wwPDB NMR Structure Validation Summary Report

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PDB ID	:	2LVX
BMRB ID	:	18592
Title	:	MRH domain of the Glucosidase II beta subunit from S. pombe
Authors	:	Dahms, N.M.; Olson, L.J.; Peterson, F.C.
Deposited on	:	2012-07-12

This is a wwPDB NMR Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
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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:

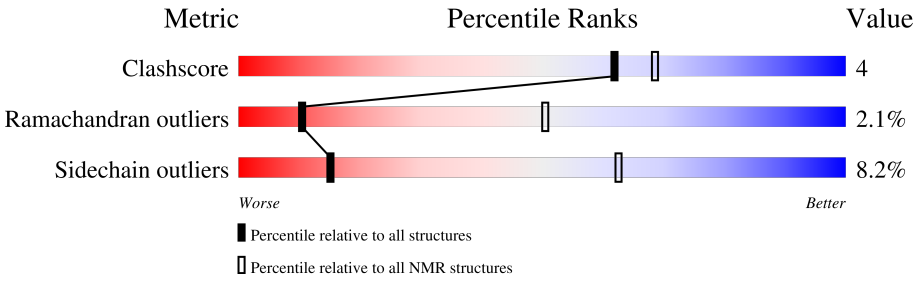
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal 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 92%.

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	94	71% 10% • 16%

2 Ensemble composition and analysis

This entry contains 20 models. Model 1 is the overall representative, medoid model (most similar to other models).

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:365-A:407, A:413-A:448 (79)	0.33	1

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 4 clusters. No single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1353 atoms, of which 615 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Glucosidase 2 subunit beta.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	94	1353	466	615	123	143	6	0

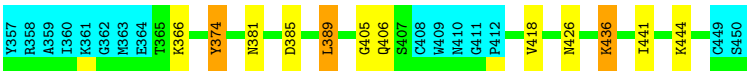
4 Residue-property plots (i)

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: Glucosidase 2 subunit beta

Chain A:

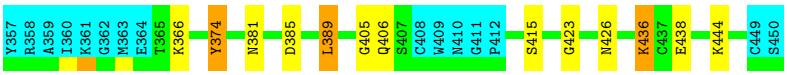


4.2 Residue scores for the representative (medoid) model from the NMR ensemble

The representative model is number 1. Colouring as in section 4.1 above.

- Molecule 1: Glucosidase 2 subunit beta

Chain A:



5 Refinement protocol and experimental data overview

The models were refined using the following method: *AUTOMATED METHODS WERE USED FOR BACKBONE CHEMICAL SHIFT ASSIGNMENT AND ITERATIVE NOE REFINEMENT. FINAL STRUCTURES WERE OBTAINED BY MOLECULAR DYNAMICS IN EXPLICIT SOLVENT.*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *target function*.

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

Software name	Classification	Version
Xplor-NIH	refinement	2.9.3
CYANA	refinement	2.1

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	1080
Number of shifts mapped to atoms	980
Number of unparsed shifts	0
Number of shifts with mapping errors	100
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	92%

6 Model quality

6.1 Standard geometry

There are no covalent bond-length or bond-angle outliers.

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	0.1±0.2
All	All	0	1

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

All unique planar outliers are listed below.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	367	ARG	Sidechain	1

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	620	513	612	6±2
All	All	12400	10260	12240	110

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 4.

5 of 21 unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:426:ASN:HA	1:A:444:LYS:O	0.69	1.87	8	18
1:A:366:LYS:HA	1:A:374:TYR:O	0.58	1.99	8	17

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:422:CYS:O	1:A:444:LYS:HD2	0.53	2.04	18	5
1:A:418:VAL:HA	1:A:441:ILE:O	0.52	2.04	4	10
1:A:423:GLY:HA3	1:A:444:LYS:HB3	0.52	1.80	2	9

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	79/94 (84%)	71±1 (90±1%)	6±1 (8±1%)	2±0 (2±1%)	10	50
All	All	1580/1880 (84%)	1417 (90%)	130 (8%)	33 (2%)	10	50

All 3 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	436	LYS	17
1	A	385	ASP	15
1	A	426	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	
1	A	68/80 (85%)	62±1 (92±2%)	6±1 (8±2%)	15	62
All	All	1360/1600 (85%)	1249 (92%)	111 (8%)	15	62

5 of 14 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	374	TYR	20
1	A	389	LEU	19
1	A	381	ASN	16
1	A	436	LYS	15
1	A	406	GLN	14

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

There are no ligands in this entry.

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 92% for the well-defined parts and 86% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chem_shift_list_1*

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	1080
Number of shifts mapped to atoms	980
Number of unparsed shifts	0
Number of shifts with mapping errors	100
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

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

- No matching atom found in the structure. First 5 (of 100) occurrences are reported below.

List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	360	ILE	HG13	1.155	0.02	2
1	A	360	ILE	HG21	0.835	0.02	.
1	A	360	ILE	HG22	0.835	0.02	.
1	A	365	THR	HG21	1.119	0.02	.
1	A	365	THR	HG22	1.119	0.02	.
1	A	369	ILE	HG13	1.599	0.02	2
1	A	369	ILE	HG21	1.057	0.02	.
1	A	369	ILE	HG22	1.057	0.02	.
1	A	369	ILE	HD12	0.753	0.02	.
1	A	369	ILE	HD13	0.753	0.02	.
1	A	373	THR	HG21	0.982	0.02	.
1	A	373	THR	HG22	0.982	0.02	.
1	A	376	VAL	HG11	0.833	0.02	.
1	A	376	VAL	HG12	0.833	0.02	.

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List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	376	VAL	HG22	0.566	0.02	.
1	A	376	VAL	HG23	0.566	0.02	.
1	A	377	VAL	HG11	0.936	0.02	.
1	A	377	VAL	HG12	0.936	0.02	.
1	A	377	VAL	HG22	1.041	0.02	.
1	A	377	VAL	HG23	1.041	0.02	.
1	A	381	ASN	HD22	6.938	0.02	2
1	A	382	VAL	HG11	0.577	0.02	.
1	A	382	VAL	HG12	0.577	0.02	.
1	A	382	VAL	HG22	-0.165	0.02	.
1	A	382	VAL	HG23	-0.165	0.02	.
1	A	384	GLN	HE22	6.37	0.02	2
1	A	387	ILE	HG13	1.172	0.02	2
1	A	387	ILE	HG21	0.619	0.02	.
1	A	387	ILE	HG22	0.619	0.02	.
1	A	387	ILE	HD12	0.852	0.02	.
1	A	387	ILE	HD13	0.852	0.02	.
1	A	388	LEU	HD11	0.49	0.02	.
1	A	388	LEU	HD12	0.49	0.02	.
1	A	388	LEU	HD22	0.49	0.02	.
1	A	388	LEU	HD23	0.49	0.02	.
1	A	389	LEU	HD11	0.276	0.02	.
1	A	389	LEU	HD12	0.276	0.02	.
1	A	389	LEU	HD22	0.276	0.02	.
1	A	389	LEU	HD23	0.276	0.02	.
1	A	391	ASN	HD22	6.814	0.02	2
1	A	395	GLN	HE22	6.42	0.02	2
1	A	398	ASN	HD22	7.482	0.02	2
1	A	399	VAL	HG11	1.036	0.02	.
1	A	399	VAL	HG12	1.036	0.02	.
1	A	399	VAL	HG22	0.817	0.02	.
1	A	399	VAL	HG23	0.817	0.02	.
1	A	400	LEU	HD11	0.755	0.02	.
1	A	400	LEU	HD12	0.755	0.02	.
1	A	400	LEU	HD22	0.477	0.02	.
1	A	400	LEU	HD23	0.477	0.02	.
1	A	404	ASN	HD22	6.836	0.02	2
1	A	406	GLN	HE22	7.716	0.02	2
1	A	410	ASN	HD22	6.511	0.02	2
1	A	417	ILE	HG13	1.058	0.02	2
1	A	417	ILE	HG21	0.842	0.02	.

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List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	417	ILE	HG22	0.842	0.02	.
1	A	417	ILE	HD12	0.481	0.02	.
1	A	417	ILE	HD13	0.481	0.02	.
1	A	418	VAL	HG11	0.826	0.02	.
1	A	418	VAL	HG12	0.826	0.02	.
1	A	418	VAL	HG22	0.875	0.02	.
1	A	418	VAL	HG23	0.875	0.02	.
1	A	419	THR	HG21	1.18	0.02	.
1	A	419	THR	HG22	1.18	0.02	.
1	A	420	VAL	HG11	0.904	0.02	.
1	A	420	VAL	HG12	0.904	0.02	.
1	A	420	VAL	HG22	0.828	0.02	.
1	A	420	VAL	HG23	0.828	0.02	.
1	A	424	VAL	HG11	1.014	0.02	.
1	A	424	VAL	HG12	1.014	0.02	.
1	A	424	VAL	HG22	1.014	0.02	.
1	A	424	VAL	HG23	1.014	0.02	.
1	A	426	ASN	HD22	6.686	0.02	2
1	A	428	ILE	HG13	0.754	0.02	2
1	A	428	ILE	HG21	0.638	0.02	.
1	A	428	ILE	HG22	0.638	0.02	.
1	A	428	ILE	HD12	0.754	0.02	.
1	A	428	ILE	HD13	0.754	0.02	.
1	A	429	VAL	HG11	0.925	0.02	.
1	A	429	VAL	HG12	0.925	0.02	.
1	A	429	VAL	HG22	0.883	0.02	.
1	A	429	VAL	HG23	0.883	0.02	.
1	A	431	VAL	HG11	0.409	0.02	.
1	A	431	VAL	HG12	0.409	0.02	.
1	A	431	VAL	HG22	0.142	0.02	.
1	A	431	VAL	HG23	0.142	0.02	.
1	A	432	LEU	HD11	0.931	0.02	.
1	A	432	LEU	HD12	0.931	0.02	.
1	A	432	LEU	HD22	0.931	0.02	.
1	A	432	LEU	HD23	0.931	0.02	.
1	A	435	GLN	HE22	6.776	0.02	2
1	A	440	LEU	HD11	0.907	0.02	.
1	A	440	LEU	HD12	0.907	0.02	.
1	A	440	LEU	HD22	0.907	0.02	.
1	A	440	LEU	HD23	0.907	0.02	.
1	A	441	ILE	HG13	1.518	0.02	2

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List ID	Chain	Res	Type	Atom	Shift Data		
					Value	Uncertainty	Ambiguity
1	A	441	ILE	HG21	0.773	0.02	.
1	A	441	ILE	HG22	0.773	0.02	.
1	A	441	ILE	HD12	0.53	0.02	.
1	A	441	ILE	HD13	0.53	0.02	.

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	89	-0.85 ± 0.13	Should be checked
$^{13}C_{\beta}$	81	-0.05 ± 0.26	None needed (< 0.5 ppm)
$^{13}C'$	78	0.13 ± 0.16	None needed (< 0.5 ppm)
^{15}N	85	-0.69 ± 0.51	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 92%, i.e. 981 atoms were assigned a chemical shift out of a possible 1066. 0 out of 14 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	390/399 (98%)	163/163 (100%)	150/158 (95%)	77/78 (99%)
Sidechain	535/584 (92%)	369/379 (97%)	157/184 (85%)	9/21 (43%)
Aromatic	56/83 (67%)	36/39 (92%)	20/42 (48%)	0/2 (0%)
Overall	981/1066 (92%)	568/581 (98%)	327/384 (85%)	86/101 (85%)

7.1.4 Statistically unusual chemical shifts (i)

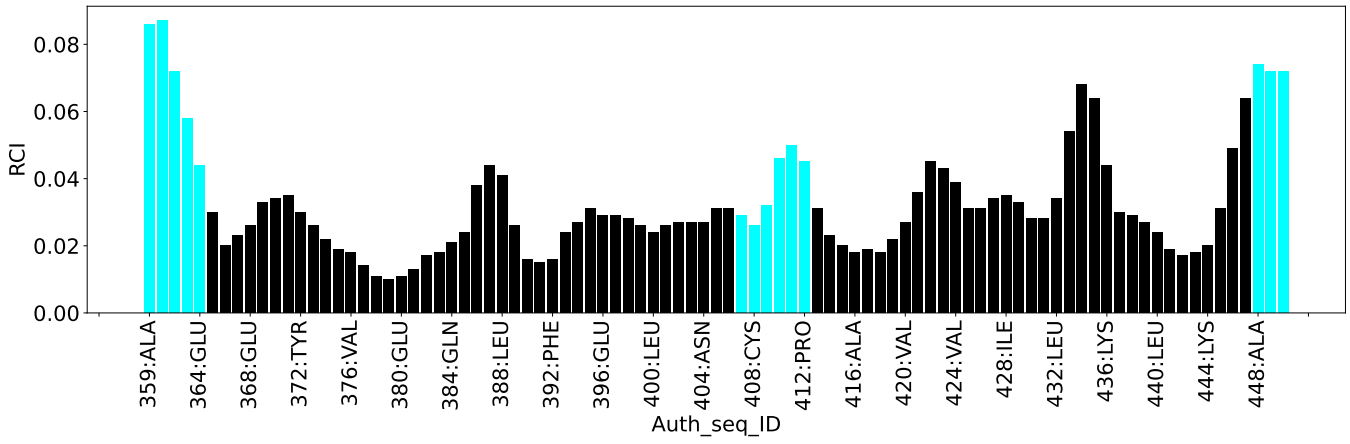
There are no statistically unusual chemical shifts.

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:



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	1616
Intra-residue (|i-j|=0)	271
Sequential (|i-j|=1)	443
Medium range (|i-j|>1 and |i-j|<5)	186
Long range (|i-j|≥5)	710
Inter-chain	0
Hydrogen bond restraints	0
Disulfide bond restraints	6
Total dihedral-angle restraints	0
Number of unmapped restraints	456
Number of restraints per residue	17.2
Number of long range restraints per residue[1]	7.6

[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.

Bins (Å)	Average number of violations per model	Max (Å)
0.1-0.2 (Small)	25.2	0.2
0.2-0.5 (Medium)	47.0	0.5
>0.5 (Large)	115.8	4.35

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)

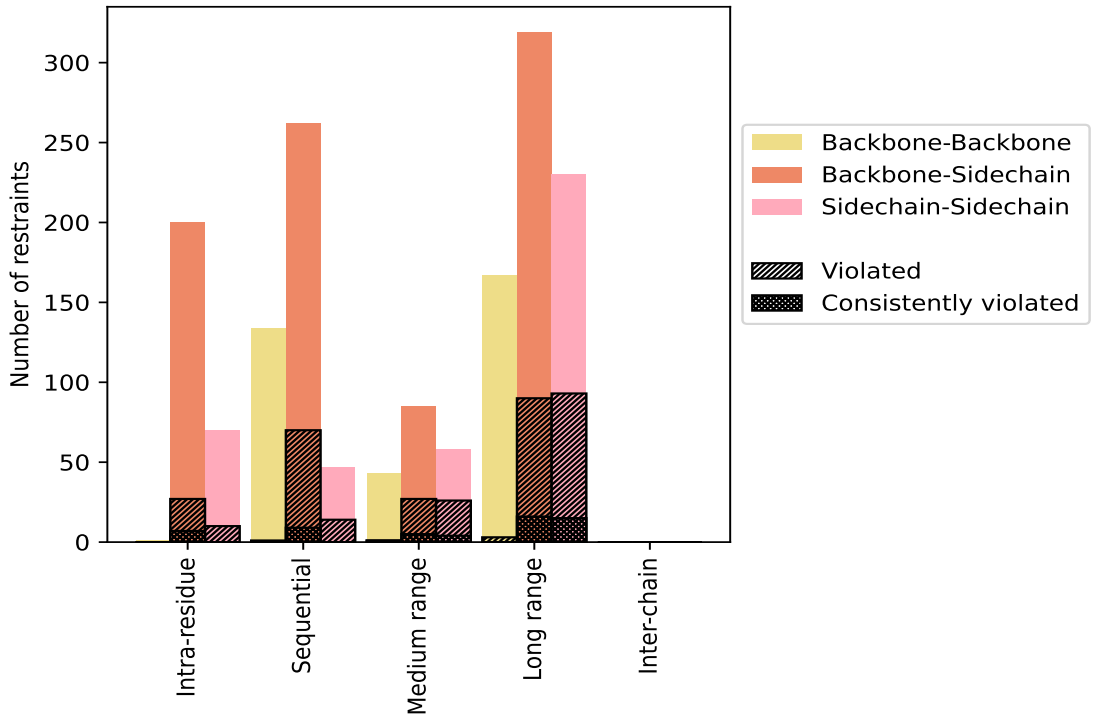
9.1 Summary of distance violations (i)

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)	271	16.8	37	13.7	2.3	7	2.6	0.4
Backbone-Backbone	1	0.1	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	200	12.4	27	13.5	1.7	7	3.5	0.4
Sidechain-Sidechain	70	4.3	10	14.3	0.6	0	0.0	0.0
Sequential (|i-j|=1)	443	27.4	85	19.2	5.3	9	2.0	0.6
Backbone-Backbone	134	8.3	1	0.7	0.1	0	0.0	0.0
Backbone-Sidechain	262	16.2	70	26.7	4.3	9	3.4	0.6
Sidechain-Sidechain	47	2.9	14	29.8	0.9	0	0.0	0.0
Medium range (|i-j|>1 & |i-j|<5)	186	11.5	54	29.0	3.3	10	5.4	0.6
Backbone-Backbone	43	2.7	1	2.3	0.1	1	2.3	0.1
Backbone-Sidechain	85	5.3	27	31.8	1.7	5	5.9	0.3
Sidechain-Sidechain	58	3.6	26	44.8	1.6	4	6.9	0.2
Long range (|i-j|≥5)	710	43.9	186	26.2	11.5	31	4.4	1.9
Backbone-Backbone	167	10.3	3	1.8	0.2	0	0.0	0.0
Backbone-Sidechain	319	19.7	90	28.2	5.6	16	5.0	1.0
Sidechain-Sidechain	224	13.9	93	41.5	5.8	15	6.7	0.9
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	6	0.4	0	0.0	0.0	0	0.0	0.0
Total	1616	100.0	362	22.4	22.4	57	3.5	3.5
Backbone-Backbone	345	21.3	5	1.4	0.3	1	0.3	0.1
Backbone-Sidechain	866	53.6	214	24.7	13.2	37	4.3	2.3
Sidechain-Sidechain	405	25.1	143	35.3	8.8	19	4.7	1.2

[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

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	19	33	28	86	0	166	0.81	2.49	0.53	0.74
2	19	40	34	106	0	199	0.72	2.49	0.52	0.57
3	20	45	31	105	0	201	0.77	2.91	0.55	0.65
4	21	43	41	102	0	207	0.81	3.19	0.57	0.69
5	24	44	29	95	0	192	0.76	2.42	0.58	0.56
6	19	38	25	97	0	179	0.74	2.28	0.5	0.61
7	19	34	30	106	0	189	0.76	3.26	0.54	0.64
8	19	39	25	93	0	176	0.79	3.12	0.56	0.66
9	19	39	32	99	0	189	0.88	3.36	0.62	0.71
10	20	38	27	107	0	192	0.83	3.86	0.63	0.7
11	25	31	25	115	0	196	0.82	3.9	0.66	0.66

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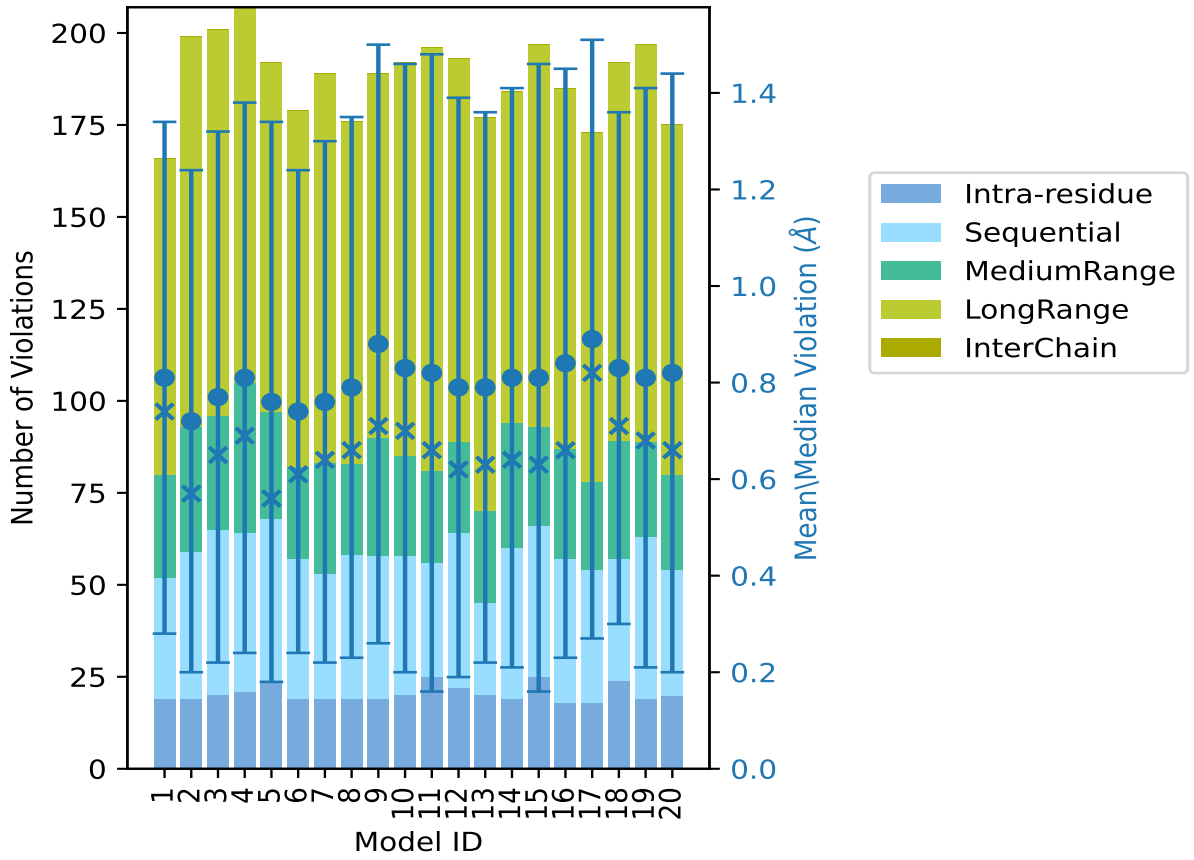
Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
12	22	42	25	104	0	193	0.79	3.63	0.6	0.62
13	20	25	25	107	0	177	0.79	2.47	0.57	0.63
14	19	41	34	90	0	184	0.81	3.44	0.6	0.64
15	25	41	27	104	0	197	0.81	4.35	0.65	0.63
16	18	39	30	98	0	185	0.84	4.27	0.61	0.66
17	18	36	24	95	0	173	0.89	3.18	0.62	0.82
18	24	33	32	103	0	192	0.83	2.23	0.53	0.71
19	19	44	26	108	0	197	0.81	3.52	0.6	0.68
20	20	34	26	95	0	175	0.82	3.8	0.62	0.66

[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



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

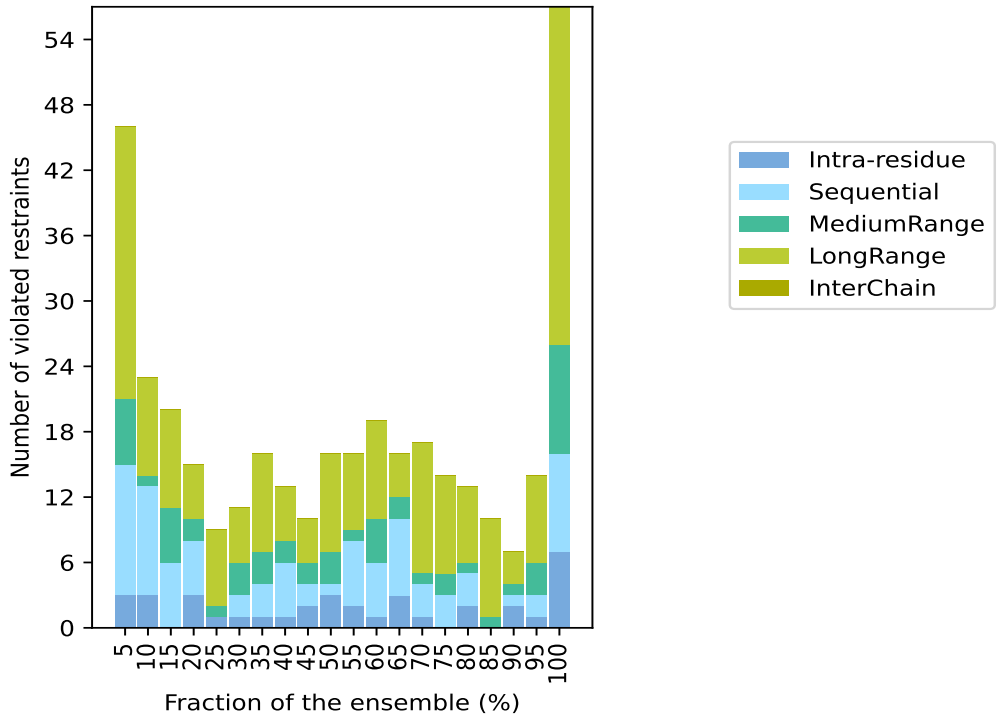
9.3 Distance violation statistics for the ensemble (i)

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, 1248(IR:234, SQ:358, MR:132, LR:524, 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]	%
3	12	6	25	0	46	1	5.0
3	10	1	9	0	23	2	10.0
0	6	5	9	0	20	3	15.0
3	5	2	5	0	15	4	20.0
1	0	1	7	0	9	5	25.0
1	2	3	5	0	11	6	30.0
1	3	3	9	0	16	7	35.0
1	5	2	5	0	13	8	40.0
2	2	2	4	0	10	9	45.0
3	1	3	9	0	16	10	50.0
2	6	1	7	0	16	11	55.0
1	5	4	9	0	19	12	60.0
3	7	2	4	0	16	13	65.0
1	3	1	12	0	17	14	70.0
0	3	2	9	0	14	15	75.0
2	3	1	7	0	13	16	80.0
0	0	1	9	0	10	17	85.0
2	1	1	3	0	7	18	90.0
1	2	3	8	0	14	19	95.0
7	9	10	31	0	57	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

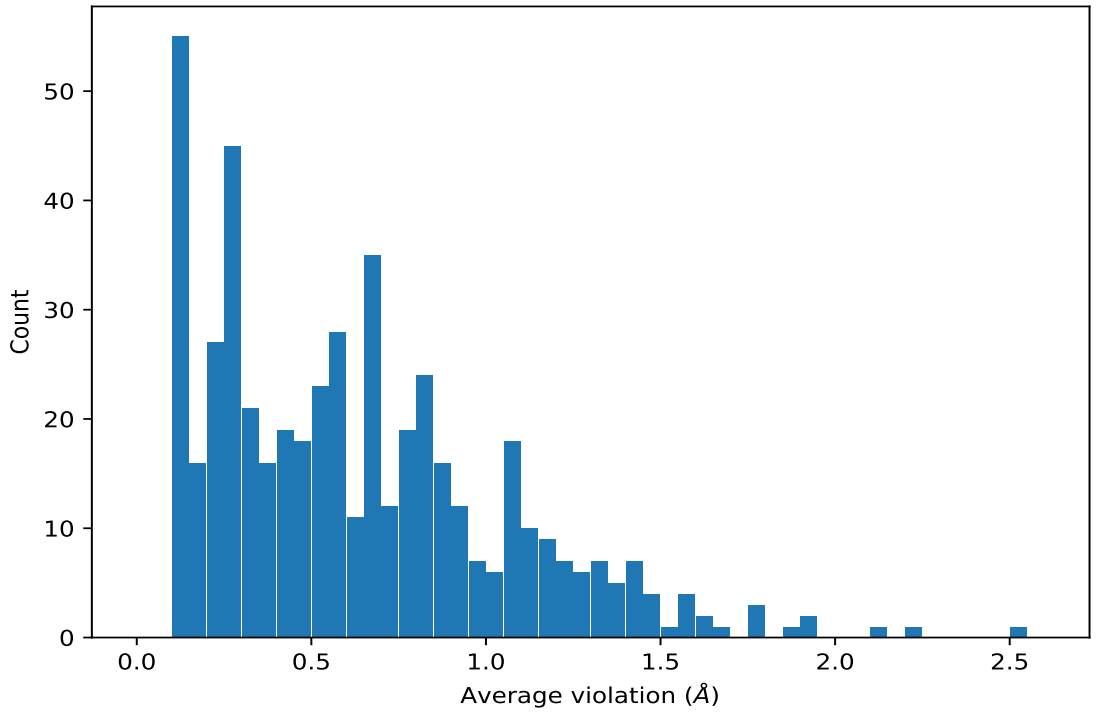
9.3.1 Bar graph : Distance violation statistics for the ensemble



9.4 Most violated distance restraints in the ensemble

9.4.1 Histogram : Distribution of mean distance violations

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

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.

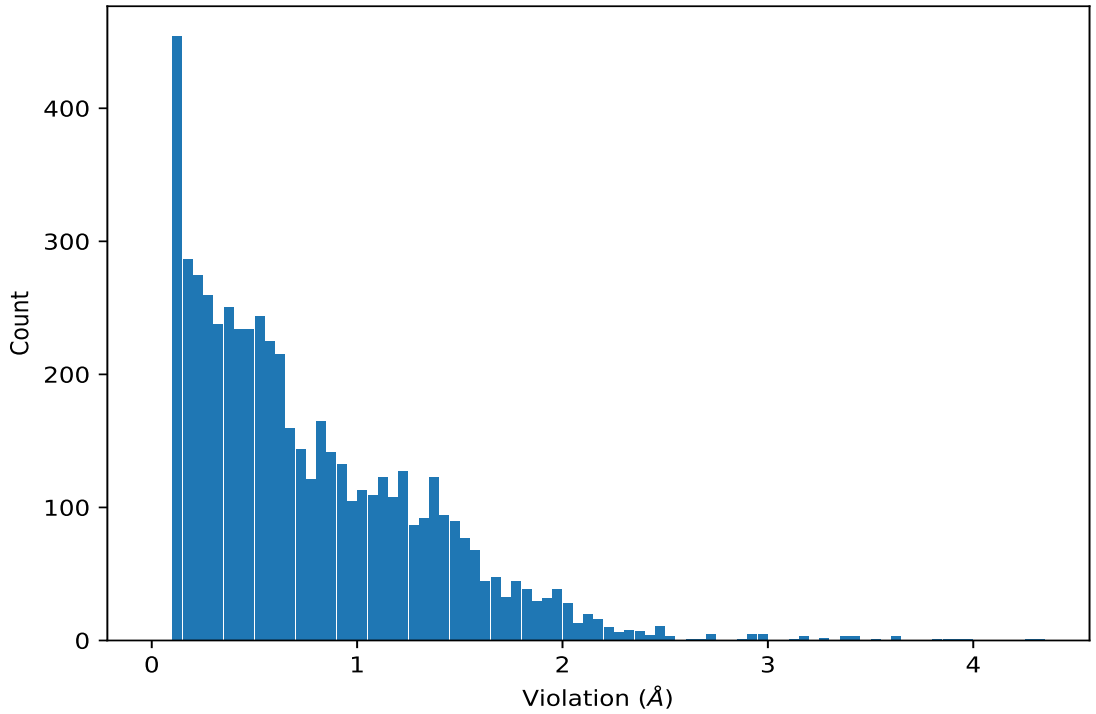
Key	Atom-1	Atom-2	Models[1]	Mean (Å)	SD[1] (Å)	Median (Å)
(1,1059)	1:A:417:ILE:HG23	1:A:419:THR:HG23	20	2.54	1.0	2.6
(1,379)	1:A:376:VAL:HG13	1:A:382:VAL:HG21	20	2.22	0.66	2.35
(1,225)	1:A:369:ILE:HG23	1:A:428:ILE:HG23	20	1.9	0.87	2.22
(1,1295)	1:A:428:ILE:HG23	1:A:431:VAL:HG13	20	1.76	0.47	1.87
(1,1295)	1:A:428:ILE:HG23	1:A:431:VAL:HG21	20	1.76	0.47	1.87
(1,59)	1:A:365:THR:HG23	1:A:376:VAL:HB	20	1.75	0.57	2.03
(1,206)	1:A:369:ILE:HD11	1:A:374:TYR:HA	20	1.68	0.54	1.56
(1,855)	1:A:400:LEU:HD13	1:A:418:VAL:HG21	20	1.64	0.56	1.82
(1,855)	1:A:400:LEU:HD21	1:A:418:VAL:HG21	20	1.64	0.56	1.82
(1,222)	1:A:369:ILE:HG23	1:A:372:TYR:H	20	1.57	0.27	1.65
(1,1366)	1:A:431:VAL:HG13	1:A:441:ILE:HG23	20	1.56	0.58	1.42
(1,1366)	1:A:431:VAL:HG21	1:A:441:ILE:HG23	20	1.56	0.58	1.42
(1,526)	1:A:382:VAL:HG21	1:A:441:ILE:HD11	20	1.54	1.04	1.54

[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)
(1,1059)	1:A:417:ILE:HG23	1:A:419:THR:HG23	15	4.35
(1,1059)	1:A:417:ILE:HG23	1:A:419:THR:HG23	16	4.27
(1,527)	1:A:382:VAL:HG21	1:A:441:ILE:HG23	15	3.98
(1,225)	1:A:369:ILE:HG23	1:A:428:ILE:HG23	11	3.9
(1,527)	1:A:382:VAL:HG21	1:A:441:ILE:HG23	10	3.86
(1,527)	1:A:382:VAL:HG21	1:A:441:ILE:HG23	20	3.8
(1,526)	1:A:382:VAL:HG21	1:A:441:ILE:HD11	12	3.63
(1,630)	1:A:387:ILE:HG23	1:A:389:LEU:HD13	11	3.61
(1,630)	1:A:387:ILE:HG23	1:A:389:LEU:HD21	11	3.61
(1,1059)	1:A:417:ILE:HG23	1:A:419:THR:HG23	19	3.52
(1,225)	1:A:369:ILE:HG23	1:A:428:ILE:HG23	14	3.44

10 Dihedral-angle violation analysis (i)

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