



Full wwPDB NMR Structure Validation Report ⓘ

Mar 9, 2026 – 04:28 AM UTC

PDB ID : 2HVA / pdb_00002hva
Title : Solution Structure of the haem-binding protein p22HBP
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Deposited on : 2006-07-28

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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
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)	:	2.49

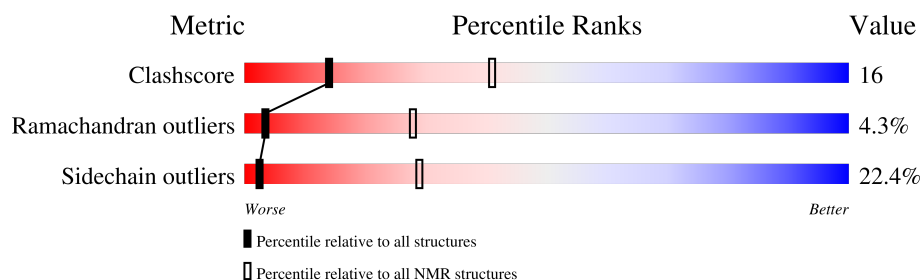
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

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	192	

2 Ensemble composition and analysis

This entry contains 21 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:19-A:171, A:182-A:190 (162)	1.10	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, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 21
2	3, 4
Single-model clusters	14; 17

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2919 atoms, of which 1438 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Heme-binding protein 1.

Mol	Chain	Residues	Atoms						Trace
1	A	190	Total	C	H	N	O	S	0
			2919	941	1438	245	286	9	

There are 2 discrepancies between the modelled and reference sequences:

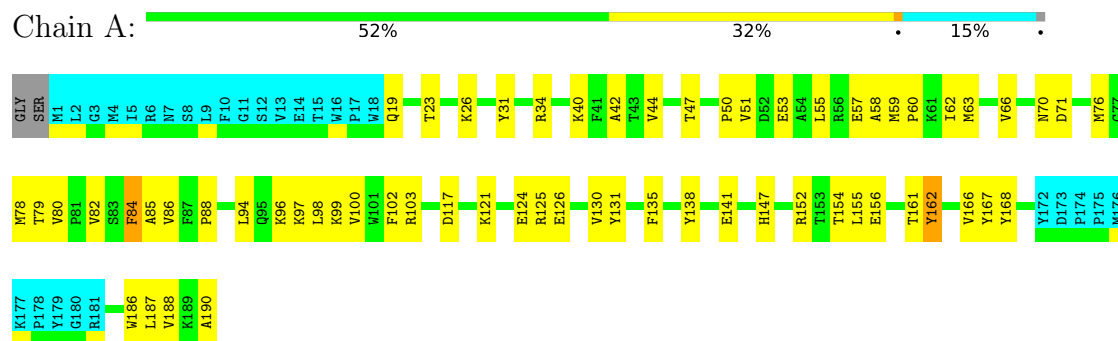
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	cloning artifact	UNP Q9R257
A	0	SER	-	cloning artifact	UNP Q9R257

4 Residue-property plots

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: Heme-binding protein 1

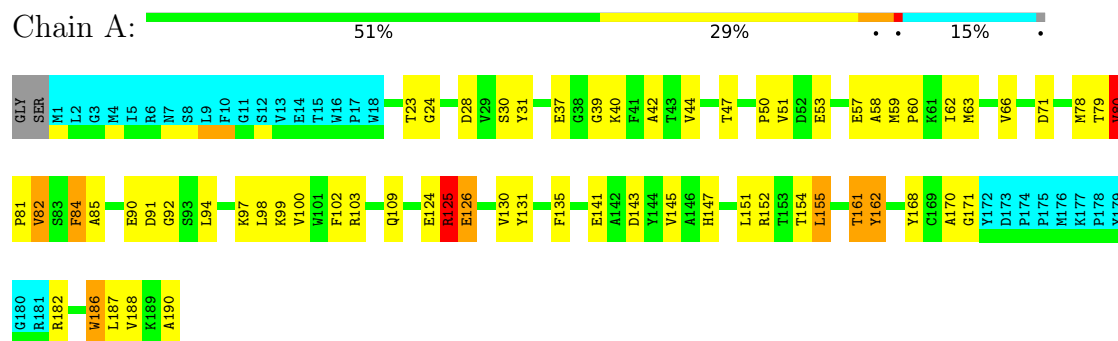


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

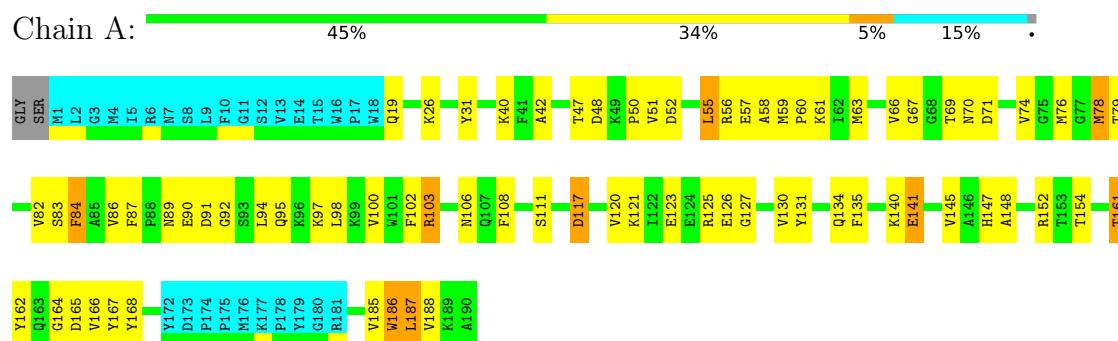
4.2.1 Score per residue for model 1 (medoid)

- Molecule 1: Heme-binding protein 1



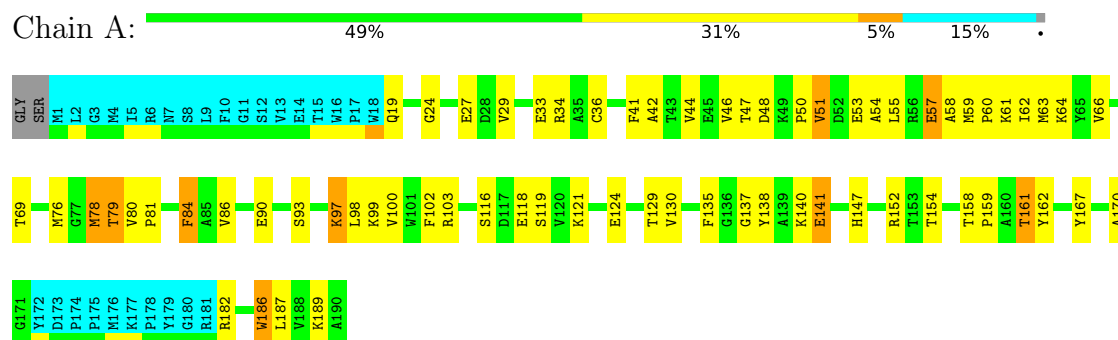
4.2.2 Score per residue for model 2

- Molecule 1: Heme-binding protein 1



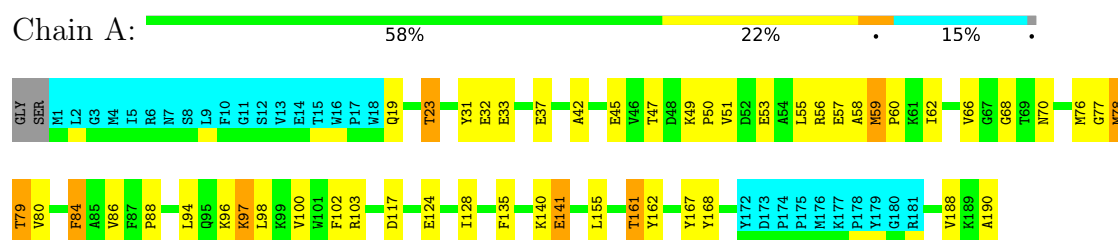
4.2.3 Score per residue for model 3

- Molecule 1: Heme-binding protein 1



4.2.4 Score per residue for model 4

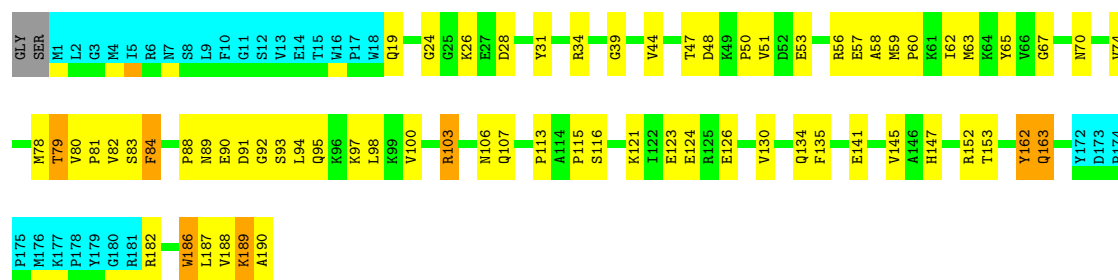
- Molecule 1: Heme-binding protein 1



4.2.5 Score per residue for model 5

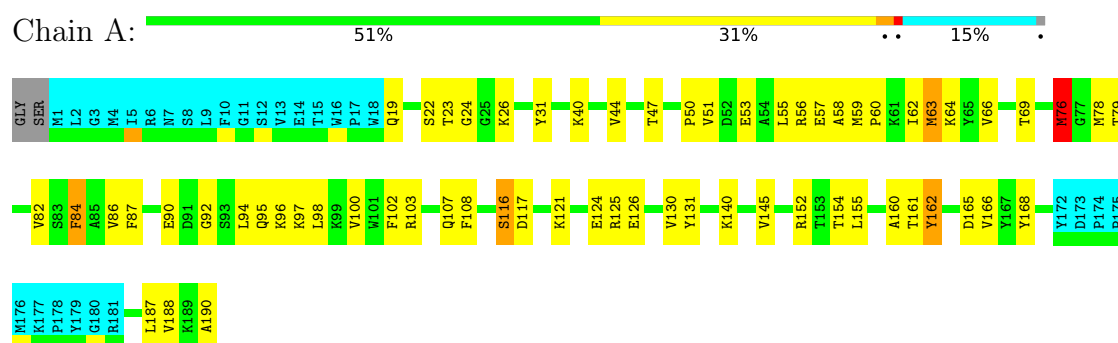
- Molecule 1: Heme-binding protein 1





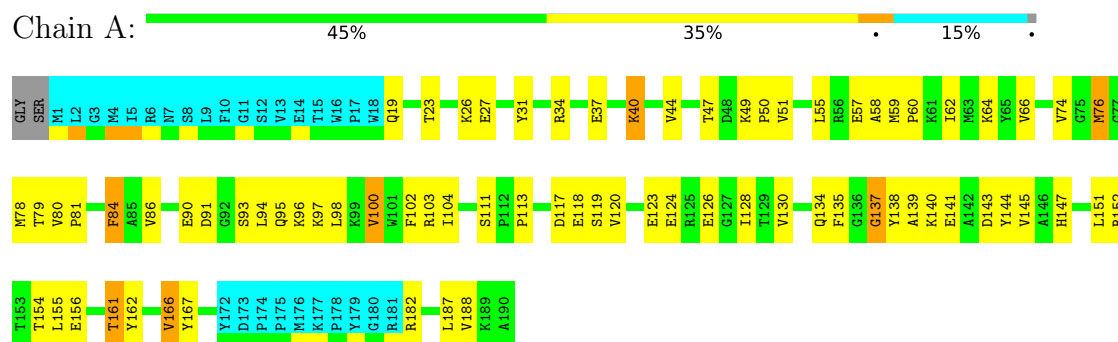
4.2.6 Score per residue for model 6

- Molecule 1: Heme-binding protein 1



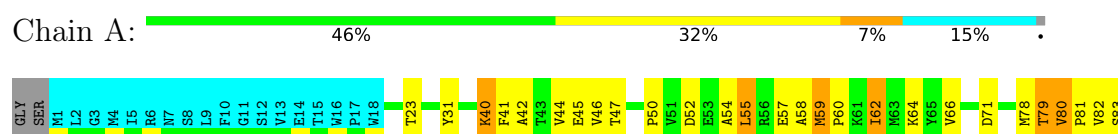
4.2.7 Score per residue for model 7

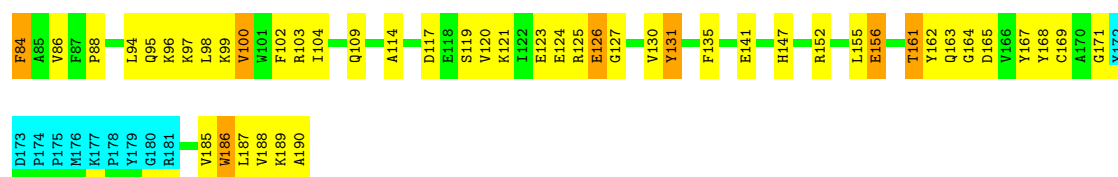
- Molecule 1: Heme-binding protein 1



4.2.8 Score per residue for model 8

- Molecule 1: Heme-binding protein 1

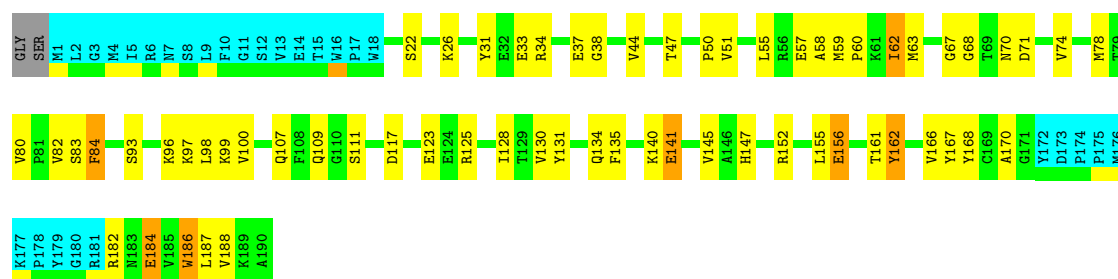




4.2.9 Score per residue for model 9

- Molecule 1: Heme-binding protein 1

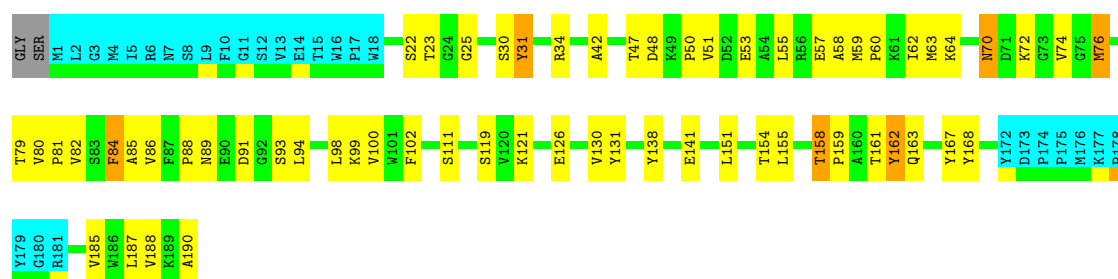
Chain A: 52% 29% 15%



4.2.10 Score per residue for model 10

- Molecule 1: Heme-binding protein 1

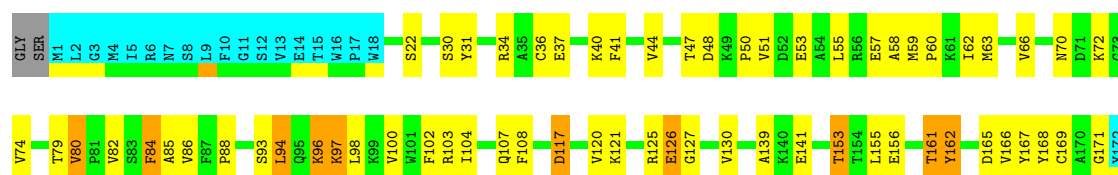
Chain A: 52% 29% 15%



4.2.11 Score per residue for model 11

- Molecule 1: Heme-binding protein 1

Chain A: 49% 30% 5% 15%

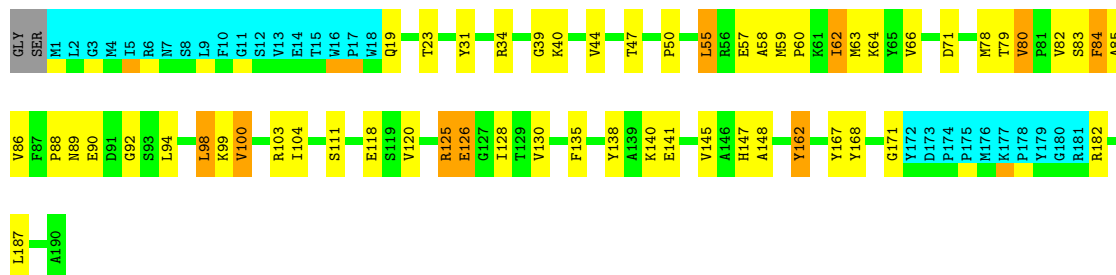




4.2.12 Score per residue for model 12

- Molecule 1: Heme-binding protein 1

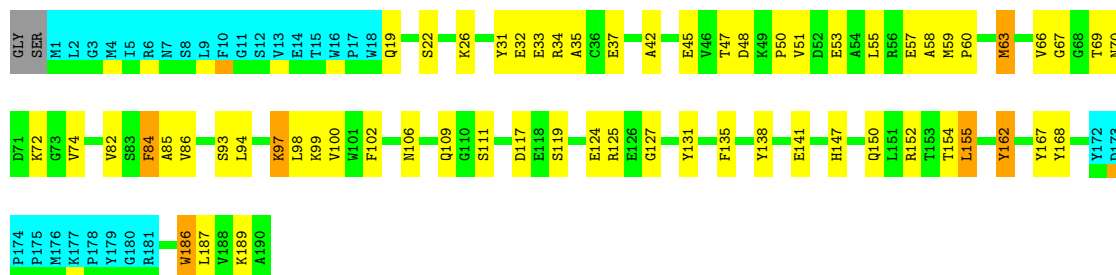
Chain A: 55% 25% 5% 15% .



4.2.13 Score per residue for model 13

- Molecule 1: Heme-binding protein 1

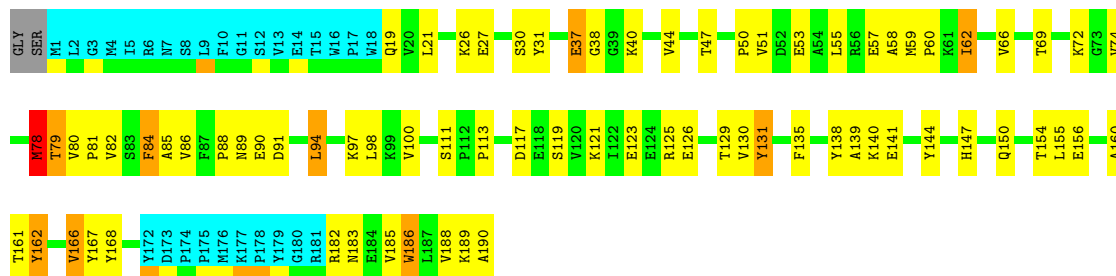
Chain A: 52% 29% . 15% .



4.2.14 Score per residue for model 14

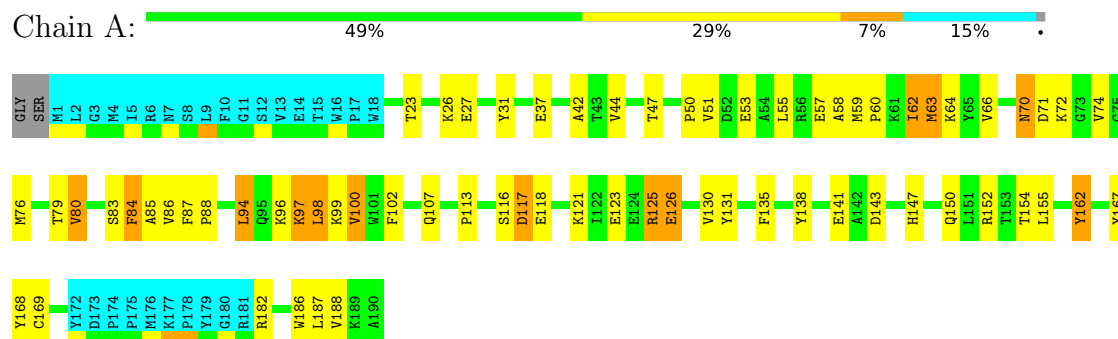
- Molecule 1: Heme-binding protein 1

Chain A: 45% 34% 5% . 15% .



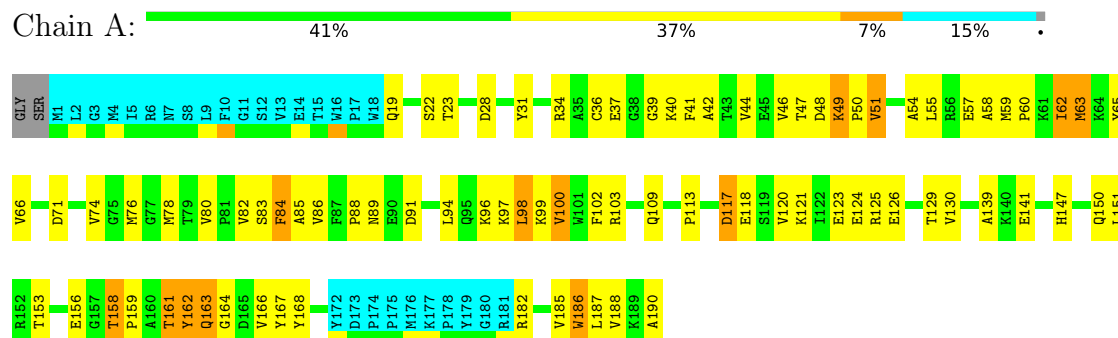
4.2.15 Score per residue for model 15

- Molecule 1: Heme-binding protein 1



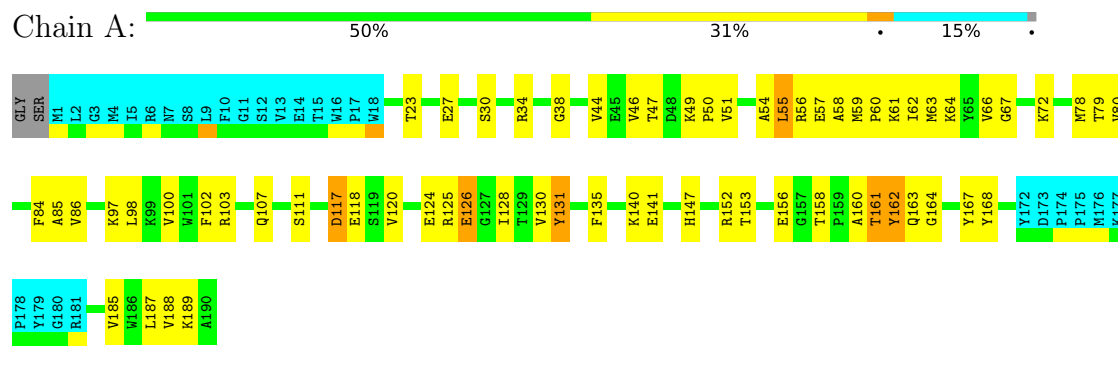
4.2.16 Score per residue for model 16

- Molecule 1: Heme-binding protein 1



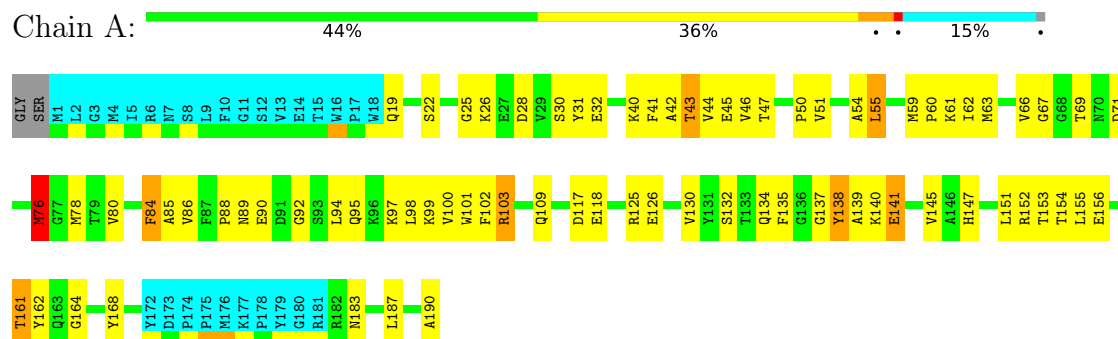
4.2.17 Score per residue for model 17

- Molecule 1: Heme-binding protein 1



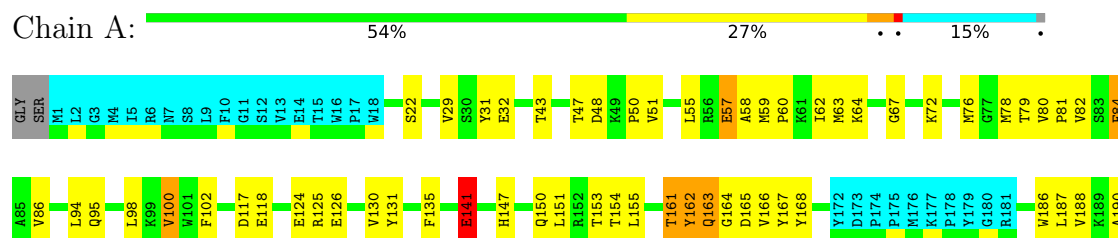
4.2.18 Score per residue for model 18

- Molecule 1: Heme-binding protein 1



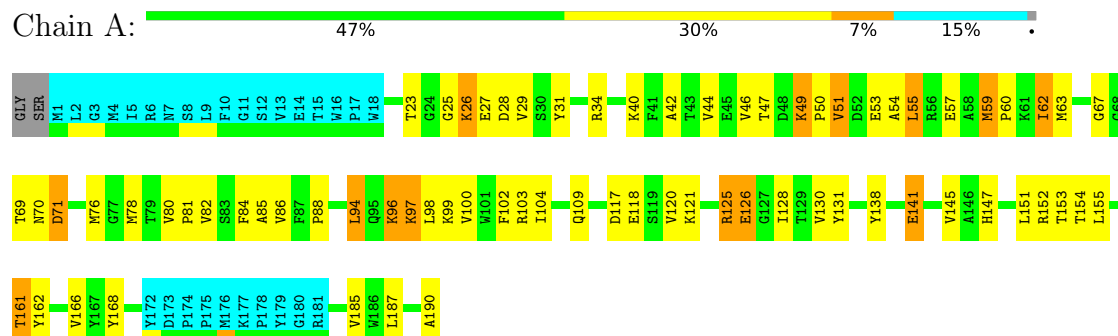
4.2.19 Score per residue for model 19

- Molecule 1: Heme-binding protein 1



4.2.20 Score per residue for model 20

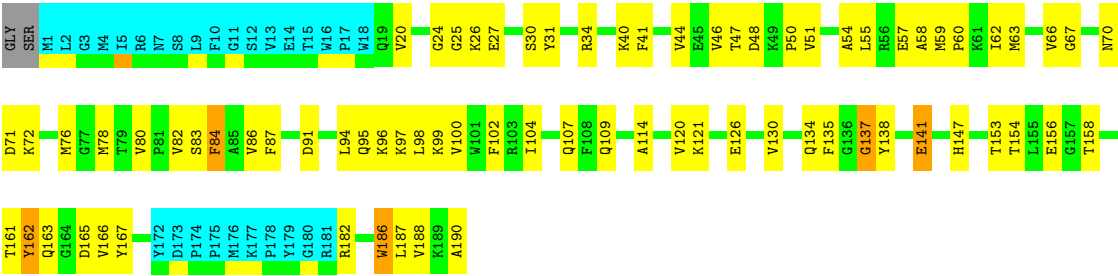
- Molecule 1: Heme-binding protein 1



4.2.21 Score per residue for model 21

- Molecule 1: Heme-binding protein 1





5 Refinement protocol and experimental data overview

The models were refined using the following method: *Simulated annealing with torsion angle dynamics*.

Of the 200 calculated structures, 21 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
CNS	refinement	1.1

No chemical shift data was provided.

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	1248	1213	1212	39±5
All	All	26208	25473	25452	813

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 16.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:85:ALA:HB2	1:A:168:TYR:CE2	0.87	2.05	17	6
1:A:55:LEU:HD11	1:A:84:PHE:CE1	0.86	2.05	18	17
1:A:162:TYR:O	1:A:190:ALA:HB2	0.83	1.73	10	6
1:A:51:VAL:HG13	1:A:98:LEU:CD1	0.83	2.03	9	15
1:A:51:VAL:HG13	1:A:98:LEU:HD13	0.82	1.49	13	14
1:A:55:LEU:HD11	1:A:84:PHE:CE2	0.81	2.11	20	1
1:A:167:TYR:HB3	1:A:187:LEU:HD23	0.76	1.57	8	12
1:A:168:TYR:CE2	1:A:188:VAL:HG22	0.76	2.15	19	7
1:A:44:VAL:HG23	1:A:62:ILE:HD12	0.75	1.56	14	12
1:A:59:MET:HE1	1:A:82:VAL:HG11	0.74	1.58	19	2
1:A:84:PHE:CD2	1:A:98:LEU:HD11	0.74	2.17	16	16
1:A:86:VAL:HG12	1:A:98:LEU:HD12	0.72	1.61	18	7
1:A:167:TYR:CD2	1:A:185:VAL:HG13	0.72	2.19	10	3
1:A:131:TYR:OH	1:A:160:ALA:HB1	0.72	1.85	17	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:170:ALA:HB3	1:A:184:GLU:CG	0.72	2.15	9	1
1:A:46:VAL:HG11	1:A:54:ALA:HA	0.72	1.62	20	6
1:A:161:THR:HG22	1:A:190:ALA:HB3	0.71	1.63	6	2
1:A:19:GLN:CG	1:A:35:ALA:HB3	0.71	2.16	13	1
1:A:85:ALA:HB2	1:A:168:TYR:CE1	0.71	2.20	14	5
1:A:66:VAL:HG11	1:A:102:PHE:CE2	0.70	2.21	4	10
1:A:130:VAL:HG12	1:A:187:LEU:O	0.70	1.87	3	12
1:A:130:VAL:HG12	1:A:188:VAL:HA	0.70	1.62	14	11
1:A:44:VAL:CG2	1:A:62:ILE:HD11	0.70	2.17	17	3
1:A:161:THR:HB	1:A:190:ALA:HB3	0.69	1.63	14	7
1:A:44:VAL:HB	1:A:100:VAL:CG1	0.68	2.19	17	3
1:A:79:THR:O	1:A:80:VAL:HG12	0.68	1.89	8	1
1:A:117:ASP:HB3	1:A:120:VAL:HG23	0.67	1.64	16	7
1:A:88:PRO:HA	1:A:94:LEU:HD23	0.67	1.65	15	11
1:A:58:ALA:HB1	1:A:100:VAL:HG21	0.67	1.66	4	18
1:A:19:GLN:HG3	1:A:35:ALA:HB3	0.66	1.67	13	1
1:A:148:ALA:HB1	1:A:187:LEU:HD21	0.66	1.68	2	1
1:A:86:VAL:HG12	1:A:98:LEU:CD1	0.66	2.21	18	2
1:A:55:LEU:HD22	1:A:59:MET:HE3	0.66	1.66	19	2
1:A:170:ALA:HB3	1:A:184:GLU:HG2	0.65	1.67	9	1
1:A:31:TYR:CD2	1:A:155:LEU:HD21	0.65	2.26	20	1
1:A:58:ALA:CB	1:A:100:VAL:HG21	0.64	2.23	3	13
1:A:153:THR:HG23	1:A:156:GLU:OE1	0.63	1.93	17	1
1:A:167:TYR:CB	1:A:187:LEU:HD23	0.63	2.24	8	4
1:A:42:ALA:HB3	1:A:102:PHE:HB3	0.63	1.69	18	10
1:A:92:GLY:O	1:A:145:VAL:HG11	0.63	1.94	1	4
1:A:86:VAL:O	1:A:166:VAL:HG23	0.63	1.93	16	2
1:A:70:ASN:ND2	1:A:74:VAL:HG22	0.63	2.09	13	4
1:A:59:MET:HE1	1:A:100:VAL:HG11	0.62	1.70	8	1
1:A:130:VAL:HG21	1:A:186:TRP:CE3	0.62	2.29	9	3
1:A:44:VAL:HG23	1:A:62:ILE:HD11	0.62	1.71	18	3
1:A:148:ALA:HB2	1:A:185:VAL:HG11	0.61	1.72	2	1
1:A:46:VAL:HG11	1:A:54:ALA:CA	0.61	2.25	20	4
1:A:31:TYR:CE2	1:A:155:LEU:HD21	0.61	2.30	4	1
1:A:42:ALA:HB3	1:A:62:ILE:HD11	0.60	1.72	20	1
1:A:82:VAL:HG11	1:A:102:PHE:CD2	0.59	2.32	11	3
1:A:94:LEU:HD12	1:A:141:GLU:OE2	0.59	1.97	11	1
1:A:66:VAL:HG21	1:A:78:MET:HG3	0.59	1.75	14	1
1:A:166:VAL:O	1:A:166:VAL:HG13	0.59	1.97	14	5
1:A:44:VAL:HG21	1:A:62:ILE:HB	0.59	1.74	3	4
1:A:44:VAL:CG2	1:A:62:ILE:HD12	0.59	2.26	14	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:86:VAL:HB	1:A:94:LEU:HD22	0.59	1.75	13	1
1:A:86:VAL:HG21	1:A:167:TYR:CZ	0.58	2.33	15	3
1:A:79:THR:HG22	1:A:81:PRO:HD2	0.58	1.74	10	4
1:A:80:VAL:N	1:A:81:PRO:CD	0.58	2.66	7	5
1:A:94:LEU:HD12	1:A:141:GLU:CG	0.58	2.29	18	10
1:A:70:ASN:HD21	1:A:74:VAL:HG22	0.57	1.59	13	4
1:A:85:ALA:HB2	1:A:168:TYR:CD1	0.57	2.34	14	1
1:A:169:CYS:SG	1:A:185:VAL:HG13	0.57	2.40	11	2
1:A:26:LYS:HD2	1:A:154:THR:HG23	0.57	1.77	13	1
1:A:21:LEU:HD12	1:A:129:THR:HG21	0.57	1.75	14	1
1:A:55:LEU:HD11	1:A:84:PHE:CD1	0.57	2.34	6	1
1:A:31:TYR:CE2	1:A:154:THR:HG22	0.57	2.35	10	1
1:A:63:MET:O	1:A:66:VAL:HG22	0.56	1.99	12	5
1:A:165:ASP:OD1	1:A:166:VAL:HG12	0.56	2.00	11	1
1:A:46:VAL:HB	1:A:54:ALA:HB1	0.56	1.77	20	3
1:A:66:VAL:HG11	1:A:102:PHE:CZ	0.56	2.36	8	4
1:A:94:LEU:HD12	1:A:141:GLU:HG3	0.56	1.78	18	3
1:A:44:VAL:HG22	1:A:120:VAL:HG22	0.56	1.78	21	2
1:A:55:LEU:HD11	1:A:84:PHE:CD2	0.56	2.36	20	1
1:A:59:MET:HE1	1:A:82:VAL:HG21	0.55	1.78	5	6
1:A:86:VAL:HG23	1:A:167:TYR:CZ	0.55	2.36	8	3
1:A:59:MET:N	1:A:60:PRO:HD2	0.55	2.16	21	8
1:A:74:VAL:HG21	1:A:113:PRO:CG	0.55	2.31	7	3
1:A:131:TYR:CZ	1:A:155:LEU:HD11	0.55	2.36	15	1
1:A:84:PHE:CD1	1:A:84:PHE:N	0.54	2.74	8	19
1:A:79:THR:O	1:A:80:VAL:HG13	0.54	2.02	4	1
1:A:46:VAL:CB	1:A:54:ALA:HB1	0.54	2.32	20	2
1:A:74:VAL:HG21	1:A:113:PRO:HG3	0.54	1.79	14	2
1:A:92:GLY:O	1:A:145:VAL:HG21	0.54	2.03	5	1
1:A:46:VAL:CG1	1:A:54:ALA:HB1	0.54	2.32	18	1
1:A:84:PHE:HB2	1:A:98:LEU:HD11	0.54	1.79	2	5
1:A:186:TRP:N	1:A:186:TRP:CD1	0.54	2.76	3	9
1:A:59:MET:CE	1:A:82:VAL:HG11	0.53	2.30	19	3
1:A:155:LEU:HD13	1:A:162:TYR:CD1	0.53	2.38	9	1
1:A:20:VAL:HG22	1:A:34:ARG:HD3	0.53	1.79	21	1
1:A:155:LEU:CD1	1:A:187:LEU:HD12	0.53	2.33	10	1
1:A:31:TYR:HB3	1:A:151:LEU:HD11	0.53	1.80	1	3
1:A:87:PHE:CE2	1:A:166:VAL:HG21	0.53	2.38	6	1
1:A:86:VAL:C	1:A:166:VAL:HG23	0.53	2.28	20	1
1:A:70:ASN:O	1:A:114:ALA:HB3	0.53	2.04	21	1
1:A:170:ALA:HB2	1:A:186:TRP:CZ2	0.52	2.39	1	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:65:TYR:CE2	1:A:76:MET:HE1	0.52	2.38	16	1
1:A:26:LYS:HD3	1:A:154:THR:HG23	0.52	1.80	6	1
1:A:79:THR:HG21	1:A:103:ARG:O	0.52	2.05	6	1
1:A:162:TYR:CD1	1:A:162:TYR:N	0.52	2.78	15	6
1:A:31:TYR:CE1	1:A:154:THR:HG22	0.52	2.40	21	4
1:A:94:LEU:HD12	1:A:141:GLU:CD	0.52	2.30	7	2
1:A:49:LYS:HB3	1:A:54:ALA:HB2	0.52	1.81	17	3
1:A:94:LEU:HD12	1:A:141:GLU:HG2	0.52	1.81	7	3
1:A:71:ASP:OD2	1:A:114:ALA:HB3	0.52	2.05	8	1
1:A:74:VAL:HG21	1:A:113:PRO:HG2	0.52	1.81	15	1
1:A:84:PHE:HD2	1:A:98:LEU:HD11	0.52	1.64	17	5
1:A:23:THR:HG22	1:A:32:GLU:HG2	0.51	1.81	4	1
1:A:40:LYS:O	1:A:104:ILE:HD12	0.51	2.06	7	4
1:A:94:LEU:HD21	1:A:167:TYR:OH	0.51	2.05	21	2
1:A:151:LEU:HB3	1:A:187:LEU:HD11	0.51	1.83	10	2
1:A:135:PHE:CD1	1:A:147:HIS:CE1	0.51	2.99	15	8
1:A:69:THR:O	1:A:69:THR:HG22	0.51	2.05	20	5
1:A:46:VAL:HG11	1:A:54:ALA:HB1	0.51	1.82	18	1
1:A:29:VAL:HG11	1:A:150:GLN:HB3	0.51	1.82	19	1
1:A:135:PHE:CE1	1:A:147:HIS:CE1	0.51	2.99	15	10
1:A:135:PHE:CD2	1:A:147:HIS:CE1	0.51	2.99	2	3
1:A:79:THR:O	1:A:80:VAL:CG1	0.51	2.59	8	1
1:A:86:VAL:HG23	1:A:167:TYR:CE1	0.50	2.41	11	5
1:A:74:VAL:HG23	1:A:76:MET:HG3	0.50	1.83	7	1
1:A:161:THR:CB	1:A:190:ALA:HB3	0.50	2.35	14	2
1:A:163:GLN:HG2	1:A:190:ALA:HB2	0.50	1.83	5	2
1:A:135:PHE:CZ	1:A:147:HIS:CE1	0.50	3.00	3	7
1:A:139:ALA:HB3	1:A:183:ASN:OD1	0.50	2.06	14	1
1:A:85:ALA:HB2	1:A:168:TYR:HE1	0.50	1.66	10	2
1:A:79:THR:O	1:A:80:VAL:HG23	0.50	2.07	1	1
1:A:80:VAL:HG21	1:A:103:ARG:HB3	0.50	1.83	4	1
1:A:162:TYR:C	1:A:190:ALA:HB2	0.50	2.32	6	3
1:A:135:PHE:CE2	1:A:147:HIS:CE1	0.50	2.99	5	5
1:A:79:THR:O	1:A:80:VAL:O	0.49	2.30	8	2
1:A:57:GLU:C	1:A:60:PRO:HD2	0.49	2.33	20	20
1:A:155:LEU:HD22	1:A:160:ALA:CB	0.49	2.38	6	1
1:A:26:LYS:CD	1:A:154:THR:HG23	0.49	2.37	13	1
1:A:186:TRP:CD1	1:A:186:TRP:N	0.49	2.81	21	2
1:A:80:VAL:CG2	1:A:81:PRO:HD3	0.49	2.37	7	1
1:A:161:THR:OG1	1:A:190:ALA:HB3	0.49	2.06	11	1
1:A:131:TYR:CE1	1:A:155:LEU:HD11	0.49	2.43	13	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:55:LEU:HD22	1:A:59:MET:HE1	0.49	1.83	4	1
1:A:139:ALA:HB2	1:A:147:HIS:HE1	0.49	1.68	18	1
1:A:31:TYR:CD1	1:A:31:TYR:N	0.48	2.81	4	14
1:A:59:MET:N	1:A:60:PRO:CD	0.48	2.76	9	21
1:A:31:TYR:CD2	1:A:155:LEU:HD23	0.48	2.43	18	1
1:A:147:HIS:HB2	1:A:185:VAL:HG21	0.48	1.86	20	1
1:A:189:LYS:O	1:A:190:ALA:HB3	0.48	2.09	5	1
1:A:162:TYR:O	1:A:164:GLY:N	0.48	2.47	16	2
1:A:69:THR:HG22	1:A:116:SER:CB	0.48	2.39	6	1
1:A:49:LYS:CB	1:A:54:ALA:HB2	0.48	2.38	17	2
1:A:84:PHE:CB	1:A:98:LEU:HD21	0.48	2.39	14	4
1:A:79:THR:C	1:A:80:VAL:CG2	0.48	2.86	1	1
1:A:55:LEU:HD22	1:A:59:MET:CE	0.47	2.39	4	1
1:A:46:VAL:HG11	1:A:54:ALA:CB	0.47	2.39	18	1
1:A:163:GLN:H	1:A:190:ALA:HB2	0.47	1.69	19	1
1:A:31:TYR:CE2	1:A:155:LEU:HD23	0.47	2.44	1	2
1:A:102:PHE:CD1	1:A:103:ARG:N	0.47	2.82	6	4
1:A:43:THR:HA	1:A:100:VAL:O	0.47	2.10	19	1
1:A:59:MET:HA	1:A:62:ILE:HG22	0.47	1.85	4	6
1:A:86:VAL:CG2	1:A:167:TYR:CZ	0.47	2.98	19	5
1:A:141:GLU:O	1:A:145:VAL:HG23	0.47	2.10	9	3
1:A:139:ALA:HB3	1:A:183:ASN:ND2	0.47	2.25	11	1
1:A:59:MET:SD	1:A:82:VAL:HG21	0.47	2.50	19	1
1:A:62:ILE:HD11	1:A:102:PHE:HB2	0.47	1.86	19	3
1:A:86:VAL:HG22	1:A:167:TYR:O	0.47	2.09	11	1
1:A:161:THR:HG21	1:A:190:ALA:OXT	0.47	2.10	20	1
1:A:125:ARG:O	1:A:126:GLU:CB	0.47	2.63	1	5
1:A:151:LEU:O	1:A:155:LEU:HD12	0.47	2.10	1	1
1:A:131:TYR:HB2	1:A:151:LEU:HD21	0.47	1.86	20	1
1:A:31:TYR:C	1:A:31:TYR:CD1	0.47	2.93	5	3
1:A:83:SER:CB	1:A:186:TRP:CH2	0.47	2.98	5	2
1:A:139:ALA:HB2	1:A:147:HIS:CE1	0.47	2.45	16	1
1:A:31:TYR:CE1	1:A:154:THR:CG2	0.46	2.98	1	3
1:A:131:TYR:CE2	1:A:155:LEU:HD22	0.46	2.45	10	1
1:A:169:CYS:SG	1:A:185:VAL:HG22	0.46	2.50	11	1
1:A:148:ALA:HB2	1:A:167:TYR:CE2	0.46	2.45	12	1
1:A:82:VAL:CG1	1:A:102:PHE:CD2	0.46	2.98	13	1
1:A:84:PHE:HB3	1:A:100:VAL:CB	0.46	2.40	18	2
1:A:155:LEU:HB3	1:A:160:ALA:HB3	0.46	1.88	6	1
1:A:161:THR:O	1:A:162:TYR:CD1	0.46	2.69	2	5
1:A:167:TYR:CD2	1:A:185:VAL:CG1	0.46	2.99	16	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:86:VAL:O	1:A:86:VAL:HG23	0.46	2.09	6	1
1:A:135:PHE:CE2	1:A:147:HIS:ND1	0.46	2.84	8	6
1:A:66:VAL:HG11	1:A:102:PHE:CE1	0.46	2.46	7	1
1:A:139:ALA:CB	1:A:144:TYR:CZ	0.46	2.99	7	1
1:A:66:VAL:HG12	1:A:76:MET:SD	0.46	2.51	18	1
1:A:125:ARG:O	1:A:126:GLU:C	0.46	2.59	20	1
1:A:31:TYR:CE2	1:A:155:LEU:CD2	0.46	2.99	20	2
1:A:144:TYR:CD1	1:A:185:VAL:CG2	0.46	2.99	14	1
1:A:41:PHE:CD1	1:A:41:PHE:N	0.45	2.84	21	3
1:A:117:ASP:CB	1:A:120:VAL:HG23	0.45	2.41	8	2
1:A:44:VAL:HB	1:A:100:VAL:HG12	0.45	1.88	20	2
1:A:161:THR:O	1:A:161:THR:HG22	0.45	2.11	10	3
1:A:42:ALA:HB3	1:A:102:PHE:CB	0.45	2.42	13	3
1:A:161:THR:C	1:A:162:TYR:CG	0.45	2.94	18	7
1:A:86:VAL:CG2	1:A:167:TYR:CE2	0.45	3.00	2	3
1:A:168:TYR:CE2	1:A:188:VAL:CG2	0.45	3.00	9	5
1:A:94:LEU:HD12	1:A:141:GLU:HB2	0.45	1.89	5	1
1:A:82:VAL:HG12	1:A:102:PHE:HA	0.45	1.88	8	1
1:A:31:TYR:CD2	1:A:155:LEU:CD2	0.45	2.98	20	2
1:A:103:ARG:NH2	1:A:186:TRP:CH2	0.45	2.85	5	1
1:A:74:VAL:HG21	1:A:108:PHE:CE2	0.45	2.47	11	1
1:A:161:THR:C	1:A:162:TYR:CD1	0.45	2.95	19	2
1:A:135:PHE:CE1	1:A:147:HIS:NE2	0.45	2.85	12	1
1:A:135:PHE:CZ	1:A:147:HIS:ND1	0.45	2.85	13	2
1:A:43:THR:CG2	1:A:101:TRP:CD2	0.45	2.99	18	1
1:A:135:PHE:N	1:A:135:PHE:CD1	0.45	2.85	21	1
1:A:131:TYR:CE1	1:A:155:LEU:CD1	0.44	3.00	14	2
1:A:66:VAL:CG1	1:A:102:PHE:CE2	0.44	3.01	21	1
1:A:87:PHE:CE2	1:A:166:VAL:CG2	0.44	2.99	21	1
1:A:29:VAL:HG11	1:A:150:GLN:CB	0.44	2.43	19	1
1:A:158:THR:CB	1:A:159:PRO:CD	0.44	2.95	16	2
1:A:70:ASN:O	1:A:71:ASP:CB	0.44	2.66	15	3
1:A:51:VAL:HG23	1:A:141:GLU:HG3	0.44	1.89	2	1
1:A:86:VAL:O	1:A:167:TYR:CE1	0.44	2.70	8	2
1:A:139:ALA:CB	1:A:144:TYR:CE1	0.44	3.01	7	1
1:A:153:THR:HG22	1:A:156:GLU:OE1	0.44	2.13	11	1
1:A:85:ALA:O	1:A:98:LEU:HD12	0.44	2.13	15	1
1:A:25:GLY:CA	1:A:31:TYR:CE1	0.44	3.00	21	1
1:A:131:TYR:CZ	1:A:155:LEU:CD1	0.44	3.00	15	2
1:A:44:VAL:HG23	1:A:62:ILE:CD1	0.43	2.41	9	1
1:A:151:LEU:HB3	1:A:187:LEU:HD12	0.43	1.88	19	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:155:LEU:CD1	1:A:162:TYR:CE1	0.43	3.01	11	1
1:A:80:VAL:N	1:A:81:PRO:HD2	0.43	2.29	5	2
1:A:161:THR:O	1:A:161:THR:CG2	0.43	2.66	10	2
1:A:131:TYR:CE2	1:A:155:LEU:HD13	0.43	2.48	19	1
1:A:153:THR:O	1:A:156:GLU:HG2	0.43	2.13	21	1
1:A:79:THR:HG22	1:A:80:VAL:HG23	0.43	1.89	15	3
1:A:87:PHE:CD2	1:A:166:VAL:CG2	0.43	3.01	6	1
1:A:59:MET:HE1	1:A:82:VAL:CG2	0.43	2.43	11	1
1:A:84:PHE:HB3	1:A:100:VAL:HB	0.43	1.91	18	1
1:A:161:THR:O	1:A:162:TYR:O	0.43	2.37	21	1
1:A:188:VAL:HG12	1:A:190:ALA:H	0.42	1.74	5	1
1:A:102:PHE:CE1	1:A:103:ARG:O	0.42	2.72	18	3
1:A:139:ALA:HB3	1:A:183:ASN:CG	0.42	2.38	14	1
1:A:144:TYR:CD1	1:A:185:VAL:HG22	0.42	2.49	14	1
1:A:51:VAL:CG1	1:A:84:PHE:CE2	0.42	3.02	14	3
1:A:162:TYR:HA	1:A:188:VAL:O	0.42	2.14	17	1
1:A:94:LEU:HD21	1:A:145:VAL:HG22	0.42	1.90	7	1
1:A:40:LYS:O	1:A:41:PHE:CD1	0.42	2.73	11	2
1:A:80:VAL:N	1:A:81:PRO:HD3	0.42	2.28	7	1
1:A:55:LEU:CD2	1:A:59:MET:HE3	0.42	2.42	19	1
1:A:51:VAL:HG22	1:A:86:VAL:HG12	0.42	1.91	21	1
1:A:135:PHE:CE1	1:A:147:HIS:ND1	0.42	2.88	13	2
1:A:40:LYS:C	1:A:41:PHE:CD1	0.42	2.98	8	1
1:A:170:ALA:HB3	1:A:184:GLU:HG3	0.42	1.88	9	1
1:A:44:VAL:HB	1:A:100:VAL:HG13	0.42	1.88	17	1
1:A:162:TYR:OH	1:A:187:LEU:HD13	0.42	2.15	2	1
1:A:158:THR:HB	1:A:159:PRO:CD	0.41	2.45	10	2
1:A:79:THR:OG1	1:A:102:PHE:CE1	0.41	2.74	7	1
1:A:51:VAL:O	1:A:55:LEU:HD23	0.41	2.16	18	1
1:A:87:PHE:CD2	1:A:166:VAL:HG23	0.41	2.50	2	1
1:A:51:VAL:HA	1:A:98:LEU:HD13	0.41	1.92	3	1
1:A:84:PHE:HB3	1:A:98:LEU:HD21	0.41	1.92	5	1
1:A:79:THR:HG22	1:A:80:VAL:HG22	0.41	1.92	1	1
1:A:80:VAL:HG12	1:A:81:PRO:HD2	0.41	1.91	1	1
1:A:88:PRO:CA	1:A:94:LEU:HD23	0.41	2.43	16	1
1:A:65:TYR:CD1	1:A:70:ASN:OD1	0.41	2.74	5	1
1:A:82:VAL:HG11	1:A:102:PHE:HD2	0.41	1.71	11	1
1:A:166:VAL:HG22	1:A:167:TYR:N	0.41	2.30	11	1
1:A:58:ALA:HB1	1:A:100:VAL:CG2	0.41	2.44	12	1
1:A:26:LYS:N	1:A:29:VAL:O	0.41	2.53	20	1
1:A:155:LEU:CD1	1:A:162:TYR:CD1	0.41	3.03	9	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:92:GLY:HA2	1:A:145:VAL:HG11	0.41	1.90	18	1
1:A:137:GLY:O	1:A:138:TYR:CG	0.41	2.74	3	1
1:A:76:MET:CG	1:A:108:PHE:CE2	0.41	3.03	6	1
1:A:31:TYR:HE2	1:A:154:THR:HG22	0.41	1.75	14	1
1:A:108:PHE:CD1	1:A:108:PHE:N	0.41	2.89	2	1
1:A:40:LYS:HB3	1:A:104:ILE:HD12	0.41	1.92	8	1
1:A:80:VAL:CG2	1:A:81:PRO:HD2	0.41	2.46	8	1
1:A:84:PHE:CE1	1:A:169:CYS:O	0.41	2.74	15	1
1:A:44:VAL:HG11	1:A:58:ALA:HA	0.41	1.93	17	1
1:A:63:MET:HE2	1:A:63:MET:HB2	0.40	1.84	6	1
1:A:76:MET:HG2	1:A:108:PHE:CE2	0.40	2.51	6	1
1:A:80:VAL:HG22	1:A:81:PRO:HD3	0.40	1.92	7	1
1:A:62:ILE:CG2	1:A:63:MET:N	0.40	2.84	16	1
1:A:86:VAL:O	1:A:167:TYR:CD1	0.40	2.73	2	1
1:A:55:LEU:HD11	1:A:84:PHE:CZ	0.40	2.49	12	1
1:A:131:TYR:CE2	1:A:189:LYS:CG	0.40	3.05	14	1
1:A:102:PHE:CE2	1:A:103:ARG:O	0.40	2.74	7	1
1:A:135:PHE:CZ	1:A:183:ASN:OD1	0.40	2.74	18	1
1:A:29:VAL:O	1:A:154:THR:HG21	0.40	2.17	3	1
1:A:137:GLY:O	1:A:138:TYR:CD2	0.40	2.74	7	2
1:A:86:VAL:HG21	1:A:167:TYR:CE2	0.40	2.52	19	1
1:A:44:VAL:CG2	1:A:62:ILE:CD1	0.40	3.00	21	1

6.3 Torsion angles ⓘ

6.3.1 Protein backbone ⓘ

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	161/192 (84%)	135±3 (84±2%)	19±3 (12±2%)	7±1 (4±1%)	3	28
All	All	3381/4032 (84%)	2844 (84%)	390 (12%)	147 (4%)	3	28

All 33 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	50	PRO	21
1	A	126	GLU	10
1	A	67	GLY	9
1	A	80	VAL	8
1	A	78	MET	8
1	A	97	LYS	8
1	A	125	ARG	7
1	A	76	MET	6
1	A	141	GLU	6
1	A	24	GLY	5
1	A	96	LYS	5
1	A	39	GLY	4
1	A	127	GLY	4
1	A	164	GLY	4
1	A	51	VAL	4
1	A	117	ASP	4
1	A	79	THR	3
1	A	137	GLY	3
1	A	38	GLY	3
1	A	25	GLY	3
1	A	162	TYR	3
1	A	163	GLN	3
1	A	171	GLY	2
1	A	68	GLY	2
1	A	166	VAL	2
1	A	156	GLU	2
1	A	138	TYR	2
1	A	77	GLY	1
1	A	135	PHE	1
1	A	115	PRO	1
1	A	95	GLN	1
1	A	37	GLU	1
1	A	87	PHE	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	132/158 (84%)	102±5 (78±4%)	30±5 (22±4%)	2 29

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	2772/3318 (84%)	2152 (78%)	620 (22%)	2 29

All 91 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	47	THR	21
1	A	84	PHE	19
1	A	63	MET	16
1	A	97	LYS	16
1	A	78	MET	13
1	A	152	ARG	13
1	A	161	THR	13
1	A	99	LYS	12
1	A	162	TYR	12
1	A	121	LYS	12
1	A	23	THR	11
1	A	53	GLU	11
1	A	124	GLU	11
1	A	34	ARG	11
1	A	182	ARG	10
1	A	186	TRP	10
1	A	19	GLN	10
1	A	140	LYS	10
1	A	37	GLU	9
1	A	90	GLU	9
1	A	103	ARG	9
1	A	26	LYS	9
1	A	48	ASP	9
1	A	117	ASP	9
1	A	64	LYS	9
1	A	118	GLU	9
1	A	91	ASP	8
1	A	109	GLN	8
1	A	76	MET	8
1	A	111	SER	8
1	A	123	GLU	8
1	A	126	GLU	8
1	A	22	SER	8
1	A	72	LYS	8
1	A	30	SER	7
1	A	40	LYS	7

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Mol	Chain	Res	Type	Models (Total)
1	A	71	ASP	7
1	A	125	ARG	7
1	A	131	TYR	7
1	A	89	ASN	7
1	A	95	GLN	7
1	A	141	GLU	7
1	A	27	GLU	7
1	A	93	SER	7
1	A	96	LYS	7
1	A	107	GLN	7
1	A	62	ILE	7
1	A	55	LEU	6
1	A	83	SER	6
1	A	134	GLN	6
1	A	119	SER	6
1	A	128	ILE	6
1	A	153	THR	6
1	A	100	VAL	6
1	A	156	GLU	6
1	A	28	ASP	5
1	A	56	ARG	5
1	A	79	THR	5
1	A	165	ASP	5
1	A	189	LYS	5
1	A	94	LEU	5
1	A	80	VAL	4
1	A	82	VAL	4
1	A	61	LYS	4
1	A	33	GLU	4
1	A	116	SER	4
1	A	45	GLU	4
1	A	49	LYS	4
1	A	70	ASN	4
1	A	163	GLN	4
1	A	98	LEU	4
1	A	158	THR	4
1	A	150	GLN	4
1	A	143	ASP	3
1	A	106	ASN	3
1	A	154	THR	3
1	A	36	CYS	3
1	A	59	MET	3

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Mol	Chain	Res	Type	Models (Total)
1	A	138	TYR	3
1	A	32	GLU	3
1	A	155	LEU	2
1	A	52	ASP	2
1	A	57	GLU	2
1	A	129	THR	2
1	A	187	LEU	1
1	A	184	GLU	1
1	A	31	TYR	1
1	A	104	ILE	1
1	A	69	THR	1
1	A	43	THR	1
1	A	132	SER	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 oligosaccharides 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

No chemical shift data were provided