Full wwPDB NMR Structure Validation Report (i)

Dec 12, 2022 – 03:32 pm GMT

PDB ID	:	7QDE
BMRB ID	:	34692
Title	:	NMR structure of Npl3 RRM12 bound to the AUCCAGUGGAA RNA
Authors	:	Allain, F.H.-T.; Clery, A.; Moursy, A.
Deposited on	:	2021-11-26

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:

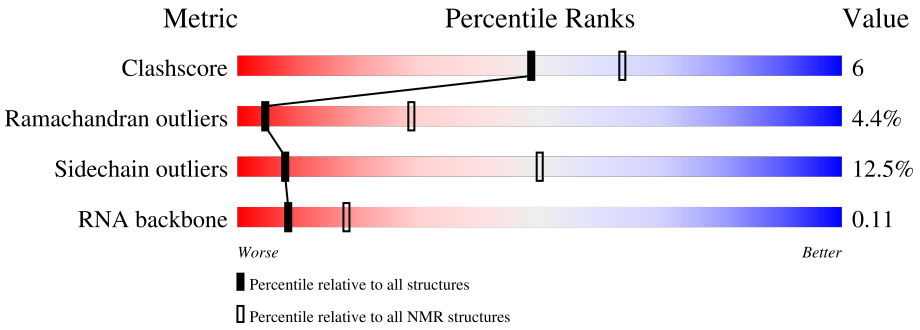
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.31.3
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

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 49%.

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
RNA backbone	4643	676

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	11	9% 64% 27%
2	B	169	74% 15% • 8%

2 Ensemble composition and analysis (i)

This entry contains 10 models. Model 4 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	B:120-B:275 (156)	0.56	4

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 and 2 single-model clusters were found.

Cluster number	Models
1	1, 2, 3, 4, 5, 6, 8, 10
Single-model clusters	7; 9

3 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3038 atoms, of which 1445 are hydrogens and 0 are deuteriums.

- Molecule 1 is a RNA chain called RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3').

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	P	
1	A	11	355	106	121	45	73	10	0

- Molecule 2 is a protein called Nucleolar protein 3.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	169	2683	856	1324	234	265	4	0

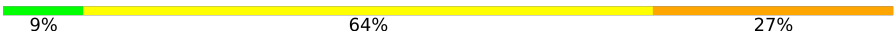
4 Residue-property plots (i)

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.

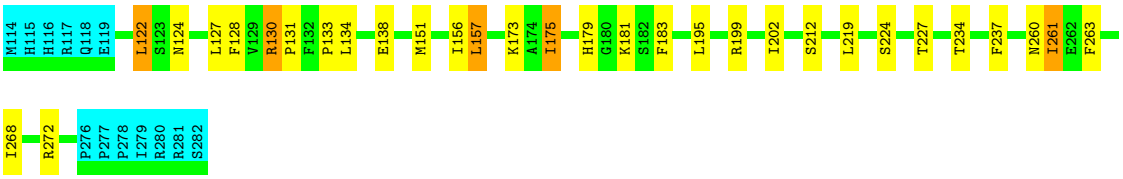
• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:



• Molecule 2: Nucleolar protein 3

Chain B:



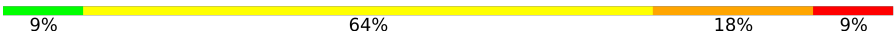
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

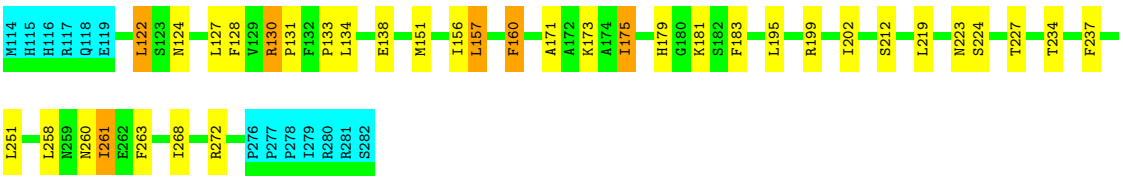
• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:



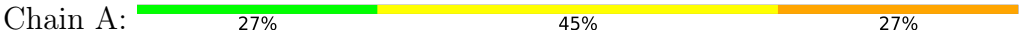
• Molecule 2: Nucleolar protein 3

Chain B:

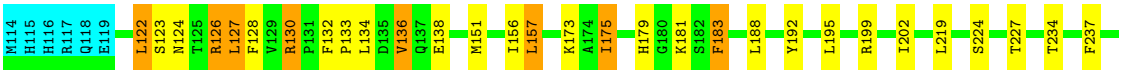


4.2.2 Score per residue for model 2

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

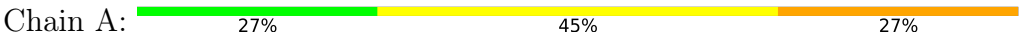


• Molecule 2: Nucleolar protein 3



4.2.3 Score per residue for model 3

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

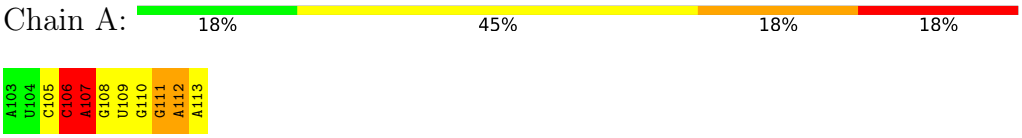


• Molecule 2: Nucleolar protein 3

4.2.4 Score per residue for model 4 (medoid)

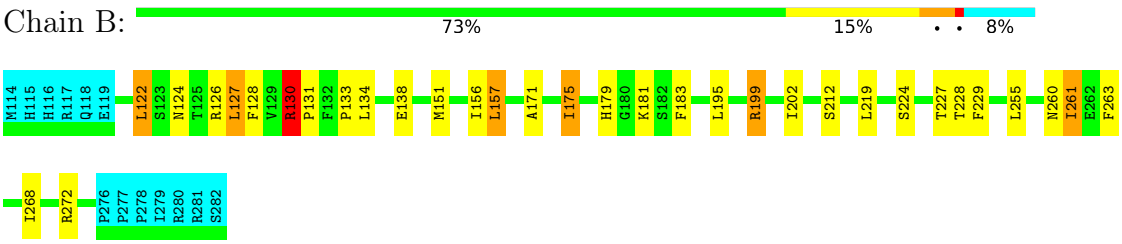
• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:



• Molecule 2: Nucleolar protein 3

Chain B:



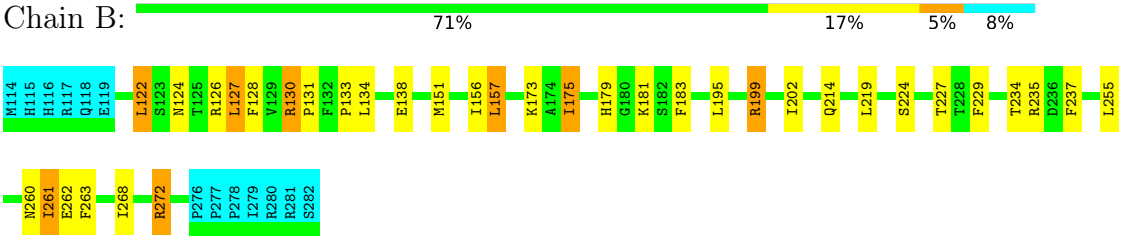
4.2.5 Score per residue for model 5

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:

• Molecule 2: Nucleolar protein 3

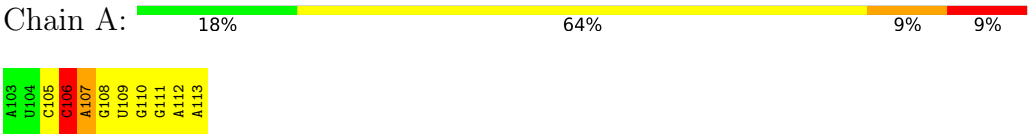
Chain B:



4.2.6 Score per residue for model 6

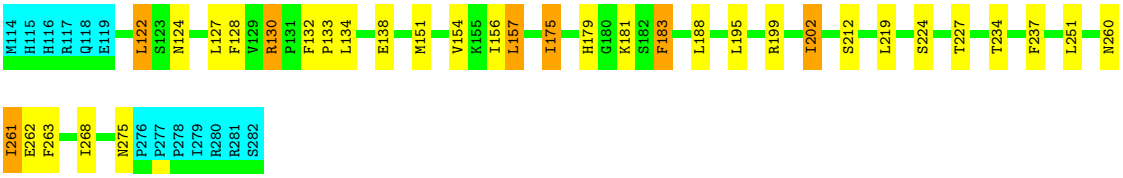
• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:



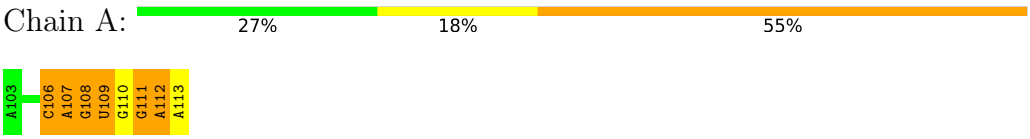
• Molecule 2: Nucleolar protein 3

Chain B:

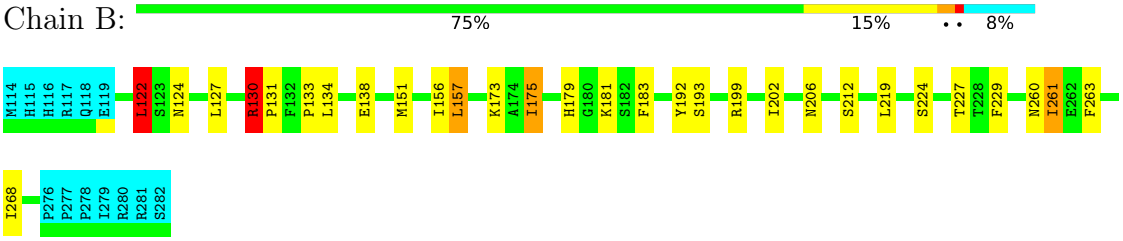


4.2.7 Score per residue for model 7

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

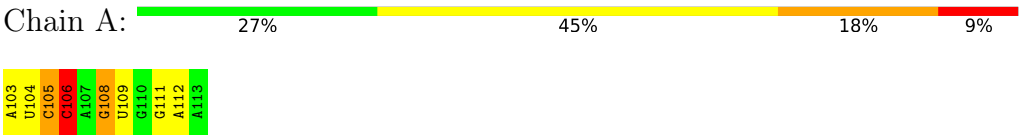


• Molecule 2: Nucleolar protein 3

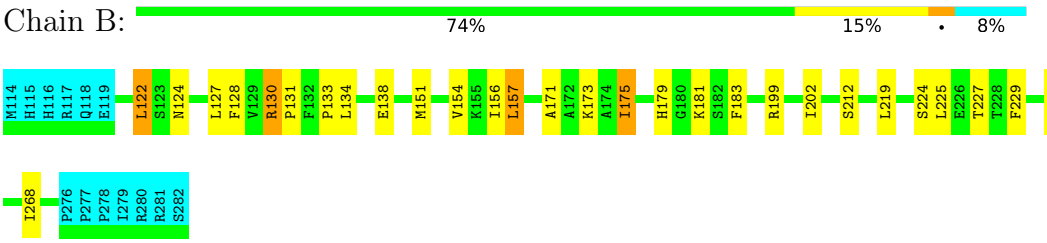


4.2.8 Score per residue for model 8

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')



• Molecule 2: Nucleolar protein 3



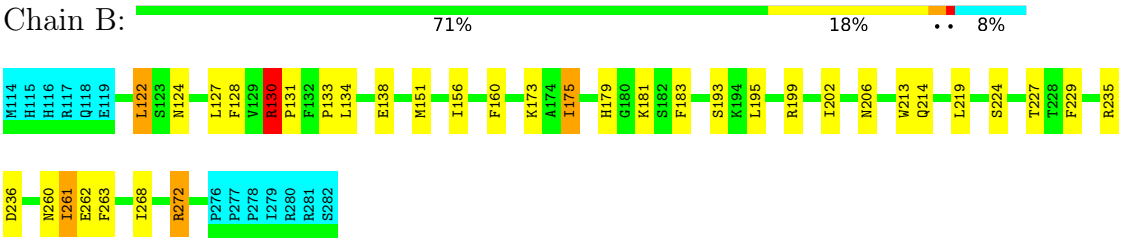
4.2.9 Score per residue for model 9

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:

• Molecule 2: Nucleolar protein 3

Chain B:



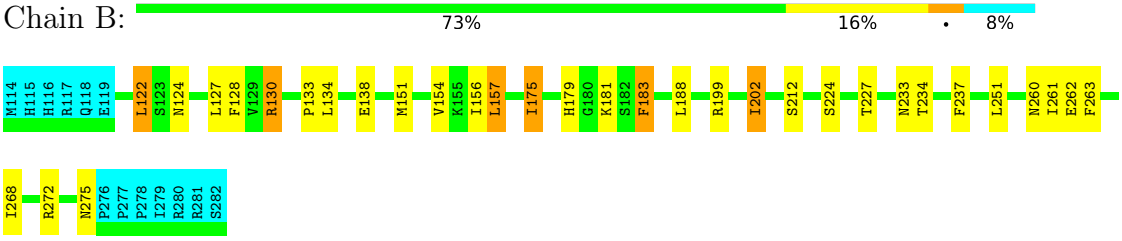
4.2.10 Score per residue for model 10

• Molecule 1: RNA (5'-R(*AP*UP*CP*CP*AP*GP*UP*GP*GP*AP*A)-3')

Chain A:

• Molecule 2: Nucleolar protein 3

Chain B:



5 Refinement protocol and experimental data overview

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

Of the 50 calculated structures, 10 were deposited, based on the following criterion: *structures with the lowest energy.*

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

Software name	Classification	Version
Amber	refinement	
CYANA	structure calculation	

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	1120
Number of shifts mapped to atoms	1117
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	3
Assignment completeness (well-defined parts)	49%

6 Model quality

6.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	1.04±0.01	0±0/262 (0.0± 0.0%)	1.42±0.03	1±1/407 (0.3± 0.2%)
2	B	0.51±0.00	0±0/1269 (0.0± 0.0%)	0.67±0.01	0±0/1717 (0.0± 0.0%)
All	All	0.63	0/15310 (0.0%)	0.87	13/21240 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	Chirality	Planarity
1	A	0.0±0.0	1.5±0.7
All	All	0	15

There are no bond-length outliers.

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
1	A	106	C	O4'-C1'-N1	6.36	113.28	108.20	8	5
1	A	104	U	O4'-C1'-N1	5.97	112.98	108.20	9	2
1	A	113	A	O4'-C1'-N9	5.29	112.43	108.20	2	1
1	A	109	U	O4'-C1'-N1	5.20	112.36	108.20	7	2
1	A	107	A	C3'-C2'-C1'	5.13	105.60	101.50	4	1
1	A	104	U	C3'-C2'-C1'	5.13	105.60	101.50	8	2

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	106	C	Sidechain	10

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Mol	Chain	Res	Type	Group	Models (Total)
1	A	111	G	Sidechain	4
1	A	104	U	Sidechain	1

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	234	121	121	4±1
2	B	1244	1209	1209	16±4
All	All	14780	13300	13300	173

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
2:B:122:LEU:HD13	2:B:122:LEU:H	0.93	1.23	9	10
2:B:122:LEU:H	2:B:122:LEU:CD1	0.70	2.00	7	6
2:B:225:LEU:N	2:B:225:LEU:HD22	0.66	2.06	8	1
2:B:127:LEU:HD12	2:B:175:ILE:HD12	0.62	1.70	2	3
2:B:225:LEU:HD22	2:B:225:LEU:H	0.59	1.58	8	1
2:B:225:LEU:H	2:B:225:LEU:CD2	0.56	2.13	8	1
2:B:195:LEU:HD22	2:B:195:LEU:N	0.56	2.16	4	7
2:B:219:LEU:HD11	2:B:261:ILE:HD11	0.56	1.78	5	9
2:B:195:LEU:H	2:B:195:LEU:HD13	0.54	1.62	3	1
2:B:219:LEU:HD13	2:B:263:PHE:CD1	0.54	2.38	9	9
1:A:106:C:O2'	1:A:107:A:C8	0.54	2.57	1	8
1:A:108:G:C4	1:A:108:G:H5"	0.53	2.38	7	1
2:B:225:LEU:N	2:B:225:LEU:CD2	0.53	2.72	8	1
2:B:127:LEU:HD12	2:B:175:ILE:CD1	0.53	2.33	2	3
2:B:157:LEU:N	2:B:157:LEU:HD23	0.53	2.19	2	4
2:B:122:LEU:N	2:B:122:LEU:HD13	0.52	2.19	3	1
2:B:122:LEU:HD11	2:B:192:TYR:HB3	0.52	1.80	7	2
2:B:195:LEU:HD22	2:B:195:LEU:H	0.51	1.64	4	4
2:B:136:VAL:HG22	2:B:136:VAL:O	0.50	2.05	2	1
1:A:105:C:C5	2:B:128:PHE:CE1	0.50	3.00	8	8

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:B:138:GLU:H	2:B:156:ILE:HD13	0.49	1.67	9	10
2:B:195:LEU:H	2:B:195:LEU:CD2	0.48	2.20	1	3
2:B:272:ARG:HD3	2:B:272:ARG:H	0.48	1.69	2	3
1:A:112:A:C2	2:B:212:SER:HB3	0.48	2.44	3	7
2:B:195:LEU:CD2	2:B:195:LEU:H	0.48	2.22	5	1
2:B:122:LEU:HD13	2:B:122:LEU:N	0.48	2.10	7	1
2:B:157:LEU:HD23	2:B:157:LEU:N	0.47	2.24	3	5
2:B:126:ARG:C	2:B:127:LEU:HD13	0.47	2.29	2	3
2:B:127:LEU:HD22	2:B:175:ILE:HD12	0.47	1.86	1	7
1:A:108:G:H5"	1:A:108:G:C4	0.47	2.45	1	2
1:A:108:G:C8	2:B:229:PHE:CD1	0.47	3.03	8	1
1:A:108:G:N7	2:B:229:PHE:CG	0.46	2.83	4	1
2:B:122:LEU:HD12	2:B:193:SER:O	0.46	2.10	7	2
2:B:127:LEU:HD22	2:B:175:ILE:CD1	0.46	2.39	8	6
1:A:108:G:C5	2:B:229:PHE:CD2	0.46	3.03	9	1
2:B:199:ARG:HD2	2:B:199:ARG:C	0.45	2.32	5	2
2:B:130:ARG:H	2:B:131:PRO:CD	0.45	2.24	5	7
2:B:132:PHE:CE1	2:B:183:PHE:CZ	0.45	3.05	2	2
1:A:104:U:C6	2:B:130:ARG:HD2	0.45	2.46	1	1
2:B:132:PHE:CD1	2:B:136:VAL:HG21	0.45	2.46	2	1
2:B:132:PHE:CE1	2:B:136:VAL:HG21	0.45	2.47	2	1
1:A:105:C:O4'	2:B:128:PHE:CE2	0.44	2.71	2	1
2:B:127:LEU:HD11	2:B:171:ALA:HB1	0.44	1.87	4	1
2:B:255:LEU:C	2:B:255:LEU:HD12	0.44	2.32	4	1
2:B:251:LEU:HD11	2:B:272:ARG:HB3	0.43	1.89	1	2
2:B:202:ILE:CG2	2:B:251:LEU:HD13	0.43	2.43	10	1
2:B:195:LEU:N	2:B:195:LEU:CD2	0.42	2.81	1	4
2:B:183:PHE:CD1	2:B:188:LEU:HD11	0.42	2.49	10	3
1:A:110:G:H2'	1:A:111:G:H5"	0.42	1.91	5	1
2:B:202:ILE:HG22	2:B:251:LEU:HD13	0.42	1.91	6	1
2:B:223:ASN:HD22	2:B:258:LEU:CD2	0.42	2.28	1	1
2:B:130:ARG:H	2:B:131:PRO:HD2	0.41	1.75	1	1
1:A:105:C:C5'	2:B:160:PHE:CE1	0.41	3.03	1	1
1:A:111:G:C2	2:B:214:GLN:HB3	0.41	2.51	9	1
1:A:108:G:C4	2:B:229:PHE:CE2	0.41	3.09	5	1
2:B:127:LEU:HD21	2:B:171:ALA:HB1	0.41	1.91	1	2
1:A:110:G:C8	2:B:213:TRP:CH2	0.41	3.08	9	1
2:B:255:LEU:HD12	2:B:255:LEU:C	0.40	2.37	2	2

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
2	B	156/169 (92%)	129±1 (83±1%)	20±1 (13±1%)	7±1 (4±1%)	4 29
All	All	1560/1690 (92%)	1290 (83%)	202 (13%)	68 (4%)	4 29

All 13 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
2	B	130	ARG	10
2	B	133	PRO	10
2	B	134	LEU	10
2	B	151	MET	10
2	B	224	SER	10
2	B	237	PHE	6
2	B	262	GLU	4
2	B	206	ASN	3
2	B	123	SER	1
2	B	136	VAL	1
2	B	122	LEU	1
2	B	236	ASP	1
2	B	233	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
2	B	137/150 (91%)	120±1 (88±1%)	17±1 (12±1%)	8 50
All	All	1370/1500 (91%)	1199 (88%)	171 (12%)	8 50

All 28 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)
2	B	122	LEU	10
2	B	124	ASN	10
2	B	175	ILE	10
2	B	179	HIS	10
2	B	181	LYS	10
2	B	183	PHE	10
2	B	202	ILE	10
2	B	227	THR	10
2	B	260	ASN	10
2	B	261	ILE	10
2	B	268	ILE	10
2	B	157	LEU	9
2	B	199	ARG	9
2	B	173	LYS	7
2	B	234	THR	6
2	B	130	ARG	6
2	B	272	ARG	4
2	B	154	VAL	4
2	B	127	LEU	3
2	B	275	ASN	3
2	B	160	PHE	2
2	B	235	ARG	2
2	B	126	ARG	1
2	B	195	LEU	1
2	B	228	THR	1
2	B	214	GLN	1
2	B	229	PHE	1
2	B	263	PHE	1

6.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers	Suiteness
1	A	11/11 (100%)	6±1 (54±13%)	2±1 (18±8%)	0.11±0.03
All	All	103/110 (94%)	59 (57%)	20 (19%)	0.11

The overall RNA backbone suiteness is 0.11.

All unique RNA backbone outliers are listed below:

Mol	Chain	Res	Type	Models (Total)
1	A	108	G	9

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Mol	Chain	Res	Type	Models (Total)
1	A	109	U	9
1	A	110	G	9
1	A	111	G	9
1	A	112	A	6
1	A	113	A	6
1	A	107	A	5
1	A	105	C	3
1	A	104	U	2
1	A	106	C	1

All unique RNA pucker outliers are listed below:

Mol	Chain	Res	Type	Models (Total)
1	A	108	G	6
1	A	109	U	4
1	A	103	A	3
1	A	107	A	3
1	A	110	G	3
1	A	104	U	1

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

The completeness of assignment taking into account all chemical shift lists is 49% for the well-defined parts and 47% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *starch_ output*

7.1.1 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	1120
Number of shifts mapped to atoms	1117
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	3
Number of shift outliers (ShiftChecker)	0

The following assigned chemical shifts were not mapped to the molecules present in the coordinate file.

- No matching atoms found in structure. All 3 occurences are reported below.

Chain	Res	Type	Atom	Shift Data		
				Value	Uncertainty	Ambiguity
A	103	A	Q5'	3.933	0.0	1
A	105	C	Q5'	4.019	0.008	1
A	108	G	H5"	4.088	0.0	1

7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	139	-0.20 ± 0.18	None needed (< 0.5 ppm)
$^{13}C_{\beta}$	142	-0.15 ± 0.13	None needed (< 0.5 ppm)
$^{13}C'$	0	—	None (insufficient data)
^{15}N	146	0.21 ± 0.28	None needed (< 0.5 ppm)

7.1.3 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 49%, i.e. 1057 atoms were assigned a chemical shift out of a possible 2147. 5 out of 26 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	551/764 (72%)	273/304 (90%)	135/312 (43%)	143/148 (97%)
Sidechain	443/1032 (43%)	243/604 (40%)	200/380 (53%)	0/48 (0%)
Aromatic	10/143 (7%)	5/78 (6%)	5/63 (8%)	0/2 (0%)
Overall	1057/2147 (49%)	574/1106 (52%)	340/829 (41%)	143/212 (67%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 47%, i.e. 1096 atoms were assigned a chemical shift out of a possible 2344. 5 out of 26 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	565/823 (69%)	280/327 (86%)	139/338 (41%)	146/158 (92%)
Sidechain	468/1156 (40%)	258/681 (38%)	210/417 (50%)	0/58 (0%)
Aromatic	10/157 (6%)	5/86 (6%)	5/67 (7%)	0/4 (0%)
Overall	1096/2344 (47%)	596/1214 (49%)	354/896 (40%)	146/234 (62%)

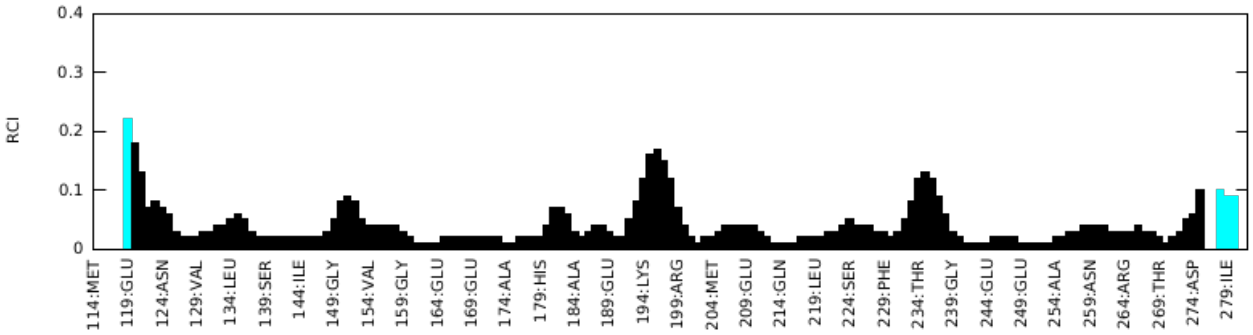
7.1.4 Statistically unusual chemical shifts

There are no statistically unusual chemical shifts.

7.1.5 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 B:


RCI
0.4
0.3
0.2
0.1
0
114:MET
119:GLU
124:ASN
129:VAL
134:LEU
139:SER
144:ILE
149:GLY
154:VAL
159:GLY
164:GLU
169:GLU
174:ALA
179:HIS
184:ALA
189:GLU
194:LYS
199:ARG
204:MET
209:GLU
214:GLN
219:LEU
224:SER
229:PHE
234:THR
239:GLY
244:GLU
249:GLU
254:ALA
259:ASN
264:ARG
269:THR
274:ASP
279:ILE