WORLDWIDE PDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Jun 4, 2025 – 07:53 pm BST

PDB ID	:	9I2X / pdb_00009i2x
Title	:	Alpha-Methylacyl-CoA racemase from Mycobacterium tuberculosis in complex with naproxenoyl-CoA
Authors	:	Mojanaga, O.O.; Acharya, K.R.; Lloyd, M.D.
Deposited on	:	2025-01-22
Resolution	:	2.00 Å(reported)

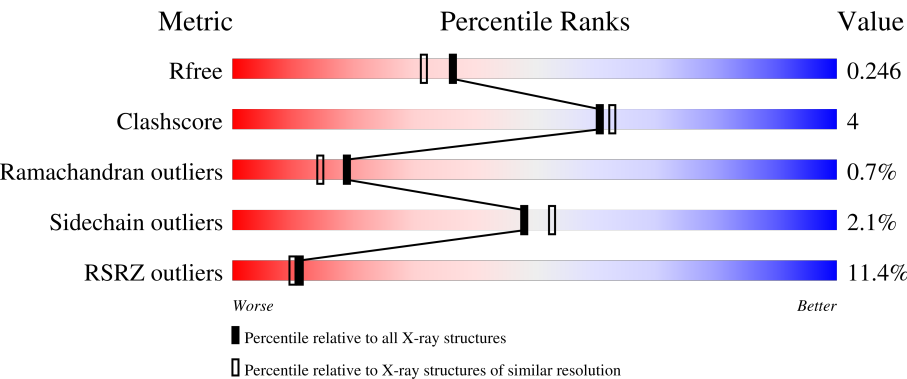The following versions of software and data (see references (i)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 2.00 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	Percentile Ranks	Value
Rfree		0.246
Clashscore		4
Ramachandran outliers		0.7%
Sidechain outliers		2.1%
RSRZ outliers		11.4%

Worse   *Better*

▋ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	9409 (2.00-2.00)
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (2.00-2.00)

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 <=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	364	11% / 88% / 10% ••
1	B	364	7% / 88% / 9% •••
1	C	364	15% / 84% / 14% ••
1	D	364	10% / 85% / 12% •••
1	E	364	12% / 88% / 10% ••

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Mol	Chain	Length	Quality of chain
1	F	364	18% ... 85% ... 12%
1	G	364	24% ... 81% ... 15%
1	H	364	15% ... 86% ... 12%
1	I	364	5% ... 89% ... 9%
1	J	364	4% ... 89% ... 9%
1	K	364	9% ... 87% ... 11%
1	L	364	4% ... 89% ... 8%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 35168 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 Alpha-methylacyl-CoA racemase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	B	359	Total 2715	C 1703	N 486	O 510	S 16	0	1	0
1	C	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	D	359	Total 2715	C 1703	N 486	O 510	S 16	0	1	0
1	E	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	F	359	Total 2715	C 1703	N 486	O 510	S 16	0	1	0
1	G	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	H	359	Total 2715	C 1703	N 486	O 510	S 16	0	1	0
1	I	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	J	359	Total 2715	C 1703	N 486	O 510	S 16	0	1	0
1	K	359	Total 2718	C 1704	N 486	O 512	S 16	0	2	0
1	L	359	Total 2724	C 1708	N 488	O 512	S 16	0	2	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	361	GLY	-	expression tag	UNP O06543
A	362	SER	-	expression tag	UNP O06543
A	363	GLY	-	expression tag	UNP O06543
A	364	CYS	-	expression tag	UNP O06543
B	361	GLY	-	expression tag	UNP O06543

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Chain	Residue	Modelled	Actual	Comment	Reference
B	362	SER	-	expression tag	UNP O06543
B	363	GLY	-	expression tag	UNP O06543
B	364	CYS	-	expression tag	UNP O06543
C	361	GLY	-	expression tag	UNP O06543
C	362	SER	-	expression tag	UNP O06543
C	363	GLY	-	expression tag	UNP O06543
C	364	CYS	-	expression tag	UNP O06543
D	361	GLY	-	expression tag	UNP O06543
D	362	SER	-	expression tag	UNP O06543
D	363	GLY	-	expression tag	UNP O06543
D	364	CYS	-	expression tag	UNP O06543
E	361	GLY	-	expression tag	UNP O06543
E	362	SER	-	expression tag	UNP O06543
E	363	GLY	-	expression tag	UNP O06543
E	364	CYS	-	expression tag	UNP O06543
F	361	GLY	-	expression tag	UNP O06543
F	362	SER	-	expression tag	UNP O06543
F	363	GLY	-	expression tag	UNP O06543
F	364	CYS	-	expression tag	UNP O06543
G	361	GLY	-	expression tag	UNP O06543
G	362	SER	-	expression tag	UNP O06543
G	363	GLY	-	expression tag	UNP O06543
G	364	CYS	-	expression tag	UNP O06543
H	361	GLY	-	expression tag	UNP O06543
H	362	SER	-	expression tag	UNP O06543
H	363	GLY	-	expression tag	UNP O06543
H	364	CYS	-	expression tag	UNP O06543
I	361	GLY	-	expression tag	UNP O06543
I	362	SER	-	expression tag	UNP O06543
I	363	GLY	-	expression tag	UNP O06543
I	364	CYS	-	expression tag	UNP O06543
J	361	GLY	-	expression tag	UNP O06543
J	362	SER	-	expression tag	UNP O06543
J	363	GLY	-	expression tag	UNP O06543
J	364	CYS	-	expression tag	UNP O06543
K	361	GLY	-	expression tag	UNP O06543
K	362	SER	-	expression tag	UNP O06543
K	363	GLY	-	expression tag	UNP O06543
K	364	CYS	-	expression tag	UNP O06543
L	361	GLY	-	expression tag	UNP O06543
L	362	SER	-	expression tag	UNP O06543
L	363	GLY	-	expression tag	UNP O06543

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Chain	Residue	Modelled	Actual	Comment	Reference
L	364	CYS	-	expression tag	UNP O06543

- Molecule 2 is Naproxenoyl-CoA (CCD ID: A1I1O) (formula: $C_{35}H_{48}N_7O_{18}P_3S$) (labeled as "Ligand of Interest" by depositor).

A1I1O
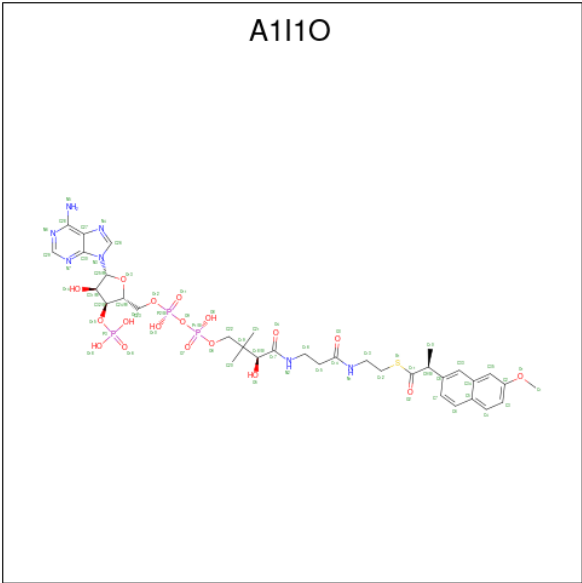
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	B	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	C	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	D	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	E	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	F	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	G	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	H	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	I	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		
2	J	1	Total	C	N	O	P	S	0	0
			64	35	7	18	3	1		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	K	1	Total 64	C 35	N 7	O 18	P 3	S 1	0	0
2	L	1	Total 64	C 35	N 7	O 18	P 3	S 1	0	0
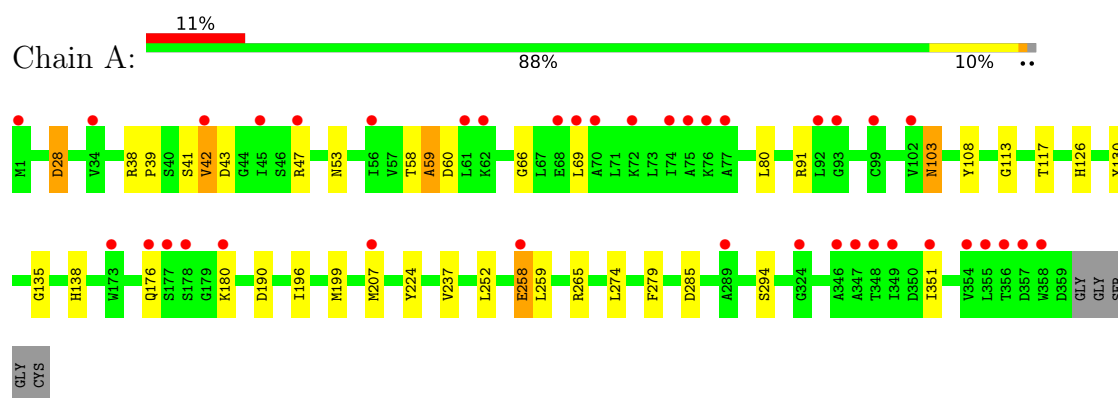
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	153	Total 153	O 153	0	0
3	B	148	Total 148	O 148	0	0
3	C	150	Total 150	O 150	0	0
3	D	151	Total 151	O 151	0	0
3	E	132	Total 132	O 132	0	0
3	F	129	Total 129	O 129	0	0
3	G	124	Total 124	O 124	0	0
3	H	136	Total 136	O 136	0	0
3	I	179	Total 179	O 179	0	0
3	J	169	Total 169	O 169	0	0
3	K	159	Total 159	O 159	0	0
3	L	163	Total 163	O 163	0	0
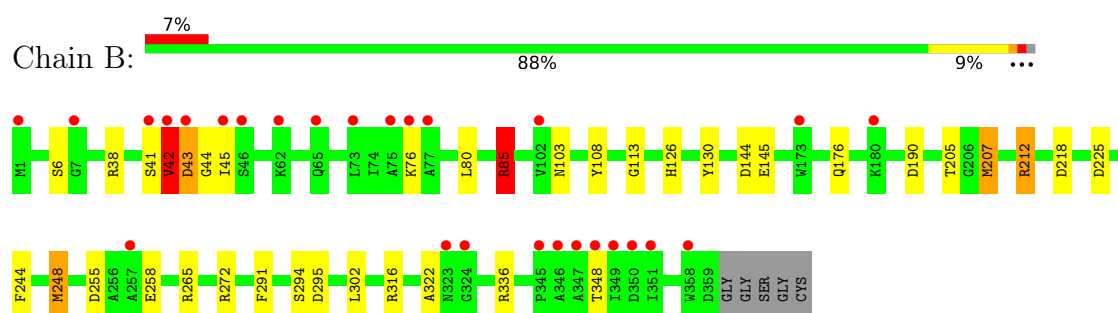
3   Residue-property plots ⓘ

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.
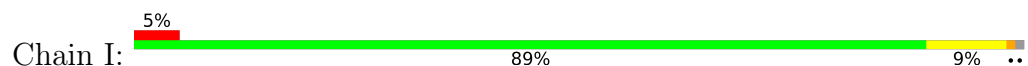
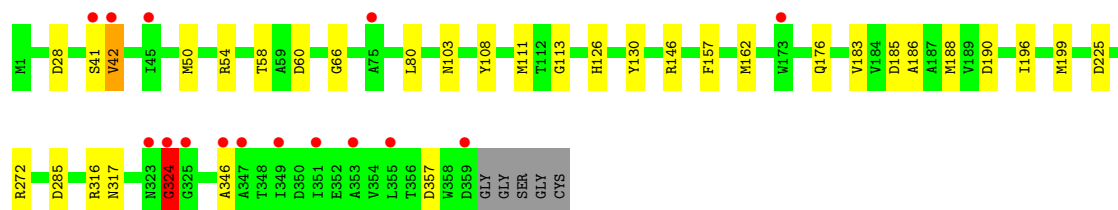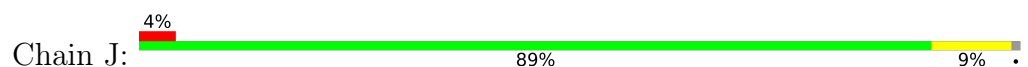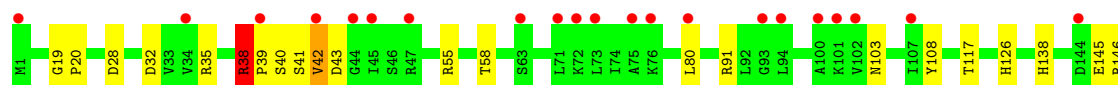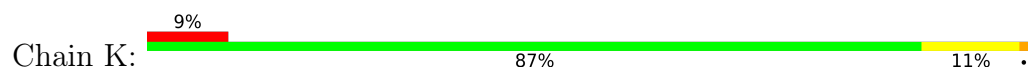• Molecule 1: Alpha-methylacyl-CoA racemase

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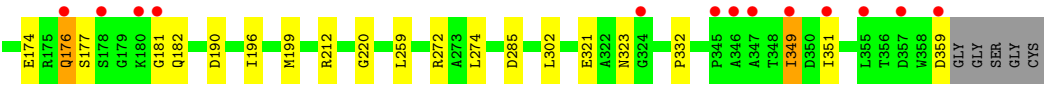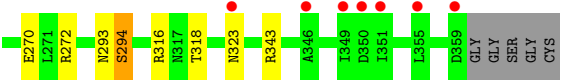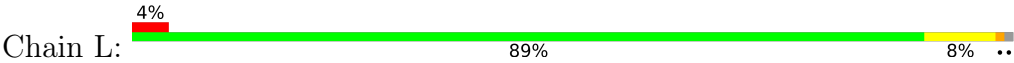Chain D:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain E:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain F:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain G:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain H:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain I:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain J:

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain K:

E174 R175 Q176 S177 S178 G179 K180 G181 Q182 D190 I196 M199 R212 G220 L259 R272 A273 L274 D285 L302 E321 A322 N323 G324 P332 P345 A346 A347 T348 I349 D350 I351 L355 T356 D357 W358 D359 GLY GLY SER GLY CYS

• Molecule 1: Alpha-methylacyl-CoA racemase

Chain L:

4%

89%

8%

M1 G7 L8 D28 R38 P39 S40 R54 L80 R91 Y108 H126 G135 R142 E145 L151 N152 L153 F163 L172 W173 E174 S177 K180 D190 I196 M199 M207 R212 M216 D225 P242 D255 R265

E270 L271 R272 N293 S294 R316 N317 T318 N323 R343 A346 I349 D350 I351 L355 D359 GLY GLY SER GLY CYS
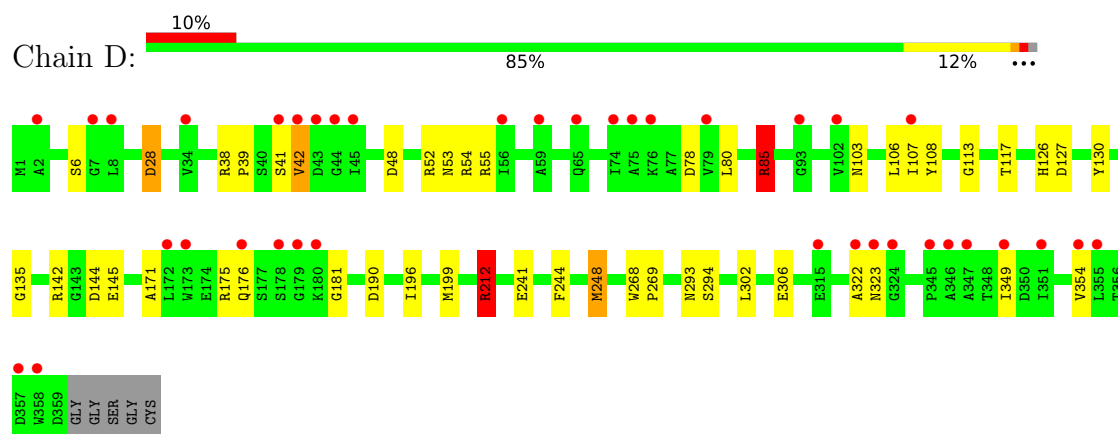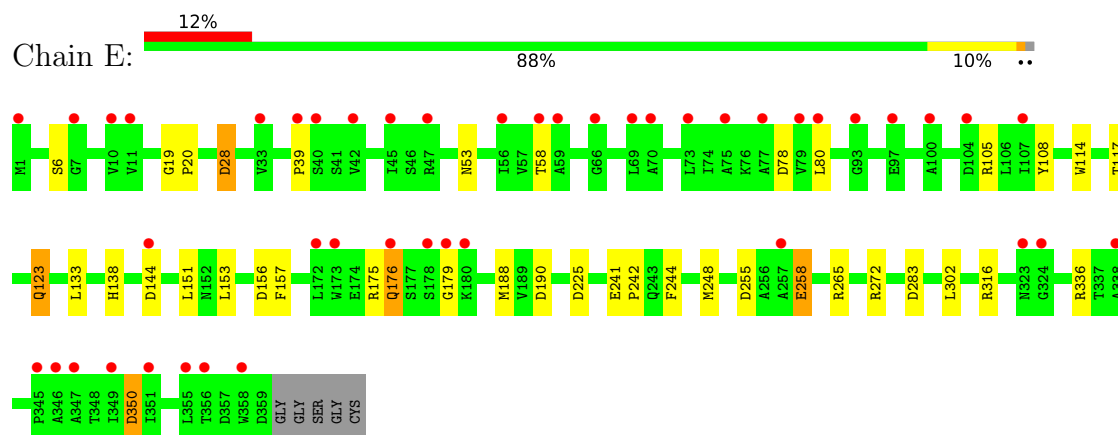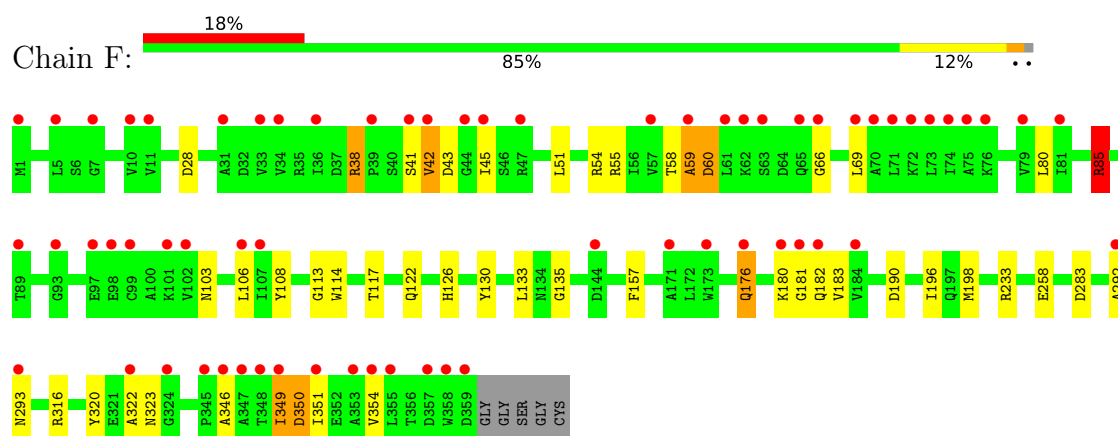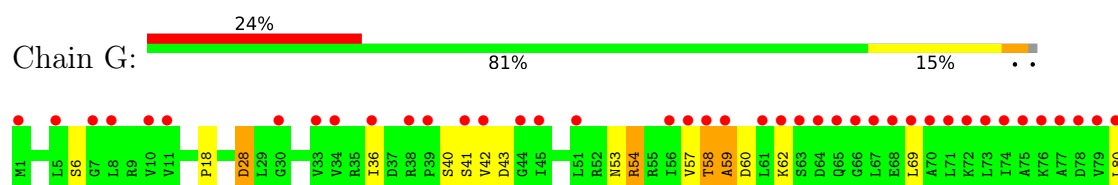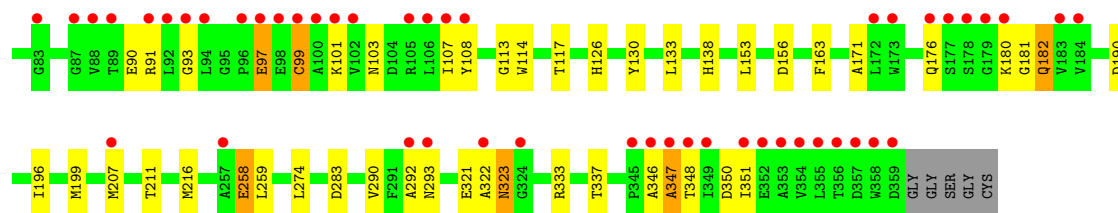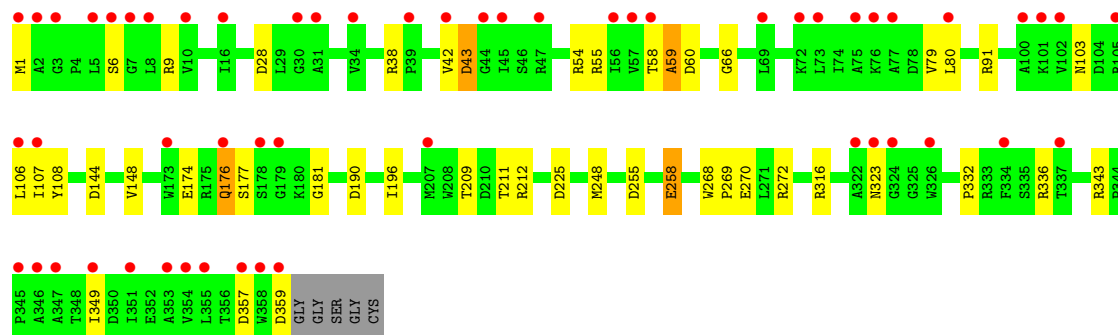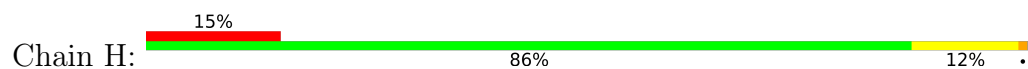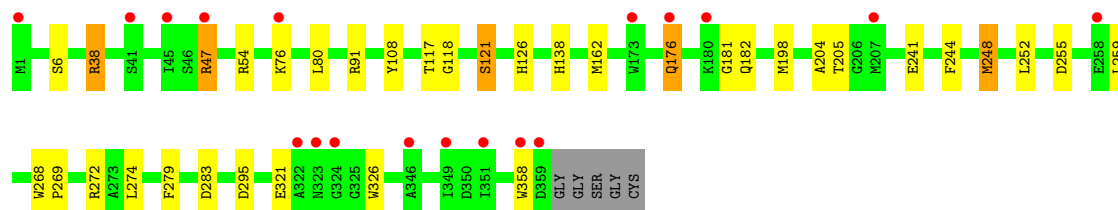
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α, β, γ	276.28Å 276.28Å 389.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	225.29 – 2.00 225.29 – 2.00	Depositor EDS
% Data completeness (in resolution range)	100.0 (225.29-2.00) 99.9 (225.29-2.00)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.33 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.88)	Depositor
R, R_{free}	0.206 , 0.239 0.214 , 0.246	Depositor DCC
R_{free} test set	24761 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	36.2	Xtriage
Anisotropy	0.113	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 38.4	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.006 for -1/2*h+1/2*k-1/2*l,1/2*h-1/2*k-1/2*l,-h-k 0.009 for -1/2*h-1/2*k+1/2*l,-1/2*h-1/2*k-1/2*l,h-k	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	35168	wwPDB-VP
Average B, all atoms (Å^2)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: A1I1O

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	0.65	0/2791	1.15	7/3797 (0.2%)
1	B	0.67	0/2782	1.12	7/3785 (0.2%)
1	C	0.65	0/2791	1.17	11/3797 (0.3%)
1	D	0.66	0/2782	1.15	8/3785 (0.2%)
1	E	0.66	0/2791	1.13	5/3797 (0.1%)
1	F	0.66	0/2782	1.14	9/3785 (0.2%)
1	G	0.63	0/2791	1.18	12/3797 (0.3%)
1	H	0.65	0/2782	1.16	8/3785 (0.2%)
1	I	0.66	0/2791	1.14	9/3797 (0.2%)
1	J	0.66	0/2782	1.13	7/3785 (0.2%)
1	K	0.66	0/2791	1.13	9/3797 (0.2%)
1	L	0.66	0/2791	1.15	8/3797 (0.2%)
All	All	0.66	0/33447	1.15	100/45504 (0.2%)

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 outliers	#Planarity outliers
1	A	0	1
1	B	0	3
1	C	0	2
1	D	0	4
1	E	0	2
1	F	0	2
1	G	0	3
1	H	0	3
1	I	0	1
1	J	0	1
1	K	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	L	0	4
All	All	0	28

There are no bond length outliers.

The worst 5 of 100 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L	38	ARG	N-CA-CB	-9.89	96.94	110.29
1	L	38	ARG	CB-CA-C	8.72	121.17	108.87
1	G	207	MET	CG-SD-CE	8.53	119.66	100.90
1	I	255	ASP	CB-CA-C	8.48	124.38	110.22
1	E	28	ASP	CA-CB-CG	8.15	120.75	112.60

There are no chirality outliers.

5 of 28 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	265	ARG	Sidechain
1	B	212	ARG	Sidechain
1	B	322	ALA	Peptide
1	B	85	ARG	Sidechain
1	C	203	ARG	Sidechain

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	2718	0	2658	25	0
1	B	2715	0	2660	21	0
1	C	2718	0	2658	30	0
1	D	2715	0	2660	32	0
1	E	2718	0	2658	24	0
1	F	2715	0	2660	34	0
1	G	2718	0	2658	32	0
1	H	2715	0	2660	22	0
1	I	2718	0	2658	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	J	2715	0	2660	19	0
1	K	2718	0	2658	24	0
1	L	2724	0	2667	20	0
2	A	64	0	0	4	0
2	B	64	0	0	3	0
2	C	64	0	0	6	0
2	D	64	0	0	5	0
2	E	64	0	0	0	0
2	F	64	0	0	5	0
2	G	64	0	0	2	0
2	H	64	0	0	2	0
2	I	64	0	0	4	0
2	J	64	0	0	2	0
2	K	64	0	0	4	0
2	L	64	0	0	2	0
3	A	153	0	0	1	0
3	B	148	0	0	0	0
3	C	150	0	0	2	0
3	D	151	0	0	0	0
3	E	132	0	0	1	0
3	F	129	0	0	3	0
3	G	124	0	0	1	0
3	H	136	0	0	0	0
3	I	179	0	0	3	0
3	J	169	0	0	1	0
3	K	159	0	0	4	0
3	L	163	0	0	2	0
All	All	35168	0	31915	269	0

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.

The worst 5 of 269 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)
1:D:85:ARG:HD3	2:D:401:A1I1O:O10	1.74	0.88
1:F:85:ARG:HD3	2:F:401:A1I1O:O11	1.76	0.86
1:A:126:HIS:ND1	2:A:401:A1I1O:C11	2.41	0.82
1:D:126:HIS:ND1	2:D:401:A1I1O:C11	2.43	0.81
1:G:259:LEU:HD22	1:G:274:LEU:HD13	1.60	0.81

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	359/364 (99%)	341 (95%)	14 (4%)	4 (1%)	12	7
1	B	358/364 (98%)	340 (95%)	16 (4%)	2 (1%)	22	17
1	C	359/364 (99%)	342 (95%)	14 (4%)	3 (1%)	16	12
1	D	358/364 (98%)	342 (96%)	14 (4%)	2 (1%)	22	17
1	E	359/364 (99%)	342 (95%)	16 (4%)	1 (0%)	37	35
1	F	358/364 (98%)	334 (93%)	19 (5%)	5 (1%)	9	4
1	G	359/364 (99%)	328 (91%)	24 (7%)	7 (2%)	6	3
1	H	358/364 (98%)	341 (95%)	14 (4%)	3 (1%)	16	12
1	I	359/364 (99%)	344 (96%)	15 (4%)	0	100	100
1	J	358/364 (98%)	341 (95%)	15 (4%)	2 (1%)	22	17
1	K	359/364 (99%)	342 (95%)	15 (4%)	2 (1%)	22	17
1	L	359/364 (99%)	344 (96%)	14 (4%)	1 (0%)	37	35
All	All	4303/4368 (98%)	4081 (95%)	190 (4%)	32 (1%)	19	14

5 of 32 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	VAL
1	A	103	ASN
1	B	42	VAL
1	C	103	ASN
1	F	41	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	277/277 (100%)	275 (99%)	2 (1%)	81	86
1	B	276/277 (100%)	267 (97%)	9 (3%)	33	33
1	C	277/277 (100%)	272 (98%)	5 (2%)	54	59
1	D	276/277 (100%)	271 (98%)	5 (2%)	54	59
1	E	277/277 (100%)	272 (98%)	5 (2%)	54	59
1	F	276/277 (100%)	270 (98%)	6 (2%)	47	51
1	G	277/277 (100%)	267 (96%)	10 (4%)	30	30
1	H	276/277 (100%)	268 (97%)	8 (3%)	37	39
1	I	277/277 (100%)	273 (99%)	4 (1%)	62	68
1	J	276/277 (100%)	274 (99%)	2 (1%)	81	86
1	K	277/277 (100%)	269 (97%)	8 (3%)	37	39
1	L	277/277 (100%)	272 (98%)	5 (2%)	54	59
All	All	3319/3324 (100%)	3250 (98%)	69 (2%)	48	53

5 of 69 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	40	SER
1	K	176	GLN
1	L	207	MET
1	E	258	GLU
1	E	248	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 47 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	323	ASN
1	I	323	ASN
1	G	327	GLN
1	H	323	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	J	134	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

12 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	A1I1O	C	401	-	60,68,68	1.67	2 (3%)	78,101,101	1.78	11 (14%)
2	A1I1O	D	401	-	60,68,68	3.78	2 (3%)	78,101,101	3.09	12 (15%)
2	A1I1O	L	401	-	60,68,68	2.76	4 (6%)	78,101,101	3.59	13 (16%)
2	A1I1O	A	401	-	60,68,68	2.41	3 (5%)	78,101,101	3.78	18 (23%)
2	A1I1O	E	401	-	60,68,68	0.88	4 (6%)	78,101,101	1.85	15 (19%)
2	A1I1O	B	401	-	60,68,68	1.44	1 (1%)	78,101,101	2.49	15 (19%)
2	A1I1O	J	401	-	60,68,68	2.05	1 (1%)	78,101,101	2.19	14 (17%)
2	A1I1O	K	401	-	60,68,68	1.38	2 (3%)	78,101,101	2.52	20 (25%)
2	A1I1O	F	401	-	60,68,68	2.09	2 (3%)	78,101,101	2.73	16 (20%)
2	A1I1O	H	401	-	60,68,68	0.87	2 (3%)	78,101,101	1.58	10 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	A1I1O	G	401	-	60,68,68	2.26	3 (5%)	78,101,101	3.33	17 (21%)
2	A1I1O	I	401	-	60,68,68	3.67	4 (6%)	78,101,101	3.90	15 (19%)

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	A1I1O	C	401	-	-	24/57/77/77	0/5/5/5
2	A1I1O	D	401	-	-	20/57/77/77	0/5/5/5
2	A1I1O	L	401	-	-	19/57/77/77	0/5/5/5
2	A1I1O	A	401	-	-	23/57/77/77	0/5/5/5
2	A1I1O	E	401	-	-	20/57/77/77	0/5/5/5
2	A1I1O	B	401	-	-	25/57/77/77	0/5/5/5
2	A1I1O	J	401	-	-	24/57/77/77	0/5/5/5
2	A1I1O	K	401	-	-	22/57/77/77	0/5/5/5
2	A1I1O	F	401	-	-	20/57/77/77	0/5/5/5
2	A1I1O	H	401	-	-	23/57/77/77	0/5/5/5
2	A1I1O	G	401	-	-	19/57/77/77	0/5/5/5
2	A1I1O	I	401	-	-	18/57/77/77	0/5/5/5

The worst 5 of 30 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	401	A1I1O	C9-C11	-28.56	1.30	1.53
2	I	401	A1I1O	C9-C11	-27.47	1.31	1.53
2	L	401	A1I1O	C9-C11	-20.36	1.37	1.53
2	A	401	A1I1O	C9-C11	-17.49	1.39	1.53
2	G	401	A1I1O	C9-C11	-16.34	1.40	1.53

The worst 5 of 176 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	I	401	A1I1O	C9-C11-S1	26.45	140.51	111.81
2	A	401	A1I1O	C9-C11-S1	25.54	139.52	111.81
2	L	401	A1I1O	C9-C11-S1	23.66	137.48	111.81
2	G	401	A1I1O	C9-C11-S1	22.52	136.25	111.81
2	D	401	A1I1O	C9-C11-S1	20.33	133.87	111.81

There are no chirality outliers.

5 of 257 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	A1I1O	O2-C11-C9-C8
2	A	401	A1I1O	C14-C15-C16-N2
2	A	401	A1I1O	N2-C17-C18-O5
2	A	401	A1I1O	O4-C17-C18-C19
2	A	401	A1I1O	C17-C18-C19-C20

There are no ring outliers.

11 monomers are involved in 39 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	401	A1I1O	6	0
2	D	401	A1I1O	5	0
2	L	401	A1I1O	2	0
2	A	401	A1I1O	4	0
2	B	401	A1I1O	3	0
2	J	401	A1I1O	2	0
2	K	401	A1I1O	4	0
2	F	401	A1I1O	5	0
2	H	401	A1I1O	2	0
2	G	401	A1I1O	2	0
2	I	401	A1I1O	4	0
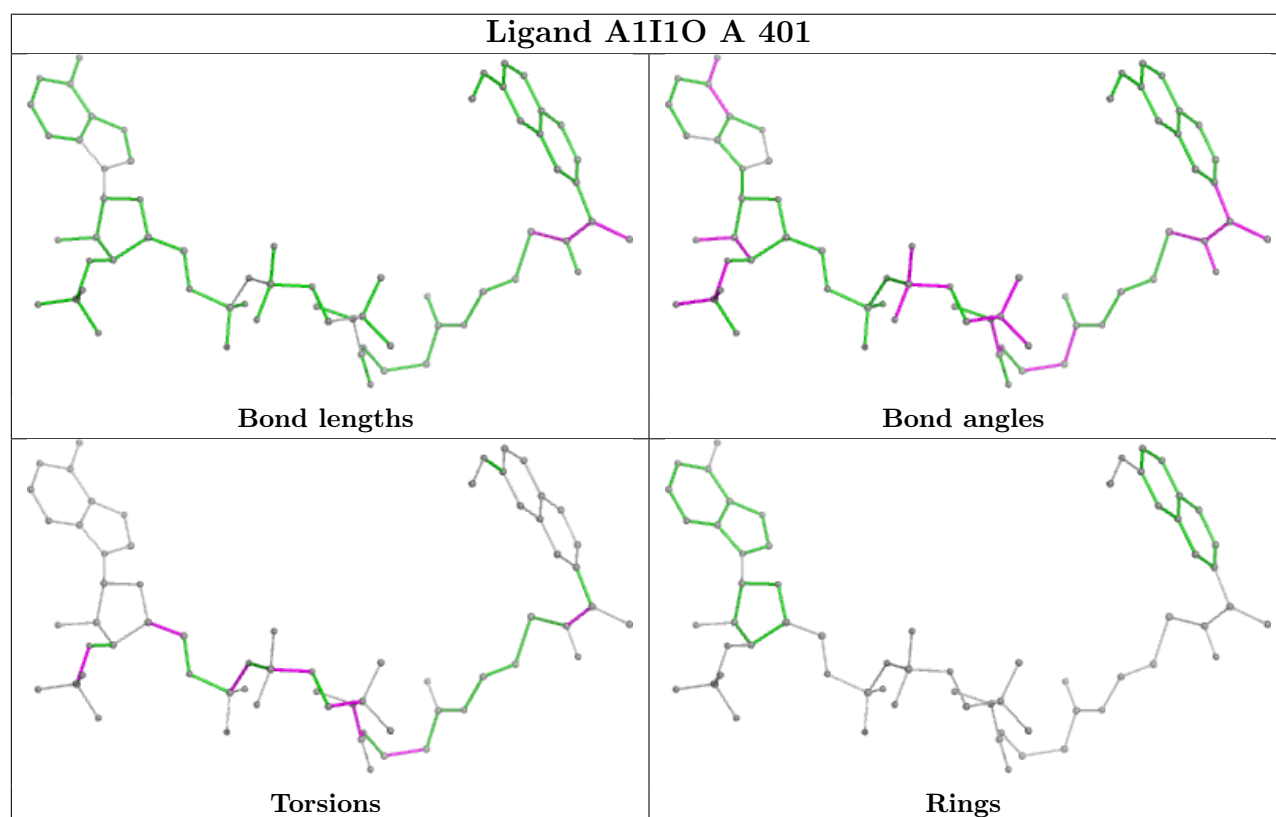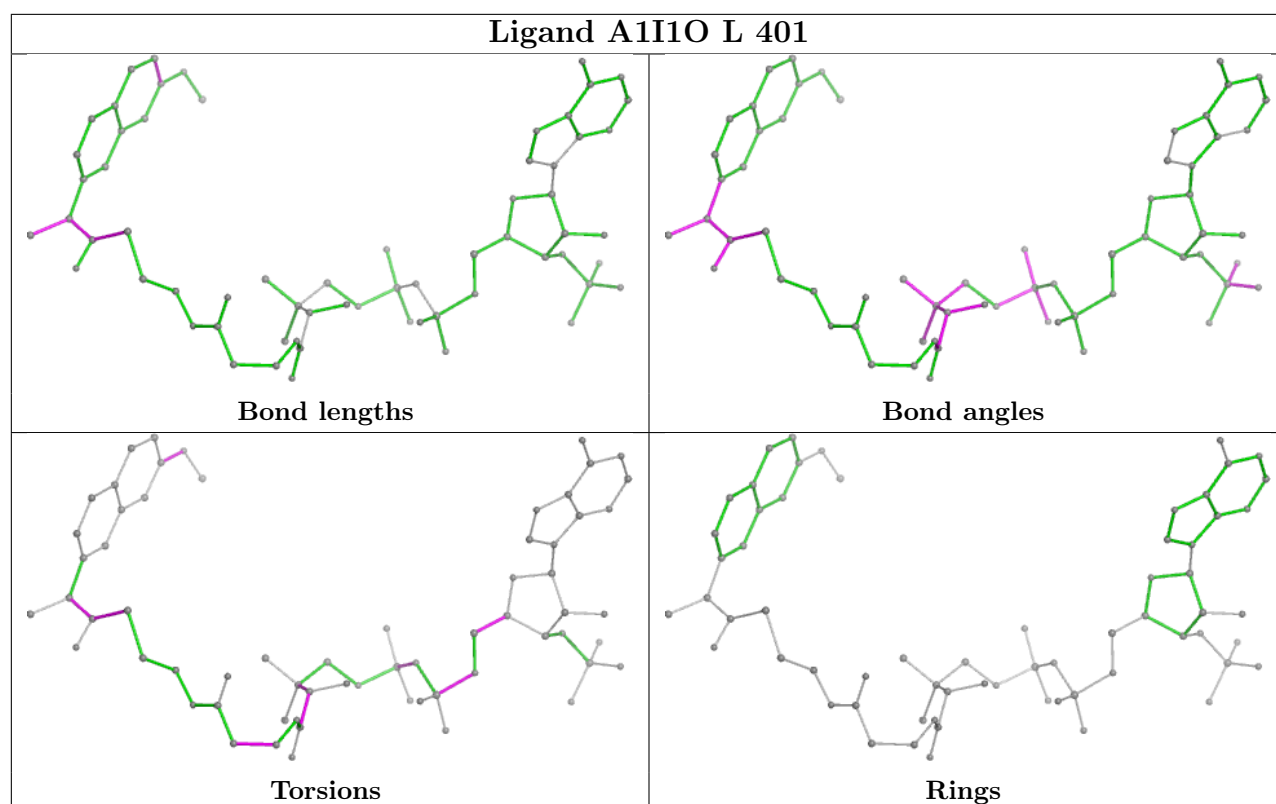
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 A1I1O C 401
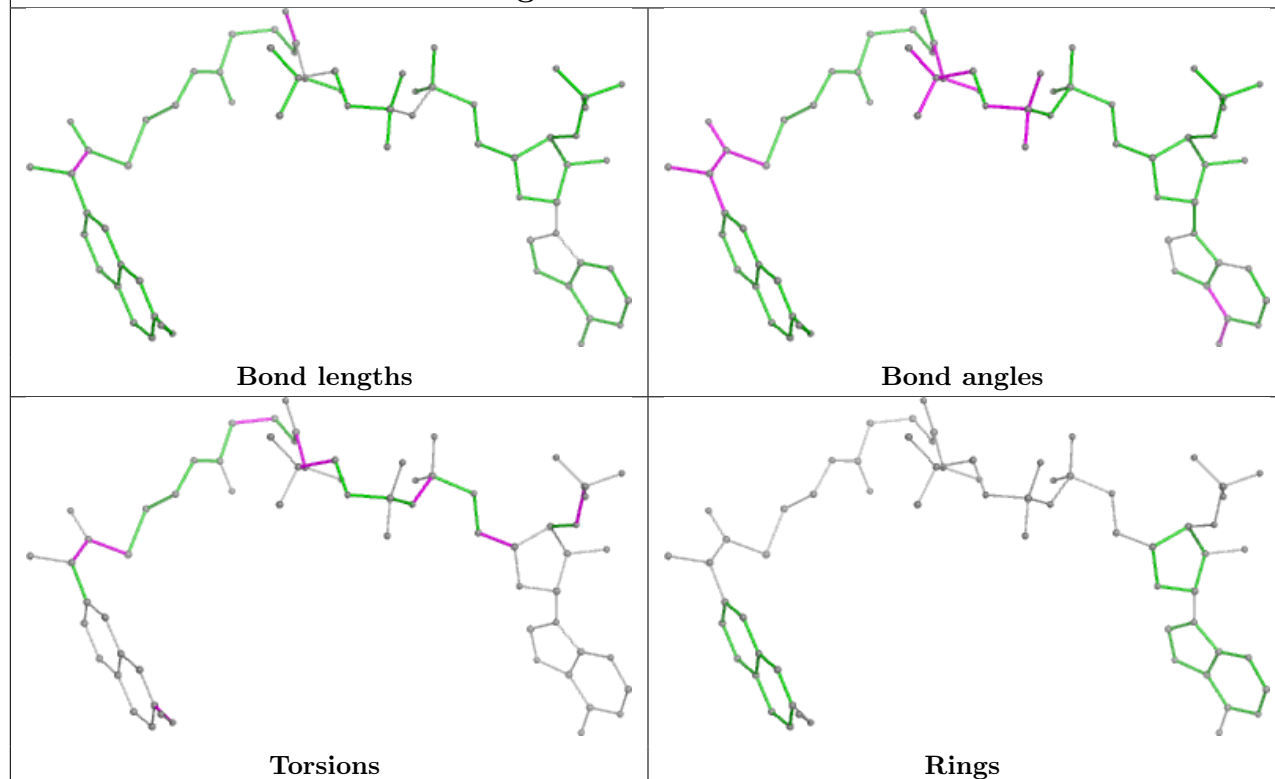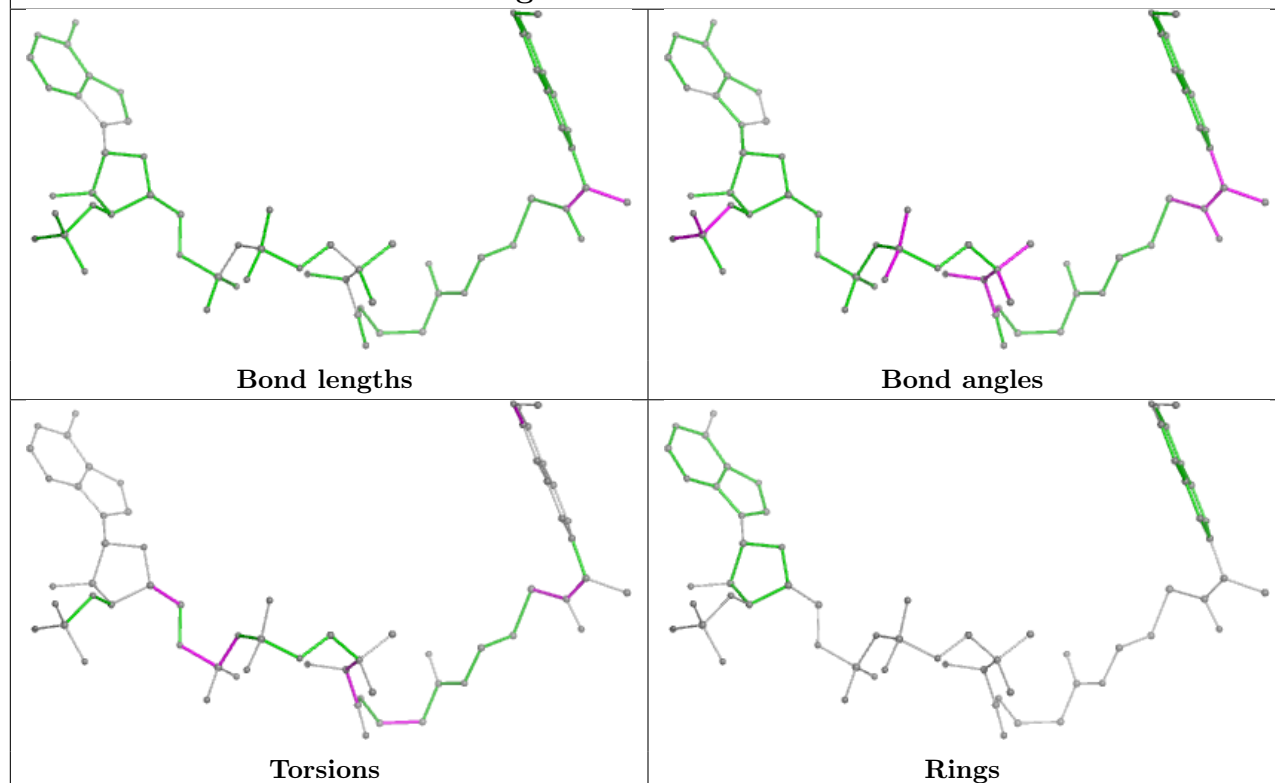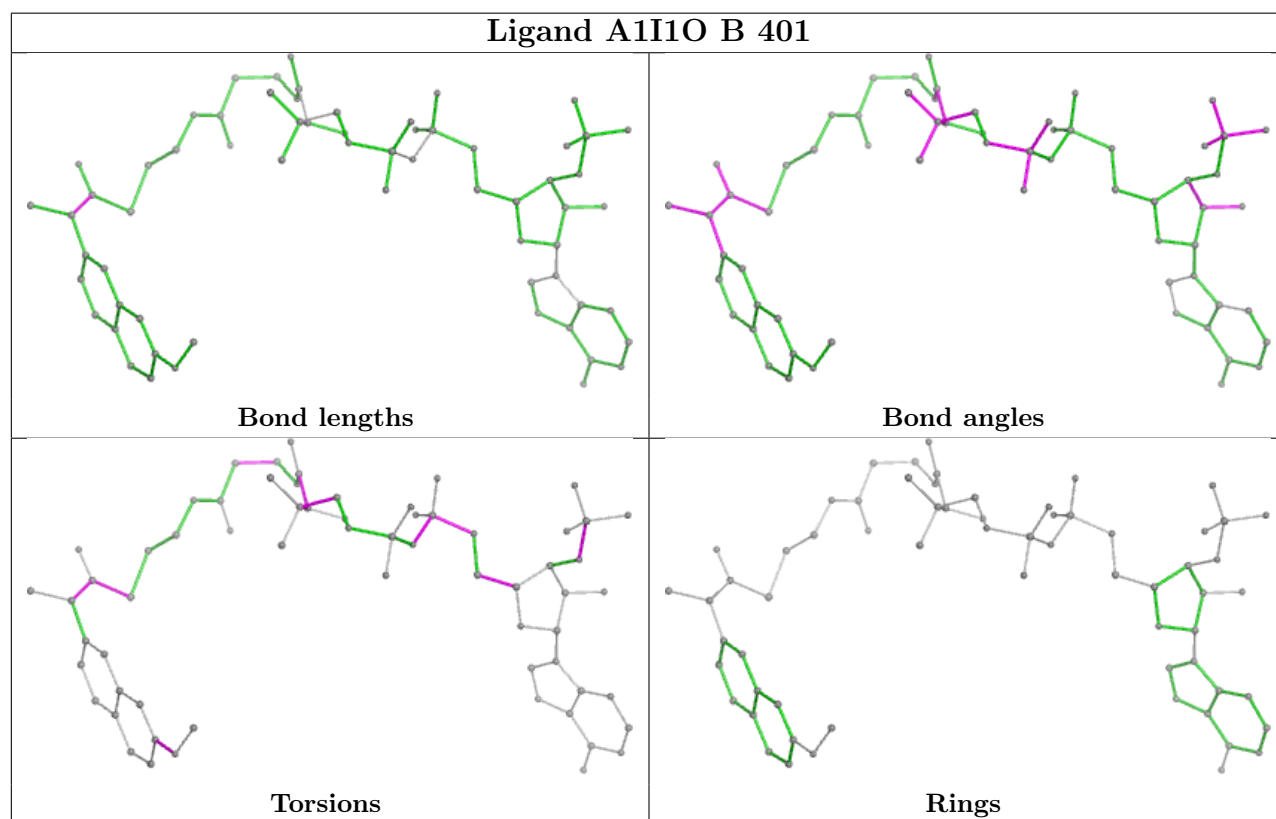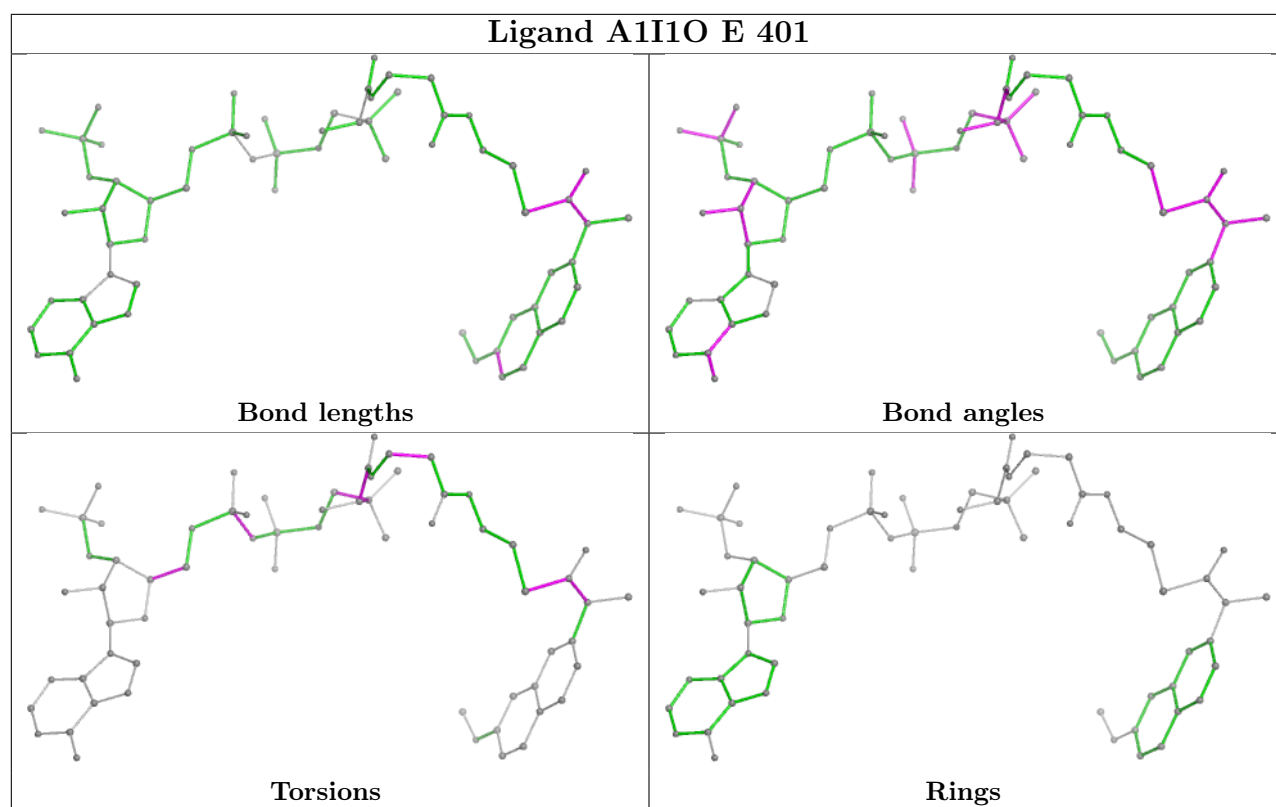
Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O D 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O L 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O A 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O E 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O B 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O J 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O K 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O F 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O H 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O G 401

Bond lengths

Bond angles

Torsions

Rings

Ligand A1I1O I 401

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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(Å²)	Q<0.9
1	A	359/364 (98%)	0.52	39 (10%)	12	11	25, 40, 76, 128	2 (0%)
1	B	359/364 (98%)	0.42	27 (7%)	22	20	24, 40, 77, 108	1 (0%)
1	C	359/364 (98%)	0.68	55 (15%)	6	5	24, 42, 77, 108	2 (0%)
1	D	359/364 (98%)	0.59	38 (10%)	13	12	26, 41, 75, 121	1 (0%)
1	E	359/364 (98%)	0.64	45 (12%)	9	8	27, 42, 84, 121	2 (0%)
1	F	359/364 (98%)	0.80	65 (18%)	4	4	26, 44, 83, 115	1 (0%)
1	G	359/364 (98%)	1.02	89 (24%)	2	2	26, 44, 87, 121	2 (0%)
1	H	359/364 (98%)	0.74	55 (15%)	6	5	24, 43, 87, 124	1 (0%)
1	I	359/364 (98%)	0.28	18 (5%)	35	33	25, 38, 66, 100	2 (0%)
1	J	359/364 (98%)	0.27	15 (4%)	41	39	26, 38, 70, 104	1 (0%)
1	K	359/364 (98%)	0.42	34 (9%)	15	14	25, 39, 75, 124	2 (0%)
1	L	359/364 (98%)	0.28	13 (3%)	46	44	16, 39, 67, 104	2 (0%)
All	All	4308/4368 (98%)	0.56	493 (11%)	11	10	16, 40, 78, 128	19 (0%)

The worst 5 of 493 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	K	346	ALA	7.2
1	A	42	VAL	6.5
1	D	42	VAL	6.2
1	D	346	ALA	6.1
1	H	346	ALA	5.7

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

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

6.3   Carbohydrates (i)

There are no monosaccharides 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(Å^2)	Q<0.9
2	A1I1O	E	401	64/64	0.91	0.14	40,56,87,119	0
2	A1I1O	G	401	64/64	0.92	0.15	29,53,94,132	0
2	A1I1O	H	401	64/64	0.92	0.14	43,62,98,126	0
2	A1I1O	A	401	64/64	0.93	0.13	25,49,97,128	0
2	A1I1O	F	401	64/64	0.93	0.14	28,49,95,115	0
2	A1I1O	C	401	64/64	0.94	0.12	31,50,76,107	0
2	A1I1O	D	401	64/64	0.94	0.12	21,43,90,108	0
2	A1I1O	B	401	64/64	0.95	0.12	28,48,87,118	0
2	A1I1O	I	401	64/64	0.95	0.11	22,40,84,115	0
2	A1I1O	J	401	64/64	0.95	0.11	26,46,85,119	0
2	A1I1O	K	401	64/64	0.95	0.11	29,46,88,98	0
2	A1I1O	L	401	64/64	0.95	0.12	22,41,89,122	0
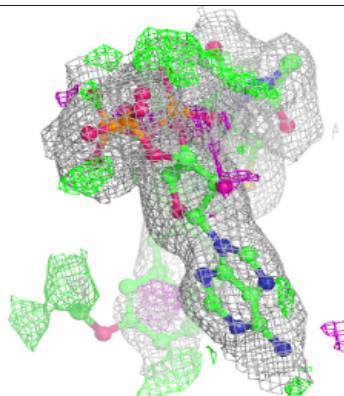
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.
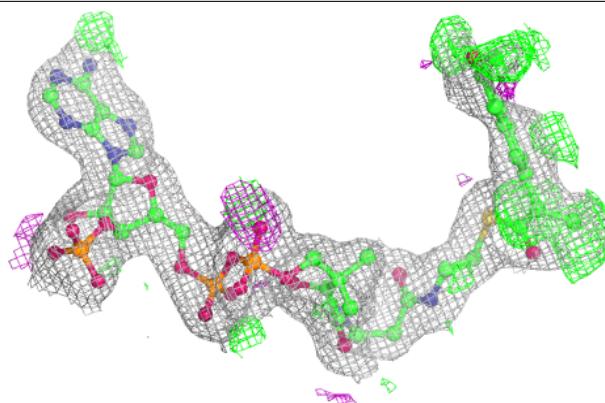
Electron density around A1I1O E 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
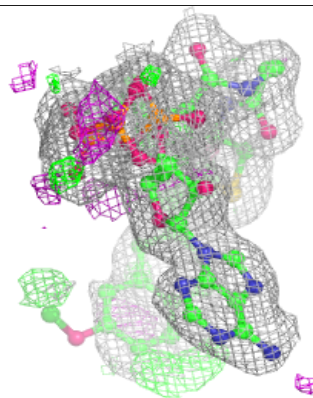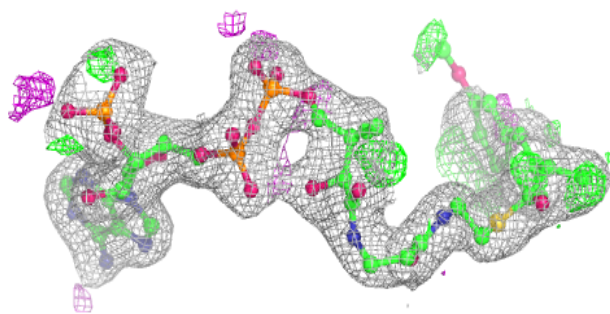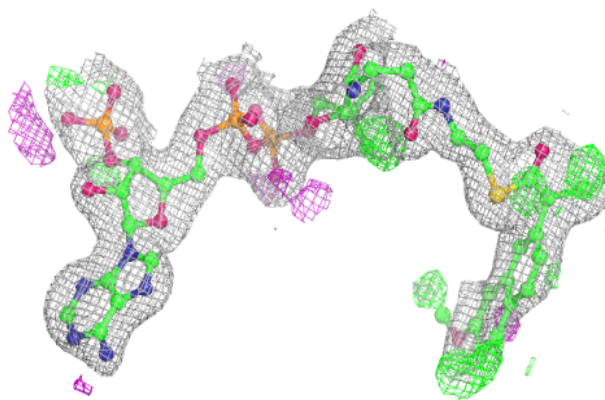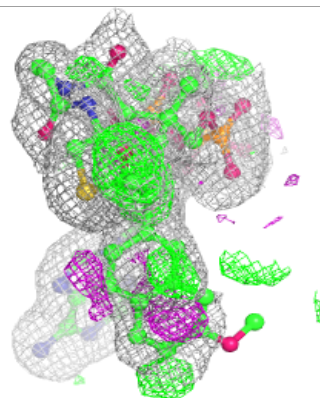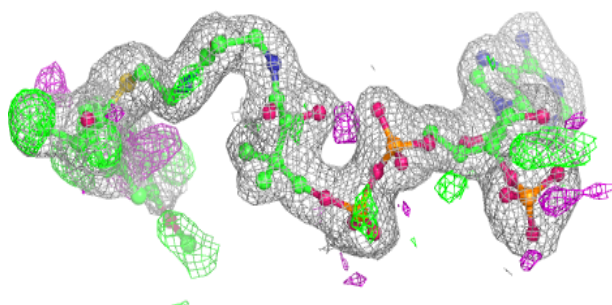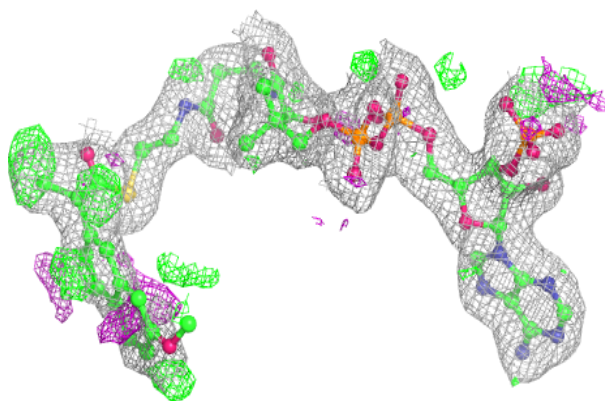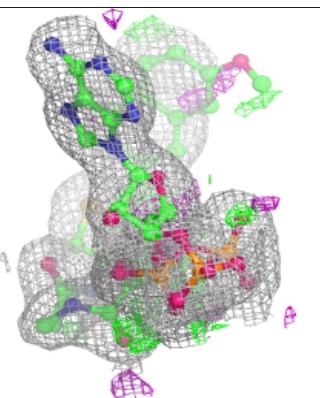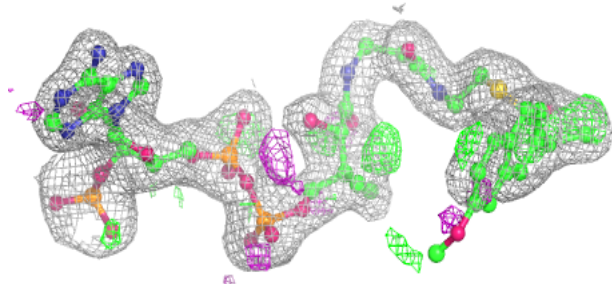mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
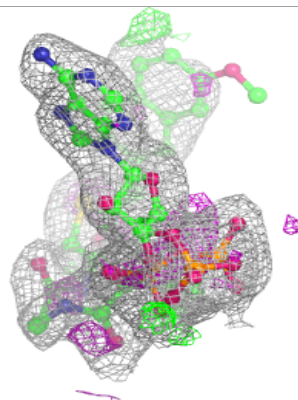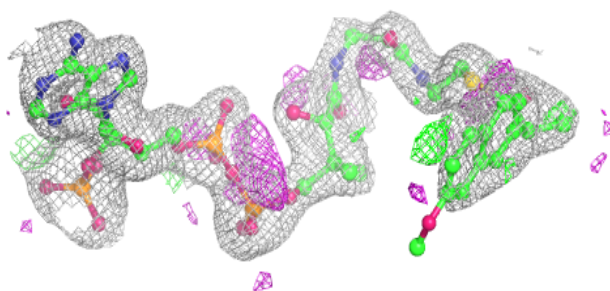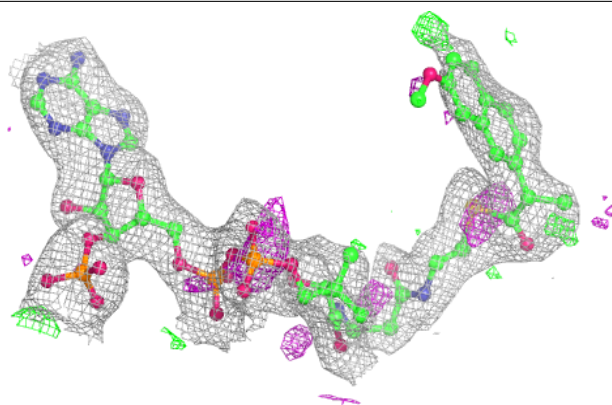
Electron density around A1I1O G 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
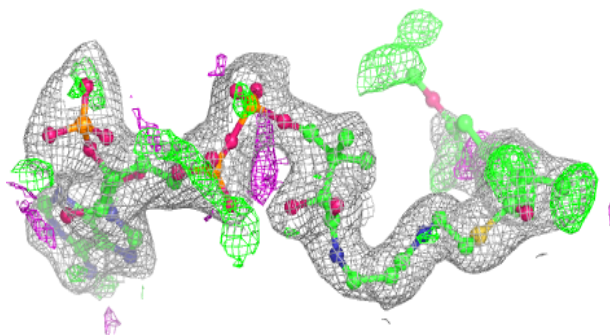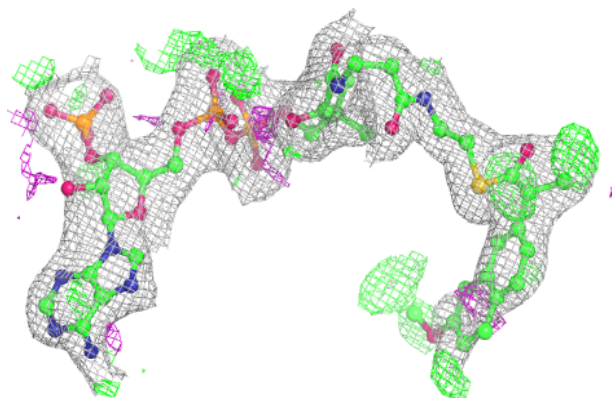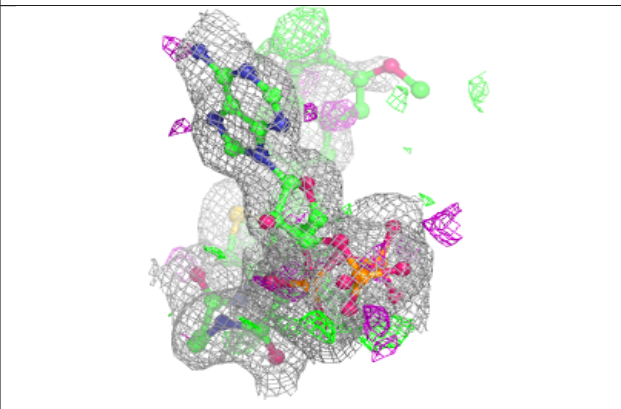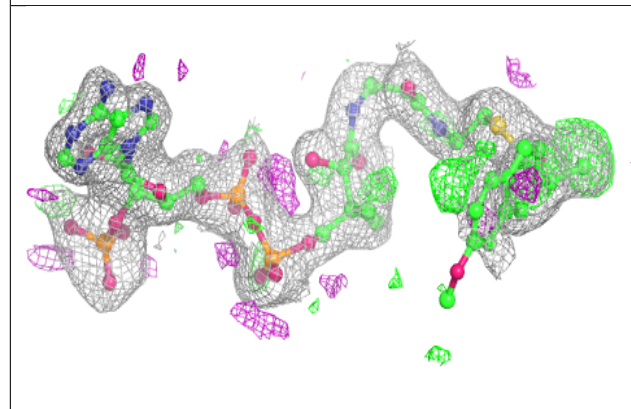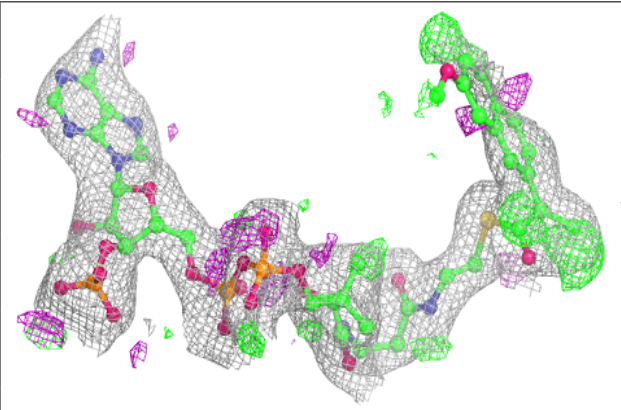
Electron density around A1I1O H 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
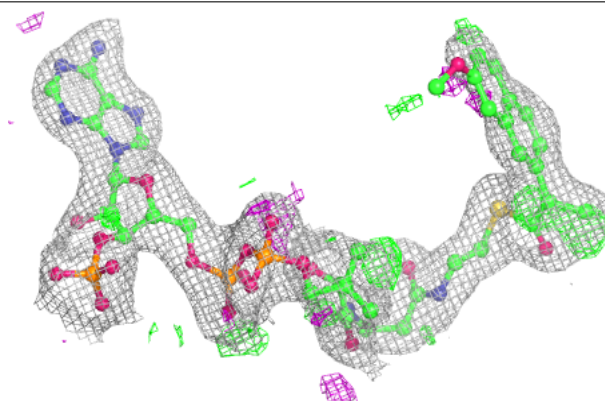mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
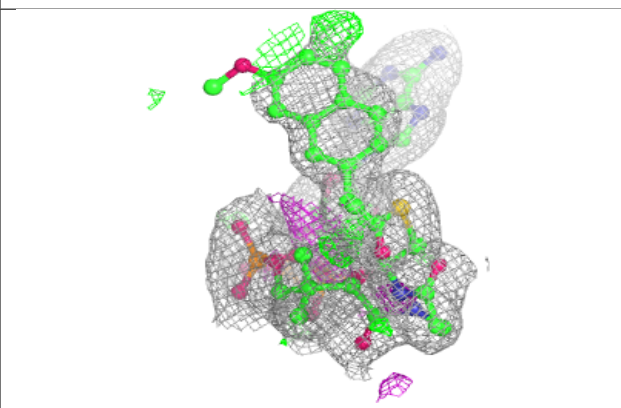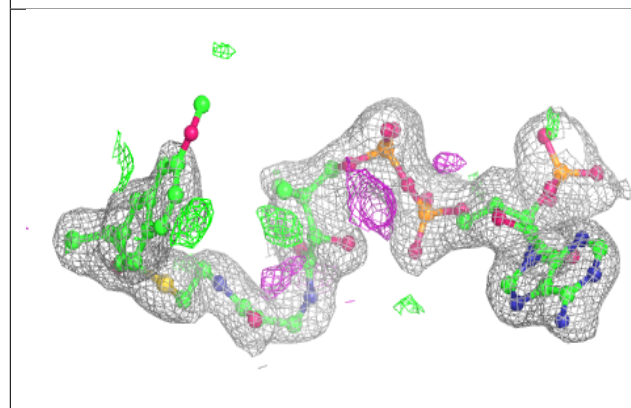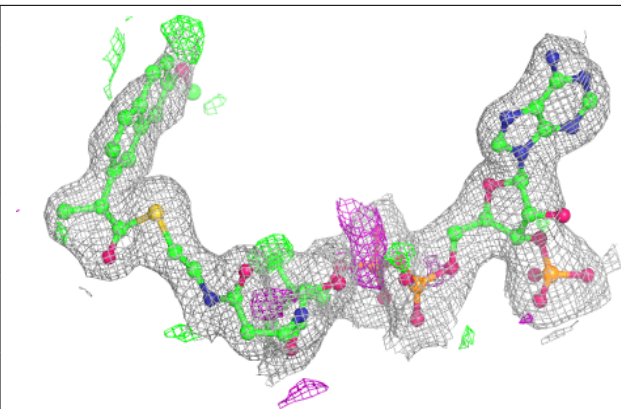
Electron density around A1I1O A 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
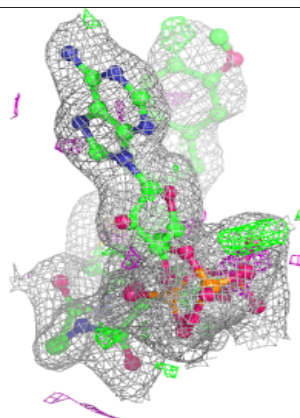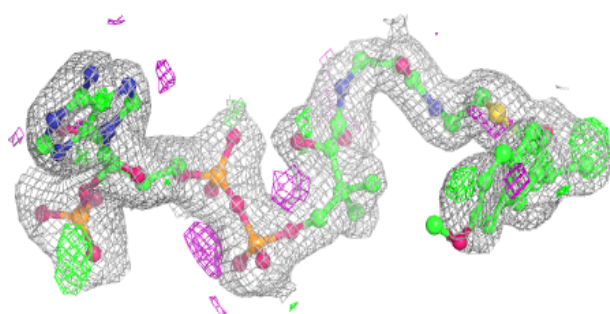and green (positive)
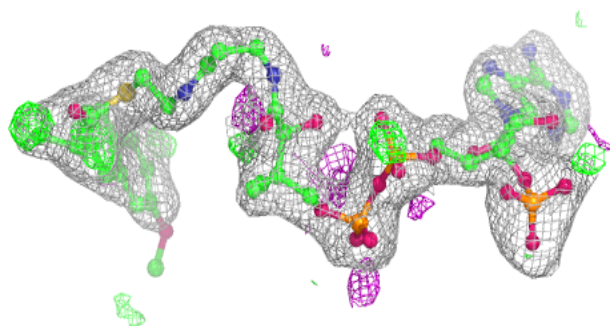
Electron density around A1I1O F 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
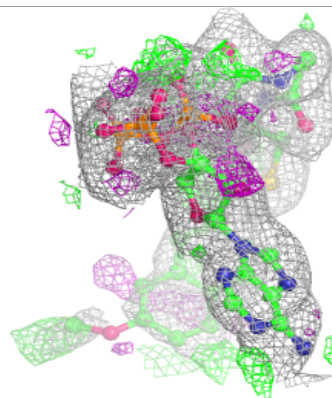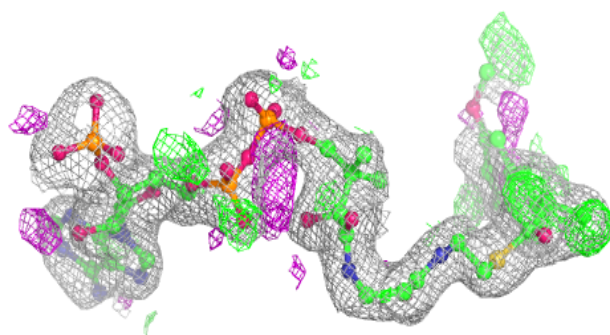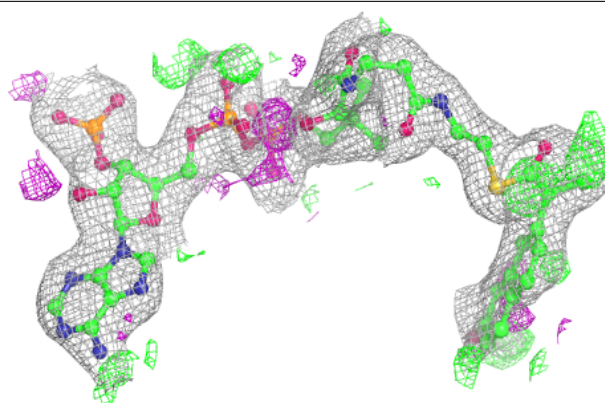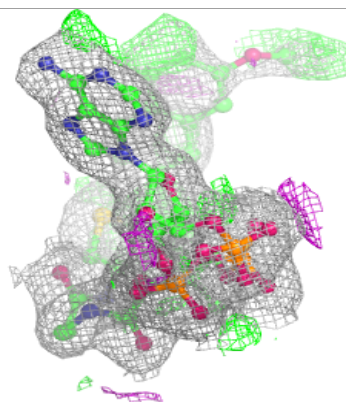
Electron density around A1I1O C 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
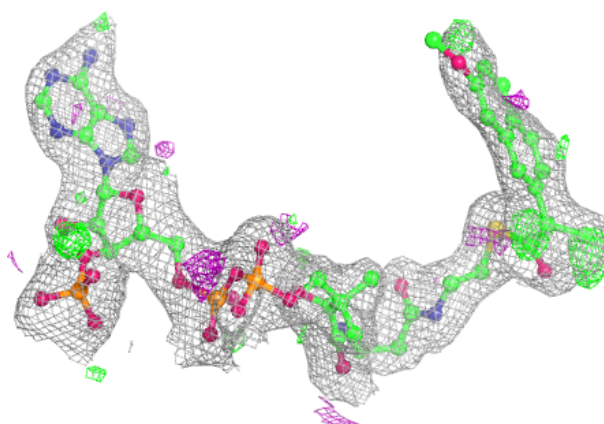and green (positive)
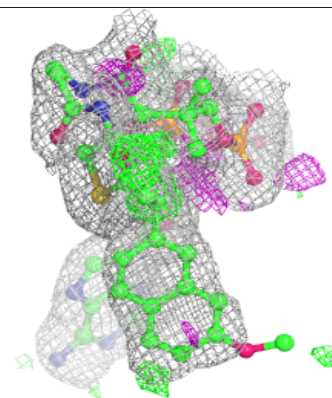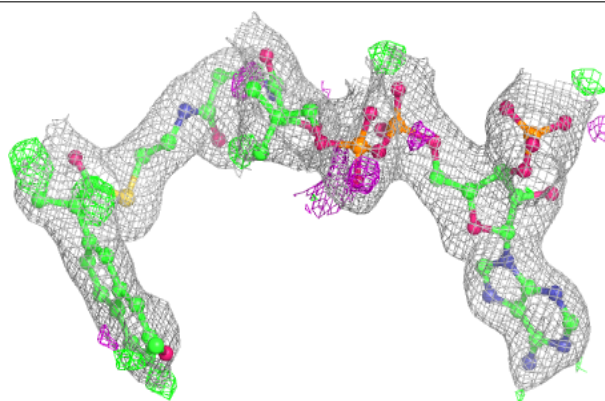
Electron density around A1I1O D 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
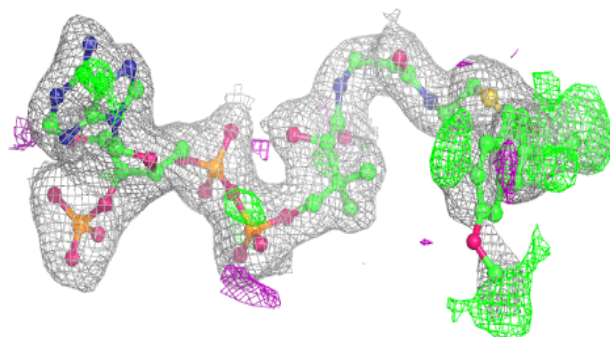
Electron density around A1I1O B 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
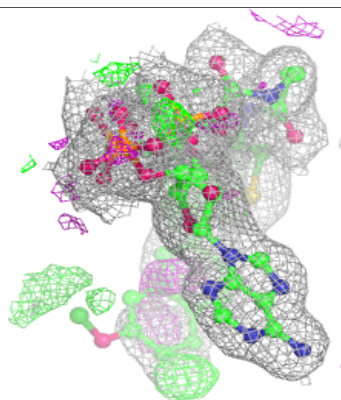and green (positive)

Electron density around A1I1O I 401:

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

Electron density around A1I1O J 401:

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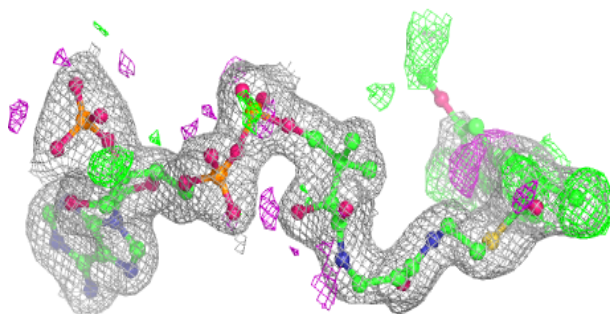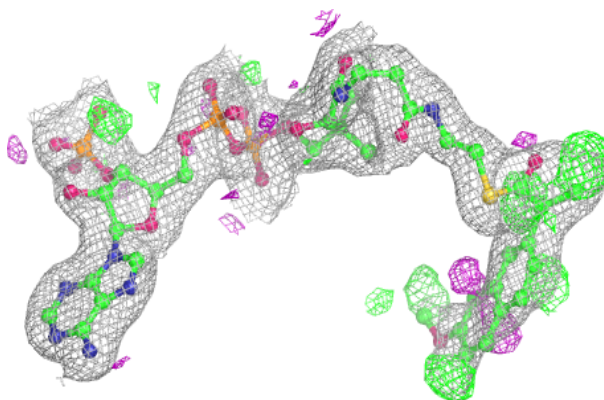mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around A1I1O K 401:

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 A1I1O L 401:

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 ⓘ

There are no such residues in this entry.