



Full wwPDB NMR Structure Validation Report ⓘ

May 28, 2020 – 11:24 pm BST

PDB ID : 2M1C
Title : HADDOCK structure of GtYybT PAS Homodimer
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Deposited on : 2012-11-25

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 ⓘ symbol.

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
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 : 2.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

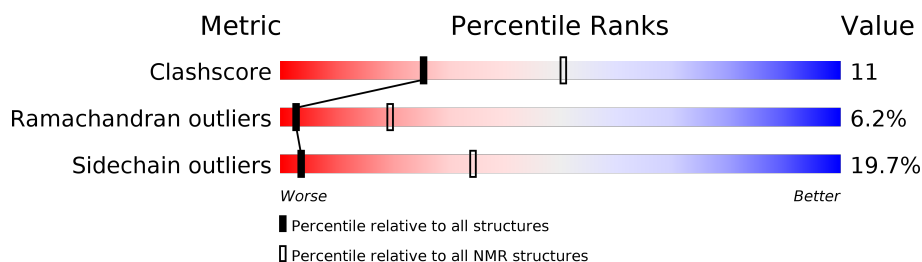
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 44%.

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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	113	<div> <div>52%</div> <div>39%</div> <div>9%</div> </div>
1	B	113	<div> <div>54%</div> <div>35%</div> <div>11%</div> <div>.</div> </div>

2 Ensemble composition and analysis

This entry contains 4 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:49-A:161, B:49-B:161 (226)	0.58	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 1 clusters. No single-model clusters were found.

Cluster number	Models
1	1, 2, 3, 4

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 3766 atoms, of which 1910 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called DHH subfamily 1 protein.

Mol	Chain	Residues	Atoms						Trace
1	A	113	Total	C	H	N	O	S	0
			1883	593	955	161	170	4	
1	B	113	Total	C	H	N	O	S	0
			1883	593	955	161	170	4	

There are 10 discrepancies between the modelled and reference sequences:

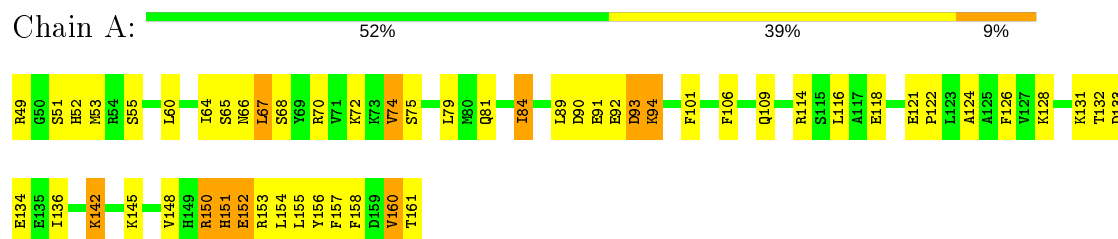
Chain	Residue	Modelled	Actual	Comment	Reference
A	49	ARG	-	EXPRESSION TAG	UNP A4ITV2
A	50	GLY	-	EXPRESSION TAG	UNP A4ITV2
A	51	SER	-	EXPRESSION TAG	UNP A4ITV2
A	52	HIS	-	EXPRESSION TAG	UNP A4ITV2
A	53	MET	-	EXPRESSION TAG	UNP A4ITV2
B	49	ARG	-	EXPRESSION TAG	UNP A4ITV2
B	50	GLY	-	EXPRESSION TAG	UNP A4ITV2
B	51	SER	-	EXPRESSION TAG	UNP A4ITV2
B	52	HIS	-	EXPRESSION TAG	UNP A4ITV2
B	53	MET	-	EXPRESSION TAG	UNP A4ITV2

4 Residue-property plots

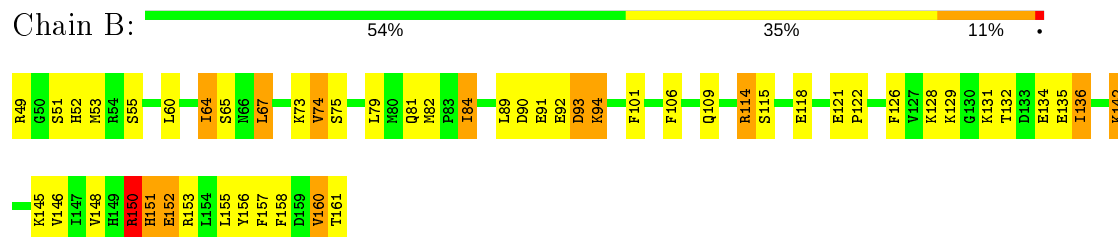
4.1 Average score per residue in the NMR ensemble

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: DHH subfamily 1 protein



- Molecule 1: DHH subfamily 1 protein

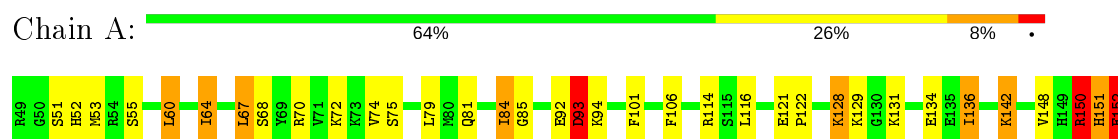


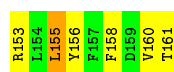
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1 (medoid)

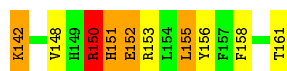
- Molecule 1: DHH subfamily 1 protein





- Molecule 1: DHH subfamily 1 protein

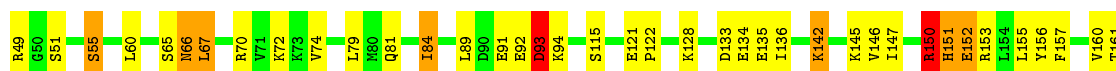
Chain B: 60% 28% 10% 2%



4.2.2 Score per residue for model 2

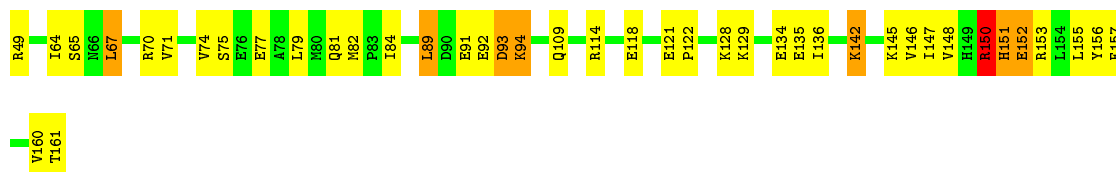
- Molecule 1: DHH subfamily 1 protein

Chain A: 65% 27% 6% 2%



- Molecule 1: DHH subfamily 1 protein

Chain B: 63% 30% 6% 2%



4.2.3 Score per residue for model 3

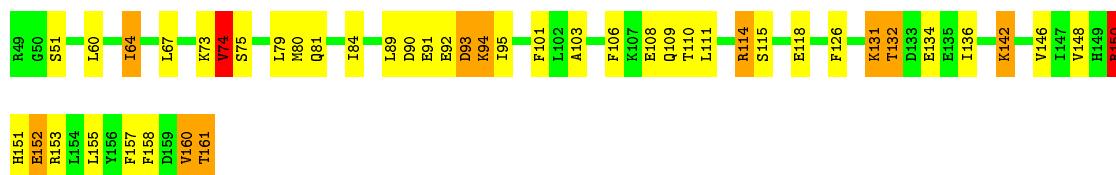
- Molecule 1: DHH subfamily 1 protein

Chain A: 61% 29% 9% 2%



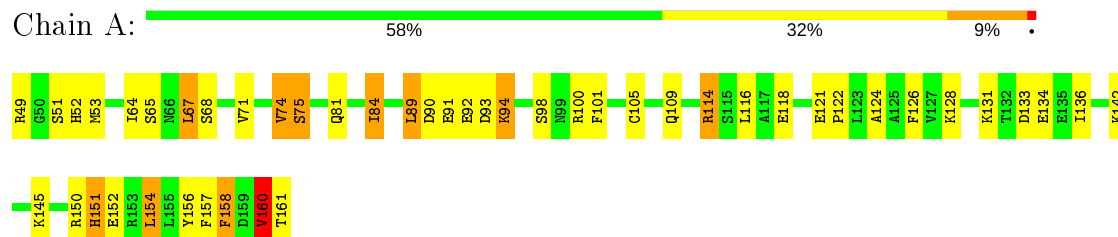
- Molecule 1: DHH subfamily 1 protein

Chain B: 60% 29% 9% 2%

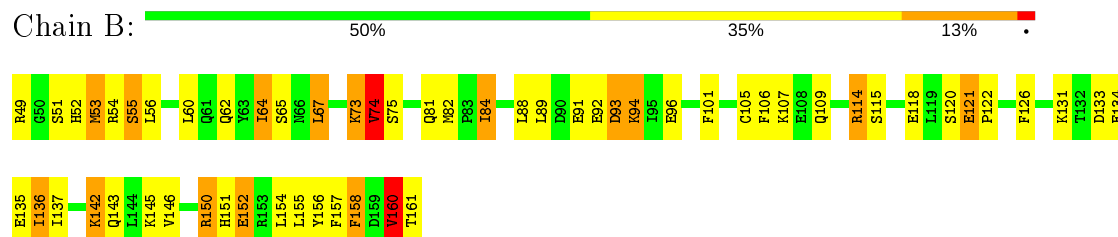


4.2.4 Score per residue for model 4

- Molecule 1: DHH subfamily 1 protein



- Molecule 1: DHH subfamily 1 protein



5 Refinement protocol and experimental data overview

The models were refined using the following method: ?.

Of the 200 calculated structures, 4 were deposited, based on the following criterion: *Top 4 structures from HADDOCK webserver.*

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

Software name	Classification	Version
CNS	refinement	
HADDOCK	refinement	

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 6 of this report.

Chemical shift file(s)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1485
Number of shifts mapped to atoms	1485
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	44%

No validations of the models with respect to experimental NMR restraints is performed at this time.

COVALENT-GEOMETRY INFOmissingINFO

5.1 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	928	955	952	20±1
1	B	928	955	952	24±3
All	All	7424	7640	7616	171

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 11.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:B:92:GLU:O	1:B:93:ASP:HB2	0.81	1.73	2	1
1:A:92:GLU:O	1:A:93:ASP:HB2	0.79	1.75	2	1
1:B:92:GLU:O	1:B:93:ASP:HB3	0.77	1.78	1	2
1:A:92:GLU:O	1:A:93:ASP:HB3	0.74	1.80	1	2
1:A:148:VAL:HG12	1:A:155:LEU:HB2	0.69	1.64	3	2
1:A:152:GLU:O	1:A:155:LEU:HD22	0.68	1.89	2	1
1:B:51:SER:HA	1:B:90:ASP:OD1	0.67	1.90	3	1
1:B:93:ASP:O	1:B:94:LYS:HE3	0.65	1.91	2	1
1:B:114:ARG:O	1:B:118:GLU:HB2	0.64	1.93	3	4
1:A:143:GLN:HB2	1:A:160:VAL:HG23	0.64	1.68	3	1
1:B:148:VAL:HG12	1:B:155:LEU:HB2	0.63	1.70	1	3
1:A:114:ARG:O	1:A:118:GLU:HB2	0.62	1.94	3	2
1:B:142:LYS:CG	1:B:161:THR:HA	0.59	2.28	3	2
1:A:145:LYS:HD2	1:A:158:PHE:CE2	0.59	2.32	4	1
1:B:89:LEU:HB2	1:B:94:LYS:O	0.58	1.99	4	3
1:A:51:SER:HA	1:A:90:ASP:OD1	0.57	2.00	3	2
1:A:92:GLU:O	1:A:128:LYS:HE2	0.57	1.99	1	1
1:B:90:ASP:CG	1:B:91:GLU:H	0.57	2.03	3	1
1:B:51:SER:O	1:B:55:SER:HB2	0.57	1.99	1	2
1:A:89:LEU:HB2	1:A:94:LYS:O	0.56	2.00	4	2
1:B:60:LEU:O	1:B:64:ILE:HG12	0.56	2.01	1	3
1:B:121:GLU:N	1:B:122:PRO:HD2	0.55	2.16	2	3
1:A:84:ILE:O	1:A:84:ILE:HG12	0.55	2.00	1	1
1:B:79:LEU:HD23	1:B:82:MET:HG3	0.55	1.78	2	1
1:B:143:GLN:HB2	1:B:160:VAL:HG23	0.54	1.78	4	1
1:B:128:LYS:NZ	1:B:128:LYS:HA	0.54	2.18	1	1
1:A:51:SER:O	1:A:55:SER:HB2	0.54	2.02	2	2
1:B:67:LEU:H	1:B:67:LEU:HD13	0.54	1.63	1	1
1:A:79:LEU:HD11	1:A:84:ILE:HA	0.53	1.78	3	1
1:A:134:GLU:HG2	1:B:136:ILE:HD12	0.53	1.79	4	1
1:B:84:ILE:O	1:B:101:PHE:HB2	0.53	2.04	4	2
1:B:152:GLU:O	1:B:155:LEU:HD22	0.52	2.04	2	2
1:A:121:GLU:N	1:A:122:PRO:HD2	0.52	2.18	2	4
1:A:74:VAL:HG11	1:A:79:LEU:HG	0.52	1.82	2	1
1:A:151:HIS:O	1:A:153:ARG:HG2	0.52	2.05	2	1
1:A:84:ILE:HD11	1:A:105:CYS:SG	0.52	2.45	4	1
1:A:134:GLU:CG	1:B:136:ILE:HD12	0.52	2.34	1	1
1:B:151:HIS:O	1:B:153:ARG:N	0.52	2.44	1	2
1:A:145:LYS:O	1:A:157:PHE:HA	0.51	2.06	2	1
1:A:67:LEU:HD13	1:A:67:LEU:H	0.51	1.65	1	1
1:A:142:LYS:CG	1:A:161:THR:HA	0.51	2.35	4	3
1:A:66:ASN:ND2	1:A:67:LEU:HG	0.50	2.22	2	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:151:HIS:O	1:A:153:ARG:N	0.49	2.45	1	1
1:A:60:LEU:O	1:A:64:ILE:HG12	0.49	2.07	3	2
1:A:80:MET:O	1:B:151:HIS:HB2	0.49	2.07	3	1
1:B:150:ARG:O	1:B:152:GLU:N	0.49	2.38	2	1
1:A:92:GLU:O	1:A:92:GLU:HG2	0.49	2.07	2	1
1:A:136:ILE:HD13	1:A:136:ILE:N	0.48	2.23	1	1
1:A:114:ARG:NE	1:A:114:ARG:HA	0.48	2.23	4	1
1:A:134:GLU:OE2	1:B:136:ILE:HG23	0.48	2.07	4	1
1:A:134:GLU:OE2	1:B:145:LYS:HG3	0.48	2.08	4	1
1:A:150:ARG:O	1:A:152:GLU:N	0.48	2.39	2	1
1:A:74:VAL:HB	1:A:101:PHE:CZ	0.48	2.43	1	2
1:B:146:VAL:HG12	1:B:157:PHE:CG	0.48	2.44	2	1
1:A:151:HIS:HB2	1:B:80:MET:O	0.48	2.09	3	1
1:B:73:LYS:O	1:B:74:VAL:HG12	0.48	2.09	3	2
1:A:154:LEU:HD11	1:B:82:MET:HE2	0.47	1.86	4	1
1:B:79:LEU:HD11	1:B:84:ILE:HA	0.47	1.86	3	1
1:B:92:GLU:O	1:B:93:ASP:CB	0.47	2.53	2	1
1:B:134:GLU:HB2	1:B:146:VAL:O	0.47	2.10	3	2
1:A:92:GLU:O	1:A:93:ASP:CB	0.47	2.55	2	2
1:B:142:LYS:CB	1:B:161:THR:HA	0.47	2.40	4	1
1:B:150:ARG:C	1:B:152:GLU:H	0.47	2.13	3	2
1:A:135:GLU:O	1:A:146:VAL:HG22	0.46	2.10	2	1
1:B:74:VAL:HG11	1:B:79:LEU:HG	0.46	1.86	2	1
1:B:67:LEU:HD12	1:B:67:LEU:H	0.46	1.71	2	1
1:B:84:ILE:HD11	1:B:105:CYS:SG	0.46	2.50	4	1
1:B:145:LYS:HD2	1:B:158:PHE:CE2	0.46	2.46	4	1
1:B:136:ILE:HD13	1:B:136:ILE:N	0.46	2.26	4	2
1:A:124:ALA:O	1:A:128:LYS:HG2	0.46	2.11	3	2
1:A:145:LYS:HG3	1:B:134:GLU:OE2	0.46	2.11	4	1
1:B:142:LYS:HA	1:B:161:THR:O	0.45	2.11	4	1
1:A:142:LYS:CB	1:A:161:THR:HA	0.45	2.41	4	2
1:B:67:LEU:H	1:B:67:LEU:CD1	0.45	2.25	4	1
1:A:70:ARG:O	1:A:72:LYS:HG2	0.45	2.11	2	1
1:A:79:LEU:HD13	1:A:84:ILE:HA	0.45	1.87	2	1
1:B:89:LEU:H	1:B:89:LEU:HD23	0.45	1.72	3	1
1:B:129:LYS:O	1:B:131:LYS:HD2	0.45	2.11	1	1
1:A:134:GLU:HG3	1:A:136:ILE:HD11	0.45	1.88	2	1
1:A:129:LYS:O	1:A:131:LYS:HD2	0.45	2.11	1	1
1:A:84:ILE:O	1:A:101:PHE:HB2	0.45	2.11	4	1
1:B:147:ILE:O	1:B:155:LEU:HA	0.44	2.12	2	1
1:A:143:GLN:HB2	1:A:160:VAL:CG2	0.44	2.39	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:90:ASP:CG	1:A:91:GLU:H	0.44	2.16	3	1
1:A:147:ILE:O	1:A:155:LEU:HA	0.44	2.12	2	1
1:A:89:LEU:HD13	1:A:116:LEU:HD21	0.44	1.89	4	1
1:B:53:MET:SD	1:B:88:LEU:HB3	0.44	2.53	4	1
1:B:131:LYS:O	1:B:132:THR:HB	0.44	2.12	3	1
1:A:145:LYS:HE3	1:A:160:VAL:HG11	0.44	1.90	3	1
1:A:151:HIS:O	1:A:153:ARG:CG	0.44	2.65	2	1
1:A:145:LYS:HG3	1:A:160:VAL:HG21	0.44	1.90	3	1
1:B:74:VAL:HB	1:B:101:PHE:CZ	0.43	2.48	3	2
1:A:131:LYS:O	1:A:132:THR:HB	0.43	2.13	3	1
1:B:53:MET:HG3	1:B:60:LEU:HG	0.43	1.89	4	1
1:B:74:VAL:CG2	1:B:77:GLU:HB2	0.43	2.43	2	1
1:A:67:LEU:H	1:A:67:LEU:CD1	0.43	2.26	4	1
1:A:70:ARG:O	1:A:72:LYS:HG3	0.43	2.13	1	1
1:A:146:VAL:HG12	1:A:157:PHE:CG	0.43	2.48	2	1
1:B:92:GLU:HG2	1:B:92:GLU:O	0.43	2.14	2	1
1:A:150:ARG:C	1:A:152:GLU:H	0.43	2.17	1	1
1:A:157:PHE:CD1	1:A:157:PHE:N	0.43	2.85	2	1
1:B:145:LYS:O	1:B:157:PHE:HA	0.43	2.13	2	1
1:B:151:HIS:O	1:B:152:GLU:HG2	0.43	2.14	3	1
1:A:79:LEU:HD21	1:A:84:ILE:HB	0.42	1.91	1	1
1:A:160:VAL:O	1:A:161:THR:C	0.42	2.57	4	1
1:B:135:GLU:O	1:B:146:VAL:HG22	0.42	2.14	2	2
1:B:90:ASP:CG	1:B:91:GLU:N	0.42	2.73	3	1
1:B:160:VAL:O	1:B:161:THR:C	0.42	2.58	4	1
1:B:142:LYS:HG2	1:B:161:THR:HA	0.42	1.92	1	1
1:B:142:LYS:HB3	1:B:161:THR:N	0.42	2.30	4	2
1:B:51:SER:HA	1:B:90:ASP:CG	0.42	2.35	1	1
1:B:134:GLU:HA	1:B:146:VAL:O	0.42	2.15	2	1
1:B:95:ILE:HD11	1:B:115:SER:O	0.42	2.15	3	1
1:B:134:GLU:HG3	1:B:136:ILE:HD11	0.42	1.91	2	1
1:B:70:ARG:O	1:B:71:VAL:HG22	0.42	2.14	2	1
1:B:92:GLU:O	1:B:128:LYS:HE2	0.42	2.14	1	1
1:B:57:HIS:O	1:B:61:GLN:HG2	0.42	2.15	1	1
1:A:142:LYS:HB3	1:A:161:THR:N	0.41	2.30	2	1
1:B:86:ILE:HG23	1:B:158:PHE:CE1	0.41	2.51	1	1
1:B:64:ILE:HA	1:B:67:LEU:HD11	0.41	1.92	4	1
1:B:103:ALA:HB2	1:B:111:LEU:HD22	0.41	1.92	3	1
1:A:68:SER:O	1:A:71:VAL:HG13	0.41	2.15	4	1
1:B:106:PHE:O	1:B:107:LYS:HB2	0.41	2.15	4	1
1:A:121:GLU:H	1:A:122:PRO:HD2	0.41	1.74	4	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:85:GLY:O	1:A:158:PHE:HA	0.41	2.16	1	1
1:B:84:ILE:HG13	1:B:84:ILE:O	0.41	2.14	1	1
1:B:54:ARG:HD2	1:B:96:GLU:OE2	0.41	2.15	4	1
1:B:99:ASN:HB3	1:B:101:PHE:CD2	0.40	2.50	1	1
1:B:152:GLU:HA	1:B:152:GLU:OE1	0.40	2.15	2	1
1:B:150:ARG:C	1:B:152:GLU:N	0.40	2.75	3	1
1:A:135:GLU:HB3	1:A:146:VAL:CG2	0.40	2.45	2	1

5.2 Torsion angles

5.2.1 Protein backbone

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	111/113 (98%)	85±1 (77±1%)	19±1 (17±1%)	7±1 (6±1%)	3	20
1	B	111/113 (98%)	84±1 (76±1%)	20±2 (18±2%)	7±1 (6±1%)	3	19
All	All	888/904 (98%)	677 (76%)	156 (18%)	55 (6%)	3	19

All 26 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	93	ASP	4
1	B	93	ASP	4
1	B	152	GLU	4
1	B	64	ILE	4
1	A	81	GLN	4
1	B	81	GLN	4
1	A	152	GLU	4
1	A	64	ILE	3
1	B	160	VAL	2
1	B	74	VAL	2
1	A	151	HIS	2
1	A	160	VAL	2
1	A	74	VAL	2
1	B	151	HIS	2

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Mol	Chain	Res	Type	Models (Total)
1	A	115	SER	1
1	B	84	ILE	1
1	A	132	THR	1
1	B	137	ILE	1
1	A	57	HIS	1
1	A	150	ARG	1
1	B	115	SER	1
1	A	84	ILE	1
1	A	75	SER	1
1	B	150	ARG	1
1	B	65	SER	1
1	B	132	THR	1

5.2.2 Protein sidechains ⓘ

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	102/102 (100%)	83±3 (81±3%)	19±3 (19±3%)	4	37
1	B	102/102 (100%)	81±5 (79±5%)	21±5 (21±5%)	3	32
All	All	816/816 (100%)	655 (80%)	161 (20%)	4	34

All 86 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	160	VAL	4
1	B	150	ARG	4
1	B	142	LYS	4
1	B	67	LEU	4
1	A	94	LYS	4
1	B	94	LYS	4
1	A	67	LEU	4
1	B	109	GLN	3
1	B	49	ARG	3
1	B	136	ILE	3
1	A	136	ILE	3
1	A	156	TYR	3

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Mol	Chain	Res	Type	Models (Total)
1	A	89	LEU	3
1	A	142	LYS	3
1	B	156	TYR	3
1	B	160	VAL	3
1	A	150	ARG	3
1	B	126	PHE	3
1	B	114	ARG	3
1	A	114	ARG	3
1	B	152	GLU	2
1	B	75	SER	2
1	A	49	ARG	2
1	A	106	PHE	2
1	A	93	ASP	2
1	B	52	HIS	2
1	B	158	PHE	2
1	A	109	GLN	2
1	A	128	LYS	2
1	B	131	LYS	2
1	A	126	PHE	2
1	A	91	GLU	2
1	A	157	PHE	2
1	A	65	SER	2
1	A	53	MET	2
1	B	53	MET	2
1	A	84	ILE	2
1	A	75	SER	2
1	A	131	LYS	2
1	B	91	GLU	2
1	B	155	LEU	2
1	B	84	ILE	2
1	B	106	PHE	2
1	B	74	VAL	2
1	A	52	HIS	2
1	A	133	ASP	2
1	A	60	LEU	2
1	B	157	PHE	2
1	A	153	ARG	1
1	B	161	THR	1
1	B	110	THR	1
1	A	155	LEU	1
1	B	62	GLN	1
1	B	56	LEU	1

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Mol	Chain	Res	Type	Models (Total)
1	A	158	PHE	1
1	B	73	LYS	1
1	B	128	LYS	1
1	B	140	ASN	1
1	B	65	SER	1
1	A	98	SER	1
1	A	152	GLU	1
1	A	74	VAL	1
1	B	55	SER	1
1	A	55	SER	1
1	A	151	HIS	1
1	B	101	PHE	1
1	B	151	HIS	1
1	B	89	LEU	1
1	B	108	GLU	1
1	B	129	LYS	1
1	A	100	ARG	1
1	A	107	LYS	1
1	A	66	ASN	1
1	B	100	ARG	1
1	B	60	LEU	1
1	B	153	ARG	1
1	A	110	THR	1
1	B	68	SER	1
1	B	121	GLU	1
1	B	93	ASP	1
1	B	79	LEU	1
1	B	116	LEU	1
1	A	116	LEU	1
1	A	68	SER	1
1	B	120	SER	1
1	B	133	ASP	1

5.2.3 RNA ⓘ

There are no RNA molecules in this entry.

5.3 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.4 Carbohydrates

There are no carbohydrates in this entry.

5.5 Ligand geometry

There are no ligands in this entry.

5.6 Other polymers

There are no such molecules in this entry.

5.7 Polymer linkage issues

There are no chain breaks in this entry.

6 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 44% for the well-defined parts and 44% for the entire structure.

6.1 Chemical shift list 1

File name: input_cs.cif

Chemical shift list name: *assigned_chem_shift_list_1*

6.1.1 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	1485
Number of shifts mapped to atoms	1485
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	4

6.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction \pm precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	111	-0.39 ± 0.26	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	107	0.27 ± 0.11	None needed (< 0.5 ppm)
$^{13}\text{C}'$	111	0.93 ± 0.39	Should be applied
^{15}N	108	1.19 ± 0.49	Should be applied

6.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 44%, i.e. 1323 atoms were assigned a chemical shift out of a possible 2976. 22 out of 44 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	550/1122 (49%)	220/448 (49%)	222/452 (49%)	108/222 (49%)
Sidechain	697/1636 (43%)	444/960 (46%)	240/598 (40%)	13/78 (17%)

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	Total	¹H	¹³C	¹⁵N
Aromatic	76/218 (35%)	47/118 (40%)	28/90 (31%)	1/10 (10%)
Overall	1323/2976 (44%)	711/1526 (47%)	490/1140 (43%)	122/310 (39%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 44%, i.e. 1323 atoms were assigned a chemical shift out of a possible 2976. 22 out of 44 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹H	¹³C	¹⁵N
Backbone	550/1122 (49%)	220/448 (49%)	222/452 (49%)	108/222 (49%)
Sidechain	697/1636 (43%)	444/960 (46%)	240/598 (40%)	13/78 (17%)
Aromatic	76/218 (35%)	47/118 (40%)	28/90 (31%)	1/10 (10%)
Overall	1323/2976 (44%)	711/1526 (47%)	490/1140 (43%)	122/310 (39%)

6.1.4 Statistically unusual chemical shifts ⓘ

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.

Mol	Chain	Res	Type	Atom	Shift, ppm	Expected range, ppm	Z-score
1	A	83	PRO	CD	58.69	55.31 – 45.41	8.4
1	A	135	GLU	HB2	0.62	3.08 – 0.98	-6.7
1	A	70	ARG	HD2	1.73	4.27 – 1.97	-6.0
1	A	69	TYR	CD1	125.78	139.11 – 126.41	-5.5

6.1.5 Random Coil Index (RCI) plots ⓘ

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.

Random coil index (RCI) for chain A:

