Full wwPDB NMR Structure Validation Report (i)

Dec 24, 2024 – 01:47 PM EST

PDB ID	:	2KQT
BMRB ID	:	16612
Title	:	Solid-state NMR structure of the M2 transmembrane peptide of the influenza A virus in DMPC lipid bilayers bound to deuterated amantadine
Authors	:	Cady, S.D.; Schmidt-Rohr, K.; Wang, J.; Soto, C.S.; DeGrado, W.F.; Hong, M.
Deposited on	:	2009-11-18

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:

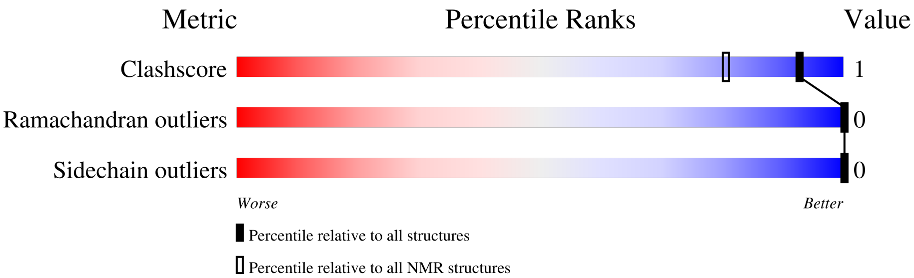
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
BMRB Restraints Analysis	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLID-STATE NMR

The overall completeness of chemical shifts assignment is 10%.

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	210492	14027
Ramachandran outliers	207382	12486
Sidechain outliers	206894	12463

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	25	96% •
1	B	25	96% •
1	C	25	96% •
1	D	25	96% •

2 Ensemble composition and analysis ⓘ

This entry contains 17 models. Model 13 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *fewest violations*.

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:22-A:46, B:22-B:46, C:22-C:46, D:22-D:46 (100)	0.10	13

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 and 1 single-model cluster was found.

Cluster number	Models
1	8, 10, 13, 14, 15, 16
2	1, 2, 3, 4
3	5, 6, 7
4	9, 12, 17
Single-model clusters	11

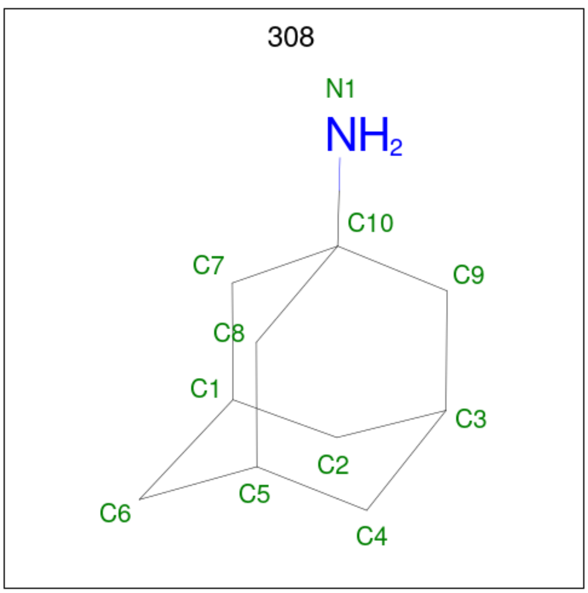
3 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 1641 atoms, of which 847 are hydrogens and 15 are deuteriums.

- Molecule 1 is a protein called M2 protein.

Mol	Chain	Residues	Atoms					Trace
1	A	25	Total 403	C 129	H 211	N 31	O 32	0
1	B	25	Total 403	C 129	H 211	N 31	O 32	0
1	C	25	Total 403	C 129	H 211	N 31	O 32	0
1	D	25	Total 403	C 129	H 211	N 31	O 32	0

- Molecule 2 is (3S,5S,7S)-tricyclo[3.3.1.1 3,7]decan-1-amine (three-letter code: 308) (formula: $C_{10}H_{17}N$).



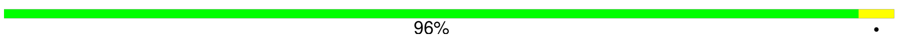
Mol	Chain	Residues	Atoms				
2	C	1	Total 29	C 10	D 15	H 3	N 1

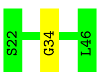
4 Residue-property plots (i)

4.1 Average score per residue in the NMR ensemble

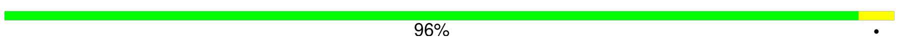
These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-coded according to the number of geometric quality criteria for 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.

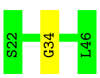
• Molecule 1: M2 protein

Chain A:


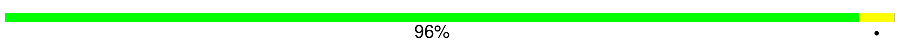


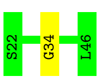
• Molecule 1: M2 protein

Chain B:


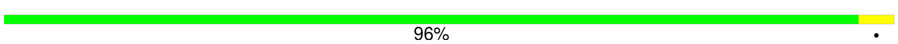


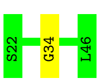
• Molecule 1: M2 protein

Chain C:




• Molecule 1: M2 protein

Chain D:




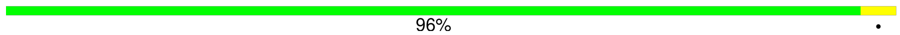
4.2 Scores per residue for each member of the ensemble

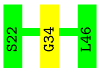
Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

- Molecule 1: M2 protein

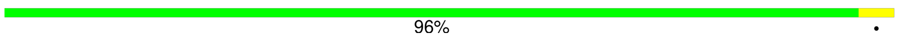
Chain A:

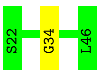




- Molecule 1: M2 protein

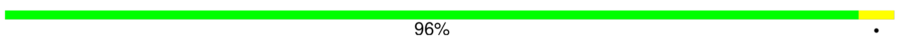
Chain B:

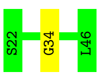




- Molecule 1: M2 protein

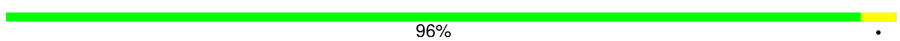
Chain C:

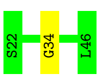




- Molecule 1: M2 protein

Chain D:

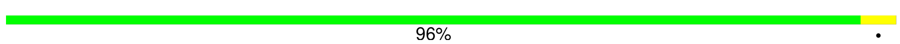


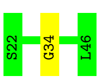


4.2.2 Score per residue for model 2

- Molecule 1: M2 protein

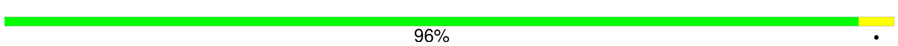
Chain A:

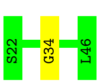




- Molecule 1: M2 protein

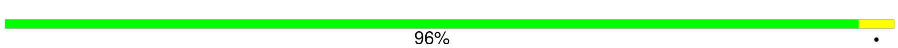
Chain B:

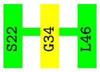




- Molecule 1: M2 protein

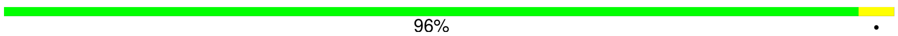
Chain C:

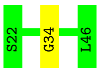




• Molecule 1: M2 protein

Chain D:

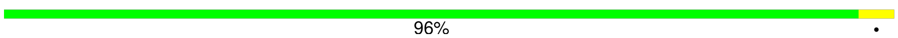


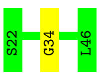


4.2.3 Score per residue for model 3

• Molecule 1: M2 protein

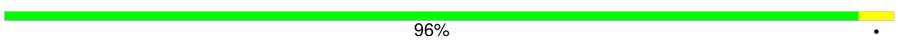
Chain A:

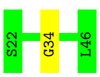




• Molecule 1: M2 protein

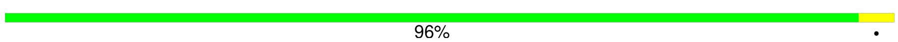
Chain B:

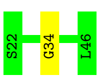




• Molecule 1: M2 protein

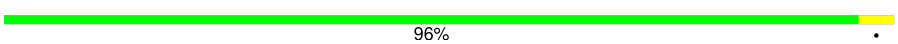
Chain C:

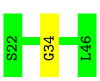




• Molecule 1: M2 protein

Chain D:

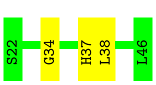




4.2.4 Score per residue for model 4

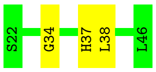
• Molecule 1: M2 protein

Chain A:



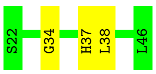
• Molecule 1: M2 protein

Chain B:



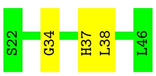
• Molecule 1: M2 protein

Chain C:



• Molecule 1: M2 protein

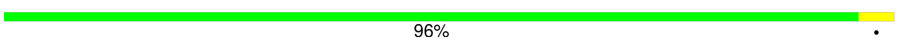
Chain D:

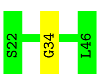


4.2.5 Score per residue for model 5

• Molecule 1: M2 protein

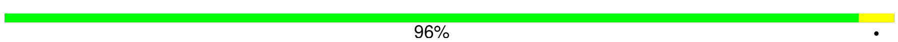
Chain A:

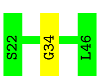




• Molecule 1: M2 protein

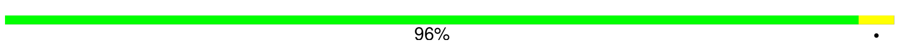
Chain B:

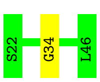




• Molecule 1: M2 protein

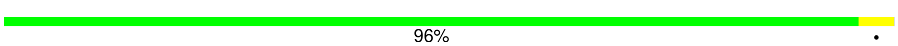
Chain C:

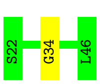




• Molecule 1: M2 protein

Chain D:

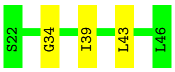




4.2.6 Score per residue for model 6

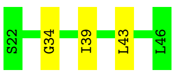
- Molecule 1: M2 protein

Chain A:



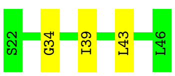
- Molecule 1: M2 protein

Chain B:



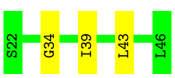
- Molecule 1: M2 protein

Chain C:



- Molecule 1: M2 protein

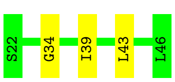
Chain D:



4.2.7 Score per residue for model 7

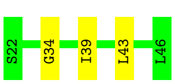
- Molecule 1: M2 protein

Chain A:



- Molecule 1: M2 protein

Chain B:



- Molecule 1: M2 protein

Chain C:

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain D: 88% 12%

S22 G34 I39 L43 L46

4.2.8 Score per residue for model 8

• Molecule 1: M2 protein

Chain A: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain B: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain C: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain D: 88% 12%

S22 G34 I39 L43 L46

4.2.9 Score per residue for model 9

• Molecule 1: M2 protein

Chain A: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain B: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain C: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain D: 88% 12%

S22 G34 I39 L43 L46

4.2.10 Score per residue for model 10

• Molecule 1: M2 protein

Chain A: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain B: 88% 12%

S22 G34 I39 L43 L46

• Molecule 1: M2 protein

Chain C: 88% 12%

S22 G34 I39 L43 L46

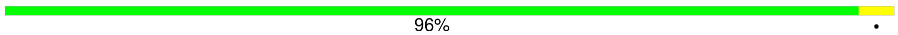
• Molecule 1: M2 protein

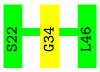
Chain D: 88% 12%

S22 G34 I39 L43 L46

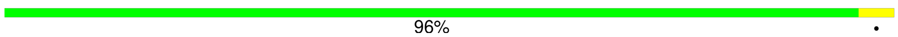
4.2.11 Score per residue for model 11

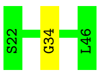
- Molecule 1: M2 protein

Chain A: 

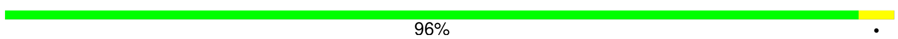


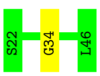
- Molecule 1: M2 protein

Chain B: 

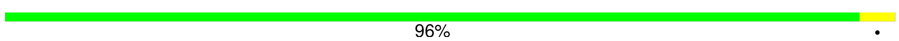


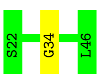
- Molecule 1: M2 protein

Chain C: 



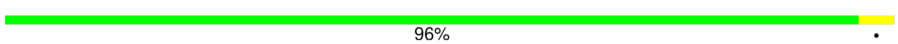
- Molecule 1: M2 protein

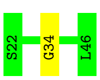
Chain D: 



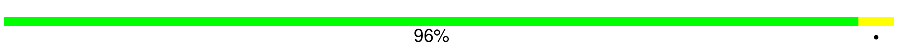
4.2.12 Score per residue for model 12

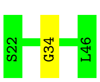
- Molecule 1: M2 protein

Chain A: 

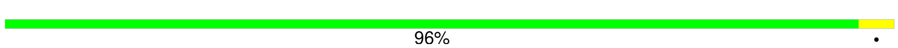


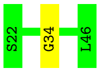
- Molecule 1: M2 protein

Chain B: 

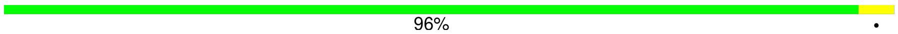


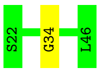
- Molecule 1: M2 protein

Chain C: 



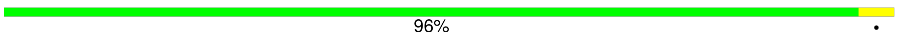
• Molecule 1: M2 protein

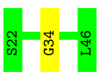
Chain D:




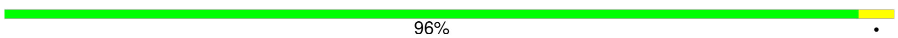
4.2.13 Score per residue for model 13 (medoid)

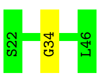
• Molecule 1: M2 protein

Chain A:


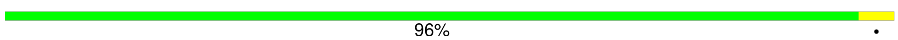


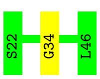
• Molecule 1: M2 protein

Chain B:


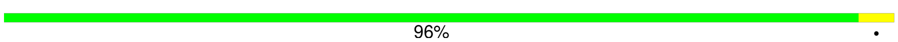


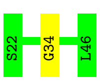
• Molecule 1: M2 protein

Chain C:




• Molecule 1: M2 protein

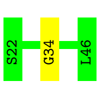
Chain D:




4.2.14 Score per residue for model 14

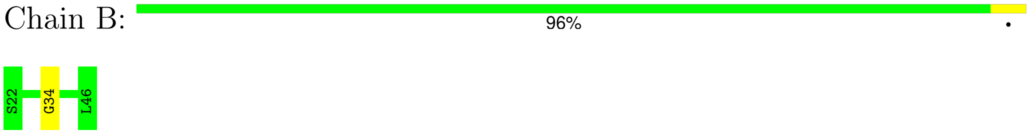
• Molecule 1: M2 protein

Chain A:



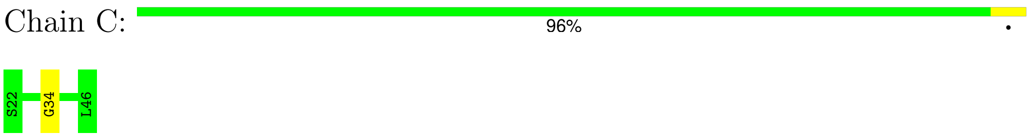
- Molecule 1: M2 protein

Chain B:



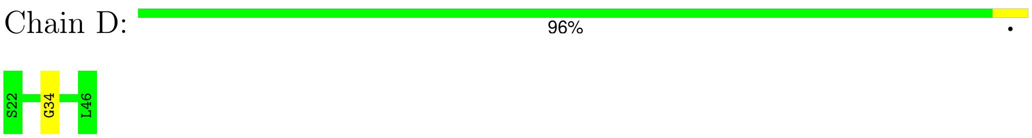
- Molecule 1: M2 protein

Chain C:



- Molecule 1: M2 protein

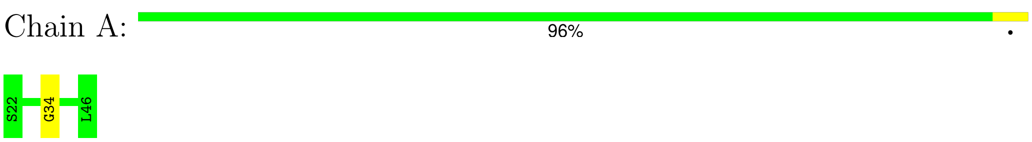
Chain D:



4.2.15 Score per residue for model 15

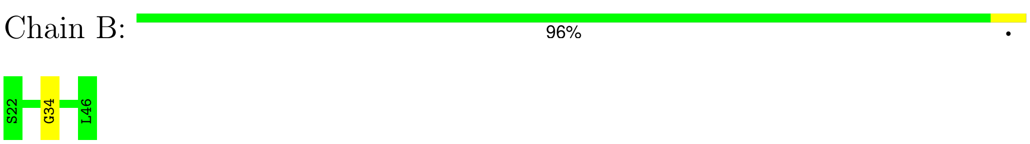
- Molecule 1: M2 protein

Chain A:



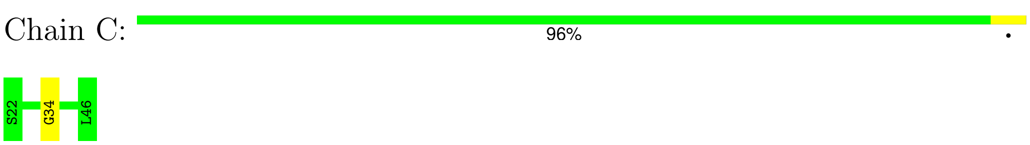
- Molecule 1: M2 protein

Chain B:



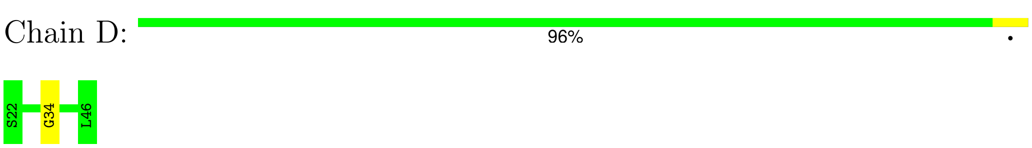
- Molecule 1: M2 protein

Chain C:



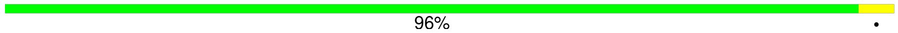
- Molecule 1: M2 protein

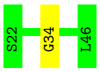
Chain D:



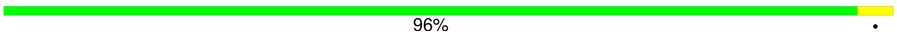
4.2.16 Score per residue for model 16

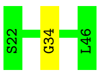
• Molecule 1: M2 protein

Chain A: 

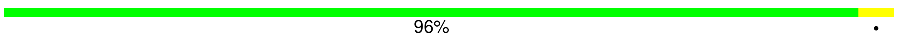


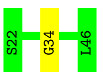
• Molecule 1: M2 protein

Chain B: 

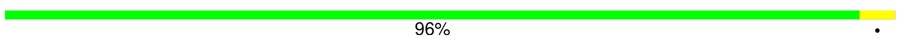


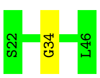
• Molecule 1: M2 protein

Chain C: 



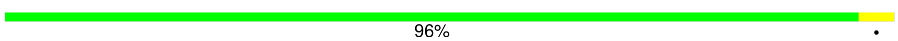
• Molecule 1: M2 protein

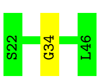
Chain D: 



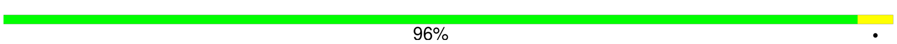
4.2.17 Score per residue for model 17

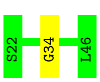
• Molecule 1: M2 protein

Chain A: 

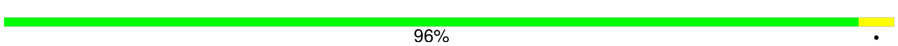


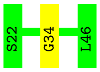
• Molecule 1: M2 protein

Chain B: 



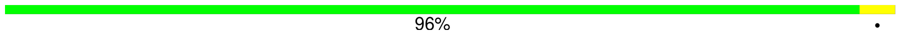
• Molecule 1: M2 protein

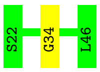
Chain C: 



• Molecule 1: M2 protein

Chain D:





5 Refinement protocol and experimental data overview (i)

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

Of the 24 calculated structures, 17 were deposited, based on the following criterion: *structures with the least restraint violations*.

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

Software name	Classification	Version
X-PLOR NIH, IN-HOUSE METHOD	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	144
Number of shifts mapped to atoms	144
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	10%

Note: This is a solid-state NMR structure, where hydrogen atoms are typically not assigned a chemical shift value, which may lead to lower completeness of assignment measure.

6 Model quality (i)

6.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 308

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	1.0±0.0
1	B	0.0±0.0	1.0±0.0
1	C	0.0±0.0	1.0±0.0
1	D	0.0±0.0	1.0±0.0
All	All	0	68

There are no bond-length outliers.

There are no bond-angle outliers.

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	34	GLY	Mainchain	17
1	B	34	GLY	Mainchain	17
1	C	34	GLY	Mainchain	17
1	D	34	GLY	Mainchain	17

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	192	211	211	1±1
1	B	192	211	211	1±1

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Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	C	192	211	211	1±1
1	D	192	211	211	1±1
All	All	13498	14399	14637	36

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:C:38:LEU:HD13	1:D:37:HIS:CG	0.47	2.45	4	1
1:B:39:ILE:HG22	1:B:43:LEU:CD1	0.46	2.41	6	4
1:C:39:ILE:HG22	1:C:43:LEU:CD1	0.46	2.41	6	4
1:B:38:LEU:HD13	1:C:37:HIS:CG	0.46	2.45	4	1
1:A:39:ILE:HG22	1:A:43:LEU:CD1	0.46	2.41	6	4
1:D:39:ILE:HG22	1:D:43:LEU:CD1	0.46	2.41	6	4
1:A:37:HIS:CG	1:D:38:LEU:HD13	0.46	2.45	4	1
1:A:38:LEU:HD13	1:B:37:HIS:CG	0.45	2.45	4	1
1:A:39:ILE:O	1:A:43:LEU:HG	0.42	2.15	6	4
1:B:39:ILE:O	1:B:43:LEU:HG	0.42	2.15	6	4
1:D:39:ILE:O	1:D:43:LEU:HG	0.42	2.15	6	4
1:C:39:ILE:O	1:C:43:LEU:HG	0.41	2.15	6	4

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	23/25 (92%)	22±0 (96±0%)	1±0 (4±0%)	0±0 (0±0%)	100	100
1	B	23/25 (92%)	22±0 (96±0%)	1±0 (4±0%)	0±0 (0±0%)	100	100
1	C	23/25 (92%)	22±0 (96±0%)	1±0 (4±0%)	0±0 (0±0%)	100	100
1	D	23/25 (92%)	22±0 (96±0%)	1±0 (4±0%)	0±0 (0±0%)	100	100
All	All	1564/1700 (92%)	1496 (96%)	68 (4%)	0 (0%)	100	100

There are no Ramachandran outliers.

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	22/22 (100%)	22±0 (100±0%)	0±0 (0±0%)	100	100
1	B	22/22 (100%)	22±0 (100±0%)	0±0 (0±0%)	100	100
1	C	22/22 (100%)	22±0 (100±0%)	0±0 (0±0%)	100	100
1	D	22/22 (100%)	22±0 (100±0%)	0±0 (0±0%)	100	100
All	All	1496/1496 (100%)	1496 (100%)	0 (0%)	100	100

There are no protein residues with a non-rotameric sidechain to report.

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 oligosaccharides in this entry.

6.6 Ligand geometry (i)

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	308	C	1	-	13,13,13	1.96±0.00	4±0 (30±0%)

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	308	C	1	-	18,21,21	1.31±0.00	4±0 (22±0%)

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	308	C	1	-	-	-	0±0,4,3,3

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	C	1	308	C8-C5	3.97	1.43	1.54	1	17
2	C	1	308	C9-C3	3.25	1.45	1.54	1	17
2	C	1	308	C4-C3	3.16	1.44	1.52	1	17
2	C	1	308	C7-C1	2.10	1.48	1.54	1	17

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
2	C	1	308	C7-C10-N1	2.33	114.16	109.70	1	17
2	C	1	308	C4-C5-C6	2.26	105.39	109.69	1	17
2	C	1	308	C4-C3-C9	2.13	113.73	109.05	1	17
2	C	1	308	C2-C1-C7	2.04	113.53	109.05	1	17

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 (i)

The completeness of assignment taking into account all chemical shift lists is 10% for the well-defined parts and 10% 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 (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	144
Number of shifts mapped to atoms	144
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	28	-1.00 ± 1.59	None needed (imprecise)
$^{13}C_{\beta}$	24	—	None (insufficient data)
$^{13}C'$	28	-0.57 ± 0.71	None needed (imprecise)
^{15}N	28	-1.15 ± 0.72	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 10%, i.e. 144 atoms were assigned a chemical shift out of a possible 1456. 0 out of 32 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	84/496 (17%)	0/200 (0%)	56/200 (28%)	28/96 (29%)
Sidechain	60/884 (7%)	0/600 (0%)	60/272 (22%)	0/12 (0%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	0/76 (0%)	0/40 (0%)	0/28 (0%)	0/8 (0%)
Overall	144/1456 (10%)	0/840 (0%)	116/500 (23%)	28/116 (24%)

Note: This is a solid-state NMR structure, where hydrogen atoms are typically not assigned a chemical shift value, which may lead to lower completeness of assignment measure.

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 10%, i.e. 144 atoms were assigned a chemical shift out of a possible 1456. 0 out of 32 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	84/496 (17%)	0/200 (0%)	56/200 (28%)	28/96 (29%)
Sidechain	60/884 (7%)	0/600 (0%)	60/272 (22%)	0/12 (0%)
Aromatic	0/76 (0%)	0/40 (0%)	0/28 (0%)	0/8 (0%)
Overall	144/1456 (10%)	0/840 (0%)	116/500 (23%)	28/116 (24%)

Note: This is a solid-state NMR structure, where hydrogen atoms are typically not assigned a chemical shift value, which may lead to lower completeness of assignment measure.

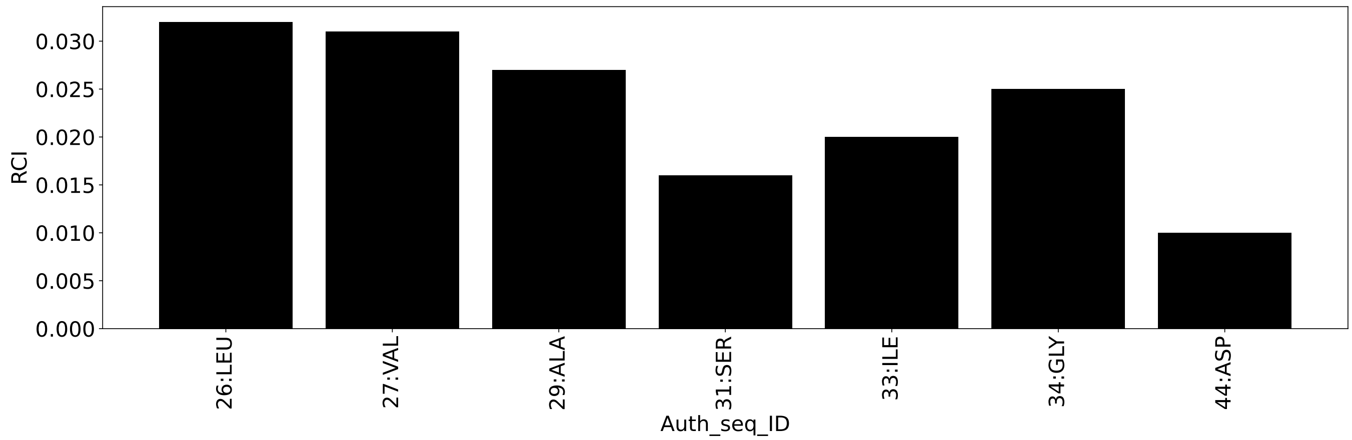
7.1.4 Statistically unusual chemical shifts (i)

There are no statistically unusual chemical shifts.

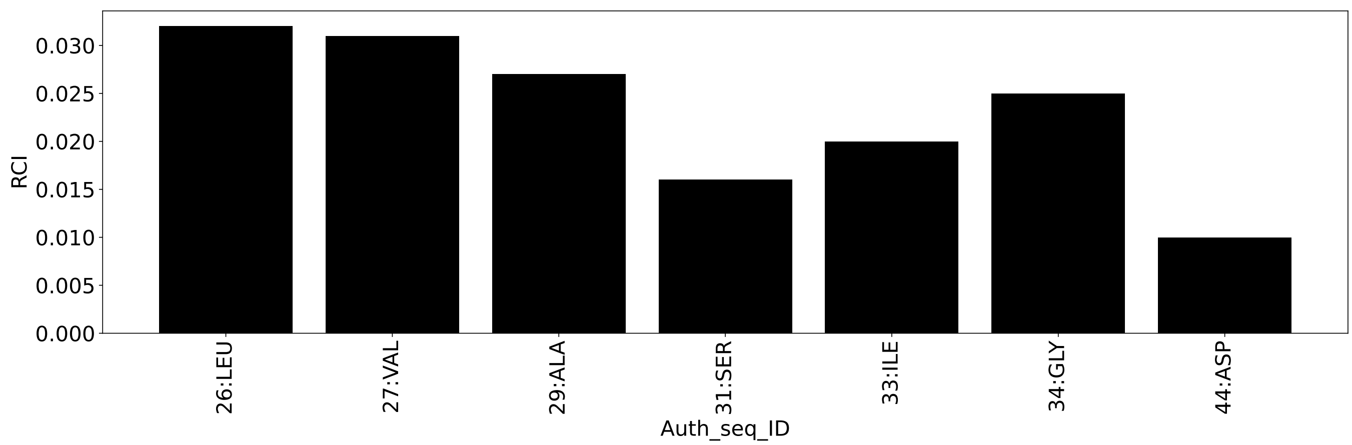
7.1.5 Random Coil Index (RCI) plots (i)

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.

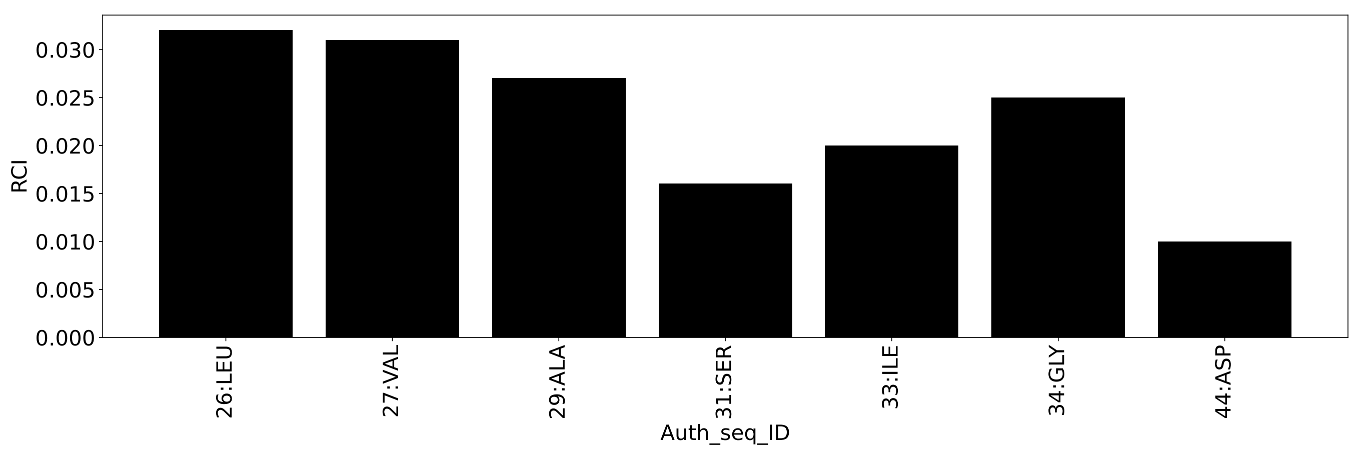
Random coil index (RCI) for chain A:



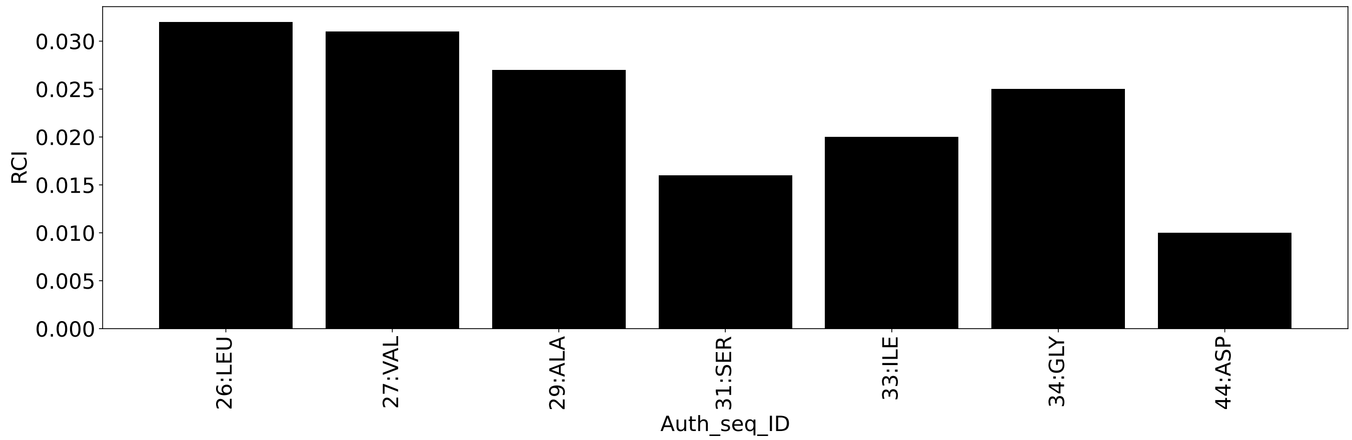
Random coil index (RCI) for chain B:



Random coil index (RCI) for chain C:



Random coil index (RCI) for chain D:


0.030
0.025
0.020
0.015
0.010
0.005
0.000
RCI
26:LEU
27:VAL
29:ALA
31:SER
33:ILE
34:GLY
44:ASP
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	12
Intra-residue (|i-j|=0)	0
Sequential (|i-j|=1)	0
Medium range (|i-j|>1 and |i-j|<5)	8
Long range (|i-j|≥5)	4
Inter-chain	0
Hydrogen bond restraints	0
Disulfide bond restraints	0
Total dihedral-angle restraints	2
Number of unmapped restraints	0
Number of restraints per residue	0.1
Number of long range restraints per residue[1]	0.0

[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)	0.5	0.18
0.2-0.5 (Medium)	3.5	0.31
>0.5 (Large)	4.0	0.94

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

Dihedral-angle violations less than 1° are not included in the calculation.

Bins (°)	Average number of violations per model	Max (°)
1.0-10.0 (Small)	1.0	4.93
10.0-20.0 (Medium)	1.0	13.17
>20.0 (Large)	None	None

9 Distance violation analysis (i)

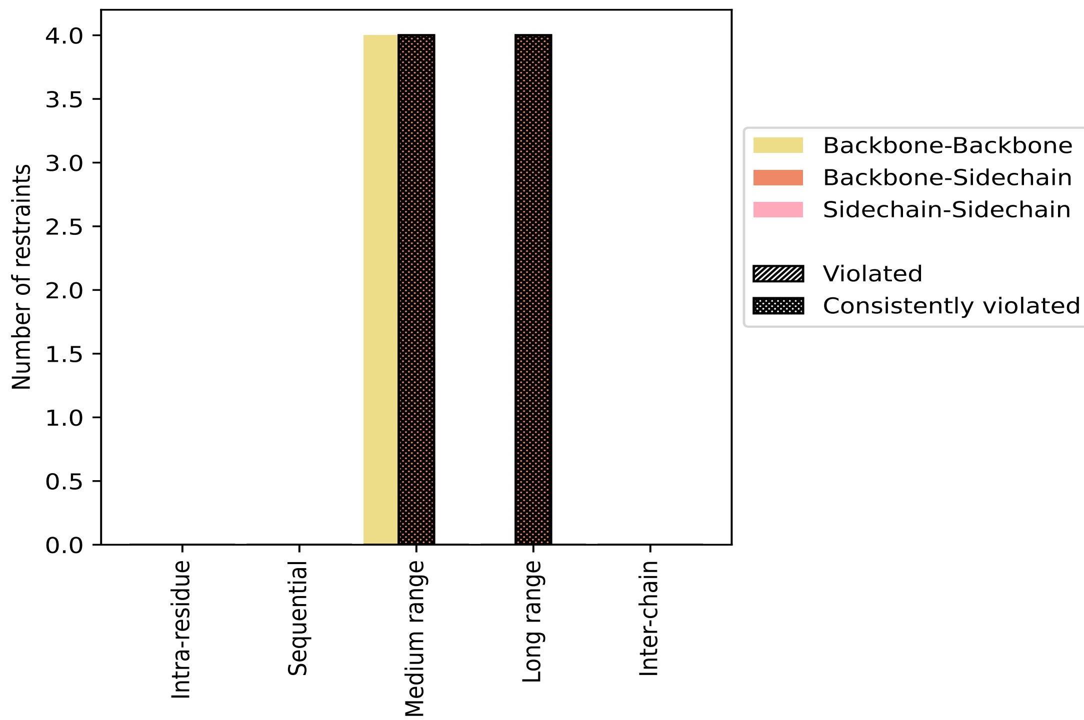
9.1 Summary of distance violations (i)

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)	8	66.7	4	50.0	33.3	4	50.0	33.3
Backbone-Backbone	4	33.3	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	4	33.3	4	100.0	33.3	4	100.0	33.3
Sidechain-Sidechain	0	0.0	0	0.0	0.0	0	0.0	0.0
Long range (|i-j|≥5)	4	33.3	4	100.0	33.3	4	100.0	33.3
Backbone-Backbone	0	0.0	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	4	33.3	4	100.0	33.3	4	100.0	33.3
Sidechain-Sidechain	0	0.0	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	12	100.0	8	66.7	66.7	8	66.7	66.7
Backbone-Backbone	4	33.3	0	0.0	0.0	0	0.0	0.0
Backbone-Sidechain	8	66.7	8	100.0	66.7	8	100.0	66.7
Sidechain-Sidechain	0	0.0	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 (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	4	4	0	8	0.5	0.8	0.3	0.5
2	0	0	4	4	0	8	0.51	0.81	0.3	0.51
3	0	0	4	4	0	8	0.48	0.79	0.3	0.48
4	0	0	4	4	0	8	0.53	0.85	0.32	0.53
5	0	0	4	4	0	8	0.54	0.86	0.32	0.54
6	0	0	4	4	0	8	0.5	0.82	0.32	0.5
7	0	0	4	4	0	8	0.55	0.87	0.32	0.55
8	0	0	4	4	0	8	0.57	0.88	0.31	0.57
9	0	0	4	4	0	8	0.55	0.88	0.33	0.55
10	0	0	4	4	0	8	0.52	0.82	0.3	0.52

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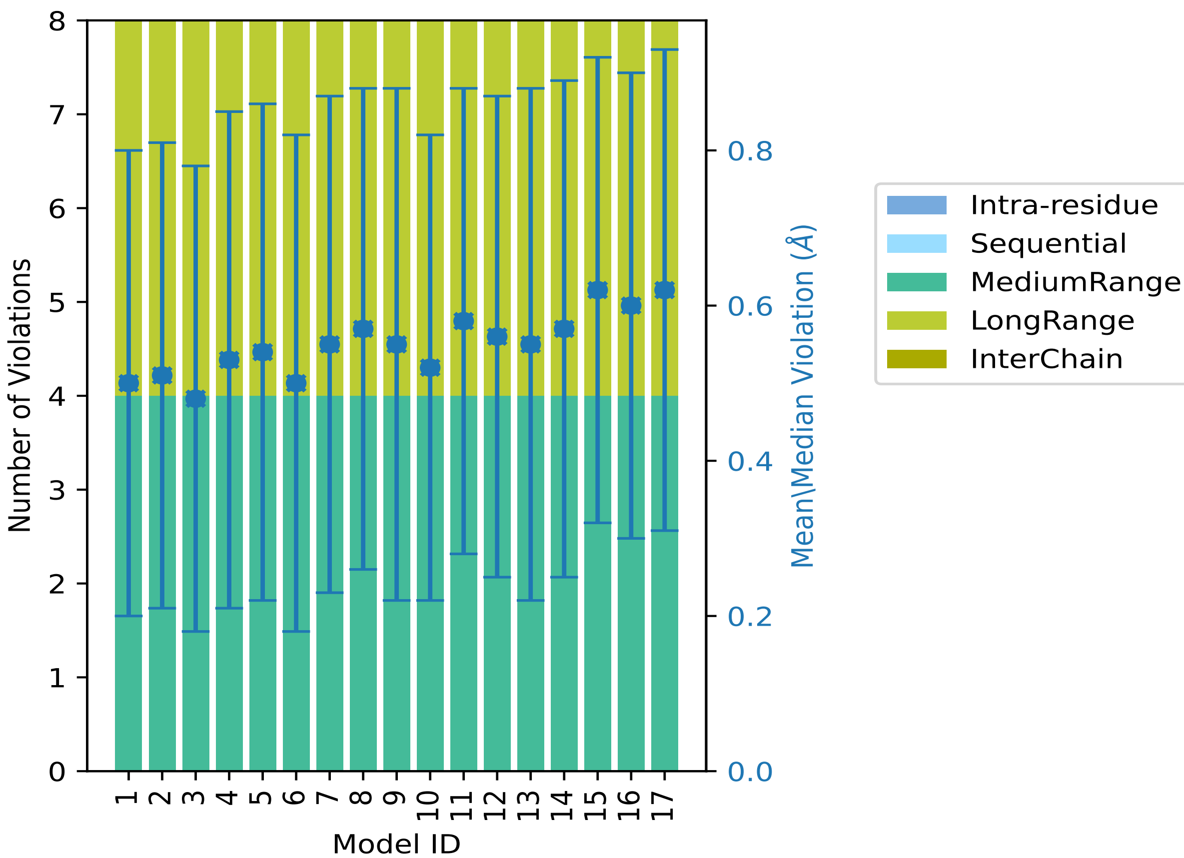
Model ID	Number of violations						Mean (Å)	Max (Å)	SD[6] (Å)	Median (Å)
	IR[1]	SQ[2]	MR[3]	LR[4]	IC[5]	Total				
11	0	0	4	4	0	8	0.58	0.88	0.3	0.58
12	0	0	4	4	0	8	0.56	0.87	0.31	0.56
13	0	0	4	4	0	8	0.55	0.88	0.33	0.55
14	0	0	4	4	0	8	0.57	0.89	0.32	0.57
15	0	0	4	4	0	8	0.62	0.92	0.3	0.62
16	0	0	4	4	0	8	0.6	0.89	0.3	0.6
17	0	0	4	4	0	8	0.62	0.94	0.31	0.62

[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

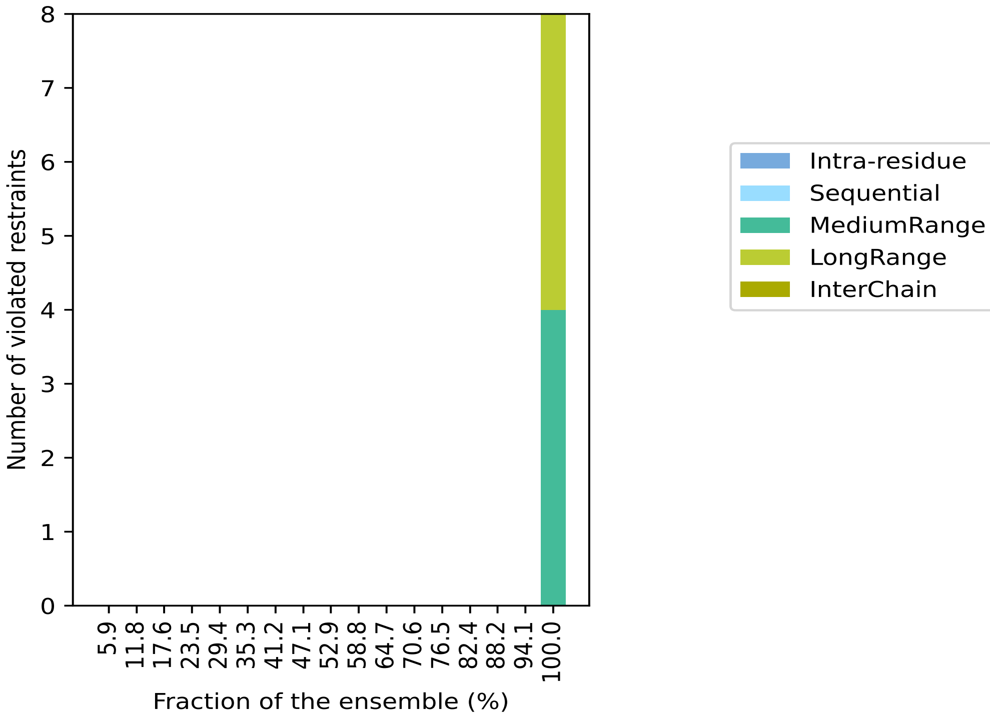
9.3 Distance violation statistics for the ensemble (i)

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, 4(IR:0, SQ:0, MR:4, LR:0, 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]	%
0	0	0	0	0	0	1	5.9
0	0	0	0	0	0	2	11.8
0	0	0	0	0	0	3	17.6
0	0	0	0	0	0	4	23.5
0	0	0	0	0	0	5	29.4
0	0	0	0	0	0	6	35.3
0	0	0	0	0	0	7	41.2
0	0	0	0	0	0	8	47.1
0	0	0	0	0	0	9	52.9
0	0	0	0	0	0	10	58.8
0	0	0	0	0	0	11	64.7
0	0	0	0	0	0	12	70.6
0	0	0	0	0	0	13	76.5
0	0	0	0	0	0	14	82.4
0	0	0	0	0	0	15	88.2
0	0	0	0	0	0	16	94.1
0	0	4	4	0	8	17	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

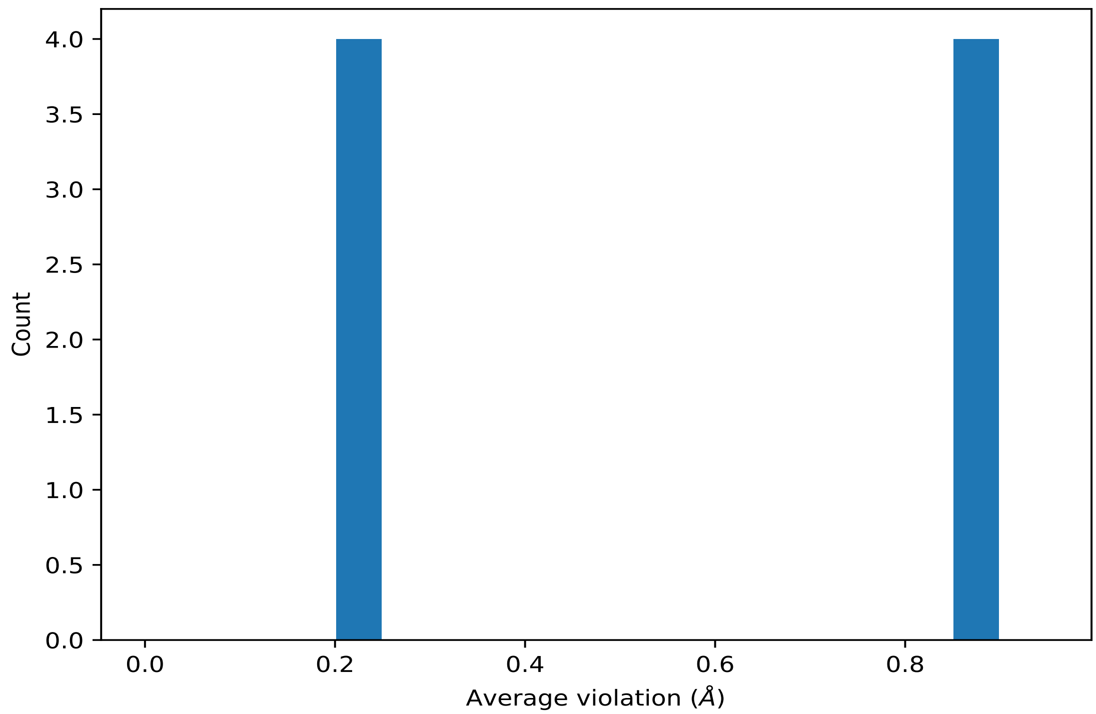
9.3.1 Bar graph : Distance violation statistics for the ensemble (i)



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 theviolation for each restraint sorted by number of violated models and the mean 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.

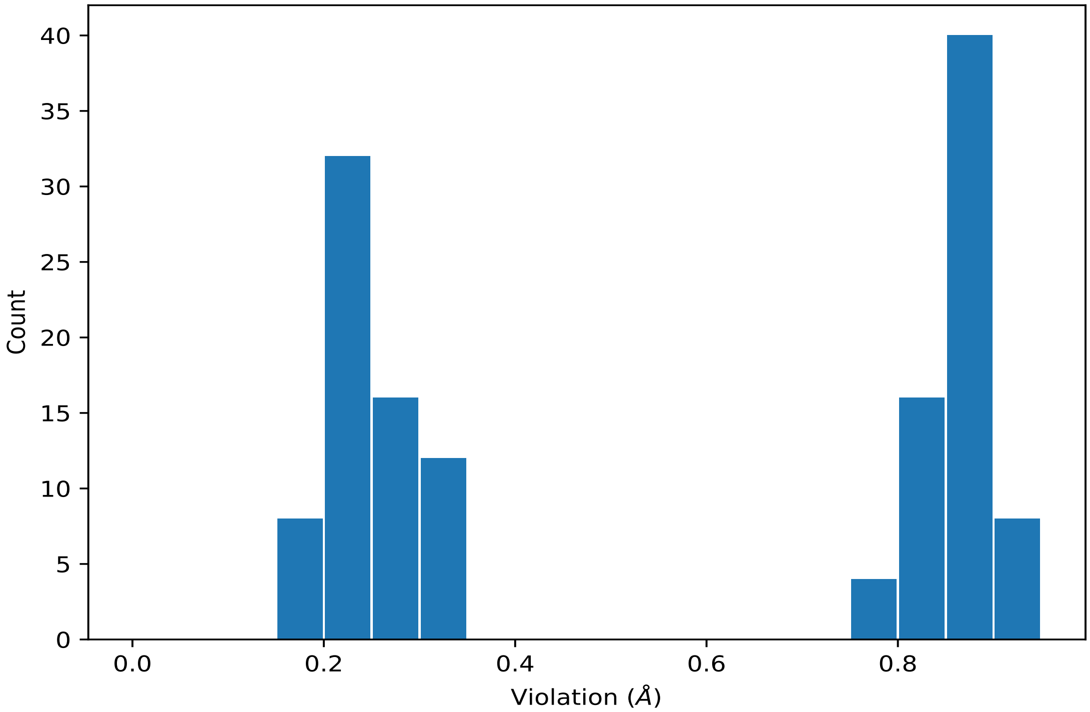
Key	Atom-1	Atom-2	Models[1]	Mean (Å)	SD[1] (Å)	Median (Å)
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.86	0.04	0.87
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.86	0.04	0.87
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.86	0.04	0.87
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.86	0.04	0.87
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.24	0.04	0.23
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.24	0.04	0.23
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.24	0.04	0.23
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.24	0.04	0.23

[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 lists the absolute value of the violation for each restraint in the ensemble sorted by its 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)
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.94
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.94
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.94
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	17	0.94
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	15	0.92
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	15	0.92
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	15	0.92
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	15	0.92
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	14	0.89
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	16	0.89

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	14	0.89
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	16	0.89
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	14	0.89
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	16	0.89
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	14	0.89
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	16	0.89
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	8	0.88
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	9	0.88
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	11	0.88
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	13	0.88
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	8	0.88
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	9	0.88
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	11	0.88
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	13	0.88
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	8	0.88
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	9	0.88
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	11	0.88
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	13	0.88
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	8	0.88
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	9	0.88
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	11	0.88
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	13	0.88
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	7	0.87
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	12	0.87
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	7	0.87
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	12	0.87
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	7	0.87
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	12	0.87
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	7	0.87
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	12	0.87
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	5	0.86
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	5	0.86
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	5	0.86
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	5	0.86
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	4	0.85
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	4	0.85
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	4	0.85
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	4	0.85
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	6	0.82
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	10	0.82
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	6	0.82
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	10	0.82

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	6	0.82
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	10	0.82
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	6	0.82
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	10	0.82
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	2	0.81
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	2	0.81
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	2	0.81
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	2	0.81
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	1	0.8
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	1	0.8
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	1	0.8
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	1	0.8
(1,10)	1:27:C:VAL:CG1	1:31:C:SER:CA	3	0.79
(1,7)	1:27:C:VAL:CG1	1:31:C:SER:CA	3	0.79
(1,4)	1:27:C:VAL:CG1	1:31:C:SER:CA	3	0.79
(1,1)	1:27:C:VAL:CG1	1:31:C:SER:CA	3	0.79
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	15	0.31
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.31
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	15	0.31
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.31
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	15	0.31
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.31
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	15	0.31
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	17	0.31
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	16	0.3
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	16	0.3
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	16	0.3
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	16	0.3
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	11	0.29
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	11	0.29
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	11	0.29
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	11	0.29
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	8	0.26
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	14	0.26
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	8	0.26
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	14	0.26
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	8	0.26
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	14	0.26
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	8	0.26
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	14	0.26
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	12	0.25
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	12	0.25

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Key	Atom-1	Atom-2	Model ID	Violation (Å)
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	12	0.25
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	12	0.25
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	7	0.24
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	7	0.24
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	7	0.24
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	7	0.24
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	10	0.23
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	10	0.23
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	10	0.23
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	10	0.23
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	5	0.22
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	9	0.22
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	13	0.22
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	5	0.22
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	9	0.22
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	13	0.22
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	5	0.22
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	9	0.22
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	13	0.22
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	5	0.22
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	9	0.22
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	13	0.22
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	1	0.21
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	2	0.21
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	4	0.21
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	1	0.21
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	2	0.21
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	4	0.21
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	1	0.21
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	2	0.21
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	4	0.21
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	1	0.21
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	2	0.21
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	4	0.21
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	3	0.18
(1,12)	1:27:C:VAL:CG1	1:34:C:GLY:CA	6	0.18
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	3	0.18
(1,9)	1:27:C:VAL:CG1	1:34:C:GLY:CA	6	0.18
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	3	0.18
(1,6)	1:27:C:VAL:CG1	1:34:C:GLY:CA	6	0.18
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	3	0.18
(1,3)	1:27:C:VAL:CG1	1:34:C:GLY:CA	6	0.18

10 Dihedral-angle violation analysis (i)

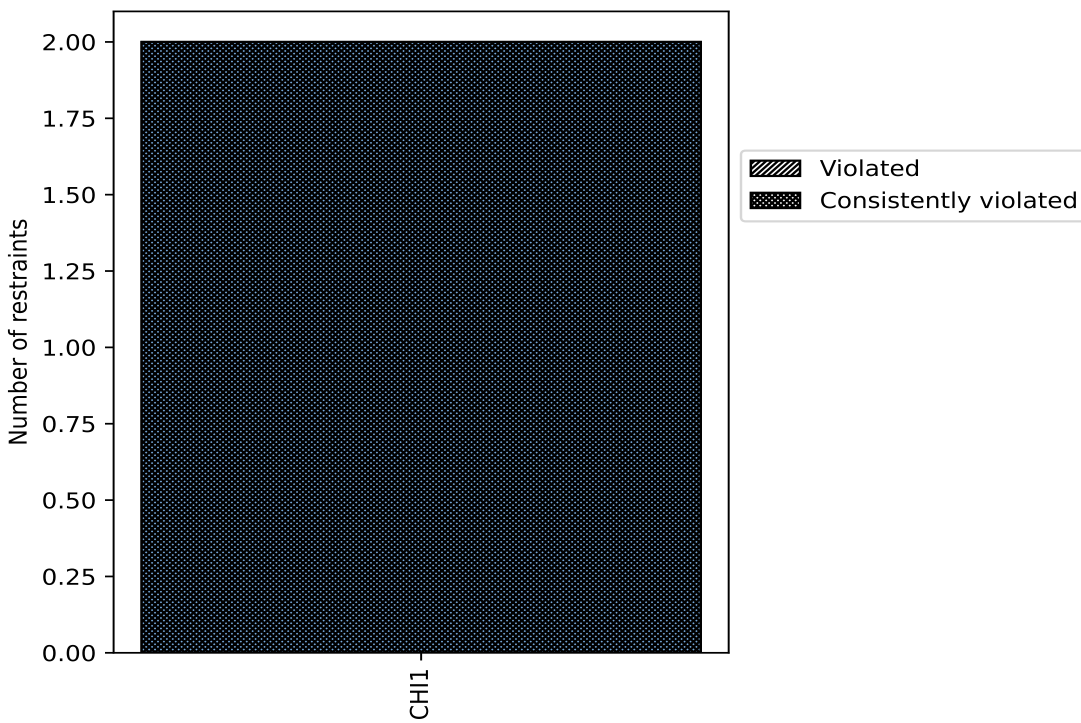
10.1 Summary of dihedral-angle violations (i)

The following table provides the summary of dihedral-angle violations in different dihedral-angle types. Violations less than 1° are not included in the calculation.

Angle type	Count	%[1]	Violated[3]			Consistently Violated[4]		
			Count	%[2]	%[1]	Count	%[2]	%[1]
CHI1	2	100.0	2	100.0	100.0	2	100.0	100.0
Total	2	100.0	2	100.0	100.0	2	100.0	100.0

[1] percentage calculated with respect to total number of dihedral-angle restraints, [2] percentage calculated with respect to number of restraints in a particular dihedral-angle type, [3] violated in at least one model, [4] violated in all the models

10.1.1 Bar chart : Distribution of dihedral-angles and violations (i)



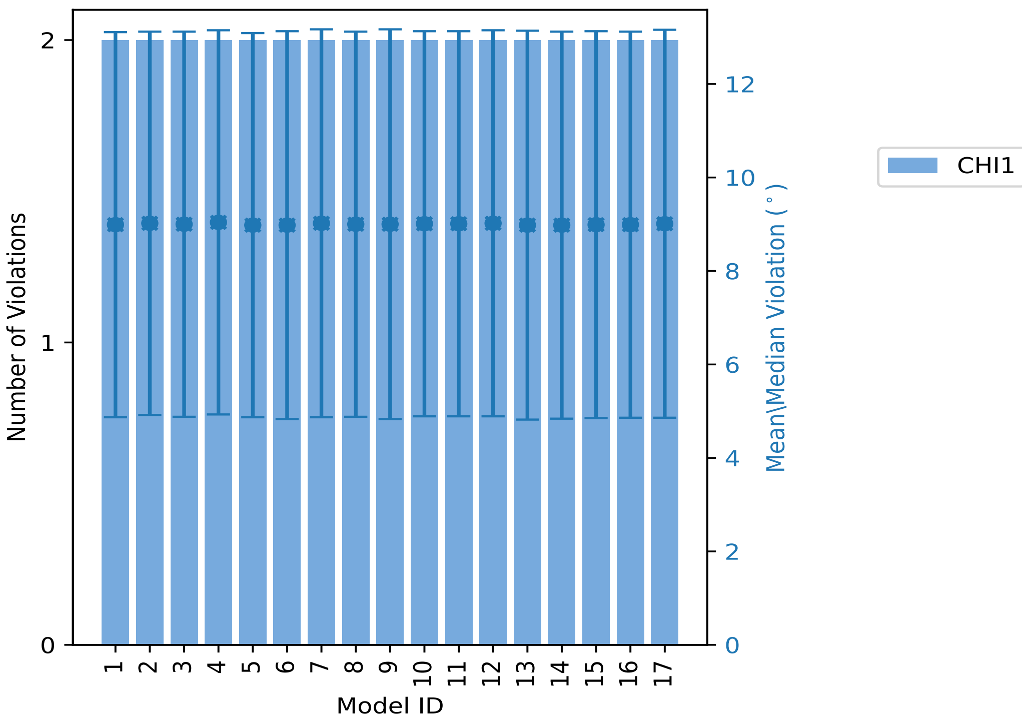
Violated and consistently violated restraints are shown using different hatch patterns in their respective categories

10.2 Dihedral-angle violation statistics for each model (i)

The following table provides the dihedral-angle violation statistics for each model in the ensemble. Violations less than 1° are not included in the statistics.

Model ID	Number of violations		Mean (°)	Max (°)	SD (°)	Median (°)
	CHI1	Total				
1	2	2	8.99	13.12	4.12	8.99
2	2	2	9.02	13.12	4.1	9.02
3	2	2	9.0	13.12	4.12	9.0
4	2	2	9.04	13.14	4.11	9.04
5	2	2	8.98	13.09	4.11	8.98
6	2	2	8.98	13.13	4.15	8.98
7	2	2	9.02	13.17	4.15	9.02
8	2	2	9.0	13.12	4.12	9.0
9	2	2	9.0	13.17	4.17	9.0
10	2	2	9.01	13.13	4.12	9.01
11	2	2	9.01	13.13	4.12	9.01
12	2	2	9.02	13.15	4.13	9.02
13	2	2	8.98	13.15	4.16	8.98
14	2	2	8.98	13.12	4.14	8.98
15	2	2	8.99	13.13	4.14	8.99
16	2	2	8.99	13.12	4.13	8.99
17	2	2	9.01	13.16	4.15	9.01

10.2.1 Bar graph : Dihedral 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

10.3 Dihedral-angle violation statistics for the ensemble (i)

Violation analysis may find that some restraints are violated in very 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 ensemble.

Number of violated restraints		Fraction of the ensemble	
CHI1	Total	Count[1]	%
0	0	1	5.9
0	0	2	11.8
0	0	3	17.6
0	0	4	23.5
0	0	5	29.4
0	0	6	35.3
0	0	7	41.2
0	0	8	47.1
0	0	9	52.9
0	0	10	58.8
0	0	11	64.7

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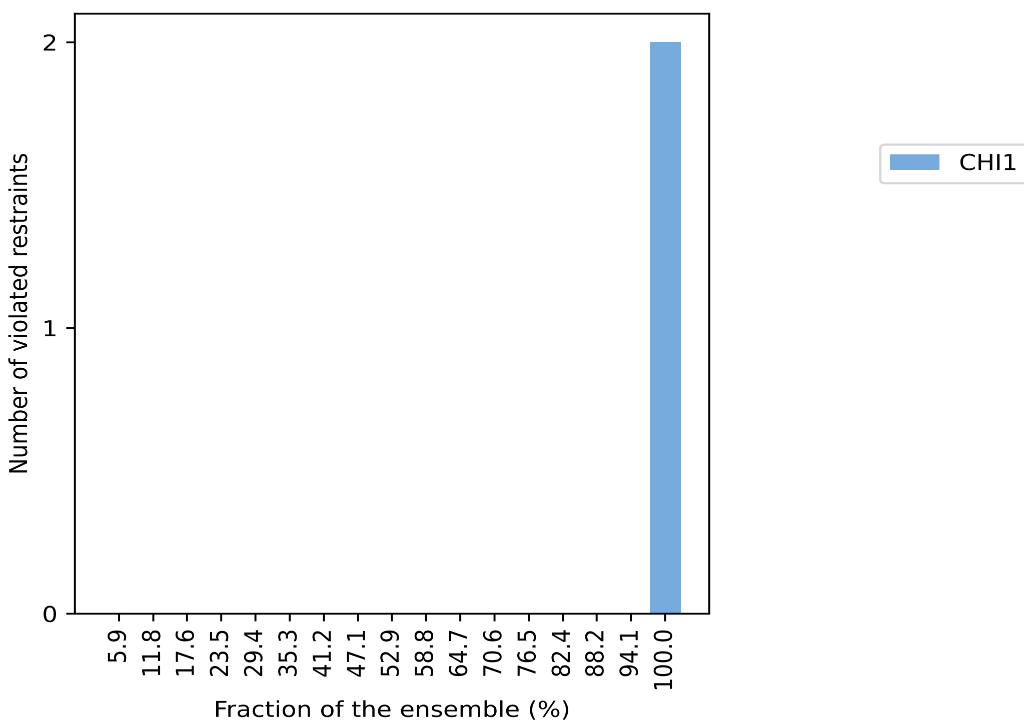
Number of violated restraints		Fraction of the ensemble	
CHI1	Total	Count[1]	%
0	0	12	70.6
0	0	13	76.5
0	0	14	82.4
0	0	15	88.2
0	0	16	94.1
2	2	17	100.0

[1] Number of models with violations

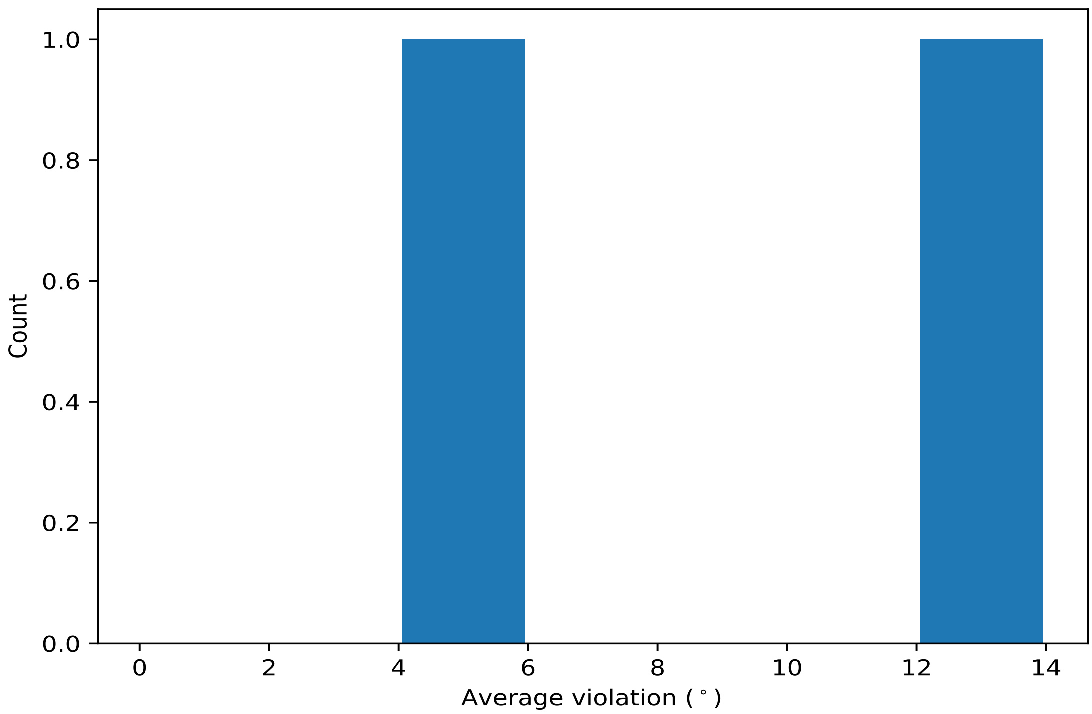
10.3.1 Bar graph : Dihedral-angle Violation statistics for the ensemble (i)



10.4 Most violated dihedral-angle restraints in the ensemble (i)

10.4.1 Histogram : Distribution of mean dihedral-angle 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



10.4.2 Table: Most violated dihedral-angle restraints (i)

The following table provides the mean and the standard deviation of the violation for each restraint sorted by number of violated models and the mean value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint.

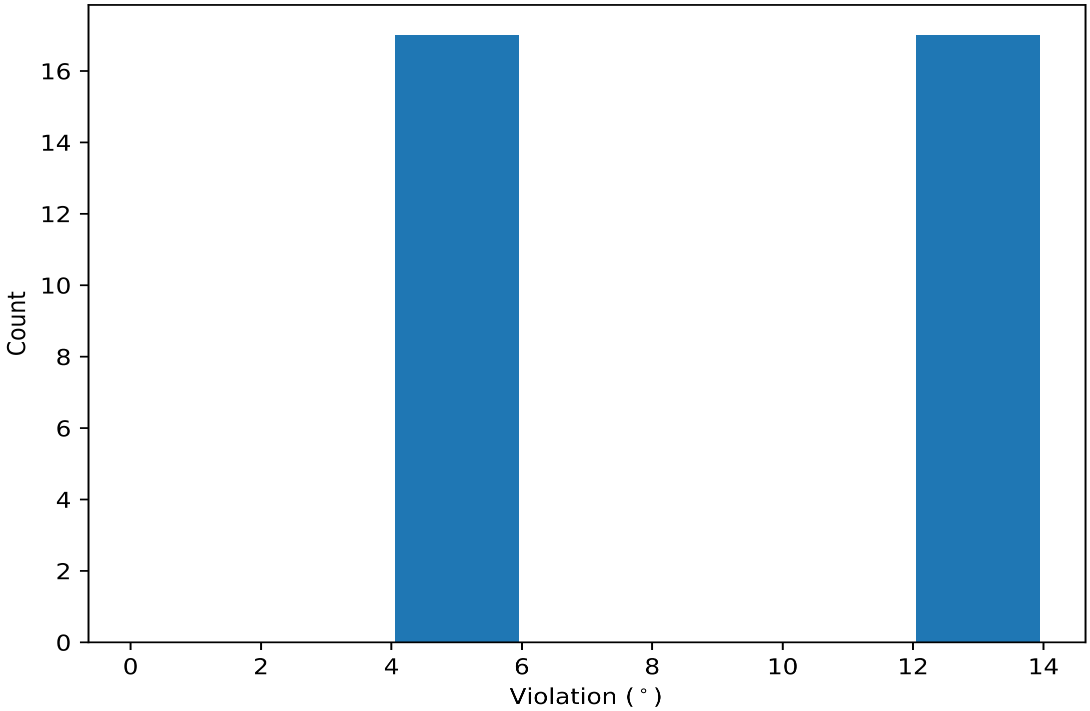
Key	Atom-1	Atom-2	Atom-3	Atom-4	Models[1]	Mean	SD[2]	Median
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	17	13.13	0.02	13.13
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	17	4.87	0.03	4.87

[1] Number of violated models, [2]Standard deviation, All angle values are in degree (°)

10.5 All violated dihedral-angle restraints (i)

10.5.1 Histogram : Distribution of violations (i)

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



10.5.2 Table: All violated dihedral-angle restraints (i)

The following table lists the absolute value of the violation for each restraint in the ensemble sorted by its value. The Key (restraint list ID, restraint ID) is the unique identifier for a given restraint.

Key	Atom-1	Atom-2	Atom-3	Atom-4	Model ID	Violation (°)
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	7	13.17
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	9	13.17
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	17	13.16
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	12	13.15
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	13	13.15
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	4	13.14
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	6	13.13
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	10	13.13
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	11	13.13
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	15	13.13
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	1	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	2	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	3	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	8	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	14	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	16	13.12
(1,1)	1:27:C:VAL:N	1:27:C:VAL:CA	1:27:C:VAL:CB	1:27:C:VAL:CG1	5	13.09
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	4	4.93
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	2	4.91
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	11	4.89
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	12	4.89

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Key	Atom-1	Atom-2	Atom-3	Atom-4	Model ID	Violation (°)
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	3	4.88
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	7	4.88
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	8	4.88
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	10	4.88
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	1	4.87
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	5	4.87
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	16	4.86
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	17	4.86
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	15	4.85
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	6	4.84
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	14	4.84
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	9	4.83
(1,2)	1:28:C:VAL:N	1:28:C:VAL:CA	1:28:C:VAL:CB	1:28:C:VAL:CG1	13	4.82