



# Full wwPDB NMR Structure Validation Report ⓘ

Feb 23, 2022 – 08:55 AM EST

PDB ID : 1X67  
Title : Solution structure of the cofilin homology domain of HIP-55 (drebrin-like protein)  
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Deposited on : 2005-05-17

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A user guide is available at

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

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

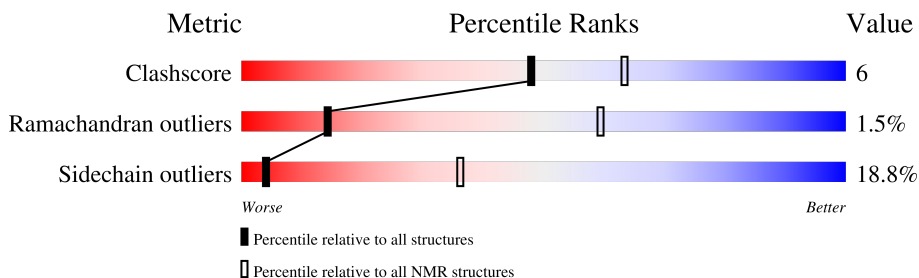
# 1 Overall quality at a glance

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	146	 69% 20% • 10%

## 2 Ensemble composition and analysis

This entry contains 20 models. Model 1 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:10-A:141 (132)	0.21	1

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. No single-model clusters were found.

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

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2112 atoms, of which 1037 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Drebrin-like protein.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	146	2112	661	1037	187	219	8	0

There are 13 discrepancies between the modelled and reference sequences:

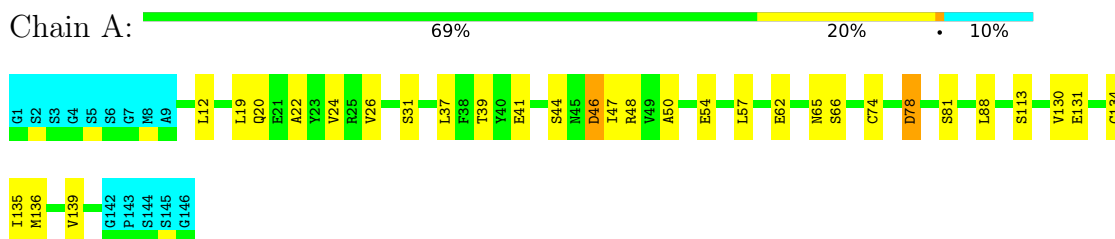
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	cloning artifact	UNP Q9UJU6
A	2	SER	-	cloning artifact	UNP Q9UJU6
A	3	SER	-	cloning artifact	UNP Q9UJU6
A	4	GLY	-	cloning artifact	UNP Q9UJU6
A	5	SER	-	cloning artifact	UNP Q9UJU6
A	6	SER	-	cloning artifact	UNP Q9UJU6
A	7	GLY	-	cloning artifact	UNP Q9UJU6
A	141	SER	-	cloning artifact	UNP Q9UJU6
A	142	GLY	-	cloning artifact	UNP Q9UJU6
A	143	PRO	-	cloning artifact	UNP Q9UJU6
A	144	SER	-	cloning artifact	UNP Q9UJU6
A	145	SER	-	cloning artifact	UNP Q9UJU6
A	146	GLY	-	cloning artifact	UNP Q9UJU6

## 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: Drebrin-like protein

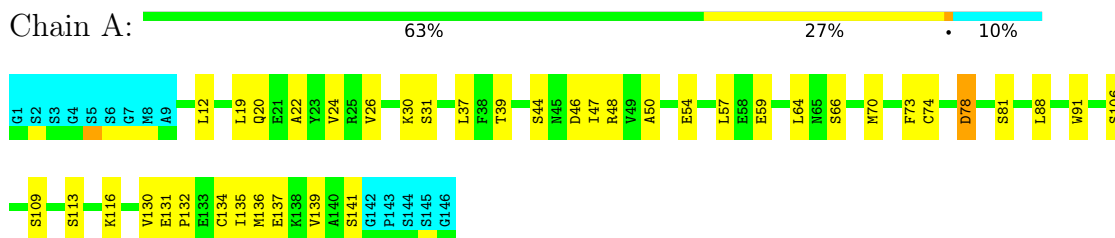


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

#### 4.2.1 Score per residue for model 1 (medoid)

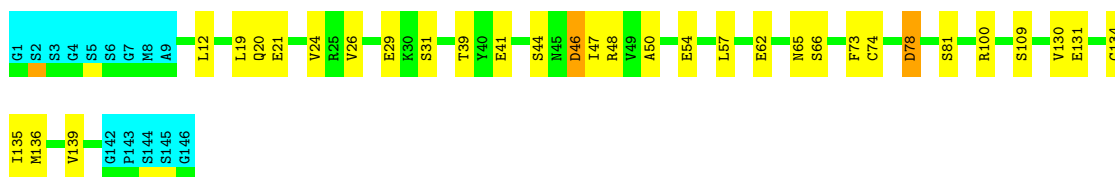
- Molecule 1: Drebrin-like protein



#### 4.2.2 Score per residue for model 2

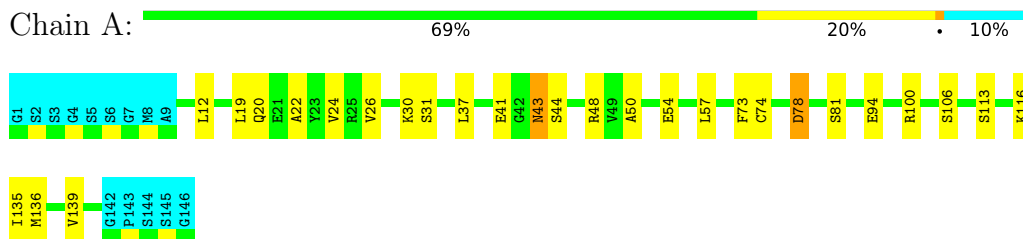
- Molecule 1: Drebrin-like protein





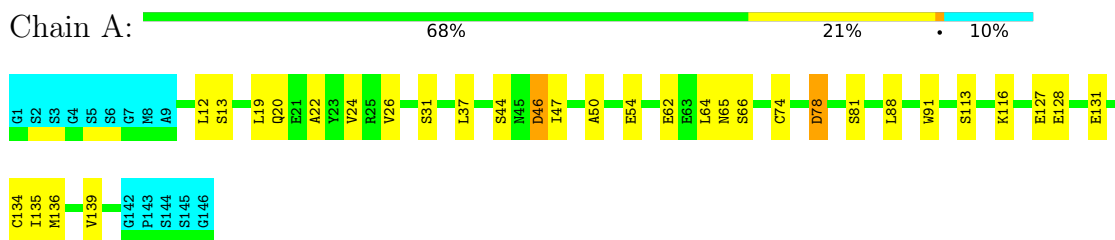
### 4.2.3 Score per residue for model 3

- Molecule 1: Drebrin-like protein



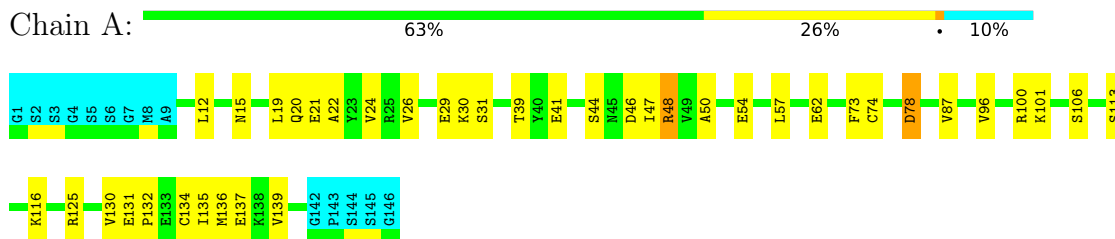
### 4.2.4 Score per residue for model 4

- Molecule 1: Drebrin-like protein



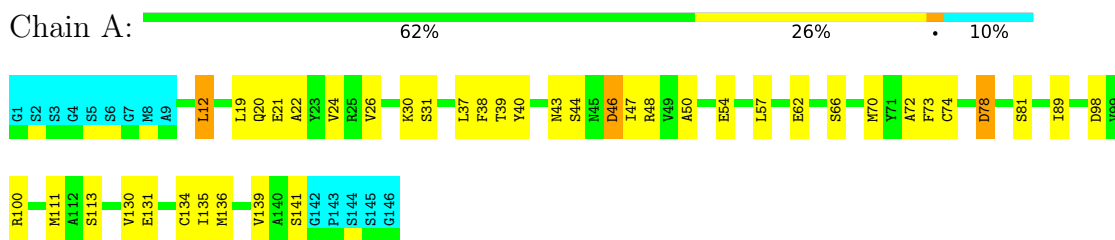
### 4.2.5 Score per residue for model 5

- Molecule 1: Drebrin-like protein



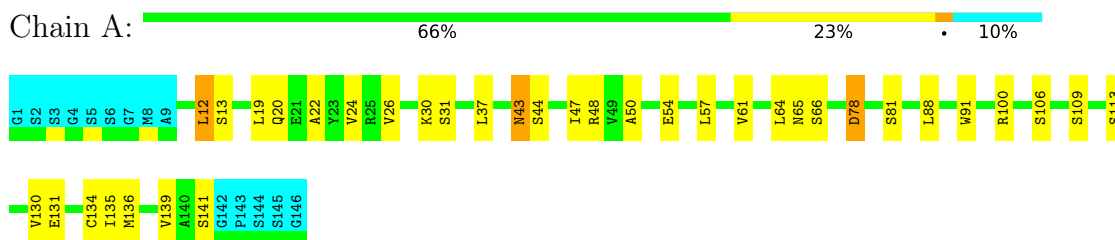
### 4.2.6 Score per residue for model 6

- Molecule 1: Drebrin-like protein



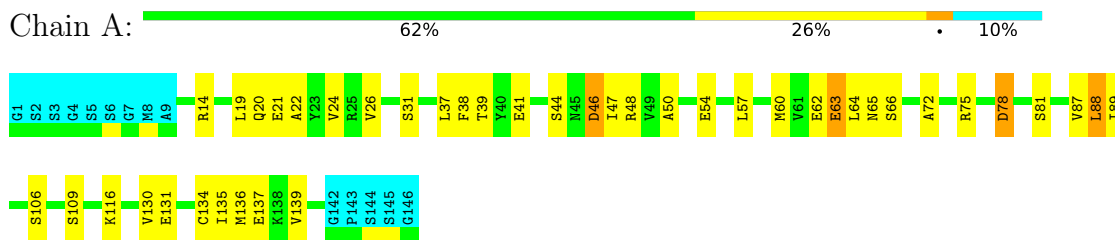
#### 4.2.7 Score per residue for model 7

- Molecule 1: Drebrin-like protein



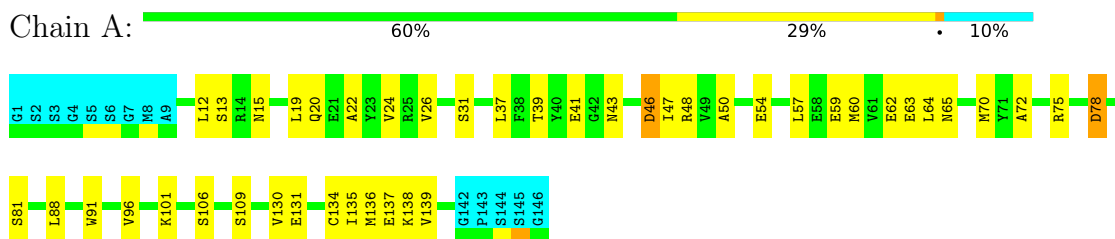
#### 4.2.8 Score per residue for model 8

- Molecule 1: Drebrin-like protein



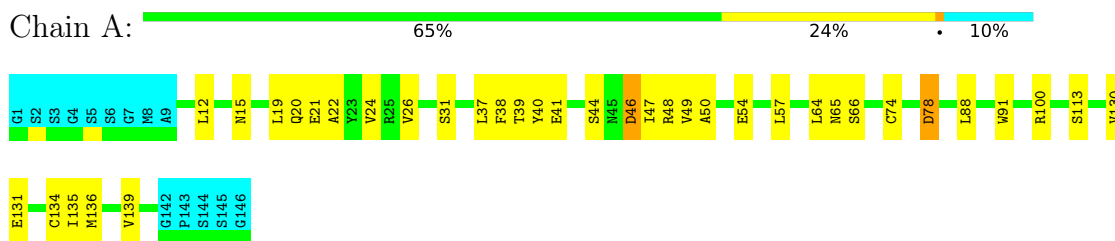
#### 4.2.9 Score per residue for model 9

- Molecule 1: Drebrin-like protein



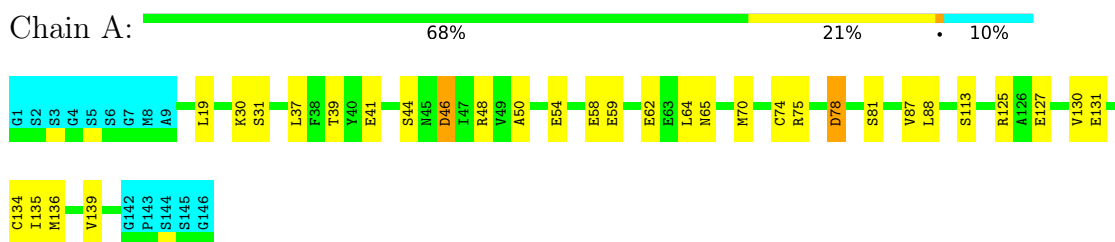
#### 4.2.10 Score per residue for model 10

- Molecule 1: Drebrin-like protein



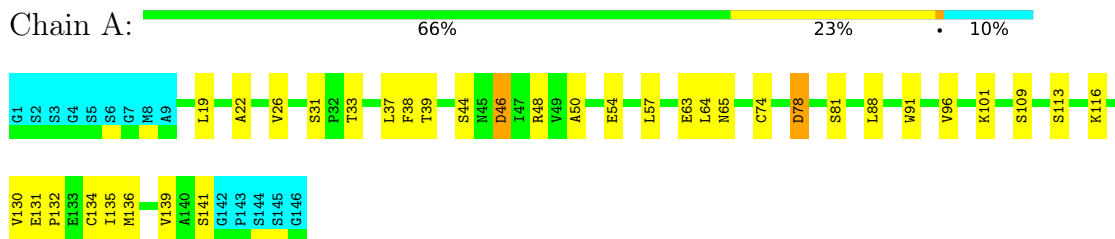
#### 4.2.11 Score per residue for model 11

- Molecule 1: Drebrin-like protein



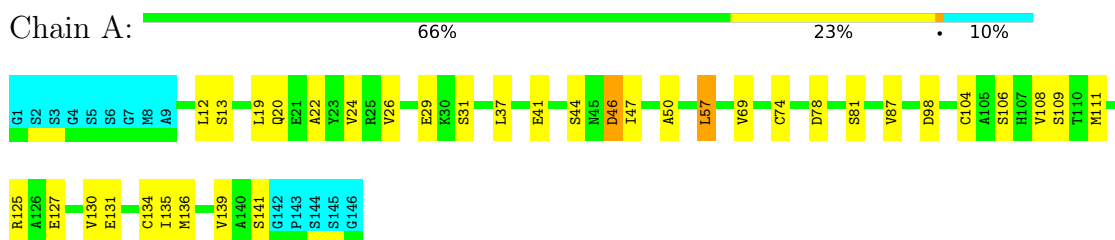
#### 4.2.12 Score per residue for model 12

- Molecule 1: Drebrin-like protein



#### 4.2.13 Score per residue for model 13

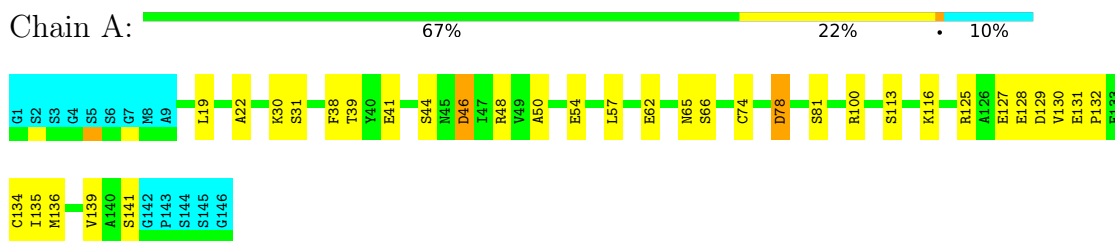
- Molecule 1: Drebrin-like protein





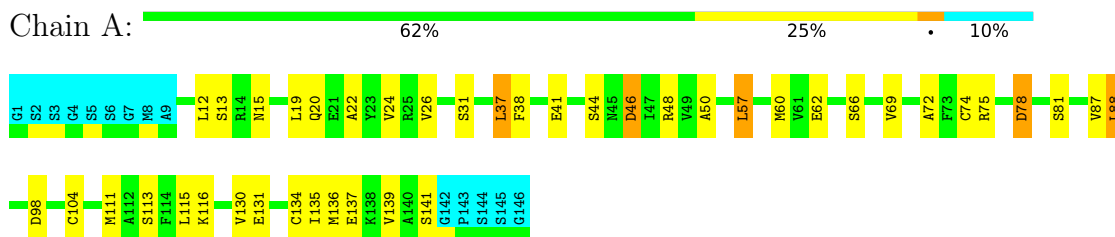
## 4.2.14 Score per residue for model 14

- Molecule 1: Drebrin-like protein



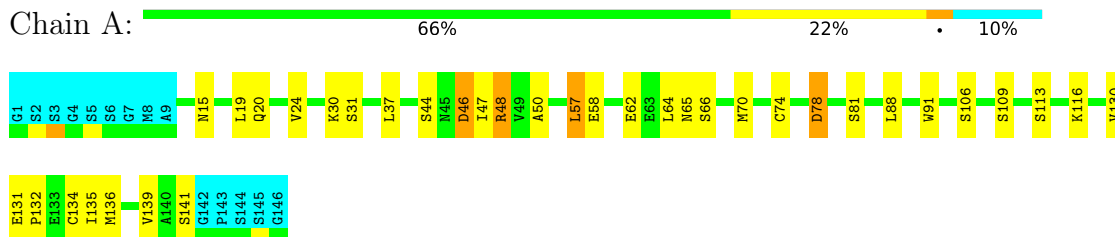
## 4.2.15 Score per residue for model 15

- Molecule 1: Drebrin-like protein



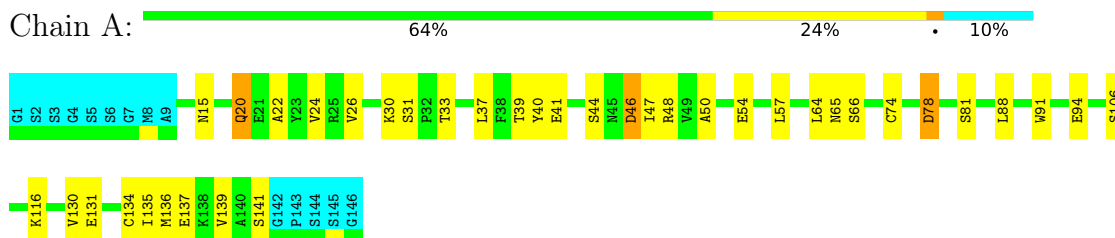
## 4.2.16 Score per residue for model 16

- Molecule 1: Drebrin-like protein



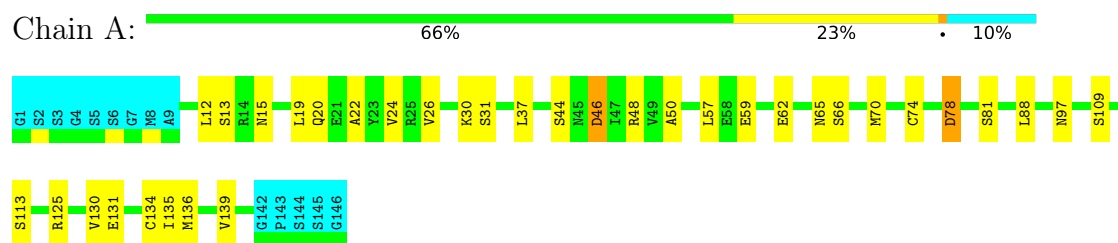
## 4.2.17 Score per residue for model 17

- Molecule 1: Drebrin-like protein



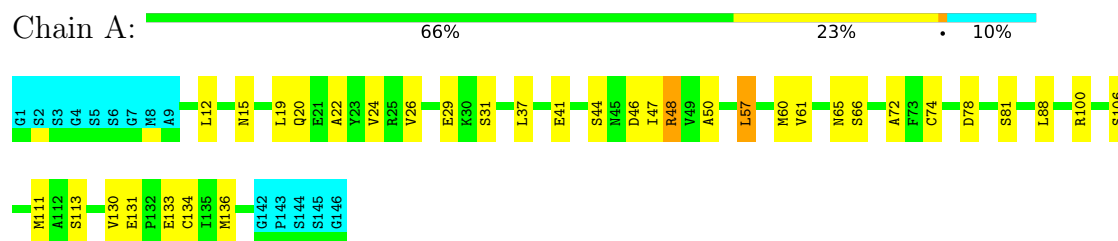
### 4.2.18 Score per residue for model 18

- Molecule 1: Drebrin-like protein



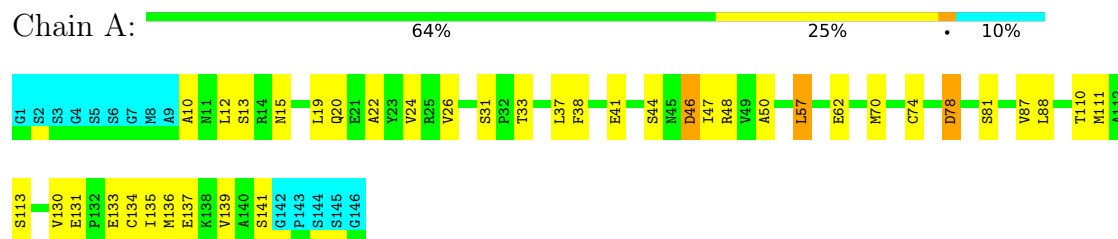
### 4.2.19 Score per residue for model 19

- Molecule 1: Drebrin-like protein



### 4.2.20 Score per residue for model 20

- Molecule 1: Drebrin-like protein



## 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*.

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

Software name	Classification	Version
CYANA	refinement	2

No chemical shift data was provided.

## 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	999	971	971	12±3
All	All	19980	19420	19420	247

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.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:12:LEU:HD23	1:A:19:LEU:HD13	0.81	1.52	6	13
1:A:57:LEU:HD22	1:A:135:ILE:HD13	0.72	1.61	2	4
1:A:96:VAL:HG13	1:A:101:LYS:HE3	0.66	1.68	5	3
1:A:87:VAL:HG21	1:A:139:VAL:HG22	0.65	1.65	5	3
1:A:39:THR:HG22	1:A:50:ALA:HB2	0.64	1.68	12	11
1:A:20:GLN:O	1:A:24:VAL:HG23	0.63	1.93	10	15
1:A:19:LEU:HD11	1:A:47:ILE:O	0.63	1.94	19	12
1:A:135:ILE:O	1:A:139:VAL:HG23	0.63	1.93	8	18
1:A:64:LEU:HD22	1:A:91:TRP:CG	0.60	2.32	9	4
1:A:87:VAL:HG11	1:A:135:ILE:CG2	0.58	2.27	13	2
1:A:22:ALA:O	1:A:26:VAL:HG23	0.57	1.99	18	14
1:A:37:LEU:HD21	1:A:64:LEU:CD2	0.57	2.29	8	1
1:A:87:VAL:HG11	1:A:135:ILE:HG23	0.56	1.76	11	3
1:A:37:LEU:HB3	1:A:50:ALA:HB3	0.56	1.76	13	10

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:64:LEU:HD13	1:A:91:TRP:CE3	0.55	2.37	17	6
1:A:19:LEU:HD21	1:A:48:ARG:HA	0.55	1.79	10	15
1:A:60:MET:SD	1:A:72:ALA:HB1	0.54	2.43	9	4
1:A:57:LEU:HD22	1:A:135:ILE:HD12	0.54	1.80	12	11
1:A:78:ASP:OD1	1:A:139:VAL:HG12	0.54	2.03	1	18
1:A:19:LEU:HD21	1:A:48:ARG:CA	0.52	2.35	16	7
1:A:96:VAL:HG13	1:A:101:LYS:CE	0.52	2.34	5	3
1:A:37:LEU:HD23	1:A:70:MET:HE1	0.50	1.83	18	6
1:A:57:LEU:HD22	1:A:135:ILE:CD1	0.50	2.34	20	9
1:A:37:LEU:HD21	1:A:64:LEU:HD21	0.50	1.83	8	1
1:A:40:TYR:CZ	1:A:47:ILE:HD11	0.49	2.42	10	3
1:A:87:VAL:CG2	1:A:139:VAL:HG22	0.49	2.37	5	1
1:A:47:ILE:HG21	1:A:111:MET:SD	0.49	2.47	13	3
1:A:10:ALA:HB3	1:A:110:THR:CG2	0.49	2.38	20	1
1:A:15:ASN:OD1	1:A:19:LEU:HD11	0.48	2.08	18	2
1:A:104:CYS:O	1:A:108:VAL:HG23	0.48	2.08	13	1
1:A:38:PHE:CE1	1:A:49:VAL:HG22	0.48	2.43	10	1
1:A:10:ALA:HB3	1:A:110:THR:HG21	0.47	1.87	20	1
1:A:57:LEU:CD2	1:A:135:ILE:HD13	0.47	2.36	20	2
1:A:37:LEU:HD21	1:A:64:LEU:HD23	0.46	1.86	10	1
1:A:37:LEU:HD22	1:A:63:GLU:HB3	0.46	1.87	9	2
1:A:57:LEU:HD13	1:A:132:PRO:HA	0.46	1.87	12	5
1:A:88:LEU:HD13	1:A:89:ILE:N	0.46	2.26	8	1
1:A:19:LEU:HD23	1:A:38:PHE:CD1	0.45	2.47	15	3
1:A:72:ALA:HB3	1:A:89:ILE:HB	0.45	1.88	6	1
1:A:12:LEU:HD21	1:A:111:MET:SD	0.45	2.51	15	1
1:A:69:VAL:HG21	1:A:104:CYS:SG	0.45	2.52	15	2
1:A:37:LEU:HD23	1:A:70:MET:CE	0.44	2.42	9	3
1:A:12:LEU:HD11	1:A:111:MET:SD	0.44	2.53	19	1
1:A:26:VAL:HG22	1:A:33:THR:HG22	0.43	1.90	12	3
1:A:88:LEU:HD21	1:A:115:LEU:HD12	0.42	1.90	15	1
1:A:22:ALA:HB3	1:A:38:PHE:CE1	0.42	2.49	20	1
1:A:20:GLN:O	1:A:24:VAL:HG12	0.42	2.15	20	2
1:A:26:VAL:HG11	1:A:73:PHE:CD2	0.42	2.50	6	5
1:A:37:LEU:HD12	1:A:63:GLU:HB2	0.41	1.92	8	1
1:A:61:VAL:HA	1:A:64:LEU:HD12	0.41	1.93	7	1
1:A:22:ALA:HB3	1:A:38:PHE:CE2	0.41	2.51	12	2
1:A:64:LEU:HD22	1:A:91:TRP:CD2	0.41	2.51	7	1
1:A:37:LEU:HD11	1:A:64:LEU:CD2	0.40	2.46	11	1
1:A:57:LEU:O	1:A:61:VAL:HG22	0.40	2.16	19	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	132/146 (90%)	115±2 (87±2%)	15±2 (11±2%)	2±0 (1±0%)	14	59
All	All	2640/2920 (90%)	2303 (87%)	298 (11%)	39 (1%)	14	59

All 4 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	130	VAL	19
1	A	46	ASP	17
1	A	43	ASN	2
1	A	97	ASN	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	107/115 (93%)	87±2 (81±2%)	20±2 (19±2%)	4	36
All	All	2140/2300 (93%)	1738 (81%)	402 (19%)	4	36

All 46 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	SER	20
1	A	78	ASP	20
1	A	131	GLU	20
1	A	134	CYS	20
1	A	136	MET	20
1	A	44	SER	19

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Mol	Chain	Res	Type	Models (Total)
1	A	81	SER	18
1	A	74	CYS	17
1	A	46	ASP	16
1	A	113	SER	15
1	A	54	GLU	14
1	A	88	LEU	14
1	A	66	SER	13
1	A	41	GLU	13
1	A	65	ASN	13
1	A	62	GLU	12
1	A	30	LYS	10
1	A	106	SER	10
1	A	116	LYS	10
1	A	141	SER	10
1	A	109	SER	9
1	A	100	ARG	8
1	A	137	GLU	7
1	A	13	SER	7
1	A	15	ASN	7
1	A	57	LEU	6
1	A	48	ARG	5
1	A	21	GLU	5
1	A	125	ARG	5
1	A	59	GLU	4
1	A	29	GLU	4
1	A	43	ASN	4
1	A	127	GLU	4
1	A	75	ARG	4
1	A	98	ASP	3
1	A	94	GLU	2
1	A	128	GLU	2
1	A	12	LEU	2
1	A	58	GLU	2
1	A	133	GLU	2
1	A	14	ARG	1
1	A	63	GLU	1
1	A	138	LYS	1
1	A	129	ASP	1
1	A	37	LEU	1
1	A	20	GLN	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](#)

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