Full wwPDB NMR Structure Validation Report (i)

Jun 3, 2023 – 04:05 AM EDT

PDB ID	:	5TLQ
BMRB ID	:	30189
Title	:	Model structure of the oxidized PaDsbA1 and 3-[(2-methylbenzyl)sulfanyl]-4 H-1,2,4-triazol-4-amine complex
Authors	:	Mohanty, B.; Rimmer, K.A.; McMahon, R.M.; Headey, S.J.; Vazirani, M.; Shouldice, S.R.; Coincon, M.; Tay, S.; Morton, C.J.; Simpson, J.S.; Martin, J.L.; Scanlon, M.S.
Deposited on	:	2016-10-11

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:

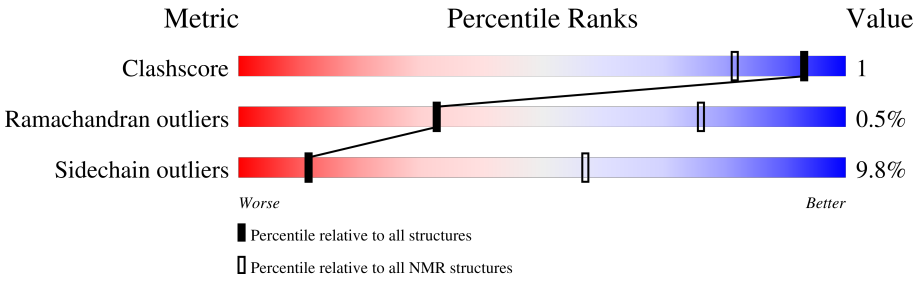
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.33

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment is 17%.

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	190	82% 5% 13%

2 Ensemble composition and analysis

This entry contains 10 models. Model 10 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:4-A:83, A:105-A:190 (166)	0.65	10

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

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2993 atoms, of which 1488 are hydrogens and 0 are deuteriums.

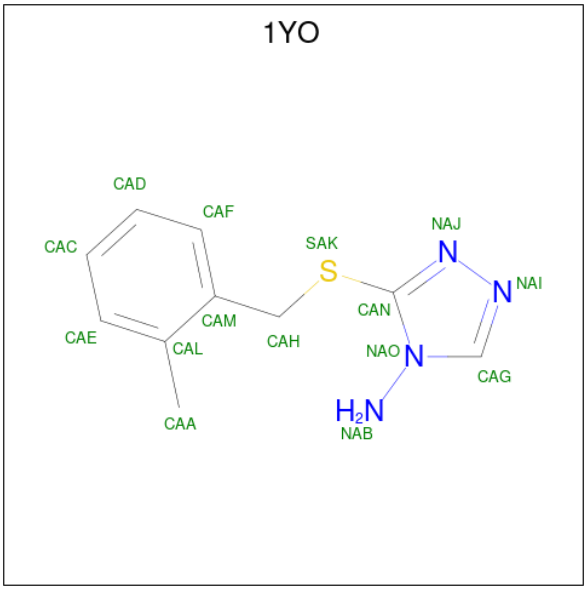
- Molecule 1 is a protein called Thiol:disulfide interchange protein DsbA.

Mol	Chain	Residues	Atoms						Trace
1	A	190	Total	C	H	N	O	S	0
			2966	965	1476	242	275	8	

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3	GLY	-	expression tag	UNP P0C2B2

- Molecule 2 is 3-[(2-methylbenzyl)sulfanyl]-4H-1,2,4-triazol-4-amine (three-letter code: 1YO) (formula: $C_{10}H_{12}N_4S$).



Mol	Chain	Residues	Atoms				
2	A	1	Total	C	H	N	S
			27	10	12	4	1

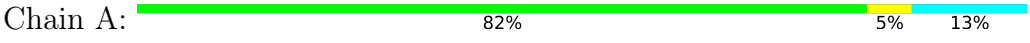
4 Residue-property plots

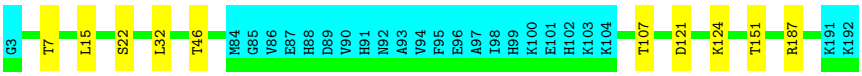
4.1 Average score per residue in the NMR ensemble

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: Thiol:disulfide interchange protein DsbA

Chain A:





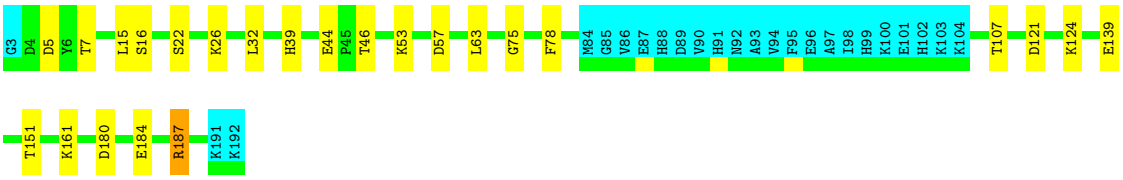
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

• Molecule 1: Thiol:disulfide interchange protein DsbA

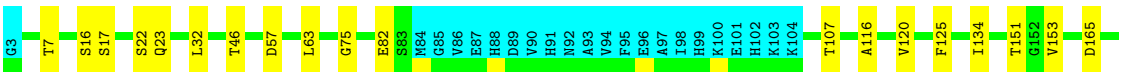
Chain A:

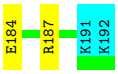


4.2.2 Score per residue for model 2

• Molecule 1: Thiol:disulfide interchange protein DsbA

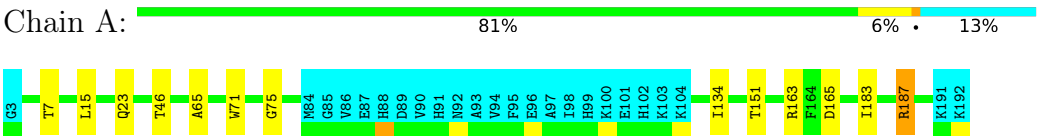
Chain A:





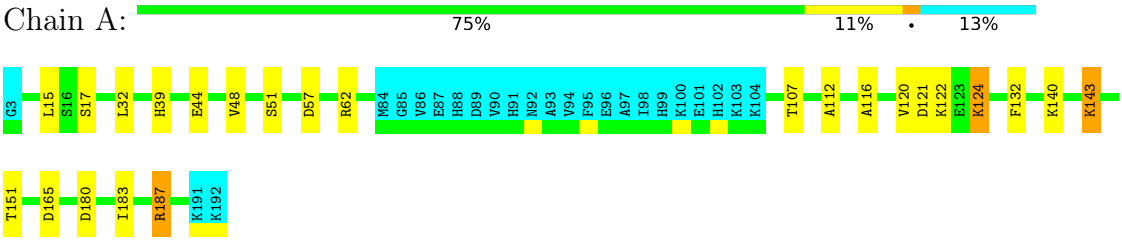
4.2.3 Score per residue for model 3

• Molecule 1: Thiol:disulfide interchange protein DsbA



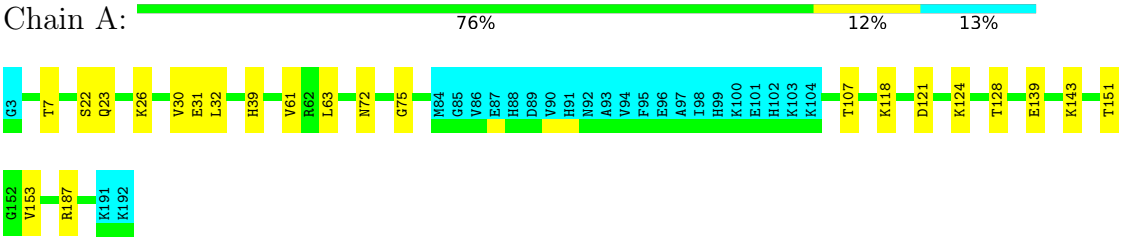
4.2.4 Score per residue for model 4

• Molecule 1: Thiol:disulfide interchange protein DsbA



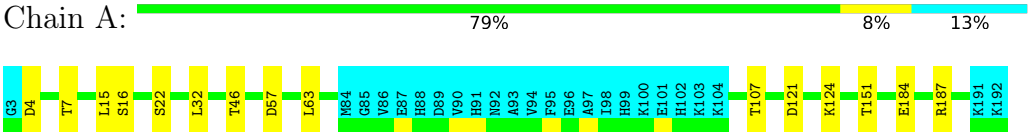
4.2.5 Score per residue for model 5

• Molecule 1: Thiol:disulfide interchange protein DsbA



4.2.6 Score per residue for model 6

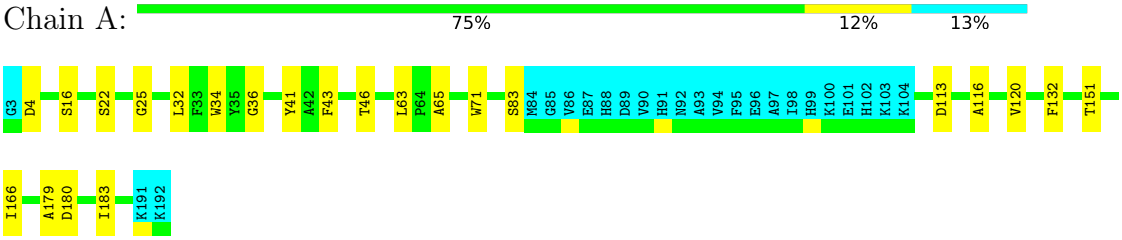
• Molecule 1: Thiol:disulfide interchange protein DsbA



4.2.7 Score per residue for model 7

• Molecule 1: Thiol:disulfide interchange protein DsbA

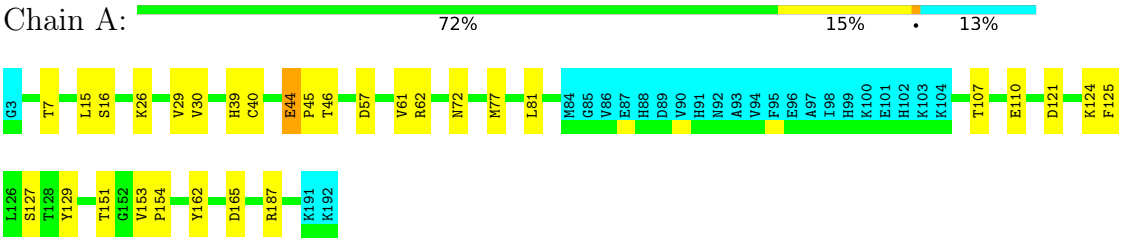
Chain A:



4.2.8 Score per residue for model 8

• Molecule 1: Thiol:disulfide interchange protein DsbA

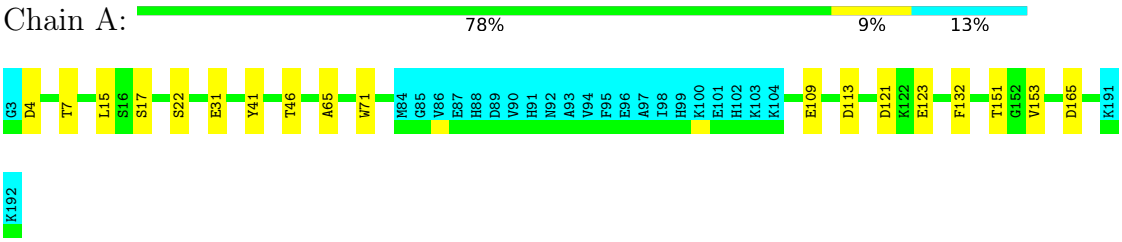
Chain A:



4.2.9 Score per residue for model 9

• Molecule 1: Thiol:disulfide interchange protein DsbA

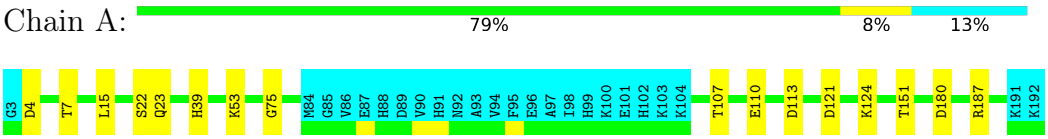
Chain A:



4.2.10 Score per residue for model 10 (medoid)

• Molecule 1: Thiol:disulfide interchange protein DsbA

Chain A:



5 Refinement protocol and experimental data overview

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

Of the 200 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
HADDOCK	structure calculation	
HADDOCK	refinement	

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	466
Number of shifts mapped to atoms	466
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	17%

6 Model quality

6.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 1YO

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	1295	1277	1274	3±2
All	All	13100	12890	12860	34

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 1.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:121:ASP:OD2	1:A:124:LYS:HG2	0.61	1.96	10	6
1:A:112:ALA:HB1	1:A:122:LYS:HG3	0.52	1.80	4	1
1:A:65:ALA:O	1:A:71:TRP:HB3	0.49	2.07	3	3
1:A:32:LEU:HA	1:A:63:LEU:O	0.47	2.10	6	5
1:A:116:ALA:HA	1:A:120:VAL:O	0.47	2.09	4	3
1:A:34:TRP:NE1	1:A:71:TRP:HA	0.46	2.24	7	1
1:A:15:LEU:HG	1:A:161:LYS:O	0.45	2.12	1	1
1:A:40:CYS:SG	1:A:154:PRO:HB3	0.45	2.51	8	1
1:A:30:VAL:HA	1:A:61:VAL:O	0.44	2.12	8	2
1:A:77:MET:O	1:A:81:LEU:HG	0.44	2.12	8	1
1:A:121:ASP:OD2	1:A:123:GLU:HB2	0.43	2.13	9	1
1:A:57:ASP:OD1	1:A:187:ARG:HD2	0.43	2.14	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:179:ALA:O	1:A:183:ILE:HG13	0.42	2.14	7	1
1:A:183:ILE:O	1:A:187:ARG:HB2	0.41	2.14	3	2
1:A:125:PHE:O	1:A:129:TYR:HB2	0.41	2.15	8	1
1:A:140:LYS:O	1:A:143:LYS:HG3	0.41	2.15	4	1
1:A:43:PHE:HB2	1:A:166:ILE:HD11	0.41	1.91	7	1
1:A:44:GLU:O	1:A:48:VAL:HG23	0.41	2.15	4	1
1:A:44:GLU:N	1:A:45:PRO:HD2	0.40	2.32	8	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	166/190 (87%)	158±3 (95±2%)	7±3 (4±2%)	1±1 (1±0%)	32	76
All	All	1660/1900 (87%)	1580 (95%)	71 (4%)	9 (1%)	32	76

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	75	GLY	5
1	A	5	ASP	1
1	A	25	GLY	1
1	A	36	GLY	1
1	A	4	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	136/156 (87%)	123±3 (90±2%)	13±3 (10±2%)	11	57
All	All	1360/1560 (87%)	1227 (90%)	133 (10%)	11	57

All 42 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	151	THR	10
1	A	7	THR	8
1	A	187	ARG	8
1	A	22	SER	7
1	A	46	THR	7
1	A	107	THR	7
1	A	15	LEU	6
1	A	16	SER	5
1	A	39	HIS	5
1	A	165	ASP	5
1	A	180	ASP	4
1	A	23	GLN	4
1	A	57	ASP	4
1	A	153	VAL	4
1	A	26	LYS	3
1	A	184	GLU	3
1	A	17	SER	3
1	A	132	PHE	3
1	A	4	ASP	3
1	A	113	ASP	3
1	A	44	GLU	2
1	A	53	LYS	2
1	A	139	GLU	2
1	A	134	ILE	2
1	A	62	ARG	2
1	A	143	LYS	2
1	A	31	GLU	2
1	A	72	ASN	2
1	A	110	GLU	2
1	A	78	PHE	1
1	A	82	GLU	1
1	A	163	ARG	1
1	A	32	LEU	1
1	A	51	SER	1
1	A	124	LYS	1
1	A	118	LYS	1

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Mol	Chain	Res	Type	Models (Total)
1	A	128	THR	1
1	A	83	SER	1
1	A	29	VAL	1
1	A	127	SER	1
1	A	162	TYR	1
1	A	109	GLU	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 monosaccharides in this entry.

6.6 Ligand geometry

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds for which Mogul statistics could be retrieved, the number of bonds that are observed in the model and the number of bonds that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length is the number of standard deviations the observed value is removed from the expected value. A bond length with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the average root-mean-square of all Z scores of the bond lengths.

Mol	Type	Chain	Res	Link	Bond lengths		
					Counts	RMSZ	#Z>2
2	1YO	A	201	-	13,16,16	1.32±0.05	2±0 (17±3%)

In the following table, the Counts columns list the number of angles for which Mogul statistics could be retrieved, the number of angles that are observed in the model and the number of angles that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond angle is the number of standard deviations the observed value is removed from the expected value. A bond angle with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the average root-mean-square of all Z scores of

the bond angles.

Mol	Type	Chain	Res	Link	Bond angles		
					Counts	RMSZ	#Z>2
2	1YO	A	201	-	15,21,21	0.95±0.22	0±0 (3±3%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	1YO	A	201	-	-	0±0,4,5,5	0±0,2,2,2

All unique bond 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(Å)	Ideal(Å)	Models	
								Worst	Total
2	A	201	1YO	CAM-CAL	2.72	1.44	1.40	8	10
2	A	201	1YO	CAH-SAK	2.67	1.88	1.82	4	10
2	A	201	1YO	CAN-NAO	2.16	1.38	1.36	2	3

All unique angle outliers are listed below.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
2	A	201	1YO	CAH-SAK-CAN	4.60	97.67	101.91	2	5

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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 17% for the well-defined parts and 17% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *renumbered_PaDsbA_Fragment1_OnlyMethyls_NMRStarFormat.txt*

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	466
Number of shifts mapped to atoms	466
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	6

The following errors were found when reading this chemical shift list.

- Chemical shift has been reported more than once. All 42 occurrences are reported below.

List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	21	VAL	HG11	0.962	0.000	.
1	A	21	VAL	HG12	0.962	0.000	.
1	A	21	VAL	HG13	0.962	0.000	.
1	A	61	VAL	HG11	0.742	0.000	.
1	A	61	VAL	HG12	0.742	0.000	.
1	A	61	VAL	HG13	0.742	0.000	.
1	A	13	VAL	HG11	0.938	0.000	.
1	A	13	VAL	HG12	0.938	0.000	.
1	A	13	VAL	HG13	0.938	0.000	.
1	A	29	VAL	HG11	1.237	0.000	.
1	A	29	VAL	HG12	1.237	0.000	.
1	A	29	VAL	HG13	1.237	0.000	.
1	A	32	LEU	HD11	0.827	0.000	.
1	A	32	LEU	HD12	0.827	0.000	.
1	A	32	LEU	HD13	0.827	0.000	.

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List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	15	LEU	HD11	0.943	0.000	.
1	A	15	LEU	HD12	0.943	0.000	.
1	A	15	LEU	HD13	0.943	0.000	.
1	A	19	VAL	HG11	0.950	0.000	.
1	A	19	VAL	HG12	0.950	0.000	.
1	A	19	VAL	HG13	0.950	0.000	.
1	A	73	VAL	HG11	1.116	0.000	.
1	A	73	VAL	HG12	1.116	0.000	.
1	A	73	VAL	HG13	1.116	0.000	.
1	A	178	LEU	HD11	-0.294	0.000	.
1	A	178	LEU	HD12	-0.294	0.000	.
1	A	178	LEU	HD13	-0.294	0.000	.
1	A	150	VAL	HG11	1.266	0.000	.
1	A	150	VAL	HG12	1.266	0.000	.
1	A	150	VAL	HG13	1.266	0.000	.
1	A	126	LEU	HD11	0.774	0.000	.
1	A	126	LEU	HD12	0.774	0.000	.
1	A	126	LEU	HD13	0.774	0.000	.
1	A	120	VAL	HG11	0.762	0.000	.
1	A	120	VAL	HG12	0.762	0.000	.
1	A	120	VAL	HG13	0.762	0.000	.
1	A	86	VAL	HG11	1.065	0.000	.
1	A	86	VAL	HG12	1.065	0.000	.
1	A	86	VAL	HG13	1.065	0.000	.
1	A	176	LEU	HD11	-0.473	0.000	.
1	A	176	LEU	HD12	-0.473	0.000	.
1	A	176	LEU	HD13	-0.473	0.000	.

7.1.2 Chemical shift referencing

No chemical shift referencing corrections were calculated (not enough data).

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 17%, i.e. 388 atoms were assigned a chemical shift out of a possible 2221. 0 out of 28 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	0/822 (0%)	0/335 (0%)	0/332 (0%)	0/155 (0%)

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	Total	^{1}H	^{13}C	^{15}N
Sidechain	388/1177 (33%)	291/772 (38%)	97/376 (26%)	0/29 (0%)
Aromatic	0/222 (0%)	0/107 (0%)	0/106 (0%)	0/9 (0%)
Overall	388/2221 (17%)	291/1214 (24%)	97/814 (12%)	0/193 (0%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 17%, i.e. 424 atoms were assigned a chemical shift out of a possible 2558. 0 out of 31 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	0/944 (0%)	0/385 (0%)	0/380 (0%)	0/179 (0%)
Sidechain	424/1350 (31%)	318/883 (36%)	106/432 (25%)	0/35 (0%)
Aromatic	0/264 (0%)	0/128 (0%)	0/119 (0%)	0/17 (0%)
Overall	424/2558 (17%)	318/1396 (23%)	106/931 (11%)	0/231 (0%)

7.1.4 Statistically unusual chemical shifts (i)

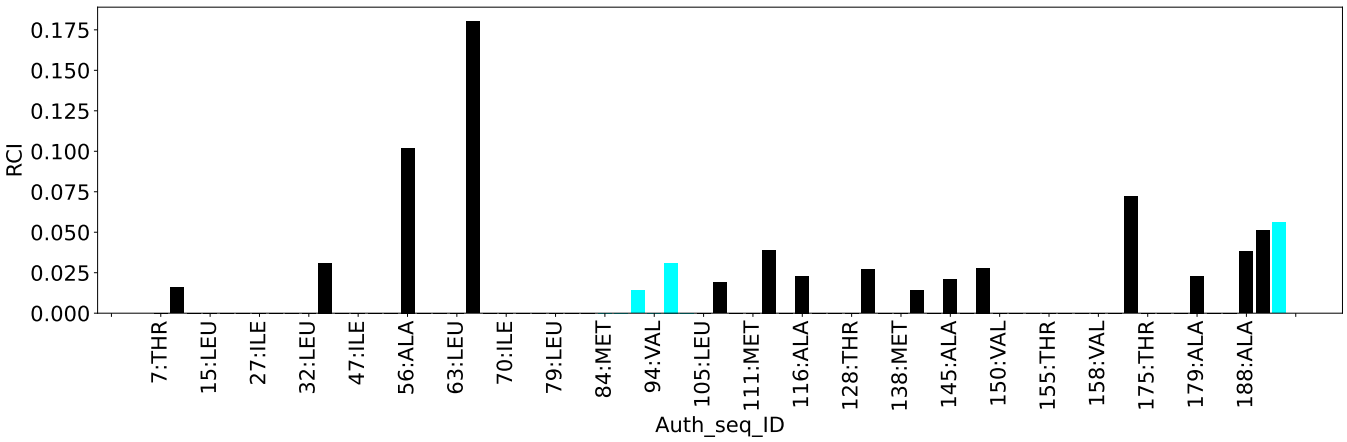
The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	182	LEU	HD21	-0.75	-0.65 – 2.13	-5.3
1	A	182	LEU	HD22	-0.75	-0.65 – 2.13	-5.3
1	A	182	LEU	HD23	-0.75	-0.65 – 2.13	-5.3
1	A	94	VAL	HG11	-0.53	-0.48 – 2.12	-5.2
1	A	94	VAL	HG12	-0.53	-0.48 – 2.12	-5.2
1	A	94	VAL	HG13	-0.53	-0.48 – 2.12	-5.2

7.1.5 Random Coil Index (RCI) plots (i)

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.If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:


RCI
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
7:THR
15:LEU
27:ILE
32:LEU
47:ILE
56:ALA
63:LEU
70:ILE
79:LEU
84:MET
94:VAL
105:LEU
111:MET
116:ALA
128:THR
138:MET
145:ALA
150:VAL
155:THR
158:VAL
175:THR
179:ALA
188:ALA
Auth_seq_ID

8 NMR restraints analysis

8.1 Conformationally restricting restraints

The following table provides the summary of experimentally observed NMR restraints in different categories. Restraints are classified into different categories based on the sequence separation of the atoms involved.

Description	Value
Total distance restraints	23
Intra-residue (|i-j|=0)	0
Sequential (|i-j|=1)	0
Medium range (|i-j|>1 and |i-j|<5)	0
Long range (|i-j|≥5)	23
Inter-chain	0
Hydrogen bond restraints	0
Disulfide bond restraints	0
Total dihedral-angle restraints	0
Number of unmapped restraints	0
Number of restraints per residue	0.1
Number of long range restraints per residue[1]	0.1

[1]Long range hydrogen bonds and disulfide bonds are counted as long range restraints while calculating the number of long range restraints per residue

8.2 Residual restraint violations

This section provides the overview of the restraint violations analysis. The violations are binned as small, medium and large violations based on its absolute value. Average number of violations per model is calculated by dividing the total number of violations in each bin by the size of the ensemble.

8.2.1 Average number of distance violations per model

Distance violations less than 0.1 Å are not included in the calculation.There are no distance violations

8.2.2 Average number of dihedral-angle violations per model

Dihedral-angle violations less than 1° are not included in the calculation.There are no dihedral-angle violations

9 Distance violation analysis (i)

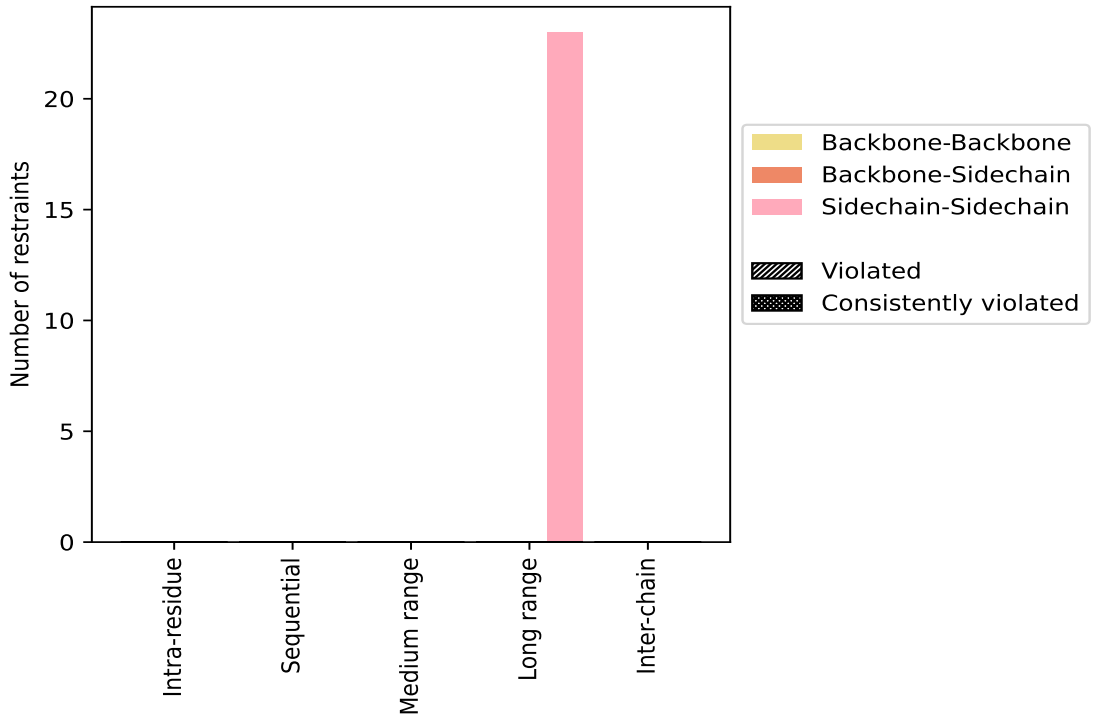
9.1 Summary of distance violations (i)

The following table shows the summary of distance violations in different restraint categories based on the sequence separation of the atoms involved. Each category is further sub-divided into three sub-categories based on the atoms involved. Violations less than 0.1 Å are not included in the statistics.

Restraints type	Count	%[1]	Violated[3]			Consistently Violated[4]		
			Count	%[2]	%[1]	Count	%[2]	%[1]
Intra-residue (|i-j|=0)	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sequential (|i-j|=1)	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Medium range (|i-j|>1 & |i-j|<5)	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Long range (|i-j|≥5)	23	100.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	23	100.0	0	0.0	0.0	0	0.0	0.0
Inter-chain	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Hydrogen bond	0	0.0	0	0.0	0.0	0	0.0	0.0
Disulfide bond	0	0.0	0	0.0	0.0	0	0.0	0.0
Total	23	100.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	23	100.0	0	0.0	0.0	0	0.0	0.0

[1] percentage calculated with respect to the total number of distance restraints, [2] percentage calculated with respect to the number of restraints in a particular restraint category, [3] violated in at least one model, [4] violated in all the models

9.1.1 Bar chart : Distribution of distance restraints and violations



Violated and consistently violated restraints are shown using different hatch patterns in their respective categories. The hydrogen bonds and disulfied bonds are counted in their appropriate category on the x-axis

9.2 Distance violation statistics for each model

No violations found

9.3 Distance violation statistics for the ensemble

No violations found

9.4 Most violated distance restraints in the ensemble

No violations found

9.5 All violated distance restraints

No violations found

10 Dihedral-angle violation analysis (i)

No dihedral-angle restraints found