



Full wwPDB NMR Structure Validation Report ⓘ

Mar 9, 2026 – 11:31 AM UTC

PDB ID : 1G7D / pdb_00001g7d
Title : NMR STRUCTURE OF ERP29 C-DOMAIN
Authors : Liepinsh, E.; Mkrtchian, S.; Barishev, M.; Sharipo, A.; Ingelman-Sundberg, M.; Otting, G.
Deposited on : 2000-11-10

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

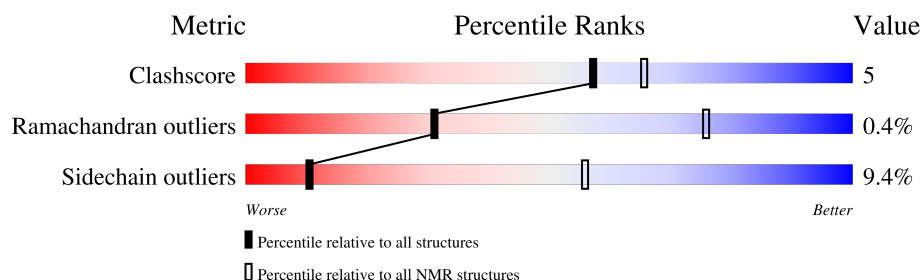
1 Overall quality at a glance

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	106	

2 Ensemble composition and analysis

This entry contains 20 models. Model 6 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

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:157-A:251 (95)	0.75	6

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 3 single-model clusters were found.

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

3 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 1673 atoms, of which 847 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called ENDOPLASMIC RETICULUM PROTEIN ERP29.

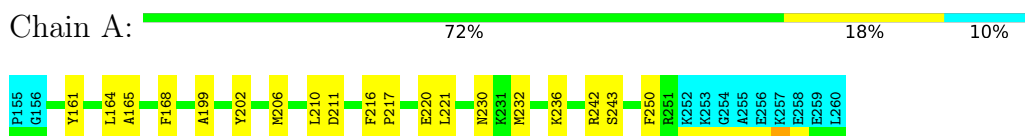
Mol	Chain	Residues	Atoms						Trace
1	A	106	Total	C	H	N	O	S	0
			1673	517	847	144	162	3	

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: ENDOPLASMIC RETICULUM PROTEIN ERP29

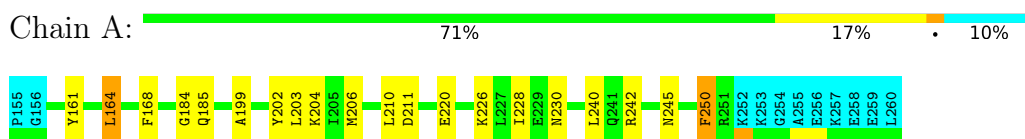


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

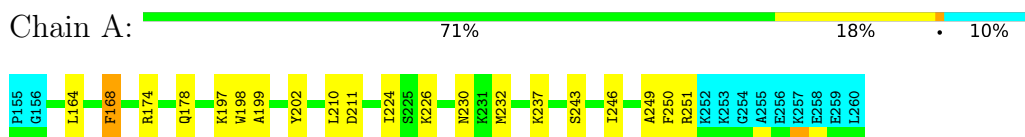
4.2.1 Score per residue for model 1

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



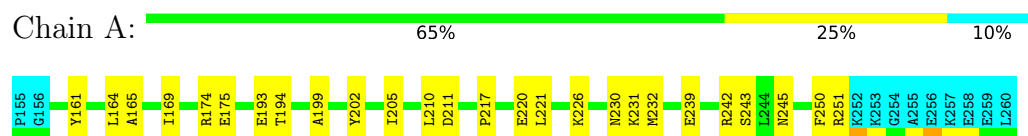
4.2.2 Score per residue for model 2

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



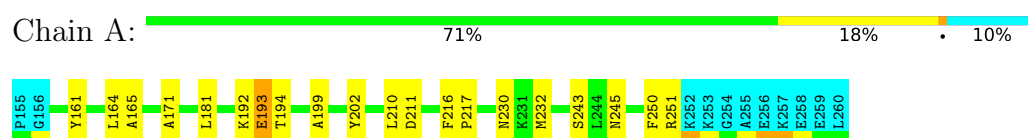
4.2.3 Score per residue for model 3

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



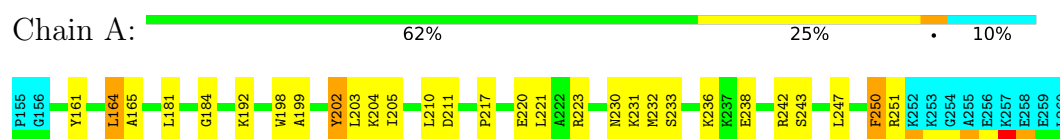
4.2.4 Score per residue for model 4

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



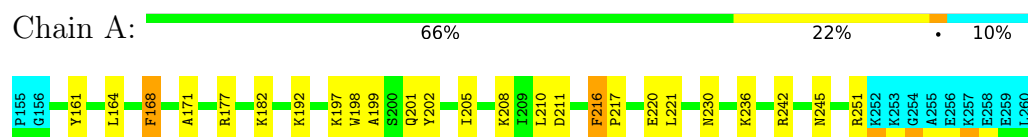
4.2.5 Score per residue for model 5

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



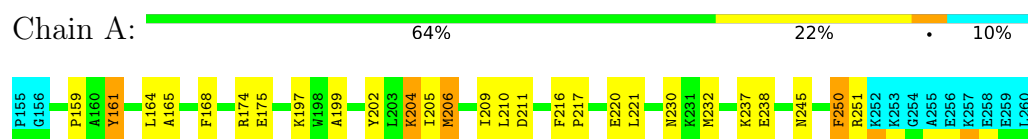
4.2.6 Score per residue for model 6 (medoid)

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



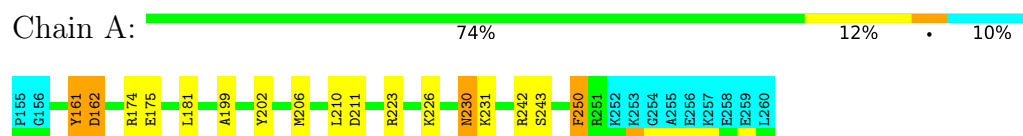
4.2.7 Score per residue for model 7

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



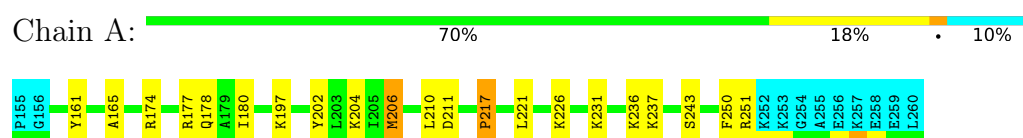
4.2.8 Score per residue for model 8

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



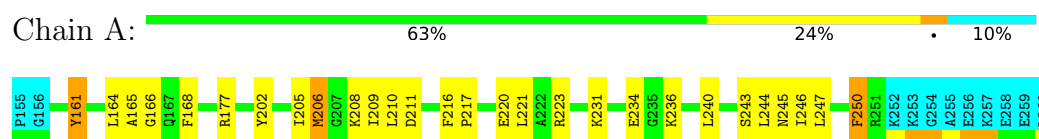
4.2.9 Score per residue for model 9

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



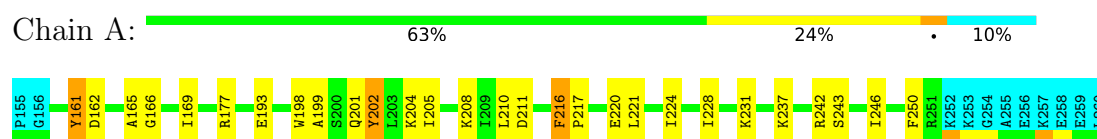
4.2.10 Score per residue for model 10

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



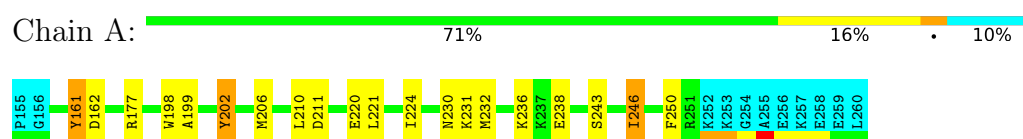
4.2.11 Score per residue for model 11

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



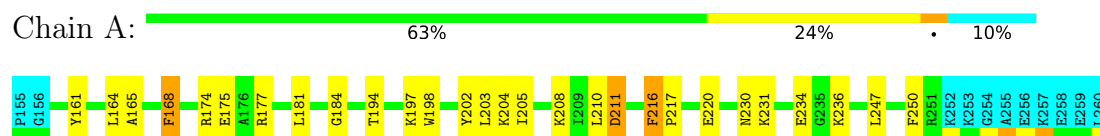
4.2.12 Score per residue for model 12

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



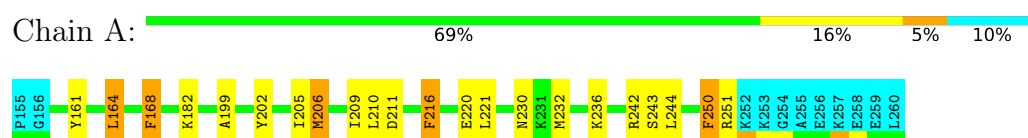
4.2.13 Score per residue for model 13

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



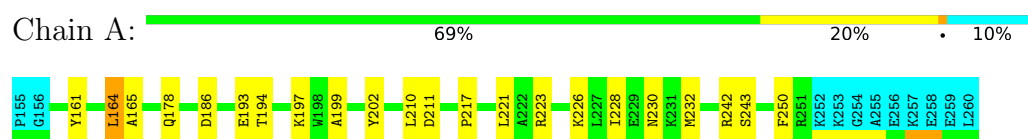
4.2.14 Score per residue for model 14

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



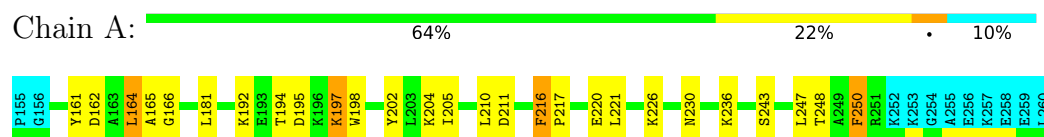
4.2.15 Score per residue for model 15

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



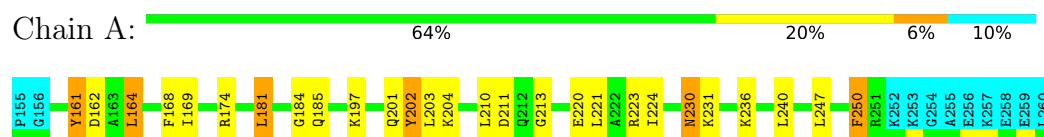
4.2.16 Score per residue for model 16

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



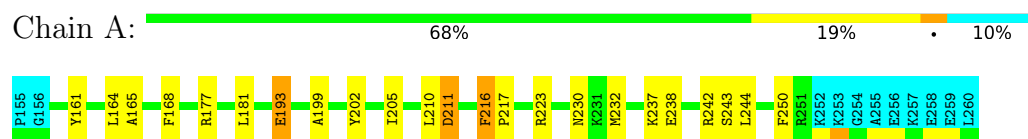
4.2.17 Score per residue for model 17

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



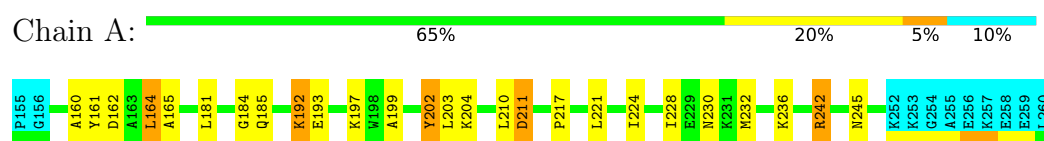
4.2.18 Score per residue for model 18

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



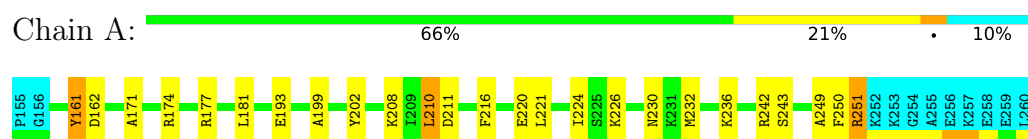
4.2.19 Score per residue for model 19

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



4.2.20 Score per residue for model 20

- Molecule 1: ENDOPLASMIC RETICULUM PROTEIN ERP29



5 Refinement protocol and experimental data overview

The models were refined using the following method: *torsion angle dynamics, molecular dynamics*.

Of the 50 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy, target function*.

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

Software name	Classification	Version
DYANA	structure solution	1.5
OPAL	refinement	2.6

No chemical shift data was provided.

6 Model quality i

6.1 Standard geometry i

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	0.71±0.02	0±0/752 (0.0± 0.0%)	1.72±0.04	12±3/1005 (1.2± 0.3%)
All	All	0.71	0/15040 (0.0%)	1.72	245/20100 (1.2%)

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	2.0±1.3
All	All	0	41

There are no bond-length outliers.

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	245	ASN	CA-CB-CG	10.54	123.14	112.60	19	7
1	A	230	ASN	CA-CB-CG	10.11	122.71	112.60	17	17
1	A	211	ASP	CA-CB-CG	10.03	122.63	112.60	16	20
1	A	162	ASP	CA-CB-CG	9.43	122.03	112.60	8	1
1	A	174	ARG	CA-C-N	8.74	132.51	120.63	3	5
1	A	174	ARG	C-N-CA	8.74	132.51	120.63	3	5
1	A	168	PHE	CA-CB-CG	8.54	122.33	113.80	2	9
1	A	202	TYR	CA-CB-CG	8.43	129.07	113.90	9	6
1	A	220	GLU	CB-CA-C	7.48	124.25	110.56	12	6
1	A	161	TYR	CA-C-N	7.17	130.84	120.38	8	6
1	A	161	TYR	C-N-CA	7.17	130.84	120.38	8	6
1	A	220	GLU	CA-C-N	7.07	129.75	120.28	6	12
1	A	220	GLU	C-N-CA	7.07	129.75	120.28	6	12
1	A	243	SER	CA-C-N	6.98	129.97	120.54	15	13
1	A	243	SER	C-N-CA	6.98	129.97	120.54	15	13

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	230	ASN	N-CA-CB	6.89	120.23	110.24	17	2
1	A	247	LEU	CA-C-N	6.71	129.82	120.29	16	2
1	A	247	LEU	C-N-CA	6.71	129.82	120.29	16	2
1	A	250	PHE	CA-CB-CG	6.53	120.33	113.80	1	3
1	A	171	ALA	CA-C-N	6.19	129.42	120.38	4	1
1	A	171	ALA	C-N-CA	6.19	129.42	120.38	4	1
1	A	250	PHE	N-CA-CB	-6.15	102.23	111.64	7	10
1	A	251	ARG	N-CA-C	6.13	119.50	107.98	20	2
1	A	240	LEU	CA-C-N	6.09	128.73	120.38	1	2
1	A	240	LEU	C-N-CA	6.09	128.73	120.38	1	2
1	A	192	LYS	CB-CG-CD	6.08	125.29	111.30	5	1
1	A	243	SER	N-CA-C	-6.06	104.59	111.14	16	1
1	A	237	LYS	CA-C-N	6.06	128.31	120.44	7	2
1	A	237	LYS	C-N-CA	6.06	128.31	120.44	7	2
1	A	230	ASN	CA-C-N	5.95	132.90	121.54	8	1
1	A	230	ASN	C-N-CA	5.95	132.90	121.54	8	1
1	A	193	GLU	CA-C-N	5.76	132.54	121.54	4	5
1	A	193	GLU	C-N-CA	5.76	132.54	121.54	4	5
1	A	242	ARG	CD-NE-CZ	5.73	132.42	124.40	15	1
1	A	231	LYS	N-CA-C	-5.65	102.04	110.23	17	3
1	A	246	ILE	CA-C-N	5.64	128.89	120.31	10	2
1	A	246	ILE	C-N-CA	5.64	128.89	120.31	10	2
1	A	198	TRP	CB-CG-CD2	5.62	134.66	126.80	12	3
1	A	246	ILE	N-CA-C	-5.59	105.65	110.74	12	1
1	A	162	ASP	N-CA-CB	-5.53	101.41	110.14	8	1
1	A	228	ILE	CA-C-N	5.49	127.90	120.38	11	4
1	A	228	ILE	C-N-CA	5.49	127.90	120.38	11	4
1	A	210	LEU	CA-C-N	5.47	127.61	120.28	20	1
1	A	210	LEU	C-N-CA	5.47	127.61	120.28	20	1
1	A	240	LEU	CA-C-O	-5.43	115.30	121.00	10	1
1	A	166	GLY	CA-C-N	5.38	127.75	120.38	16	3
1	A	166	GLY	C-N-CA	5.38	127.75	120.38	16	3
1	A	244	LEU	CA-C-O	-5.38	115.17	120.82	18	1
1	A	186	ASP	CA-CB-CG	5.34	117.94	112.60	15	1
1	A	245	ASN	CB-CA-C	-5.29	102.51	110.92	7	1
1	A	216	PHE	CA-CB-CG	-5.22	108.58	113.80	16	1
1	A	231	LYS	CB-CG-CD	5.21	123.30	111.30	3	1
1	A	211	ASP	CB-CA-C	-5.20	102.01	110.85	8	2
1	A	233	SER	CA-C-N	5.20	131.46	121.54	5	1
1	A	233	SER	C-N-CA	5.20	131.46	121.54	5	1
1	A	234	GLU	CA-C-N	5.16	125.81	119.99	10	1

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	234	GLU	C-N-CA	5.16	125.81	119.99	10	1
1	A	181	LEU	CA-C-N	5.14	127.17	120.28	17	4
1	A	181	LEU	C-N-CA	5.14	127.17	120.28	17	4
1	A	165	ALA	CA-C-N	5.12	125.52	119.94	9	1
1	A	165	ALA	C-N-CA	5.12	125.52	119.94	9	1
1	A	192	LYS	CA-C-N	5.12	127.97	120.71	19	1
1	A	192	LYS	C-N-CA	5.12	127.97	120.71	19	1
1	A	162	ASP	N-CA-C	-5.10	105.61	111.07	16	1
1	A	197	LYS	CA-C-N	5.07	127.33	120.44	16	1
1	A	197	LYS	C-N-CA	5.07	127.33	120.44	16	1
1	A	159	PRO	N-CA-C	-5.07	107.80	114.03	7	1
1	A	217	PRO	CA-C-N	5.06	127.38	120.54	6	1
1	A	217	PRO	C-N-CA	5.06	127.38	120.54	6	1
1	A	248	THR	CA-CB-CG2	5.05	119.09	110.50	16	1
1	A	213	GLY	CA-C-N	5.04	130.37	120.99	17	1
1	A	213	GLY	C-N-CA	5.04	130.37	120.99	17	1

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	251	ARG	Sidechain	7
1	A	216	PHE	Sidechain	7
1	A	177	ARG	Sidechain	6
1	A	242	ARG	Sidechain	5
1	A	223	ARG	Sidechain	5
1	A	168	PHE	Sidechain	3
1	A	211	ASP	Sidechain	3
1	A	161	TYR	Sidechain	2
1	A	174	ARG	Sidechain	2
1	A	162	ASP	Sidechain	1

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	743	761	761	7±3
All	All	14860	15220	15220	145

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 5.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:162:ASP:HA	1:A:221:LEU:HD21	0.66	1.67	19	5
1:A:184:GLY:HA3	1:A:203:LEU:HD21	0.60	1.74	19	5
1:A:224:ILE:HD11	1:A:249:ALA:HB2	0.58	1.76	2	2
1:A:165:ALA:HB1	1:A:217:PRO:HB2	0.56	1.76	19	11
1:A:161:TYR:CE1	1:A:202:TYR:CD2	0.55	2.95	4	17
1:A:238:GLU:H	1:A:238:GLU:CD	0.54	2.11	18	3
1:A:198:TRP:H	1:A:198:TRP:CD1	0.52	2.22	16	3
1:A:199:ALA:HA	1:A:202:TYR:CD2	0.52	2.39	19	14
1:A:161:TYR:CE1	1:A:202:TYR:CE2	0.52	2.98	3	9
1:A:205:ILE:HD13	1:A:250:PHE:HB3	0.52	1.81	7	3
1:A:202:TYR:HB2	1:A:250:PHE:CE2	0.52	2.40	17	11
1:A:199:ALA:HA	1:A:202:TYR:CE2	0.51	2.41	19	11
1:A:195:ASP:HA	1:A:198:TRP:CD1	0.50	2.41	16	1
1:A:193:GLU:CD	1:A:193:GLU:H	0.49	2.16	11	3
1:A:164:LEU:HD13	1:A:202:TYR:CE1	0.48	2.43	19	5
1:A:221:LEU:HD23	1:A:224:ILE:HG13	0.48	1.86	17	5
1:A:205:ILE:HD12	1:A:205:ILE:N	0.47	2.24	6	6
1:A:197:LYS:HE3	1:A:198:TRP:CE2	0.45	2.46	2	2
1:A:206:MET:HE3	1:A:209:ILE:CD1	0.45	2.41	7	3
1:A:205:ILE:CD1	1:A:250:PHE:HA	0.45	2.41	11	1
1:A:206:MET:SD	1:A:250:PHE:CE1	0.45	3.10	7	1
1:A:238:GLU:CD	1:A:238:GLU:N	0.45	2.74	7	1
1:A:206:MET:SD	1:A:250:PHE:CZ	0.45	3.10	14	3
1:A:175:GLU:CD	1:A:175:GLU:N	0.44	2.75	8	4
1:A:161:TYR:CD1	1:A:202:TYR:CD2	0.44	3.05	19	1
1:A:205:ILE:HG23	1:A:216:PHE:CD1	0.43	2.48	10	1
1:A:164:LEU:HD13	1:A:202:TYR:CD1	0.42	2.49	15	2
1:A:206:MET:HE1	1:A:217:PRO:HB3	0.42	1.91	9	1
1:A:198:TRP:HB3	1:A:246:ILE:HD11	0.42	1.92	2	2
1:A:204:LYS:HA	1:A:204:LYS:HE3	0.41	1.92	7	1
1:A:160:ALA:O	1:A:164:LEU:HD12	0.41	2.16	19	1
1:A:171:ALA:HB3	1:A:177:ARG:HG2	0.41	1.91	20	2
1:A:168:PHE:CE1	1:A:209:ILE:HG21	0.41	2.49	14	1
1:A:192:LYS:HD3	1:A:193:GLU:H	0.41	1.76	4	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:236:LYS:CE	1:A:236:LYS:HA	0.41	2.45	9	1
1:A:208:LYS:HA	1:A:208:LYS:HE2	0.41	1.93	10	1
1:A:234:GLU:H	1:A:234:GLU:CD	0.41	2.24	13	1

6.3 Torsion angles [i](#)

6.3.1 Protein backbone [i](#)

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	95/106 (90%)	86±2 (90±2%)	9±2 (10±2%)	0±0 (0±1%)	31	76
All	All	1900/2120 (90%)	1710 (90%)	183 (10%)	7 (0%)	31	76

All 3 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	194	THR	5
1	A	251	ARG	1
1	A	217	PRO	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	78/86 (91%)	71±2 (91±3%)	7±2 (9±3%)	10	56
All	All	1560/1720 (91%)	1414 (91%)	146 (9%)	10	56

All 27 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	210	LEU	20
1	A	164	LEU	15
1	A	232	MET	11
1	A	236	LYS	10
1	A	204	LYS	9
1	A	221	LEU	9
1	A	226	LYS	8
1	A	206	MET	7
1	A	197	LYS	7
1	A	242	ARG	6
1	A	181	LEU	6
1	A	231	LYS	5
1	A	208	LYS	4
1	A	185	GLN	3
1	A	178	GLN	3
1	A	237	LYS	3
1	A	169	ILE	3
1	A	192	LYS	3
1	A	201	GLN	3
1	A	182	LYS	2
1	A	230	ASN	2
1	A	244	LEU	2
1	A	239	GLU	1
1	A	174	ARG	1
1	A	180	ILE	1
1	A	246	ILE	1
1	A	223	ARG	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates ⓘ

There are no oligosaccharides 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

No chemical shift data were provided