



Full wwPDB NMR Structure Validation Report ⓘ

May 28, 2020 – 11:21 pm BST

PDB ID : 2LV3
Title : Structure-functional characterization of Grx domain of Mus musculus TGR
Authors : Dobrovolska, O.; Shumilina, E.; Gladyshev, V.; Dikiy, A.
Deposited on : 2012-06-28

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 ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

Cyrange : Kirchner and Güntert (2011)
NmrClust : Kelley et al. (1996)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : 2.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

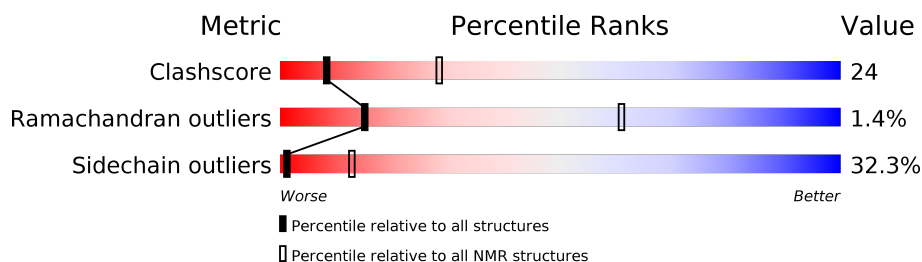
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 86%.

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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	118	

2 Ensemble composition and analysis

This entry contains 20 models. Model 11 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:27-A:121 (95)	0.25	11

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 3 clusters. No single-model clusters were found.

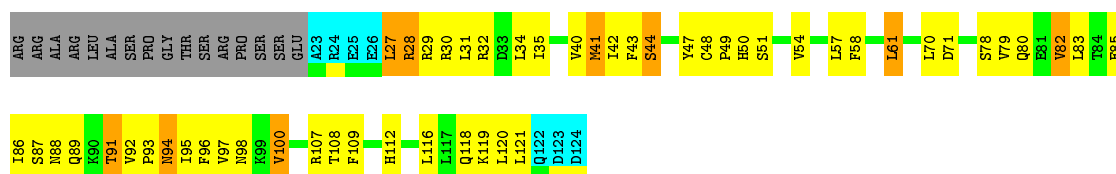
Cluster number	Models
1	1, 2, 4, 5, 6, 9, 10, 11, 14, 17
2	3, 7, 13, 16, 18, 19
3	8, 12, 15, 20

3 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 1638 atoms, of which 821 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Thioredoxin reductase 3.

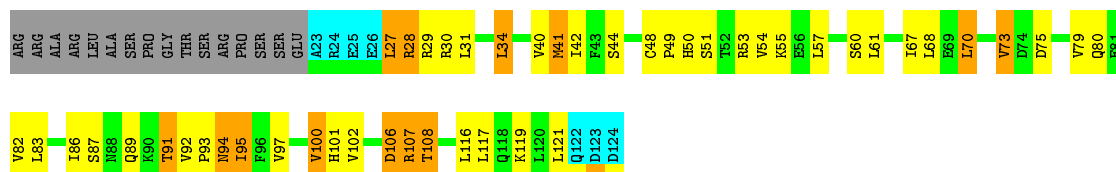
Mol	Chain	Residues	Atoms						Trace
1	A	102	Total	C	H	N	O	S	0
			1638	508	821	150	156	3	



4.2.3 Score per residue for model 3

- Molecule 1: Thioredoxin reductase 3

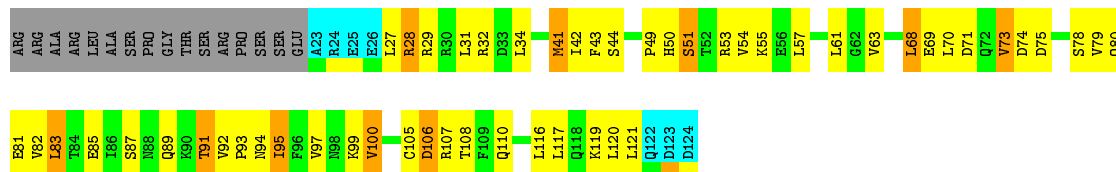
Chain A: 40% 30% 11% 6% 14%



4.2.4 Score per residue for model 4

- Molecule 1: Thioredoxin reductase 3

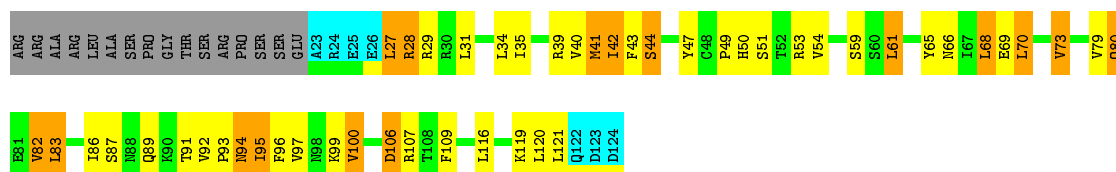
Chain A: 36% 36% 8% 6% 14%



4.2.5 Score per residue for model 5

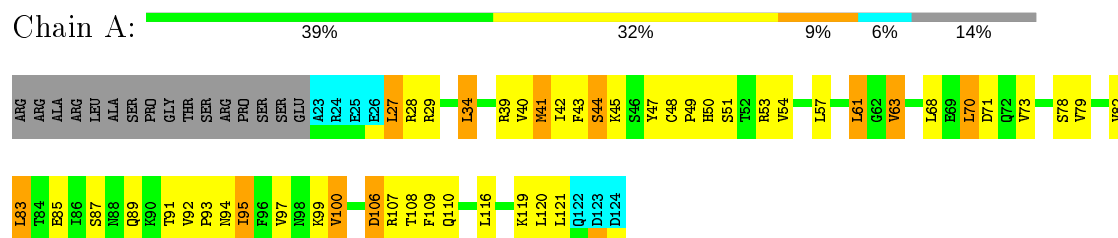
- Molecule 1: Thioredoxin reductase 3

Chain A: 39% 28% 14% 6% 14%



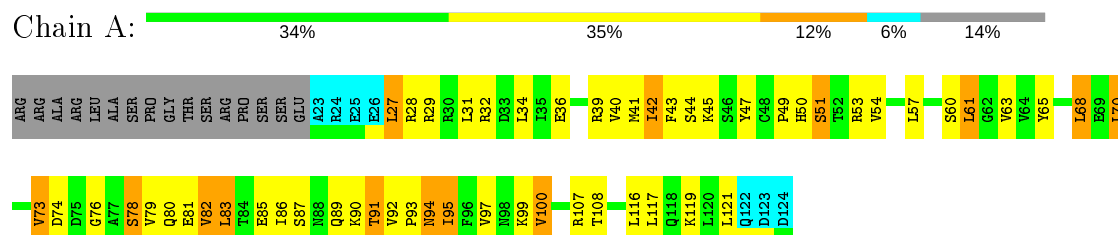
4.2.6 Score per residue for model 6

- Molecule 1: Thioredoxin reductase 3



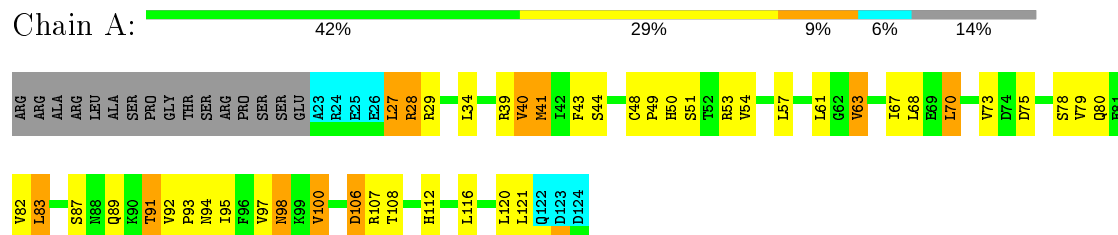
4.2.7 Score per residue for model 7

- Molecule 1: Thioredoxin reductase 3



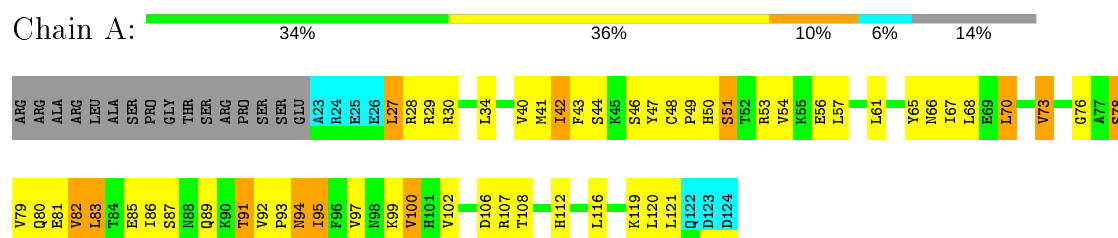
4.2.8 Score per residue for model 8

- Molecule 1: Thioredoxin reductase 3



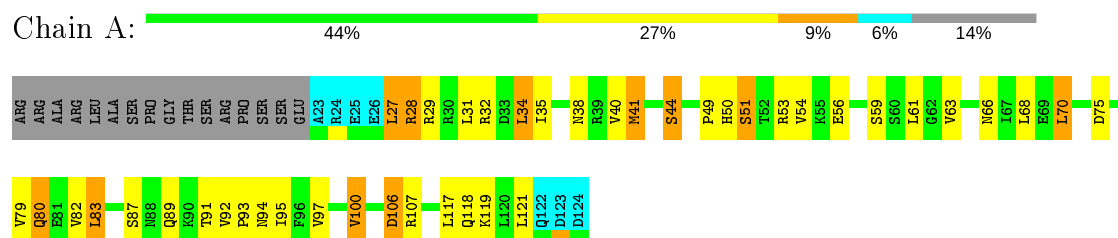
4.2.9 Score per residue for model 9

- Molecule 1: Thioredoxin reductase 3



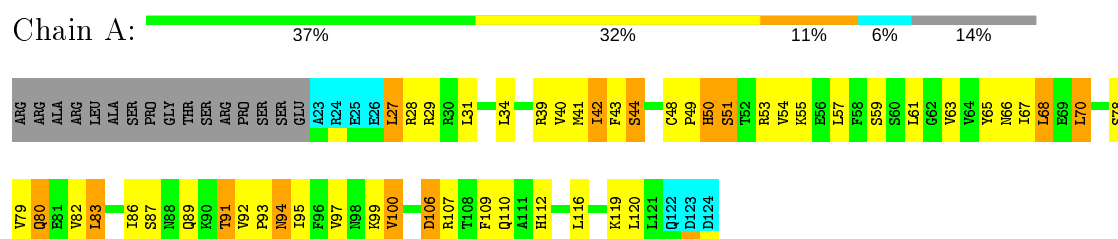
4.2.10 Score per residue for model 10

- Molecule 1: Thioredoxin reductase 3



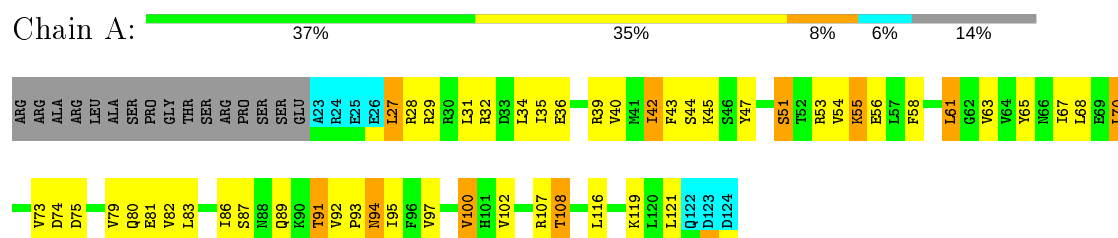
4.2.11 Score per residue for model 11 (medoid)

- Molecule 1: Thioredoxin reductase 3



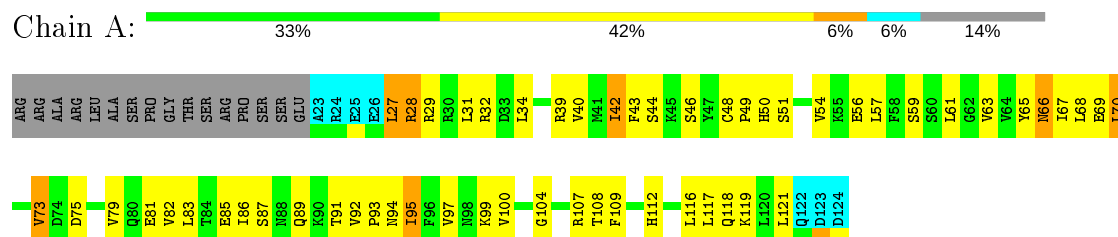
4.2.12 Score per residue for model 12

- Molecule 1: Thioredoxin reductase 3



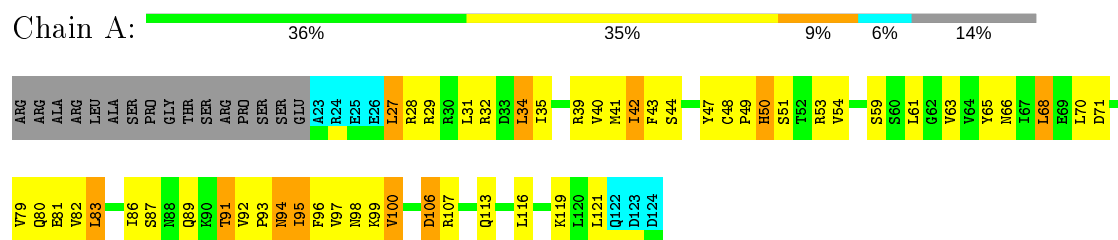
4.2.13 Score per residue for model 13

- Molecule 1: Thioredoxin reductase 3



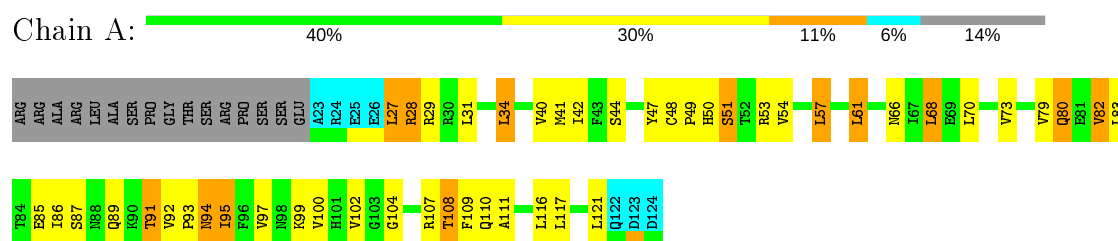
4.2.14 Score per residue for model 14

- Molecule 1: Thioredoxin reductase 3



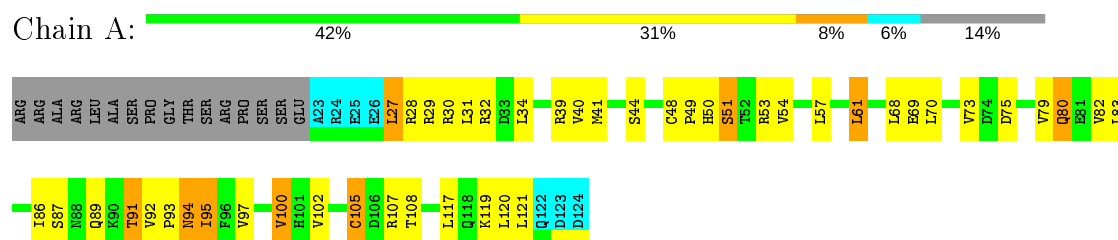
4.2.15 Score per residue for model 15

- Molecule 1: Thioredoxin reductase 3



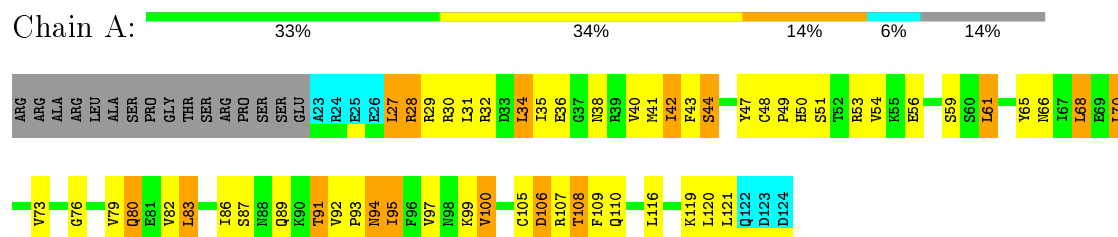
4.2.16 Score per residue for model 16

- Molecule 1: Thioredoxin reductase 3



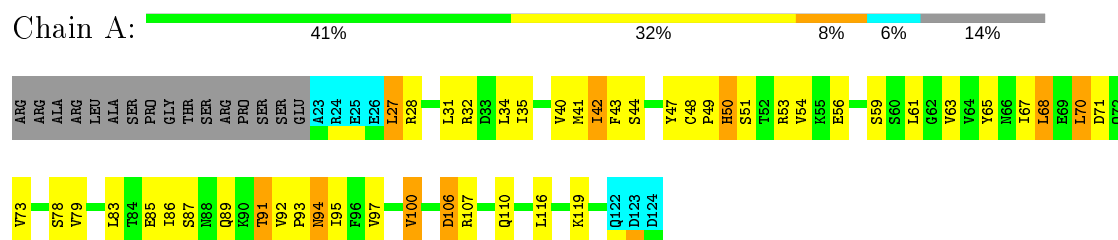
4.2.17 Score per residue for model 17

- Molecule 1: Thioredoxin reductase 3



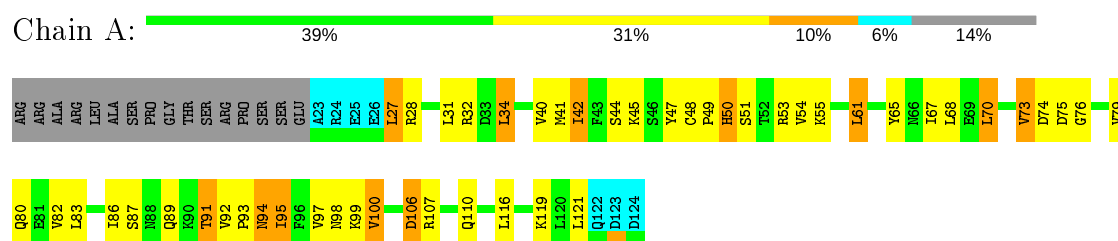
4.2.18 Score per residue for model 18

- Molecule 1: Thioredoxin reductase 3



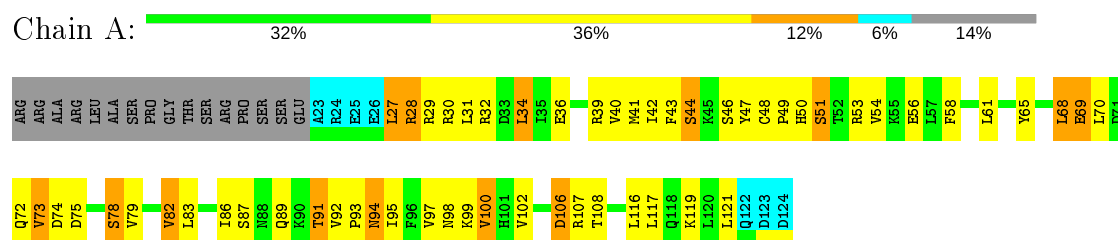
4.2.19 Score per residue for model 19

- Molecule 1: Thioredoxin reductase 3



4.2.20 Score per residue for model 20

- Molecule 1: Thioredoxin reductase 3



5 Refinement protocol and experimental data overview

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

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

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

Software name	Classification	Version
CYANA 2.1	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)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1400
Number of shifts mapped to atoms	1400
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	86%

No validations of the models with respect to experimental NMR restraints is performed at this time.

6 Model quality ⓘ

6.1 Standard geometry ⓘ

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

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	758	775	775	37±4
All	All	15160	15500	15500	747

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 24.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:102:VAL:HG11	1:A:108:THR:HG23	0.99	1.35	15	4
1:A:31:LEU:HD13	1:A:83:LEU:HD23	0.92	1.41	10	1
1:A:83:LEU:HD22	1:A:86:ILE:HD12	0.87	1.44	16	9
1:A:70:LEU:HD12	1:A:92:VAL:HG11	0.87	1.47	16	1
1:A:83:LEU:HD12	1:A:86:ILE:HD12	0.85	1.48	19	2
1:A:83:LEU:HD23	1:A:86:ILE:HD12	0.82	1.52	13	3
1:A:70:LEU:HD11	1:A:92:VAL:HG21	0.82	1.49	12	8
1:A:40:VAL:HG22	1:A:97:VAL:HG23	0.82	1.52	12	13
1:A:27:LEU:HD21	1:A:79:VAL:HA	0.78	1.55	6	20
1:A:61:LEU:HD23	1:A:121:LEU:HD11	0.77	1.55	3	2
1:A:97:VAL:HG13	1:A:120:LEU:HD22	0.75	1.56	1	2
1:A:100:VAL:HG11	1:A:120:LEU:HD11	0.74	1.57	8	4
1:A:42:ILE:HD11	1:A:65:TYR:CD1	0.73	2.19	17	3
1:A:70:LEU:HD13	1:A:92:VAL:HG11	0.73	1.61	20	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:83:LEU:HD22	1:A:92:VAL:HG12	0.71	1.61	6	3
1:A:27:LEU:CD1	1:A:79:VAL:HG22	0.69	2.17	4	1
1:A:27:LEU:HD11	1:A:79:VAL:CG2	0.69	2.17	6	4
1:A:27:LEU:HD11	1:A:79:VAL:HG23	0.69	1.64	7	4
1:A:28:ARG:CG	1:A:82:VAL:HG21	0.68	2.18	3	3
1:A:57:LEU:HD23	1:A:108:THR:HG22	0.68	1.64	9	4
1:A:67:ILE:O	1:A:68:LEU:HD23	0.66	1.91	12	5
1:A:67:ILE:O	1:A:68:LEU:HD13	0.66	1.90	18	2
1:A:34:LEU:HD23	1:A:43:PHE:CZ	0.65	2.26	12	6
1:A:41:MET:C	1:A:42:ILE:HD13	0.65	2.11	11	7
1:A:97:VAL:HG11	1:A:121:LEU:CD2	0.65	2.21	8	14
1:A:49:PRO:O	1:A:91:THR:HG21	0.65	1.92	15	16
1:A:97:VAL:HG13	1:A:98:ASN:ND2	0.65	2.06	2	2
1:A:31:LEU:HD21	1:A:79:VAL:HG23	0.64	1.68	13	13
1:A:69:GLU:O	1:A:73:VAL:HG13	0.64	1.91	20	3
1:A:27:LEU:HD13	1:A:79:VAL:HG22	0.64	1.69	4	1
1:A:41:MET:CE	1:A:68:LEU:HD11	0.64	2.23	20	4
1:A:31:LEU:HD21	1:A:79:VAL:HG13	0.64	1.70	4	1
1:A:42:ILE:HD11	1:A:65:TYR:HB2	0.64	1.70	19	7
1:A:69:GLU:O	1:A:73:VAL:HG23	0.63	1.92	16	2
1:A:116:LEU:O	1:A:116:LEU:HD13	0.63	1.94	8	4
1:A:57:LEU:HD21	1:A:117:LEU:HD23	0.63	1.70	15	1
1:A:43:PHE:CD2	1:A:83:LEU:HD11	0.63	2.28	8	2
1:A:70:LEU:O	1:A:73:VAL:HG22	0.62	1.95	9	6
1:A:83:LEU:CD1	1:A:86:ILE:HD12	0.62	2.25	3	2
1:A:28:ARG:CD	1:A:82:VAL:HG21	0.62	2.25	3	2
1:A:43:PHE:HB3	1:A:70:LEU:HD11	0.61	1.72	20	2
1:A:83:LEU:HD23	1:A:86:ILE:CD1	0.61	2.24	13	1
1:A:57:LEU:HD21	1:A:108:THR:O	0.61	1.96	3	1
1:A:42:ILE:HG22	1:A:94:ASN:O	0.61	1.96	12	4
1:A:40:VAL:HG12	1:A:42:ILE:CD1	0.61	2.26	7	5
1:A:102:VAL:CG1	1:A:117:LEU:HD11	0.60	2.26	3	1
1:A:31:LEU:HD13	1:A:83:LEU:HG	0.60	1.72	13	2
1:A:83:LEU:HD22	1:A:86:ILE:CD1	0.60	2.25	14	7
1:A:57:LEU:HG	1:A:108:THR:HG22	0.60	1.72	8	1
1:A:83:LEU:HD12	1:A:92:VAL:HG12	0.60	1.72	2	4
1:A:83:LEU:HD12	1:A:92:VAL:CG1	0.60	2.27	16	6
1:A:97:VAL:HG11	1:A:121:LEU:HD23	0.60	1.74	13	11
1:A:61:LEU:O	1:A:61:LEU:HD13	0.60	1.97	8	1
1:A:34:LEU:HD22	1:A:41:MET:CE	0.59	2.28	10	4
1:A:97:VAL:HG22	1:A:98:ASN:OD1	0.59	1.97	14	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:97:VAL:HG13	1:A:98:ASN:OD1	0.59	1.97	8	1
1:A:83:LEU:HD11	1:A:94:ASN:OD1	0.59	1.97	19	1
1:A:40:VAL:HG22	1:A:97:VAL:CG2	0.58	2.27	12	7
1:A:43:PHE:CD2	1:A:83:LEU:HD21	0.58	2.33	6	2
1:A:44:SER:O	1:A:70:LEU:HD12	0.58	1.98	20	6
1:A:27:LEU:HD11	1:A:79:VAL:CA	0.58	2.27	17	14
1:A:41:MET:HE3	1:A:68:LEU:HD11	0.58	1.75	7	4
1:A:75:ASP:O	1:A:79:VAL:HG23	0.58	1.99	4	1
1:A:34:LEU:HD21	1:A:68:LEU:HD13	0.57	1.76	4	1
1:A:39:ARG:HG3	1:A:40:VAL:HG23	0.57	1.75	16	2
1:A:48:CYS:HB3	1:A:91:THR:HG22	0.57	1.75	14	15
1:A:34:LEU:HD22	1:A:41:MET:SD	0.57	2.38	2	4
1:A:70:LEU:HD11	1:A:92:VAL:HG11	0.57	1.75	17	4
1:A:61:LEU:HD22	1:A:117:LEU:HD23	0.57	1.77	4	2
1:A:35:ILE:HD12	1:A:96:PHE:HB2	0.57	1.77	2	3
1:A:116:LEU:HD13	1:A:116:LEU:O	0.57	1.99	7	1
1:A:34:LEU:HD21	1:A:68:LEU:CD1	0.57	2.29	12	2
1:A:70:LEU:CD1	1:A:92:VAL:HG11	0.56	2.29	17	5
1:A:97:VAL:HG22	1:A:98:ASN:CG	0.56	2.21	8	1
1:A:31:LEU:O	1:A:35:ILE:HD12	0.56	2.00	12	3
1:A:78:SER:O	1:A:82:VAL:HG23	0.56	2.01	6	5
1:A:57:LEU:O	1:A:57:LEU:HD12	0.55	2.01	1	4
1:A:95:ILE:HG21	1:A:108:THR:HG21	0.55	1.76	17	3
1:A:67:ILE:C	1:A:68:LEU:HD13	0.55	2.21	18	1
1:A:44:SER:O	1:A:70:LEU:HD22	0.55	2.01	6	1
1:A:83:LEU:CD2	1:A:86:ILE:HD12	0.55	2.26	16	2
1:A:83:LEU:HD11	1:A:94:ASN:ND2	0.55	2.17	14	11
1:A:28:ARG:HG3	1:A:82:VAL:HG21	0.55	1.79	17	2
1:A:34:LEU:HD21	1:A:68:LEU:HD22	0.55	1.79	7	1
1:A:83:LEU:HD21	1:A:94:ASN:OD1	0.54	2.02	2	3
1:A:97:VAL:O	1:A:100:VAL:HG12	0.54	2.03	8	17
1:A:57:LEU:HD21	1:A:112:HIS:HB2	0.54	1.79	2	1
1:A:27:LEU:HD11	1:A:79:VAL:HG22	0.54	1.78	6	1
1:A:70:LEU:HD12	1:A:79:VAL:HG11	0.54	1.79	6	1
1:A:34:LEU:HD21	1:A:68:LEU:HD12	0.54	1.78	13	2
1:A:41:MET:HE3	1:A:68:LEU:HD21	0.54	1.80	16	1
1:A:34:LEU:O	1:A:34:LEU:HD23	0.54	2.02	18	1
1:A:97:VAL:CG1	1:A:120:LEU:HD22	0.53	2.33	6	2
1:A:68:LEU:N	1:A:68:LEU:HD22	0.53	2.18	18	2
1:A:34:LEU:HD21	1:A:68:LEU:CD2	0.53	2.34	7	1
1:A:42:ILE:O	1:A:68:LEU:HD12	0.53	2.02	1	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:51:SER:O	1:A:54:VAL:HG12	0.53	2.04	4	20
1:A:55:LYS:HE3	1:A:67:ILE:HG23	0.53	1.81	11	1
1:A:43:PHE:HB3	1:A:70:LEU:HD21	0.53	1.80	6	4
1:A:83:LEU:HD22	1:A:92:VAL:CG1	0.53	2.34	6	3
1:A:41:MET:HG3	1:A:68:LEU:HD11	0.53	1.81	16	2
1:A:28:ARG:HG2	1:A:82:VAL:HG21	0.53	1.80	10	1
1:A:28:ARG:CG	1:A:82:VAL:HG11	0.53	2.34	4	7
1:A:27:LEU:HD11	1:A:79:VAL:CB	0.53	2.34	8	10
1:A:34:LEU:HD22	1:A:41:MET:HE2	0.53	1.81	10	1
1:A:97:VAL:HG22	1:A:98:ASN:ND2	0.52	2.18	8	1
1:A:42:ILE:HD11	1:A:65:TYR:CE1	0.52	2.38	12	1
1:A:102:VAL:CG1	1:A:108:THR:HG23	0.52	2.34	12	2
1:A:42:ILE:HD13	1:A:42:ILE:N	0.52	2.20	19	5
1:A:70:LEU:CD2	1:A:92:VAL:HG11	0.52	2.35	9	6
1:A:67:ILE:C	1:A:68:LEU:HD23	0.51	2.24	8	1
1:A:27:LEU:HD11	1:A:79:VAL:HA	0.51	1.82	10	9
1:A:70:LEU:HD22	1:A:79:VAL:CG1	0.51	2.35	16	1
1:A:34:LEU:HD13	1:A:41:MET:HE2	0.51	1.81	20	1
1:A:116:LEU:O	1:A:116:LEU:HD23	0.51	2.06	4	3
1:A:27:LEU:HD23	1:A:28:ARG:N	0.51	2.20	8	1
1:A:34:LEU:O	1:A:34:LEU:HD12	0.51	2.06	9	2
1:A:108:THR:HG23	1:A:117:LEU:HD21	0.51	1.82	20	1
1:A:41:MET:SD	1:A:68:LEU:HD11	0.51	2.46	15	1
1:A:92:VAL:N	1:A:93:PRO:CD	0.51	2.73	5	20
1:A:79:VAL:O	1:A:83:LEU:HD12	0.51	2.05	12	2
1:A:31:LEU:HD13	1:A:83:LEU:CD2	0.51	2.28	10	1
1:A:34:LEU:HD13	1:A:43:PHE:CE1	0.51	2.41	18	1
1:A:31:LEU:HD13	1:A:83:LEU:HD12	0.51	1.82	1	2
1:A:97:VAL:HG13	1:A:120:LEU:CD2	0.51	2.33	1	2
1:A:57:LEU:HD11	1:A:112:HIS:CG	0.51	2.41	9	2
1:A:116:LEU:HD23	1:A:116:LEU:O	0.51	2.06	6	5
1:A:28:ARG:HD2	1:A:82:VAL:HG21	0.51	1.82	17	1
1:A:54:VAL:HA	1:A:57:LEU:HD23	0.50	1.83	8	3
1:A:27:LEU:HD21	1:A:79:VAL:CA	0.50	2.36	4	1
1:A:108:THR:HG22	1:A:117:LEU:HD21	0.50	1.83	15	1
1:A:61:LEU:HG	1:A:121:LEU:HD12	0.50	1.83	5	9
1:A:31:LEU:HD21	1:A:79:VAL:HG22	0.50	1.81	19	2
1:A:57:LEU:HD11	1:A:61:LEU:HD23	0.50	1.83	16	1
1:A:97:VAL:HG21	1:A:121:LEU:HD22	0.50	1.82	14	1
1:A:35:ILE:HD13	1:A:41:MET:HB3	0.50	1.82	2	1
1:A:57:LEU:HD12	1:A:112:HIS:CB	0.50	2.35	8	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:70:LEU:HD12	1:A:79:VAL:CG1	0.50	2.36	6	1
1:A:108:THR:O	1:A:117:LEU:HD22	0.50	2.07	13	2
1:A:83:LEU:O	1:A:83:LEU:HD13	0.50	2.07	2	3
1:A:49:PRO:O	1:A:50:HIS:CB	0.49	2.60	18	19
1:A:43:PHE:CE2	1:A:83:LEU:HD21	0.49	2.42	11	2
1:A:55:LYS:CE	1:A:67:ILE:HG23	0.49	2.38	19	1
1:A:34:LEU:HD22	1:A:41:MET:CG	0.49	2.37	18	1
1:A:28:ARG:HB3	1:A:82:VAL:HG21	0.49	1.83	8	2
1:A:35:ILE:HD11	1:A:41:MET:HE3	0.49	1.84	18	1
1:A:57:LEU:CD2	1:A:108:THR:HG22	0.48	2.38	9	1
1:A:28:ARG:HG3	1:A:82:VAL:HG11	0.48	1.85	1	5
1:A:83:LEU:HD13	1:A:83:LEU:O	0.48	2.08	15	3
1:A:73:VAL:HG12	1:A:75:ASP:H	0.48	1.69	12	3
1:A:61:LEU:CD2	1:A:117:LEU:HD23	0.48	2.39	10	1
1:A:54:VAL:HG21	1:A:95:ILE:HD12	0.48	1.84	9	9
1:A:108:THR:CG2	1:A:117:LEU:HD21	0.48	2.39	20	1
1:A:70:LEU:HD23	1:A:79:VAL:HG13	0.47	1.85	2	2
1:A:95:ILE:HD11	1:A:104:GLY:CA	0.47	2.39	15	1
1:A:40:VAL:HG11	1:A:58:PHE:CD2	0.47	2.44	2	2
1:A:31:LEU:CD2	1:A:79:VAL:HG13	0.47	2.39	4	1
1:A:63:VAL:HG11	1:A:121:LEU:HD13	0.47	1.87	6	3
1:A:55:LYS:HE2	1:A:67:ILE:HG23	0.47	1.86	19	1
1:A:83:LEU:HD12	1:A:86:ILE:CD1	0.47	2.33	19	1
1:A:91:THR:C	1:A:93:PRO:CD	0.47	2.83	20	20
1:A:70:LEU:HD21	1:A:92:VAL:HG11	0.47	1.86	9	4
1:A:70:LEU:HB3	1:A:79:VAL:HG11	0.47	1.84	9	3
1:A:102:VAL:HG22	1:A:120:LEU:CD2	0.47	2.40	9	1
1:A:63:VAL:HG11	1:A:121:LEU:CD1	0.47	2.39	10	1
1:A:102:VAL:HG11	1:A:117:LEU:HD11	0.47	1.87	3	2
1:A:42:ILE:N	1:A:42:ILE:HD13	0.47	2.25	7	3
1:A:107:ARG:CZ	1:A:116:LEU:HD21	0.46	2.40	3	1
1:A:40:VAL:CG2	1:A:97:VAL:HG23	0.46	2.39	15	3
1:A:43:PHE:CD2	1:A:68:LEU:HD12	0.46	2.45	17	1
1:A:57:LEU:HD21	1:A:109:PHE:CD2	0.46	2.45	13	1
1:A:61:LEU:C	1:A:61:LEU:HD13	0.46	2.29	8	1
1:A:41:MET:HE2	1:A:68:LEU:HD11	0.46	1.87	14	1
1:A:32:ARG:O	1:A:35:ILE:HD12	0.46	2.11	18	2
1:A:34:LEU:HD12	1:A:34:LEU:O	0.46	2.11	13	2
1:A:73:VAL:HG21	1:A:79:VAL:HG11	0.46	1.87	20	1
1:A:28:ARG:HD3	1:A:82:VAL:HG21	0.46	1.88	3	1
1:A:97:VAL:HG11	1:A:121:LEU:HD22	0.46	1.88	16	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:43:PHE:HD2	1:A:83:LEU:HD21	0.45	1.68	6	1
1:A:34:LEU:HD13	1:A:43:PHE:CZ	0.45	2.46	18	1
1:A:34:LEU:HD13	1:A:41:MET:SD	0.45	2.52	6	1
1:A:79:VAL:O	1:A:83:LEU:HB2	0.45	2.11	8	1
1:A:91:THR:C	1:A:93:PRO:HD3	0.45	2.32	3	19
1:A:42:ILE:HD11	1:A:65:TYR:CD2	0.45	2.46	5	1
1:A:42:ILE:HD11	1:A:65:TYR:CB	0.45	2.42	19	2
1:A:41:MET:SD	1:A:68:LEU:HD21	0.45	2.51	17	1
1:A:57:LEU:HD21	1:A:117:LEU:CD2	0.45	2.39	15	2
1:A:57:LEU:HD22	1:A:108:THR:HG22	0.45	1.89	15	1
1:A:58:PHE:CD1	1:A:121:LEU:HD13	0.45	2.46	20	1
1:A:42:ILE:HD12	1:A:55:LYS:HG2	0.45	1.88	3	1
1:A:31:LEU:HD12	1:A:82:VAL:HG13	0.45	1.88	12	1
1:A:83:LEU:HD23	1:A:92:VAL:CG1	0.45	2.42	19	1
1:A:111:ALA:HB3	1:A:117:LEU:HD13	0.44	1.88	15	1
1:A:57:LEU:CD2	1:A:117:LEU:HD23	0.44	2.41	15	1
1:A:42:ILE:HD13	1:A:66:ASN:O	0.44	2.12	13	1
1:A:83:LEU:C	1:A:83:LEU:HD13	0.44	2.32	2	2
1:A:42:ILE:CD1	1:A:42:ILE:N	0.43	2.81	19	4
1:A:83:LEU:HD12	1:A:92:VAL:HG13	0.43	1.89	15	1
1:A:83:LEU:HD13	1:A:83:LEU:C	0.43	2.32	16	2
1:A:79:VAL:CG1	1:A:80:GLN:N	0.43	2.81	17	10
1:A:31:LEU:HD12	1:A:82:VAL:CG2	0.43	2.43	14	1
1:A:34:LEU:HD11	1:A:41:MET:CE	0.43	2.43	4	1
1:A:31:LEU:HD12	1:A:82:VAL:CG1	0.43	2.44	17	2
1:A:55:LYS:NZ	1:A:67:ILE:HG23	0.43	2.28	3	1
1:A:43:PHE:CE1	1:A:68:LEU:HD13	0.43	2.48	11	2
1:A:40:VAL:HG13	1:A:97:VAL:HB	0.43	1.91	8	1
1:A:40:VAL:HG21	1:A:63:VAL:CG1	0.43	2.43	12	1
1:A:57:LEU:HD23	1:A:108:THR:O	0.43	2.14	4	1
1:A:42:ILE:HD12	1:A:65:TYR:CD2	0.43	2.48	13	1
1:A:58:PHE:CD2	1:A:121:LEU:HD13	0.43	2.48	12	1
1:A:43:PHE:CG	1:A:83:LEU:HD11	0.42	2.48	6	1
1:A:41:MET:HE1	1:A:43:PHE:CD2	0.42	2.50	8	1
1:A:75:ASP:O	1:A:79:VAL:HG12	0.42	2.14	20	1
1:A:73:VAL:HG23	1:A:76:GLY:N	0.42	2.30	19	4
1:A:120:LEU:O	1:A:120:LEU:HD13	0.42	2.15	11	1
1:A:70:LEU:HD23	1:A:92:VAL:HG11	0.42	1.91	14	1
1:A:70:LEU:HD12	1:A:92:VAL:CG1	0.42	2.34	16	1
1:A:54:VAL:CG2	1:A:108:THR:HG21	0.42	2.44	1	1
1:A:42:ILE:HD13	1:A:55:LYS:HG2	0.42	1.90	12	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:40:VAL:HG22	1:A:97:VAL:HB	0.42	1.92	16	1
1:A:42:ILE:HD11	1:A:65:TYR:CE2	0.41	2.50	20	1
1:A:100:VAL:HG11	1:A:120:LEU:HD21	0.41	1.92	16	1
1:A:34:LEU:HD11	1:A:68:LEU:CD1	0.41	2.44	19	1
1:A:55:LYS:HZ3	1:A:67:ILE:HD12	0.41	1.76	3	1
1:A:120:LEU:HD13	1:A:120:LEU:C	0.41	2.36	5	1
1:A:57:LEU:HD12	1:A:112:HIS:HB2	0.41	1.92	11	1
1:A:97:VAL:O	1:A:98:ASN:CG	0.41	2.59	2	2
1:A:95:ILE:HD11	1:A:104:GLY:HA3	0.41	1.91	13	1
1:A:61:LEU:HD12	1:A:121:LEU:HD12	0.41	1.93	8	1
1:A:70:LEU:HD22	1:A:79:VAL:HG13	0.41	1.91	16	1
1:A:27:LEU:HD21	1:A:79:VAL:N	0.40	2.31	4	1
1:A:28:ARG:HG2	1:A:82:VAL:HG11	0.40	1.93	10	1
1:A:54:VAL:HG22	1:A:108:THR:HG21	0.40	1.91	8	1
1:A:61:LEU:CD1	1:A:121:LEU:HD12	0.40	2.46	8	1
1:A:27:LEU:HD11	1:A:79:VAL:HB	0.40	1.94	2	1
1:A:83:LEU:CD1	1:A:92:VAL:HG12	0.40	2.46	2	1
1:A:34:LEU:HD23	1:A:43:PHE:HZ	0.40	1.71	9	1
1:A:120:LEU:C	1:A:120:LEU:HD13	0.40	2.37	11	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	95/118 (81%)	88±1 (92±1%)	6±1 (6±2%)	1±1 (1±1%)	15	61
All	All	1900/2360 (81%)	1753 (92%)	121 (6%)	26 (1%)	15	61

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	106	ASP	14
1	A	73	VAL	11
1	A	105	CYS	1

6.3.2 Protein sidechains ⓘ

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	87/106 (82%)	59±4 (68±4%)	28±4 (32±4%)	1	13
All	All	1740/2120 (82%)	1178 (68%)	562 (32%)	1	13

All 62 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	94	ASN	20
1	A	44	SER	20
1	A	87	SER	20
1	A	89	GLN	20
1	A	100	VAL	20
1	A	107	ARG	20
1	A	95	ILE	20
1	A	27	LEU	19
1	A	28	ARG	19
1	A	53	ARG	18
1	A	29	ARG	18
1	A	119	LYS	17
1	A	61	LEU	16
1	A	91	THR	15
1	A	42	ILE	14
1	A	70	LEU	14
1	A	80	GLN	13
1	A	47	TYR	13
1	A	99	LYS	13
1	A	32	ARG	12
1	A	68	LEU	12
1	A	106	ASP	12
1	A	34	LEU	11
1	A	83	LEU	11
1	A	82	VAL	10
1	A	66	ASN	9
1	A	39	ARG	9
1	A	51	SER	9
1	A	63	VAL	9

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Mol	Chain	Res	Type	Models (Total)
1	A	41	MET	8
1	A	110	GLN	8
1	A	85	GLU	8
1	A	59	SER	8
1	A	78	SER	7
1	A	56	GLU	7
1	A	109	PHE	7
1	A	81	GLU	6
1	A	30	ARG	6
1	A	50	HIS	5
1	A	75	ASP	5
1	A	74	ASP	5
1	A	71	ASP	5
1	A	108	THR	4
1	A	116	LEU	4
1	A	45	LYS	4
1	A	36	GLU	4
1	A	105	CYS	3
1	A	46	SER	3
1	A	120	LEU	3
1	A	118	GLN	3
1	A	69	GLU	2
1	A	38	ASN	2
1	A	60	SER	2
1	A	55	LYS	2
1	A	98	ASN	1
1	A	90	LYS	1
1	A	72	GLN	1
1	A	88	ASN	1
1	A	57	LEU	1
1	A	40	VAL	1
1	A	101	HIS	1
1	A	113	GLN	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

6.5 Carbohydrates [i](#)

There are no carbohydrates 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

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

7.1 Chemical shift list 1

File name: input_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	1400
Number of shifts mapped to atoms	1400
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

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction \pm precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	116	-0.43 ± 0.15	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	109	0.33 ± 0.13	None needed (< 0.5 ppm)
$^{13}\text{C}'$	83	-0.31 ± 0.08	None needed (< 0.5 ppm)
^{15}N	112	-0.69 ± 0.36	None needed (imprecise)

7.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 86%, i.e. 1038 atoms were assigned a chemical shift out of a possible 1211. 21 out of 23 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	442/471 (94%)	185/188 (98%)	166/190 (87%)	91/93 (98%)
Sidechain	540/667 (81%)	329/388 (85%)	199/241 (83%)	12/38 (32%)

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	Total	¹ H	¹³ C	¹⁵ N
Aromatic	56/73 (77%)	30/40 (75%)	26/30 (87%)	0/3 (0%)
Overall	1038/1211 (86%)	544/616 (88%)	391/461 (85%)	103/134 (77%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 86%, i.e. 1110 atoms were assigned a chemical shift out of a possible 1298. 21 out of 23 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	476/506 (94%)	199/202 (99%)	179/204 (88%)	98/100 (98%)
Sidechain	578/719 (80%)	354/418 (85%)	211/259 (81%)	13/42 (31%)
Aromatic	56/73 (77%)	30/40 (75%)	26/30 (87%)	0/3 (0%)
Overall	1110/1298 (86%)	583/660 (88%)	416/493 (84%)	111/145 (77%)

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.

Random coil index (RCI) for chain A:

