Full wwPDB NMR Structure Validation Report (i)

Oct 22, 2024 – 06:55 PM EDT

PDB ID	:	2MLM
BMRB ID	:	19826
Title	:	Solution structure of sortase A from S. aureus in complex with benzo[d]isothiazol-3-one based inhibitor
Authors	:	Jaudzems, K.; Zhulenkovs, D.; Leonchiks, A.
Deposited on	:	2014-03-03

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/NMRValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

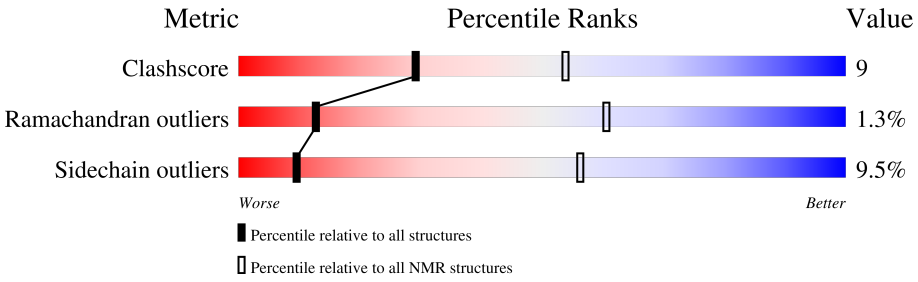
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance

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

The overall completeness of chemical shifts assignment is 90%.

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	210492	14027
Ramachandran outliers	207382	12486
Sidechain outliers	206894	12463

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

Mol	Chain	Length	Quality of chain
1	A	148	75% 18% 7%

2 Ensemble composition and analysis

This entry contains 20 models. Model 2 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

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:4-A:128, A:137-A:148 (137)	1.53	2

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. No single-model clusters were found.

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

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2411 atoms, of which 1206 are hydrogens and 0 are deuteriums.

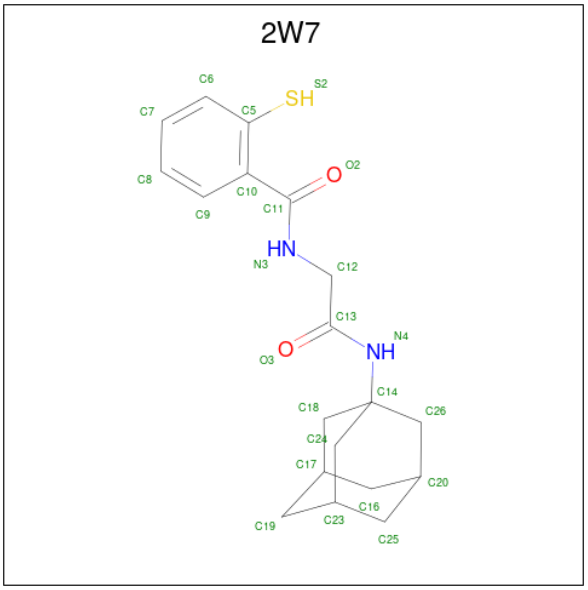
- Molecule 1 is a protein called Sortase family protein.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	148	2364	746	1183	199	232	4	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	expression tag	UNP R9YTM5

- Molecule 2 is N-{2-oxo-2-[(3s,5s,7s)-tricyclo[3.3.1.1 3,7]dec-1-ylamino]ethyl}-2-sulfanylbenz amide (three-letter code: 2W7) (formula: $C_{19}H_{24}N_2O_2S$).



Mol	Chain	Residues	Atoms					
			Total	C	H	N	O	S
2	A	1	47	19	23	2	2	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: Sortase family protein

Chain A:

4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

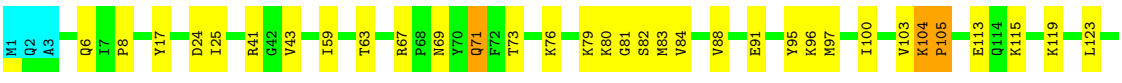
• Molecule 1: Sortase family protein

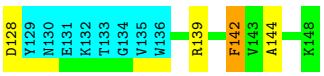
Chain A:

4.2.2 Score per residue for model 2 (medoid)

• Molecule 1: Sortase family protein

Chain A:

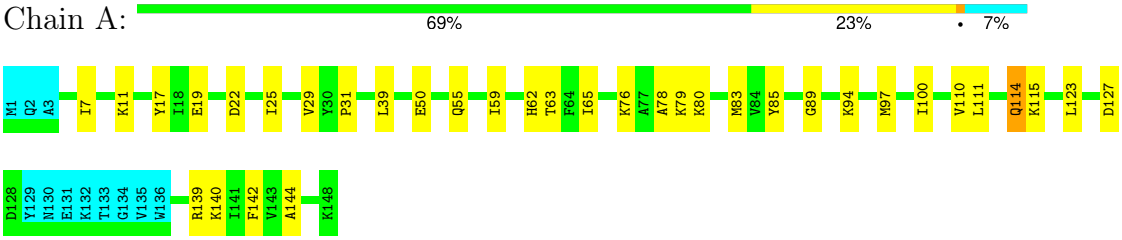




4.2.3 Score per residue for model 3

• Molecule 1: Sortase family protein

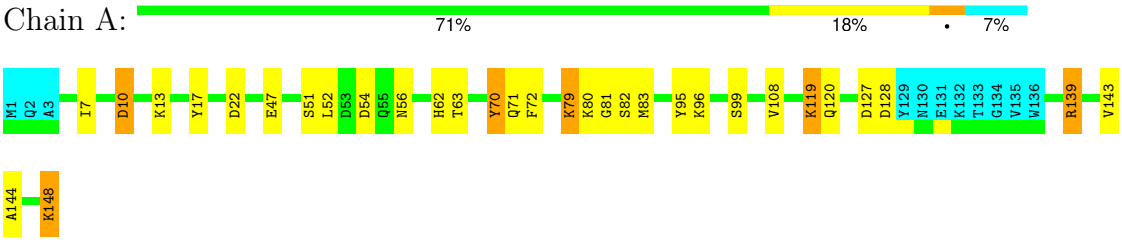
Chain A:



4.2.4 Score per residue for model 4

• Molecule 1: Sortase family protein

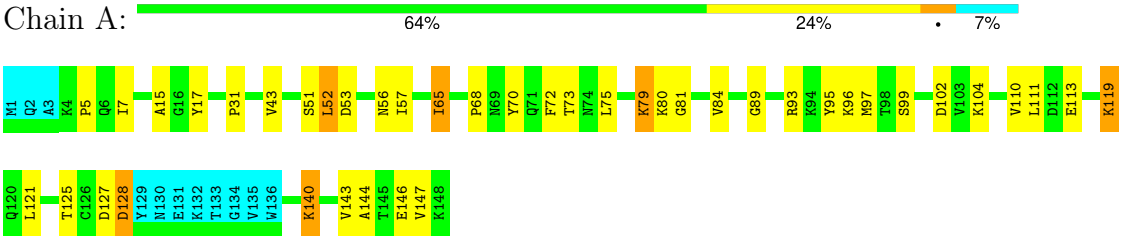
Chain A:



4.2.5 Score per residue for model 5

• Molecule 1: Sortase family protein

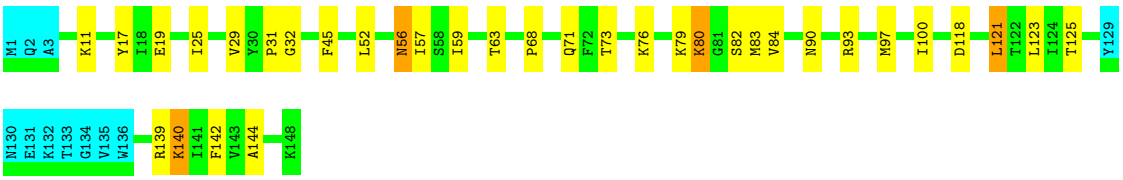
Chain A:



4.2.6 Score per residue for model 6

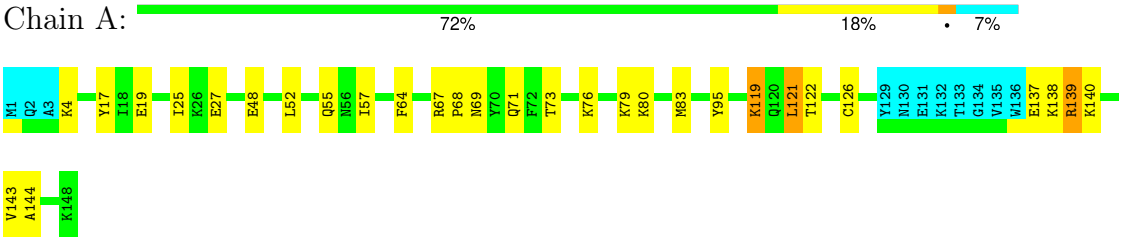
• Molecule 1: Sortase family protein

Chain A:



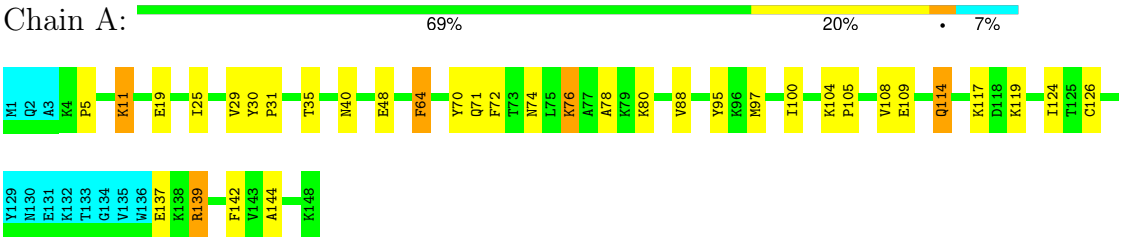
4.2.7 Score per residue for model 7

• Molecule 1: Sortase family protein



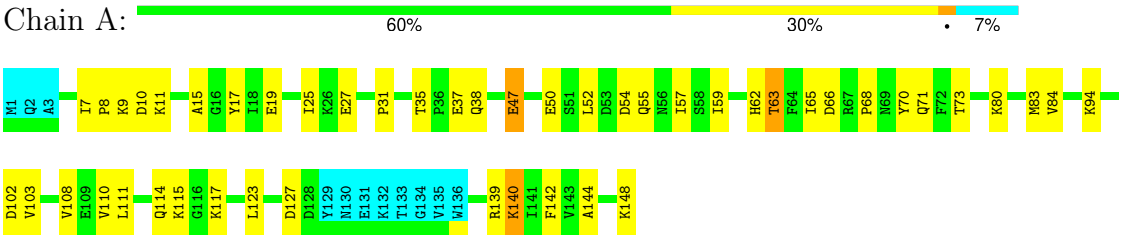
4.2.8 Score per residue for model 8

• Molecule 1: Sortase family protein



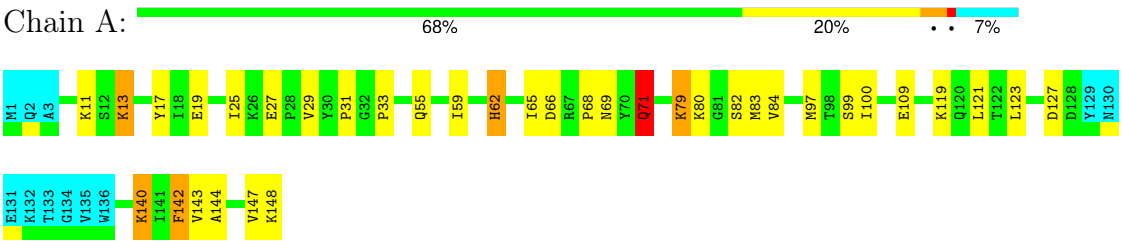
4.2.9 Score per residue for model 9

• Molecule 1: Sortase family protein



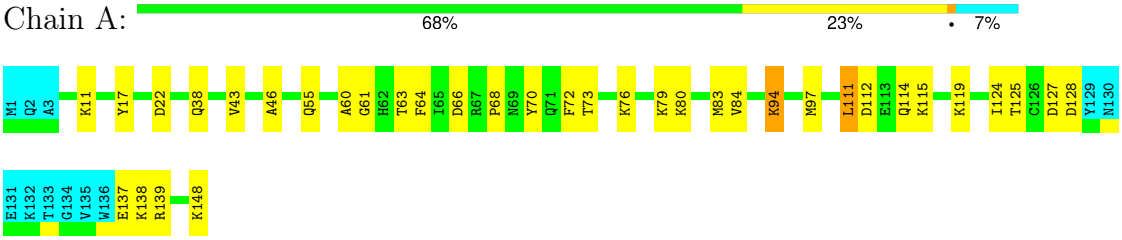
4.2.10 Score per residue for model 10

• Molecule 1: Sortase family protein



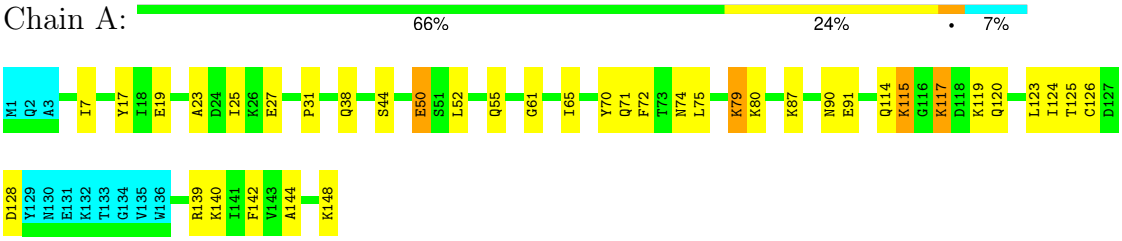
4.2.11 Score per residue for model 11

• Molecule 1: Sortase family protein



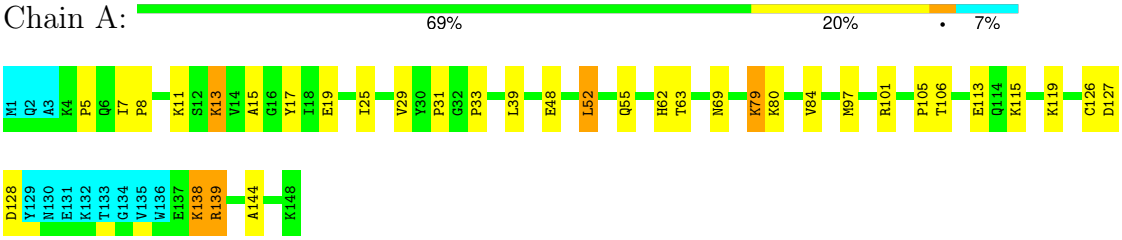
4.2.12 Score per residue for model 12

• Molecule 1: Sortase family protein



4.2.13 Score per residue for model 13

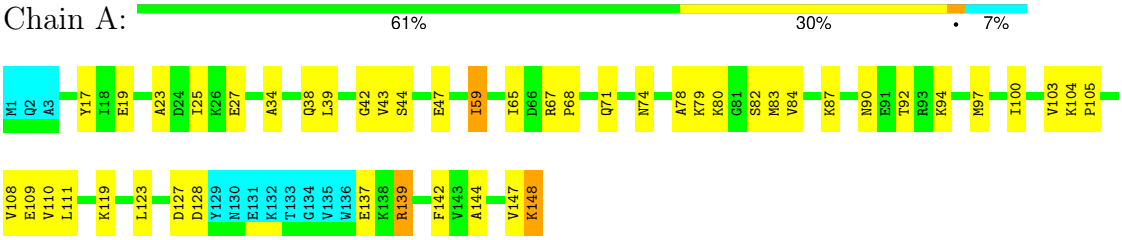
• Molecule 1: Sortase family protein



4.2.14 Score per residue for model 14

• Molecule 1: Sortase family protein

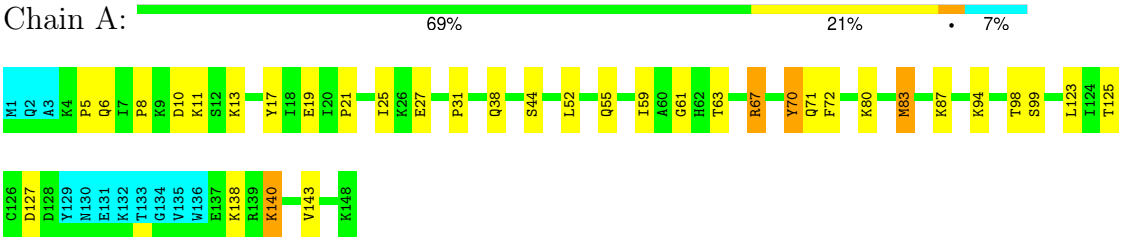
Chain A:



4.2.15 Score per residue for model 15

• Molecule 1: Sortase family protein

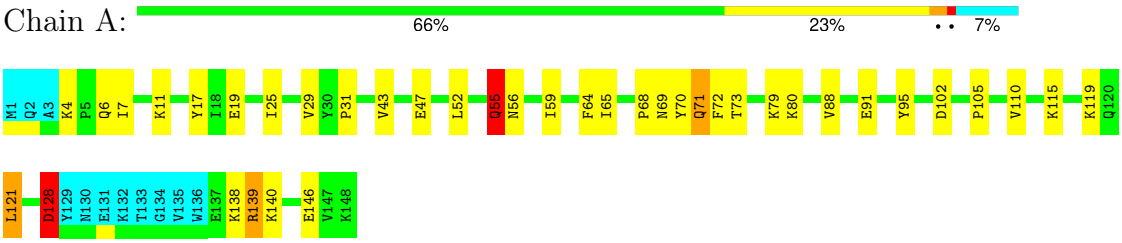
Chain A:



4.2.16 Score per residue for model 16

• Molecule 1: Sortase family protein

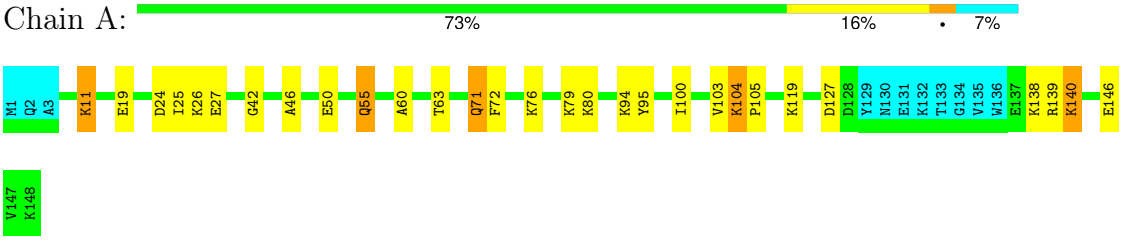
Chain A:



4.2.17 Score per residue for model 17

• Molecule 1: Sortase family protein

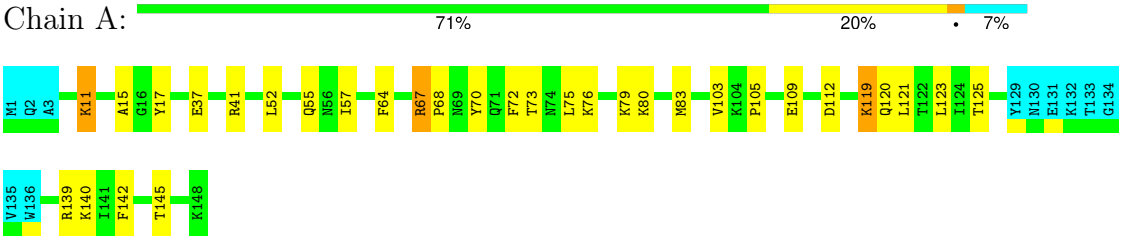
Chain A:



4.2.18 Score per residue for model 18

• Molecule 1: Sortase family protein

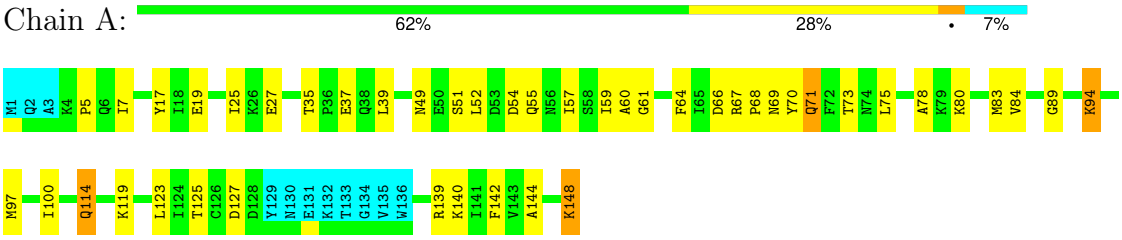
Chain A:



4.2.19 Score per residue for model 19

• Molecule 1: Sortase family protein

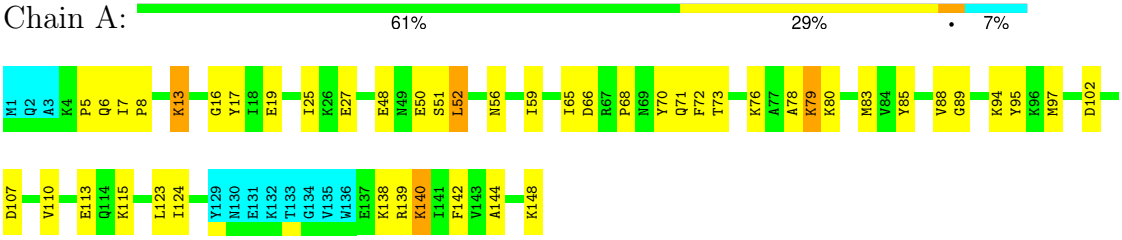
Chain A:



4.2.20 Score per residue for model 20

• Molecule 1: Sortase family protein

Chain A:



5 Refinement protocol and experimental data overview

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

Of the 100 calculated structures, 20 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
CNS	refinement	1.2
CYANA	structure solution	2.1
UNIO	structure solution	2.0.2
CYANA	refinement	2.1

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	1843
Number of shifts mapped to atoms	1843
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	90%

6 Model quality

6.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 2W7

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	1089	1099	1099	20±4
2	A	24	23	23	2±2
All	All	22260	22440	22440	406

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 9.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:102:ASP:HB2	1:A:138:LYS:HD3	0.82	1.50	1	2
1:A:63:THR:HG23	1:A:73:THR:HA	0.80	1.51	2	1
2:A:201:2W7:O2	2:A:201:2W7:N4	0.76	2.19	20	2
1:A:126:CYS:HA	1:A:139:ARG:HG3	0.75	1.57	13	1
1:A:27:GLU:HG3	1:A:71:GLN:HA	0.73	1.58	14	3
1:A:7:ILE:HD11	1:A:52:LEU:HB3	0.71	1.61	16	4
1:A:27:GLU:HG3	1:A:71:GLN:HB3	0.70	1.63	20	3
1:A:25:ILE:HG23	1:A:71:GLN:HB2	0.70	1.64	17	2
1:A:84:VAL:HG21	1:A:142:PHE:HZ	0.67	1.49	19	7
1:A:61:GLY:HA3	1:A:72:PHE:HE2	0.67	1.50	15	1
1:A:55:GLN:O	1:A:119:LYS:HA	0.66	1.90	18	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:19:GLU:HG3	1:A:85:TYR:HB2	0.66	1.67	20	1
2:A:201:2W7:N4	2:A:201:2W7:C11	0.66	2.57	20	2
1:A:62:HIS:CD2	1:A:127:ASP:HA	0.65	2.27	10	1
1:A:128:ASP:HB2	1:A:137:GLU:H	0.65	1.51	14	1
1:A:126:CYS:HA	1:A:139:ARG:HA	0.64	1.68	12	1
1:A:43:VAL:HG22	1:A:59:ILE:HG22	0.64	1.68	14	2
2:A:201:2W7:H4	2:A:201:2W7:C11	0.64	2.05	13	1
1:A:142:PHE:CZ	1:A:144:ALA:HB2	0.63	2.27	12	8
1:A:72:PHE:HE1	1:A:75:LEU:HD22	0.62	1.55	12	1
1:A:11:LYS:HD3	1:A:38:GLN:HB2	0.62	1.71	9	1
1:A:11:LYS:HE2	1:A:33:PRO:HG2	0.62	1.71	13	1
1:A:19:GLU:HA	1:A:25:ILE:O	0.61	1.95	16	15
1:A:43:VAL:HB	1:A:72:PHE:HE2	0.61	1.56	11	2
1:A:103:VAL:HG22	1:A:105:PRO:HD3	0.61	1.73	14	1
1:A:68:PRO:HA	1:A:73:THR:HG21	0.61	1.73	6	7
1:A:22:ASP:OD2	1:A:78:ALA:HA	0.60	1.96	3	1
1:A:84:VAL:HG21	1:A:142:PHE:CZ	0.60	2.31	19	3
1:A:13:LYS:HE2	1:A:31:PRO:HD2	0.60	1.73	13	1
1:A:71:GLN:HG2	1:A:72:PHE:HD1	0.60	1.56	17	1
1:A:11:LYS:HE3	1:A:11:LYS:HA	0.59	1.73	17	1
1:A:103:VAL:O	1:A:105:PRO:HD3	0.59	1.97	2	1
1:A:8:PRO:HD2	1:A:13:LYS:HZ2	0.59	1.58	13	1
1:A:11:LYS:HB2	1:A:30:TYR:HB3	0.58	1.75	8	1
1:A:52:LEU:HA	1:A:57:ILE:HD11	0.58	1.75	18	3
1:A:13:LYS:HD3	1:A:13:LYS:C	0.58	2.19	20	1
1:A:137:GLU:HG3	1:A:138:LYS:H	0.57	1.58	11	1
1:A:139:ARG:HH21	2:A:201:2W7:C11	0.57	2.12	18	1
1:A:127:ASP:H	1:A:139:ARG:HA	0.57	1.57	9	2
1:A:35:THR:H	1:A:39:LEU:HD23	0.57	1.58	19	1
1:A:138:LYS:HZ3	1:A:138:LYS:HB3	0.57	1.60	7	1
1:A:41:ARG:HA	1:A:41:ARG:NE	0.57	2.15	2	1
1:A:27:GLU:HG3	1:A:71:GLN:CB	0.56	2.31	10	1
1:A:103:VAL:HB	1:A:139:ARG:HB2	0.56	1.77	17	1
1:A:72:PHE:HB3	1:A:75:LEU:HB2	0.56	1.77	18	1
1:A:78:ALA:HB1	1:A:97:MET:SD	0.56	2.40	19	4
1:A:16:GLY:HA2	1:A:88:VAL:HA	0.56	1.76	20	1
1:A:128:ASP:HB2	1:A:138:LYS:HB3	0.56	1.77	16	1
2:A:201:2W7:C11	2:A:201:2W7:H4	0.56	2.13	20	2
1:A:97:MET:HA	1:A:142:PHE:HE1	0.56	1.60	3	2
1:A:61:GLY:HA3	1:A:125:THR:HG22	0.56	1.77	12	1
1:A:11:LYS:HD2	1:A:11:LYS:H	0.55	1.61	16	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:139:ARG:NH2	2:A:201:2W7:O2	0.55	2.35	1	4
1:A:71:GLN:HG3	1:A:72:PHE:H	0.55	1.62	16	1
1:A:140:LYS:HB3	1:A:140:LYS:NZ	0.55	2.17	20	2
1:A:5:PRO:HB3	1:A:88:VAL:HB	0.54	1.80	8	1
1:A:63:THR:HB	1:A:127:ASP:HA	0.54	1.80	1	1
1:A:46:ALA:HB2	1:A:60:ALA:HB2	0.54	1.78	11	2
2:A:201:2W7:C11	2:A:201:2W7:N4	0.54	2.70	13	1
1:A:126:CYS:HB3	2:A:201:2W7:O2	0.53	2.03	8	1
1:A:139:ARG:HD2	1:A:139:ARG:H	0.53	1.63	14	1
1:A:82:SER:HB2	1:A:97:MET:SD	0.53	2.43	6	4
1:A:84:VAL:HG21	1:A:97:MET:SD	0.53	2.43	13	3
1:A:67:ARG:HD2	1:A:127:ASP:OD1	0.53	2.04	14	1
1:A:127:ASP:OD2	1:A:138:LYS:HE2	0.53	2.03	15	1
1:A:51:SER:HB2	1:A:54:ASP:HB2	0.53	1.81	4	2
1:A:119:LYS:HE3	1:A:146:GLU:OE1	0.53	2.03	16	1
1:A:63:THR:HG23	1:A:70:TYR:HB3	0.53	1.80	4	1
1:A:114:GLN:N	1:A:114:GLN:HE21	0.52	2.02	8	1
1:A:65:ILE:HA	1:A:73:THR:HG23	0.52	1.79	5	1
1:A:13:LYS:C	1:A:13:LYS:HD2	0.52	2.24	10	1
1:A:67:ARG:HB2	1:A:70:TYR:HB2	0.52	1.81	15	1
1:A:15:ALA:HB1	1:A:52:LEU:HD11	0.52	1.81	18	1
2:A:201:2W7:N3	2:A:201:2W7:S2	0.52	2.82	4	1
1:A:128:ASP:CB	1:A:138:LYS:HB3	0.52	2.34	16	1
1:A:81:GLY:HA2	1:A:96:LYS:HD2	0.52	1.82	4	3
1:A:57:ILE:HG22	1:A:121:LEU:HD12	0.52	1.82	6	1
1:A:103:VAL:HG23	1:A:139:ARG:HB2	0.52	1.82	18	1
1:A:128:ASP:HB2	1:A:137:GLU:N	0.52	2.17	14	1
1:A:11:LYS:HD2	1:A:32:GLY:HA2	0.51	1.82	6	1
1:A:61:GLY:O	1:A:125:THR:HA	0.51	2.05	11	1
1:A:139:ARG:NH2	2:A:201:2W7:O3	0.51	2.42	18	3
1:A:128:ASP:OD1	1:A:139:ARG:HB3	0.51	2.06	14	1
1:A:59:ILE:O	1:A:123:LEU:HA	0.51	2.06	10	7
1:A:139:ARG:NH1	2:A:201:2W7:O3	0.51	2.37	19	3
1:A:97:MET:HB3	1:A:100:ILE:HD11	0.50	1.81	6	7
1:A:57:ILE:O	1:A:121:LEU:HA	0.50	2.06	7	2
1:A:29:VAL:O	1:A:31:PRO:HD3	0.50	2.06	13	6
1:A:128:ASP:OD1	1:A:139:ARG:HB2	0.50	2.06	4	1
1:A:114:GLN:CD	1:A:114:GLN:H	0.50	2.10	19	1
1:A:11:LYS:N	1:A:11:LYS:HD2	0.50	2.22	3	1
1:A:125:THR:HB	1:A:140:LYS:O	0.50	2.06	15	2
1:A:23:ALA:O	1:A:74:ASN:HB3	0.50	2.05	14	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:39:LEU:HB3	1:A:62:HIS:HB3	0.50	1.83	13	1
1:A:40:ASN:HA	1:A:70:TYR:OH	0.50	2.07	8	1
1:A:123:LEU:HD12	1:A:142:PHE:CD2	0.50	2.42	10	3
1:A:79:LYS:N	1:A:79:LYS:HD3	0.50	2.21	20	3
1:A:72:PHE:CE1	1:A:75:LEU:HD22	0.50	2.40	12	1
1:A:103:VAL:O	1:A:139:ARG:HB2	0.49	2.07	2	1
1:A:65:ILE:HG13	1:A:66:ASP:H	0.49	1.67	9	1
1:A:11:LYS:HD2	1:A:32:GLY:CA	0.49	2.37	6	1
1:A:71:GLN:HG2	1:A:72:PHE:N	0.49	2.23	4	1
1:A:104:LYS:HA	1:A:137:GLU:O	0.49	2.08	8	1
1:A:104:LYS:H	1:A:104:LYS:HD2	0.49	1.68	17	1
1:A:124:ILE:HG23	1:A:139:ARG:HH22	0.49	1.67	20	1
1:A:61:GLY:N	2:A:201:2W7:O2	0.49	2.40	19	1
1:A:125:THR:HB	1:A:140:LYS:CG	0.48	2.38	19	1
1:A:47:GLU:HB3	1:A:50:GLU:HG3	0.48	1.84	9	1
1:A:139:ARG:HE	2:A:201:2W7:C10	0.48	2.21	20	1
1:A:7:ILE:HB	1:A:50:GLU:HB3	0.48	1.84	3	1
1:A:7:ILE:HG13	1:A:52:LEU:HD23	0.48	1.85	9	1
1:A:64:PHE:HB2	1:A:70:TYR:CD2	0.48	2.43	19	2
1:A:105:PRO:HD2	1:A:139:ARG:HG3	0.48	1.85	2	1
1:A:87:LYS:HG2	1:A:92:THR:HB	0.48	1.85	14	1
1:A:138:LYS:HD2	1:A:138:LYS:O	0.48	2.09	13	1
1:A:109:GLU:HA	1:A:112:ASP:HB2	0.48	1.85	18	1
1:A:97:MET:HG2	1:A:142:PHE:CE1	0.47	2.44	10	2
1:A:7:ILE:HG23	1:A:31:PRO:HB2	0.47	1.86	13	1
1:A:110:VAL:HG13	1:A:111:LEU:HG	0.47	1.85	3	2
1:A:139:ARG:HE	2:A:201:2W7:C9	0.47	2.22	20	1
2:A:201:2W7:S2	2:A:201:2W7:O2	0.47	2.72	3	1
1:A:27:GLU:CB	1:A:71:GLN:HG3	0.47	2.39	9	1
1:A:48:GLU:HG2	1:A:48:GLU:O	0.47	2.09	7	1
1:A:121:LEU:O	1:A:143:VAL:HA	0.47	2.10	7	1
1:A:108:VAL:HB	2:A:201:2W7:C26	0.47	2.40	9	1
1:A:88:VAL:HG23	1:A:91:GLU:HB2	0.47	1.87	16	2
1:A:115:LYS:N	1:A:115:LYS:HD2	0.47	2.25	13	2
1:A:127:ASP:HB2	1:A:138:LYS:O	0.47	2.09	17	1
1:A:139:ARG:NH2	2:A:201:2W7:C11	0.47	2.77	18	1
1:A:95:TYR:HB3	1:A:144:ALA:HB1	0.47	1.87	8	6
1:A:59:ILE:HB	1:A:123:LEU:HG	0.47	1.86	9	1
1:A:94:LYS:HD3	1:A:94:LYS:H	0.46	1.71	11	2
1:A:64:PHE:CE2	1:A:66:ASP:HB2	0.46	2.46	11	1
1:A:7:ILE:HG23	1:A:31:PRO:HB3	0.46	1.87	12	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:70:TYR:HD2	1:A:71:GLN:HG2	0.46	1.70	16	1
1:A:127:ASP:O	1:A:128:ASP:HB3	0.46	2.10	5	1
1:A:70:TYR:HB3	1:A:73:THR:OG1	0.46	2.10	9	2
1:A:97:MET:SD	1:A:144:ALA:HB2	0.46	2.50	13	1
1:A:67:ARG:HG3	1:A:69:ASN:H	0.46	1.70	19	1
1:A:38:GLN:HG2	1:A:44:SER:OG	0.46	2.09	15	2
1:A:19:GLU:HG3	1:A:85:TYR:CB	0.46	2.39	20	1
1:A:79:LYS:HD2	1:A:79:LYS:N	0.46	2.25	4	5
1:A:104:LYS:HD3	1:A:104:LYS:H	0.46	1.71	2	1
1:A:142:PHE:CE1	1:A:144:ALA:HB2	0.46	2.44	10	1
1:A:11:LYS:HB2	1:A:31:PRO:O	0.46	2.11	15	1
1:A:63:THR:OG1	1:A:67:ARG:HD3	0.46	2.11	15	1
1:A:11:LYS:H	1:A:11:LYS:HD3	0.46	1.71	18	1
1:A:72:PHE:CZ	1:A:123:LEU:HD23	0.46	2.45	20	1
1:A:97:MET:HG2	1:A:142:PHE:CZ	0.46	2.46	19	2
1:A:5:PRO:O	1:A:52:LEU:HD21	0.46	2.10	15	3
1:A:107:ASP:HB3	1:A:110:VAL:HB	0.46	1.87	20	1
1:A:97:MET:HA	1:A:142:PHE:CE1	0.45	2.45	3	1
1:A:114:GLN:NE2	1:A:114:GLN:H	0.45	2.10	3	1
1:A:139:ARG:NH1	2:A:201:2W7:O2	0.45	2.37	3	1
1:A:15:ALA:HB2	1:A:31:PRO:HG3	0.45	1.87	9	1
1:A:124:ILE:HG21	2:A:201:2W7:O3	0.45	2.10	11	1
1:A:102:ASP:CB	1:A:140:LYS:HA	0.45	2.42	5	1
1:A:65:ILE:O	1:A:66:ASP:HB3	0.45	2.11	10	1
1:A:39:LEU:O	1:A:62:HIS:HB2	0.45	2.11	3	1
1:A:117:LYS:N	1:A:117:LYS:HD2	0.45	2.26	12	1
1:A:5:PRO:CB	1:A:88:VAL:HB	0.45	2.41	8	1
1:A:140:LYS:O	1:A:140:LYS:HD2	0.45	2.12	20	1
1:A:27:GLU:CG	1:A:71:GLN:HB3	0.45	2.39	17	1
1:A:10:ASP:HB3	1:A:13:LYS:CG	0.45	2.42	15	2
1:A:140:LYS:O	1:A:140:LYS:HD3	0.45	2.12	10	1
1:A:63:THR:HG23	1:A:127:ASP:HA	0.44	1.88	3	1
1:A:124:ILE:HD13	2:A:201:2W7:O3	0.44	2.13	11	1
1:A:147:VAL:CG2	1:A:148:LYS:N	0.44	2.80	14	1
1:A:21:PRO:HD2	1:A:83:MET:O	0.44	2.12	15	1
1:A:125:THR:HB	1:A:140:LYS:HG3	0.44	1.88	19	1
1:A:5:PRO:HG3	1:A:89:GLY:HA3	0.44	1.89	5	2
1:A:74:ASN:OD1	1:A:76:LYS:HE3	0.44	2.11	8	1
1:A:139:ARG:O	1:A:139:ARG:HD3	0.44	2.12	8	1
1:A:126:CYS:SG	2:A:201:2W7:N3	0.44	2.91	12	1
1:A:75:LEU:HD13	1:A:75:LEU:O	0.44	2.12	18	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:124:ILE:HG23	1:A:139:ARG:NH2	0.44	2.28	8	2
1:A:147:VAL:HG22	1:A:148:LYS:N	0.44	2.28	10	2
1:A:111:LEU:N	1:A:111:LEU:HD13	0.44	2.27	11	1
1:A:67:ARG:N	1:A:68:PRO:HD3	0.44	2.28	14	1
1:A:120:GLN:CB	1:A:145:THR:HA	0.44	2.42	18	1
1:A:99:SER:HB2	1:A:143:VAL:HB	0.44	1.90	10	3
1:A:27:GLU:OE1	1:A:71:GLN:HB3	0.44	2.12	15	1
1:A:26:LYS:NZ	1:A:26:LYS:HB3	0.44	2.27	17	1
1:A:27:GLU:OE1	1:A:71:GLN:HA	0.44	2.13	19	1
1:A:119:LYS:HB3	1:A:146:GLU:CB	0.44	2.43	5	1
1:A:15:ALA:HB3	1:A:31:PRO:HG2	0.44	1.90	13	1
1:A:125:THR:O	1:A:140:LYS:HB2	0.43	2.13	18	1
1:A:123:LEU:HD12	1:A:142:PHE:CE2	0.43	2.48	10	3
1:A:112:ASP:HB2	1:A:114:GLN:NE2	0.43	2.28	11	1
1:A:102:ASP:OD2	1:A:138:LYS:HE3	0.43	2.13	20	1
1:A:119:LYS:HE3	1:A:119:LYS:N	0.43	2.28	4	1
1:A:63:THR:HG21	1:A:140:LYS:HZ1	0.43	1.73	6	1
1:A:122:THR:HA	1:A:143:VAL:HG22	0.43	1.89	7	1
1:A:64:PHE:HD1	1:A:73:THR:HG22	0.43	1.74	16	1
1:A:79:LYS:HD3	1:A:79:LYS:H	0.43	1.73	20	1
1:A:124:ILE:HD13	2:A:201:2W7:HZ21	0.43	1.90	12	1
1:A:83:MET:SD	1:A:94:LYS:HD2	0.43	2.54	15	1
1:A:148:LYS:O	1:A:148:LYS:HD3	0.43	2.12	19	1
1:A:80:LYS:HA	1:A:97:MET:O	0.43	2.14	6	1
1:A:110:VAL:HG23	1:A:111:LEU:HG	0.43	1.89	5	1
1:A:56:ASN:C	1:A:56:ASN:HD22	0.43	2.16	6	1
1:A:11:LYS:HG2	1:A:38:GLN:NE2	0.43	2.29	11	1
2:A:201:2W7:C12	2:A:201:2W7:C9	0.43	2.97	11	1
1:A:105:PRO:HB2	1:A:110:VAL:HG11	0.43	1.89	16	1
1:A:123:LEU:HB2	1:A:142:PHE:HB2	0.43	1.90	18	1
1:A:37:GLU:O	1:A:41:ARG:HG3	0.43	2.14	18	2
1:A:71:GLN:HG3	1:A:72:PHE:CD2	0.43	2.49	8	1
1:A:10:ASP:OD2	1:A:13:LYS:HG2	0.43	2.13	1	1
1:A:59:ILE:HB	1:A:123:LEU:CD2	0.43	2.43	3	2
1:A:102:ASP:HA	1:A:140:LYS:HA	0.42	1.89	1	2
1:A:59:ILE:HB	1:A:123:LEU:HD23	0.42	1.91	19	1
1:A:102:ASP:CB	1:A:138:LYS:HD3	0.42	2.34	1	1
1:A:15:ALA:HB2	1:A:31:PRO:HB3	0.42	1.90	5	1
1:A:11:LYS:HE3	1:A:33:PRO:HG2	0.42	1.90	10	1
1:A:55:GLN:HB2	1:A:119:LYS:HG3	0.42	1.91	13	1
1:A:57:ILE:HB	1:A:121:LEU:CD2	0.42	2.45	18	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:38:GLN:HB3	1:A:44:SER:OG	0.42	2.14	12	1
1:A:63:THR:O	1:A:127:ASP:HA	0.42	2.15	13	2
1:A:63:THR:HG23	1:A:125:THR:HB	0.42	1.91	6	1
1:A:42:GLY:HA2	1:A:71:GLN:OE1	0.42	2.14	14	1
1:A:70:TYR:HB2	1:A:73:THR:HG23	0.42	1.91	1	1
1:A:140:LYS:HB3	1:A:140:LYS:HZ2	0.42	1.74	6	1
1:A:148:LYS:O	1:A:148:LYS:HG2	0.42	2.14	14	1
1:A:51:SER:HB2	1:A:54:ASP:CB	0.42	2.45	19	1
1:A:102:ASP:HB3	1:A:140:LYS:HD3	0.42	1.90	5	1
1:A:54:ASP:CG	1:A:55:GLN:H	0.42	2.18	19	1
1:A:99:SER:HB3	1:A:143:VAL:HB	0.42	1.91	4	1
1:A:31:PRO:HA	1:A:45:PHE:CD2	0.42	2.49	6	1
1:A:66:ASP:O	1:A:68:PRO:HD3	0.42	2.15	20	2
1:A:95:TYR:CD2	1:A:121:LEU:HD21	0.41	2.50	16	1
1:A:51:SER:HB3	1:A:53:ASP:OD1	0.41	2.15	5	1
1:A:108:VAL:HG23	1:A:109:GLU:HG2	0.41	1.91	8	1
1:A:62:HIS:O	1:A:63:THR:HB	0.41	2.15	9	1
1:A:68:PRO:C	1:A:73:THR:HG21	0.41	2.35	19	1
1:A:19:GLU:HB2	1:A:85:TYR:HB2	0.41	1.93	3	1
2:A:201:2W7:O2	2:A:201:2W7:O3	0.41	2.39	17	1
1:A:120:GLN:HB3	1:A:145:THR:HA	0.41	1.91	18	1
1:A:94:LYS:H	1:A:94:LYS:HD3	0.41	1.75	19	1
1:A:6:GLN:NE2	1:A:51:SER:HA	0.41	2.29	20	1
1:A:11:LYS:HD3	1:A:11:LYS:N	0.41	2.30	8	1
1:A:120:GLN:HA	1:A:144:ALA:O	0.41	2.15	12	1
1:A:47:GLU:H	1:A:47:GLU:CD	0.41	2.17	16	1
1:A:100:ILE:CG2	1:A:140:LYS:HE3	0.41	2.46	17	1
1:A:83:MET:HE1	1:A:94:LYS:HB3	0.41	1.90	20	1
1:A:22:ASP:OD2	1:A:82:SER:HB2	0.41	2.15	4	1
1:A:83:MET:SD	1:A:94:LYS:HB3	0.41	2.55	11	1
1:A:10:ASP:HB3	1:A:13:LYS:HG2	0.41	1.90	15	1
1:A:140:LYS:HD2	1:A:142:PHE:CZ	0.41	2.50	18	1
1:A:43:VAL:HG12	1:A:59:ILE:HG22	0.41	1.93	2	1
1:A:55:GLN:HB2	1:A:119:LYS:HA	0.41	1.92	13	1
1:A:139:ARG:HD2	2:A:201:2W7:O2	0.41	2.15	3	1
1:A:103:VAL:HG21	1:A:111:LEU:HD21	0.41	1.92	9	1
1:A:70:TYR:HB2	1:A:73:THR:OG1	0.41	2.15	20	1
1:A:64:PHE:CE2	1:A:67:ARG:HG2	0.41	2.51	7	1
1:A:63:THR:HG22	1:A:125:THR:HB	0.41	1.92	11	1
1:A:25:ILE:HG12	1:A:71:GLN:O	0.41	2.16	16	1
1:A:64:PHE:CD1	1:A:67:ARG:HB2	0.41	2.51	18	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:A:201:2W7:O3	2:A:201:2W7:HZ12	0.41	2.16	16	1
1:A:48:GLU:C	1:A:50:GLU:H	0.40	2.19	20	1
1:A:37:GLU:HG2	1:A:41:ARG:HD2	0.40	1.92	1	1
1:A:6:GLN:O	1:A:8:PRO:HD3	0.40	2.15	2	2
1:A:87:LYS:HA	1:A:91:GLU:O	0.40	2.16	12	1
1:A:104:LYS:HD2	1:A:104:LYS:N	0.40	2.30	17	1
1:A:148:LYS:HG2	1:A:148:LYS:O	0.40	2.16	4	1
1:A:34:ALA:HB1	1:A:39:LEU:HD11	0.40	1.93	14	1
1:A:119:LYS:HB2	1:A:119:LYS:HE2	0.40	1.76	7	1
1:A:50:GLU:H	1:A:50:GLU:CD	0.40	2.20	12	1
1:A:4:LYS:HE3	1:A:6:GLN:OE1	0.40	2.17	16	1
1:A:95:TYR:CD2	1:A:146:GLU:HA	0.40	2.51	17	1
1:A:60:ALA:HB1	2:A:201:2W7:H9	0.40	1.94	19	1
1:A:11:LYS:CB	1:A:30:TYR:HB3	0.40	2.45	8	1
1:A:8:PRO:HD2	1:A:13:LYS:NZ	0.40	2.28	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	136/148 (92%)	119±4 (88±3%)	15±4 (11±3%)	2±1 (1±1%)	13	60
All	All	2720/2960 (92%)	2387 (88%)	298 (11%)	35 (1%)	13	60

All 21 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	65	ILE	4
1	A	105	PRO	4
1	A	128	ASP	4
1	A	55	GLN	3
1	A	71	GLN	3
1	A	8	PRO	2
1	A	89	GLY	1

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Mol	Chain	Res	Type	Models (Total)
1	A	139	ARG	1
1	A	118	ASP	1
1	A	137	GLU	1
1	A	9	LYS	1
1	A	54	ASP	1
1	A	63	THR	1
1	A	62	HIS	1
1	A	127	ASP	1
1	A	106	THR	1
1	A	90	ASN	1
1	A	110	VAL	1
1	A	115	LYS	1
1	A	42	GLY	1
1	A	7	ILE	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	122/131 (93%)	110±2 (90±1%)	12±2 (10±1%)	9 56
All	All	2440/2620 (93%)	2207 (90%)	233 (10%)	9 56

All 56 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	80	LYS	20
1	A	17	TYR	18
1	A	79	LYS	13
1	A	83	MET	12
1	A	140	LYS	11
1	A	119	LYS	10
1	A	76	LYS	9
1	A	94	LYS	7
1	A	148	LYS	7
1	A	69	ASN	6
1	A	114	GLN	6

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Mol	Chain	Res	Type	Models (Total)
1	A	115	LYS	6
1	A	55	GLN	6
1	A	52	LEU	6
1	A	56	ASN	5
1	A	70	TYR	5
1	A	139	ARG	5
1	A	71	GLN	4
1	A	104	LYS	4
1	A	113	GLU	4
1	A	121	LEU	4
1	A	50	GLU	3
1	A	142	PHE	3
1	A	67	ARG	3
1	A	47	GLU	3
1	A	11	LYS	3
1	A	117	LYS	3
1	A	13	LYS	3
1	A	49	ASN	2
1	A	59	ILE	2
1	A	126	CYS	2
1	A	24	ASP	2
1	A	65	ILE	2
1	A	10	ASP	2
1	A	108	VAL	2
1	A	75	LEU	2
1	A	93	ARG	2
1	A	90	ASN	2
1	A	35	THR	2
1	A	48	GLU	2
1	A	37	GLU	2
1	A	109	GLU	2
1	A	111	LEU	2
1	A	128	ASP	2
1	A	120	GLN	1
1	A	147	VAL	1
1	A	4	LYS	1
1	A	64	PHE	1
1	A	22	ASP	1
1	A	101	ARG	1
1	A	138	LYS	1
1	A	87	LYS	1
1	A	98	THR	1

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Mol	Chain	Res	Type	Models (Total)
1	A	68	PRO	1
1	A	63	THR	1
1	A	66	ASP	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

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	2W7	A	201	1	27,27,27	1.07±0.04	1±0 (3±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	2W7	A	201	1	39,40,40	0.74±0.03	1±0 (2±0%)

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	2W7	A	201	1	-	0±0,14,41,41	0±0,5,4,4

All unique bond outliers are listed below.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)	Models	
								Worst	Total
2	A	201	2W7	C10-C11	5.44	1.39	1.50	20	20

All unique angle outliers are listed below.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
2	A	201	2W7	C14-N4-C13	4.34	119.96	126.42	15	20

There are no chirality outliers.

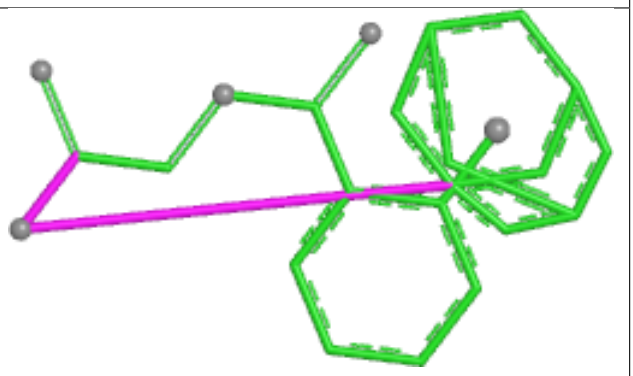
There are no torsion outliers.

There are no ring outliers.

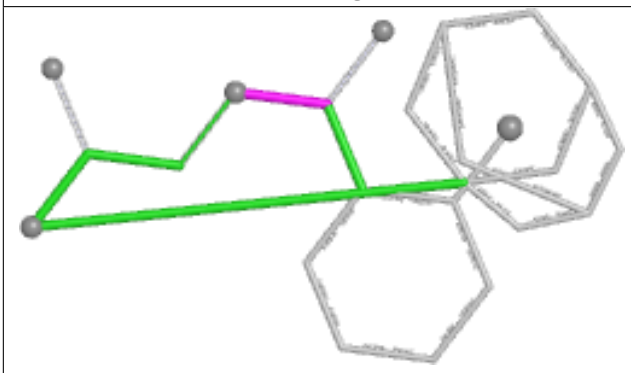
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.

Ligand 2W7 A 201

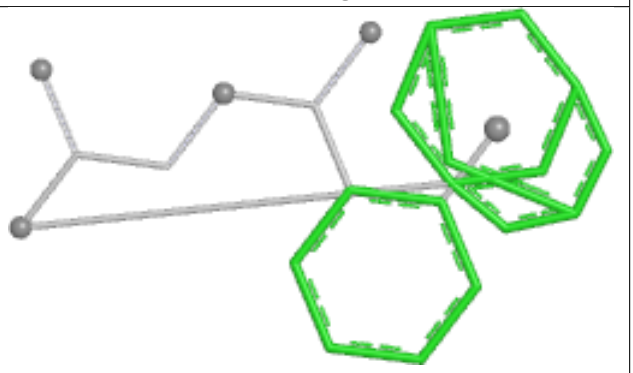
Bond lengths



Bond angles



Torsions



Rings

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 90% for the well-defined parts and 90% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chem_shift_list_1*

7.1.1 Bookkeeping

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	1843
Number of shifts mapped to atoms	1843
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	146	-0.03 ± 0.22	None needed (< 0.5 ppm)
$^{13}C_{\beta}$	138	0.03 ± 0.12	None needed (< 0.5 ppm)
$^{13}C'$	136	0.11 ± 0.15	None needed (< 0.5 ppm)
^{15}N	134	-0.32 ± 0.16	None needed (< 0.5 ppm)

7.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 90%, i.e. 1695 atoms were assigned a chemical shift out of a possible 1876. 0 out of 16 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	654/674 (97%)	267/272 (98%)	262/274 (96%)	125/128 (98%)
Sidechain	958/1100 (87%)	640/705 (91%)	306/350 (87%)	12/45 (27%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	83/102 (81%)	38/49 (78%)	45/52 (87%)	0/1 (0%)
Overall	1695/1876 (90%)	945/1026 (92%)	613/676 (91%)	137/174 (79%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 90%, i.e. 1822 atoms were assigned a chemical shift out of a possible 2026. 0 out of 17 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	703/730 (96%)	287/295 (97%)	282/296 (95%)	134/139 (96%)
Sidechain	1016/1173 (87%)	679/752 (90%)	324/373 (87%)	13/48 (27%)
Aromatic	103/123 (84%)	48/59 (81%)	54/62 (87%)	1/2 (50%)
Overall	1822/2026 (90%)	1014/1106 (92%)	660/731 (90%)	148/189 (78%)

7.1.4 Statistically unusual chemical shifts (i)

There are no statistically unusual chemical shifts.

7.1.5 Random Coil Index (RCI) plots (i)

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

Random coil index (RCI) for chain A: