



# Full wwPDB NMR Structure Validation Report ⓘ

Feb 20, 2022 – 02:45 AM EST

PDB ID : 1UL5  
Title : Solution structure of the DNA-binding domain of squamosa promoter binding protein-like 7  
Authors : Yamasaki, K.; Inoue, M.; Kigawa, T.; Yokoyama, S.; RIKEN Structural Genomics/Proteomics Initiative (RSGI)  
Deposited on : 2003-09-09

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

<https://www.wwpdb.org/validation/2017/NMRValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

---

The following versions of software and data (see [references ⓘ](#)) 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)  
RCI : v\_1n\_11\_5\_13\_A (Berjanski et al., 2005)  
PANAV : Wang et al. (2010)  
ShiftChecker : 2.26  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.26

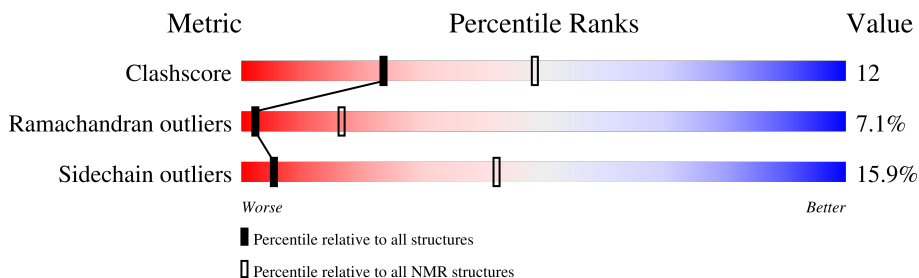
# 1 Overall quality at a glance

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	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  $\geq 3$ , 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	88	 42% 16% 5% 35% .

## 2 Ensemble composition and analysis

This entry contains 20 models. Model 8 is the overall representative, medoid model (most similar to other models).

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:136-A:190 (55)	0.24	8

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 3 single-model clusters were found.

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

### 3 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 1396 atoms, of which 697 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called squamosa promoter binding protein-like 7.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	86	1394	424	697	145	121	7	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	133	GLY	-	cloning artifact	UNP Q8S9G8
A	134	SER	-	cloning artifact	UNP Q8S9G8

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

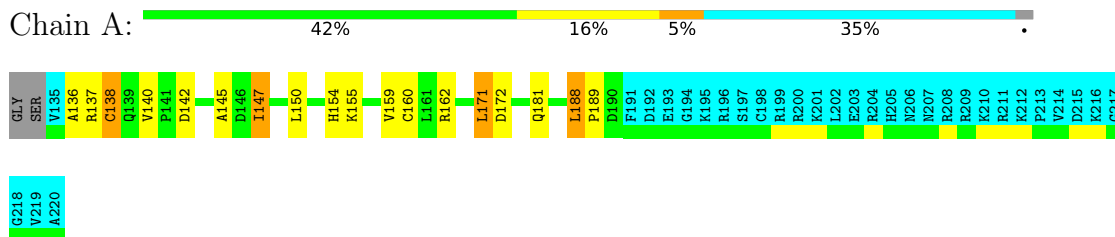
Mol	Chain	Residues	Atoms	
			Total	Zn
2	A	2	2	2

## 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: squamosa promoter binding protein-like 7

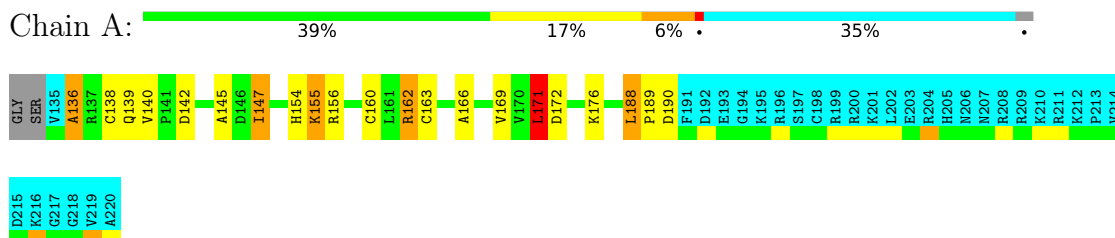


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

#### 4.2.1 Score per residue for model 1

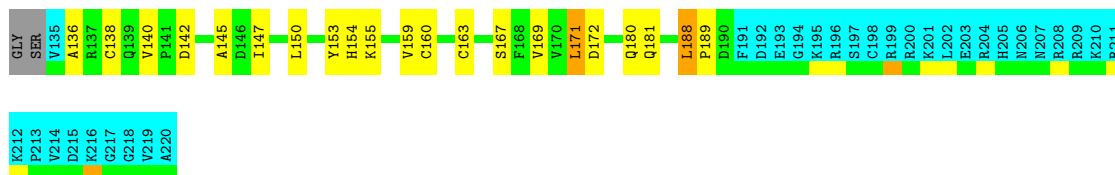
- Molecule 1: squamosa promoter binding protein-like 7



#### 4.2.2 Score per residue for model 2

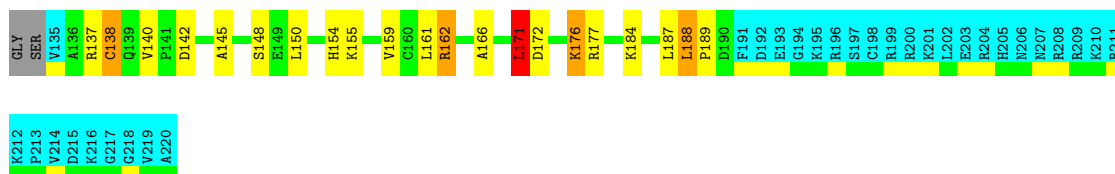
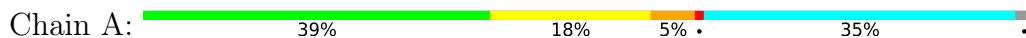
- Molecule 1: squamosa promoter binding protein-like 7





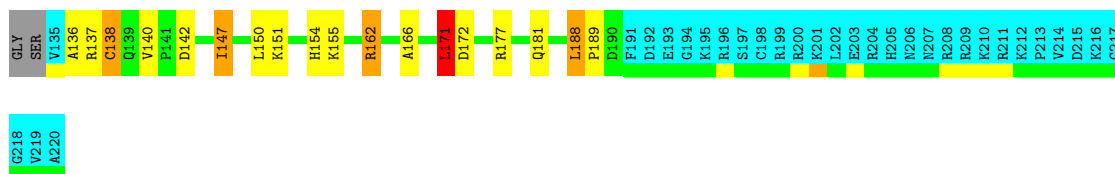
### 4.2.3 Score per residue for model 3

- Molecule 1: squamosa promoter binding protein-like 7



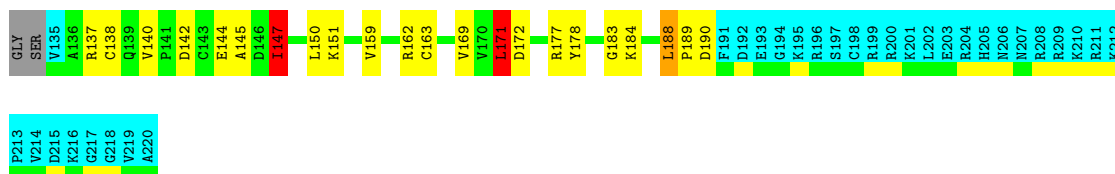
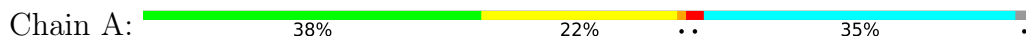
### 4.2.4 Score per residue for model 4

- Molecule 1: squamosa promoter binding protein-like 7



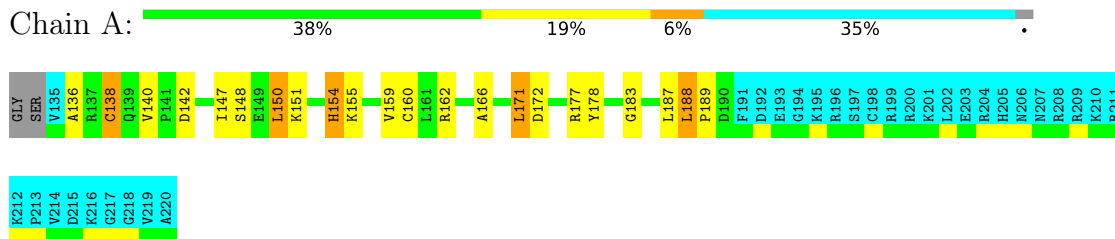
### 4.2.5 Score per residue for model 5

- Molecule 1: squamosa promoter binding protein-like 7



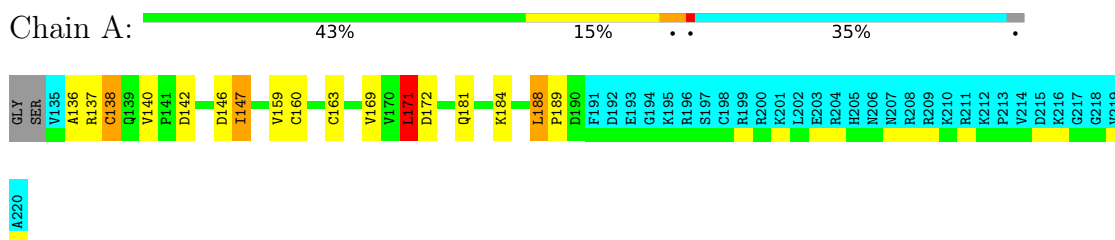
### 4.2.6 Score per residue for model 6

- Molecule 1: squamosa promoter binding protein-like 7



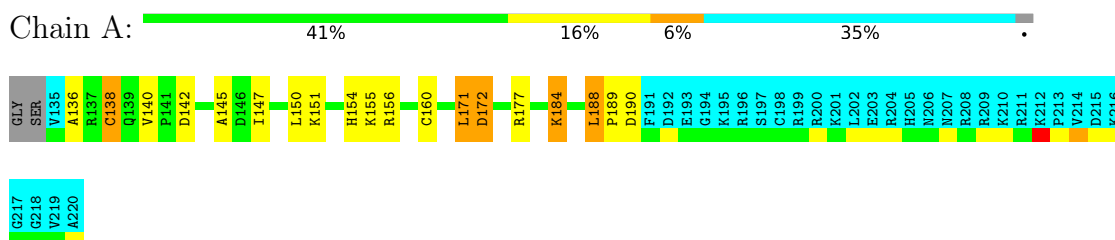
#### 4.2.7 Score per residue for model 7

- Molecule 1: squamosa promoter binding protein-like 7



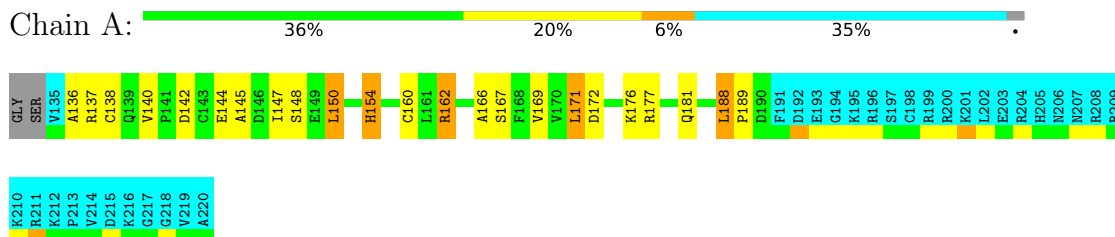
#### 4.2.8 Score per residue for model 8 (medoid)

- Molecule 1: squamosa promoter binding protein-like 7



#### 4.2.9 Score per residue for model 9

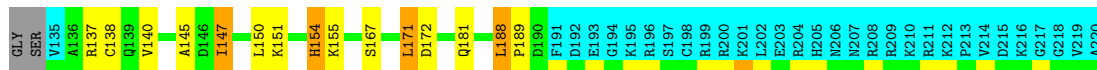
- Molecule 1: squamosa promoter binding protein-like 7



#### 4.2.10 Score per residue for model 10

- Molecule 1: squamosa promoter binding protein-like 7

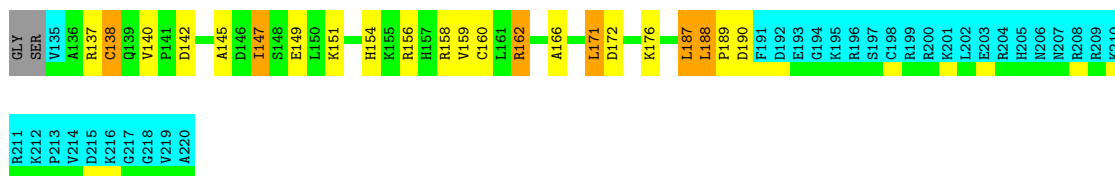
Chain A: 



#### 4.2.11 Score per residue for model 11

- Molecule 1: squamosa promoter binding protein-like 7

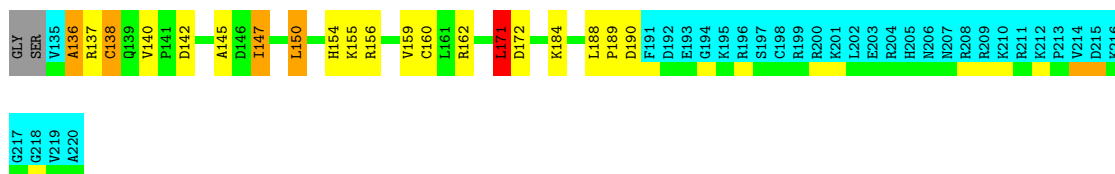
Chain A: 



#### 4.2.12 Score per residue for model 12

- Molecule 1: squamosa promoter binding protein-like 7

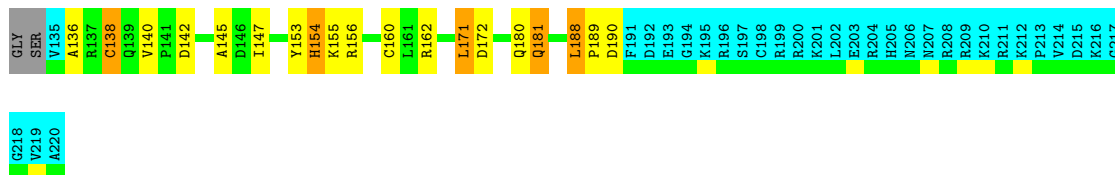
Chain A: 



#### 4.2.13 Score per residue for model 13

- Molecule 1: squamosa promoter binding protein-like 7

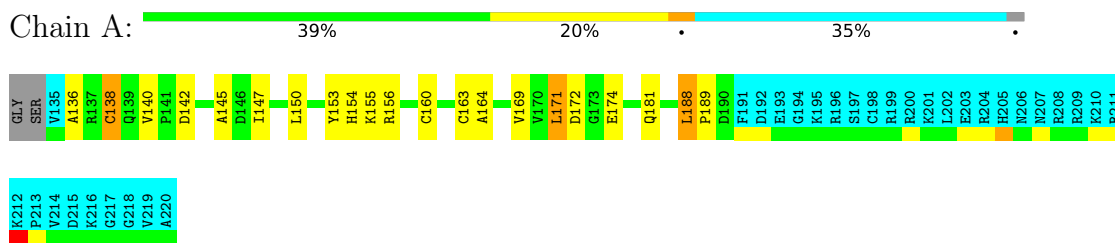
Chain A: 





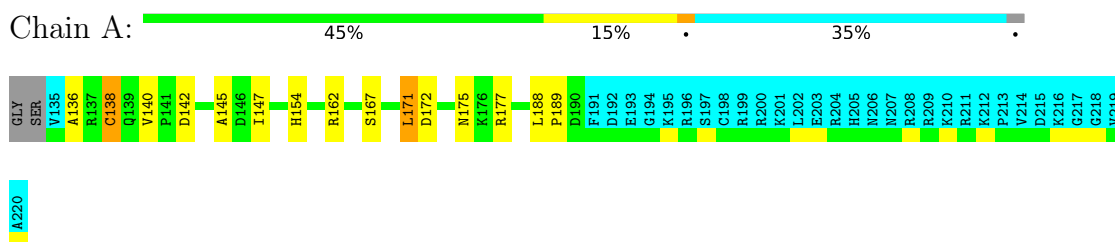
#### 4.2.14 Score per residue for model 14

- Molecule 1: squamosa promoter binding protein-like 7



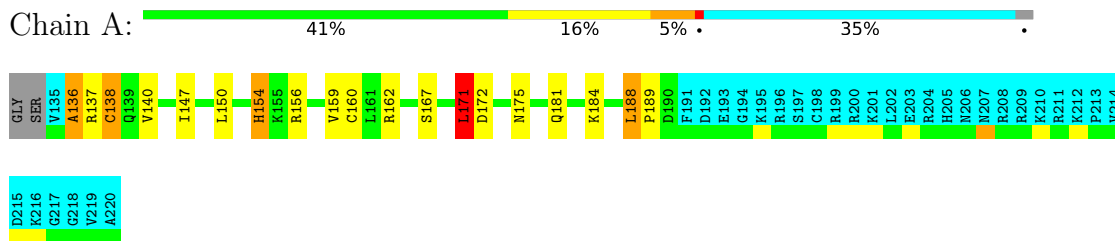
#### 4.2.15 Score per residue for model 15

- Molecule 1: squamosa promoter binding protein-like 7



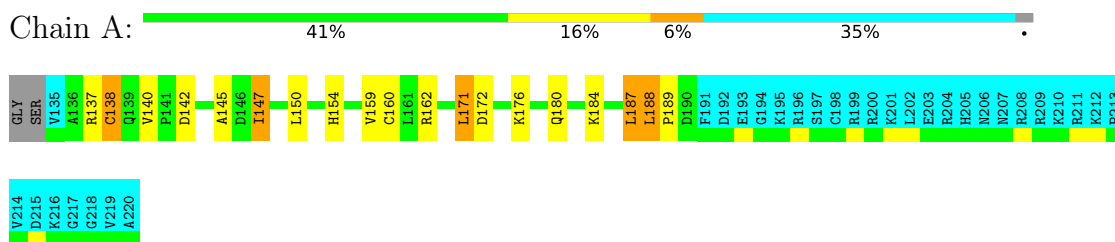
#### 4.2.16 Score per residue for model 16

- Molecule 1: squamosa promoter binding protein-like 7



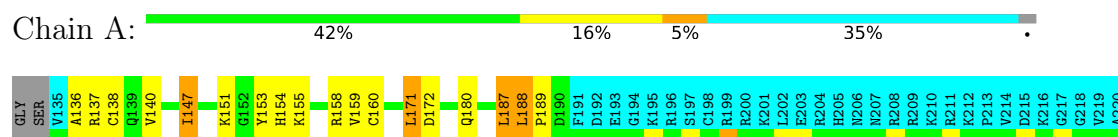
#### 4.2.17 Score per residue for model 17

- Molecule 1: squamosa promoter binding protein-like 7



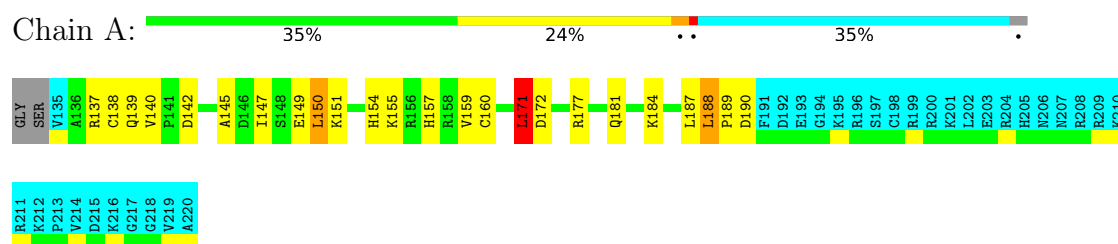
### 4.2.18 Score per residue for model 18

- Molecule 1: squamosa promoter binding protein-like 7



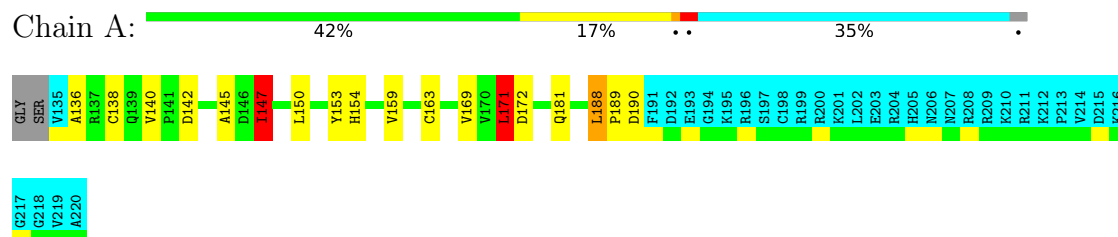
### 4.2.19 Score per residue for model 19

- Molecule 1: squamosa promoter binding protein-like 7



### 4.2.20 Score per residue for model 20

- Molecule 1: squamosa promoter binding protein-like 7



## 5 Refinement protocol and experimental data overview

The models were refined using the following method: *simulated annealing*.

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

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

Software name	Classification	Version
CNS	structure solution	1.1
CNS	refinement	1.1

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	438	424	424	11±2
All	All	8800	8480	8480	211

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 12.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:187:LEU:HD23	1:A:189:PRO:HG2	0.76	1.56	11	3
1:A:136:ALA:HB1	1:A:147:ILE:HD12	0.72	1.60	13	5
1:A:147:ILE:HG21	1:A:160:CYS:HA	0.71	1.61	12	14
1:A:136:ALA:HB2	1:A:155:LYS:HE2	0.67	1.67	1	1
1:A:147:ILE:HD13	1:A:159:VAL:O	0.66	1.91	11	10
1:A:140:VAL:HG13	1:A:171:LEU:HD12	0.65	1.67	4	9
1:A:150:LEU:HD23	1:A:154:HIS:NE2	0.62	2.10	19	3
1:A:138:CYS:HB3	1:A:145:ALA:HB3	0.62	1.72	5	15
1:A:150:LEU:HD23	1:A:154:HIS:CD2	0.62	2.29	14	12
1:A:188:LEU:N	1:A:189:PRO:HD2	0.62	2.10	14	17
1:A:187:LEU:HD23	1:A:189:PRO:CG	0.61	2.25	11	3
1:A:175:ASN:O	1:A:188:LEU:HD13	0.61	1.95	15	2

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:136:ALA:HB1	1:A:147:ILE:O	0.60	1.96	1	2
1:A:188:LEU:N	1:A:189:PRO:CD	0.60	2.64	20	20
1:A:140:VAL:HG12	1:A:142:ASP:OD1	0.57	1.99	7	17
1:A:171:LEU:HD22	1:A:176:LYS:HD2	0.57	1.76	3	1
1:A:136:ALA:HB1	1:A:147:ILE:CD1	0.56	2.30	14	2
1:A:162:ARG:O	1:A:166:ALA:HB2	0.55	2.02	3	6
1:A:163:CYS:SG	1:A:169:VAL:HG11	0.55	2.42	14	6
1:A:138:CYS:SG	1:A:140:VAL:HG23	0.54	2.43	13	20
1:A:138:CYS:CB	1:A:145:ALA:HB3	0.52	2.34	5	12
1:A:147:ILE:HD13	1:A:150:LEU:HD22	0.52	1.82	4	1
1:A:136:ALA:HB2	1:A:155:LYS:CG	0.48	2.38	13	2
1:A:176:LYS:HE3	1:A:187:LEU:HD12	0.47	1.85	11	1
1:A:169:VAL:HG22	1:A:176:LYS:O	0.47	2.09	9	1
1:A:136:ALA:HB2	1:A:155:LYS:HG2	0.47	1.87	2	4
1:A:176:LYS:HE2	1:A:187:LEU:HD22	0.46	1.88	3	1
1:A:153:TYR:CD1	1:A:154:HIS:N	0.45	2.84	14	5
1:A:176:LYS:HD3	1:A:187:LEU:HD12	0.45	1.89	17	1
1:A:159:VAL:HG22	1:A:160:CYS:N	0.43	2.29	6	3
1:A:157:HIS:CE1	1:A:184:LYS:N	0.42	2.87	19	1
1:A:147:ILE:HG21	1:A:160:CYS:CA	0.42	2.37	12	2
1:A:171:LEU:HD22	1:A:176:LYS:HG3	0.41	1.91	1	1
1:A:154:HIS:HB2	1:A:159:VAL:HG13	0.41	1.92	3	2
1:A:147:ILE:CG2	1:A:150:LEU:HD22	0.41	2.46	5	1
1:A:188:LEU:N	1:A:189:PRO:HD3	0.41	2.30	5	1
1:A:161:LEU:HD12	1:A:161:LEU:O	0.41	2.16	3	1
1:A:153:TYR:OH	1:A:164:ALA:HB1	0.41	2.15	14	1
1:A:178:TYR:CE2	1:A:183:GLY:O	0.40	2.75	5	1
1:A:178:TYR:CE1	1:A:183:GLY:O	0.40	2.74	6	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	55/88 (62%)	43±2 (77±4%)	9±2 (16±4%)	4±1 (7±2%)	<b>2</b> <b>16</b>

Continued on next page...

*Continued from previous page...*

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	1100/1760 (62%)	851 (77%)	171 (16%)	78 (7%)	<b>2</b> <b>16</b>

All 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	171	LEU	20
1	A	172	ASP	20
1	A	138	CYS	12
1	A	147	ILE	10
1	A	136	ALA	7
1	A	181	GLN	5
1	A	190	ASP	2
1	A	184	LYS	2

### 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	48/76 (63%)	40±2 (84±4%)	8±2 (16±4%)	<b>5</b> 42
All	All	960/1520 (63%)	807 (84%)	153 (16%)	<b>5</b> 42

All 26 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	171	LEU	20
1	A	188	LEU	18
1	A	137	ARG	12
1	A	162	ARG	11
1	A	154	HIS	9
1	A	177	ARG	8
1	A	151	LYS	8
1	A	155	LYS	7
1	A	156	ARG	7
1	A	181	GLN	6
1	A	184	LYS	6

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Models (Total)
1	A	190	ASP	5
1	A	167	SER	5
1	A	180	GLN	4
1	A	147	ILE	4
1	A	150	LEU	4
1	A	187	LEU	4
1	A	148	SER	3
1	A	139	GLN	2
1	A	144	GLU	2
1	A	149	GLU	2
1	A	158	ARG	2
1	A	176	LYS	1
1	A	146	ASP	1
1	A	172	ASP	1
1	A	174	GLU	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 2 ligands modelled in this entry, 2 are 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

No chemical shift data were provided