Full wwPDB NMR Structure Validation Report (i)

Jun 18, 2024 – 09:31 AM EDT

PDB ID	:	4B2R
Title	:	Solution structure of CCP modules 10-11 of complement factor H
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Deposited on	:	2012-07-17

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:

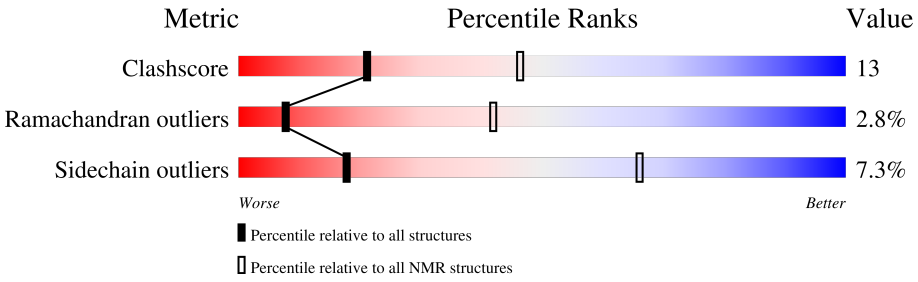
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment is 93%.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and a grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	126	67% 28% • 5%

2 Ensemble composition and analysis

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

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

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:568-A:687 (120)	1.06	1

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

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

The models can be grouped into 2 clusters and 2 single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1967 atoms, of which 975 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called COMPLEMENT FACTOR H.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	126	1967	630	975	164	189	9	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	562	GLU	-	expression tag	UNP P08603
A	563	ALA	-	expression tag	UNP P08603
A	564	ALA	-	expression tag	UNP P08603
A	565	GLY	-	expression tag	UNP P08603

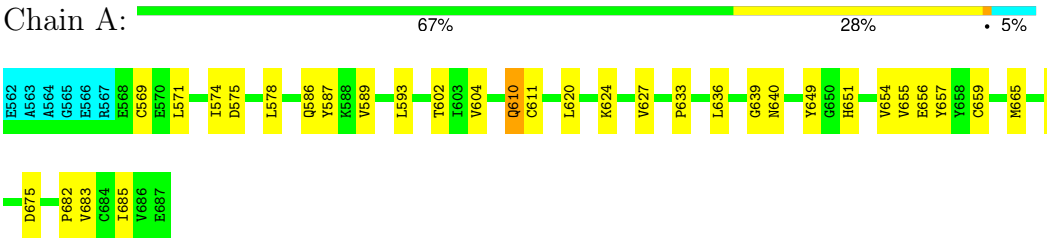
4 Residue-property plots (i)

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: COMPLEMENT FACTOR H

Chain A:



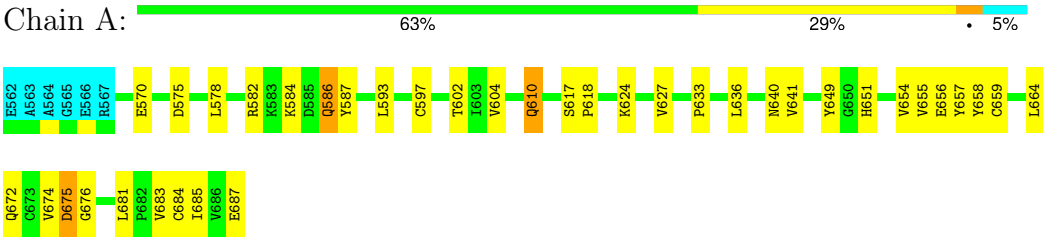
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1 (medoid)

• Molecule 1: COMPLEMENT FACTOR H

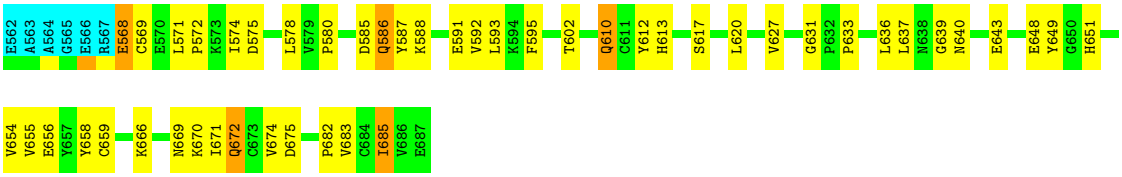
Chain A:



4.2.2 Score per residue for model 2

• Molecule 1: COMPLEMENT FACTOR H

Chain A:



4.2.3 Score per residue for model 3

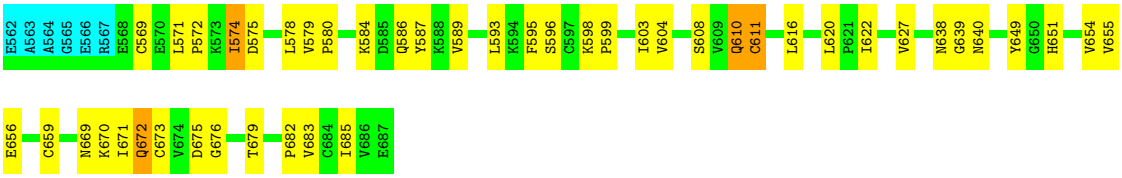
• Molecule 1: COMPLEMENT FACTOR H

Chain A:

4.2.4 Score per residue for model 4

• Molecule 1: COMPLEMENT FACTOR H

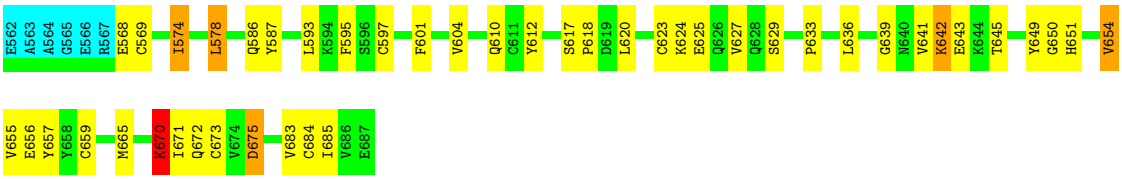
Chain A:



4.2.5 Score per residue for model 5

• Molecule 1: COMPLEMENT FACTOR H

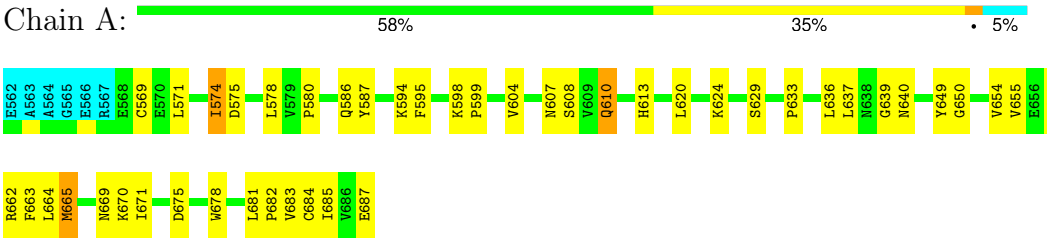
Chain A:



4.2.6 Score per residue for model 6

• Molecule 1: COMPLEMENT FACTOR H

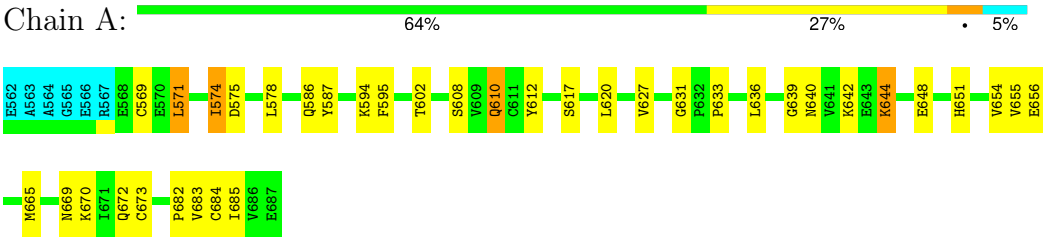
Chain A:



4.2.7 Score per residue for model 7

• Molecule 1: COMPLEMENT FACTOR H

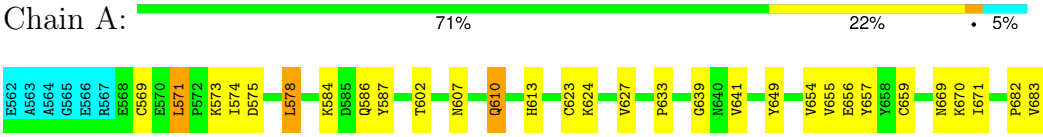
Chain A:



4.2.8 Score per residue for model 8

• Molecule 1: COMPLEMENT FACTOR H

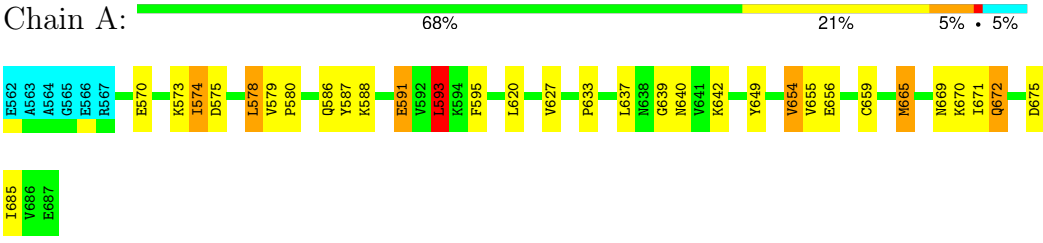
Chain A:



4.2.9 Score per residue for model 9

• Molecule 1: COMPLEMENT FACTOR H

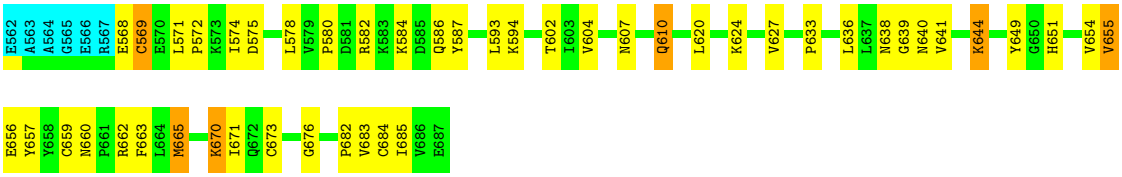
Chain A:



4.2.10 Score per residue for model 10

• Molecule 1: COMPLEMENT FACTOR H

Chain A:



4.2.11 Score per residue for model 11

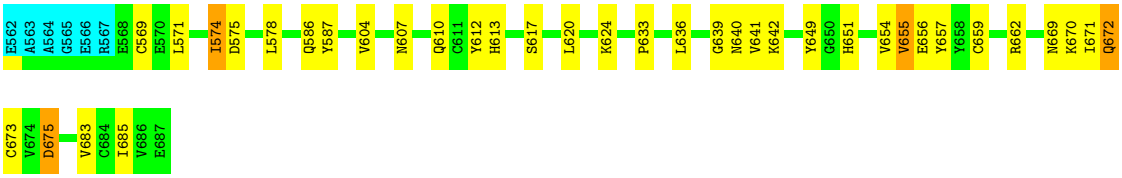
• Molecule 1: COMPLEMENT FACTOR H

Chain A:

4.2.12 Score per residue for model 12

• Molecule 1: COMPLEMENT FACTOR H

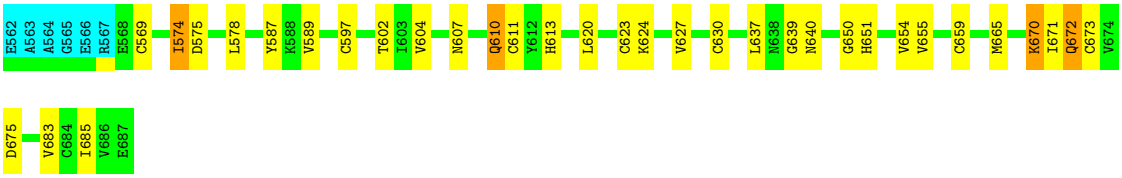
Chain A:



4.2.13 Score per residue for model 13

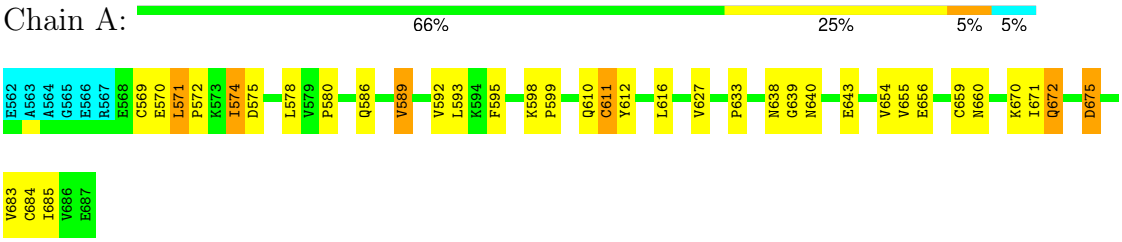
• Molecule 1: COMPLEMENT FACTOR H

Chain A:



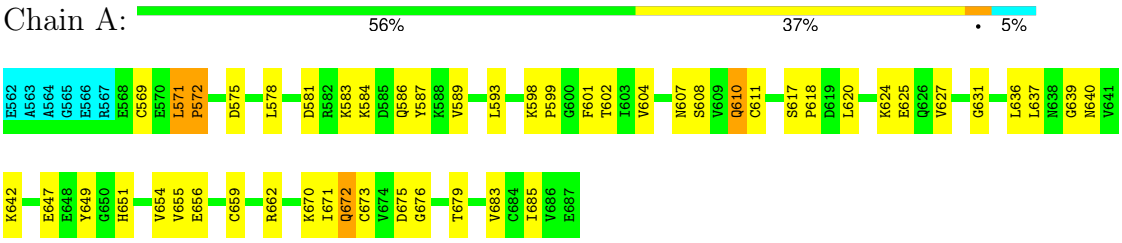
4.2.14 Score per residue for model 14

• Molecule 1: COMPLEMENT FACTOR H



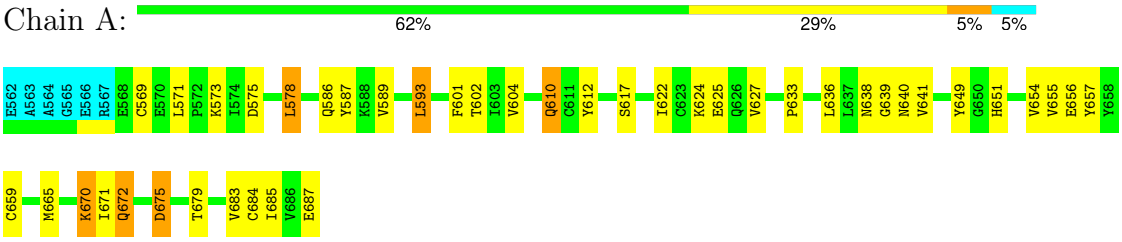
4.2.15 Score per residue for model 15

• Molecule 1: COMPLEMENT FACTOR H



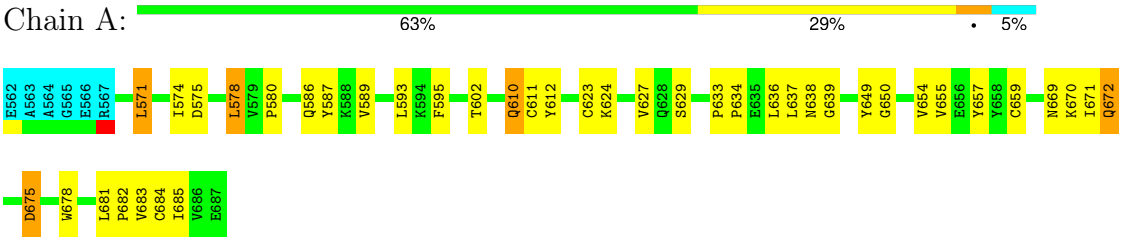
4.2.16 Score per residue for model 16

• Molecule 1: COMPLEMENT FACTOR H



4.2.17 Score per residue for model 17

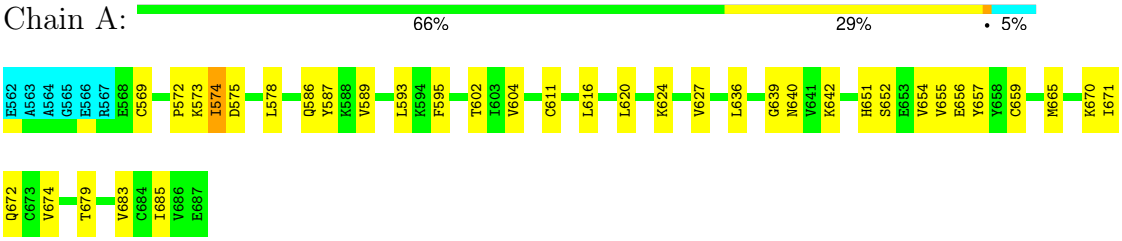
• Molecule 1: COMPLEMENT FACTOR H



4.2.18 Score per residue for model 18

• Molecule 1: COMPLEMENT FACTOR H

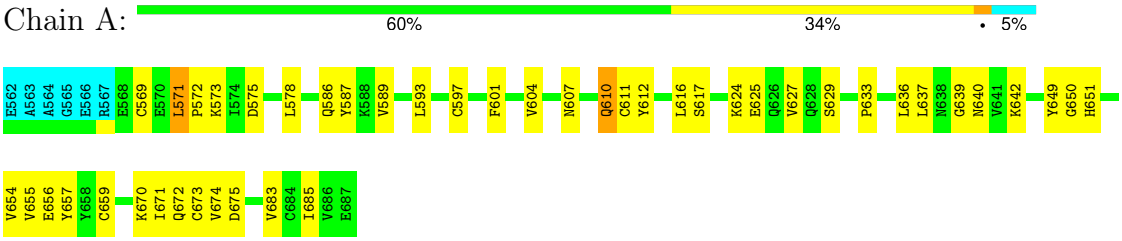
Chain A:



4.2.19 Score per residue for model 19

• Molecule 1: COMPLEMENT FACTOR H

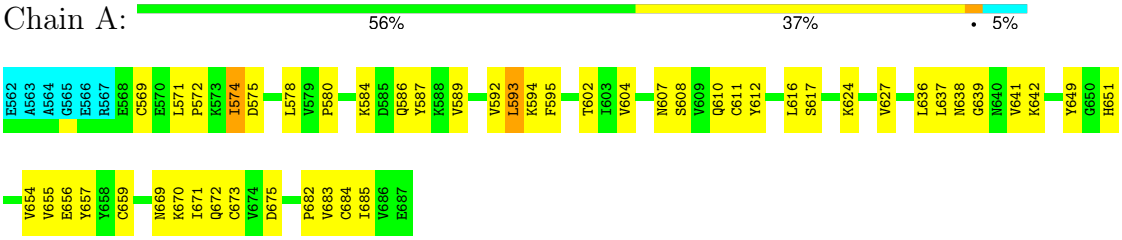
Chain A:



4.2.20 Score per residue for model 20

• Molecule 1: COMPLEMENT FACTOR H

Chain A:



5 Refinement protocol and experimental data overview

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

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

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

Software name	Classification	Version
CNS	refinement	1.2
CNS	structure solution	1.2
PROCHECK / PROCHECK-NMR	structure solution	3.4.3
TopSpin	structure solution	1.3
MOLMOL	structure solution	2
Azara	structure solution	2.0
CcpNmr Analysis	structure solution	2.0
CcpNmr Analysis	structure solution	2.1
CcpNmr Analysis	structure solution	2.2

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	1572
Number of shifts mapped to atoms	1572
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	93%

6 Model quality

6.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	0.93±0.02	0±0/974 (0.0± 0.0%)	0.72±0.02	0±0/1320 (0.0± 0.0%)
All	All	0.93	2/19480 (0.0%)	0.72	1/26400 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	Chirality	Planarity
1	A	0.0±0.0	0.1±0.3
All	All	0	2

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)	Models	
								Worst	Total
1	A	670	LYS	N-CA	-6.47	1.33	1.46	5	1
1	A	654	VAL	CB-CG2	-5.59	1.41	1.52	5	1

All unique angle outliers are listed below.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
1	A	593	LEU	CB-CG-CD1	5.09	119.65	111.00	9	1

There are no chirality outliers.

All unique planar outliers are listed below.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	662	ARG	Sidechain	2

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	949	935	932	25±4
All	All	18980	18700	18640	497

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 13.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:636:LEU:HD21	1:A:659:CYS:SG	0.94	2.03	7	11
1:A:604:VAL:HG21	1:A:622:ILE:HG12	0.84	1.47	16	1
1:A:575:ASP:HB3	1:A:578:LEU:HB2	0.77	1.56	18	19
1:A:636:LEU:HD21	1:A:684:CYS:SG	0.71	2.24	17	3
1:A:655:VAL:O	1:A:670:LYS:HA	0.70	1.86	12	19
1:A:604:VAL:HG21	1:A:624:LYS:HD3	0.70	1.64	1	10
1:A:669:ASN:HA	1:A:682:PRO:HB3	0.69	1.64	17	10
1:A:665:MET:HG3	1:A:684:CYS:SG	0.69	2.27	1	3
1:A:578:LEU:HD11	1:A:595:PHE:HB3	0.68	1.63	4	8
1:A:569:CYS:HB3	1:A:616:LEU:HD11	0.68	1.66	14	1
1:A:589:VAL:HA	1:A:611:CYS:SG	0.66	2.31	17	9
1:A:654:VAL:HG21	1:A:670:LYS:HB2	0.66	1.68	5	1
1:A:574:ILE:HG13	1:A:575:ASP:H	0.65	1.51	6	5
1:A:665:MET:HG3	1:A:682:PRO:HB2	0.65	1.69	6	2
1:A:666:LYS:HG2	1:A:685:ILE:HD11	0.64	1.68	2	1
1:A:571:LEU:HD11	1:A:580:PRO:HG3	0.63	1.70	2	7
1:A:639:GLY:HA3	1:A:659:CYS:HA	0.63	1.69	15	18
1:A:638:ASN:HB2	1:A:684:CYS:HB2	0.62	1.69	16	4
1:A:644:LYS:HD3	1:A:644:LYS:H	0.61	1.55	3	3
1:A:651:HIS:HA	1:A:673:CYS:O	0.61	1.95	5	10
1:A:636:LEU:HD23	1:A:639:GLY:HA3	0.60	1.71	7	6
1:A:582:ARG:HD2	1:A:584:LYS:HE3	0.60	1.73	10	1
1:A:642:LYS:HD3	1:A:656:GLU:HB3	0.60	1.74	19	8
1:A:570:GLU:HG2	1:A:586:GLN:HG3	0.60	1.72	1	1
1:A:574:ILE:HG22	1:A:620:LEU:HD23	0.59	1.72	4	6
1:A:569:CYS:HB2	1:A:587:TYR:HB2	0.58	1.75	16	14
1:A:574:ILE:HG22	1:A:620:LEU:HG	0.58	1.75	5	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:571:LEU:HB2	1:A:587:TYR:CE2	0.58	2.34	15	3
1:A:633:PRO:HD3	1:A:649:TYR:CE1	0.57	2.34	10	6
1:A:587:TYR:CE1	1:A:593:LEU:HG	0.56	2.35	11	6
1:A:651:HIS:ND1	1:A:674:VAL:HA	0.56	2.15	18	1
1:A:636:LEU:CD2	1:A:659:CYS:SG	0.56	2.93	15	1
1:A:654:VAL:HA	1:A:671:ILE:O	0.55	2.01	10	14
1:A:654:VAL:HG11	1:A:670:LYS:HE3	0.55	1.78	9	2
1:A:654:VAL:CG2	1:A:670:LYS:HB2	0.55	2.31	5	3
1:A:654:VAL:HG21	1:A:670:LYS:HE2	0.55	1.78	11	3
1:A:643:GLU:HG2	1:A:656:GLU:HB2	0.55	1.78	2	3
1:A:571:LEU:HB2	1:A:587:TYR:CE1	0.55	2.37	4	2
1:A:664:LEU:HG	1:A:687:GLU:HG2	0.55	1.77	6	1
1:A:655:VAL:HG22	1:A:657:TYR:CE1	0.54	2.38	12	1
1:A:572:PRO:HD3	1:A:616:LEU:HD13	0.54	1.79	14	1
1:A:572:PRO:HD2	1:A:616:LEU:HD12	0.54	1.79	3	2
1:A:587:TYR:CZ	1:A:593:LEU:HG	0.54	2.38	9	1
1:A:665:MET:HG2	1:A:682:PRO:HB2	0.54	1.78	10	2
1:A:633:PRO:HD3	1:A:649:TYR:CE2	0.54	2.38	17	6
1:A:610:GLN:HB2	1:A:612:TYR:CE1	0.53	2.38	3	2
1:A:627:VAL:CG2	1:A:675:ASP:HA	0.53	2.33	19	7
1:A:641:VAL:HG22	1:A:657:TYR:CE2	0.53	2.38	8	3
1:A:572:PRO:HG2	1:A:620:LEU:HD11	0.53	1.81	10	2
1:A:633:PRO:HB3	1:A:655:VAL:HG11	0.53	1.80	12	2
1:A:587:TYR:CD1	1:A:593:LEU:HD22	0.53	2.39	16	1
1:A:604:VAL:CG1	1:A:624:LYS:HG2	0.53	2.34	16	1
1:A:656:GLU:HG2	1:A:670:LYS:HG2	0.52	1.80	14	5
1:A:610:GLN:HE21	1:A:610:GLN:N	0.52	2.02	10	12
1:A:575:ASP:CB	1:A:578:LEU:HB2	0.52	2.32	9	4
1:A:656:GLU:HA	1:A:669:ASN:O	0.52	2.05	8	3
1:A:588:LYS:O	1:A:591:GLU:HB2	0.52	2.05	9	1
1:A:636:LEU:HD22	1:A:657:TYR:HB3	0.52	1.80	6	6
1:A:672:GLN:HE21	1:A:672:GLN:N	0.52	2.02	15	1
1:A:640:ASN:HB3	1:A:658:TYR:CE2	0.51	2.40	1	2
1:A:584:LYS:HG2	1:A:587:TYR:CE1	0.51	2.39	3	4
1:A:656:GLU:CG	1:A:670:LYS:HG2	0.51	2.36	19	7
1:A:641:VAL:HG22	1:A:657:TYR:CE1	0.51	2.40	11	3
1:A:651:HIS:CE1	1:A:674:VAL:HA	0.51	2.41	1	2
1:A:671:ILE:HD13	1:A:681:LEU:CD2	0.50	2.36	6	1
1:A:638:ASN:HB2	1:A:684:CYS:SG	0.50	2.46	10	1
1:A:665:MET:CG	1:A:682:PRO:HB2	0.50	2.37	6	1
1:A:654:VAL:HG22	1:A:671:ILE:N	0.50	2.22	9	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:610:GLN:HB2	1:A:612:TYR:CE2	0.50	2.42	12	3
1:A:574:ILE:HA	1:A:620:LEU:HG	0.50	1.83	9	1
1:A:604:VAL:HG21	1:A:624:LYS:HG3	0.50	1.84	13	1
1:A:594:LYS:HA	1:A:607:ASN:O	0.49	2.08	20	1
1:A:578:LEU:HD12	1:A:597:CYS:SG	0.49	2.48	13	5
1:A:654:VAL:HG21	1:A:670:LYS:HE3	0.49	1.83	3	6
1:A:664:LEU:HG	1:A:687:GLU:HB3	0.49	1.83	1	1
1:A:645:THR:HA	1:A:649:TYR:OH	0.49	2.07	5	1
1:A:612:TYR:CD1	1:A:617:SER:HB2	0.49	2.42	19	1
1:A:592:VAL:HG12	1:A:610:GLN:HG3	0.49	1.85	20	4
1:A:594:LYS:HG2	1:A:608:SER:HB3	0.49	1.84	20	3
1:A:659:CYS:SG	1:A:665:MET:HG3	0.49	2.47	16	1
1:A:574:ILE:HD13	1:A:580:PRO:HD3	0.49	1.83	2	3
1:A:633:PRO:HG3	1:A:655:VAL:HG11	0.49	1.84	3	3
1:A:596:SER:HA	1:A:603:ILE:HD12	0.49	1.83	4	1
1:A:671:ILE:HD12	1:A:678:TRP:HB3	0.48	1.85	6	1
1:A:602:THR:HG21	1:A:627:VAL:HG11	0.48	1.85	1	9
1:A:602:THR:HB	1:A:624:LYS:O	0.48	2.09	8	4
1:A:636:LEU:HD23	1:A:639:GLY:CA	0.48	2.37	17	2
1:A:587:TYR:CD1	1:A:593:LEU:HD21	0.48	2.44	2	2
1:A:587:TYR:CD2	1:A:593:LEU:HD21	0.48	2.44	19	1
1:A:584:LYS:HG2	1:A:587:TYR:CE2	0.48	2.44	10	2
1:A:612:TYR:CD2	1:A:617:SER:HB3	0.48	2.44	7	4
1:A:639:GLY:CA	1:A:659:CYS:HA	0.48	2.39	15	1
1:A:655:VAL:HG22	1:A:657:TYR:CE2	0.47	2.43	10	1
1:A:583:LYS:HA	1:A:587:TYR:OH	0.47	2.10	3	1
1:A:641:VAL:HG23	1:A:655:VAL:HG23	0.47	1.85	10	2
1:A:598:LYS:HB3	1:A:599:PRO:HD2	0.47	1.87	14	4
1:A:644:LYS:HD3	1:A:644:LYS:N	0.47	2.25	3	2
1:A:654:VAL:HG22	1:A:670:LYS:HB3	0.47	1.86	7	2
1:A:612:TYR:CD2	1:A:617:SER:HB2	0.47	2.45	16	2
1:A:570:GLU:O	1:A:571:LEU:HB2	0.46	2.10	14	1
1:A:572:PRO:HD2	1:A:616:LEU:HD22	0.46	1.87	4	1
1:A:578:LEU:HD12	1:A:623:CYS:SG	0.46	2.50	5	3
1:A:672:GLN:NE2	1:A:672:GLN:H	0.46	2.08	2	8
1:A:663:PHE:HB3	1:A:684:CYS:HB2	0.46	1.86	6	1
1:A:587:TYR:CD1	1:A:593:LEU:HD11	0.46	2.45	18	1
1:A:654:VAL:CG2	1:A:670:LYS:HB3	0.46	2.41	7	1
1:A:636:LEU:HD23	1:A:659:CYS:SG	0.46	2.50	15	1
1:A:655:VAL:HG23	1:A:678:TRP:CZ3	0.46	2.45	17	1
1:A:582:ARG:HG2	1:A:584:LYS:HE3	0.45	1.87	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:636:LEU:CD2	1:A:684:CYS:SG	0.45	3.05	11	1
1:A:627:VAL:HG11	1:A:651:HIS:HB2	0.45	1.88	19	1
1:A:654:VAL:HG11	1:A:670:LYS:CE	0.45	2.41	19	1
1:A:610:GLN:HG2	1:A:612:TYR:CE1	0.45	2.46	17	1
1:A:642:LYS:NZ	1:A:642:LYS:HB2	0.45	2.26	5	1
1:A:578:LEU:CD1	1:A:595:PHE:HB3	0.45	2.42	17	1
1:A:649:TYR:CE2	1:A:655:VAL:HG22	0.45	2.47	2	2
1:A:666:LYS:CG	1:A:685:ILE:HD11	0.45	2.38	2	1
1:A:601:PHE:HA	1:A:625:GLU:HA	0.45	1.87	5	2
1:A:636:LEU:HB3	1:A:639:GLY:C	0.45	2.33	19	2
1:A:601:PHE:CE1	1:A:625:GLU:HB2	0.45	2.46	15	2
1:A:636:LEU:HG	1:A:637:LEU:N	0.45	2.27	15	2
1:A:656:GLU:HA	1:A:670:LYS:HB3	0.44	1.88	5	3
1:A:601:PHE:CD2	1:A:625:GLU:HB2	0.44	2.47	16	1
1:A:588:LYS:O	1:A:591:GLU:HG2	0.44	2.12	2	1
1:A:649:TYR:CE1	1:A:655:VAL:HG22	0.44	2.47	8	1
1:A:631:GLY:HA2	1:A:648:GLU:HA	0.44	1.89	2	2
1:A:660:ASN:HB2	1:A:663:PHE:CE1	0.44	2.48	10	1
1:A:671:ILE:HG21	1:A:681:LEU:HD23	0.44	1.90	17	1
1:A:640:ASN:HB3	1:A:658:TYR:CE1	0.43	2.48	6	1
1:A:649:TYR:CE1	1:A:655:VAL:HG12	0.43	2.48	4	3
1:A:593:LEU:N	1:A:593:LEU:HD23	0.43	2.28	16	1
1:A:617:SER:HA	1:A:618:PRO:C	0.43	2.34	15	2
1:A:671:ILE:HB	1:A:679:THR:OG1	0.43	2.13	16	1
1:A:654:VAL:HG21	1:A:670:LYS:CB	0.43	2.43	17	1
1:A:610:GLN:CG	1:A:612:TYR:HE1	0.43	2.26	17	1
1:A:572:PRO:HG2	1:A:620:LEU:HD21	0.43	1.90	18	1
1:A:650:GLY:O	1:A:673:CYS:HB3	0.43	2.14	13	1
1:A:671:ILE:HD13	1:A:681:LEU:HD12	0.43	1.91	1	1
1:A:627:VAL:HG23	1:A:675:ASP:HA	0.43	1.89	4	1
1:A:602:THR:O	1:A:623:CYS:HA	0.43	2.13	13	1
1:A:629:SER:HA	1:A:650:GLY:HA2	0.42	1.89	19	4
1:A:649:TYR:CE2	1:A:655:VAL:HG12	0.42	2.49	1	2
1:A:604:VAL:HB	1:A:622:ILE:HG13	0.42	1.90	4	1
1:A:656:GLU:CG	1:A:670:LYS:HD2	0.42	2.44	4	1
1:A:671:ILE:HD13	1:A:681:LEU:HD23	0.42	1.91	6	1
1:A:654:VAL:HG22	1:A:670:LYS:HB2	0.42	1.92	6	1
1:A:656:GLU:CG	1:A:670:LYS:HB3	0.42	2.44	9	1
1:A:651:HIS:CE1	1:A:675:ASP:H	0.42	2.33	16	1
1:A:572:PRO:HD3	1:A:616:LEU:HD23	0.42	1.89	19	1
1:A:624:LYS:HE2	1:A:675:ASP:OD2	0.42	2.14	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:587:TYR:CE2	1:A:593:LEU:HG	0.42	2.50	10	1
1:A:646:LYS:HE3	1:A:649:TYR:HA	0.41	1.92	11	1
1:A:593:LEU:O	1:A:608:SER:HA	0.41	2.16	15	2
1:A:578:LEU:HD13	1:A:579:VAL:N	0.41	2.30	9	2
1:A:642:LYS:HE3	1:A:643:GLU:OE1	0.41	2.15	5	1
1:A:611:CYS:HA	1:A:616:LEU:HD13	0.41	1.91	19	1
1:A:593:LEU:HD22	1:A:595:PHE:CZ	0.41	2.50	9	1
1:A:651:HIS:HD1	1:A:674:VAL:HA	0.41	1.74	19	1
1:A:627:VAL:HG11	1:A:651:HIS:CB	0.41	2.44	19	1
1:A:656:GLU:HG2	1:A:670:LYS:HB3	0.41	1.92	5	1
1:A:617:SER:OG	1:A:618:PRO:HA	0.41	2.16	1	1
1:A:568:GLU:HB3	1:A:587:TYR:O	0.41	2.16	10	1
1:A:568:GLU:HG3	1:A:586:GLN:HB3	0.41	1.91	2	1
1:A:587:TYR:HD1	1:A:593:LEU:HD21	0.41	1.74	2	1
1:A:651:HIS:O	1:A:672:GLN:HB2	0.41	2.16	4	1
1:A:654:VAL:HG23	1:A:671:ILE:N	0.41	2.31	5	1
1:A:569:CYS:CB	1:A:587:TYR:HB2	0.41	2.45	10	1
1:A:624:LYS:HE2	1:A:675:ASP:OD1	0.41	2.16	12	1
1:A:631:GLY:HA2	1:A:647:GLU:O	0.41	2.16	15	1
1:A:569:CYS:HB3	1:A:616:LEU:CD2	0.41	2.46	20	1
1:A:637:LEU:H	1:A:637:LEU:HD23	0.41	1.76	20	1
1:A:641:VAL:HG11	1:A:645:THR:HG21	0.40	1.92	3	1
1:A:654:VAL:HG22	1:A:655:VAL:N	0.40	2.31	5	1
1:A:595:PHE:CZ	1:A:620:LEU:HD12	0.40	2.52	5	1
1:A:569:CYS:HB3	1:A:616:LEU:CD1	0.40	2.46	4	1
1:A:578:LEU:HD21	1:A:595:PHE:HB3	0.40	1.92	6	1
1:A:654:VAL:HG11	1:A:670:LYS:HE2	0.40	1.93	17	1
1:A:594:LYS:HD2	1:A:608:SER:HB3	0.40	1.92	11	1
1:A:578:LEU:HD22	1:A:623:CYS:SG	0.40	2.57	17	1
1:A:636:LEU:HB2	1:A:657:TYR:CD2	0.40	2.52	17	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	119/126 (94%)	104±3 (87±3%)	12±3 (10±3%)	3±1 (3±1%)	8 42
All	All	2380/2520 (94%)	2076 (87%)	238 (10%)	66 (3%)	8 42

All 14 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	683	VAL	20
1	A	574	ILE	13
1	A	675	ASP	11
1	A	571	LEU	7
1	A	676	GLY	4
1	A	572	PRO	3
1	A	585	ASP	1
1	A	570	GLU	1
1	A	569	CYS	1
1	A	661	PRO	1
1	A	630	CYS	1
1	A	583	LYS	1
1	A	634	PRO	1
1	A	652	SER	1

6.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the sidechain conformation was analysed and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	111/114 (97%)	103±2 (93±2%)	8±2 (7±2%)	18 66
All	All	2220/2280 (97%)	2058 (93%)	162 (7%)	18 66

All 30 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	685	ILE	20
1	A	586	GLN	19
1	A	672	GLN	17
1	A	610	GLN	13

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Mol	Chain	Res	Type	Models (Total)
1	A	640	ASN	13
1	A	607	ASN	9
1	A	637	LEU	8
1	A	670	LYS	6
1	A	573	LYS	6
1	A	578	LEU	6
1	A	665	MET	6
1	A	613	HIS	5
1	A	662	ARG	4
1	A	593	LEU	4
1	A	644	LYS	3
1	A	679	THR	3
1	A	571	LEU	3
1	A	568	GLU	2
1	A	611	CYS	2
1	A	655	VAL	2
1	A	589	VAL	2
1	A	628	GLN	1
1	A	638	ASN	1
1	A	642	LYS	1
1	A	591	GLU	1
1	A	654	VAL	1
1	A	594	LYS	1
1	A	660	ASN	1
1	A	581	ASP	1
1	A	687	GLU	1

6.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates (i)

There are no monosaccharides in this entry.

6.6 Ligand geometry

There are no ligands in this entry.

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 93% for the well-defined parts and 93% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *4b2r*

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	1572
Number of shifts mapped to atoms	1572
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	1

7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	126	0.11 ± 0.13	None needed (< 0.5 ppm)
$^{13}C_{\beta}$	116	-0.20 ± 0.17	None needed (< 0.5 ppm)
$^{13}C'$	124	0.50 ± 0.10	Should be applied
^{15}N	113	0.32 ± 0.26	None needed (< 0.5 ppm)

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 93%, i.e. 1510 atoms were assigned a chemical shift out of a possible 1619. 0 out of 22 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	581/585 (99%)	236/237 (100%)	238/240 (99%)	107/108 (99%)
Sidechain	839/913 (92%)	564/590 (96%)	265/295 (90%)	10/28 (36%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	90/121 (74%)	45/58 (78%)	44/56 (79%)	1/7 (14%)
Overall	1510/1619 (93%)	845/885 (95%)	547/591 (93%)	118/143 (83%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 93%, i.e. 1569 atoms were assigned a chemical shift out of a possible 1690. 0 out of 22 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	611/616 (99%)	248/250 (99%)	250/252 (99%)	113/114 (99%)
Sidechain	868/953 (91%)	584/615 (95%)	274/307 (89%)	10/31 (32%)
Aromatic	90/121 (74%)	45/58 (78%)	44/56 (79%)	1/7 (14%)
Overall	1569/1690 (93%)	877/923 (95%)	568/615 (92%)	124/152 (82%)

7.1.4 Statistically unusual chemical shifts (i)

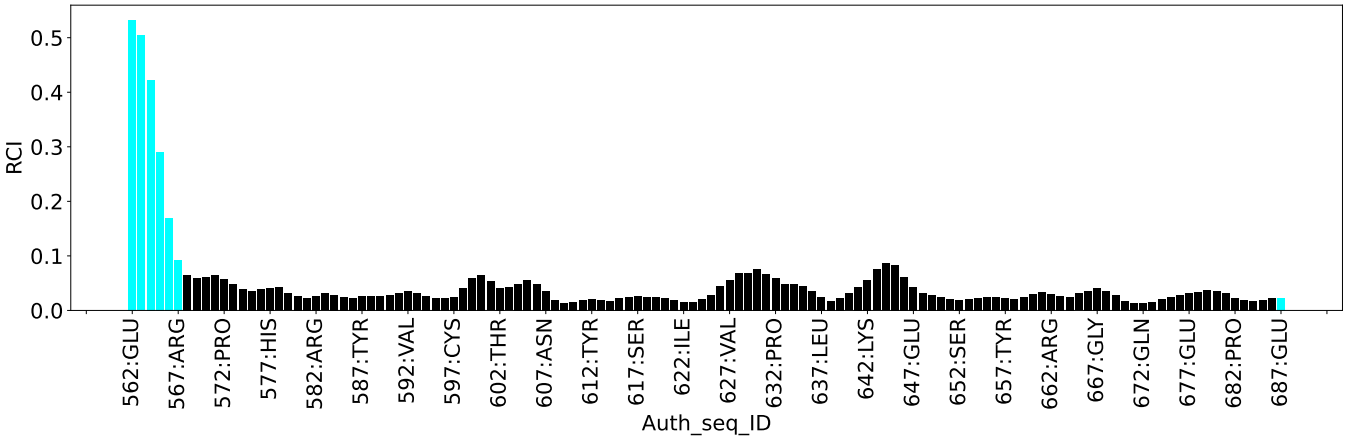
The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

List Id	Chain	Res	Type	Atom	Shift, *ppm*	Expected range, *ppm*	Z-score
1	A	638	ASN	HB2	1.05	1.27 – 4.34	-5.7

7.1.5 Random Coil Index (RCI) plots (i)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:


RCI
0.0
0.1
0.2
0.3
0.4
0.5
562:GLU
567:ARG
572:PRO
577:HIS
582:ARG
587:TYR
592:VAL
597:CYS
602:THR
607:ASN
612:TYR
617:SER
622:ILE
627:VAL
632:PRO
637:LEU
642:LYS
647:GLU
652:SER
657:TYR
662:ARG
667:GLY
672:GLN
677:GLU
682:PRO
687:GLU
Auth_seq_ID