wwPDB NMR Structure Validation Summary Report (i)

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BMRB ID	:	17382
Title	:	Solution structure of the human Raf-1 kinase inhibitor protein
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This is a wwPDB NMR Structure Validation Summary 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 (1)) were used in the production of this report:

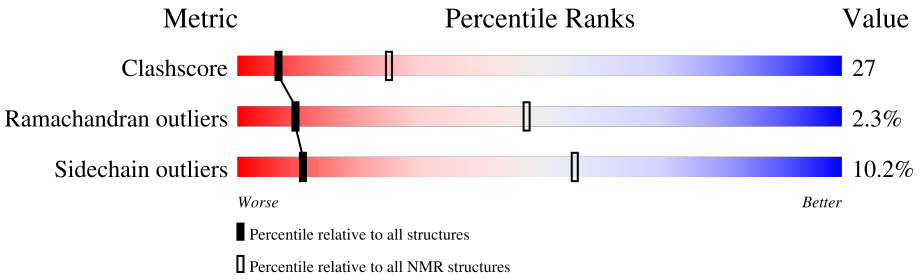
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal 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 85%.

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	187	48% 47% 5% •

2 Ensemble composition and analysis (i)

This entry contains 20 models. Model 19 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

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:3-A:187 (185)	0.72	19

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. No single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 2953 atoms, of which 1465 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Phosphatidylethanolamine-binding protein 1.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	187	2953	946	1465	257	281	4	0

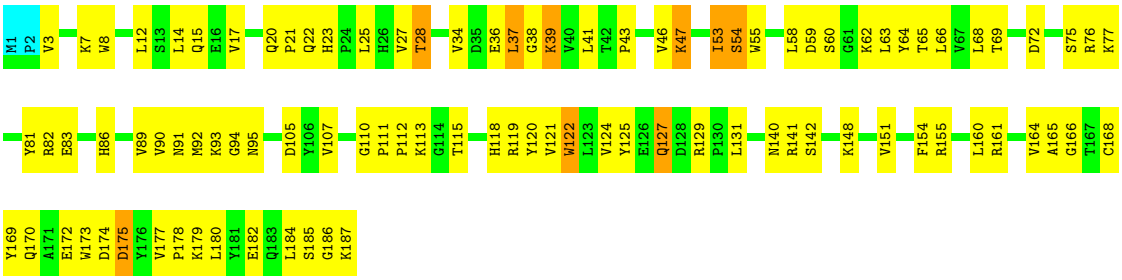
4 Residue-property plots (i)

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: Phosphatidylethanolamine-binding protein 1

Chain A: 48% 47% 5% •



4.2 Residue scores for the representative (medoid) model from the NMR ensemble

The representative model is number 19. Colouring as in section 4.1 above.

• Molecule 1: Phosphatidylethanolamine-binding protein 1

Chain A: 43% 47% 9% •

5 Refinement protocol and experimental data overview (i)

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

Of the 200 calculated structures, 20 were deposited, based on the following criterion: *all calculated structures submitted*.

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

Software name	Classification	Version
CNS	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	2177
Number of shifts mapped to atoms	2177
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	85%

6 Model quality (i)

6.1 Standard geometry (i)

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	0.37±0.02	0±0/1515 (0.0± 0.0%)	0.48±0.01	0±0/2059 (0.0± 0.0%)
All	All	0.37	2/30300 (0.0%)	0.48	0/41180 (0.0%)

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
1	A	158	TYR	CE1-CZ	-6.78	1.29	1.38	19	1
1	A	158	TYR	CE2-CZ	6.61	1.47	1.38	19	1

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in each chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1473	1447	1441	80±6
All	All	29460	28940	28820	1601

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 27.

5 of 400 unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:54:SER:HA	1:A:58:LEU:HD13	0.95	1.37	4	20
1:A:43:PRO:HD2	1:A:174:ASP:HB3	0.94	1.38	11	4
1:A:119:ARG:HB3	1:A:170:GLN:HG3	0.93	1.41	11	5
1:A:68:LEU:HB3	1:A:86:HIS:HB3	0.93	1.36	7	16
1:A:111:PRO:HG2	1:A:172:GLU:HA	0.90	1.39	11	3

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	184/187 (98%)	157±3 (85±2%)	23±3 (12±2%)	4±2 (2±1%)	9	48
All	All	3680/3740 (98%)	3139 (85%)	458 (12%)	83 (2%)	9	48

5 of 17 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	175	ASP	20
1	A	54	SER	17
1	A	56	ASP	8
1	A	20	GLN	6
1	A	142	SER	4

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	162/164 (99%)	146±2 (90±1%)	16±2 (10±1%)	11	56
All	All	3240/3280 (99%)	2910 (90%)	330 (10%)	11	56

5 of 56 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	28	THR	20
1	A	39	LYS	20
1	A	47	LYS	20
1	A	53	ILE	20
1	A	113	LYS	20

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 (i)

The completeness of assignment taking into account all chemical shift lists is 85% for the well-defined parts and 85% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shifts_1*

7.1.1 Bookkeeping (i)

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	2177
Number of shifts mapped to atoms	2177
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	18

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	186	-1.15 ± 0.12	Should be applied
$^{13}C_{\beta}$	171	-0.72 ± 0.18	Should be applied
$^{13}C'$	183	-0.74 ± 0.14	Should be applied
^{15}N	172	-0.54 ± 0.49	None needed (imprecise)

7.1.3 Completeness of resonance assignments (i)

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 85%, i.e. 2142 atoms were assigned a chemical shift out of a possible 2509. 0 out of 35 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	906/912 (99%)	370/371 (100%)	365/370 (99%)	171/171 (100%)
Sidechain	1221/1369 (89%)	831/886 (94%)	381/430 (89%)	9/53 (17%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	15/228 (7%)	15/109 (14%)	0/102 (0%)	0/17 (0%)
Overall	2142/2509 (85%)	1216/1366 (89%)	746/902 (83%)	180/241 (75%)

7.1.4 Statistically unusual chemical shifts (i)

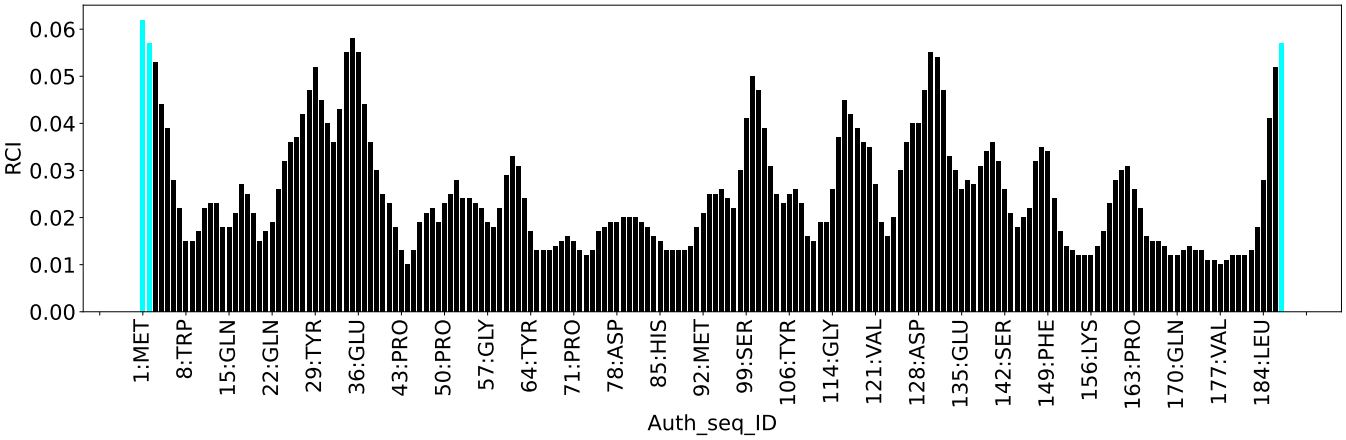
The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	65	THR	HG1	4.97	0.08 – 2.19	18.2
1	A	115	THR	HG1	4.77	0.08 – 2.19	17.2
1	A	44	THR	HG1	4.76	0.08 – 2.19	17.2
1	A	146	ARG	HB2	-0.86	0.52 – 3.08	-10.4
1	A	170	GLN	CG	44.89	28.36 – 39.21	10.2
1	A	113	LYS	HB2	0.09	0.58 – 2.97	-7.1
1	A	157	LYS	HG2	-0.29	0.13 – 2.61	-6.7
1	A	113	LYS	HD2	0.32	0.58 – 2.64	-6.3
1	A	46	VAL	HG11	-0.79	-0.48 – 2.12	-6.2
1	A	46	VAL	HG12	-0.79	-0.48 – 2.12	-6.2
1	A	46	VAL	HG13	-0.79	-0.48 – 2.12	-6.2
1	A	146	ARG	HD2	1.74	1.97 – 4.26	-6.0
1	A	20	GLN	HA	1.90	2.17 – 6.35	-5.6
1	A	120	TYR	HB2	0.86	1.09 – 4.72	-5.6
1	A	14	LEU	HB2	-0.28	-0.07 – 3.30	-5.6
1	A	21	PRO	HD3	1.66	1.76 – 5.48	-5.3
1	A	68	LEU	HB2	-0.13	-0.07 – 3.30	-5.2
1	A	58	LEU	HB2	-0.11	-0.07 – 3.30	-5.1

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
0.00
0.01
0.02
0.03
0.04
0.05
0.06
1:MET
8:TRP
15:GLN
22:GLN
29:TYR
36:GLU
43:PRO
50:PRO
57:GLY
64:TYR
71:PRO
78:ASP
85:HIS
92:MET
99:SER
106:TYR
114:GLY
121:VAL
128:ASP
135:GLU
142:SER
149:PHE
156:LYS
163:PRO
170:GLN
177:VAL
184:LEU
Auth_seq_ID

8 NMR restraints analysis (i)

8.1 Conformationally restricting restraints (i)

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	2062
Intra-residue (|i-j|=0)	1065
Sequential (|i-j|=1)	429
Medium range (|i-j|>1 and |i-j|<5)	128
Long range (|i-j|≥5)	440
Inter-chain	0
Hydrogen bond restraints	0
Disulfide bond restraints	0
Total dihedral-angle restraints	0
Number of unmapped restraints	2
Number of restraints per residue	11.0
Number of long range restraints per residue[1]	2.4

[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 (i)

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 (i)

Distance violations less than 0.1 Å are not included in the calculation.

Bins (Å)	Average number of violations per model	Max (Å)
0.1-0.2 (Small)	114.0	0.2
0.2-0.5 (Medium)	47.6	0.5
>0.5 (Large)	124.7	2.03

8.2.2 Average number of dihedral-angle violations per model (i)

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

9 Distance violation analysis (i)

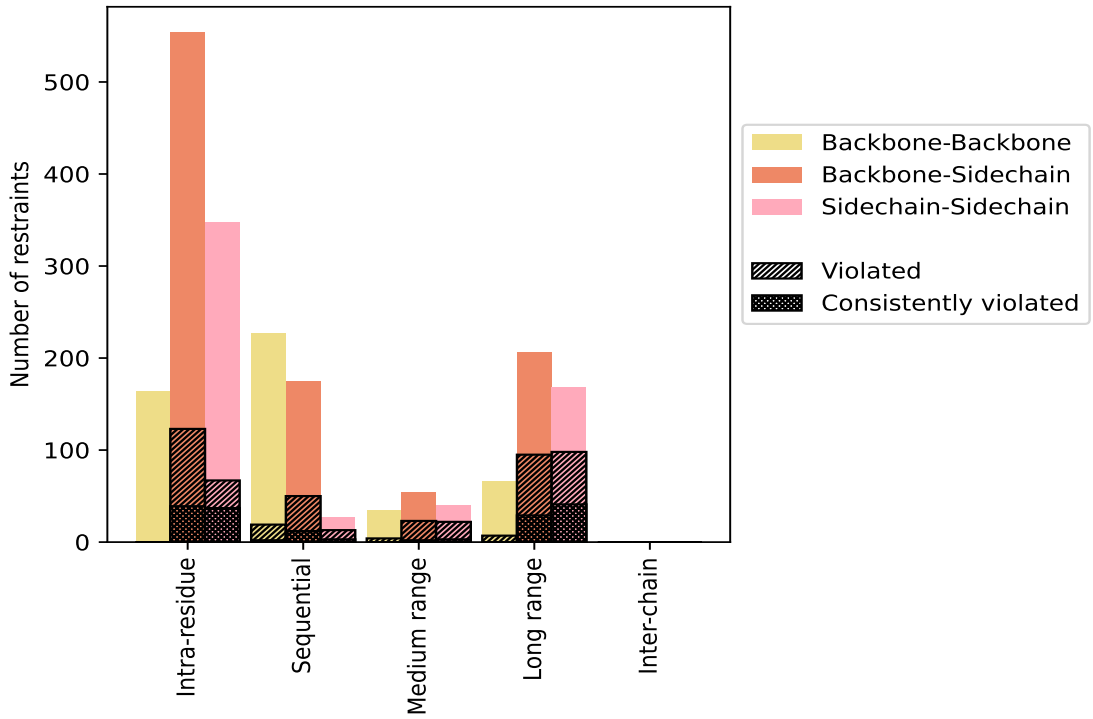
9.1 Summary of distance violations (i)

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)	1065	51.6	190	17.8	9.2	76	7.1	3.7
Backbone-Backbone	164	8.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	554	26.9	123	22.2	6.0	39	7.0	1.9
Sidechain-Sidechain	347	16.8	67	19.3	3.2	37	10.7	1.8
Sequential (|i-j|=1)	429	20.8	82	19.1	4.0	17	4.0	0.8
Backbone-Backbone	227	11.0	19	8.4	0.9	2	0.9	0.1
Backbone-Sidechain	175	8.5	50	28.6	2.4	12	6.9	0.6
Sidechain-Sidechain	27	1.3	13	48.1	0.6	3	11.1	0.1
Medium range (|i-j|>1 & |i-j|<5)	128	6.2	49	38.3	2.4	5	3.9	0.2
Backbone-Backbone	34	1.6	4	11.8	0.2	0	0.0	0.0
Backbone-Sidechain	54	2.6	23	42.6	1.1	2	3.7	0.1
Sidechain-Sidechain	40	1.9	22	55.0	1.1	3	7.5	0.1
Long range (|i-j|≥5)	440	21.3	200	45.5	9.7	70	15.9	3.4
Backbone-Backbone	66	3.2	7	10.6	0.3	0	0.0	0.0
Backbone-Sidechain	206	10.0	95	46.1	4.6	29	14.1	1.4
Sidechain-Sidechain	168	8.1	98	58.3	4.8	41	24.4	2.0
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	2062	100.0	521	25.3	25.3	168	8.1	8.1
Backbone-Backbone	491	23.8	30	6.1	1.5	2	0.4	0.1
Backbone-Sidechain	989	48.0	291	29.4	14.1	82	8.3	4.0
Sidechain-Sidechain	582	28.2	200	34.4	9.7	84	14.4	4.1

[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 (i)



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 (i)

The following table provides the distance violation statistics for each model in the ensemble. Violations less than 0.1 Å are not included in the statistics.

Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
1	115	35	19	119	0	288	0.59	1.93	0.53	0.26
2	120	36	15	116	0	287	0.6	1.94	0.53	0.34
3	119	35	11	109	0	274	0.61	1.94	0.54	0.26
4	111	41	15	112	0	279	0.61	1.96	0.54	0.32
5	121	35	20	124	0	300	0.58	1.99	0.52	0.28
6	114	33	17	122	0	286	0.6	1.93	0.53	0.32
7	124	30	16	112	0	282	0.59	1.94	0.52	0.32
8	116	36	18	115	0	285	0.59	1.98	0.52	0.3
9	118	32	15	118	0	283	0.6	1.99	0.54	0.28
10	117	36	13	128	0	294	0.6	1.94	0.53	0.3
11	117	38	17	124	0	296	0.57	1.95	0.52	0.28

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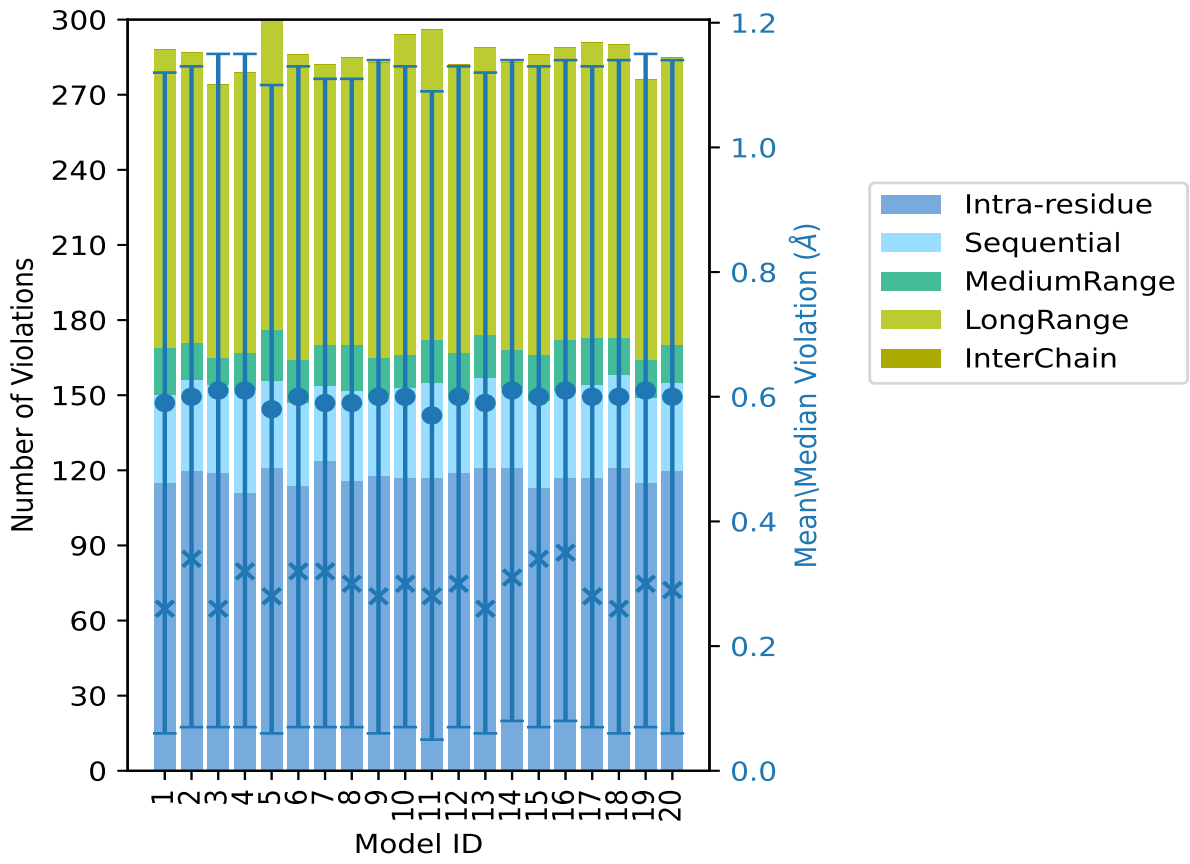
Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
12	119	31	17	115	0	282	0.6	1.94	0.53	0.3
13	121	36	17	115	0	289	0.59	1.95	0.53	0.26
14	121	32	15	115	0	283	0.61	1.94	0.53	0.31
15	113	35	18	120	0	286	0.6	1.98	0.53	0.34
16	117	35	20	117	0	289	0.61	1.93	0.53	0.35
17	117	37	19	118	0	291	0.6	1.96	0.53	0.28
18	121	37	15	117	0	290	0.6	1.96	0.54	0.26
19	115	34	15	112	0	276	0.61	1.94	0.54	0.3
20	120	35	15	115	0	285	0.6	2.03	0.54	0.29

[1]Intra-residue restraints, [2]Sequential restraints, [3]Medium range restraints, [4]Long range restraints, [5]Inter-chain restraints, [6]Standard deviation

9.2.1 Bar graph : Distance Violation statistics for each model (i)



The mean(dot),median(x) and the standard deviation are shown in blue with respect to the y axis on the right

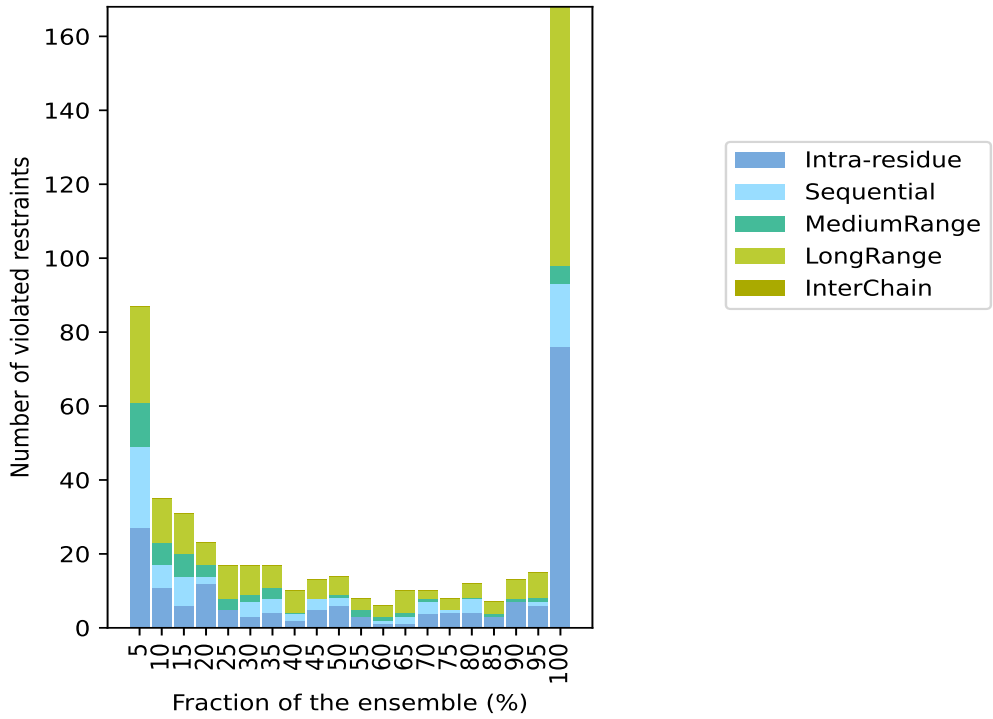
9.3 Distance violation statistics for the ensemble (i)

Violation analysis may find that some restraints are violated in few models and some are violated in most of models. The following table provides this information as number of violated restraints for a given fraction of the ensemble. In total, 1541(IR:875, SQ:347, MR:79, LR:240, IC:0) restraints are not violated in the ensemble.

Number of violated restraints						Fraction of the ensemble	
IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total	Count[6]	%
27	22	12	26	0	87	1	5.0
11	6	6	12	0	35	2	10.0
6	8	6	11	0	31	3	15.0
12	2	3	6	0	23	4	20.0
5	0	3	9	0	17	5	25.0
3	4	2	8	0	17	6	30.0
4	4	3	6	0	17	7	35.0
2	2	0	6	0	10	8	40.0
5	3	0	5	0	13	9	45.0
6	2	1	5	0	14	10	50.0
3	0	2	3	0	8	11	55.0
1	1	1	3	0	6	12	60.0
1	2	1	6	0	10	13	65.0
4	3	1	2	0	10	14	70.0
4	1	0	3	0	8	15	75.0
4	4	0	4	0	12	16	80.0
3	0	1	3	0	7	17	85.0
7	0	1	5	0	13	18	90.0
6	1	1	7	0	15	19	95.0
76	17	5	70	0	168	20	100.0

[1]Intra-residue restraints, [2]Sequential restraints, [3]Medium range restraints, [4]Long range restraints, [5]Inter-chain restraints, [6] Number of models with violations

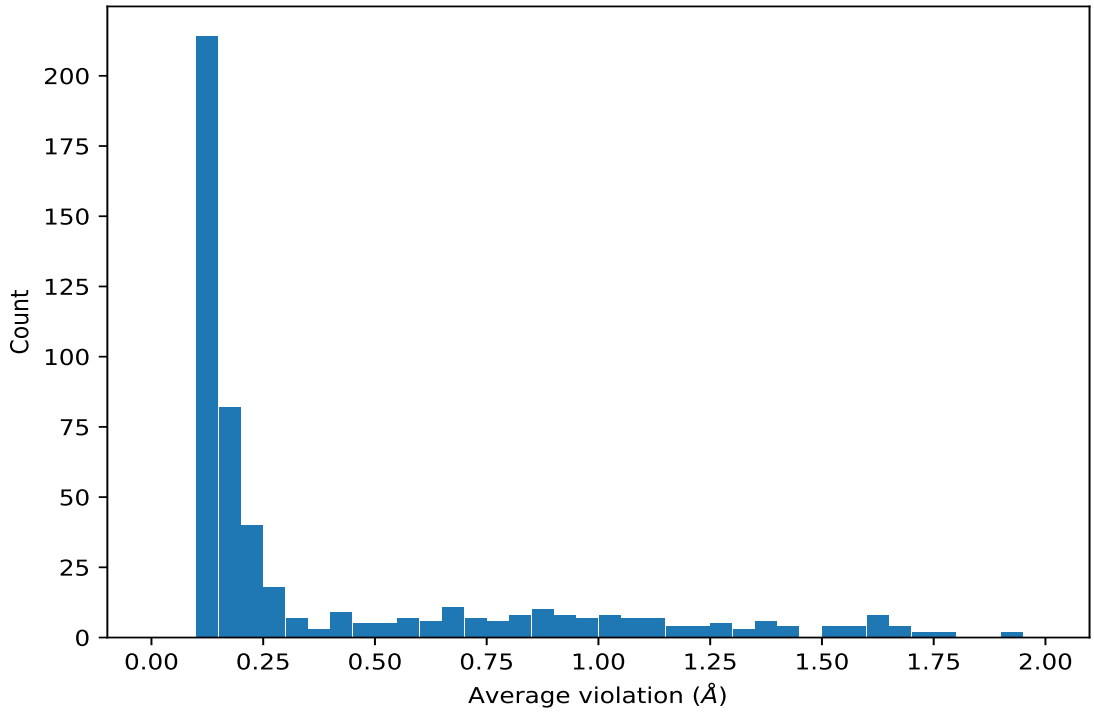
9.3.1 Bar graph : Distance violation statistics for the ensemble (i)



9.4 Most violated distance restraints in the ensemble (i)

9.4.1 Histogram : Distribution of mean distance violations (i)

The following histogram shows the distribution of the average value of the violation. The average is calculated for each restraint that is violated in more than one model over all the violated models in the ensemble



9.4.2 Table: Most violated distance restraints (i)

The following table provides the mean and the standard deviation of the violations for the 10 worst performing restraints, sorted by number of violated models and the mean violation value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

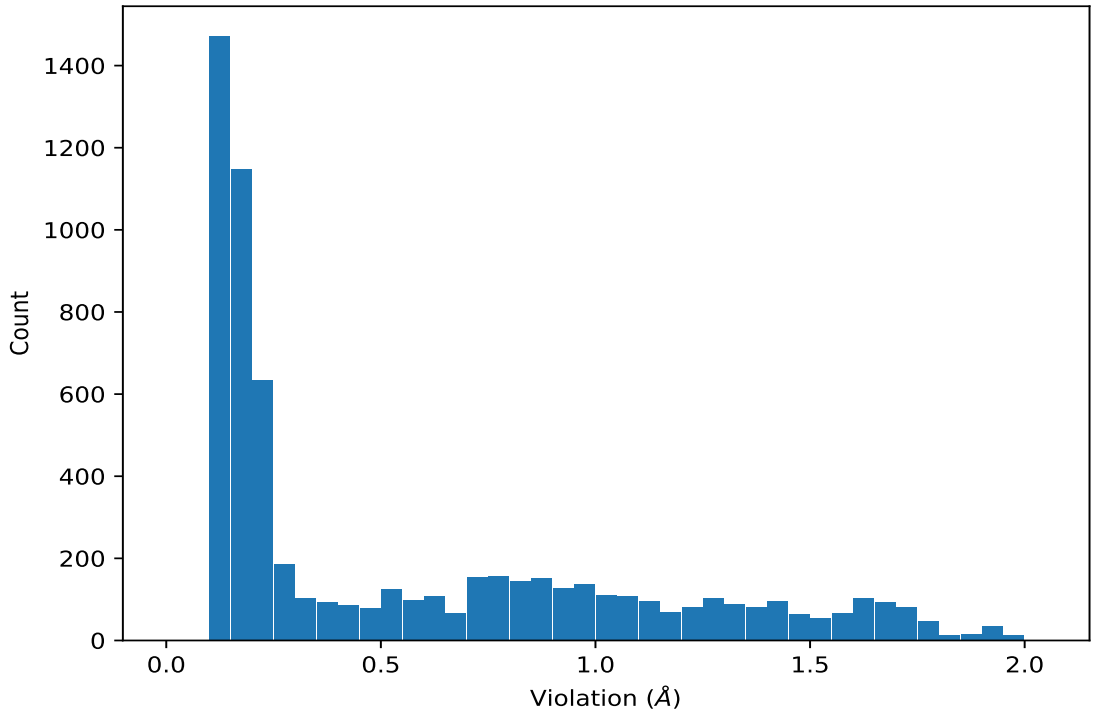
Key	Atom-1	Atom-2	Models[1]	Mean (Å)	SD[1] (Å)	Median (Å)
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	20	1.95	0.02	1.94
(1,661)	1:A:92:MET:HA	1:A:92:MET:HE1	20	1.92	0.02	1.92
(1,648)	1:A:90:VAL:HG21	1:A:91:ASN:HB3	20	1.77	0.11	1.77
(1,106)	1:A:14:LEU:HD11	1:A:121:VAL:HG21	20	1.76	0.04	1.76
(1,438)	1:A:63:LEU:HD21	1:A:91:ASN:HB3	20	1.74	0.4	1.9
(1,44)	1:A:5:LEU:HD21	1:A:24:PRO:HA	20	1.71	0.04	1.7
(1,716)	1:A:100:GLY:HA2	1:A:89:VAL:HG21	20	1.69	0.08	1.71
(1,406)	1:A:58:LEU:HD21	1:A:95:ASN:HA	20	1.69	0.05	1.7
(1,628)	1:A:88:LEU:HD21	1:A:104:SER:HB2	20	1.66	0.07	1.69
(1,289)	1:A:42:THR:HG21	1:A:174:ASP:HB2	20	1.65	0.2	1.73

[1]Number of violated models, [2]Standard deviation

9.5 All violated distance restraints (i)

9.5.1 Histogram : Distribution of distance violations (i)

The following histogram shows the distribution of the absolute value of the violation for all violated restraints in the ensemble.



9.5.2 Table : All distance violations (i)

The following table provides the 10 worst performing restraints, sorted by the violation value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint. Rows with same key represent combinatorial or ambiguous restraints and are counted as a single restraint.

Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,438)	1:A:63:LEU:HD21	1:A:91:ASN:HB3	20	2.03
(1,438)	1:A:63:LEU:HD21	1:A:91:ASN:HB3	5	1.99
(1,438)	1:A:63:LEU:HD21	1:A:91:ASN:HB3	9	1.99
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	8	1.98
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	9	1.98
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	15	1.98
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	4	1.96
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	17	1.96
(1,1142)	1:A:34:VAL:HG21	1:A:169:TYR:HA	18	1.96
(1,661)	1:A:92:MET:HA	1:A:92:MET:HE1	8	1.95

10 Dihedral-angle violation analysis (i)

No dihedral-angle restraints found