEU:HD22	0.54	2.37	6	1
1:A:771:TYR:HE2	1:A:785:LEU:HD22	0.54	1.62	6	1
1:A:779:ILE:HG23	1:A:798:PRO:HB2	0.53	1.80	6	8

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:784:THR:O	1:A:785:LEU:HD12	0.53	2.04	13	7
1:A:769:ILE:HD11	1:A:793:TRP:HH2	0.52	1.62	12	1
1:A:780:VAL:HB	1:A:799:PHE:CE2	0.50	2.41	7	15
1:A:769:ILE:HG12	1:A:793:TRP:CH2	0.50	2.42	1	1
1:A:769:ILE:HG13	1:A:793:TRP:CH2	0.50	2.42	1	1
1:A:768:ARG:CG	1:A:784:THR:HG23	0.49	2.38	17	1
1:A:765:ARG:NE	1:A:791:LEU:HD21	0.48	2.21	6	1
1:A:744:GLY:CA	1:A:763:LEU:O	0.48	2.61	2	1
1:A:748:LEU:HD23	1:A:769:ILE:CD1	0.48	2.38	17	1
1:A:780:VAL:HB	1:A:799:PHE:CE1	0.48	2.42	14	3
1:A:782:SER:O	1:A:785:LEU:CD1	0.48	2.61	16	8
1:A:777:TYR:CE2	1:A:802:LYS:HB2	0.48	2.44	15	1
1:A:744:GLY:CA	1:A:791:LEU:HD22	0.47	2.38	3	2
1:A:768:ARG:HG2	1:A:784:THR:HG23	0.47	1.87	17	1
1:A:754:GLY:CA	1:A:772:GLN:O	0.47	2.63	2	1
1:A:771:TYR:CE2	1:A:798:PRO:HD2	0.46	2.45	15	1
1:A:789:TRP:CE3	1:A:789:TRP:O	0.46	2.68	9	1
1:A:799:PHE:N	1:A:799:PHE:CD1	0.46	2.83	10	2
1:A:755:TRP:C	1:A:755:TRP:CD1	0.45	2.90	15	1
1:A:763:LEU:HD22	1:A:769:ILE:HD11	0.45	1.88	7	1
1:A:768:ARG:O	1:A:769:ILE:HD13	0.45	2.12	6	1
1:A:793:TRP:O	1:A:794:SER:C	0.45	2.55	19	14
1:A:745:CYS:N	1:A:763:LEU:O	0.45	2.50	2	1
1:A:780:VAL:CG1	1:A:799:PHE:CZ	0.44	3.00	7	2
1:A:786:THR:HG22	1:A:787:CYS:N	0.44	2.27	5	3
1:A:789:TRP:CE2	1:A:790:ASP:OD1	0.44	2.71	11	1
1:A:764:VAL:O	1:A:765:ARG:C	0.44	2.55	4	2
1:A:748:LEU:HD21	1:A:793:TRP:CD1	0.43	2.48	15	1
1:A:745:CYS:HB3	1:A:793:TRP:CE2	0.43	2.49	6	1
1:A:799:PHE:CD1	1:A:799:PHE:N	0.42	2.87	2	1
1:A:748:LEU:HD13	1:A:771:TYR:OH	0.42	2.15	2	1
1:A:790:ASP:CG	1:A:790:ASP:O	0.42	2.58	4	1
1:A:755:TRP:CD1	1:A:755:TRP:C	0.42	2.92	10	1
1:A:755:TRP:CZ2	1:A:772:GLN:HG2	0.42	2.50	19	2
1:A:768:ARG:HG2	1:A:784:THR:CG2	0.41	2.45	1	1
1:A:748:LEU:CD2	1:A:769:ILE:HD12	0.41	2.45	17	1
1:A:765:ARG:CB	1:A:765:ARG:NH1	0.41	2.84	4	1
1:A:769:ILE:HG12	1:A:793:TRP:CZ3	0.41	2.51	1	1
1:A:765:ARG:HB2	1:A:765:ARG:CZ	0.41	2.46	16	1
1:A:744:GLY:H	1:A:791:LEU:HD13	0.41	1.76	5	1
1:A:745:CYS:SG	1:A:791:LEU:C	0.41	3.00	12	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:756:LYS:O	1:A:757:THR:HG23	0.40	2.16	17	1
1:A:744:GLY:O	1:A:745:CYS:C	0.40	2.59	5	1
1:A:766:GLY:O	1:A:767:ALA:C	0.40	2.60	17	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	54/74 (73%)	48±1 (89±3%)	5±2 (10±3%)	1±1 (2±2%)	16	59
All	All	1080/1480 (73%)	958 (89%)	104 (10%)	18 (2%)	16	59

All 5 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	763	LEU	7
1	A	745	CYS	7
1	A	744	GLY	2
1	A	788	GLN	1
1	A	747	ASP	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	48/64 (75%)	46±1 (96±2%)	2±1 (4±2%)	39	82
All	All	960/1280 (75%)	918 (96%)	42 (4%)	39	82

All 14 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	783	ASP	9
1	A	796	ASP	7
1	A	756	LYS	6
1	A	747	ASP	4
1	A	774	ASP	4
1	A	778	ASP	2
1	A	750	GLU	2
1	A	802	LYS	2
1	A	799	PHE	1
1	A	757	THR	1
1	A	782	SER	1
1	A	801	GLU	1
1	A	790	ASP	1
1	A	768	ARG	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 ⓘ

There are no carbohydrates in this entry.

## 6.6 Ligand geometry ⓘ

There are no ligands in this entry.

## 6.7 Other polymers ⓘ

There are no such molecules in this entry.

## 6.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

## 7 Chemical shift validation

No chemical shift data were provided