



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 02:52 PM UTC

PDB ID : 5LNQ / pdb_00005lnq
Title : Crystal structure of SCP2 thiolase from Leishmania mexicana. Complex of the C123A mutant with acetoacetyl-CoA.
Authors : Harijan, R.K.; Kiema, T.-R.; Wierenga, R.K.
Deposited on : 2016-08-06
Resolution : 1.98 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

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
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

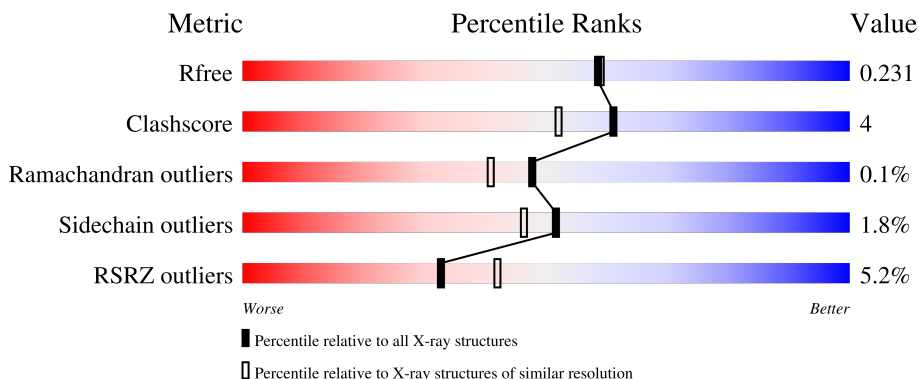
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.98 Å.

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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1506 (1.98-1.98)
Clashscore	190562	1534 (1.98-1.98)
Ramachandran outliers	187476	1518 (1.98-1.98)
Sidechain outliers	187428	1518 (1.98-1.98)
RSRZ outliers	180081	1506 (1.98-1.98)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	457	4% 86% 8% 6%
1	B	457	3% 86% 7% 6%
1	C	457	6% 86% 7% 6%
1	D	457	6% 85% 8% 6%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 14016 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called 3-ketoacyl-CoA thiolase-like protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	430	Total	C	N	O	S	0	1	0
			3229	2014	566	623	26			
1	B	430	Total	C	N	O	S	0	1	0
			3229	2014	566	623	26			
1	C	430	Total	C	N	O	S	0	1	0
			3229	2014	566	623	26			
1	D	430	Total	C	N	O	S	0	1	0
			3229	2014	566	623	26			

There are 180 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-15	HIS	-	expression tag	UNP E9AW84
A	-14	HIS	-	expression tag	UNP E9AW84
A	-13	HIS	-	expression tag	UNP E9AW84
A	-12	HIS	-	expression tag	UNP E9AW84
A	-11	HIS	-	expression tag	UNP E9AW84
A	-10	HIS	-	expression tag	UNP E9AW84
A	-9	SER	-	expression tag	UNP E9AW84
A	-8	SER	-	expression tag	UNP E9AW84
A	-7	GLY	-	expression tag	UNP E9AW84
A	-6	LEU	-	expression tag	UNP E9AW84
A	-5	VAL	-	expression tag	UNP E9AW84
A	-4	PRO	-	expression tag	UNP E9AW84
A	-3	ARG	-	expression tag	UNP E9AW84
A	-2	GLY	-	expression tag	UNP E9AW84
A	-1	SER	-	expression tag	UNP E9AW84
A	0	HIS	-	expression tag	UNP E9AW84
A	6	LEU	MET	conflict	UNP E9AW84
A	12	ALA	THR	conflict	UNP E9AW84
A	31	PRO	LYS	conflict	UNP E9AW84
A	34	ILE	VAL	conflict	UNP E9AW84
A	45	LYS	GLN	conflict	UNP E9AW84

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Chain	Residue	Modelled	Actual	Comment	Reference
A	59	GLY	HIS	conflict	UNP E9AW84
A	61	MET	ILE	conflict	UNP E9AW84
A	63	HIS	ASN	conflict	UNP E9AW84
A	64	SER	VAL	conflict	UNP E9AW84
A	65	GLY	SER	conflict	UNP E9AW84
A	67	SER	LYS	conflict	UNP E9AW84
A	69	ARG	LYS	conflict	UNP E9AW84
A	71	GLY	ASP	conflict	UNP E9AW84
A	107	SER	ALA	conflict	UNP E9AW84
A	112	MET	ILE	conflict	UNP E9AW84
A	123	ALA	CYS	engineered mutation	UNP E9AW84
A	134	MET	THR	conflict	UNP E9AW84
A	139	SER	ALA	conflict	UNP E9AW84
A	145	THR	VAL	conflict	UNP E9AW84
A	157	SER	THR	conflict	UNP E9AW84
A	176	GLN	LYS	conflict	UNP E9AW84
A	229	THR	SER	conflict	UNP E9AW84
A	268	VAL	ALA	conflict	UNP E9AW84
A	277	ARG	LYS	conflict	UNP E9AW84
A	327	ILE	VAL	conflict	UNP E9AW84
A	356	GLU	ASP	conflict	UNP E9AW84
A	368	ASP	GLU	conflict	UNP E9AW84
A	398	ILE	VAL	conflict	UNP E9AW84
A	410	GLU	GLY	conflict	UNP E9AW84
B	-15	HIS	-	expression tag	UNP E9AW84
B	-14	HIS	-	expression tag	UNP E9AW84
B	-13	HIS	-	expression tag	UNP E9AW84
B	-12	HIS	-	expression tag	UNP E9AW84
B	-11	HIS	-	expression tag	UNP E9AW84
B	-10	HIS	-	expression tag	UNP E9AW84
B	-9	SER	-	expression tag	UNP E9AW84
B	-8	SER	-	expression tag	UNP E9AW84
B	-7	GLY	-	expression tag	UNP E9AW84
B	-6	LEU	-	expression tag	UNP E9AW84
B	-5	VAL	-	expression tag	UNP E9AW84
B	-4	PRO	-	expression tag	UNP E9AW84
B	-3	ARG	-	expression tag	UNP E9AW84
B	-2	GLY	-	expression tag	UNP E9AW84
B	-1	SER	-	expression tag	UNP E9AW84
B	0	HIS	-	expression tag	UNP E9AW84
B	6	LEU	MET	conflict	UNP E9AW84
B	12	ALA	THR	conflict	UNP E9AW84

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Chain	Residue	Modelled	Actual	Comment	Reference
B	31	PRO	LYS	conflict	UNP E9AW84
B	34	ILE	VAL	conflict	UNP E9AW84
B	45	LYS	GLN	conflict	UNP E9AW84
B	59	GLY	HIS	conflict	UNP E9AW84
B	61	MET	ILE	conflict	UNP E9AW84
B	63	HIS	ASN	conflict	UNP E9AW84
B	64	SER	VAL	conflict	UNP E9AW84
B	65	GLY	SER	conflict	UNP E9AW84
B	67	SER	LYS	conflict	UNP E9AW84
B	69	ARG	LYS	conflict	UNP E9AW84
B	71	GLY	ASP	conflict	UNP E9AW84
B	107	SER	ALA	conflict	UNP E9AW84
B	112	MET	ILE	conflict	UNP E9AW84
B	123	ALA	CYS	engineered mutation	UNP E9AW84
B	134	MET	THR	conflict	UNP E9AW84
B	139	SER	ALA	conflict	UNP E9AW84
B	145	THR	VAL	conflict	UNP E9AW84
B	157	SER	THR	conflict	UNP E9AW84
B	176	GLN	LYS	conflict	UNP E9AW84
B	229	THR	SER	conflict	UNP E9AW84
B	268	VAL	ALA	conflict	UNP E9AW84
B	277	ARG	LYS	conflict	UNP E9AW84
B	327	ILE	VAL	conflict	UNP E9AW84
B	356	GLU	ASP	conflict	UNP E9AW84
B	368	ASP	GLU	conflict	UNP E9AW84
B	398	ILE	VAL	conflict	UNP E9AW84
B	410	GLU	GLY	conflict	UNP E9AW84
C	-15	HIS	-	expression tag	UNP E9AW84
C	-14	HIS	-	expression tag	UNP E9AW84
C	-13	HIS	-	expression tag	UNP E9AW84
C	-12	HIS	-	expression tag	UNP E9AW84
C	-11	HIS	-	expression tag	UNP E9AW84
C	-10	HIS	-	expression tag	UNP E9AW84
C	-9	SER	-	expression tag	UNP E9AW84
C	-8	SER	-	expression tag	UNP E9AW84
C	-7	GLY	-	expression tag	UNP E9AW84
C	-6	LEU	-	expression tag	UNP E9AW84
C	-5	VAL	-	expression tag	UNP E9AW84
C	-4	PRO	-	expression tag	UNP E9AW84
C	-3	ARG	-	expression tag	UNP E9AW84
C	-2	GLY	-	expression tag	UNP E9AW84
C	-1	SER	-	expression tag	UNP E9AW84

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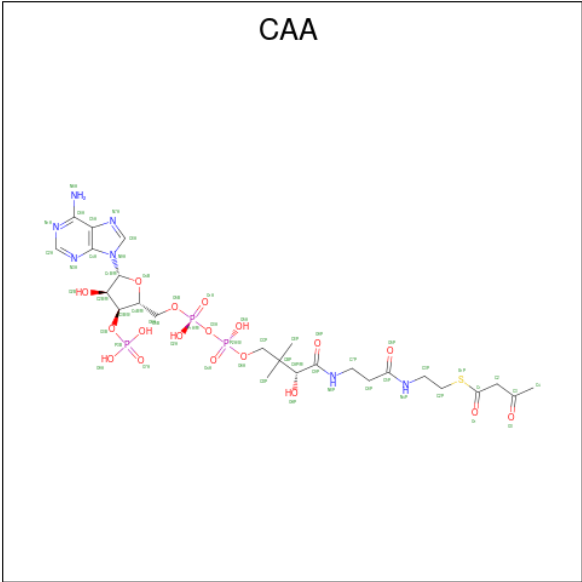
Chain	Residue	Modelled	Actual	Comment	Reference
C	0	HIS	-	expression tag	UNP E9AW84
C	6	LEU	MET	conflict	UNP E9AW84
C	12	ALA	THR	conflict	UNP E9AW84
C	31	PRO	LYS	conflict	UNP E9AW84
C	34	ILE	VAL	conflict	UNP E9AW84
C	45	LYS	GLN	conflict	UNP E9AW84
C	59	GLY	HIS	conflict	UNP E9AW84
C	61	MET	ILE	conflict	UNP E9AW84
C	63	HIS	ASN	conflict	UNP E9AW84
C	64	SER	VAL	conflict	UNP E9AW84
C	65	GLY	SER	conflict	UNP E9AW84
C	67	SER	LYS	conflict	UNP E9AW84
C	69	ARG	LYS	conflict	UNP E9AW84
C	71	GLY	ASP	conflict	UNP E9AW84
C	107	SER	ALA	conflict	UNP E9AW84
C	112	MET	ILE	conflict	UNP E9AW84
C	123	ALA	CYS	engineered mutation	UNP E9AW84
C	134	MET	THR	conflict	UNP E9AW84
C	139	SER	ALA	conflict	UNP E9AW84
C	145	THR	VAL	conflict	UNP E9AW84
C	157	SER	THR	conflict	UNP E9AW84
C	176	GLN	LYS	conflict	UNP E9AW84
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C	398	ILE	VAL	conflict	UNP E9AW84
C	410	GLU	GLY	conflict	UNP E9AW84
D	-15	HIS	-	expression tag	UNP E9AW84
D	-14	HIS	-	expression tag	UNP E9AW84
D	-13	HIS	-	expression tag	UNP E9AW84
D	-12	HIS	-	expression tag	UNP E9AW84
D	-11	HIS	-	expression tag	UNP E9AW84
D	-10	HIS	-	expression tag	UNP E9AW84
D	-9	SER	-	expression tag	UNP E9AW84
D	-8	SER	-	expression tag	UNP E9AW84
D	-7	GLY	-	expression tag	UNP E9AW84
D	-6	LEU	-	expression tag	UNP E9AW84
D	-5	VAL	-	expression tag	UNP E9AW84
D	-4	PRO	-	expression tag	UNP E9AW84

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-3	ARG	-	expression tag	UNP E9AW84
D	-2	GLY	-	expression tag	UNP E9AW84
D	-1	SER	-	expression tag	UNP E9AW84
D	0	HIS	-	expression tag	UNP E9AW84
D	6	LEU	MET	conflict	UNP E9AW84
D	12	ALA	THR	conflict	UNP E9AW84
D	31	PRO	LYS	conflict	UNP E9AW84
D	34	ILE	VAL	conflict	UNP E9AW84
D	45	LYS	GLN	conflict	UNP E9AW84
D	59	GLY	HIS	conflict	UNP E9AW84
D	61	MET	ILE	conflict	UNP E9AW84
D	63	HIS	ASN	conflict	UNP E9AW84
D	64	SER	VAL	conflict	UNP E9AW84
D	65	GLY	SER	conflict	UNP E9AW84
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D	107	SER	ALA	conflict	UNP E9AW84
D	112	MET	ILE	conflict	UNP E9AW84
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D	327	ILE	VAL	conflict	UNP E9AW84
D	356	GLU	ASP	conflict	UNP E9AW84
D	368	ASP	GLU	conflict	UNP E9AW84
D	398	ILE	VAL	conflict	UNP E9AW84
D	410	GLU	GLY	conflict	UNP E9AW84

- Molecule 2 is ACETOACETYL-COENZYME A (CCD ID: CAA) (formula: C₂₅H₄₀N₇O₁₈P₃S).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	0	1
			108	50	14	36	6	2		
2	B	1	Total	C	N	O	P	S	0	0
			54	25	7	18	3	1		
2	D	1	Total	C	N	O	P	S	0	1
			108	50	14	36	6	2		

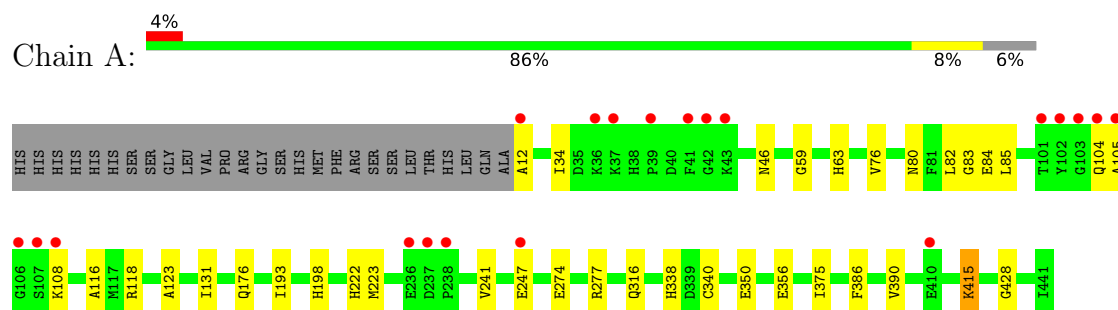
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	231	Total	O	0	0
			231	231		
3	B	233	Total	O	0	0
			233	233		
3	C	183	Total	O	0	0
			183	183		
3	D	183	Total	O	0	0
			183	183		

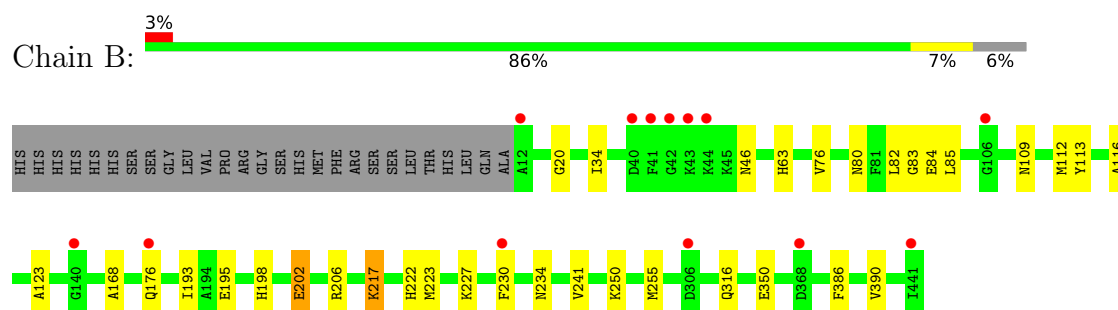
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

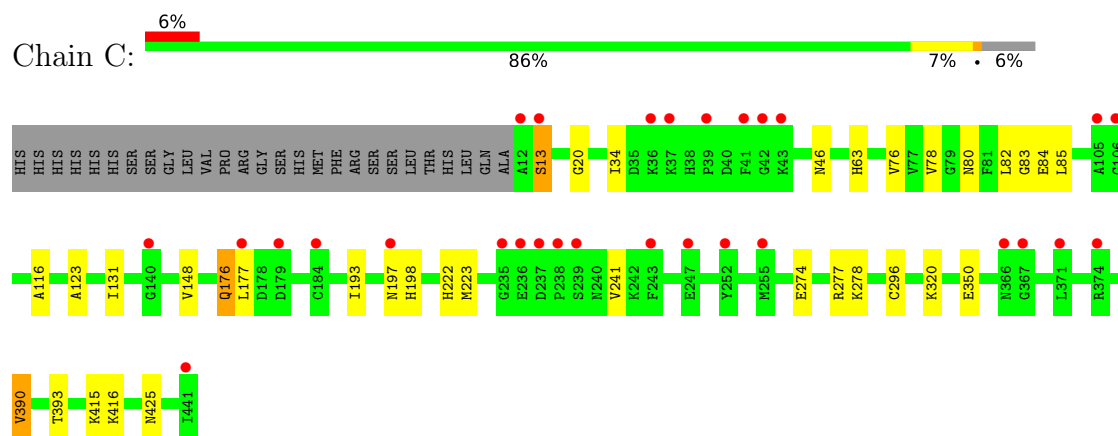
- Molecule 1: 3-ketoacyl-CoA thiolase-like protein



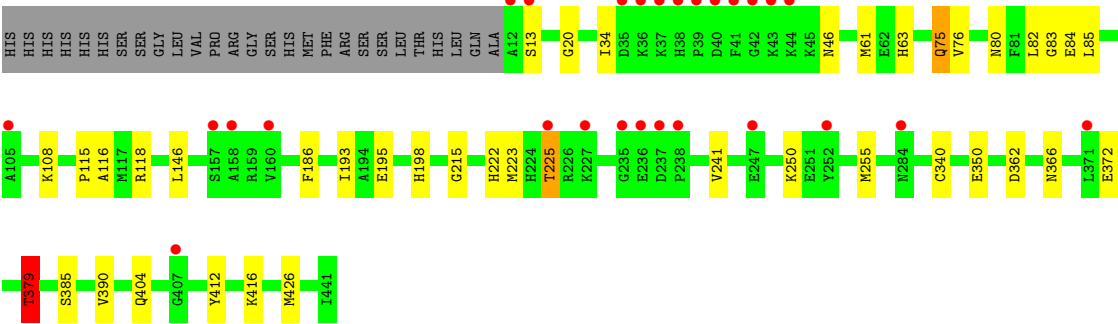
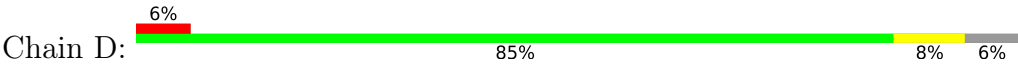
- Molecule 1: 3-ketoacyl-CoA thiolase-like protein



- Molecule 1: 3-ketoacyl-CoA thiolase-like protein



- Molecule 1: 3-ketoacyl-CoA thiolase-like protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.14Å 89.80Å 123.72Å 90.00° 104.76° 90.00°	Depositor
Resolution (Å)	119.63 – 1.98 119.63 – 1.98	Depositor EDS
% Data completeness (in resolution range)	99.1 (119.63-1.98) 99.1 (119.63-1.98)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.06 (at 1.98Å)	Xtriage
Refinement program	REFMAC 5.8.0131	Depositor
R, R_{free}	0.189 , 0.226 0.196 , 0.231	Depositor DCC
R_{free} test set	5300 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	20.4	Xtriage
Anisotropy	0.108	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 31.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	0.044 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	14016	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.89% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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 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	1.06	0/3285	1.02	2/4429 (0.0%)
1	B	1.08	0/3285	1.04	7/4429 (0.2%)
1	C	1.01	1/3285 (0.0%)	1.03	4/4429 (0.1%)
1	D	1.02	0/3285	1.01	3/4429 (0.1%)
All	All	1.04	1/13140 (0.0%)	1.02	16/17716 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	425	ASN	C-O	-5.38	1.17	1.24

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	13	SER	N-CA-CB	7.23	122.71	110.49
1	D	379	THR	N-CA-CB	-6.86	99.00	110.39
1	B	202	GLU	CA-CB-CG	-6.68	100.73	114.10
1	B	390	VAL	N-CA-C	6.57	117.26	110.36
1	C	278	LYS	CB-CA-C	6.32	123.52	110.31
1	A	131	ILE	N-CA-C	6.03	116.21	110.42
1	D	390	VAL	N-CA-C	5.86	116.51	110.36
1	B	234	ASN	N-CA-C	5.53	119.65	113.02
1	C	390	VAL	N-CA-C	5.52	116.15	110.36
1	B	206	ARG	CD-NE-CZ	5.45	132.02	124.40
1	C	393	THR	N-CA-C	5.40	116.84	111.07
1	B	386	PHE	N-CA-C	-5.35	105.35	111.07
1	B	390	VAL	N-CA-CB	5.34	116.44	110.51
1	D	75	GLN	N-CA-CB	-5.33	102.06	111.39
1	B	217	LYS	CG-CD-CE	5.02	122.86	111.30
1	A	386	PHE	N-CA-C	-5.00	105.72	111.07

There are no chirality outliers.

There are no planarity outliers.

5.2 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 the 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 within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3229	0	3208	22	2
1	B	3229	0	3208	25	0
1	C	3229	0	3208	17	2
1	D	3229	0	3208	30	0
2	A	108	0	71	16	0
2	B	54	0	36	5	0
2	D	108	0	72	14	0
3	A	231	0	0	3	0
3	B	233	0	0	6	0
3	C	183	0	0	1	0
3	D	183	0	0	2	0
All	All	14016	0	13011	110	2

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 4.

All (110) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:501[A]:CAA:S1P	2:A:501[A]:CAA:H4'2	1.67	1.30
2:D:501[A]:CAA:H52A	2:D:501[A]:CAA:H8A	1.12	1.09
2:A:501[B]:CAA:CEP	2:A:501[B]:CAA:O9P	2.02	1.08
2:A:501[B]:CAA:S1P	2:A:501[B]:CAA:H4'3	1.90	1.07
1:D:340:CYS:SG	2:D:501[A]:CAA:H4'3	1.95	1.06
1:D:379:THR:HG21	1:D:404:GLN:HE21	1.23	1.02
2:A:501[B]:CAA:O9P	2:A:501[B]:CAA:H141	1.54	1.00
2:A:501[A]:CAA:S1P	2:A:501[A]:CAA:C4	2.49	0.99
2:D:501[A]:CAA:H8A	2:D:501[A]:CAA:C5B	2.00	0.91
1:A:340:CYS:SG	2:A:501[A]:CAA:H2'1	2.10	0.89
1:B:34:ILE:H	1:B:46:ASN:HD21	1.28	0.82
1:B:123:ALA:HB2	2:B:501:CAA:H2'1	1.60	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:426:MET:HE3	2:D:501[A]:CAA:H4'1	1.61	0.82
2:D:501[B]:CAA:S1P	2:D:501[B]:CAA:C4	2.69	0.80
2:D:501[B]:CAA:S1P	2:D:501[B]:CAA:H4'3	2.23	0.79
1:D:34:ILE:H	1:D:46:ASN:HD21	1.30	0.78
2:A:501[A]:CAA:O9P	2:A:501[A]:CAA:H142	1.81	0.78
1:B:168:ALA:CB	2:B:501:CAA:H4'1	2.14	0.78
2:B:501:CAA:O2A	2:B:501:CAA:O4A	2.00	0.78
1:C:34:ILE:H	1:C:46:ASN:HD21	1.33	0.77
1:A:34:ILE:H	1:A:46:ASN:HD21	1.32	0.76
1:D:379:THR:CG2	1:D:404:GLN:HE21	1.97	0.76
1:D:379:THR:HG21	1:D:404:GLN:NE2	2.00	0.76
2:A:501[A]:CAA:O9P	2:A:501[A]:CAA:CEP	2.32	0.75
1:B:168:ALA:HB3	2:B:501:CAA:H4'1	1.70	0.74
2:A:501[B]:CAA:O9P	2:A:501[B]:CAA:H142	1.85	0.73
1:C:84[B]:GLU:OE1	1:D:84[B]:GLU:OE1	2.06	0.73
1:A:340:CYS:SG	2:A:501[A]:CAA:C2	2.78	0.72
2:D:501[A]:CAA:H52A	2:D:501[A]:CAA:C8A	2.06	0.71
1:D:340:CYS:SG	2:D:501[A]:CAA:C4	2.78	0.69
1:B:112:MET:HE1	3:B:737:HOH:O	1.94	0.66
1:A:12:ALA:N	3:A:601:HOH:O	2.29	0.65
2:A:501[A]:CAA:H52A	2:A:501[A]:CAA:H8A	1.79	0.65
1:C:80:ASN:HD21	1:C:83:GLY:H	1.46	0.63
1:A:415:LYS:HE3	1:A:415:LYS:HA	1.79	0.63
1:B:80:ASN:HD21	1:B:83:GLY:H	1.45	0.63
1:D:80:ASN:HD21	1:D:83:GLY:H	1.47	0.61
1:D:84[B]:GLU:H	1:D:84[B]:GLU:CD	2.08	0.60
2:A:501[B]:CAA:O1	2:A:501[B]:CAA:H4'2	2.00	0.59
1:D:379:THR:HG23	1:D:412:TYR:HD2	1.68	0.58
1:A:84[B]:GLU:OE1	1:B:84[B]:GLU:OE1	2.23	0.57
1:A:247:GLU:HG2	3:A:759:HOH:O	2.03	0.57
2:D:501[B]:CAA:H8A	2:D:501[B]:CAA:H52A	1.87	0.57
1:D:186:PHE:CE1	2:D:501[A]:CAA:C4	2.88	0.56
1:D:61:MET:HE3	1:D:146:LEU:HD13	1.88	0.55
1:A:80:ASN:HD21	1:A:83:GLY:H	1.54	0.55
1:B:241:VAL:HG12	1:B:255:MET:SD	2.46	0.55
1:D:186:PHE:HE1	2:D:501[A]:CAA:H4'2	1.72	0.54
1:D:241:VAL:HG22	1:D:255:MET:SD	2.48	0.54
1:C:274:GLU:OE1	1:C:277:ARG:NH1	2.38	0.53
1:D:186:PHE:CE1	2:D:501[A]:CAA:H4'2	2.44	0.53
1:B:195:GLU:HG3	3:B:649:HOH:O	2.08	0.53
1:A:84[B]:GLU:H	1:A:84[B]:GLU:CD	2.17	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:198:HIS:HD2	3:A:813:HOH:O	1.92	0.51
1:D:225:THR:HB	3:D:653:HOH:O	2.09	0.51
1:D:362:ASP:O	1:D:366:ASN:OD1	2.30	0.50
2:A:501[A]:CAA:O9P	2:A:501[A]:CAA:H141	2.11	0.50
1:C:176:GLN:HG3	3:C:579:HOH:O	2.12	0.50
1:C:222:HIS:CD2	1:C:223:MET:HE3	2.48	0.49
1:D:61:MET:CE	1:D:146:LEU:HD13	2.42	0.48
1:C:82:LEU:HD22	1:C:85:LEU:HD12	1.95	0.48
1:D:82:LEU:HD22	1:D:85:LEU:HD12	1.95	0.48
1:A:123:ALA:HA	1:A:390:VAL:HG13	1.96	0.48
1:D:198:HIS:HE1	1:D:350:GLU:OE1	1.97	0.48
1:B:222:HIS:CD2	1:B:223:MET:HE3	2.49	0.48
1:C:176:GLN:OE1	1:C:177:LEU:HD22	2.14	0.48
1:D:75:GLN:HG3	1:D:115:PRO:HB2	1.96	0.48
1:B:82:LEU:HD22	1:B:85:LEU:HD12	1.96	0.48
1:D:222:HIS:CD2	1:D:223:MET:HE3	2.48	0.48
1:A:82:LEU:HD22	1:A:85:LEU:HD12	1.96	0.47
1:C:198:HIS:HE1	1:C:350:GLU:OE1	1.99	0.45
1:D:76:VAL:O	1:D:116:ALA:HA	2.17	0.45
1:A:222:HIS:CD2	1:A:223:MET:HE3	2.51	0.45
1:D:20:GLY:H	1:D:63:HIS:CD2	2.35	0.45
1:A:59:GLY:O	1:A:63:HIS:HD2	2.00	0.44
2:D:501[B]:CAA:O9A	2:D:501[B]:CAA:C2B	2.66	0.44
1:B:123:ALA:HB2	2:B:501:CAA:C2	2.39	0.44
1:A:428:GLY:N	2:A:501[A]:CAA:O3	2.51	0.44
1:B:198:HIS:HE1	1:B:350:GLU:OE1	2.00	0.44
1:B:202:GLU:CD	1:B:230:PHE:HZ	2.26	0.44
1:B:76:VAL:O	1:B:116:ALA:HA	2.18	0.44
1:A:274:GLU:OE2	1:A:277:ARG:NH2	2.51	0.44
1:A:193:ILE:HG23	1:A:198:HIS:HB3	2.00	0.43
1:A:316:GLN:HG3	1:B:113:TYR:CG	2.52	0.43
1:B:176:GLN:HG3	3:B:728:HOH:O	2.17	0.43
1:C:131:ILE:CD1	1:C:296:CYS:HB2	2.48	0.43
1:C:123:ALA:HA	1:C:390:VAL:HG13	2.01	0.43
1:C:193:ILE:HG23	1:C:198:HIS:HB3	2.01	0.43
1:D:193:ILE:HG23	1:D:198:HIS:HB3	1.99	0.43
2:A:501[B]:CAA:H4'3	2:A:501[B]:CAA:C2P	2.47	0.43
1:C:176:GLN:OE1	1:C:177:LEU:CD2	2.67	0.43
1:B:112:MET:HB2	1:B:112:MET:HE2	1.76	0.42
1:A:76:VAL:O	1:A:116:ALA:HA	2.19	0.42
1:C:20:GLY:H	1:C:63:HIS:CD2	2.37	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:76:VAL:O	1:C:116:ALA:HA	2.19	0.42
1:D:61:MET:HE2	1:D:61:MET:HA	2.00	0.42
1:C:84[A]:GLU:CD	1:D:84[A]:GLU:OE1	2.63	0.42
1:D:215:GLY:HA3	1:D:385:SER:OG	2.20	0.42
1:B:202:GLU:HG2	3:B:792:HOH:O	2.20	0.42
1:B:217:LYS:NZ	3:B:614:HOH:O	2.52	0.41
1:B:193:ILE:HG23	1:B:198:HIS:HB3	2.02	0.41
1:D:379:THR:HB	3:D:602:HOH:O	2.19	0.41
1:B:20:GLY:H	1:B:63:HIS:CD2	2.39	0.41
2:D:501[A]:CAA:H121	2:D:501[A]:CAA:O9P	2.21	0.41
1:A:84[A]:GLU:OE1	1:B:84[A]:GLU:CD	2.64	0.41
1:A:198:HIS:HE1	1:A:350:GLU:OE1	2.04	0.41
1:B:316:GLN:NE2	3:B:604:HOH:O	2.41	0.41
1:A:338:HIS:CD2	2:A:501[A]:CAA:H2'2	2.56	0.40
1:B:109:ASN:HB3	1:B:112:MET:CE	2.51	0.40
1:C:78:VAL:HA	1:C:148:VAL:O	2.22	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:105:ALA:O	1:C:197:ASN:CB[2_646]	2.07	0.13
1:A:105:ALA:O	1:C:197:ASN:O[2_646]	2.17	0.03

5.3 Torsion angles [i](#)

5.3.1 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 X-ray entries followed by that with respect to entries of similar resolution.

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	429/457 (94%)	422 (98%)	7 (2%)	0	100	100
1	B	429/457 (94%)	423 (99%)	6 (1%)	0	100	100
1	C	429/457 (94%)	419 (98%)	9 (2%)	1 (0%)	43	35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	429/457 (94%)	422 (98%)	7 (2%)	0	100	100
All	All	1716/1828 (94%)	1686 (98%)	29 (2%)	1 (0%)	48	41

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	13	SER

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	339/362 (94%)	331 (98%)	8 (2%)	43	35
1	B	339/362 (94%)	337 (99%)	2 (1%)	78	76
1	C	339/362 (94%)	334 (98%)	5 (2%)	57	52
1	D	339/362 (94%)	330 (97%)	9 (3%)	39	31
All	All	1356/1448 (94%)	1332 (98%)	24 (2%)	51	46

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	104	GLN
1	A	108	LYS
1	A	118	ARG
1	A	176	GLN
1	A	241	VAL
1	A	356	GLU
1	A	375	ILE
1	A	415	LYS
1	B	227	LYS
1	B	250	LYS
1	C	176	GLN
1	C	241	VAL
1	C	320	LYS

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Mol	Chain	Res	Type
1	C	415	LYS
1	C	416	LYS
1	D	13	SER
1	D	108	LYS
1	D	118	ARG
1	D	195	GLU
1	D	225	THR
1	D	250	LYS
1	D	372	GLU
1	D	379	THR
1	D	416	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	46	ASN
1	A	63	HIS
1	A	80	ASN
1	A	198	HIS
1	A	359	HIS
1	A	408	GLN
1	A	425	ASN
1	B	38	HIS
1	B	46	ASN
1	B	63	HIS
1	B	80	ASN
1	B	197	ASN
1	B	198	HIS
1	B	316	GLN
1	B	326	ASN
1	B	359	HIS
1	B	425	ASN
1	C	46	ASN
1	C	63	HIS
1	C	80	ASN
1	C	153	GLN
1	C	198	HIS
1	C	359	HIS
1	C	408	GLN
1	D	46	ASN
1	D	63	HIS
1	D	75	GLN

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Mol	Chain	Res	Type
1	D	80	ASN
1	D	198	HIS
1	D	316	GLN
1	D	359	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or 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 length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	CAA	A	501[A]	-	53,56,56	1.34	6 (11%)	77,83,83	3.16	24 (31%)
2	CAA	D	501[B]	-	53,56,56	1.22	6 (11%)	77,83,83	1.72	17 (22%)
2	CAA	A	501[B]	-	53,56,56	1.16	5 (9%)	77,83,83	3.26	22 (28%)
2	CAA	B	501	-	53,56,56	1.31	8 (15%)	77,83,83	1.89	23 (29%)
2	CAA	D	501[A]	-	53,56,56	1.37	9 (16%)	77,83,83	2.50	19 (24%)

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	CAA	A	501[A]	-	-	11/55/71/71	0/3/3/3
2	CAA	D	501[B]	-	-	13/55/71/71	0/3/3/3
2	CAA	A	501[B]	-	-	11/55/71/71	0/3/3/3
2	CAA	B	501	-	-	9/55/71/71	0/3/3/3
2	CAA	D	501[A]	-	-	21/55/71/71	0/3/3/3

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501[A]	CAA	C5A-C4A	5.00	1.48	1.39
2	D	501[B]	CAA	C5A-C4A	4.62	1.47	1.39
2	A	501[B]	CAA	C5A-C4A	4.56	1.47	1.39
2	B	501	CAA	O1-C1	4.07	1.27	1.21
2	A	501[A]	CAA	P2A-O3A	3.31	1.63	1.59
2	D	501[A]	CAA	C5A-N7A	-3.29	1.33	1.39
2	D	501[B]	CAA	C1-S1P	-3.24	1.68	1.76
2	B	501	CAA	C5A-C4A	3.19	1.44	1.39
2	D	501[A]	CAA	C5A-C4A	3.11	1.44	1.39
2	A	501[A]	CAA	P1A-O3A	2.97	1.62	1.59
2	A	501[A]	CAA	C5A-C6A	2.96	1.49	1.41
2	B	501	CAA	C4A-N9A	-2.77	1.31	1.37
2	D	501[A]	CAA	P2A-O3A	2.75	1.62	1.59
2	D	501[B]	CAA	C5A-C6A	2.74	1.48	1.41
2	A	501[B]	CAA	C5A-C6A	2.72	1.48	1.41
2	B	501	CAA	C5A-C6A	2.71	1.48	1.41
2	D	501[A]	CAA	O5P-C5P	-2.58	1.18	1.23
2	B	501	CAA	C1-S1P	-2.57	1.70	1.76
2	A	501[B]	CAA	C1-S1P	-2.42	1.70	1.76
2	D	501[B]	CAA	C8A-N7A	2.36	1.36	1.31
2	D	501[A]	CAA	C5A-C6A	2.36	1.47	1.41
2	A	501[A]	CAA	C8A-N7A	2.36	1.36	1.31
2	B	501	CAA	C8A-N9A	-2.30	1.33	1.37
2	A	501[B]	CAA	C8A-N7A	2.29	1.36	1.31
2	A	501[A]	CAA	C5A-N7A	-2.27	1.34	1.39
2	A	501[B]	CAA	C5A-N7A	-2.26	1.35	1.39
2	D	501[B]	CAA	C5A-N7A	-2.25	1.35	1.39
2	D	501[A]	CAA	C8A-N9A	-2.22	1.33	1.37
2	B	501	CAA	P3B-O9A	-2.20	1.46	1.54
2	B	501	CAA	P1A-O3A	2.17	1.61	1.59
2	D	501[A]	CAA	P3B-O8A	-2.15	1.46	1.54
2	D	501[A]	CAA	C4A-N9A	-2.09	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501[B]	CAA	P2A-O3A	2.09	1.61	1.59
2	D	501[A]	CAA	P3B-O9A	-2.08	1.47	1.54

All (105) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501[B]	CAA	CEP-CBP-CAP	-14.84	83.47	108.77
2	A	501[A]	CAA	CEP-CBP-CAP	-13.90	85.07	108.77
2	A	501[B]	CAA	CDP-CBP-CAP	-13.40	85.93	108.77
2	A	501[A]	CAA	CDP-CBP-CAP	-10.72	90.49	108.77
2	A	501[A]	CAA	CEP-CBP-CCP	7.77	121.06	108.22
2	D	501[A]	CAA	C7P-N8P-C9P	7.59	136.18	122.55
2	A	501[B]	CAA	CEP-CBP-CCP	7.21	120.13	108.22
2	A	501[A]	CAA	C7P-C6P-C5P	-6.81	101.04	112.39
2	A	501[B]	CAA	O1-C1-C2	-6.63	112.36	123.40
2	D	501[A]	CAA	C2-C1-S1P	6.54	121.94	113.63
2	D	501[A]	CAA	C5A-C4A-N3A	-6.48	117.80	126.72
2	D	501[A]	CAA	O1-C1-C2	-6.43	112.69	123.40
2	A	501[B]	CAA	C2-C1-S1P	6.43	121.80	113.63
2	D	501[B]	CAA	C5A-C4A-N3A	-5.95	118.52	126.72
2	A	501[A]	CAA	CEP-CBP-CDP	5.91	120.98	109.20
2	A	501[B]	CAA	CEP-CBP-CDP	5.90	120.97	109.20
2	A	501[B]	CAA	C3-C2-C1	-5.82	91.13	113.95
2	A	501[A]	CAA	C5A-C4A-N3A	-5.71	118.85	126.72
2	A	501[A]	CAA	C3-C2-C1	-5.69	91.62	113.95
2	D	501[A]	CAA	O6A-CCP-CBP	5.60	119.55	110.55
2	A	501[A]	CAA	CDP-CBP-CCP	5.55	117.39	108.22
2	A	501[B]	CAA	C5A-C4A-N3A	-5.51	119.13	126.72
2	B	501	CAA	C4A-N9A-C8A	5.41	111.42	105.74
2	A	501[B]	CAA	CDP-CBP-CCP	5.38	117.11	108.22
2	D	501[A]	CAA	O9P-C9P-N8P	5.32	134.22	122.98
2	A	501[A]	CAA	O1-C1-C2	-5.11	114.89	123.40
2	D	501[A]	CAA	C6P-C7P-N8P	5.01	122.66	112.00
2	D	501[A]	CAA	N3A-C4A-N9A	4.92	135.53	127.17
2	D	501[B]	CAA	N3A-C4A-N9A	4.81	135.34	127.17
2	D	501[A]	CAA	C2A-N3A-C4A	4.64	123.17	111.83
2	B	501	CAA	C7P-N8P-C9P	4.60	130.81	122.55
2	A	501[B]	CAA	N3A-C4A-N9A	4.55	134.90	127.17
2	D	501[A]	CAA	N3A-C2A-N1A	-4.54	121.70	128.58
2	A	501[A]	CAA	N3A-C4A-N9A	4.40	134.64	127.17
2	D	501[A]	CAA	CAP-C9P-N8P	-4.31	108.31	116.48
2	A	501[A]	CAA	O1-C1-S1P	4.29	128.14	122.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	CAA	N3A-C4A-N9A	4.21	134.33	127.17
2	A	501[A]	CAA	O3-C3-C4	4.09	131.72	121.48
2	D	501[B]	CAA	C2A-N3A-C4A	3.99	121.57	111.83
2	A	501[A]	CAA	N3A-C2A-N1A	-3.89	122.69	128.58
2	A	501[A]	CAA	C2A-N3A-C4A	3.89	121.34	111.83
2	D	501[B]	CAA	C7P-C6P-C5P	-3.88	105.92	112.39
2	D	501[A]	CAA	OAP-CAP-CBP	3.87	119.14	110.18
2	B	501	CAA	C7P-C6P-C5P	-3.86	105.97	112.39
2	D	501[B]	CAA	N3A-C2A-N1A	-3.84	122.77	128.58
2	A	501[B]	CAA	C2A-N3A-C4A	3.76	121.02	111.83
2	A	501[B]	CAA	N3A-C2A-N1A	-3.75	122.90	128.58
2	D	501[A]	CAA	C3P-N4P-C5P	3.73	129.76	122.82
2	B	501	CAA	C5A-C4A-N3A	-3.72	121.60	126.72
2	A	501[A]	CAA	C4A-C5A-N7A	-3.56	106.51	110.58
2	D	501[B]	CAA	C4A-C5A-N7A	-3.47	106.61	110.58
2	A	501[B]	CAA	C4A-C5A-N7A	-3.42	106.67	110.58
2	B	501	CAA	N3A-C2A-N1A	-3.37	123.48	128.58
2	A	501[B]	CAA	C4A-N9A-C8A	3.25	109.15	105.74
2	D	501[A]	CAA	C4A-C5A-N7A	-3.21	106.91	110.58
2	B	501	CAA	C4A-N9A-C1B	-3.16	119.24	126.63
2	B	501	CAA	CEP-CBP-CAP	3.08	114.02	108.77
2	D	501[B]	CAA	O1-C1-S1P	3.00	126.50	122.68
2	B	501	CAA	O2B-C2B-C1B	-2.99	99.81	110.10
2	B	501	CAA	N9A-C8A-N7A	-2.96	109.74	113.94
2	D	501[A]	CAA	C7P-C6P-C5P	-2.92	107.53	112.39
2	B	501	CAA	C2A-N3A-C4A	2.92	118.95	111.83
2	B	501	CAA	O9P-C9P-N8P	2.89	129.10	122.98
2	D	501[B]	CAA	C4A-N9A-C8A	2.88	108.76	105.74
2	D	501[B]	CAA	C5A-N7A-C8A	2.79	107.84	103.45
2	D	501[B]	CAA	C3-C2-C1	-2.79	103.01	113.95
2	A	501[A]	CAA	O3B-P3B-O7A	-2.78	99.44	109.33
2	A	501[B]	CAA	C5A-N7A-C8A	2.74	107.76	103.45
2	A	501[A]	CAA	C5A-N7A-C8A	2.69	107.68	103.45
2	D	501[B]	CAA	C7P-N8P-C9P	-2.66	117.76	122.55
2	A	501[A]	CAA	C2-C1-S1P	2.58	116.90	113.63
2	B	501	CAA	CDP-CBP-CCP	2.54	112.41	108.22
2	B	501	CAA	O6A-P2A-O4A	-2.53	98.89	108.94
2	B	501	CAA	N6A-C6A-N1A	2.49	123.92	118.38
2	D	501[A]	CAA	C5A-N7A-C8A	2.47	107.34	103.45
2	A	501[B]	CAA	N9A-C8A-N7A	-2.45	110.45	113.94
2	A	501[B]	CAA	C3B-C2B-C1B	2.42	105.22	99.89
2	B	501	CAA	O5A-P2A-O4A	2.38	123.52	112.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	501[B]	CAA	P3B-O3B-C3B	-2.38	117.08	123.43
2	A	501[B]	CAA	C7P-C6P-C5P	-2.35	108.47	112.39
2	D	501[B]	CAA	C3B-C2B-C1B	2.35	105.06	99.89
2	A	501[A]	CAA	C3B-C2B-C1B	2.33	105.02	99.89
2	B	501	CAA	C4-C3-C2	-2.33	109.74	117.78
2	D	501[B]	CAA	N9A-C8A-N7A	-2.32	110.65	113.94
2	A	501[A]	CAA	C2A-N1A-C6A	2.27	122.47	118.73
2	D	501[A]	CAA	OAP-CAP-C9P	-2.27	99.89	109.38
2	A	501[A]	CAA	C4A-N9A-C8A	2.27	108.12	105.74
2	B	501	CAA	C5A-C6A-N6A	-2.24	117.74	123.29
2	D	501[A]	CAA	C2A-N1A-C6A	2.22	122.38	118.73
2	A	501[B]	CAA	O1-C1-S1P	2.21	125.50	122.68
2	A	501[B]	CAA	C6A-C5A-N7A	2.20	136.34	132.09
2	A	501[A]	CAA	C6A-C5A-N7A	2.20	136.33	132.09
2	A	501[B]	CAA	C2A-N1A-C6A	2.18	122.30	118.73
2	A	501[A]	CAA	O5A-P2A-O3A	2.18	113.15	107.27
2	D	501[B]	CAA	C6A-C5A-N7A	2.17	136.28	132.09
2	A	501[B]	CAA	C2P-S1P-C1	-2.16	95.45	101.84
2	B	501	CAA	C3B-C2B-C1B	2.16	104.64	99.89
2	B	501	CAA	C4A-C5A-N7A	-2.13	108.14	110.58
2	D	501[A]	CAA	O1-C1-S1P	2.11	125.37	122.68
2	D	501[B]	CAA	C2A-N1A-C6A	2.09	122.16	118.73
2	D	501[B]	CAA	C6P-C7P-N8P	2.07	116.40	112.00
2	B	501	CAA	O2A-P1A-O1A	2.06	122.05	112.44
2	B	501	CAA	O5P-C5P-C6P	-2.06	118.29	122.02
2	B	501	CAA	C5A-N7A-C8A	2.02	106.62	103.45
2	A	501[A]	CAA	O5P-C5P-C6P	-2.02	118.37	122.02

There are no chirality outliers.

All (65) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501[A]	CAA	C5B-O5B-P1A-O2A
2	A	501[A]	CAA	C5B-O5B-P1A-O3A
2	A	501[A]	CAA	CCP-O6A-P2A-O3A
2	A	501[A]	CAA	CCP-O6A-P2A-O4A
2	A	501[A]	CAA	CCP-O6A-P2A-O5A
2	A	501[A]	CAA	CDP-CBP-CCP-O6A
2	A	501[A]	CAA	CAP-CBP-CCP-O6A
2	A	501[A]	CAA	C3P-C2P-S1P-C1
2	A	501[B]	CAA	C2B-C3B-O3B-P3B
2	A	501[B]	CAA	CCP-O6A-P2A-O3A

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Mol	Chain	Res	Type	Atoms
2	A	501[B]	CAA	CCP-O6A-P2A-O4A
2	A	501[B]	CAA	CCP-O6A-P2A-O5A
2	A	501[B]	CAA	CDP-CBP-CCP-O6A
2	A	501[B]	CAA	CAP-CBP-CCP-O6A
2	A	501[B]	CAA	S1P-C2P-C3P-N4P
2	B	501	CAA	O1-C1-S1P-C2P
2	B	501	CAA	C2-C1-S1P-C2P
2	B	501	CAA	C1-C2-C3-O3
2	D	501[A]	CAA	CDP-CBP-CCP-O6A
2	D	501[A]	CAA	CEP-CBP-CCP-O6A
2	D	501[A]	CAA	CAP-CBP-CCP-O6A
2	D	501[A]	CAA	O9P-C9P-CAP-OAP
2	D	501[A]	CAA	CAP-C9P-N8P-C7P
2	D	501[A]	CAA	O9P-C9P-N8P-C7P
2	D	501[A]	CAA	C5P-C6P-C7P-N8P
2	D	501[A]	CAA	S1P-C2P-C3P-N4P
2	D	501[A]	CAA	O1-C1-S1P-C2P
2	D	501[A]	CAA	C2-C1-S1P-C2P
2	D	501[A]	CAA	C1-C2-C3-O3
2	D	501[B]	CAA	CCP-O6A-P2A-O3A
2	D	501[B]	CAA	CCP-O6A-P2A-O4A
2	D	501[B]	CAA	CCP-O6A-P2A-O5A
2	D	501[B]	CAA	C1-C2-C3-O3
2	D	501[B]	CAA	C1-C2-C3-C4
2	A	501[A]	CAA	C2B-C3B-O3B-P3B
2	B	501	CAA	C2B-C3B-O3B-P3B
2	D	501[B]	CAA	C2B-C3B-O3B-P3B
2	B	501	CAA	C4B-C3B-O3B-P3B
2	A	501[B]	CAA	C1-C2-C3-O3
2	A	501[B]	CAA	C1-C2-C3-C4
2	B	501	CAA	C1-C2-C3-C4
2	B	501	CAA	O4B-C4B-C5B-O5B
2	A	501[B]	CAA	N8P-C9P-CAP-CBP
2	D	501[A]	CAA	N8P-C9P-CAP-OAP
2	D	501[B]	CAA	O1-C1-S1P-C2P
2	D	501[B]	CAA	C2-C1-S1P-C2P
2	B	501	CAA	C3B-C4B-C5B-O5B
2	D	501[A]	CAA	P2A-O3A-P1A-O2A
2	A	501[A]	CAA	C5B-O5B-P1A-O1A
2	D	501[A]	CAA	CCP-O6A-P2A-O3A
2	D	501[A]	CAA	CCP-O6A-P2A-O4A
2	D	501[A]	CAA	CCP-O6A-P2A-O5A

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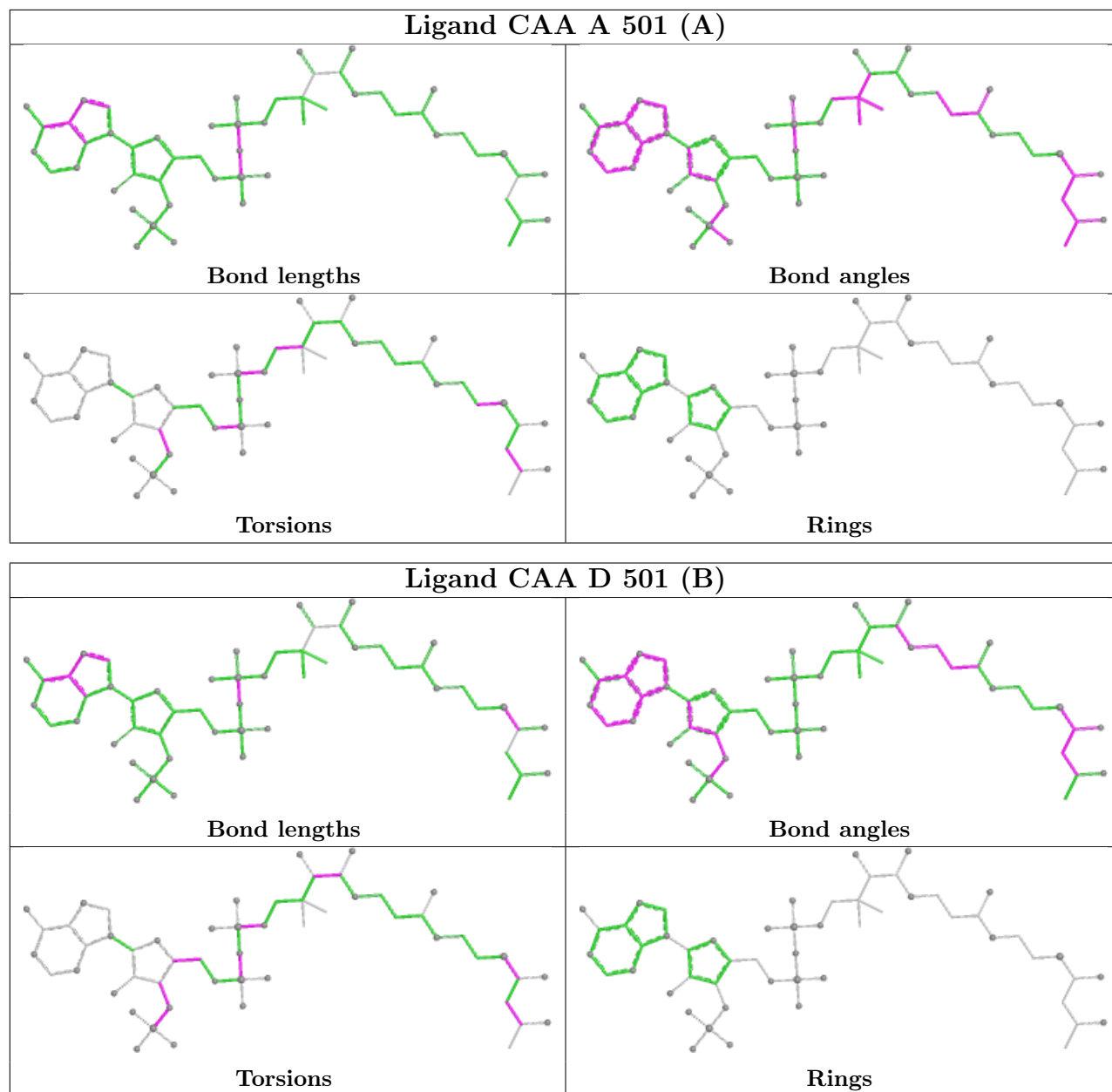
Mol	Chain	Res	Type	Atoms
2	D	501[B]	CAA	C4B-C3B-O3B-P3B
2	B	501	CAA	P2A-O3A-P1A-O2A
2	A	501[B]	CAA	O9P-C9P-CAP-CBP
2	D	501[A]	CAA	O9P-C9P-CAP-CBP
2	D	501[A]	CAA	N8P-C9P-CAP-CBP
2	D	501[B]	CAA	O4B-C4B-C5B-O5B
2	D	501[A]	CAA	O5P-C5P-C6P-C7P
2	D	501[A]	CAA	N4P-C5P-C6P-C7P
2	D	501[B]	CAA	C3B-O3B-P3B-O7A
2	A	501[A]	CAA	C1-C2-C3-C4
2	D	501[A]	CAA	P2A-O3A-P1A-O1A
2	D	501[B]	CAA	P2A-O3A-P1A-O2A
2	D	501[B]	CAA	N8P-C9P-CAP-OAP

There are no ring outliers.

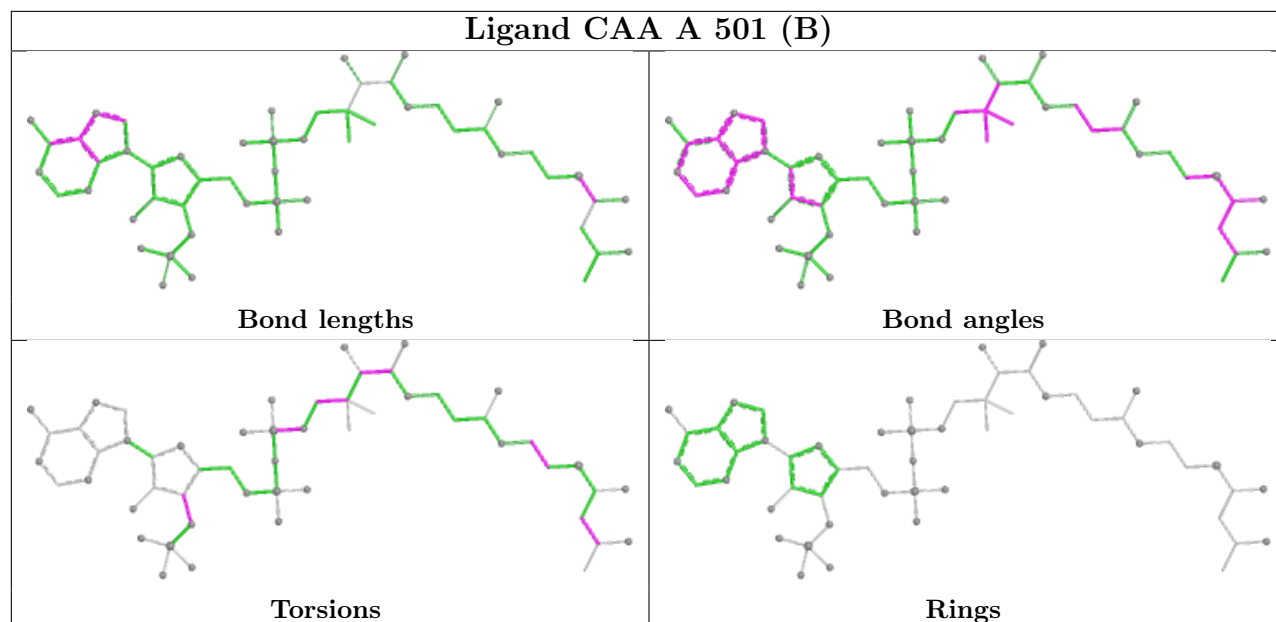
5 monomers are involved in 35 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501[A]	CAA	10	0
2	D	501[B]	CAA	4	0
2	A	501[B]	CAA	6	0
2	B	501	CAA	5	0
2	D	501[A]	CAA	10	0

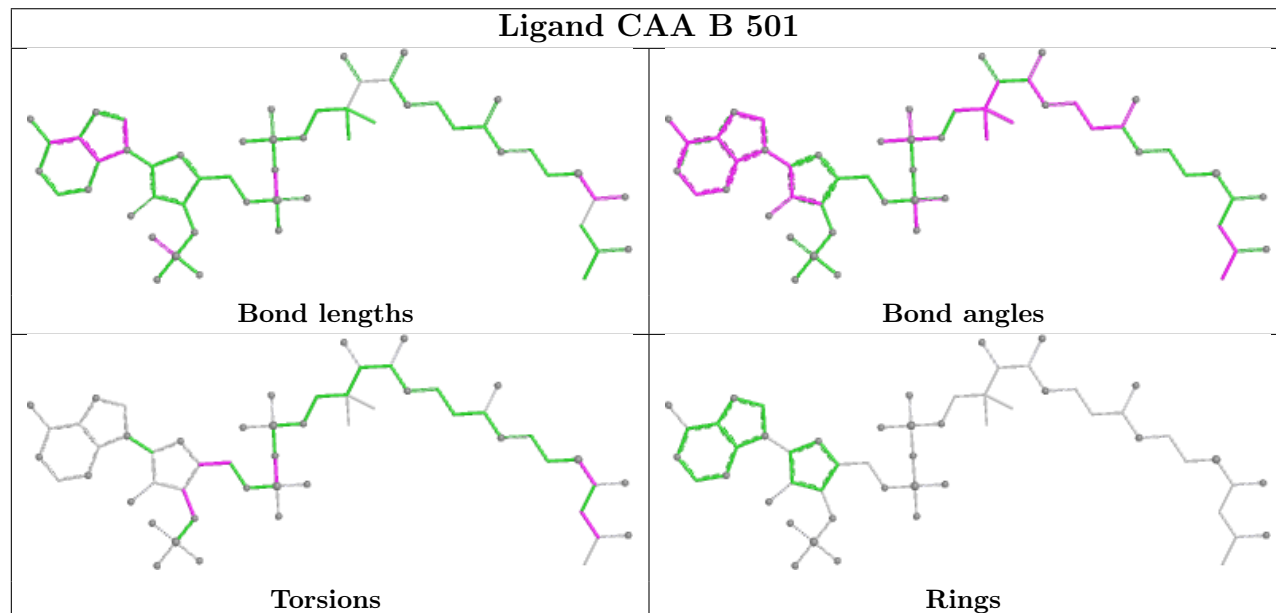
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

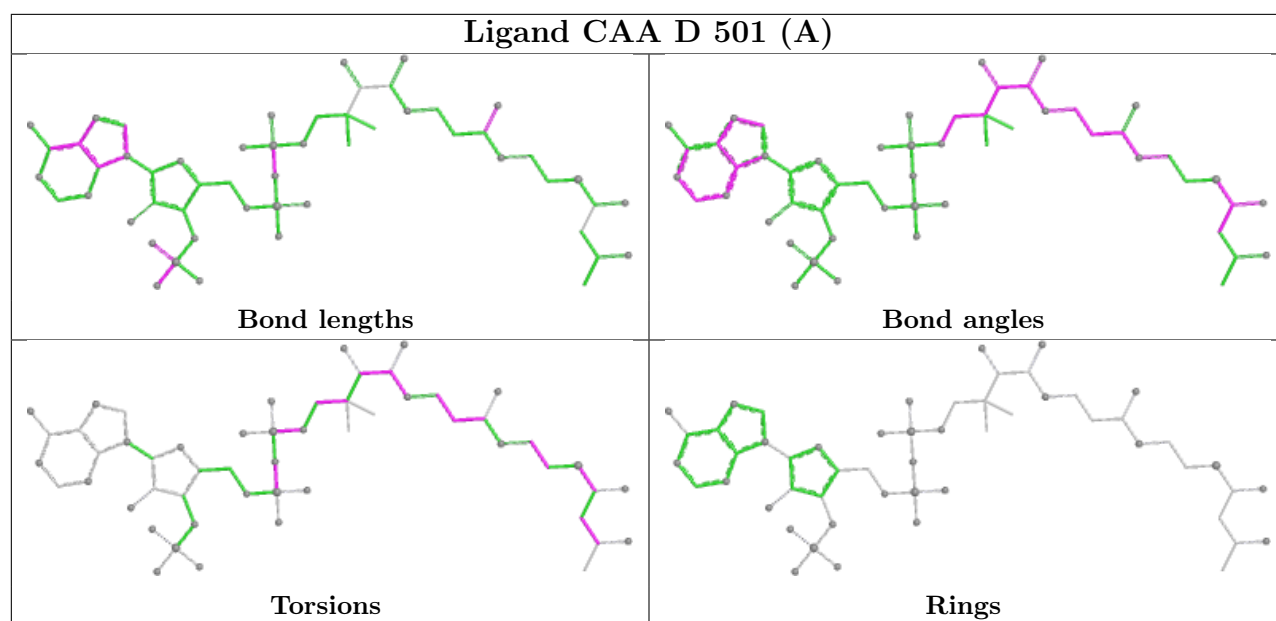


Ligand CAA A 501 (B)



Ligand CAA B 501





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	430/457 (94%)	0.24	20 (4%) 36 46	10, 18, 45, 132	1 (0%)
1	B	430/457 (94%)	0.20	13 (3%) 52 62	8, 18, 37, 65	1 (0%)
1	C	430/457 (94%)	0.65	29 (6%) 24 31	10, 23, 48, 110	1 (0%)
1	D	430/457 (94%)	0.50	27 (6%) 26 34	10, 22, 51, 87	1 (0%)
All	All	1720/1828 (94%)	0.40	89 (5%) 33 42	8, 20, 44, 132	4 (0%)

All (89) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	238	PRO	6.4
1	A	102	TYR	6.3
1	A	105	ALA	6.0
1	A	103	GLY	5.8
1	A	106	GLY	5.6
1	B	12	ALA	5.2
1	D	41	PHE	5.1
1	C	371	LEU	4.8
1	D	12	ALA	4.8
1	A	107	SER	4.7
1	A	12	ALA	4.7
1	D	39	PRO	4.4
1	C	12	ALA	4.2
1	C	105	ALA	4.1
1	D	235	GLY	4.1
1	A	104	GLN	4.0
1	A	247	GLU	4.0
1	D	43	LYS	4.0
1	D	42	GLY	3.9
1	A	36	LYS	3.9
1	A	108	LYS	3.9

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Mol	Chain	Res	Type	RSRZ
1	B	42	GLY	3.9
1	C	36	LYS	3.9
1	A	42	GLY	3.5
1	D	158	ALA	3.5
1	A	37	LYS	3.4
1	C	197	ASN	3.3
1	D	36	LYS	3.2
1	C	239	SER	3.2
1	D	238	PRO	3.1
1	C	235	GLY	3.1
1	D	247	GLU	3.1
1	D	37	LYS	3.1
1	C	37	LYS	3.0
1	D	40	ASP	3.0
1	C	237	ASP	2.9
1	A	41	PHE	2.9
1	A	101	THR	2.9
1	C	39	PRO	2.9
1	D	35	ASP	2.9
1	C	252	TYR	2.8
1	A	43	LYS	2.8
1	D	105	ALA	2.8
1	C	42	GLY	2.8
1	C	441	ILE	2.8
1	B	140	GLY	2.7
1	C	367	GLY	2.7
1	D	371	LEU	2.7
1	A	238	PRO	2.6
1	B	44	LYS	2.6
1	C	41	PHE	2.6
1	C	243	PHE	2.6
1	C	255	MET	2.6
1	A	237	ASP	2.6
1	C	177	LEU	2.6
1	C	43	LYS	2.6
1	D	13	SER	2.6
1	C	179	ASP	2.5
1	C	13	SER	2.5
1	C	247	GLU	2.5
1	D	157	SER	2.5
1	C	236	GLU	2.5
1	B	40	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
1	D	44	LYS	2.4
1	C	184	CYS	2.4
1	D	252	TYR	2.4
1	B	368	ASP	2.4
1	D	236	GLU	2.3
1	C	366	ASN	2.3
1	B	43	LYS	2.3
1	B	306	ASP	2.3
1	C	374	ARG	2.3
1	B	230	PHE	2.3
1	A	39	PRO	2.3
1	B	106	GLY	2.2
1	C	140	GLY	2.2
1	D	237	ASP	2.2
1	C	106	GLY	2.2
1	D	407	GLY	2.2
1	B	41	PHE	2.1
1	B	441	ILE	2.1
1	A	410	GLU	2.1
1	D	227	LYS	2.1
1	A	236	GLU	2.0
1	D	225	THR	2.0
1	D	38	HIS	2.0
1	B	176	GLN	2.0
1	D	284	ASN	2.0
1	D	160	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

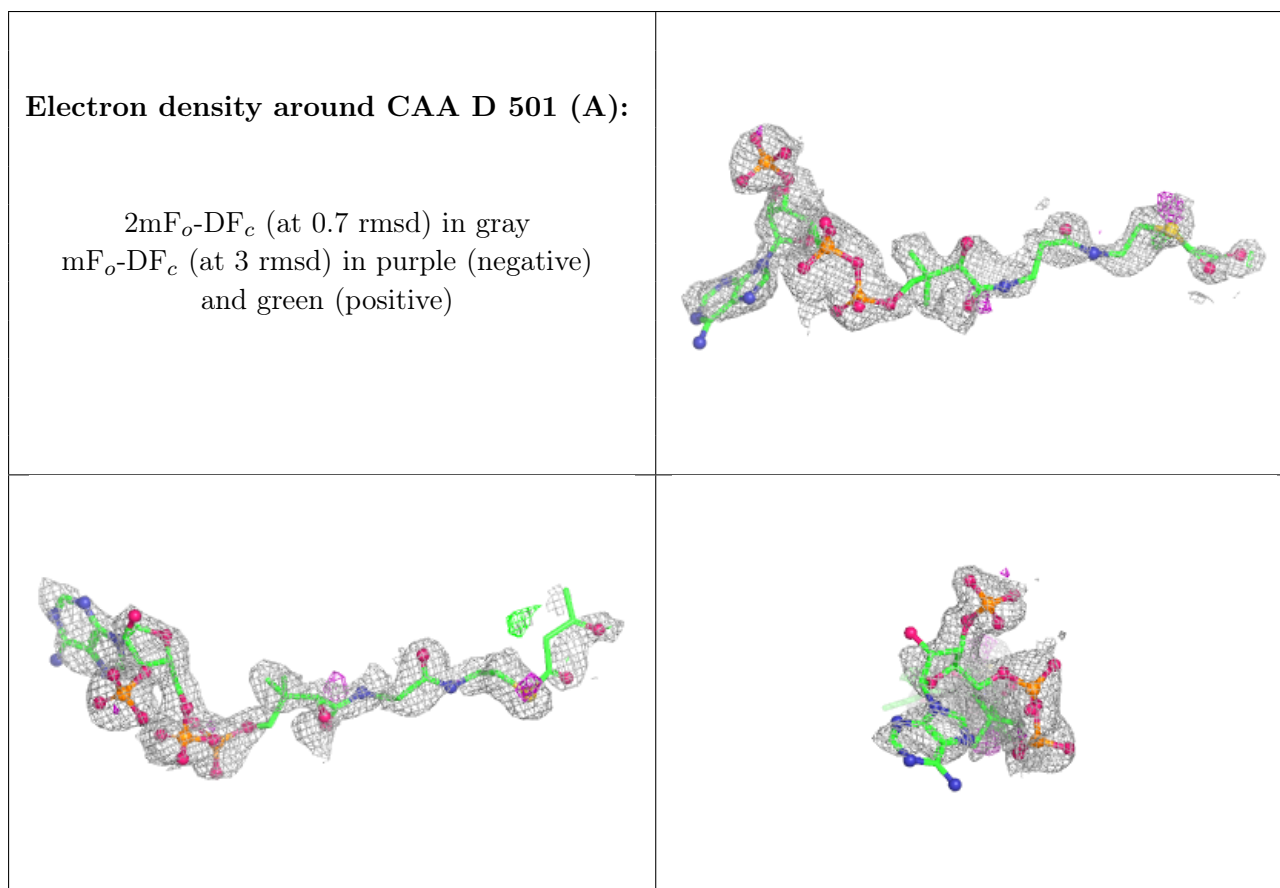
There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

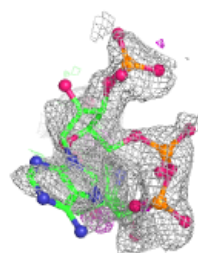
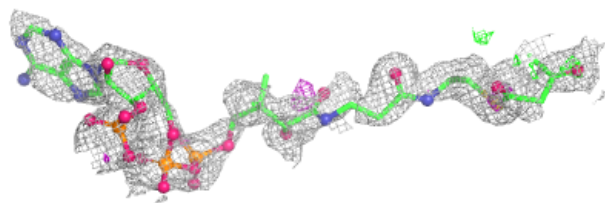
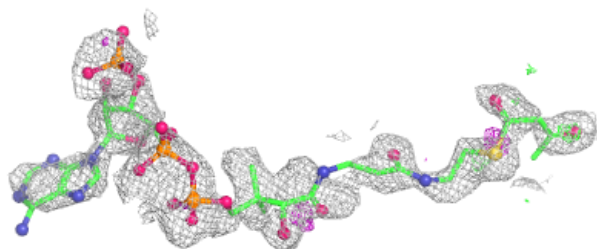
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	CAA	D	501[A]	54/54	0.74	0.15	29,41,47,51	54
2	CAA	D	501[B]	54/54	0.74	0.15	17,122,137,146	54
2	CAA	A	501[A]	54/54	0.77	0.15	18,43,49,50	54
2	CAA	A	501[B]	54/54	0.77	0.15	14,147,214,218	54
2	CAA	B	501	54/54	0.92	0.09	19,25,41,50	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

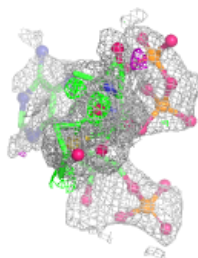
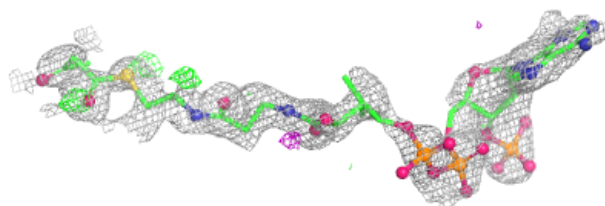
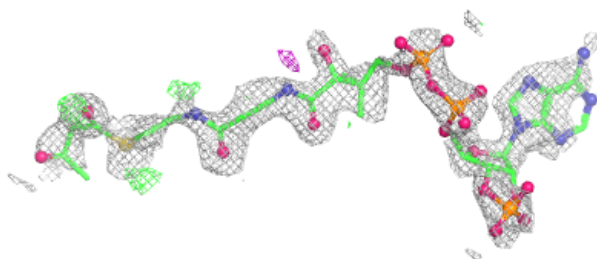


Electron density around CAA D 501 (B):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

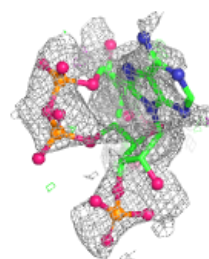
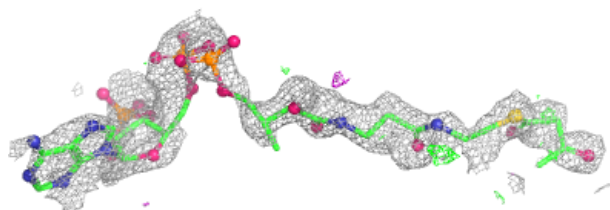
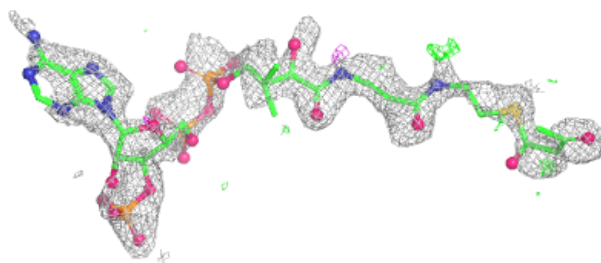
**Electron density around CAA A 501 (A):**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

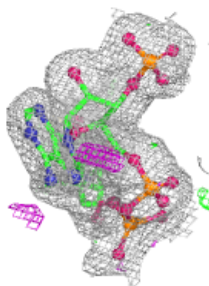
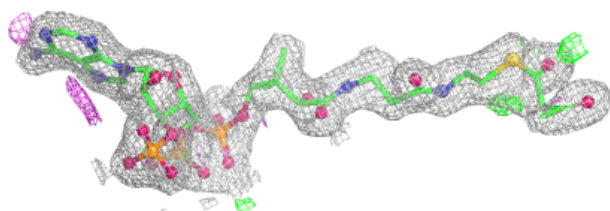
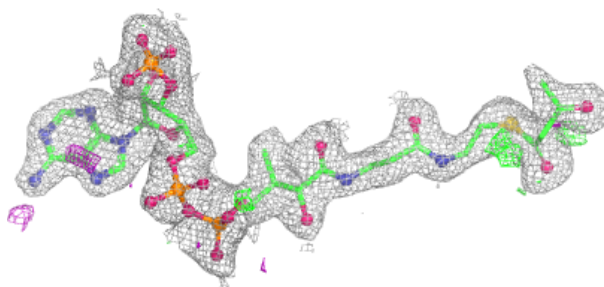


Electron density around CAA A 501 (B):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around CAA B 501:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.