



Full wwPDB NMR Structure Validation Report ⓘ

Feb 16, 2022 – 07:52 AM EST

PDB ID : 1MX8
Title : Two homologous rat cellular retinol-binding proteins differ in local structure and flexibility
Authors : Lu, J.; Cistola, D.P.; Li, E.
Deposited on : 2002-10-01

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:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
buster-report : 1.1.7 (2018)
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 : 2.26
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.26

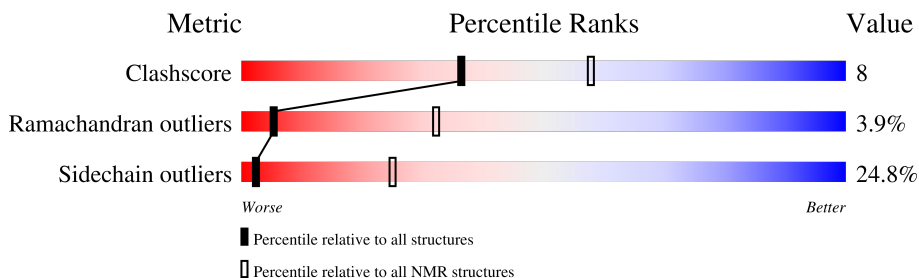
1 Overall quality at a glance

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	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	134	

2 Ensemble composition and analysis i

This entry contains 25 models. Model 16 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *minimized average structure*.

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:3-A:134 (132)	0.54	16

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 5 single-model clusters were found.

Cluster number	Models
1	1, 3, 6, 7, 10, 11, 16, 18, 19, 20
2	2, 9, 14, 21, 23
3	8, 15, 25
4	12, 17
Single-model clusters	4; 5; 13; 22; 24

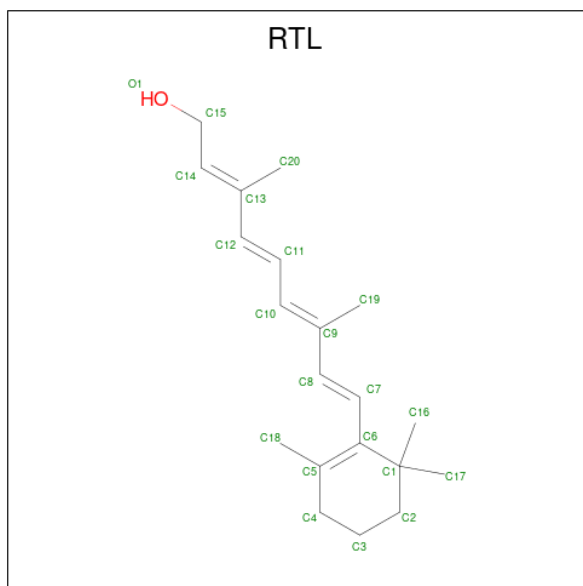
3 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 2233 atoms, of which 1110 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called CELLULAR RETINOL-BINDING PROTEIN I, HOLO.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	134	2182	695	1080	189	210	8	0

- Molecule 2 is RETINOL (three-letter code: RTL) (formula: $C_{20}H_{30}O$).



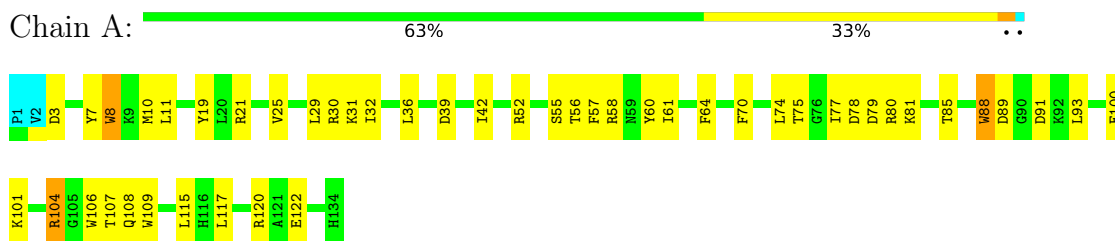
Mol	Chain	Residues	Atoms			
			Total	C	H	O
2	A	1	51	20	30	1

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: CELLULAR RETINOL-BINDING PROTEIN I, HOLO

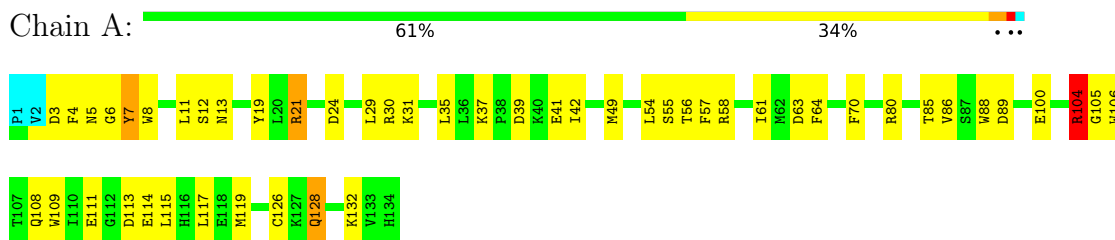


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

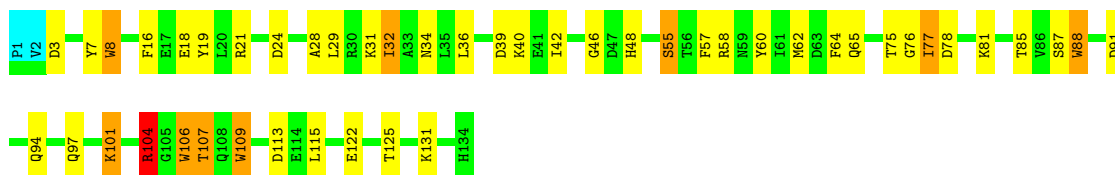
- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



4.2.2 Score per residue for model 2

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO

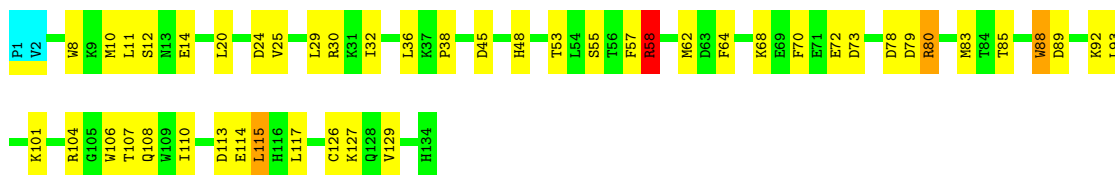




4.2.3 Score per residue for model 3

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO

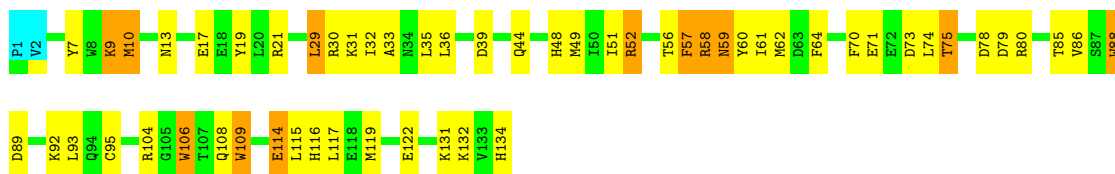
Chain A: 63% 32%



4.2.4 Score per residue for model 4

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO

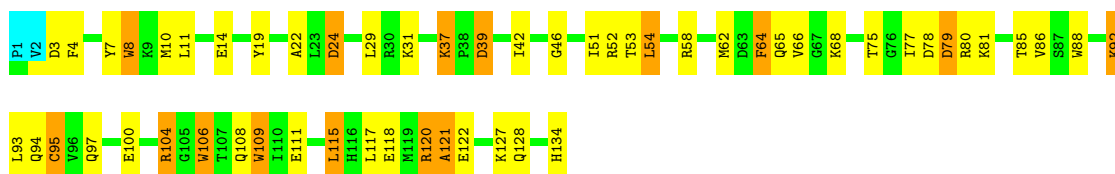
Chain A: 57% 33% 9%



4.2.5 Score per residue for model 5

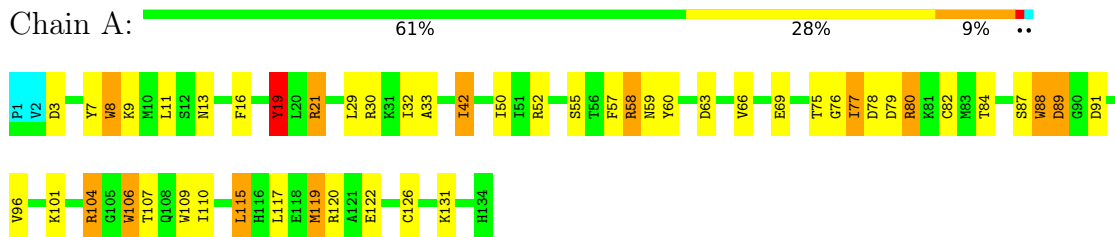
- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO

Chain A: 57% 30% 11%



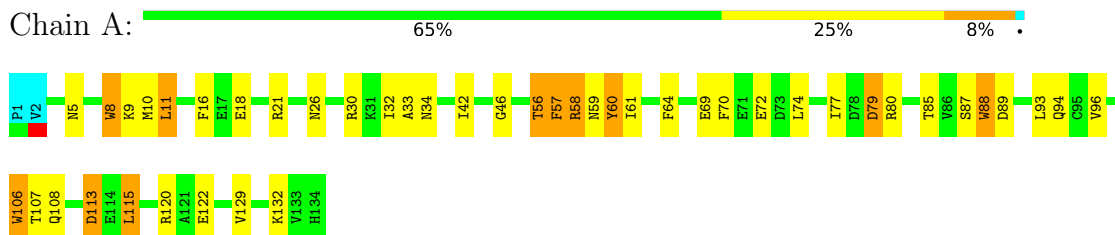
4.2.6 Score per residue for model 6

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



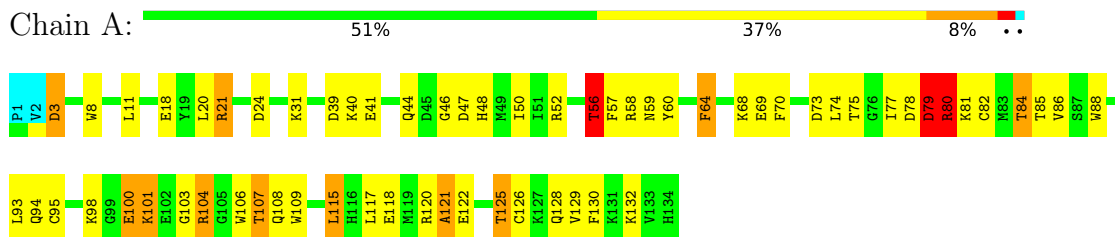
4.2.7 Score per residue for model 7

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



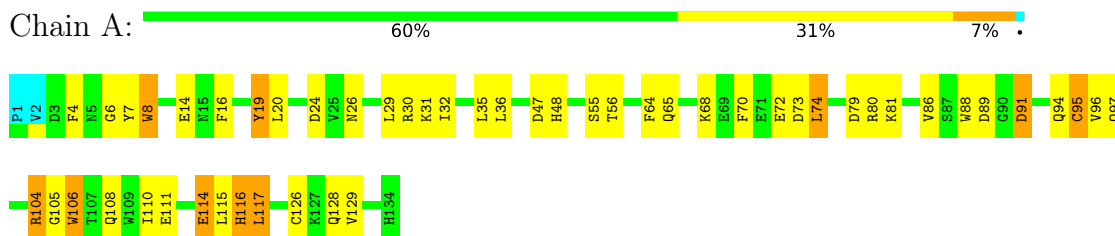
4.2.8 Score per residue for model 8

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



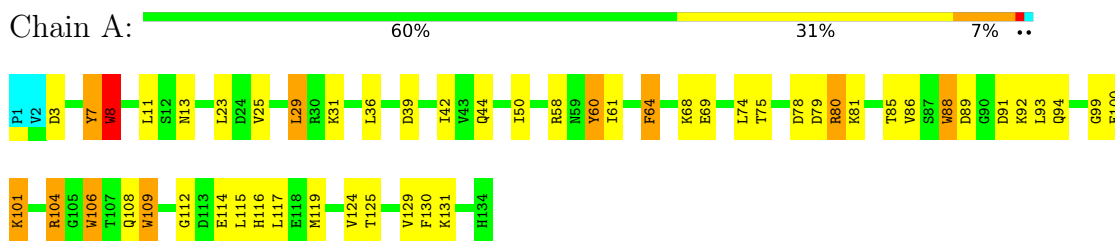
4.2.9 Score per residue for model 9

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



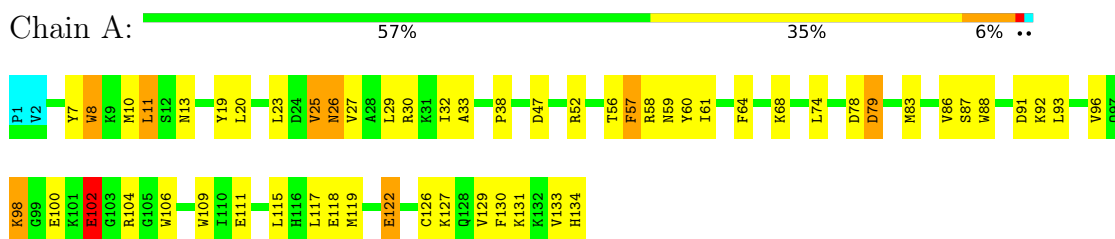
4.2.10 Score per residue for model 10

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



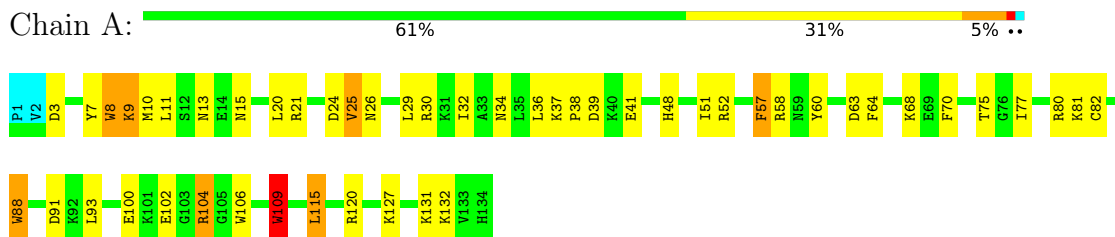
4.2.11 Score per residue for model 11

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



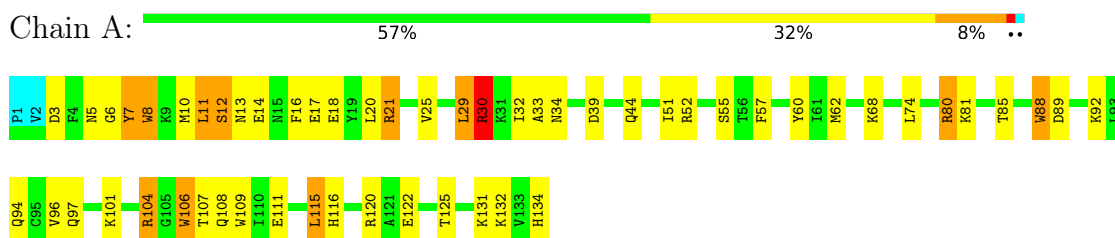
4.2.12 Score per residue for model 12

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



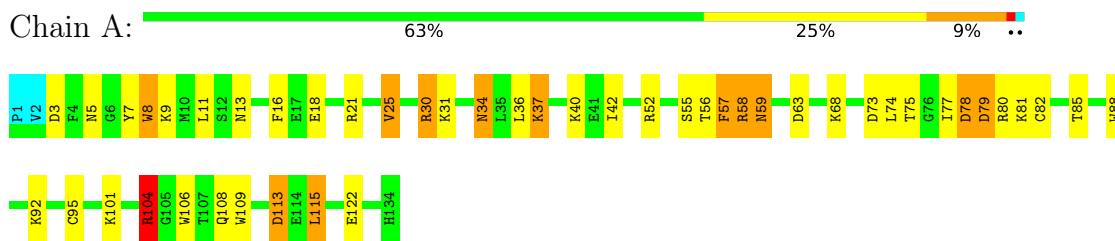
4.2.13 Score per residue for model 13

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



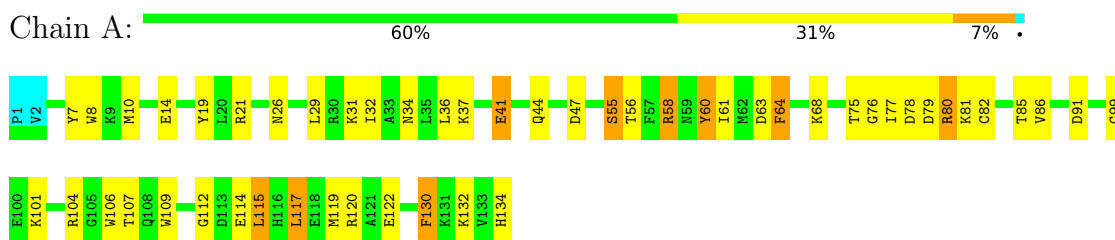
4.2.14 Score per residue for model 14

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



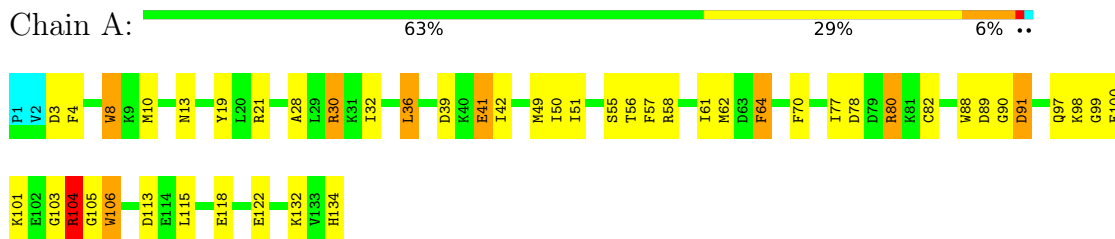
4.2.15 Score per residue for model 15

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



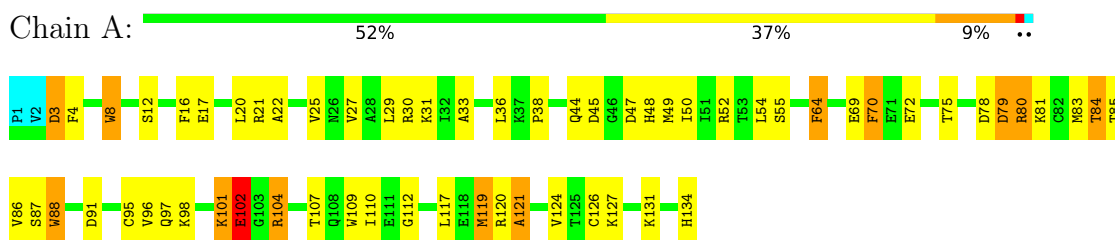
4.2.16 Score per residue for model 16 (medoid)

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



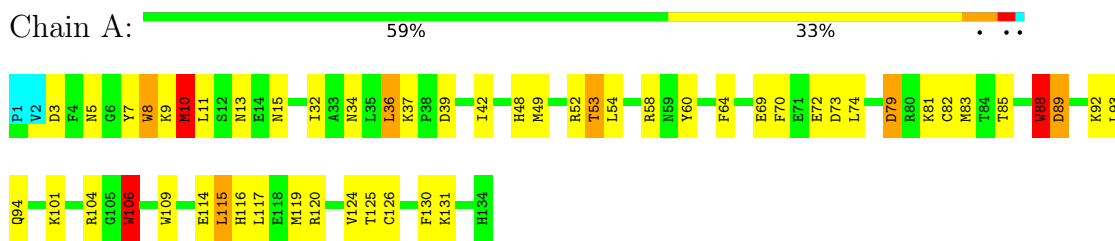
4.2.17 Score per residue for model 17

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



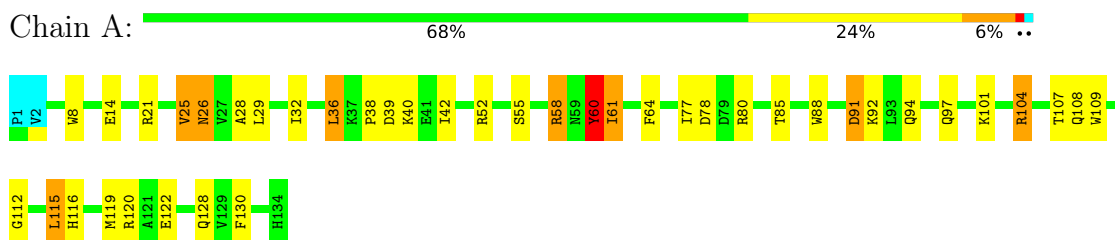
4.2.18 Score per residue for model 18

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



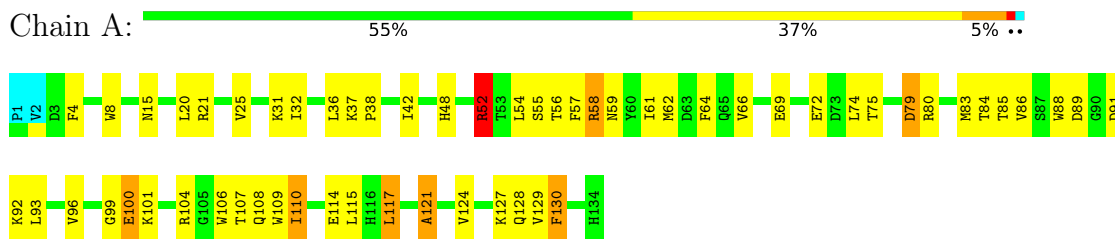
4.2.19 Score per residue for model 19

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



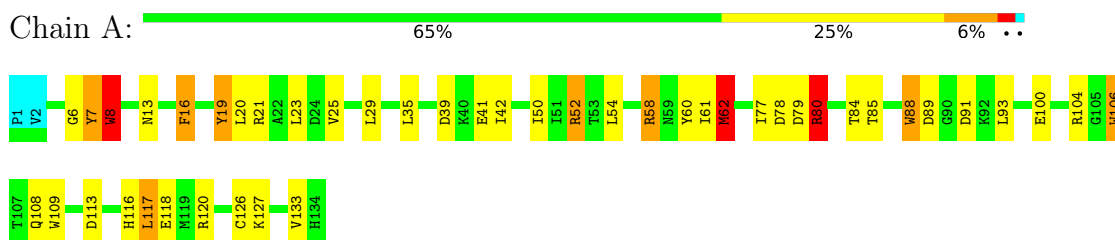
4.2.20 Score per residue for model 20

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



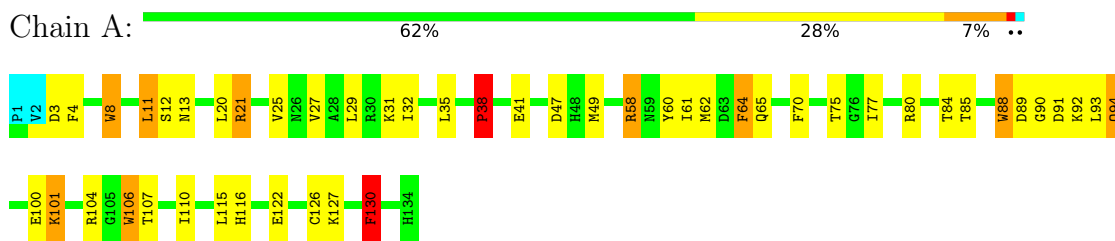
4.2.21 Score per residue for model 21

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



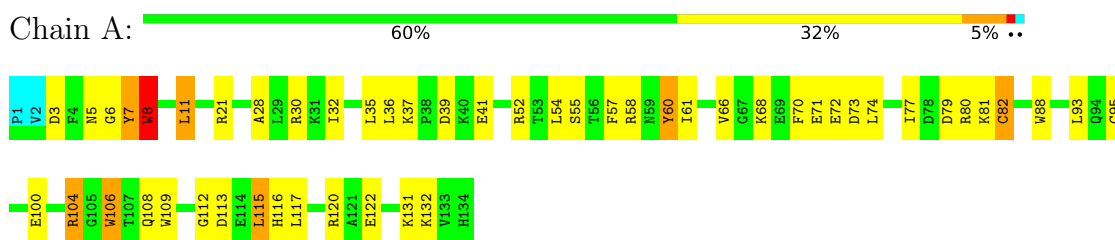
4.2.22 Score per residue for model 22

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



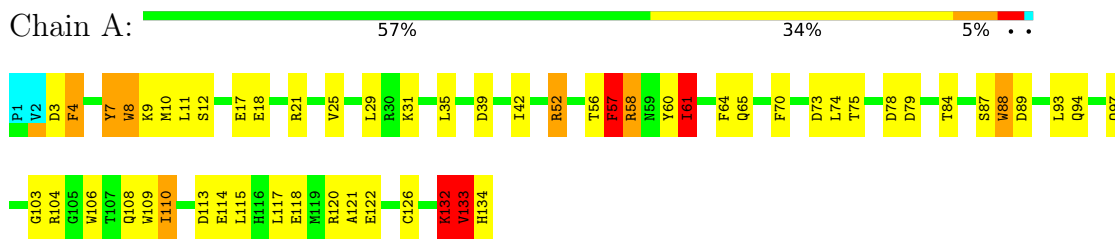
4.2.23 Score per residue for model 23

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



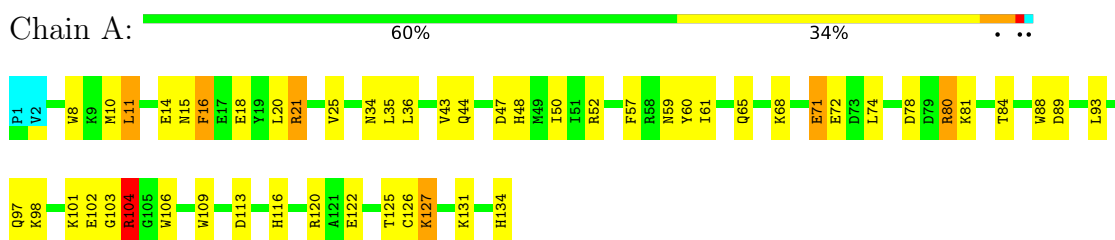
4.2.24 Score per residue for model 24

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



4.2.25 Score per residue for model 25

- Molecule 1: CELLULAR RETINOL-BINDING PROTEIN I, HOLO



5 Refinement protocol and experimental data overview

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

Of the 50 calculated structures, 25 were deposited, based on the following criterion: *target function*.

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

Software name	Classification	Version
Tinker	structure solution	3.3
Tinker	refinement	3.3

No chemical shift data was provided.

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: RTL

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	0.89±0.02	4±1/1108 (0.3± 0.1%)	1.65±0.03	9±3/1486 (0.6± 0.2%)
All	All	0.89	88/27700 (0.3%)	1.65	235/37150 (0.6%)

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	88	TRP	CD2-CE2	-6.10	1.34	1.41	12	18
1	A	106	TRP	CD2-CE2	-6.07	1.34	1.41	21	13
1	A	109	TRP	CD2-CE2	-6.00	1.34	1.41	1	10
1	A	8	TRP	CD2-CE2	-5.96	1.34	1.41	2	13
1	A	8	TRP	CG-CD2	-5.73	1.33	1.43	23	6
1	A	88	TRP	CG-CD2	-5.67	1.34	1.43	18	11
1	A	109	TRP	CG-CD2	-5.54	1.34	1.43	10	8
1	A	106	TRP	CG-CD2	-5.51	1.34	1.43	13	9

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
1	A	21	ARG	NE-CZ-NH2	-10.88	114.86	120.30	1	8
1	A	80	ARG	NE-CZ-NH1	9.89	125.25	120.30	16	10
1	A	21	ARG	NE-CZ-NH1	9.63	125.12	120.30	17	12
1	A	8	TRP	CG-CD1-NE1	-8.82	101.28	110.10	21	4
1	A	120	ARG	NE-CZ-NH1	8.82	124.71	120.30	25	6
1	A	120	ARG	NE-CZ-NH2	-8.64	115.98	120.30	5	8
1	A	30	ARG	NE-CZ-NH1	8.19	124.39	120.30	13	5
1	A	58	ARG	NE-CZ-NH2	-8.04	116.28	120.30	2	9
1	A	130	PHE	CB-CG-CD1	7.90	126.33	120.80	22	1

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	8	TRP	CD1-CG-CD2	7.72	112.48	106.30	5	3
1	A	30	ARG	NE-CZ-NH2	-7.59	116.51	120.30	16	5
1	A	104	ARG	NE-CZ-NH1	7.56	124.08	120.30	18	7
1	A	8	TRP	CD1-NE1-CE2	7.48	115.73	109.00	21	2
1	A	52	ARG	NE-CZ-NH1	7.35	123.97	120.30	13	9
1	A	80	ARG	NE-CZ-NH2	-7.33	116.64	120.30	13	9
1	A	19	TYR	CB-CG-CD1	-7.20	116.68	121.00	6	3
1	A	7	TYR	CB-CG-CD2	-7.19	116.69	121.00	1	5
1	A	58	ARG	NE-CZ-NH1	7.18	123.89	120.30	14	13
1	A	7	TYR	CB-CG-CD1	7.14	125.28	121.00	1	3
1	A	109	TRP	CE2-CD2-CG	7.02	112.92	107.30	12	3
1	A	60	TYR	CB-CG-CD2	-6.91	116.86	121.00	24	8
1	A	38	PRO	N-CA-CB	6.78	111.44	103.30	20	4
1	A	64	PHE	CB-CG-CD2	-6.75	116.07	120.80	3	2
1	A	57	PHE	CB-CG-CD2	-6.61	116.17	120.80	14	2
1	A	106	TRP	CD1-CG-CD2	6.44	111.45	106.30	11	3
1	A	8	TRP	CB-CG-CD1	-6.39	118.69	127.00	23	2
1	A	8	TRP	CE2-CD2-CG	6.32	112.36	107.30	2	4
1	A	104	ARG	NE-CZ-NH2	-6.31	117.15	120.30	23	7
1	A	8	TRP	CG-CD2-CE3	-6.30	128.23	133.90	2	3
1	A	60	TYR	CG-CD1-CE1	-6.24	116.31	121.30	21	1
1	A	8	TRP	NE1-CE2-CZ2	6.08	137.09	130.40	22	2
1	A	111	GLU	OE1-CD-OE2	6.06	130.57	123.30	11	2
1	A	60	TYR	CB-CG-CD1	-6.01	117.39	121.00	13	1
1	A	18	GLU	OE1-CD-OE2	6.01	130.51	123.30	2	1
1	A	106	TRP	CG-CD2-CE3	-5.97	128.53	133.90	21	2
1	A	100	GLU	OE1-CD-OE2	5.91	130.39	123.30	5	2
1	A	109	TRP	CD1-CG-CD2	-5.86	101.61	106.30	12	2
1	A	24	ASP	CB-CG-OD2	-5.86	113.03	118.30	2	1
1	A	114	GLU	OE1-CD-OE2	5.79	130.25	123.30	24	1
1	A	52	ARG	NE-CZ-NH2	5.75	123.17	120.30	21	2
1	A	41	GLU	OE1-CD-OE2	5.74	130.18	123.30	8	2
1	A	109	TRP	CG-CD1-NE1	-5.74	104.36	110.10	8	1
1	A	19	TYR	CG-CD1-CE1	-5.72	116.72	121.30	16	1
1	A	4	PHE	CB-CG-CD2	-5.68	116.82	120.80	24	3
1	A	88	TRP	CE2-CD2-CG	5.67	111.83	107.30	11	3
1	A	60	TYR	CG-CD2-CE2	-5.65	116.78	121.30	24	3
1	A	109	TRP	NE1-CE2-CZ2	5.61	136.57	130.40	8	1
1	A	79	ASP	CB-CG-OD1	-5.55	113.30	118.30	5	1
1	A	106	TRP	CE2-CD2-CG	-5.53	102.88	107.30	11	2
1	A	88	TRP	CG-CD2-CE3	-5.51	128.94	133.90	6	3

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	7	TYR	CG-CD1-CE1	-5.50	116.90	121.30	6	2
1	A	39	ASP	CB-CG-OD1	-5.49	113.36	118.30	16	1
1	A	8	TRP	CH2-CZ2-CE2	5.49	122.89	117.40	22	3
1	A	130	PHE	CB-CG-CD2	-5.46	116.98	120.80	22	2
1	A	109	TRP	CH2-CZ2-CE2	5.43	122.83	117.40	8	2
1	A	89	ASP	CB-CG-OD2	-5.40	113.44	118.30	22	2
1	A	118	GLU	OE1-CD-OE2	5.37	129.75	123.30	8	2
1	A	113	ASP	CB-CG-OD1	-5.33	113.50	118.30	7	2
1	A	73	ASP	CB-CG-OD1	-5.32	113.51	118.30	14	1
1	A	58	ARG	O-C-N	5.32	131.21	122.70	22	1
1	A	91	ASP	CB-CG-OD1	-5.30	113.53	118.30	19	1
1	A	89	ASP	CB-CG-OD1	-5.29	113.54	118.30	6	1
1	A	101	LYS	O-C-N	5.26	131.12	122.70	17	1
1	A	106	TRP	NE1-CE2-CZ2	5.26	136.19	130.40	25	1
1	A	19	TYR	CB-CG-CD2	-5.23	117.86	121.00	9	2
1	A	106	TRP	NE1-CE2-CD2	5.19	112.49	107.30	11	1
1	A	88	TRP	NE1-CE2-CZ2	5.18	136.09	130.40	4	1
1	A	109	TRP	CG-CD2-CE3	-5.17	129.25	133.90	4	1
1	A	70	PHE	CB-CG-CD2	-5.16	117.19	120.80	17	1
1	A	16	PHE	CB-CG-CD2	-5.15	117.20	120.80	25	1
1	A	91	ASP	CB-CG-OD2	-5.15	113.67	118.30	16	1
1	A	88	TRP	CH2-CZ2-CE2	5.14	122.54	117.40	4	1
1	A	70	PHE	CB-CG-CD1	-5.13	117.21	120.80	12	1
1	A	71	GLU	OE1-CD-OE2	5.04	129.35	123.30	4	1
1	A	3	ASP	CB-CG-OD1	-5.04	113.76	118.30	22	1
1	A	133	VAL	O-C-N	5.04	130.76	122.70	11	1
1	A	39	ASP	CB-CG-OD2	-5.03	113.77	118.30	21	1
1	A	55	SER	O-C-N	5.02	130.73	122.70	15	1
1	A	122	GLU	OE1-CD-OE2	5.01	129.31	123.30	2	1

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	1088	1062	1059	17±4
2	A	21	30	30	2±1
All	All	27725	27300	27225	459

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 8.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:LEU:HD12	1:A:129:VAL:HG12	0.80	1.52	10	1
1:A:102:GLU:CD	1:A:121:ALA:HB1	0.79	1.98	17	1
1:A:66:VAL:HG22	1:A:86:VAL:HG11	0.75	1.59	5	1
1:A:16:PHE:CZ	1:A:20:LEU:HD11	0.74	2.17	21	2
1:A:101:LYS:CG	1:A:102:GLU:N	0.74	2.50	25	1
1:A:8:TRP:CD2	1:A:115:LEU:HD12	0.73	2.19	12	1
1:A:117:LEU:HD11	1:A:119:MET:HE3	0.70	1.62	1	1
2:A:135:RTL:C8	2:A:135:RTL:H161	0.69	2.17	1	12
1:A:8:TRP:CD2	1:A:115:LEU:HD13	0.69	2.23	7	3
1:A:48:HIS:CE1	1:A:50:ILE:HD11	0.68	2.23	8	1
1:A:60:TYR:C	1:A:61:ILE:HD12	0.68	2.09	10	2
1:A:27:VAL:HG23	1:A:30:ARG:NH2	0.67	2.04	11	1
1:A:94:GLN:CG	1:A:107:THR:HG22	0.66	2.20	2	1
1:A:94:GLN:HB3	1:A:107:THR:HG23	0.66	1.68	22	1
1:A:115:LEU:HD13	1:A:116:HIS:N	0.64	2.07	22	1
1:A:23:LEU:HD22	1:A:78:ASP:OD2	0.64	1.92	10	2
1:A:42:ILE:N	1:A:42:ILE:HD12	0.64	2.07	14	2
1:A:8:TRP:CD2	1:A:8:TRP:N	0.64	2.62	23	2
1:A:84:THR:HG23	1:A:97:GLN:HG2	0.63	1.71	24	1
1:A:4:PHE:HB3	1:A:42:ILE:HG21	0.63	1.71	1	3
1:A:64:PHE:CE1	1:A:86:VAL:HG23	0.63	2.27	15	1
1:A:11:LEU:HD23	1:A:130:PHE:HB3	0.63	1.69	22	1
1:A:86:VAL:CG1	1:A:93:LEU:HD11	0.62	2.24	4	2
1:A:106:TRP:CH2	1:A:117:LEU:HD22	0.62	2.28	18	1
1:A:8:TRP:CG	1:A:130:PHE:CZ	0.62	2.87	22	1
1:A:8:TRP:CE3	1:A:115:LEU:HD13	0.62	2.30	6	6
1:A:32:ILE:HG22	1:A:57:PHE:CZ	0.62	2.29	3	1
1:A:52:ARG:HG3	1:A:61:ILE:HD12	0.61	1.73	20	2
1:A:117:LEU:O	1:A:117:LEU:HD23	0.61	1.95	15	2
1:A:8:TRP:HD1	1:A:115:LEU:HD13	0.61	1.55	23	1
1:A:8:TRP:CE2	1:A:42:ILE:HD13	0.61	2.30	14	1
1:A:8:TRP:CE3	1:A:115:LEU:HD12	0.60	2.30	12	2
1:A:94:GLN:HG3	1:A:107:THR:HG22	0.59	1.74	2	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:60:TYR:C	1:A:61:ILE:HD13	0.59	2.17	23	1
1:A:11:LEU:HD22	1:A:11:LEU:N	0.59	2.12	8	1
1:A:72:GLU:O	1:A:74:LEU:HD12	0.59	1.97	9	1
1:A:77:ILE:HG23	2:A:135:RTL:H183	0.59	1.72	8	2
1:A:106:TRP:CE3	1:A:117:LEU:HD21	0.59	2.32	6	1
1:A:8:TRP:CE3	1:A:130:PHE:CE2	0.59	2.91	22	1
1:A:32:ILE:HG21	1:A:57:PHE:CE2	0.58	2.33	12	3
1:A:130:PHE:C	1:A:130:PHE:CD1	0.58	2.76	22	1
1:A:36:LEU:HD12	1:A:38:PRO:HD3	0.58	1.75	19	1
1:A:11:LEU:HD12	1:A:131:LYS:HB2	0.58	1.74	25	1
1:A:61:ILE:HD12	1:A:61:ILE:N	0.57	2.13	1	4
1:A:101:LYS:HG2	1:A:102:GLU:N	0.57	2.14	25	1
1:A:36:LEU:HD23	1:A:38:PRO:HD3	0.57	1.77	17	1
1:A:32:ILE:O	1:A:36:LEU:HD23	0.57	2.00	18	1
2:A:135:RTL:C8	2:A:135:RTL:C17	0.57	2.83	11	13
1:A:115:LEU:CB	1:A:130:PHE:CE2	0.56	2.89	22	1
1:A:106:TRP:CH2	2:A:135:RTL:H203	0.56	2.36	9	1
1:A:25:VAL:HG12	1:A:26:ASN:N	0.56	2.16	11	3
1:A:56:THR:HG22	1:A:57:PHE:N	0.56	2.16	7	1
1:A:28:ALA:O	1:A:32:ILE:HD12	0.56	2.01	2	4
1:A:8:TRP:CH2	1:A:42:ILE:HD12	0.56	2.36	20	2
1:A:16:PHE:HE2	1:A:33:ALA:HB1	0.56	1.60	6	2
1:A:116:HIS:CE1	1:A:129:VAL:HG22	0.56	2.36	9	1
1:A:76:GLY:O	1:A:77:ILE:HD13	0.56	2.00	6	1
1:A:8:TRP:CD1	1:A:115:LEU:HD13	0.55	2.35	23	1
1:A:8:TRP:CZ2	1:A:42:ILE:CG1	0.55	2.89	10	1
1:A:8:TRP:CZ3	1:A:41:GLU:HA	0.55	2.37	23	2
1:A:77:ILE:HD12	1:A:77:ILE:N	0.55	2.16	15	3
1:A:20:LEU:HD22	1:A:25:VAL:HG21	0.55	1.77	17	2
2:A:135:RTL:H171	2:A:135:RTL:H8	0.55	1.79	24	1
1:A:117:LEU:C	1:A:117:LEU:HD12	0.55	2.22	10	1
1:A:128:GLN:CB	1:A:130:PHE:CE2	0.54	2.90	20	1
1:A:8:TRP:CE3	1:A:41:GLU:HA	0.54	2.37	21	2
1:A:116:HIS:C	1:A:117:LEU:HD23	0.54	2.23	9	1
1:A:57:PHE:CE2	1:A:58:ARG:CB	0.53	2.90	24	1
1:A:132:LYS:HD2	1:A:133:VAL:N	0.53	2.18	24	1
1:A:43:VAL:HG12	1:A:50:ILE:HB	0.53	1.79	25	1
1:A:16:PHE:CE2	1:A:33:ALA:HB1	0.53	2.39	6	1
1:A:8:TRP:CE3	1:A:115:LEU:CD1	0.53	2.91	18	1
1:A:117:LEU:HD12	1:A:118:GLU:N	0.53	2.18	24	3
1:A:76:GLY:C	1:A:77:ILE:HD13	0.53	2.23	6	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:32:ILE:HG23	1:A:57:PHE:CZ	0.53	2.39	6	1
1:A:106:TRP:CE2	1:A:119:MET:CG	0.53	2.92	6	1
1:A:76:GLY:C	1:A:77:ILE:HD12	0.53	2.23	2	2
1:A:8:TRP:N	1:A:8:TRP:CD1	0.53	2.76	14	9
1:A:116:HIS:CD2	1:A:117:LEU:N	0.53	2.77	18	2
1:A:93:LEU:O	1:A:93:LEU:HD23	0.52	2.04	7	2
1:A:8:TRP:CZ3	1:A:42:ILE:HD13	0.52	2.39	18	2
1:A:16:PHE:CD1	1:A:16:PHE:C	0.52	2.82	13	2
1:A:36:LEU:HD21	1:A:57:PHE:HB2	0.52	1.79	25	2
2:A:135:RTL:C8	2:A:135:RTL:C16	0.52	2.86	1	7
1:A:121:ALA:O	1:A:124:VAL:HG22	0.52	2.04	20	1
1:A:8:TRP:CZ3	1:A:115:LEU:HD13	0.52	2.39	5	1
1:A:22:ALA:HB1	1:A:122:GLU:HB2	0.52	1.82	5	1
1:A:8:TRP:CD1	1:A:42:ILE:HD12	0.52	2.39	19	2
1:A:8:TRP:CD2	1:A:130:PHE:CE2	0.52	2.98	22	1
1:A:32:ILE:CG2	1:A:57:PHE:CE2	0.52	2.92	12	2
1:A:74:LEU:HD22	1:A:77:ILE:HD12	0.52	1.81	23	1
1:A:74:LEU:HG	1:A:77:ILE:HD12	0.52	1.81	8	1
1:A:20:LEU:HD21	2:A:135:RTL:C18	0.52	2.34	17	1
1:A:61:ILE:N	1:A:61:ILE:HD12	0.52	2.20	22	2
1:A:6:GLY:N	1:A:8:TRP:CZ2	0.51	2.78	23	2
1:A:8:TRP:CD2	1:A:115:LEU:CD1	0.51	2.93	7	2
1:A:11:LEU:HD21	1:A:131:LYS:HB2	0.51	1.81	13	1
1:A:107:THR:HG23	1:A:108:GLN:N	0.51	2.21	8	1
1:A:75:THR:HG23	1:A:79:ASP:OD2	0.51	2.05	14	1
1:A:64:PHE:CE2	1:A:86:VAL:HG21	0.51	2.41	17	1
1:A:70:PHE:CD1	1:A:70:PHE:N	0.51	2.78	9	7
1:A:74:LEU:HD12	1:A:74:LEU:N	0.51	2.20	11	2
1:A:11:LEU:HD11	1:A:131:LYS:HB2	0.51	1.82	10	1
1:A:36:LEU:HD11	1:A:57:PHE:CD1	0.51	2.41	14	1
1:A:42:ILE:HD13	1:A:42:ILE:N	0.50	2.20	10	1
1:A:92:LYS:CD	1:A:109:TRP:CE3	0.50	2.94	14	1
1:A:4:PHE:CE1	1:A:110:ILE:HD11	0.50	2.42	17	1
1:A:106:TRP:CZ2	1:A:119:MET:CG	0.50	2.94	6	1
1:A:106:TRP:CZ2	1:A:119:MET:HG3	0.50	2.42	6	1
1:A:8:TRP:CE2	1:A:115:LEU:CD1	0.50	2.95	7	1
1:A:7:TYR:CE1	1:A:41:GLU:CG	0.50	2.95	15	1
1:A:8:TRP:HB2	1:A:40:LYS:CG	0.50	2.37	19	1
1:A:64:PHE:CD2	1:A:86:VAL:HG21	0.49	2.42	1	4
1:A:20:LEU:HD21	2:A:135:RTL:H182	0.49	1.83	22	4
1:A:133:VAL:HG12	1:A:134:HIS:N	0.49	2.21	24	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:128:GLN:HB2	1:A:130:PHE:CE2	0.49	2.42	20	1
1:A:77:ILE:HG22	1:A:78:ASP:N	0.49	2.22	2	2
1:A:86:VAL:HG22	1:A:95:CYS:HB2	0.49	1.84	9	2
1:A:93:LEU:HD23	1:A:93:LEU:C	0.49	2.28	7	2
1:A:61:ILE:HD13	1:A:61:ILE:N	0.49	2.23	23	1
1:A:8:TRP:CD2	1:A:130:PHE:CZ	0.49	3.01	22	1
1:A:109:TRP:CD1	1:A:109:TRP:C	0.49	2.86	12	5
1:A:117:LEU:HD13	1:A:119:MET:HG3	0.49	1.84	10	1
1:A:130:PHE:CD1	1:A:130:PHE:N	0.48	2.80	15	2
1:A:104:ARG:H	1:A:104:ARG:NE	0.48	2.06	14	1
1:A:88:TRP:O	1:A:88:TRP:CG	0.48	2.66	18	1
1:A:60:TYR:CE2	1:A:77:ILE:CD1	0.48	2.96	19	1
1:A:8:TRP:CD1	1:A:8:TRP:N	0.48	2.81	8	7
1:A:8:TRP:CH2	1:A:42:ILE:HD13	0.48	2.43	18	2
1:A:42:ILE:N	1:A:42:ILE:HD13	0.48	2.24	2	1
1:A:117:LEU:HD23	1:A:117:LEU:N	0.48	2.23	9	1
1:A:72:GLU:OE2	1:A:74:LEU:HD11	0.48	2.08	20	1
1:A:75:THR:HG23	1:A:79:ASP:CG	0.48	2.29	14	1
1:A:104:ARG:CD	1:A:104:ARG:N	0.47	2.76	16	2
1:A:74:LEU:CD2	1:A:74:LEU:N	0.47	2.78	13	1
1:A:119:MET:CG	1:A:126:CYS:HB3	0.47	2.39	18	1
1:A:92:LYS:HD3	1:A:109:TRP:CE3	0.47	2.44	14	1
1:A:125:THR:HG22	1:A:127:LYS:HE2	0.47	1.86	25	1
1:A:13:ASN:ND2	1:A:16:PHE:CG	0.47	2.82	14	1
1:A:8:TRP:CZ2	1:A:42:ILE:HG12	0.47	2.45	10	1
1:A:39:ASP:O	1:A:54:LEU:HD12	0.47	2.09	5	1
1:A:96:VAL:HG12	1:A:96:VAL:O	0.47	2.10	7	1
1:A:8:TRP:CZ2	1:A:42:ILE:HG13	0.47	2.44	10	1
1:A:74:LEU:N	1:A:74:LEU:HD22	0.47	2.25	13	1
1:A:8:TRP:CH2	1:A:132:LYS:HE2	0.47	2.44	15	1
1:A:51:ILE:HD13	1:A:62:MET:CE	0.47	2.40	16	1
1:A:61:ILE:HG22	1:A:62:MET:N	0.47	2.25	21	2
1:A:8:TRP:N	1:A:132:LYS:HG2	0.47	2.24	24	1
1:A:80:ARG:CB	1:A:80:ARG:CZ	0.47	2.93	21	1
1:A:115:LEU:HB3	1:A:130:PHE:CD2	0.47	2.45	22	2
1:A:8:TRP:CA	1:A:132:LYS:HG2	0.47	2.39	24	1
1:A:117:LEU:HD23	1:A:130:PHE:HZ	0.47	1.69	20	1
1:A:20:LEU:HD12	1:A:30:ARG:HB2	0.46	1.86	13	1
1:A:16:PHE:CE1	1:A:20:LEU:HD11	0.46	2.45	17	1
1:A:32:ILE:HG21	1:A:57:PHE:CZ	0.46	2.45	7	2
1:A:94:GLN:NE2	1:A:107:THR:HG23	0.46	2.26	19	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:56:THR:HG23	1:A:56:THR:O	0.46	2.10	8	1
1:A:57:PHE:CE2	1:A:58:ARG:HB2	0.46	2.45	24	1
1:A:52:ARG:CD	1:A:61:ILE:HG23	0.46	2.41	24	1
1:A:32:ILE:HG21	1:A:57:PHE:HE2	0.46	1.70	12	1
1:A:36:LEU:HG	1:A:57:PHE:CZ	0.46	2.46	3	1
1:A:75:THR:HG22	1:A:75:THR:O	0.46	2.10	4	2
1:A:115:LEU:HD23	1:A:116:HIS:N	0.46	2.26	18	1
1:A:101:LYS:HB3	1:A:104:ARG:CD	0.46	2.41	2	1
1:A:19:TYR:CD1	1:A:19:TYR:C	0.46	2.90	21	1
1:A:124:VAL:HG12	1:A:125:THR:N	0.46	2.26	18	1
1:A:43:VAL:O	1:A:43:VAL:HG13	0.45	2.11	25	1
1:A:8:TRP:CZ3	1:A:115:LEU:HD12	0.45	2.46	8	1
1:A:62:MET:HE3	1:A:72:GLU:HG2	0.45	1.89	3	1
1:A:9:LYS:O	1:A:131:LYS:N	0.45	2.49	12	4
1:A:16:PHE:CE2	1:A:20:LEU:HD11	0.45	2.46	25	2
1:A:16:PHE:CE1	1:A:33:ALA:HB1	0.45	2.46	13	1
1:A:88:TRP:CD1	1:A:88:TRP:N	0.45	2.84	21	2
1:A:36:LEU:HD21	1:A:57:PHE:HB3	0.45	1.88	2	1
1:A:64:PHE:CE1	1:A:86:VAL:CG2	0.45	3.00	5	2
1:A:50:ILE:HG23	1:A:62:MET:O	0.45	2.12	16	1
1:A:108:GLN:HG3	1:A:117:LEU:CD1	0.45	2.42	4	2
1:A:129:VAL:HG12	1:A:130:PHE:N	0.45	2.27	8	2
1:A:11:LEU:N	1:A:11:LEU:CD2	0.45	2.80	8	1
1:A:61:ILE:N	1:A:61:ILE:CD1	0.45	2.79	1	1
1:A:32:ILE:CG2	1:A:57:PHE:CZ	0.45	3.00	4	1
1:A:20:LEU:HD11	1:A:33:ALA:CB	0.45	2.42	11	1
1:A:75:THR:HG22	1:A:79:ASP:OD1	0.45	2.11	17	1
1:A:84:THR:HG23	1:A:97:GLN:OE1	0.45	2.12	17	1
1:A:8:TRP:HB3	1:A:130:PHE:CD1	0.45	2.47	22	1
1:A:37:LYS:N	1:A:38:PRO:CD	0.44	2.79	12	1
2:A:135:RTL:C8	2:A:135:RTL:H172	0.44	2.42	10	5
1:A:42:ILE:N	1:A:42:ILE:CD1	0.44	2.78	14	1
1:A:4:PHE:CD1	1:A:110:ILE:CD1	0.44	3.01	24	1
1:A:7:TYR:C	1:A:8:TRP:CG	0.44	2.90	5	1
1:A:58:ARG:CG	1:A:59:ASN:N	0.44	2.80	14	1
1:A:52:ARG:CG	1:A:61:ILE:HD12	0.44	2.42	23	1
1:A:77:ILE:N	1:A:77:ILE:CD1	0.44	2.80	5	2
1:A:106:TRP:CZ3	1:A:117:LEU:HD21	0.44	2.48	6	1
1:A:57:PHE:CE2	1:A:58:ARG:HB3	0.44	2.47	24	1
1:A:36:LEU:HD21	1:A:57:PHE:CB	0.44	2.42	25	2
1:A:115:LEU:HB2	1:A:130:PHE:CE2	0.44	2.48	22	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:104:ARG:CZ	1:A:104:ARG:HB2	0.44	2.43	25	1
1:A:124:VAL:CG1	1:A:125:THR:N	0.43	2.81	10	1
1:A:25:VAL:CG2	1:A:78:ASP:CB	0.43	2.96	14	1
1:A:60:TYR:O	1:A:61:ILE:CB	0.43	2.66	19	1
1:A:11:LEU:CD1	1:A:131:LYS:HB2	0.43	2.43	23	1
1:A:48:HIS:CD2	1:A:65:GLN:CG	0.43	3.01	9	1
1:A:97:GLN:HB2	1:A:104:ARG:HD3	0.43	1.91	17	1
1:A:75:THR:O	1:A:75:THR:HG23	0.43	2.14	24	1
1:A:53:THR:HG22	1:A:53:THR:O	0.43	2.13	5	1
1:A:134:HIS:CD2	1:A:134:HIS:N	0.43	2.86	4	1
1:A:104:ARG:NE	1:A:104:ARG:N	0.43	2.66	14	1
1:A:32:ILE:HG21	1:A:57:PHE:CE1	0.43	2.49	20	1
1:A:48:HIS:CD2	1:A:48:HIS:C	0.43	2.89	3	1
1:A:86:VAL:CG1	1:A:87:SER:N	0.43	2.82	11	1
1:A:132:LYS:HD3	1:A:134:HIS:CE1	0.43	2.48	13	1
1:A:4:PHE:CZ	1:A:93:LEU:HD22	0.43	2.49	20	1
1:A:71:GLU:CG	1:A:72:GLU:N	0.43	2.81	25	1
1:A:130:PHE:N	1:A:130:PHE:CD1	0.43	2.87	8	1
1:A:117:LEU:N	1:A:117:LEU:CD2	0.43	2.82	9	1
1:A:53:THR:C	1:A:54:LEU:HD23	0.43	2.33	18	1
1:A:58:ARG:HB3	1:A:58:ARG:CZ	0.43	2.44	3	1
1:A:128:GLN:HB3	1:A:130:PHE:CE2	0.43	2.49	20	1
1:A:8:TRP:NE1	1:A:42:ILE:HD12	0.43	2.29	24	1
1:A:8:TRP:CH2	1:A:42:ILE:CD1	0.42	3.02	6	1
1:A:23:LEU:HB2	1:A:25:VAL:HG23	0.42	1.90	21	1
1:A:11:LEU:HD13	1:A:131:LYS:HB2	0.42	1.90	23	1
1:A:51:ILE:HG22	1:A:51:ILE:O	0.42	2.14	5	1
1:A:8:TRP:CZ3	1:A:115:LEU:HB2	0.42	2.49	13	1
1:A:117:LEU:HD23	1:A:119:MET:SD	0.42	2.54	17	1
1:A:29:LEU:O	1:A:33:ALA:HB2	0.42	2.14	4	2
1:A:4:PHE:CE2	1:A:108:GLN:NE2	0.42	2.87	5	1
1:A:74:LEU:O	1:A:79:ASP:N	0.42	2.52	8	4
1:A:48:HIS:CD2	1:A:65:GLN:HG2	0.42	2.49	9	1
1:A:20:LEU:HD21	2:A:135:RTL:H183	0.42	1.90	12	1
1:A:20:LEU:CD2	2:A:135:RTL:H182	0.42	2.44	9	1
1:A:10:MET:N	1:A:130:PHE:CD2	0.42	2.88	18	1
1:A:74:LEU:HD22	1:A:74:LEU:N	0.42	2.29	18	1
1:A:115:LEU:HG	1:A:130:PHE:CE2	0.42	2.49	22	1
1:A:7:TYR:C	1:A:132:LYS:CG	0.42	2.87	24	1
1:A:61:ILE:CG2	1:A:62:MET:N	0.42	2.82	16	1
1:A:57:PHE:CD1	1:A:57:PHE:N	0.42	2.85	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:8:TRP:CE3	1:A:42:ILE:HD13	0.42	2.49	18	1
1:A:7:TYR:HA	1:A:8:TRP:CE3	0.42	2.49	23	1
1:A:52:ARG:HD3	1:A:61:ILE:HG23	0.42	1.91	24	1
1:A:107:THR:CG2	1:A:108:GLN:N	0.42	2.83	8	1
1:A:7:TYR:CD1	1:A:7:TYR:N	0.42	2.82	9	2
1:A:102:GLU:C	1:A:104:ARG:N	0.42	2.71	25	1
1:A:8:TRP:CE3	1:A:115:LEU:HB2	0.42	2.50	3	1
1:A:24:ASP:OD1	1:A:24:ASP:N	0.42	2.51	5	1
1:A:132:LYS:HD2	1:A:132:LYS:C	0.42	2.34	24	1
1:A:104:ARG:N	1:A:104:ARG:HD2	0.42	2.30	5	2
1:A:19:TYR:CZ	1:A:119:MET:HE1	0.42	2.50	6	1
1:A:30:ARG:O	1:A:34:ASN:ND2	0.42	2.53	14	1
1:A:5:ASN:OD1	1:A:6:GLY:N	0.42	2.53	23	2
1:A:116:HIS:CD2	1:A:116:HIS:C	0.42	2.93	21	1
1:A:11:LEU:O	1:A:13:ASN:N	0.42	2.53	22	1
1:A:106:TRP:CE2	1:A:119:MET:HG2	0.41	2.49	6	1
1:A:93:LEU:HD23	1:A:108:GLN:HB2	0.41	1.92	8	1
1:A:125:THR:HG23	1:A:126:CYS:N	0.41	2.29	8	1
1:A:75:THR:HG23	1:A:79:ASP:OD1	0.41	2.14	20	1
1:A:7:TYR:C	1:A:132:LYS:HG2	0.41	2.36	24	1
1:A:102:GLU:O	1:A:104:ARG:NH1	0.41	2.53	25	1
1:A:119:MET:HE1	1:A:128:GLN:HB2	0.41	1.91	1	1
1:A:62:MET:CE	1:A:72:GLU:HG2	0.41	2.45	3	1
1:A:70:PHE:CD1	1:A:70:PHE:C	0.41	2.93	4	1
1:A:12:SER:OG	1:A:13:ASN:N	0.41	2.54	13	1
1:A:97:GLN:NE2	1:A:106:TRP:CZ2	0.41	2.88	16	1
1:A:110:ILE:HA	1:A:115:LEU:HD22	0.41	1.91	22	1
1:A:13:ASN:N	1:A:13:ASN:OD1	0.41	2.53	11	1
1:A:108:GLN:CG	1:A:117:LEU:CD1	0.41	2.98	23	1
1:A:96:VAL:CG1	1:A:97:GLN:N	0.41	2.83	13	1
1:A:115:LEU:HD23	1:A:115:LEU:O	0.41	2.15	13	1
1:A:7:TYR:HB3	1:A:132:LYS:CE	0.41	2.45	24	1
1:A:106:TRP:CD1	1:A:106:TRP:N	0.41	2.86	2	1
1:A:120:ARG:O	1:A:121:ALA:HB2	0.41	2.16	8	2
1:A:25:VAL:CG1	1:A:26:ASN:N	0.41	2.83	11	1
1:A:64:PHE:CE1	1:A:70:PHE:CE1	0.41	3.09	16	1
1:A:115:LEU:N	1:A:130:PHE:O	0.41	2.52	18	1
1:A:6:GLY:C	1:A:8:TRP:CH2	0.41	2.94	23	1
1:A:16:PHE:CD2	1:A:16:PHE:C	0.41	2.93	2	1
1:A:58:ARG:CZ	1:A:58:ARG:CB	0.41	2.97	3	1
1:A:26:ASN:OD1	1:A:26:ASN:N	0.41	2.54	7	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:63:ASP:OD1	1:A:63:ASP:N	0.41	2.53	14	1
1:A:30:ARG:HB2	1:A:30:ARG:CZ	0.41	2.46	1	1
1:A:84:THR:HG23	1:A:96:VAL:O	0.41	2.15	6	1
1:A:29:LEU:HD21	2:A:135:RTL:H42	0.41	1.93	10	1
1:A:11:LEU:HD23	1:A:131:LYS:CB	0.41	2.46	11	1
1:A:102:GLU:O	1:A:122:GLU:N	0.41	2.53	11	1
1:A:60:TYR:CE1	1:A:62:MET:CE	0.41	3.03	4	1
1:A:59:ASN:ND2	1:A:59:ASN:N	0.41	2.67	7	1
1:A:70:PHE:CE1	1:A:84:THR:HB	0.41	2.51	8	1
1:A:106:TRP:CD1	1:A:119:MET:HG2	0.41	2.51	10	1
1:A:74:LEU:CD1	1:A:77:ILE:HD13	0.41	2.45	14	1
1:A:103:GLY:O	1:A:105:GLY:N	0.41	2.54	16	1
1:A:60:TYR:O	1:A:61:ILE:CG1	0.41	2.69	19	1
1:A:91:ASP:N	1:A:91:ASP:OD1	0.41	2.54	20	1
1:A:31:LYS:O	1:A:35:LEU:HD12	0.41	2.15	24	1
1:A:59:ASN:HB3	1:A:61:ILE:CD1	0.41	2.46	4	1
1:A:83:MET:O	1:A:98:LYS:N	0.41	2.53	11	1
1:A:78:ASP:OD1	1:A:78:ASP:N	0.41	2.53	15	1
1:A:8:TRP:CZ2	1:A:42:ILE:HB	0.41	2.51	21	1
1:A:134:HIS:N	1:A:134:HIS:CD2	0.41	2.88	24	1
1:A:92:LYS:CG	1:A:109:TRP:HB2	0.40	2.45	5	1
1:A:80:ARG:HD2	1:A:101:LYS:CE	0.40	2.46	8	1
1:A:22:ALA:HB2	1:A:124:VAL:HG21	0.40	1.93	17	1
1:A:75:THR:HA	1:A:79:ASP:HA	0.40	1.92	15	1
1:A:4:PHE:O	1:A:6:GLY:N	0.40	2.55	1	1
1:A:99:GLY:O	1:A:101:LYS:N	0.40	2.55	10	1
1:A:25:VAL:HG11	1:A:29:LEU:HD22	0.40	1.92	19	2
1:A:13:ASN:OD1	1:A:13:ASN:N	0.40	2.54	16	1
1:A:69:GLU:OE2	1:A:84:THR:N	0.40	2.54	20	1
1:A:71:GLU:HG3	1:A:72:GLU:N	0.40	2.30	25	1
1:A:92:LYS:HD3	1:A:107:THR:HG22	0.40	1.92	19	1
1:A:3:ASP:OD1	1:A:3:ASP:N	0.40	2.54	23	1
1:A:72:GLU:N	1:A:82:CYS:O	0.40	2.54	23	1
1:A:6:GLY:C	1:A:7:TYR:CD1	0.40	2.95	9	1
1:A:19:TYR:CD1	1:A:19:TYR:O	0.40	2.75	9	1
1:A:114:GLU:OE2	1:A:129:VAL:HG13	0.40	2.16	9	1
1:A:36:LEU:HD11	1:A:57:PHE:CG	0.40	2.51	14	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	131/134 (98%)	106±5 (81±4%)	20±4 (15±3%)	5±2 (4±1%)	5	32
All	All	3275/3350 (98%)	2651 (81%)	495 (15%)	129 (4%)	5	32

All 52 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	79	ASP	14
1	A	104	ARG	10
1	A	100	GLU	7
1	A	121	ALA	5
1	A	3	ASP	5
1	A	112	GLY	5
1	A	46	GLY	4
1	A	114	GLU	4
1	A	91	ASP	4
1	A	110	ILE	3
1	A	10	MET	3
1	A	56	THR	3
1	A	103	GLY	3
1	A	81	LYS	3
1	A	25	VAL	3
1	A	99	GLY	3
1	A	101	LYS	3
1	A	58	ARG	3
1	A	61	ILE	3
1	A	5	ASN	2
1	A	105	GLY	2
1	A	77	ILE	2
1	A	59	ASN	2
1	A	37	LYS	2
1	A	89	ASP	2
1	A	102	GLU	2
1	A	90	GLY	2

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Mol	Chain	Res	Type	Models (Total)
1	A	55	SER	1
1	A	24	ASP	1
1	A	48	HIS	1
1	A	75	THR	1
1	A	65	GLN	1
1	A	60	TYR	1
1	A	11	LEU	1
1	A	14	GLU	1
1	A	73	ASP	1
1	A	98	LYS	1
1	A	92	LYS	1
1	A	113	ASP	1
1	A	50	ILE	1
1	A	69	GLU	1
1	A	109	TRP	1
1	A	62	MET	1
1	A	12	SER	1
1	A	38	PRO	1
1	A	64	PHE	1
1	A	66	VAL	1
1	A	116	HIS	1
1	A	57	PHE	1
1	A	78	ASP	1
1	A	132	LYS	1
1	A	133	VAL	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	118/120 (98%)	89±4 (75±4%)	29±4 (25±4%)	2 25
All	All	2950/3000 (98%)	2218 (75%)	732 (25%)	2 25

All 112 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	115	LEU	20
1	A	80	ARG	17
1	A	85	THR	17
1	A	104	ARG	16
1	A	29	LEU	15
1	A	64	PHE	15
1	A	11	LEU	14
1	A	122	GLU	14
1	A	55	SER	13
1	A	31	LYS	12
1	A	39	ASP	12
1	A	89	ASP	12
1	A	101	LYS	12
1	A	68	LYS	12
1	A	108	GLN	11
1	A	88	TRP	11
1	A	106	TRP	11
1	A	10	MET	11
1	A	3	ASP	10
1	A	21	ARG	10
1	A	126	CYS	10
1	A	81	LYS	10
1	A	78	ASP	10
1	A	36	LEU	10
1	A	56	THR	9
1	A	113	ASP	9
1	A	91	ASP	9
1	A	107	THR	9
1	A	127	LYS	9
1	A	94	GLN	9
1	A	57	PHE	8
1	A	132	LYS	8
1	A	34	ASN	8
1	A	58	ARG	8
1	A	92	LYS	8
1	A	93	LEU	8
1	A	82	CYS	8
1	A	7	TYR	7
1	A	13	ASN	7
1	A	35	LEU	7
1	A	37	LYS	7
1	A	75	THR	7
1	A	30	ARG	7

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Mol	Chain	Res	Type	Models (Total)
1	A	44	GLN	7
1	A	52	ARG	7
1	A	95	CYS	7
1	A	60	TYR	7
1	A	47	ASP	7
1	A	49	MET	6
1	A	54	LEU	6
1	A	48	HIS	6
1	A	14	GLU	6
1	A	25	VAL	6
1	A	73	ASP	6
1	A	117	LEU	6
1	A	116	HIS	6
1	A	119	MET	6
1	A	134	HIS	6
1	A	18	GLU	6
1	A	12	SER	5
1	A	24	ASP	5
1	A	41	GLU	5
1	A	114	GLU	5
1	A	128	GLN	5
1	A	32	ILE	5
1	A	62	MET	5
1	A	87	SER	5
1	A	97	GLN	5
1	A	9	LYS	5
1	A	19	TYR	5
1	A	59	ASN	5
1	A	69	GLU	5
1	A	84	THR	5
1	A	63	ASP	4
1	A	100	GLU	4
1	A	65	GLN	4
1	A	83	MET	4
1	A	17	GLU	4
1	A	74	LEU	4
1	A	77	ILE	4
1	A	98	LYS	4
1	A	96	VAL	4
1	A	8	TRP	4
1	A	15	ASN	4
1	A	40	LYS	3

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Mol	Chain	Res	Type	Models (Total)
1	A	125	THR	3
1	A	129	VAL	3
1	A	51	ILE	3
1	A	79	ASP	3
1	A	111	GLU	3
1	A	50	ILE	3
1	A	72	GLU	3
1	A	26	ASN	3
1	A	130	PHE	3
1	A	102	GLU	3
1	A	131	LYS	2
1	A	45	ASP	2
1	A	53	THR	2
1	A	66	VAL	2
1	A	5	ASN	2
1	A	109	TRP	2
1	A	27	VAL	2
1	A	70	PHE	2
1	A	133	VAL	2
1	A	71	GLU	2
1	A	42	ILE	1
1	A	110	ILE	1
1	A	118	GLU	1
1	A	16	PHE	1
1	A	38	PRO	1
1	A	120	ARG	1
1	A	61	ILE	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

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	RTL	A	135	-	21,21,21	1.72±0.04	2±0 (9±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	RTL	A	135	-	26,28,28	2.41±0.09	9±1 (34±5%)

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	RTL	A	135	-	-	0±0,14,31,31	0±0,1,1,1

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	A	135	RTL	C1-C6	6.58	1.44	1.53	2	25
2	A	135	RTL	C4-C5	4.32	1.42	1.51	12	25

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

occurrence in the ensemble.

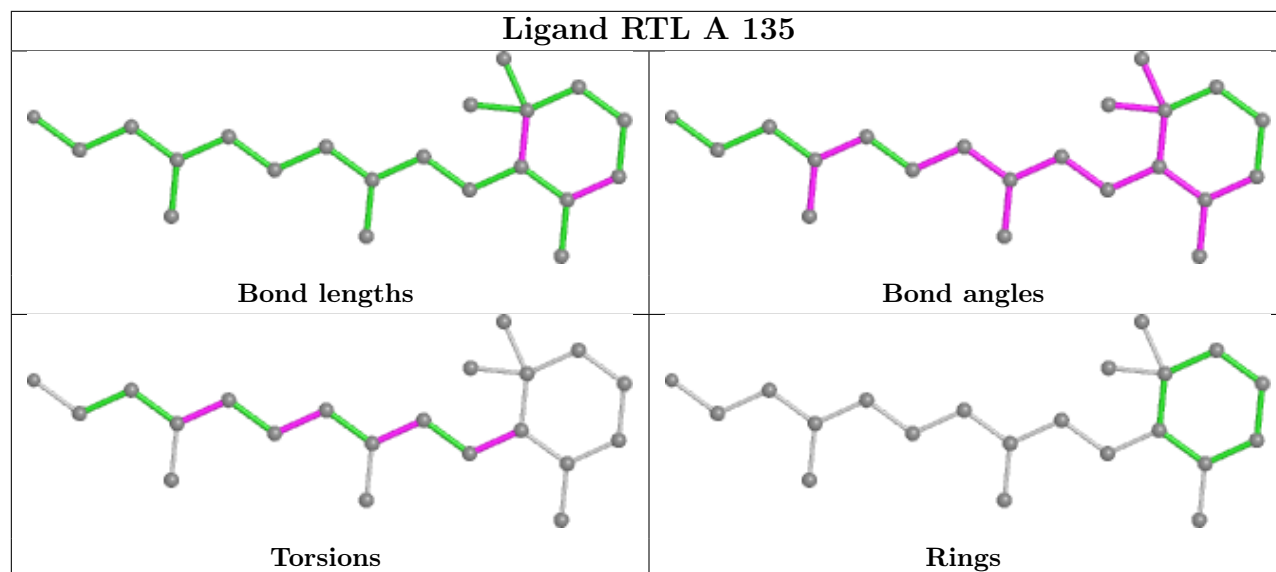
Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
2	A	135	RTL	C11-C10-C9	6.59	117.91	127.31	16	25
2	A	135	RTL	C17-C1-C16	6.19	89.53	108.53	15	25
2	A	135	RTL	C4-C5-C6	4.98	115.50	122.73	10	25
2	A	135	RTL	C20-C13-C12	4.20	111.46	118.08	6	25
2	A	135	RTL	C19-C9-C8	4.17	111.51	118.08	8	24
2	A	135	RTL	C17-C1-C6	3.94	116.69	110.30	16	19
2	A	135	RTL	C16-C1-C6	3.62	116.16	110.30	13	14
2	A	135	RTL	C7-C8-C9	3.45	121.02	126.23	14	7
2	A	135	RTL	C18-C5-C6	3.12	128.03	124.53	1	7
2	A	135	RTL	C19-C9-C10	3.06	127.20	122.92	1	15
2	A	135	RTL	C3-C4-C5	2.85	108.99	114.08	14	5
2	A	135	RTL	C2-C1-C6	2.76	114.72	110.48	12	1
2	A	135	RTL	C8-C7-C6	2.71	119.58	127.20	10	21
2	A	135	RTL	C20-C13-C14	2.60	128.70	123.59	20	5
2	A	135	RTL	C8-C9-C10	2.49	122.76	118.94	3	4
2	A	135	RTL	C18-C5-C4	2.27	117.97	113.62	12	1

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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