



wwPDB X-ray Structure Validation Summary Report ⓘ

Jul 20, 2026 – 02:51 pm BST

PDB ID : 9RZA / pdb_00009rza
Title : Alpha-Methylacyl-CoA racemase from Mycobacterium tuberculosis in complex with 2-(3-(3-Methoxybenzyloxy)phenylthiol)propanoyl-CoA
Authors : Mojanaga, O.O.; Acharya, K.R.; Lloyd, M.D.
Deposited on : 2025-07-15
Resolution : 2.20 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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/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 : 1.8.4, CSD as541be (2020)
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 : 9.0.015 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

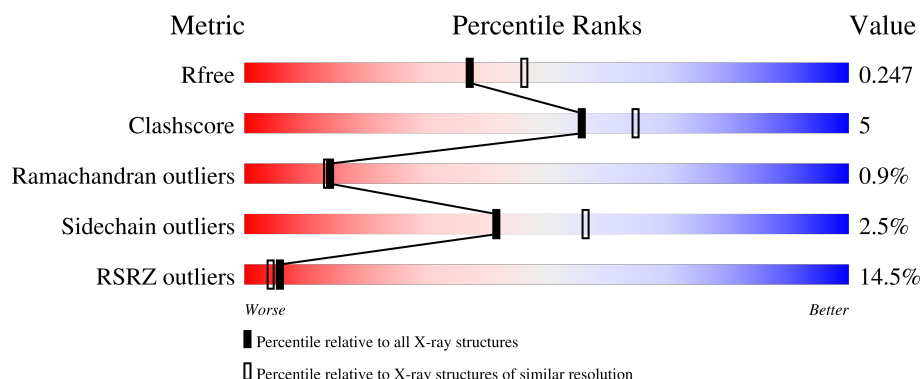
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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	364	12% 87% 10% ..
1	B	364	10% 87% 10% ..
1	C	364	15% 84% 13% ..
1	D	364	10% 84% 13% ..
1	E	364	17% 86% 12% ..

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Mol	Chain	Length	Quality of chain
1	F	364	
1	G	364	
1	H	364	
1	I	364	
1	J	364	
1	K	364	
1	L	364	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 34762 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	358	Total	C	N	O	S	0	2	0
			2710	1698	485	511	16			
1	B	358	Total	C	N	O	S	0	1	0
			2707	1699	485	507	16			
1	C	357	Total	C	N	O	S	0	2	0
			2706	1698	484	508	16			
1	D	357	Total	C	N	O	S	0	1	0
			2703	1697	484	506	16			
1	E	359	Total	C	N	O	S	0	3	0
			2727	1709	488	514	16			
1	F	359	Total	C	N	O	S	0	1	0
			2715	1703	486	510	16			
1	G	358	Total	C	N	O	S	0	2	0
			2714	1702	485	511	16			
1	H	358	Total	C	N	O	S	0	1	0
			2707	1697	485	509	16			
1	I	359	Total	C	N	O	S	0	2	0
			2718	1704	486	512	16			
1	J	359	Total	C	N	O	S	0	1	0
			2715	1703	486	510	16			
1	K	356	Total	C	N	O	S	0	3	0
			2704	1696	484	508	16			
1	L	359	Total	C	N	O	S	0	1	0
			2715	1703	486	510	16			

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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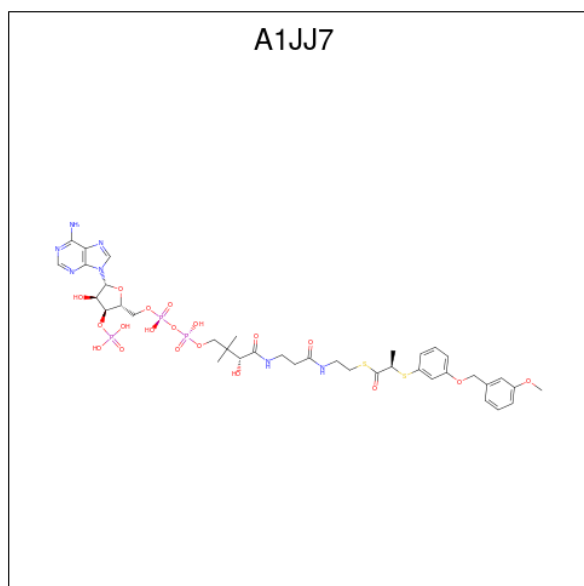
Chain	Residue	Modelled	Actual	Comment	Reference
B	362	SER	-	expression tag	UNP O06543
B	363	GLY	-	expression tag	UNP O06543
B	364	CYS	-	expression tag	UNP O06543
C	361	GLY	-	expression tag	UNP O06543
C	362	SER	-	expression tag	UNP O06543
C	363	GLY	-	expression tag	UNP O06543
C	364	CYS	-	expression tag	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 2-(3-(3-Methoxybenzyloxy)phenylthiol)propanoyl-CoA (CCD ID: A1JJ7) (formula: C₃₈H₅₂N₇O₁₉P₃S₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	B	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	C	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	D	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	E	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	F	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	G	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	H	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	I	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	J	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	K	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		
2	L	1	Total	C	N	O	P	S	0	0
			69	38	7	19	3	2		

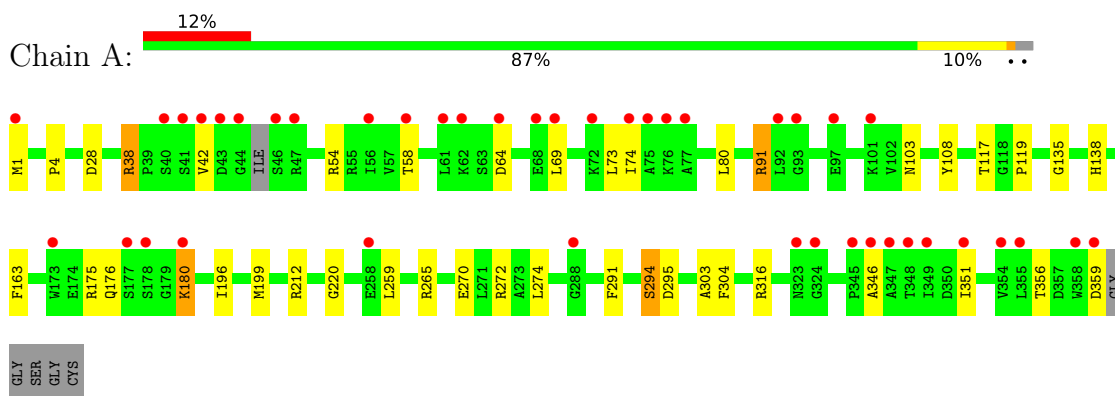
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	112	Total	O	0	0
			112	112		
3	B	123	Total	O	0	0
			123	123		
3	C	114	Total	O	0	0
			114	114		
3	D	111	Total	O	0	0
			111	111		
3	E	110	Total	O	0	0
			110	110		
3	F	105	Total	O	0	0
			105	105		
3	G	98	Total	O	0	0
			98	98		
3	H	108	Total	O	0	0
			108	108		
3	I	127	Total	O	0	0
			127	127		
3	J	128	Total	O	0	0
			128	128		
3	K	132	Total	O	0	0
			132	132		
3	L	125	Total	O	0	0
			125	125		

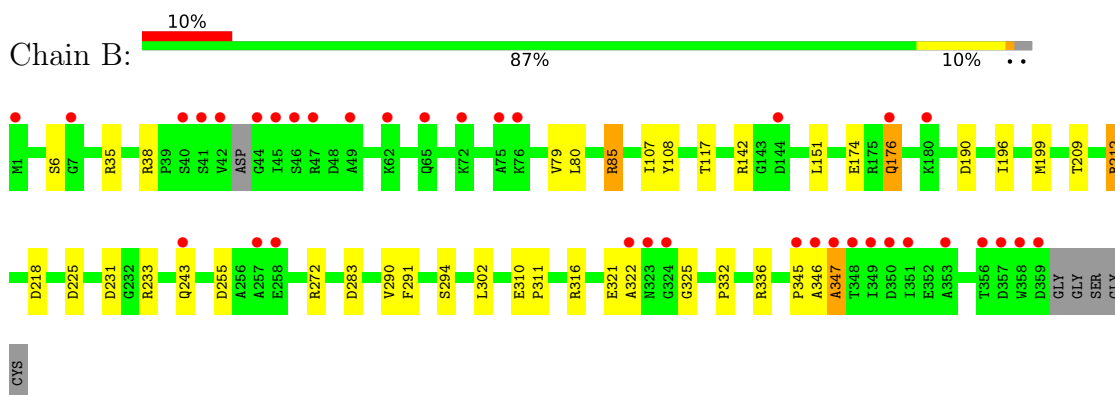
3 Residue-property plots [i](#)

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.

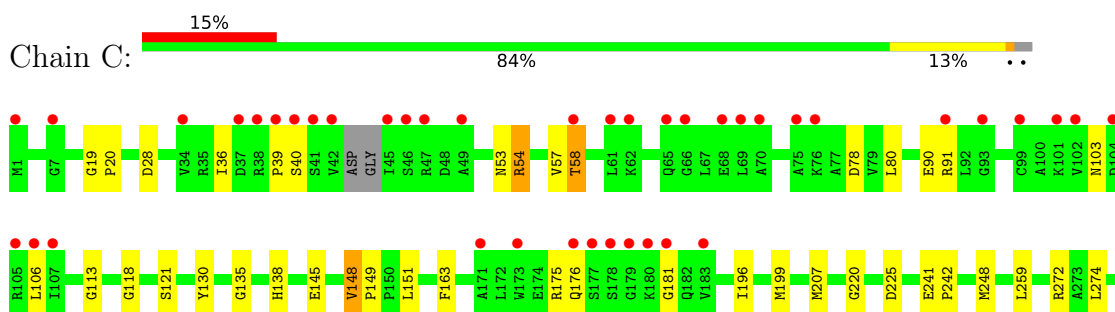
• Molecule 1: Alpha-methylacyl-CoA racemase

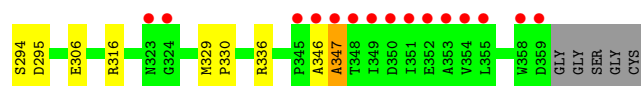


• Molecule 1: Alpha-methylacyl-CoA racemase

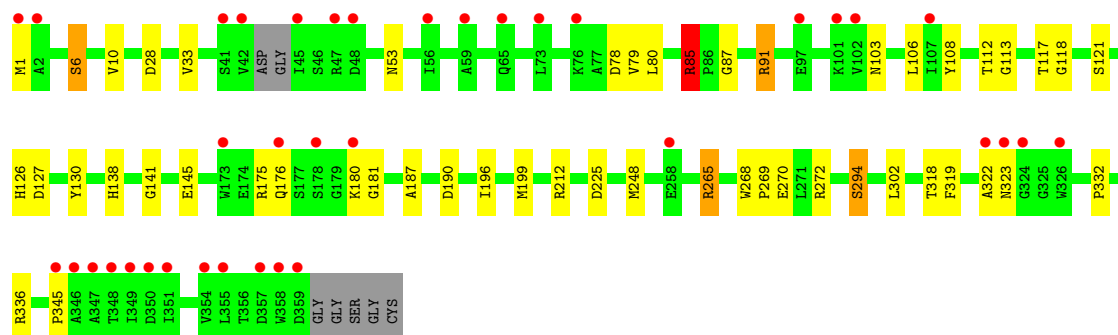
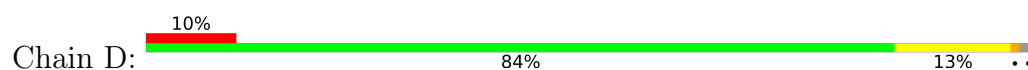


• Molecule 1: Alpha-methylacyl-CoA racemase

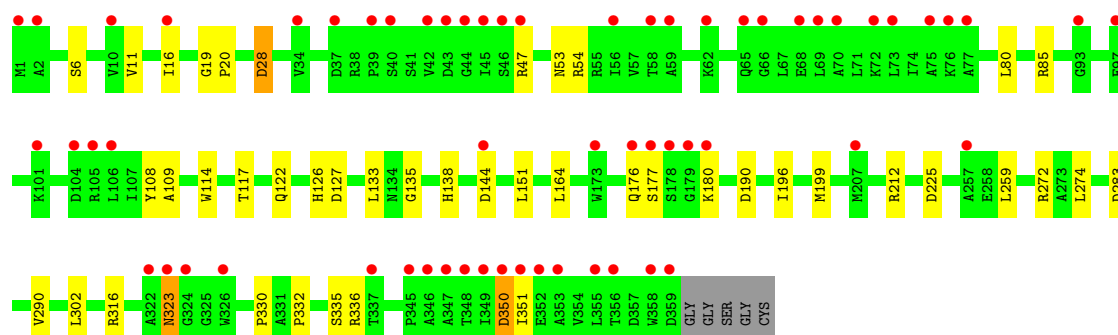
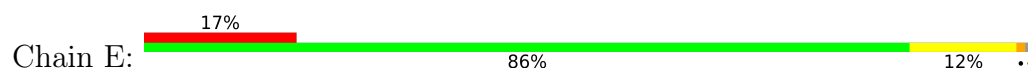




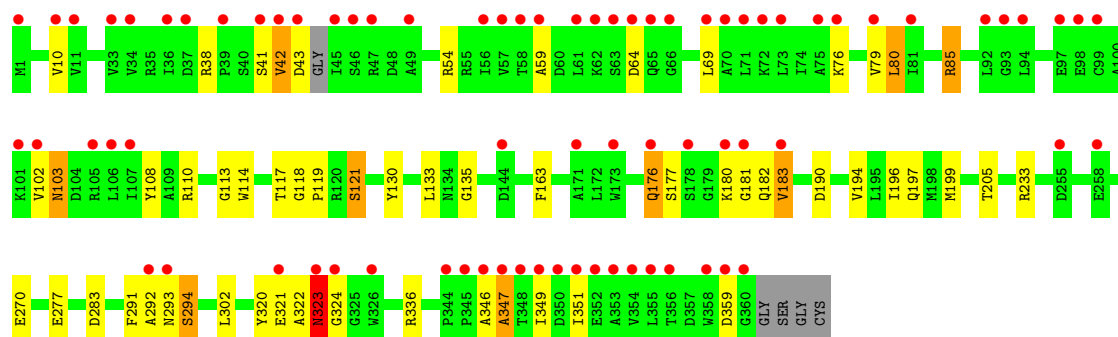
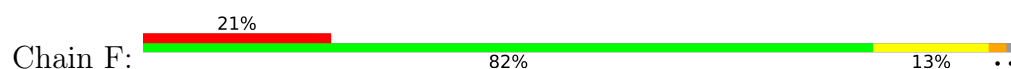
• Molecule 1: Alpha-methylacyl-CoA racemase



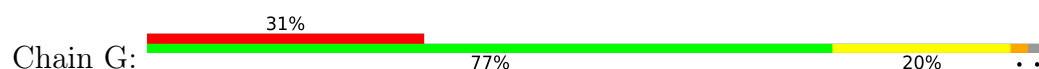
• Molecule 1: Alpha-methylacyl-CoA racemase

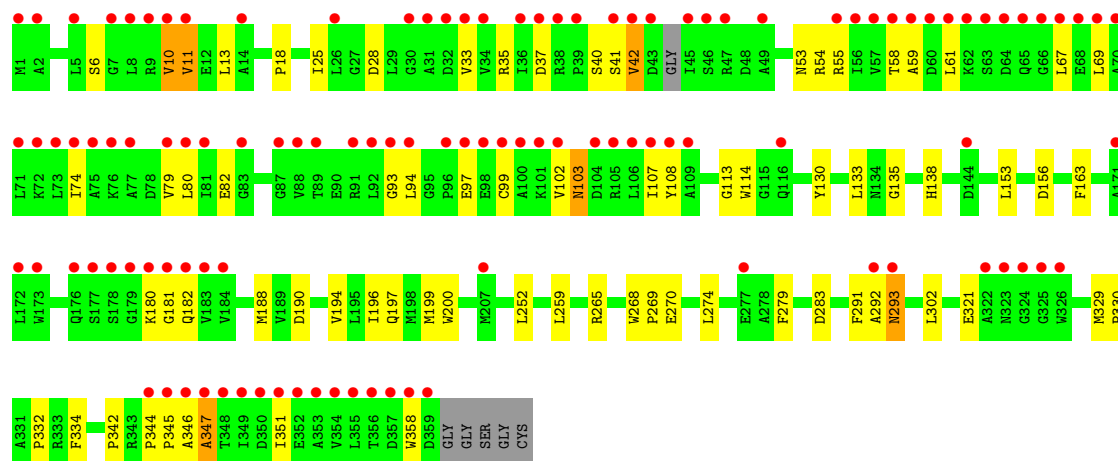


• Molecule 1: Alpha-methylacyl-CoA racemase

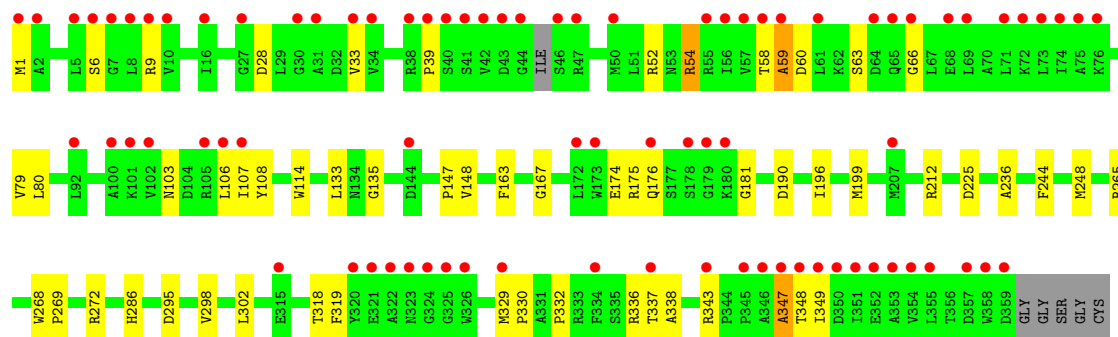
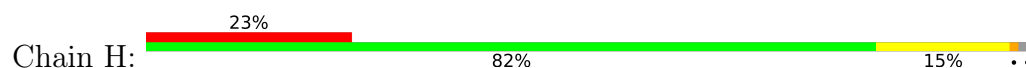


• Molecule 1: Alpha-methylacyl-CoA racemase

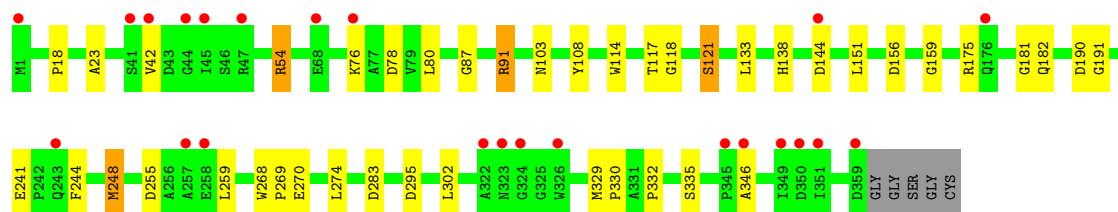
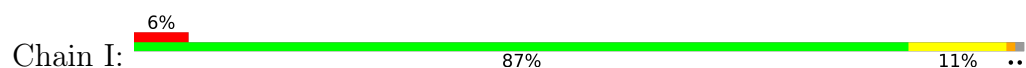




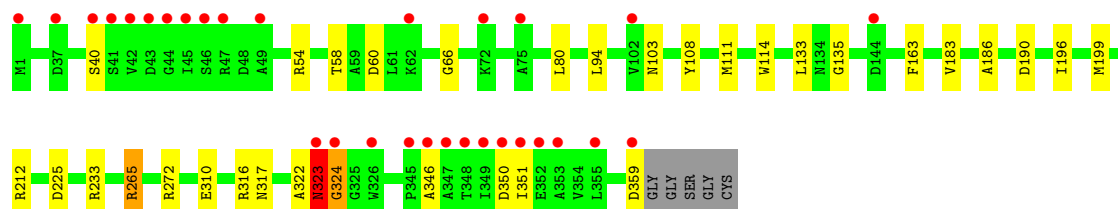
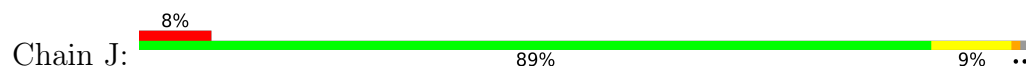
● Molecule 1: Alpha-methylacyl-CoA racemase



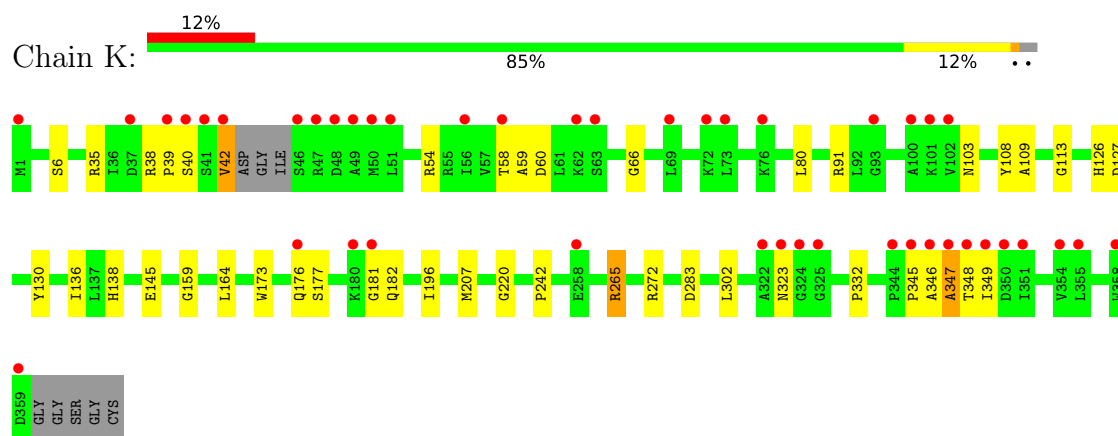
● Molecule 1: Alpha-methylacyl-CoA racemase



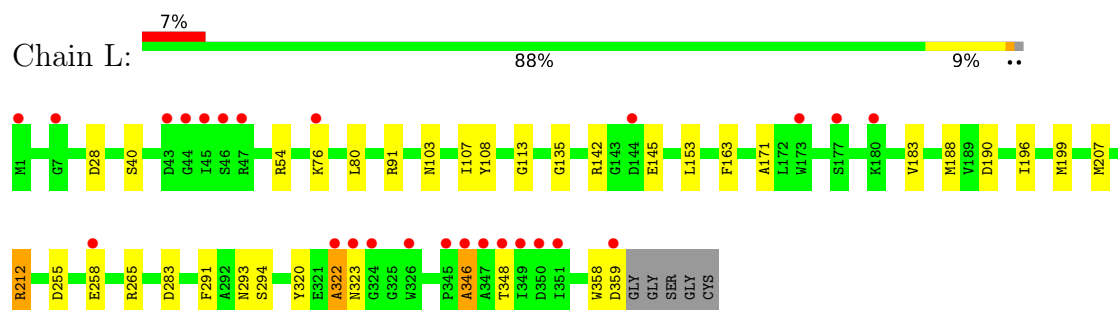
● Molecule 1: Alpha-methylacyl-CoA racemase



• Molecule 1: Alpha-methylacyl-CoA racemase



• Molecule 1: Alpha-methylacyl-CoA racemase



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 388.79Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	196.12 – 2.20 196.12 – 2.20	Depositor EDS
% Data completeness (in resolution range)	100.0 (196.12-2.20) 99.8 (196.12-2.20)	Depositor EDS
R_{merge}	0.31	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.44 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.8.0415	Depositor
R, R_{free}	0.202 , 0.239 0.210 , 0.247	Depositor DCC
R_{free} test set	18731 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	35.9	Xtriage
Anisotropy	0.214	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 33.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.010 for -1/2*h+1/2*k-1/2*l, 1/2*h-1/2*k-1/2*l, -h-k 0.010 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	34762	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 3.58% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: A1JJ7

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	0.64	0/2782	1.03	1/3783 (0.0%)
1	B	0.62	0/2773	1.04	5/3771 (0.1%)
1	C	0.62	0/2778	1.02	1/3778 (0.0%)
1	D	0.63	0/2769	1.06	3/3766 (0.1%)
1	E	0.61	0/2800	1.04	3/3809 (0.1%)
1	F	0.61	0/2781	1.06	4/3782 (0.1%)
1	G	0.60	0/2786	1.04	2/3789 (0.1%)
1	H	0.61	0/2773	1.06	4/3771 (0.1%)
1	I	0.62	0/2791	1.04	5/3797 (0.1%)
1	J	0.62	0/2782	1.03	2/3785 (0.1%)
1	K	0.63	1/2779 (0.0%)	1.04	1/3779 (0.0%)
1	L	0.61	0/2782	1.01	3/3785 (0.1%)
All	All	0.62	1/33376 (0.0%)	1.04	34/45395 (0.1%)

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	4
1	B	0	2
1	C	0	2
1	D	0	2
1	E	0	2
1	F	0	2
1	G	0	2
1	H	0	2
1	I	0	1
1	J	0	3
1	K	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	L	0	5
All	All	0	30

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	K	159	GLY	C-O	-5.53	1.20	1.24

The worst 5 of 34 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	190	ASP	CA-CB-CG	6.90	119.50	112.60
1	E	28	ASP	CA-CB-CG	6.69	119.29	112.60
1	F	190	ASP	CA-CB-CG	6.62	119.22	112.60
1	I	255	ASP	CB-CA-C	6.57	121.66	110.81
1	I	283	ASP	CA-CB-CG	6.40	119.00	112.60

There are no chirality outliers.

5 of 30 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	265	ARG	Sidechain
1	A	38	ARG	Sidechain
1	A	54	ARG	Peptide
1	A	91	ARG	Sidechain
1	B	35	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	2710	0	2646	26	0
1	B	2707	0	2655	26	0
1	C	2706	0	2650	32	0
1	D	2703	0	2652	36	0
1	E	2727	0	2665	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2715	0	2659	36	0
1	G	2714	0	2654	47	0
1	H	2707	0	2648	34	0
1	I	2718	0	2658	25	0
1	J	2715	0	2660	18	0
1	K	2704	0	2647	24	0
1	L	2715	0	2660	16	0
2	A	69	0	0	4	0
2	B	69	0	0	4	0
2	C	69	0	0	0	0
2	D	69	0	0	3	0
2	E	69	0	0	0	0
2	F	69	0	0	6	0
2	G	69	0	0	0	0
2	H	69	0	0	1	0
2	I	69	0	0	0	0
2	J	69	0	0	0	0
2	K	69	0	0	1	0
2	L	69	0	0	0	0
3	A	112	0	0	4	0
3	B	123	0	0	2	0
3	C	114	0	0	1	0
3	D	111	0	0	2	0
3	E	110	0	0	1	0
3	F	105	0	0	1	0
3	G	98	0	0	2	0
3	H	108	0	0	2	0
3	I	127	0	0	3	0
3	J	128	0	0	5	0
3	K	132	0	0	2	0
3	L	125	0	0	1	0
All	All	34762	0	31854	304	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 5.

The worst 5 of 304 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:G:80:LEU:HD22	1:G:108:TYR:CE1	2.08	0.89
1:G:259:LEU:HD22	1:G:274:LEU:HD13	1.56	0.86

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:310:GLU:OE2	3:J:501:HOH:O	1.97	0.82
1:F:80:LEU:CD2	1:F:108:TYR:CE1	2.70	0.74
1:A:291:PHE:O	1:A:294:SER:HB3	1.86	0.74

There are no symmetry-related clashes.

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	356/364 (98%)	330 (93%)	24 (7%)	2 (1%)	21	23
1	B	355/364 (98%)	340 (96%)	13 (4%)	2 (1%)	21	23
1	C	355/364 (98%)	335 (94%)	17 (5%)	3 (1%)	16	16
1	D	354/364 (97%)	334 (94%)	18 (5%)	2 (1%)	21	23
1	E	360/364 (99%)	339 (94%)	19 (5%)	2 (1%)	21	23
1	F	356/364 (98%)	329 (92%)	20 (6%)	7 (2%)	6	4
1	G	356/364 (98%)	320 (90%)	31 (9%)	5 (1%)	9	7
1	H	355/364 (98%)	328 (92%)	23 (6%)	4 (1%)	11	10
1	I	359/364 (99%)	343 (96%)	14 (4%)	2 (1%)	21	23
1	J	358/364 (98%)	340 (95%)	15 (4%)	3 (1%)	16	16
1	K	355/364 (98%)	329 (93%)	22 (6%)	4 (1%)	11	10
1	L	358/364 (98%)	340 (95%)	16 (4%)	2 (1%)	21	23
All	All	4277/4368 (98%)	4007 (94%)	232 (5%)	38 (1%)	14	14

5 of 38 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	103	ASN
1	B	347	ALA

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Mol	Chain	Res	Type
1	C	347	ALA
1	F	41	SER
1	F	103	ASN

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	276/277 (100%)	271 (98%)	5 (2%)	51	68
1	B	275/277 (99%)	270 (98%)	5 (2%)	51	68
1	C	276/277 (100%)	271 (98%)	5 (2%)	51	68
1	D	275/277 (99%)	270 (98%)	5 (2%)	51	68
1	E	278/277 (100%)	266 (96%)	12 (4%)	26	35
1	F	276/277 (100%)	263 (95%)	13 (5%)	23	31
1	G	277/277 (100%)	270 (98%)	7 (2%)	42	56
1	H	275/277 (99%)	271 (98%)	4 (2%)	57	73
1	I	277/277 (100%)	273 (99%)	4 (1%)	59	75
1	J	276/277 (100%)	270 (98%)	6 (2%)	45	61
1	K	276/277 (100%)	266 (96%)	10 (4%)	31	42
1	L	276/277 (100%)	271 (98%)	5 (2%)	51	68
All	All	3313/3324 (100%)	3232 (98%)	81 (2%)	42	58

5 of 81 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	76	LYS
1	K	176	GLN
1	I	248	MET
1	J	359	ASP
1	K	349	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 46

such sidechains are listed below:

Mol	Chain	Res	Type
1	H	286	HIS
1	I	263	ASN
1	H	309	ASN
1	I	123	GLN
1	J	263	ASN

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](#)

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	A1JJ7	H	401	-	67,73,73	0.88	3 (4%)	91,106,106	1.10	9 (9%)
2	A1JJ7	F	401	-	67,73,73	0.70	3 (4%)	91,106,106	1.06	6 (6%)
2	A1JJ7	J	401	-	67,73,73	0.57	1 (1%)	91,106,106	0.79	2 (2%)
2	A1JJ7	G	401	-	67,73,73	0.62	1 (1%)	91,106,106	1.02	9 (9%)
2	A1JJ7	A	401	-	67,73,73	0.57	0	91,106,106	1.25	7 (7%)
2	A1JJ7	B	401	-	67,73,73	0.62	1 (1%)	91,106,106	1.43	11 (12%)
2	A1JJ7	L	401	-	67,73,73	0.68	2 (2%)	91,106,106	0.93	6 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	A1JJ7	I	401	-	67,73,73	0.70	1 (1%)	91,106,106	0.81	5 (5%)
2	A1JJ7	C	401	-	67,73,73	0.57	0	91,106,106	1.00	5 (5%)
2	A1JJ7	D	401	-	67,73,73	0.63	0	91,106,106	0.87	6 (6%)
2	A1JJ7	K	401	-	67,73,73	0.60	1 (1%)	91,106,106	0.95	6 (6%)
2	A1JJ7	E	401	-	67,73,73	0.76	2 (2%)	91,106,106	0.92	6 (6%)

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	A1JJ7	H	401	-	-	15/65/82/82	0/5/5/5
2	A1JJ7	F	401	-	-	20/65/82/82	0/5/5/5
2	A1JJ7	J	401	-	-	9/65/82/82	0/5/5/5
2	A1JJ7	G	401	-	-	12/65/82/82	0/5/5/5
2	A1JJ7	A	401	-	-	16/65/82/82	0/5/5/5
2	A1JJ7	B	401	-	-	18/65/82/82	0/5/5/5
2	A1JJ7	L	401	-	-	12/65/82/82	0/5/5/5
2	A1JJ7	I	401	-	-	8/65/82/82	0/5/5/5
2	A1JJ7	C	401	-	-	15/65/82/82	0/5/5/5
2	A1JJ7	D	401	-	-	8/65/82/82	0/5/5/5
2	A1JJ7	K	401	-	-	12/65/82/82	0/5/5/5
2	A1JJ7	E	401	-	-	14/65/82/82	0/5/5/5

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	401	A1JJ7	C13-S1	3.52	1.89	1.83
2	I	401	A1JJ7	O3-C15	3.47	1.25	1.20
2	H	401	A1JJ7	O3-C15	3.45	1.25	1.20
2	E	401	A1JJ7	C13-S1	3.15	1.88	1.83
2	L	401	A1JJ7	O3-C15	3.05	1.25	1.20

The worst 5 of 78 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	A1JJ7	C25-C23-C26	6.49	118.81	108.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	A1JJ7	C25-C23-C26	-6.39	97.80	108.23
2	B	401	A1JJ7	C24-C23-C26	-5.88	98.63	108.23
2	B	401	A1JJ7	C16-S2-C15	4.43	115.07	101.75
2	G	401	A1JJ7	O9-P1-O8	4.19	132.94	112.24

There are no chirality outliers.

5 of 159 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	A1JJ7	C18-C19-C20-N2
2	A	401	A1JJ7	C21-C22-C23-C24
2	A	401	A1JJ7	C21-C22-C23-C25
2	A	401	A1JJ7	C21-C22-C23-C26
2	A	401	A1JJ7	C26-O7-P1-O8

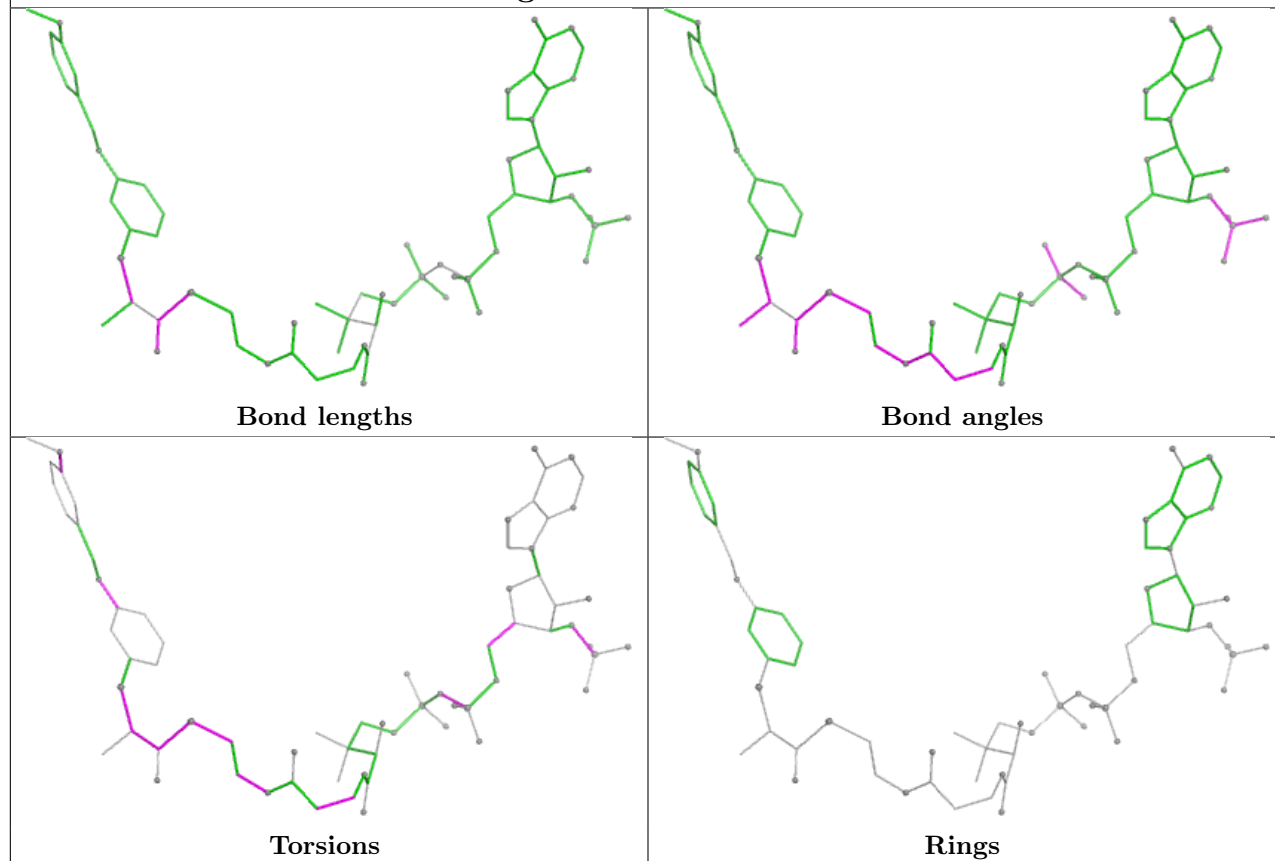
There are no ring outliers.

6 monomers are involved in 19 short contacts:

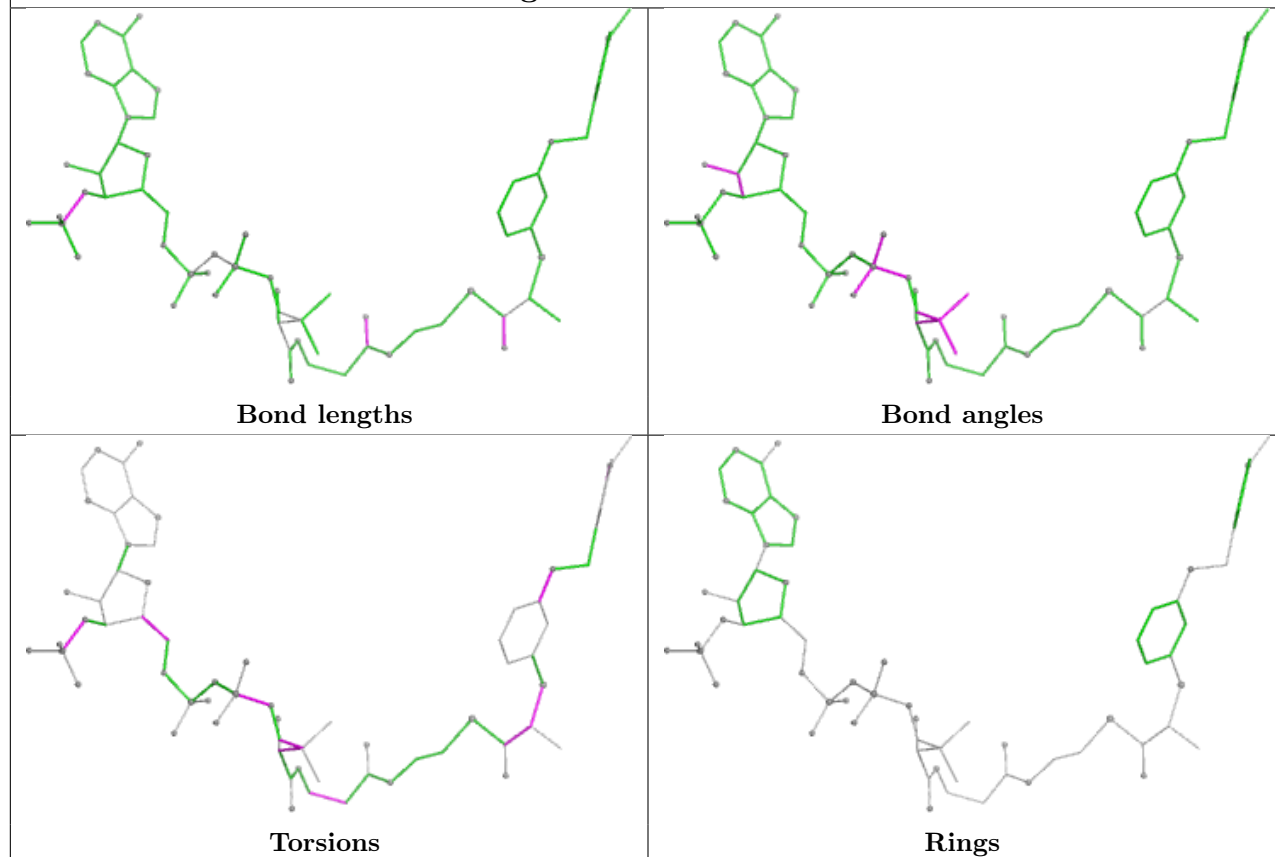
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	401	A1JJ7	1	0
2	F	401	A1JJ7	6	0
2	A	401	A1JJ7	4	0
2	B	401	A1JJ7	4	0
2	D	401	A1JJ7	3	0
2	K	401	A1JJ7	1	0

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.

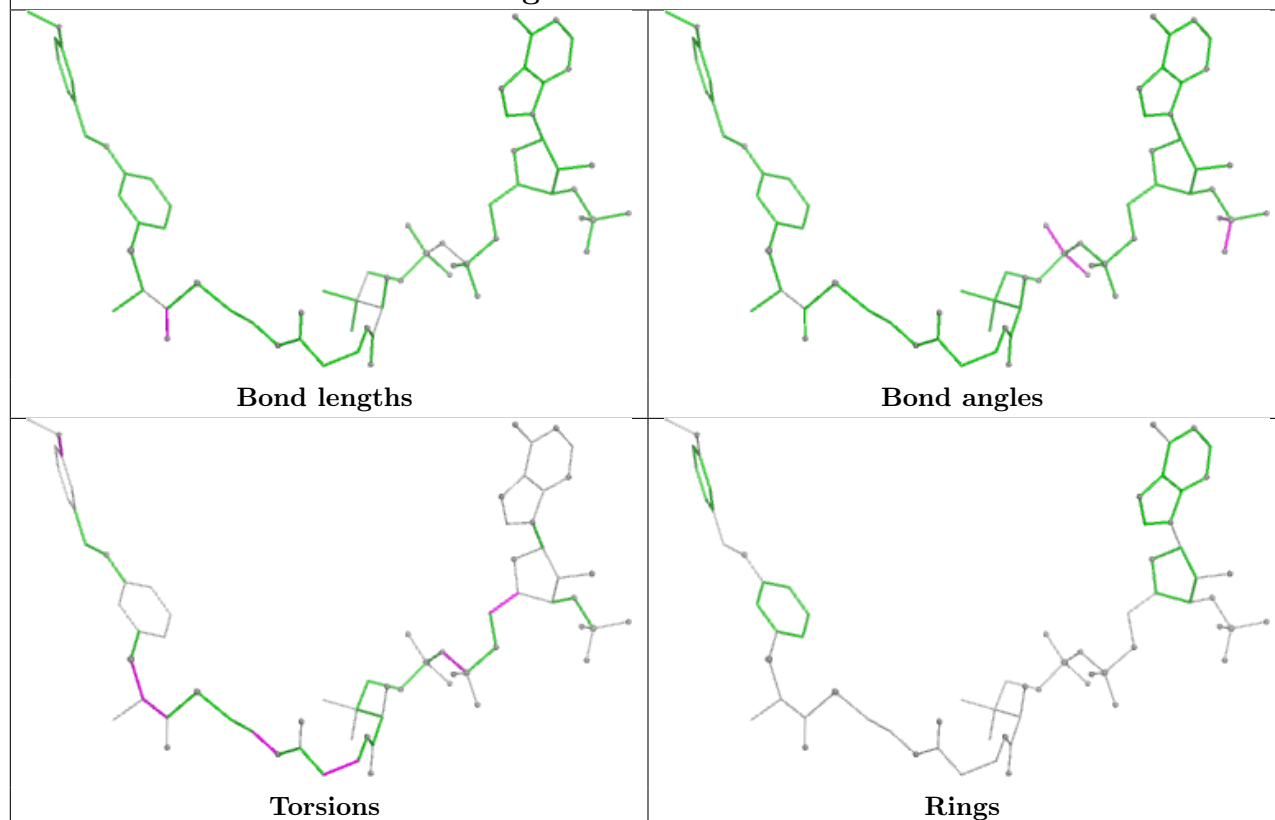
Ligand A1JJ7 H 401

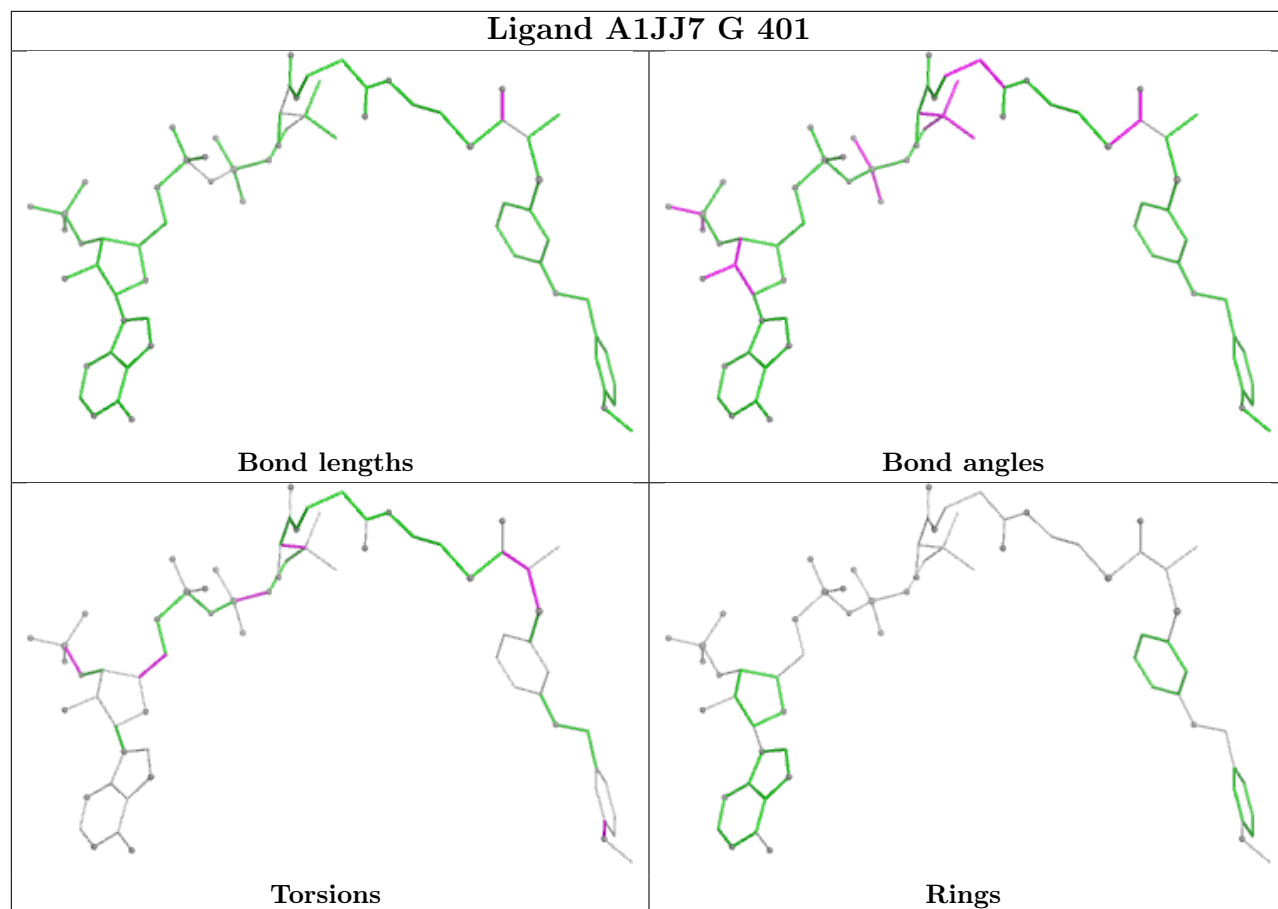


Ligand A1JJ7 F 401

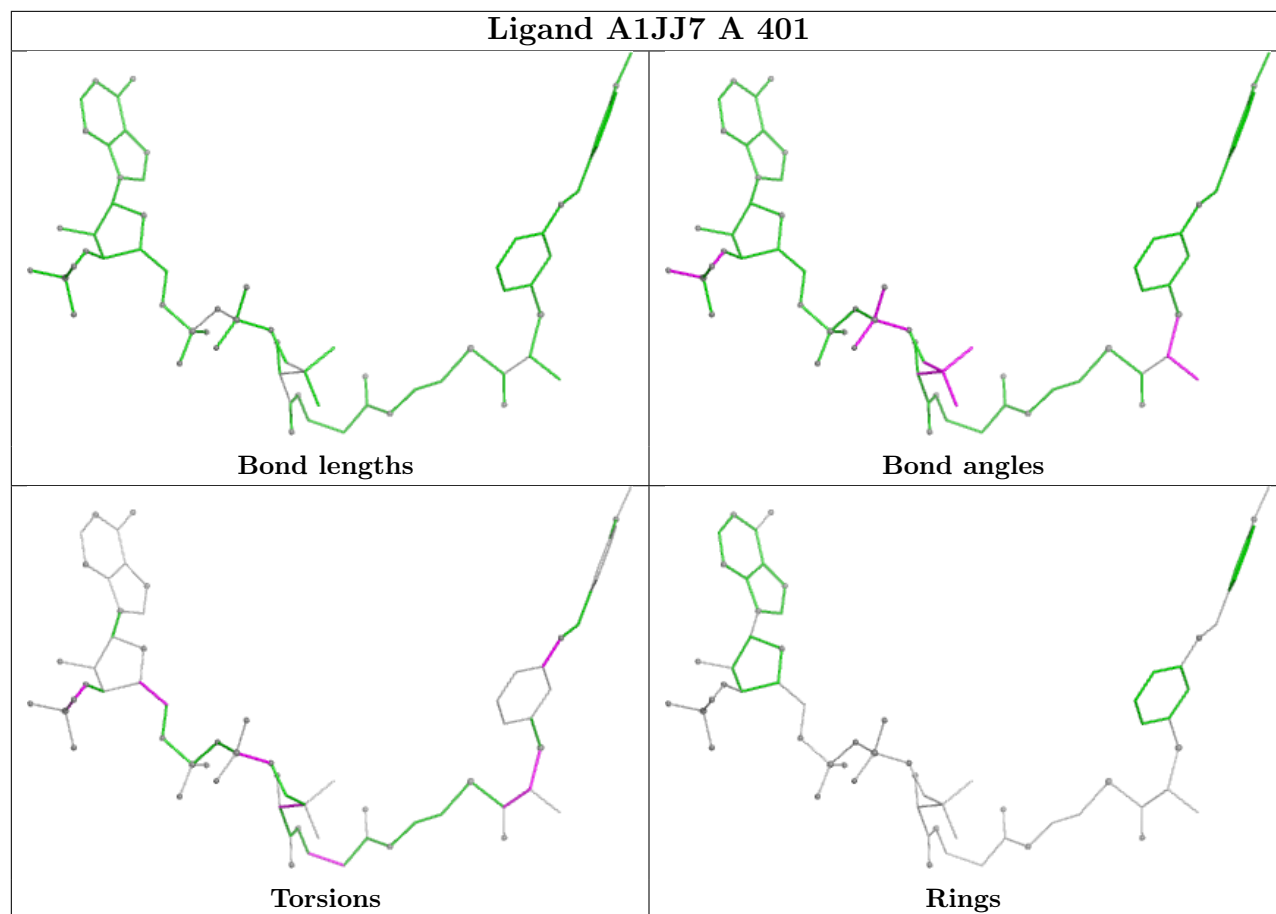


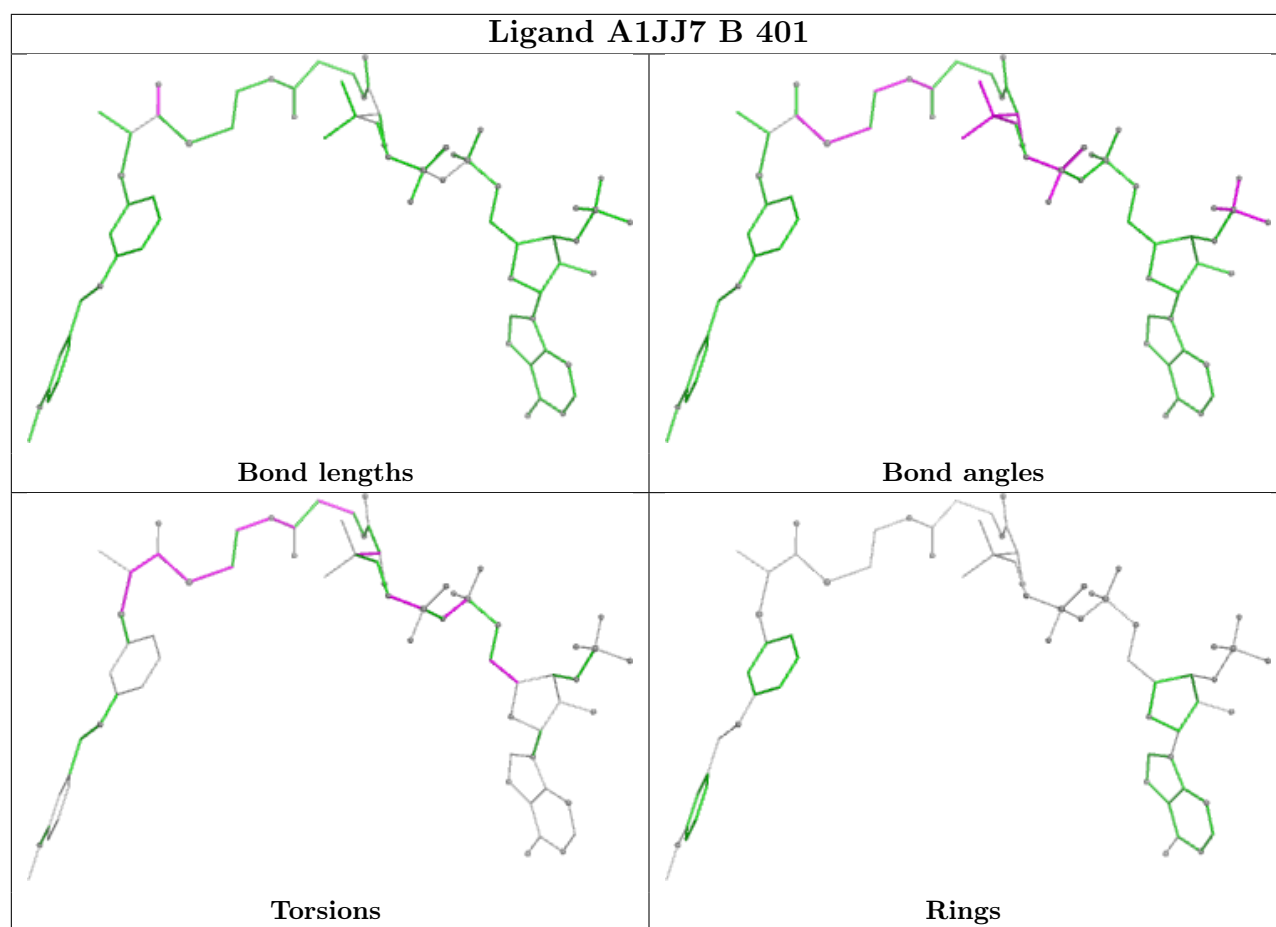
Ligand A1JJ7 J 401

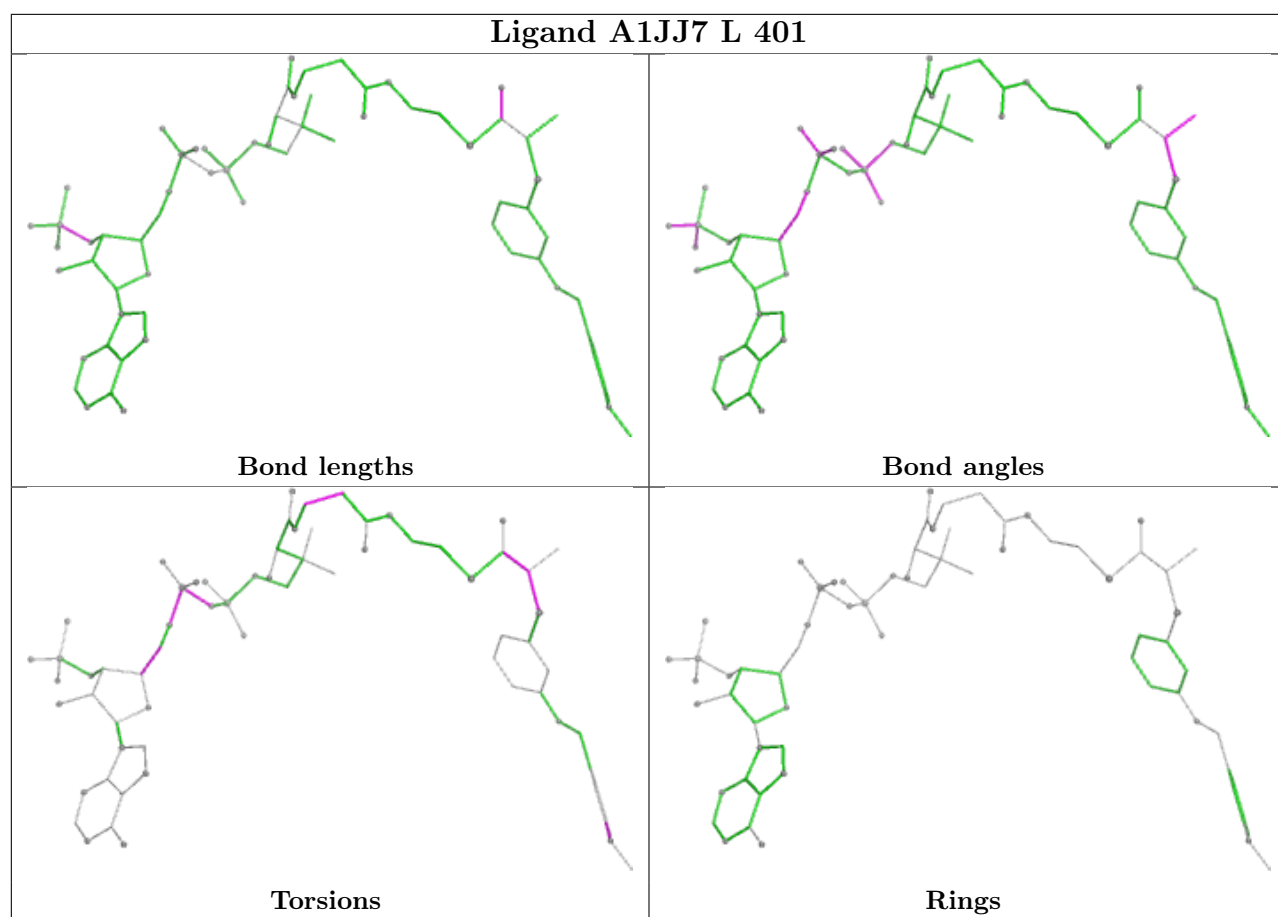


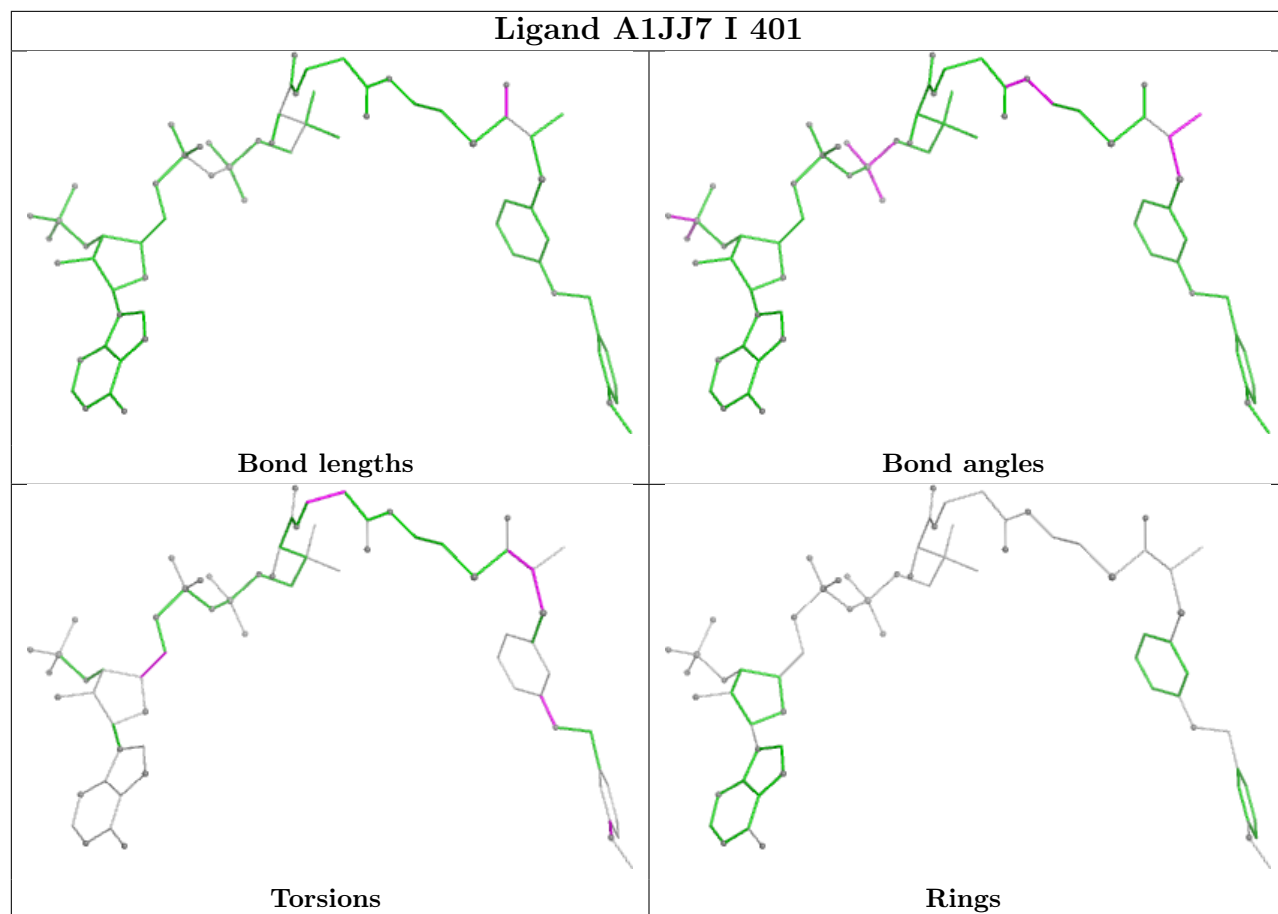


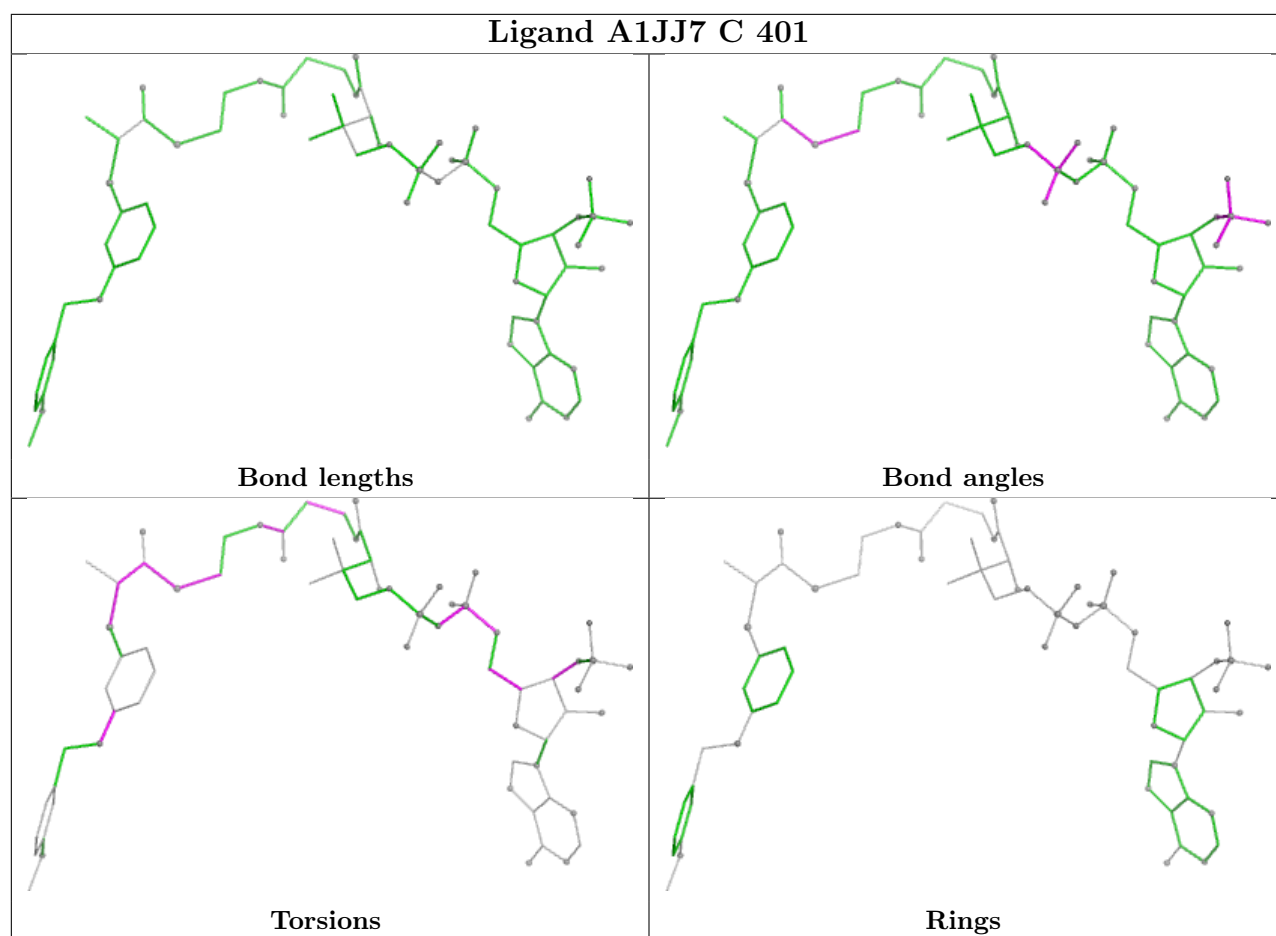
Ligand A1JJ7 A 401



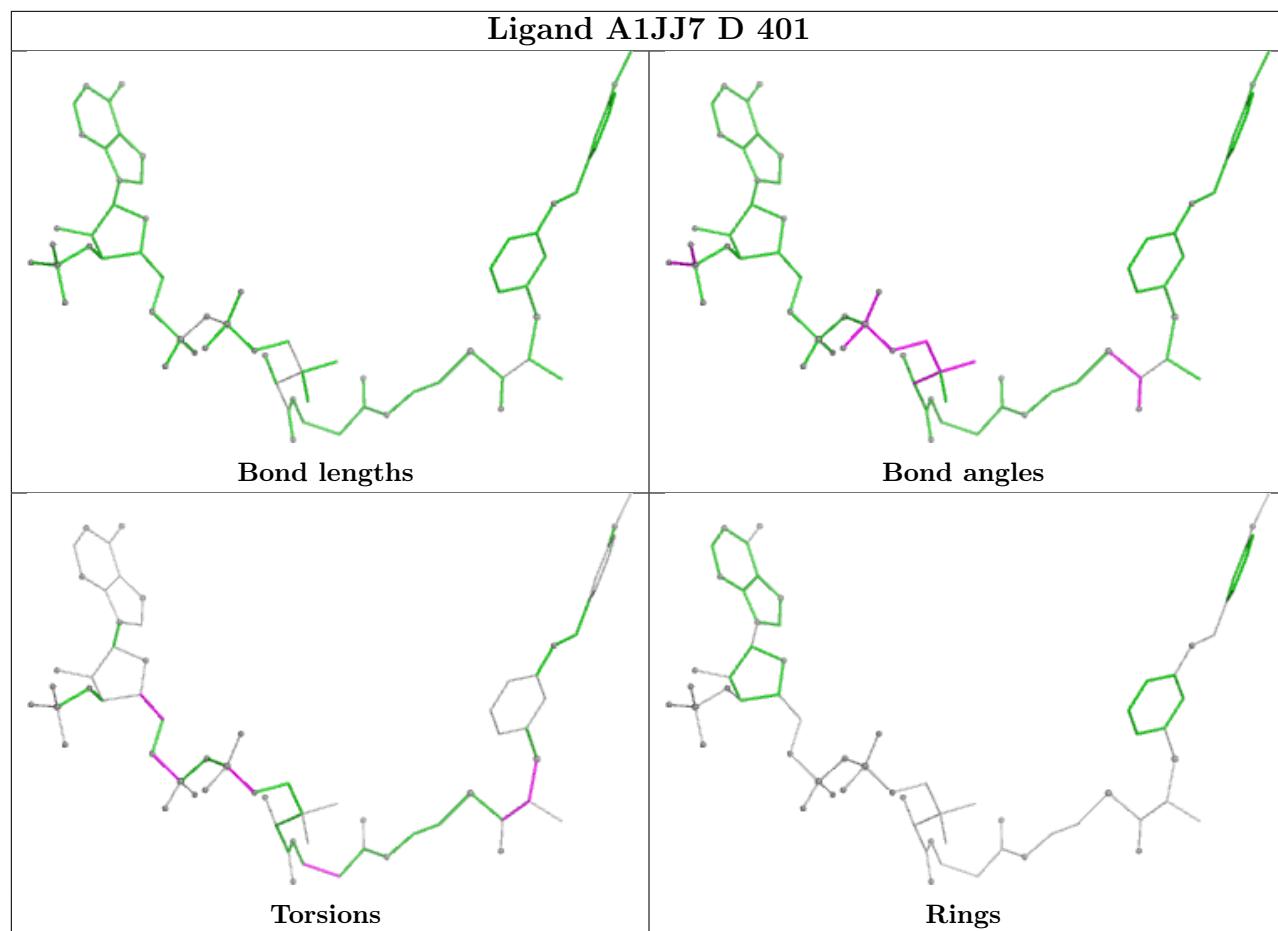




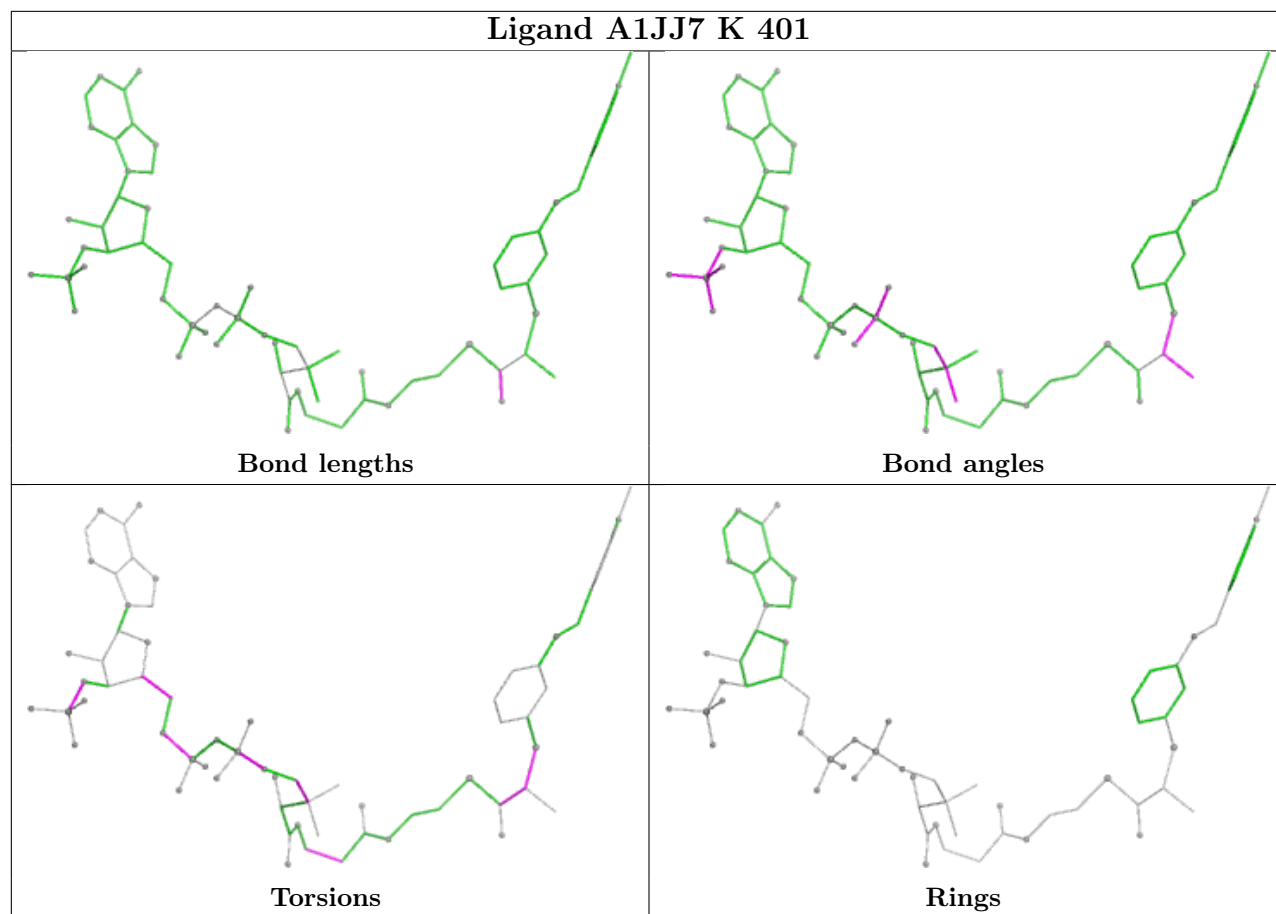


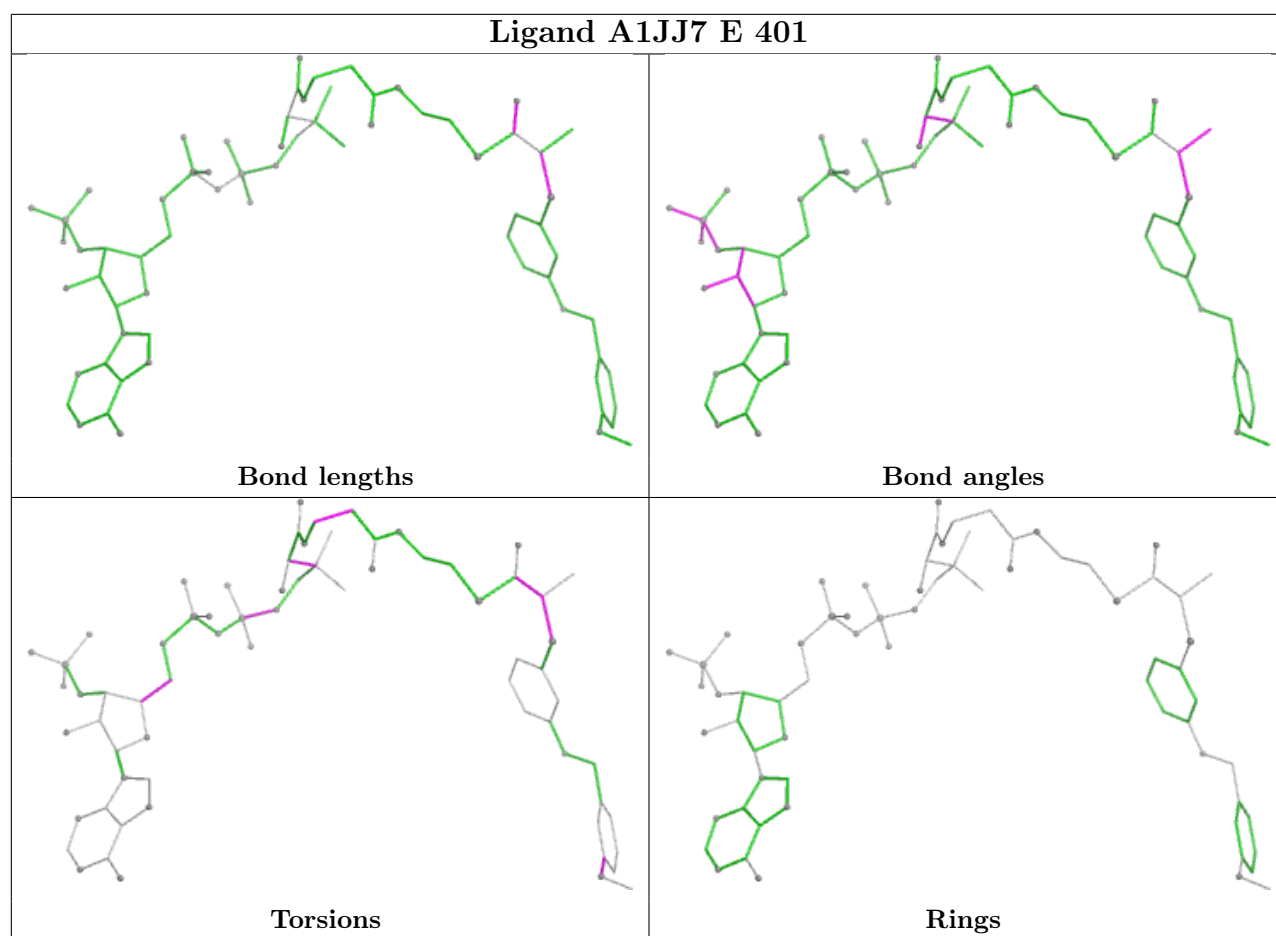


Ligand A1JJ7 D 401



Ligand A1JJ7 K 401





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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	358/364 (98%)	0.52	42 (11%) 9 7	22, 38, 82, 118	2 (0%)
1	B	358/364 (98%)	0.47	36 (10%) 12 10	21, 38, 86, 126	1 (0%)
1	C	357/364 (98%)	0.64	56 (15%) 5 4	22, 39, 87, 113	2 (0%)
1	D	357/364 (98%)	0.54	37 (10%) 11 9	23, 39, 83, 116	1 (0%)
1	E	359/364 (98%)	0.73	61 (16%) 4 3	14, 41, 95, 129	3 (0%)
1	F	359/364 (98%)	0.88	77 (21%) 2 2	23, 43, 92, 128	1 (0%)
1	G	358/364 (98%)	1.21	112 (31%) 1 1	23, 46, 103, 128	2 (0%)
1	H	358/364 (98%)	0.91	82 (22%) 2 1	22, 44, 102, 141	1 (0%)
1	I	359/364 (98%)	0.29	23 (6%) 25 22	23, 37, 72, 119	2 (0%)
1	J	359/364 (98%)	0.37	30 (8%) 17 14	23, 37, 77, 123	1 (0%)
1	K	356/364 (97%)	0.51	44 (12%) 8 6	17, 38, 86, 112	3 (0%)
1	L	359/364 (98%)	0.35	25 (6%) 22 19	23, 39, 79, 115	1 (0%)
All	All	4297/4368 (98%)	0.62	625 (14%) 6 4	14, 40, 89, 141	20 (0%)

The worst 5 of 625 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	K	42	VAL	9.2
1	E	346	ALA	8.5
1	A	346	ALA	7.9
1	C	42	VAL	7.6
1	F	45	ILE	7.4

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 ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

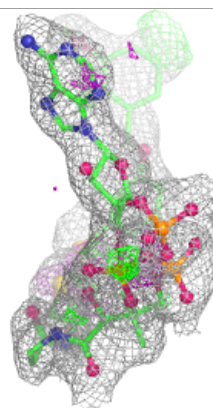
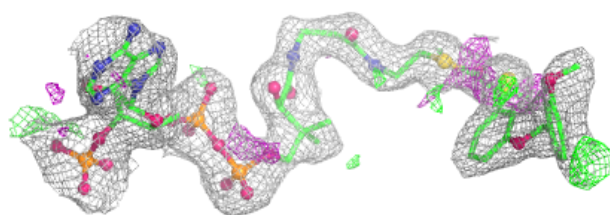
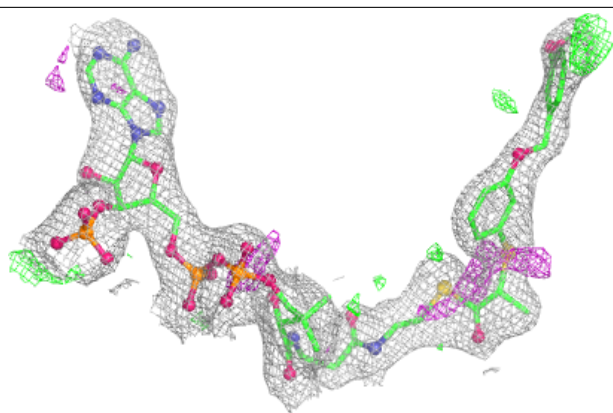
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	A1JJ7	E	401	69/69	0.89	0.16	40,64,101,107	0
2	A1JJ7	H	401	69/69	0.89	0.17	43,68,107,114	0
2	A1JJ7	G	401	69/69	0.94	0.12	30,54,84,87	0
2	A1JJ7	C	401	69/69	0.94	0.12	30,52,75,91	0
2	A1JJ7	A	401	69/69	0.95	0.10	27,50,67,75	0
2	A1JJ7	F	401	69/69	0.95	0.11	27,51,81,84	0
2	A1JJ7	K	401	69/69	0.95	0.10	26,49,66,73	0
2	A1JJ7	I	401	69/69	0.96	0.09	25,42,59,65	0
2	A1JJ7	J	401	69/69	0.96	0.10	28,45,65,71	0
2	A1JJ7	B	401	69/69	0.96	0.10	30,45,84,89	0
2	A1JJ7	D	401	69/69	0.97	0.08	28,43,58,68	0
2	A1JJ7	L	401	69/69	0.97	0.09	26,39,67,75	0

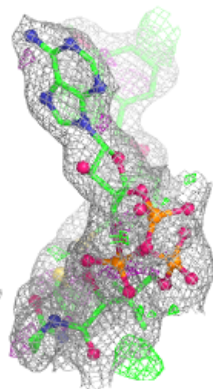
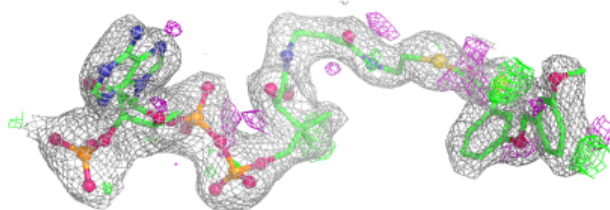
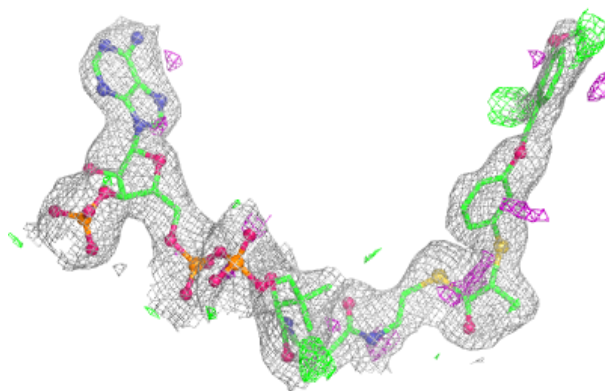
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1JJ7 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)

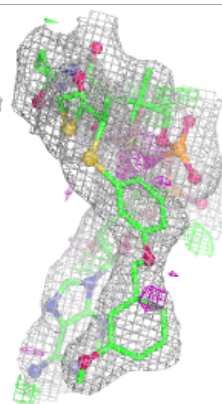
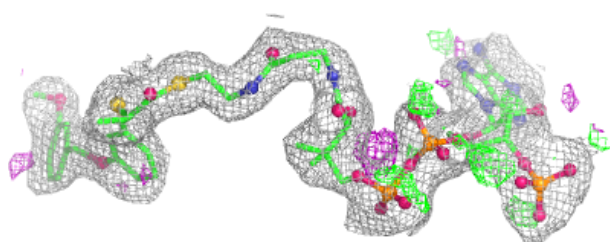
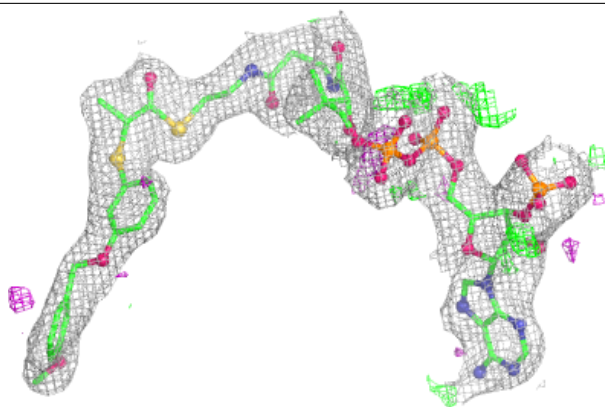
**Electron density around A1JJ7 H 401:**

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

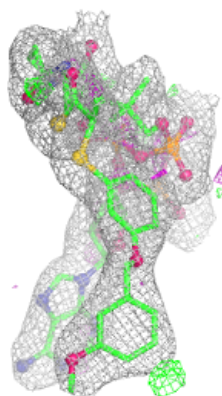
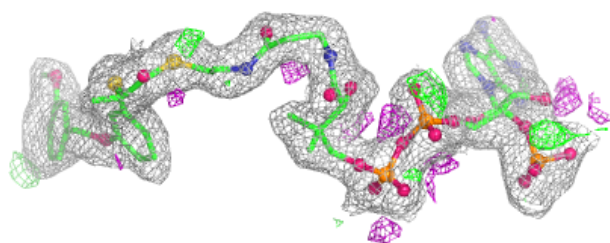
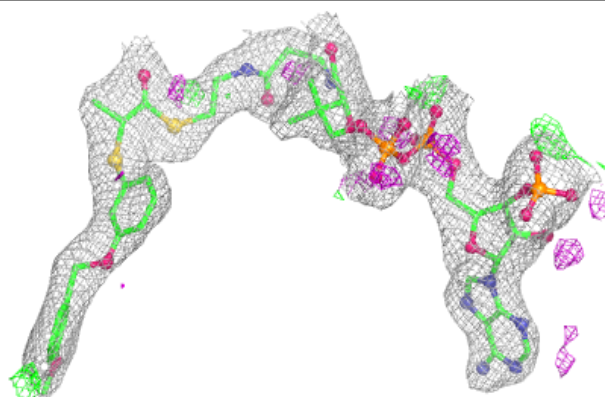


Electron density around A1JJ7 G 401:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

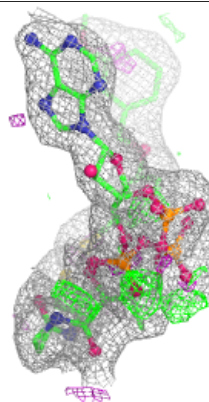
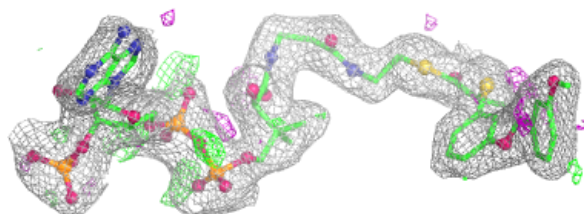
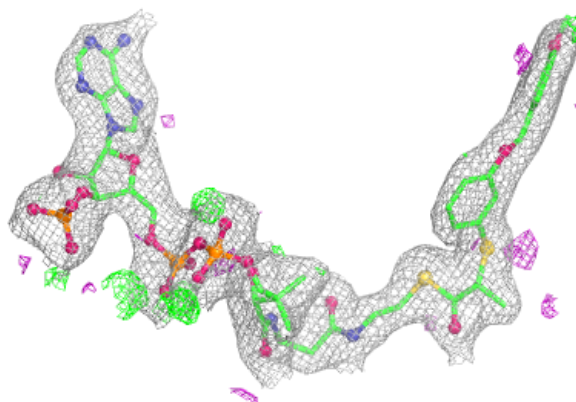
**Electron density around A1JJ7 C 401:**

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

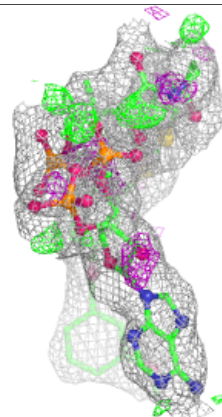
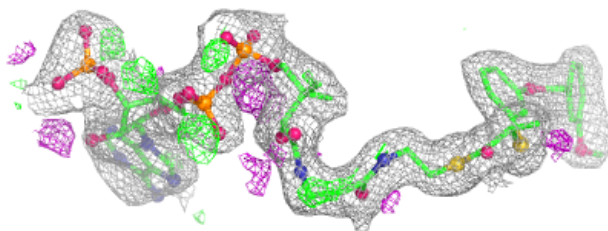
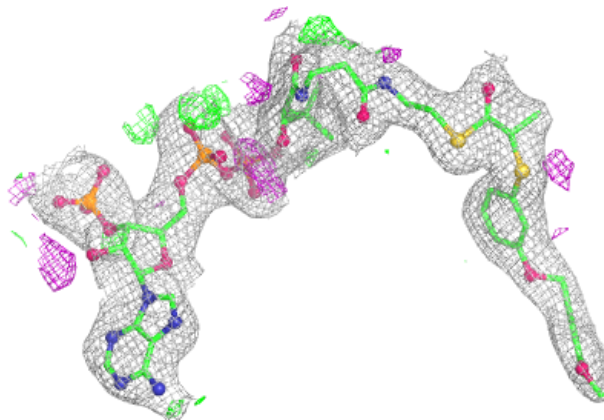


Electron density around A1JJ7 A 401:

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

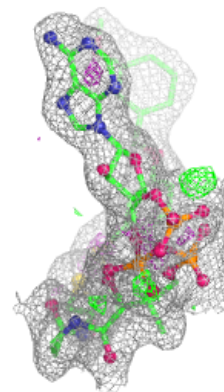
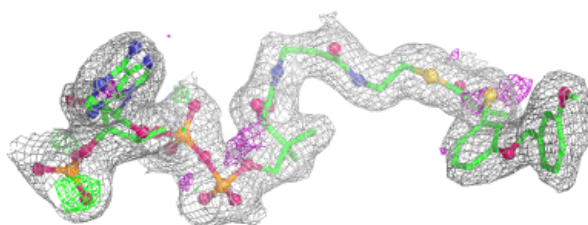
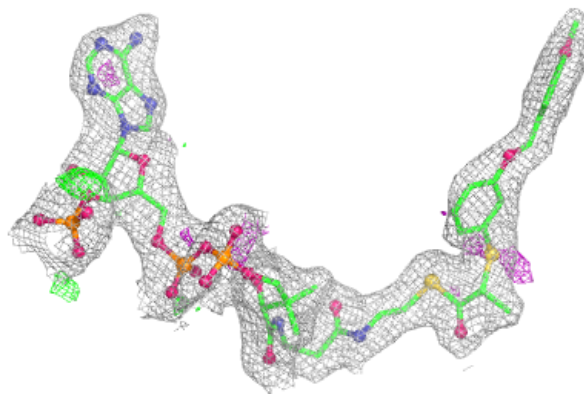
**Electron density around A1JJ7 F 401:**

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

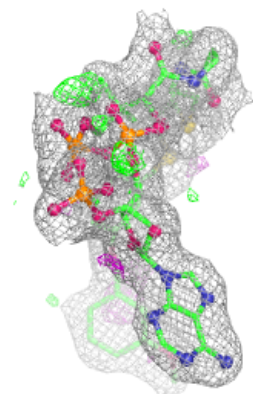
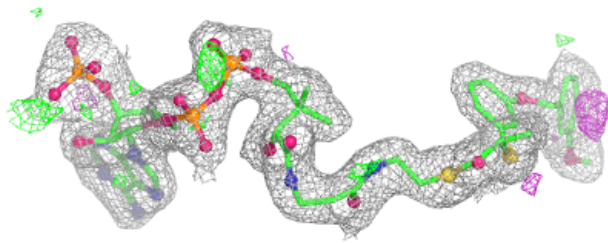
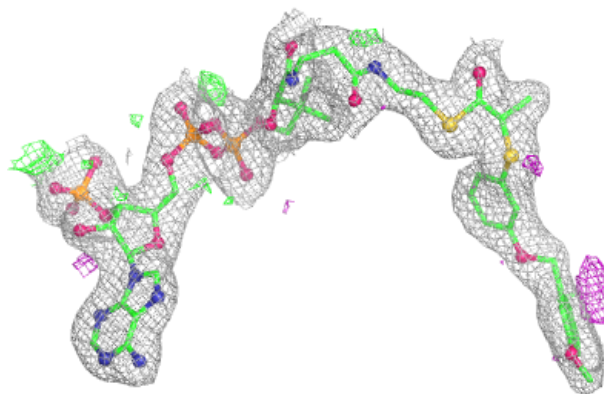


Electron density around A1JJ7 K 401:

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

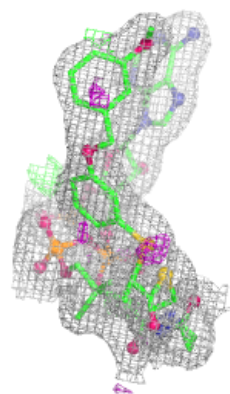
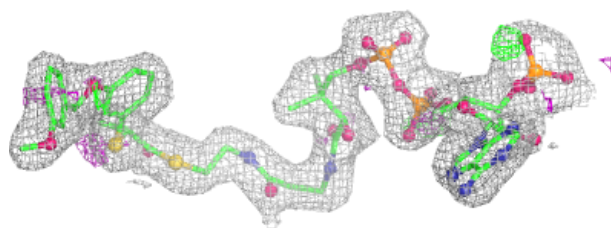
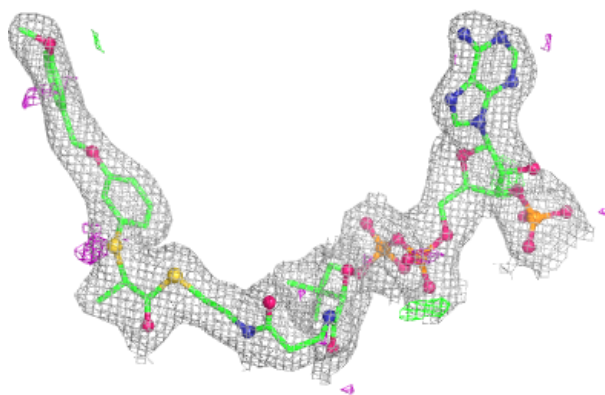
**Electron density around A1JJ7 I 401:**

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

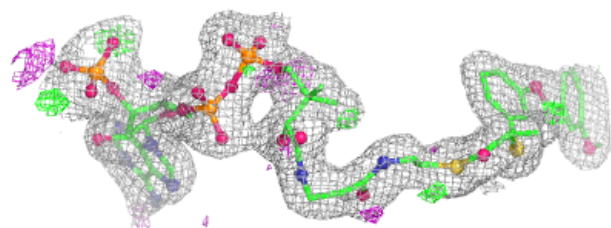
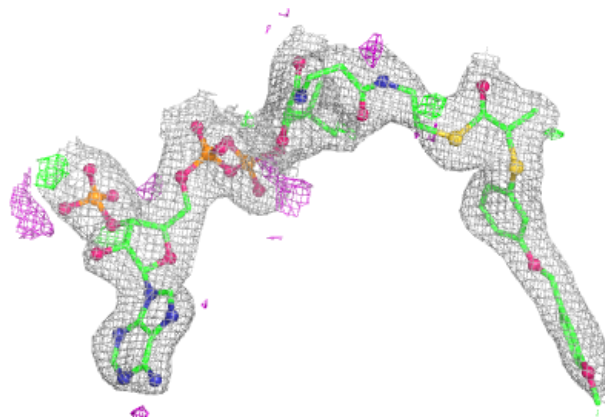


Electron density around A1JJ7 J 401:

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

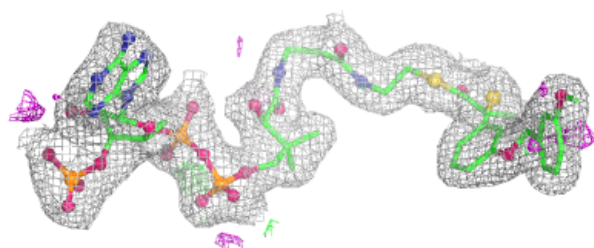
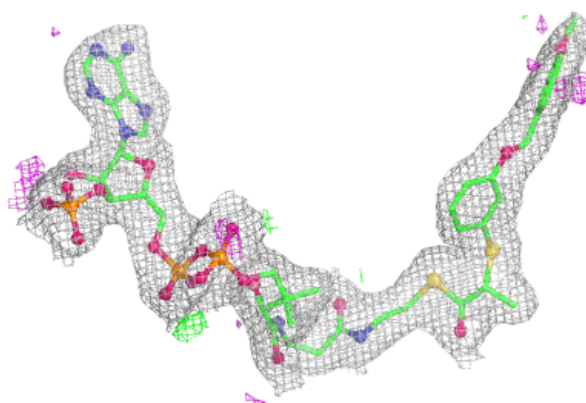
**Electron density around A1JJ7 B 401:**

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

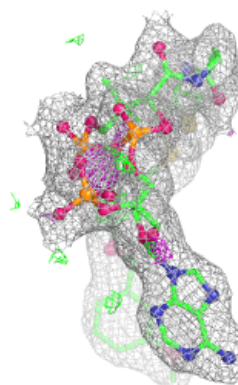
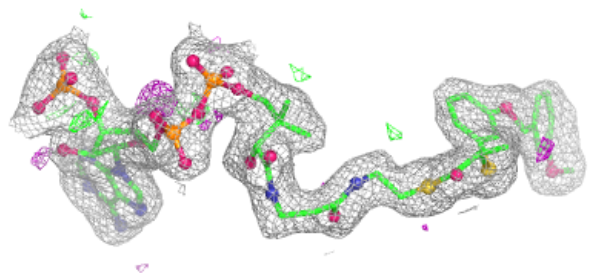
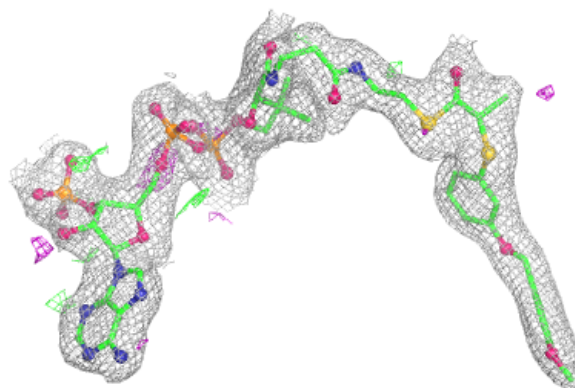


Electron density around A1JJ7 D 401:

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

**Electron density around A1JJ7 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 [i](#)

There are no such residues in this entry.