wwPDB NMR Structure Validation Summary Report (i)

Jun 6, 2023 – 01:18 pm BST

PDB ID	:	6FDP
BMRB ID	:	34223
Title	:	NMR structure of the second TPR domain of the human RPAP3 protein in complex with HSP90 peptide DTSRMEEVD
Authors	:	Quinternet, M.; Chagot, M.E.; Manival, X.
Deposited on	:	2017-12-26

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 (i)) were used in the production of this report:

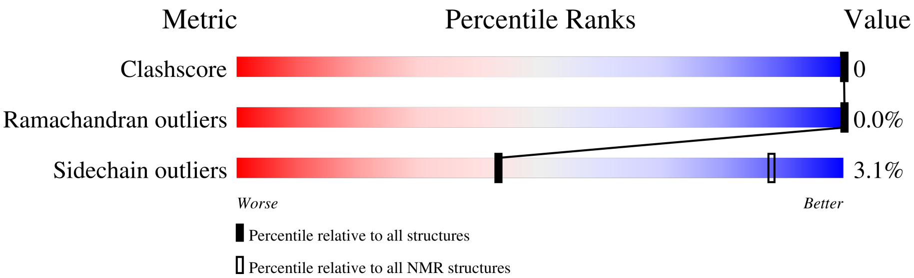
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal 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 91%.

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	120	85% 7% 8%
2	B	9	78% 11% 11%

2 Ensemble composition and analysis (i)

This entry contains 20 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	A:282-A:391, B:725-B:732 (118)	0.29	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 2 clusters. No single-model clusters were found.

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

3 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 2031 atoms, of which 1019 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called RNA polymerase II-associated protein 3.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	120	1892	589	954	167	178	4	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	277	GLY	-	expression tag	UNP Q9H6T3
A	278	PRO	-	expression tag	UNP Q9H6T3
A	279	HIS	-	expression tag	UNP Q9H6T3
A	280	MET	-	expression tag	UNP Q9H6T3
A	396	LYS	-	expression tag	UNP Q9H6T3

- Molecule 2 is a protein called Heat shock protein HSP 90-alpha.

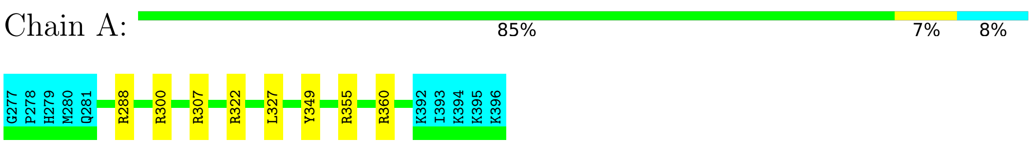
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	9	139	41	65	12	20	1	0

4 Residue-property plots (i)

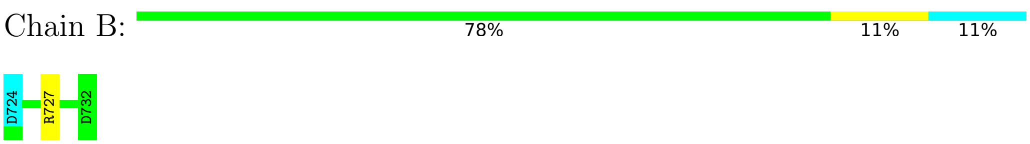
4.1 Average score per residue in the NMR ensemble

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 polymerase II-associated protein 3



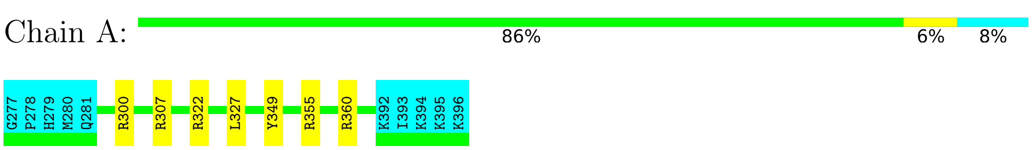
- Molecule 2: Heat shock protein HSP 90-alpha



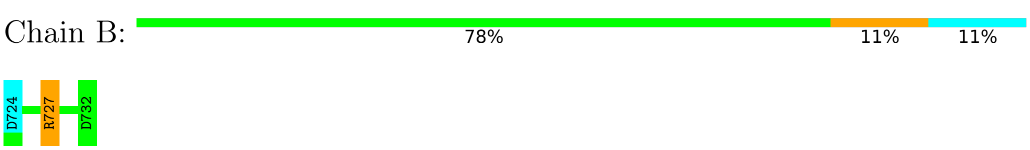
4.2 Residue scores for the representative (medoid) model from the NMR ensemble

The representative model is number 4. Colouring as in section 4.1 above.

- Molecule 1: RNA polymerase II-associated protein 3



- Molecule 2: Heat shock protein HSP 90-alpha



5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *molecular dynamics*.

Of the 200 calculated structures, 20 were deposited, based on the following criterion: *structures with the restraint lowest energy*.

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

Software name	Classification	Version
CYANA	structure calculation	
TALOS	structure calculation	
Amber	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	1588
Number of shifts mapped to atoms	1588
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	91%

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	0.70±0.00	0±0/867 (0.0± 0.0%)	1.02±0.03	6±1/1163 (0.5± 0.1%)
2	B	0.69±0.04	0±0/65 (0.0± 0.0%)	1.34±0.19	1±0/84 (1.0± 0.4%)
All	All	0.70	0/18640 (0.0%)	1.05	137/24940 (0.5%)

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	0.7±0.7
2	B	0.0±0.0	0.1±0.4
All	All	0	16

There are no bond-length outliers.

5 of 13 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(°)	Ideal(°)	Models	
								Worst	Total
2	B	727	ARG	NE-CZ-NH1	10.79	125.69	120.30	8	17
1	A	288	ARG	NE-CZ-NH1	10.09	125.35	120.30	1	13
1	A	322	ARG	NE-CZ-NH1	9.77	125.19	120.30	12	20
1	A	307	ARG	NE-CZ-NH1	8.92	124.76	120.30	20	20
1	A	300	ARG	NE-CZ-NH1	8.84	124.72	120.30	13	19

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	360	ARG	Sidechain	5

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Mol	Chain	Res	Type	Group	Models (Total)
1	A	349	TYR	Sidechain	4
1	A	355	ARG	Sidechain	4
2	B	730	GLU	Peptide	3

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	855	855	855	0±0
All	All	18420	18280	18280	1

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 0.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:361:THR:HG23	1:A:366:LEU:CD1	0.42	2.44	7	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	110/120 (92%)	107±1 (98±1%)	3±1 (2±1%)	0±0 (0±0%)	100	100
2	B	7/9 (78%)	6±1 (86±9%)	1±1 (14±8%)	0±0 (1±3%)	26	73
All	All	2340/2580 (91%)	2268 (97%)	71 (3%)	1 (0%)	100	100

All 1 unique Ramachandran outliers are listed below.

Mol	Chain	Res	Type	Models (Total)
2	B	729	GLU	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	85/94 (90%)	83±1 (97±1%)	2±1 (3±1%)	49	91
2	B	8/9 (89%)	7±1 (92±10%)	1±1 (8±10%)	15	63
All	All	1860/2060 (90%)	1802 (97%)	58 (3%)	43	88

5 of 9 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	327	LEU	20
1	A	349	TYR	14
2	B	727	ARG	9
1	A	380	GLU	5
1	A	338	ASP	4

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 91% for the well-defined parts and 91% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *test.str*

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	1588
Number of shifts mapped to atoms	1588
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	10

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	124	-0.89 ± 0.08	Should be checked
$^{13}C_{\beta}$	119	0.48 ± 0.12	None needed (< 0.5 ppm)
$^{13}C'$	116	-0.63 ± 0.10	Should be applied
^{15}N	123	-0.35 ± 0.19	None needed (< 0.5 ppm)

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 91%, i.e. 1446 atoms were assigned a chemical shift out of a possible 1587. 0 out of 14 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	581/595 (98%)	243/243 (100%)	223/236 (94%)	115/116 (99%)
Sidechain	812/897 (91%)	554/577 (96%)	241/277 (87%)	17/43 (40%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	53/95 (56%)	38/45 (84%)	15/50 (30%)	0/0 (—%)
Overall	1446/1587 (91%)	835/865 (97%)	479/563 (85%)	132/159 (83%)

7.1.4 Statistically unusual chemical shifts (i)

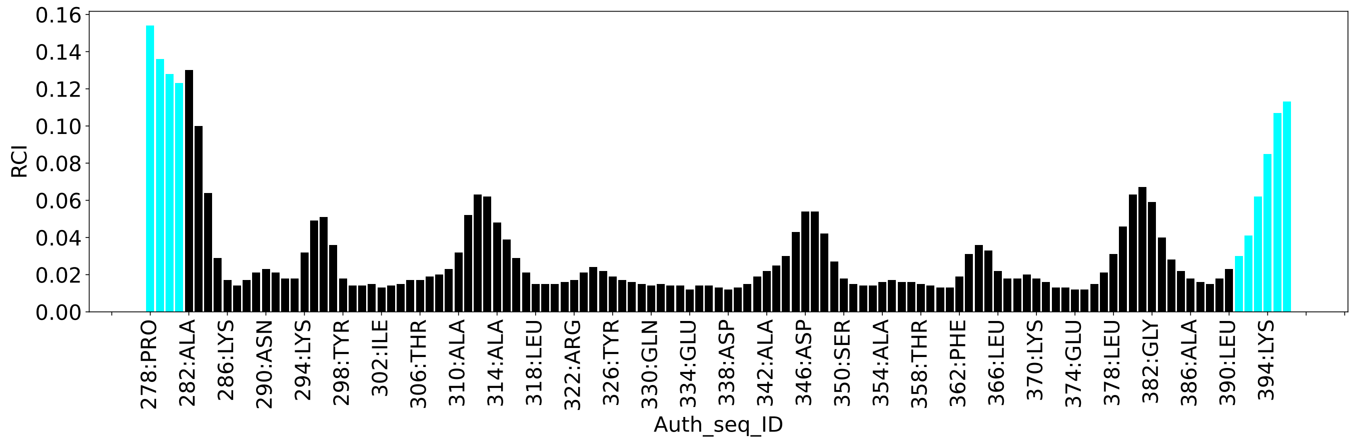
The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	340	THR	HG1	5.63	0.08 – 2.19	21.3
1	A	306	THR	HG1	5.57	0.08 – 2.19	21.0
1	A	361	THR	HG1	5.10	0.08 – 2.19	18.8
1	A	334	GLU	HB2	0.61	1.00 – 3.05	-6.9
1	A	389	GLU	HB2	0.73	1.00 – 3.05	-6.3
1	A	322	ARG	HE	10.90	4.52 – 10.19	6.2
1	A	300	ARG	HB2	0.37	0.52 – 3.08	-5.6
1	A	375	THR	HG21	0.06	0.08 – 2.19	-5.1
1	A	375	THR	HG22	0.06	0.08 – 2.19	-5.1
1	A	375	THR	HG23	0.06	0.08 – 2.19	-5.1

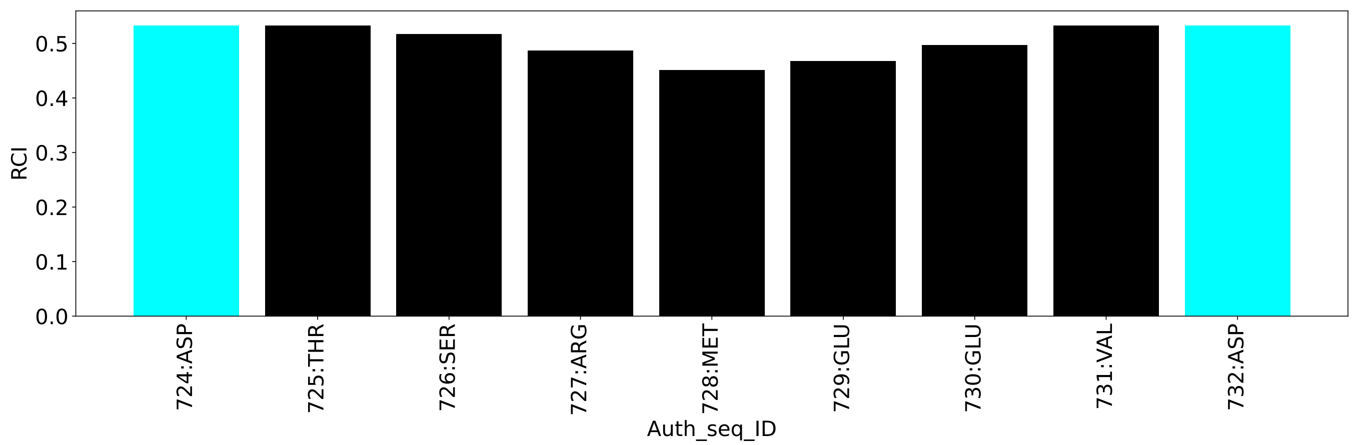
7.1.5 Random Coil Index (RCI) plots (i)

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:



Random coil index (RCI) for chain B:



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	2617
Intra-residue (|i-j|=0)	585
Sequential (|i-j|=1)	577
Medium range (|i-j|>1 and |i-j|<5)	748
Long range (|i-j|≥5)	571
Inter-chain	136
Hydrogen bond restraints	0
Disulfide bond restraints	0
Total dihedral-angle restraints	0
Number of unmapped restraints	0
Number of restraints per residue	20.3
Number of long range restraints per residue[1]	4.4

[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)	3.6	0.2
0.2-0.5 (Medium)	6.8	0.5
>0.5 (Large)	4.3	1.88

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)

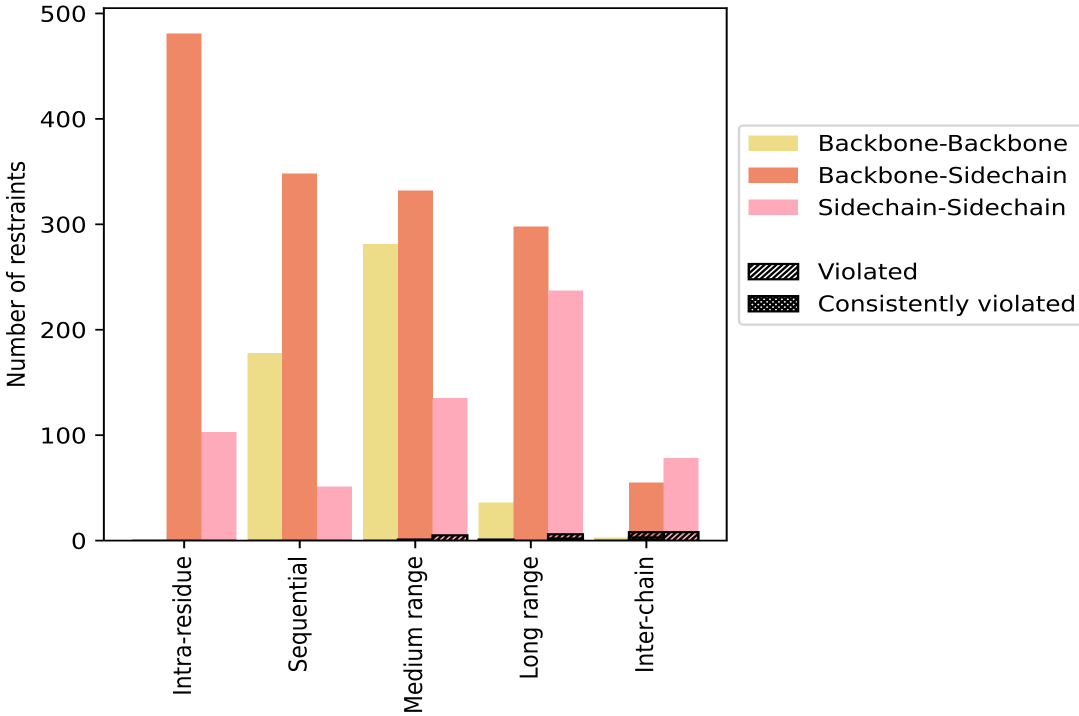
9.1 Summary of distance violations (i)

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)	585	22.4	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	1	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	481	18.4	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	103	3.9	0	0.0	0.0	0	0.0	0.0
Sequential (|i-j|=1)	577	22.0	0	0.0	0.0	0	0.0	0.0
Backbone-Backbone	178	6.8	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	348	13.3	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	51	1.9	0	0.0	0.0	0	0.0	0.0
Medium range (|i-j|>1 & |i-j|<5)	748	28.6	6	0.8	0.2	0	0.0	0.0
Backbone-Backbone	281	10.7	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	332	12.7	1	0.3	0.0	0	0.0	0.0
Sidechain-Sidechain	135	5.2	5	3.7	0.2	0	0.0	0.0
Long range (|i-j|≥5)	571	21.8	7	1.2	0.3	2	0.4	0.1
Backbone-Backbone	36	1.4	1	2.8	0.0	0	0.0	0.0
Backbone-Sidechain	298	11.4	0	0.0	0.0	0	0.0	0.0
Sidechain-Sidechain	237	9.1	6	2.5	0.2	2	0.8	0.1
Inter-chain	136	5.2	16	11.8	0.6	3	2.2	0.1
Backbone-Backbone	3	0.1	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	55	2.1	8	14.5	0.3	3	5.5	0.1
Sidechain-Sidechain	78	3.0	8	10.3	0.3	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	2617	100.0	29	1.1	1.1	5	0.2	0.2
Backbone-Backbone	499	19.1	1	0.2	0.0	0	0.0	0.0
Backbone-Sidechain	1514	57.9	9	0.6	0.3	3	0.2	0.1
Sidechain-Sidechain	604	23.1	19	3.1	0.7	2	0.3	0.1

[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	0	0	2	5	10	17	0.55	1.53	0.4	0.51
2	0	0	1	5	7	13	0.32	0.73	0.17	0.31
3	0	0	1	5	7	13	0.41	1.26	0.31	0.28
4	0	0	3	5	8	16	0.55	1.77	0.46	0.4
5	0	0	4	5	6	15	0.53	1.49	0.42	0.34
6	0	0	3	5	6	14	0.38	1.09	0.25	0.3
7	0	0	3	5	9	17	0.56	1.67	0.43	0.5
8	0	0	2	4	11	17	0.3	0.62	0.15	0.29
9	0	0	1	5	7	13	0.43	1.35	0.34	0.34
10	0	0	2	5	9	16	0.44	0.88	0.23	0.4
11	0	0	1	5	6	12	0.38	1.17	0.27	0.4

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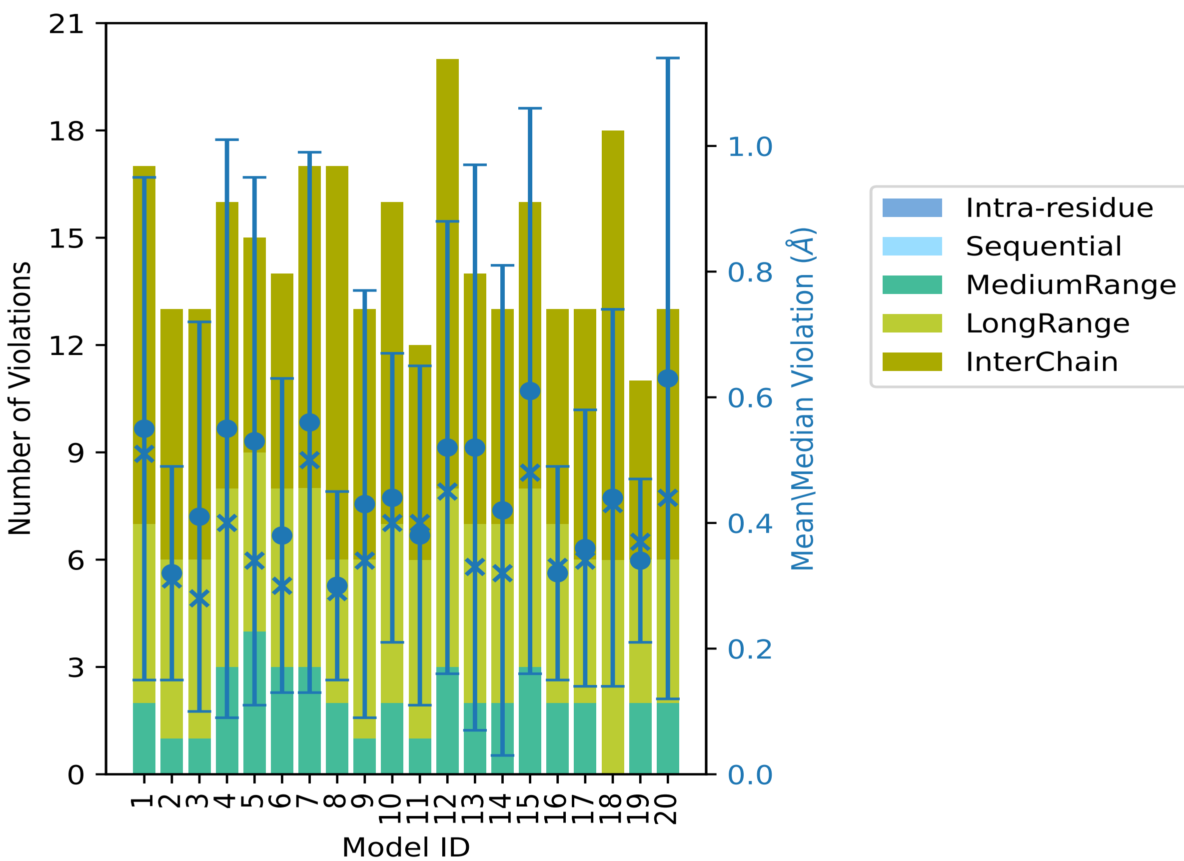
Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
12	0	0	3	5	12	20	0.52	1.48	0.36	0.45
13	0	0	2	5	7	14	0.52	1.63	0.45	0.33
14	0	0	2	5	6	13	0.42	1.62	0.39	0.32
15	0	0	3	5	8	16	0.61	1.79	0.45	0.48
16	0	0	2	5	6	13	0.32	0.77	0.17	0.33
17	0	0	2	4	7	13	0.36	0.97	0.22	0.34
18	0	0	0	6	12	18	0.44	0.95	0.3	0.43
19	0	0	2	4	5	11	0.34	0.51	0.13	0.37
20	0	0	2	4	7	13	0.63	1.88	0.51	0.44

[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

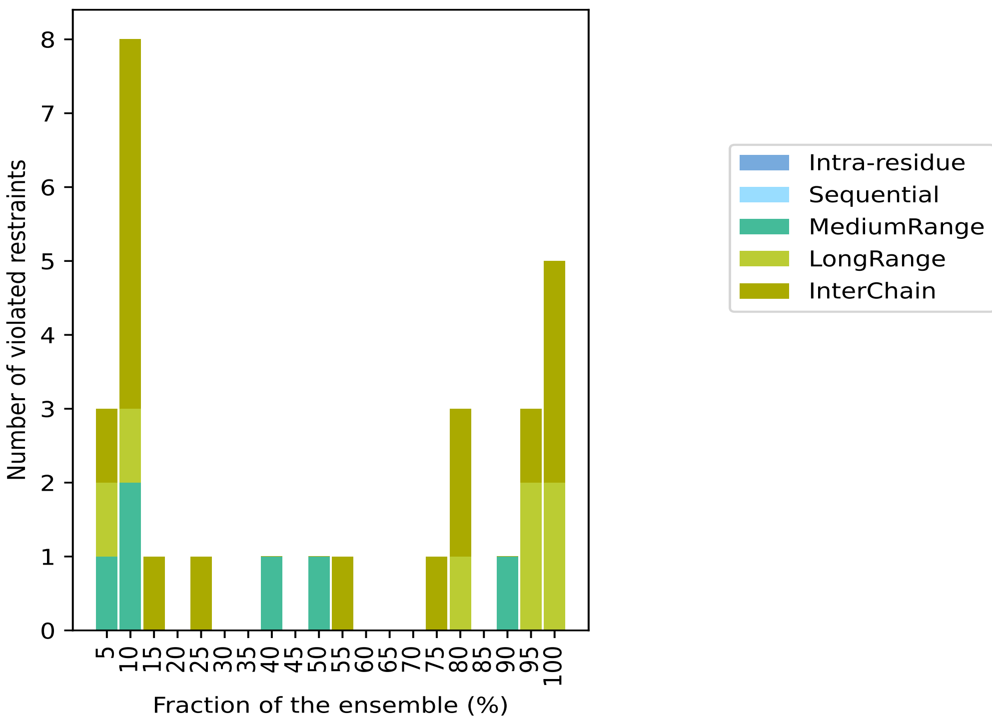
9.3 Distance violation statistics for the ensemble (i)

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, 2588(IR:585, SQ:577, MR:742, LR:564, IC:120) 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]	%
0	0	1	1	1	3	1	5.0
0	0	2	1	5	8	2	10.0
0	0	0	0	1	1	3	15.0
0	0	0	0	0	0	4	20.0
0	0	0	0	1	1	5	25.0
0	0	0	0	0	0	6	30.0
0	0	0	0	0	0	7	35.0
0	0	1	0	0	1	8	40.0
0	0	0	0	0	0	9	45.0
0	0	1	0	0	1	10	50.0
0	0	0	0	1	1	11	55.0
0	0	0	0	0	0	12	60.0
0	0	0	0	0	0	13	65.0
0	0	0	0	0	0	14	70.0
0	0	0	0	1	1	15	75.0
0	0	0	1	2	3	16	80.0
0	0	0	0	0	0	17	85.0
0	0	1	0	0	1	18	90.0
0	0	0	2	1	3	19	95.0
0	0	0	2	3	5	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

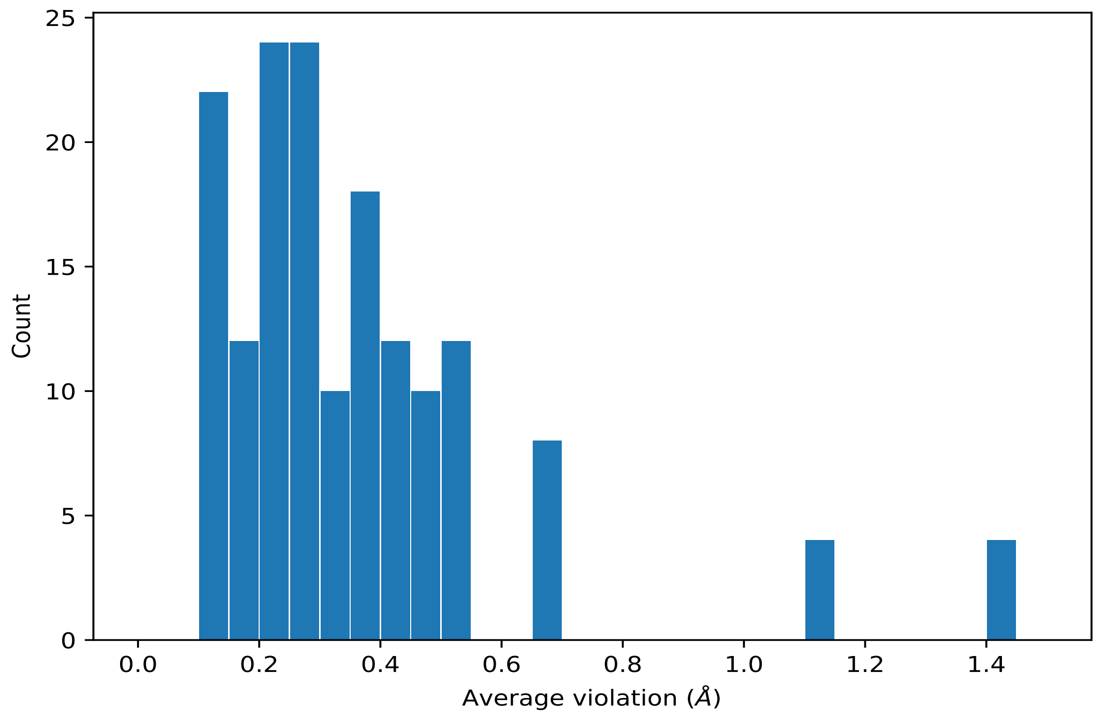
9.3.1 Bar graph : Distance violation statistics for the ensemble (i)



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)
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG11	20	0.54	0.18	0.51
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG12	20	0.54	0.18	0.51
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG13	20	0.54	0.18	0.51
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG21	20	0.54	0.18	0.51
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG22	20	0.54	0.18	0.51
(1,164)	1:A:287:ASP:HA	2:B:731:VAL:HG23	20	0.54	0.18	0.51
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG11	20	0.5	0.18	0.46
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG12	20	0.5	0.18	0.46
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG13	20	0.5	0.18	0.46
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG21	20	0.5	0.18	0.46
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG22	20	0.5	0.18	0.46
(1,256)	1:A:292:PHE:H	2:B:731:VAL:HG23	20	0.5	0.18	0.46
(1,898)	1:A:319:PRO:HG2	1:A:352:ALA:HB1	20	0.49	0.04	0.49
(1,898)	1:A:319:PRO:HG2	1:A:352:ALA:HB2	20	0.49	0.04	0.49
(1,898)	1:A:319:PRO:HG2	1:A:352:ALA:HB3	20	0.49	0.04	0.49
(1,898)	1:A:319:PRO:HG3	1:A:352:ALA:HB1	20	0.49	0.04	0.49

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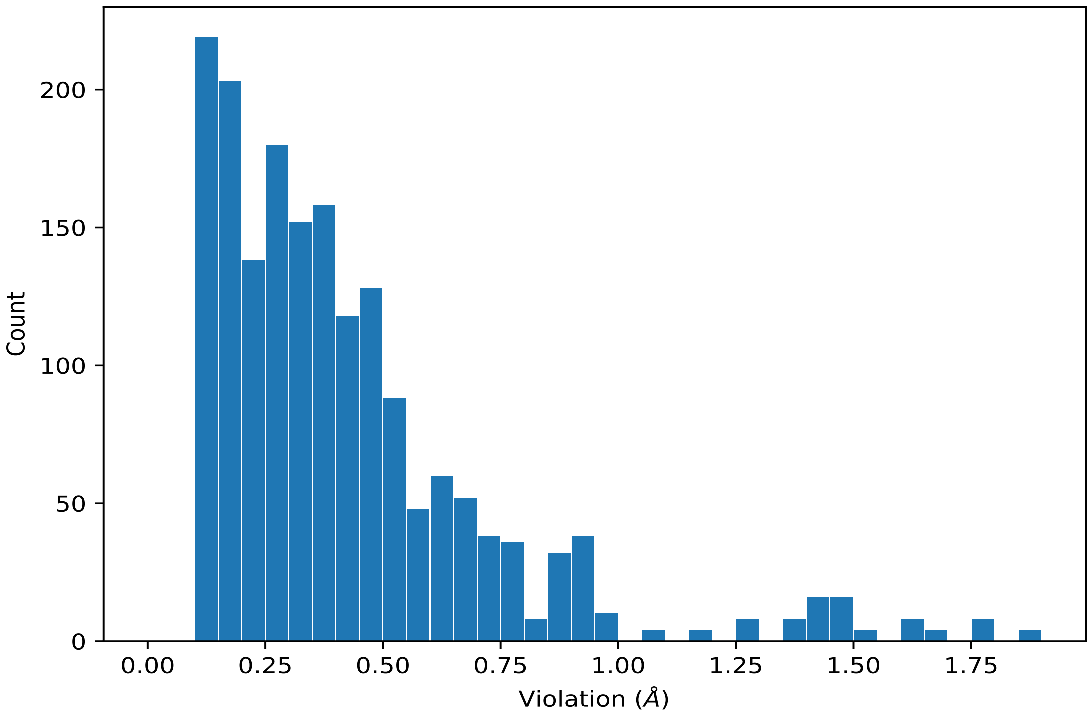
Key	Atom-1	Atom-2	Models[1]	Mean (Å)	SD[1] (Å)	Median (Å)
(1,898)	1:A:319:PRO:HG3	1:A:352:ALA:HB2	20	0.49	0.04	0.49
(1,898)	1:A:319:PRO:HG3	1:A:352:ALA:HB3	20	0.49	0.04	0.49
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG11	20	0.39	0.16	0.32
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG12	20	0.39	0.16	0.32
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG13	20	0.39	0.16	0.32
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG21	20	0.39	0.16	0.32
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG22	20	0.39	0.16	0.32
(1,245)	1:A:291:GLY:H	2:B:731:VAL:HG23	20	0.39	0.16	0.32
(1,847)	1:A:317:LEU:HD21	1:A:349:TYR:HD1	20	0.31	0.09	0.3
(1,847)	1:A:317:LEU:HD21	1:A:349:TYR:HD2	20	0.31	0.09	0.3
(1,847)	1:A:317:LEU:HD22	1:A:349:TYR:HD1	20	0.31	0.09	0.3
(1,847)	1:A:317:LEU:HD22	1:A:349:TYR:HD2	20	0.31	0.09	0.3
(1,847)	1:A:317:LEU:HD23	1:A:349:TYR:HD1	20	0.31	0.09	0.3
(1,847)	1:A:317:LEU:HD23	1:A:349:TYR:HD2	20	0.31	0.09	0.3
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG11	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG12	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG13	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG21	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG22	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD2	2:B:731:VAL:HG23	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG11	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG12	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG13	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG21	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG22	19	0.43	0.23	0.35
(1,350)	1:A:294:LYS:HD3	2:B:731:VAL:HG23	19	0.43	0.23	0.35
(1,845)	1:A:317:LEU:HD11	1:A:349:TYR:HD1	19	0.27	0.14	0.23
(1,845)	1:A:317:LEU:HD11	1:A:349:TYR:HD2	19	0.27	0.14	0.23
(1,845)	1:A:317:LEU:HD12	1:A:349:TYR:HD1	19	0.27	0.14	0.23
(1,845)	1:A:317:LEU:HD12	1:A:349:TYR:HD2	19	0.27	0.14	0.23
(1,845)	1:A:317:LEU:HD13	1:A:349:TYR:HD1	19	0.27	0.14	0.23
(1,845)	1:A:317:LEU:HD13	1:A:349:TYR:HD2	19	0.27	0.14	0.23
(1,1819)	1:A:360:ARG:HG3	1:A:369:ALA:HB1	19	0.12	0.01	0.12
(1,1819)	1:A:360:ARG:HG3	1:A:369:ALA:HB2	19	0.12	0.01	0.12
(1,1819)	1:A:360:ARG:HG3	1:A:369:ALA:HB3	19	0.12	0.01	0.12
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	18	1.15	0.52	1.27
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	18	1.15	0.52	1.27
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	18	1.15	0.52	1.27
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	18	1.15	0.52	1.27
(1,2360)	1:A:385:GLN:HB2	2:B:727:ARG:HD2	16	0.65	0.22	0.67

[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)
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	20	1.88
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	20	1.88
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	20	1.88
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	20	1.88
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	15	1.79
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	15	1.79
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	15	1.79
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	15	1.79
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	4	1.77
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	4	1.77
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	4	1.77

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	4	1.77
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	7	1.67
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	7	1.67
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	7	1.67
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	7	1.67
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	13	1.63
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	13	1.63
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	13	1.63
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	13	1.63
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG2	14	1.62
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG3	14	1.62
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG2	14	1.62
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG3	14	1.62
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG2	1	1.53
(1,2542)	2:B:727:ARG:HB2	2:B:729:GLU:HG3	1	1.53
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG2	1	1.53
(1,2542)	2:B:727:ARG:HB3	2:B:729:GLU:HG3	1	1.53
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG2	5	1.49
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG3	5	1.49
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG2	5	1.49
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG3	5	1.49
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG2	12	1.48
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG3	12	1.48
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG2	12	1.48
(1,2543)	2:B:727:ARG:HG3	2:B:729:GLU:HG3	12	1.48
(1,2543)	2:B:727:ARG:HG2	2:B:729:GLU:HG2	15	1.47

10 Dihedral-angle violation analysis (i)

Dihedral angle analysis failed due to data error in the dihedral angle restraints, possibly missing target value