



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 09:01 PM UTC

PDB ID : 8W0L / pdb_00008w0l
Title : Crystal structure of Acetyl-CoA synthetase 2 from *Candida albicans* in complex with a propyne AMP ester inhibitor and CoA
Authors : Seattle Structural Genomics Center for Infectious Disease; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2024-02-13
Resolution : 2.75 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

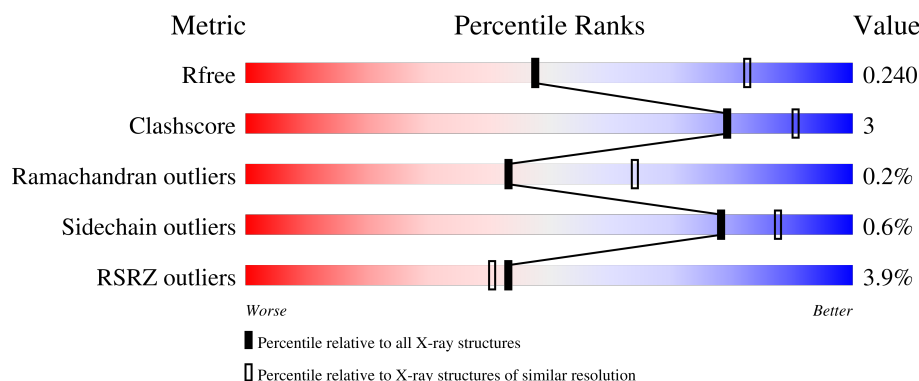
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.75 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	1009 (2.76-2.76)
Clashscore	190562	1044 (2.76-2.76)
Ramachandran outliers	187476	1024 (2.76-2.76)
Sidechain outliers	187428	1024 (2.76-2.76)
RSRZ outliers	180081	1009 (2.76-2.76)

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	686	<div> <div>0%</div> <div>90%</div> <div>7%</div> <div>.</div> </div>
1	B	686	<div> <div>6%</div> <div>81%</div> <div>6%</div> <div>12%</div> </div>
1	C	686	<div> <div>4%</div> <div>79%</div> <div>6%</div> <div>15%</div> </div>

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 14724 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 Acetyl-coenzyme A synthetase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	666	Total	C	N	O	S	0	0	0
			5153	3286	876	977	14			
1	B	604	Total	C	N	O	S	0	0	0
			4695	3004	796	882	13			
1	C	582	Total	C	N	O	S	0	0	0
			4527	2897	762	855	13			

There are 51 discrepancies between the modelled and reference sequences:

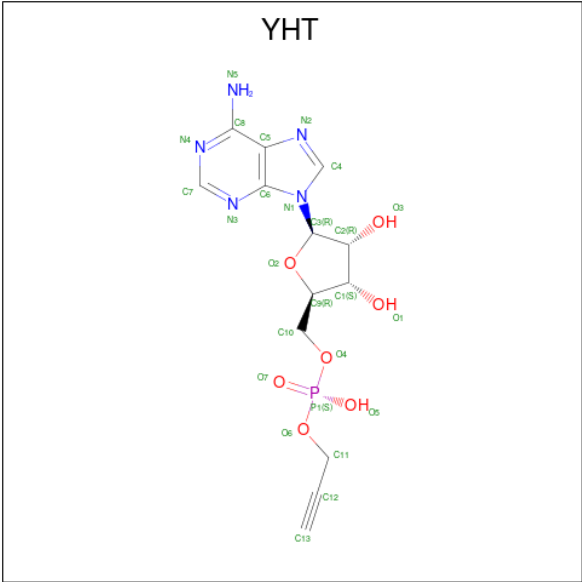
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP Q8NJJN3
A	2	HIS	-	expression tag	UNP Q8NJJN3
A	3	HIS	-	expression tag	UNP Q8NJJN3
A	4	HIS	-	expression tag	UNP Q8NJJN3
A	5	HIS	-	expression tag	UNP Q8NJJN3
A	6	HIS	-	expression tag	UNP Q8NJJN3
A	7	HIS	-	expression tag	UNP Q8NJJN3
A	8	HIS	-	expression tag	UNP Q8NJJN3
A	9	HIS	-	expression tag	UNP Q8NJJN3
A	10	GLU	-	expression tag	UNP Q8NJJN3
A	11	ASN	-	expression tag	UNP Q8NJJN3
A	12	LEU	-	expression tag	UNP Q8NJJN3
A	13	TYR	-	expression tag	UNP Q8NJJN3
A	14	PHE	-	expression tag	UNP Q8NJJN3
A	15	GLN	-	expression tag	UNP Q8NJJN3
A	16	GLY	-	expression tag	UNP Q8NJJN3
A	403	ALA	VAL	engineered mutation	UNP Q8NJJN3
B	1	MET	-	initiating methionine	UNP Q8NJJN3
B	2	HIS	-	expression tag	UNP Q8NJJN3
B	3	HIS	-	expression tag	UNP Q8NJJN3
B	4	HIS	-	expression tag	UNP Q8NJJN3
B	5	HIS	-	expression tag	UNP Q8NJJN3
B	6	HIS	-	expression tag	UNP Q8NJJN3

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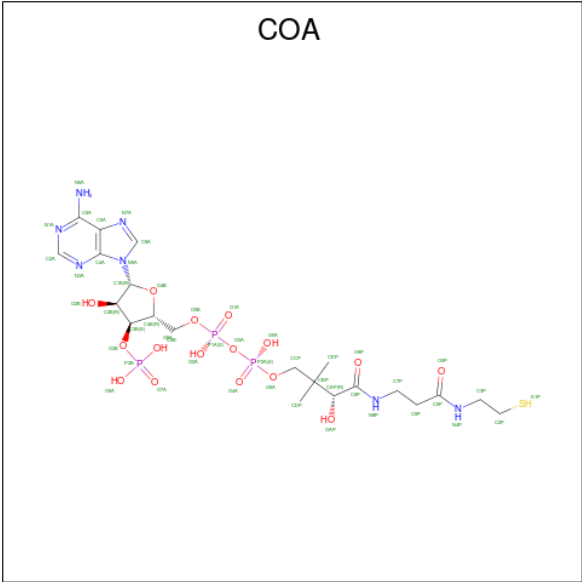
Chain	Residue	Modelled	Actual	Comment	Reference
B	7	HIS	-	expression tag	UNP Q8NJJ3
B	8	HIS	-	expression tag	UNP Q8NJJ3
B	9	HIS	-	expression tag	UNP Q8NJJ3
B	10	GLU	-	expression tag	UNP Q8NJJ3
B	11	ASN	-	expression tag	UNP Q8NJJ3
B	12	LEU	-	expression tag	UNP Q8NJJ3
B	13	TYR	-	expression tag	UNP Q8NJJ3
B	14	PHE	-	expression tag	UNP Q8NJJ3
B	15	GLN	-	expression tag	UNP Q8NJJ3
B	16	GLY	-	expression tag	UNP Q8NJJ3
B	403	ALA	VAL	engineered mutation	UNP Q8NJJ3
C	1	MET	-	initiating methionine	UNP Q8NJJ3
C	2	HIS	-	expression tag	UNP Q8NJJ3
C	3	HIS	-	expression tag	UNP Q8NJJ3
C	4	HIS	-	expression tag	UNP Q8NJJ3
C	5	HIS	-	expression tag	UNP Q8NJJ3
C	6	HIS	-	expression tag	UNP Q8NJJ3
C	7	HIS	-	expression tag	UNP Q8NJJ3
C	8	HIS	-	expression tag	UNP Q8NJJ3
C	9	HIS	-	expression tag	UNP Q8NJJ3
C	10	GLU	-	expression tag	UNP Q8NJJ3
C	11	ASN	-	expression tag	UNP Q8NJJ3
C	12	LEU	-	expression tag	UNP Q8NJJ3
C	13	TYR	-	expression tag	UNP Q8NJJ3
C	14	PHE	-	expression tag	UNP Q8NJJ3
C	15	GLN	-	expression tag	UNP Q8NJJ3
C	16	GLY	-	expression tag	UNP Q8NJJ3
C	403	ALA	VAL	engineered mutation	UNP Q8NJJ3

- Molecule 2 is 5'-O-[(S)-hydroxy[(prop-2-yn-1-yl)oxy]phosphoryl]adenosine (CCD ID: YHT) (formula: C₁₃H₁₆N₅O₇P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			26	13	5	7	1		
2	B	1	Total	C	N	O	P	0	0
			26	13	5	7	1		
2	C	1	Total	C	N	O	P	0	0
			26	13	5	7	1		

- Molecule 3 is COENZYME A (CCD ID: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$) (labeled as "Ligand of Interest" by depositor).



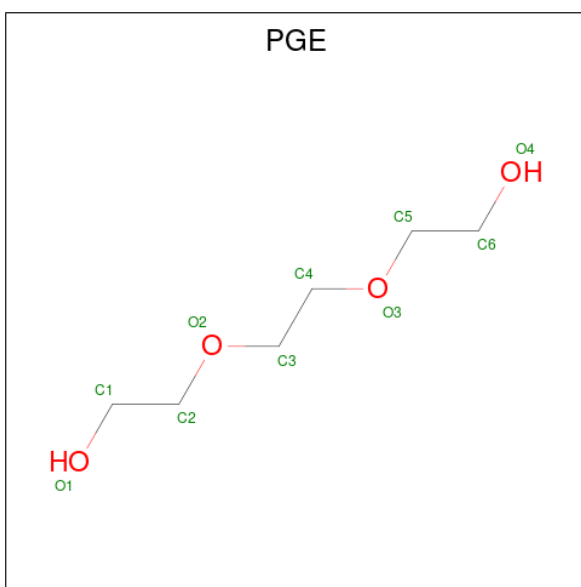
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	S	
			48	21	7	16	3	1	
3	C	1	Total	C	N	O	P		
			31	10	5	13	3		

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



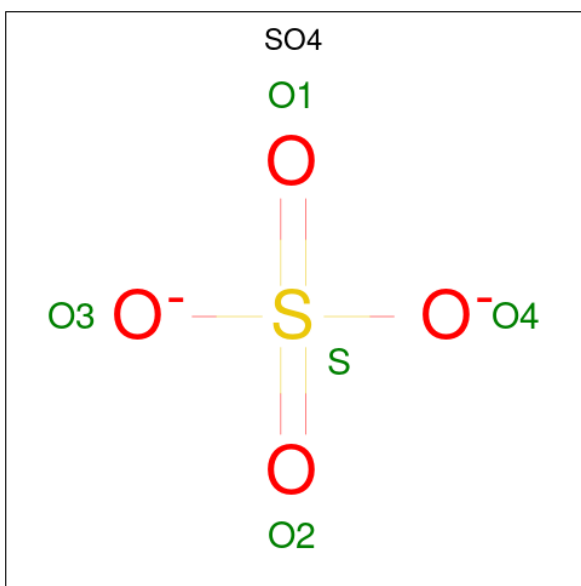
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O		
			6	3	3	0	0
4	A	1	Total	C	O		
			6	3	3	0	0
4	A	1	Total	C	O		
			6	3	3	0	0
4	B	1	Total	C	O		
			6	3	3	0	0

- Molecule 5 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			10	6	4		
5	B	1	Total	C	O	0	0
			10	6	4		

- Molecule 6 is SULFATE ION (CCD ID: SO₄) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	A	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	C	1	Total O S 5 4 1	0	0
6	C	1	Total O S 5 4 1	0	0
6	C	1	Total O S 5 4 1	0	0

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	2	Total Cl 2 2	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	39	Total O 39 39	0	0
8	B	27	Total O 27 27	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	139.18Å 139.18Å 543.69Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.62 – 2.75 48.62 – 2.75	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.62-2.75) 99.9 (48.62-2.75)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.14 (at 2.77Å)	Xtriage
Refinement program	PHENIX (dev_5233: ???)	Depositor
R, R_{free}	0.203 , 0.239 0.207 , 0.240	Depositor DCC
R_{free} test set	4109 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	65.8	Xtriage
Anisotropy	0.622	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 54.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14724	wwPDB-VP
Average B, all atoms (Å ²)	85.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.97% 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: GOL, SO4, YHT, COA, PGE, CL

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	0.36	0/5283	0.47	0/7186
1	B	0.31	0/4818	0.43	0/6557
1	C	0.25	0/4650	0.38	0/6333
All	All	0.31	0/14751	0.43	0/20076

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	5153	0	5027	29	0
1	B	4695	0	4560	30	0
1	C	4527	0	4383	20	0
2	A	26	0	0	0	0
2	B	26	0	0	0	0
2	C	26	0	0	0	0
3	A	48	0	32	0	0
3	C	31	0	11	0	0
4	A	18	0	24	2	0
4	B	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	10	0	14	0	0
5	B	10	0	14	0	0
6	A	40	0	0	0	0
6	B	25	0	0	0	0
6	C	15	0	0	0	0
7	B	2	0	0	0	0
8	A	39	0	0	0	0
8	B	27	0	0	0	0
All	All	14724	0	14073	78	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 3.

All (78) 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:B:479:ILE:O	1:B:495:VAL:HG22	1.82	0.79
1:B:574:VAL:HG13	1:B:595:VAL:HG23	1.76	0.67
1:B:25:VAL:HG22	1:B:535:ALA:HB1	1.78	0.66
1:A:106:LEU:HD11	1:A:308:THR:HG22	1.76	0.66
1:C:114:ASP:OD1	1:C:185:ARG:NH2	2.29	0.65
1:A:91:GLY:H	4:A:704:GOL:H2	1.62	0.64
1:B:479:ILE:HB	1:B:495:VAL:CG2	2.27	0.64
1:B:479:ILE:HB	1:B:495:VAL:HG23	1.79	0.64
1:A:493:GLU:OE1	1:A:545:ARG:NH1	2.32	0.63
1:C:106:LEU:HD11	1:C:308:THR:HG22	1.80	0.62
1:B:106:LEU:C	1:B:106:LEU:HD12	2.27	0.60
1:C:185:ARG:NH1	1:C:278:LEU:O	2.37	0.58
1:A:106:LEU:HD12	1:A:106:LEU:C	2.29	0.57
1:A:268:ASP:OD1	1:A:268:ASP:N	2.36	0.57
1:B:498:ILE:HD12	1:B:502:TRP:CH2	2.40	0.56
1:A:658:ASP:O	1:A:659:GLN:HB2	2.06	0.56
1:A:386:VAL:HG22	1:A:387:ALA:N	2.22	0.55
1:A:102:LEU:HD22	1:B:118:PHE:CZ	2.44	0.52
1:A:547:ARG:NH2	1:A:549:ASP:OD2	2.40	0.52
1:B:110:TYR:CD1	1:B:114:ASP:HB2	2.45	0.51
1:B:420:ILE:O	1:B:420:ILE:HG23	2.11	0.50
1:B:479:ILE:HD11	1:B:527:TYR:CD2	2.47	0.50
1:B:445:GLN:NE2	1:B:530:THR:O	2.42	0.50
1:A:605:ASP:O	1:A:606:SER:C	2.55	0.49
1:B:106:LEU:HD11	1:B:308:THR:HG22	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:467:ALA:O	1:B:468:SER:OG	2.30	0.49
1:C:580:VAL:HG22	1:C:581:GLY:H	1.78	0.48
1:A:640:ARG:NH2	1:A:664:SER:O	2.46	0.48
1:A:365:ALA:HB2	1:A:369:TYR:CE1	2.49	0.47
1:A:605:ASP:O	1:A:608:GLY:N	2.47	0.47
1:B:614:VAL:HG13	1:B:626:ALA:HB1	1.95	0.47
4:A:704:GOL:H12	1:B:121:PRO:HB3	1.97	0.47
1:C:218:ASP:OD1	1:C:219:GLU:N	2.46	0.47
1:A:447:GLU:HG2	1:A:520:TYR:CZ	2.50	0.47
1:C:420:ILE:O	1:C:420:ILE:HG23	2.15	0.47
1:B:574:VAL:HG13	1:B:595:VAL:CG2	2.42	0.47
1:B:422:PRO:O	1:B:426:GLU:HG2	2.14	0.46
1:A:330:ILE:HB	1:A:381:ALA:HA	1.97	0.46
1:A:106:LEU:HD11	1:A:308:THR:CG2	2.45	0.46
1:C:106:LEU:C	1:C:106:LEU:HD12	2.41	0.46
1:B:230:LYS:HE2	1:B:234:ASP:OD1	2.16	0.45
1:B:27:GLU:CD	1:B:545:ARG:HH11	2.24	0.45
1:C:505:MET:O	1:C:507:ARG:NH1	2.49	0.45
1:B:367:PRO:HD2	1:B:371:ARG:HD3	1.98	0.45
1:A:347:LEU:C	1:A:347:LEU:HD23	2.42	0.45
1:B:522:ASN:N	1:B:523:PRO:CD	2.80	0.45
1:B:607:GLU:O	1:B:611:LYS:HG2	2.17	0.45
1:A:143:ASP:OD1	1:A:146:ARG:NH2	2.50	0.44
1:C:158:TRP:CG	1:C:245:LYS:HD2	2.53	0.44
1:B:169:TYR:CE2	1:B:229:ILE:HG23	2.52	0.44
1:B:268:ASP:N	1:B:268:ASP:OD1	2.49	0.44
1:C:438:HIS:CD2	1:C:457:ALA:HA	2.53	0.44
1:A:522:ASN:N	1:A:523:PRO:CD	2.80	0.44
1:A:25:VAL:HG22	1:A:535:ALA:HB1	2.00	0.43
1:A:647:ARG:O	1:A:651:LYS:HG2	2.18	0.43
1:A:294:THR:HG21	1:A:558:ARG:CZ	2.48	0.43
1:A:555:SER:OG	1:A:587:THR:HG22	2.18	0.43
1:B:194:PHE:HB3	1:B:197:PHE:CD2	2.53	0.43
1:C:430:GLU:O	1:C:434:LYS:HA	2.19	0.43
1:C:133:GLU:OE1	1:C:374:GLN:NE2	2.52	0.42
1:C:532:ASP:OD1	1:C:547:ARG:HD2	2.19	0.42
1:C:558:ARG:C	1:C:559:LEU:HD12	2.44	0.42
1:A:521:MET:HE2	1:A:521:MET:HA	1.99	0.42
1:C:582:ILE:O	1:C:589:GLN:NE2	2.52	0.42
1:A:420:ILE:O	1:A:420:ILE:HG23	2.20	0.42
1:A:230:LYS:HE2	1:A:234:ASP:OD1	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:418:GLU:HB2	1:A:419:PRO:HD2	2.01	0.42
1:B:169:TYR:CD2	1:B:229:ILE:HG23	2.54	0.42
1:B:418:GLU:HB2	1:B:419:PRO:HD2	2.02	0.42
1:B:505:MET:O	1:B:507:ARG:NH1	2.53	0.42
1:B:416:VAL:HG23	1:B:444:TRP:HE1	1.85	0.41
1:C:522:ASN:N	1:C:523:PRO:CD	2.83	0.41
1:A:438:HIS:CD2	1:A:457:ALA:HA	2.55	0.41
1:C:386:VAL:HG22	1:C:387:ALA:N	2.35	0.41
1:A:169:TYR:CZ	1:A:202:ILE:HD11	2.55	0.41
1:C:440:SER:HA	1:C:455:PRO:HG2	2.02	0.41
1:C:128:CYS:SG	1:C:174:ALA:HB2	2.61	0.40
1:C:447:GLU:HG2	1:C:520:TYR:CZ	2.56	0.40

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	664/686 (97%)	644 (97%)	19 (3%)	1 (0%)	43	64
1	B	596/686 (87%)	583 (98%)	12 (2%)	1 (0%)	43	64
1	C	578/686 (84%)	561 (97%)	16 (3%)	1 (0%)	43	64
All	All	1838/2058 (89%)	1788 (97%)	47 (3%)	3 (0%)	43	64

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	606	SER
1	C	468	SER
1	B	468	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	542/568 (95%)	541 (100%)	1 (0%)	87	95
1	B	492/568 (87%)	490 (100%)	2 (0%)	84	91
1	C	476/568 (84%)	470 (99%)	6 (1%)	61	76
All	All	1510/1704 (89%)	1501 (99%)	9 (1%)	78	88

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	120	ASN
1	B	120	ASN
1	B	545	ARG
1	C	120	ASN
1	C	261	GLU
1	C	295	SER
1	C	297	SER
1	C	302	LYS
1	C	363	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	GLN
1	A	137	HIS
1	A	156	GLN
1	A	429	ASN
1	A	557	HIS
1	A	659	GLN
1	B	46	ASN
1	B	95	ASN
1	B	156	GLN
1	B	583	HIS
1	B	589	GLN
1	C	137	HIS

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Mol	Chain	Res	Type
1	C	156	GLN
1	C	374	GLN
1	C	462	ASN
1	C	589	GLN

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](#)

Of 29 ligands modelled in this entry, 2 are monoatomic - leaving 27 for Mogul analysis.

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	$\# Z > 2$
3	COA	C	702	-	32,33,50	0.62	0	50,52,75	0.99	2 (4%)
2	YHT	A	701	-	27,28,28	0.34	0	38,41,41	0.64	0
6	SO4	C	703	-	4,4,4	0.71	0	6,6,6	0.17	0
4	GOL	A	704	-	5,5,5	0.34	0	5,5,5	0.72	0
6	SO4	B	710	-	4,4,4	0.74	0	6,6,6	0.39	0
2	YHT	B	701	-	27,28,28	0.37	0	38,41,41	0.41	0
6	SO4	B	709	-	4,4,4	0.85	0	6,6,6	0.64	0
6	SO4	A	714	-	4,4,4	0.71	0	6,6,6	0.46	0
5	PGE	B	703	-	9,9,9	0.34	0	8,8,8	0.48	0
6	SO4	B	708	-	4,4,4	0.74	0	6,6,6	0.14	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	SO4	A	708	-	4,4,4	0.81	0	6,6,6	0.42	0
6	SO4	A	711	-	4,4,4	0.80	0	6,6,6	0.50	0
6	SO4	B	706	-	4,4,4	0.76	0	6,6,6	0.44	0
5	PGE	A	706	-	9,9,9	0.35	0	8,8,8	0.61	0
4	GOL	A	705	-	5,5,5	0.34	0	5,5,5	0.26	0
6	SO4	B	707	-	4,4,4	0.78	0	6,6,6	0.26	0
6	SO4	C	704	-	4,4,4	0.74	0	6,6,6	0.27	0
6	SO4	A	710	-	4,4,4	0.74	0	6,6,6	0.35	0
6	SO4	A	712	-	4,4,4	0.88	0	6,6,6	0.46	0
6	SO4	A	713	-	4,4,4	0.70	0	6,6,6	0.16	0
6	SO4	A	707	-	4,4,4	0.76	0	6,6,6	0.32	0
4	GOL	A	703	-	5,5,5	0.35	0	5,5,5	0.30	0
6	SO4	A	709	-	4,4,4	0.76	0	6,6,6	0.49	0
4	GOL	B	702	-	5,5,5	0.21	0	5,5,5	0.52	0
2	YHT	C	701	-	27,28,28	0.37	0	38,41,41	0.37	0
3	COA	A	702	-	47,50,50	0.48	0	69,75,75	0.77	1 (1%)
6	SO4	C	705	-	4,4,4	0.67	0	6,6,6	0.20	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	705	-	-	4/4/4/4	-
5	PGE	B	703	-	-	2/7/7/7	-
3	COA	C	702	-	-	1/21/37/64	0/3/3/3
2	YHT	A	701	-	-	3/15/31/31	0/3/3/3
4	GOL	B	702	-	-	2/4/4/4	-
4	GOL	A	704	-	-	1/4/4/4	-
2	YHT	C	701	-	-	1/15/31/31	0/3/3/3
2	YHT	B	701	-	-	1/15/31/31	0/3/3/3
3	COA	A	702	-	-	12/48/64/64	0/3/3/3
4	GOL	A	703	-	-	4/4/4/4	-
5	PGE	A	706	-	-	3/7/7/7	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	702	COA	P3B-O3B-C3B	-5.48	108.79	123.43
3	A	702	COA	P3B-O3B-C3B	-4.51	111.39	123.43
3	C	702	COA	O5A-P2A-O4A	2.07	118.91	110.83

There are no chirality outliers.

All (34) torsion outliers are listed below:

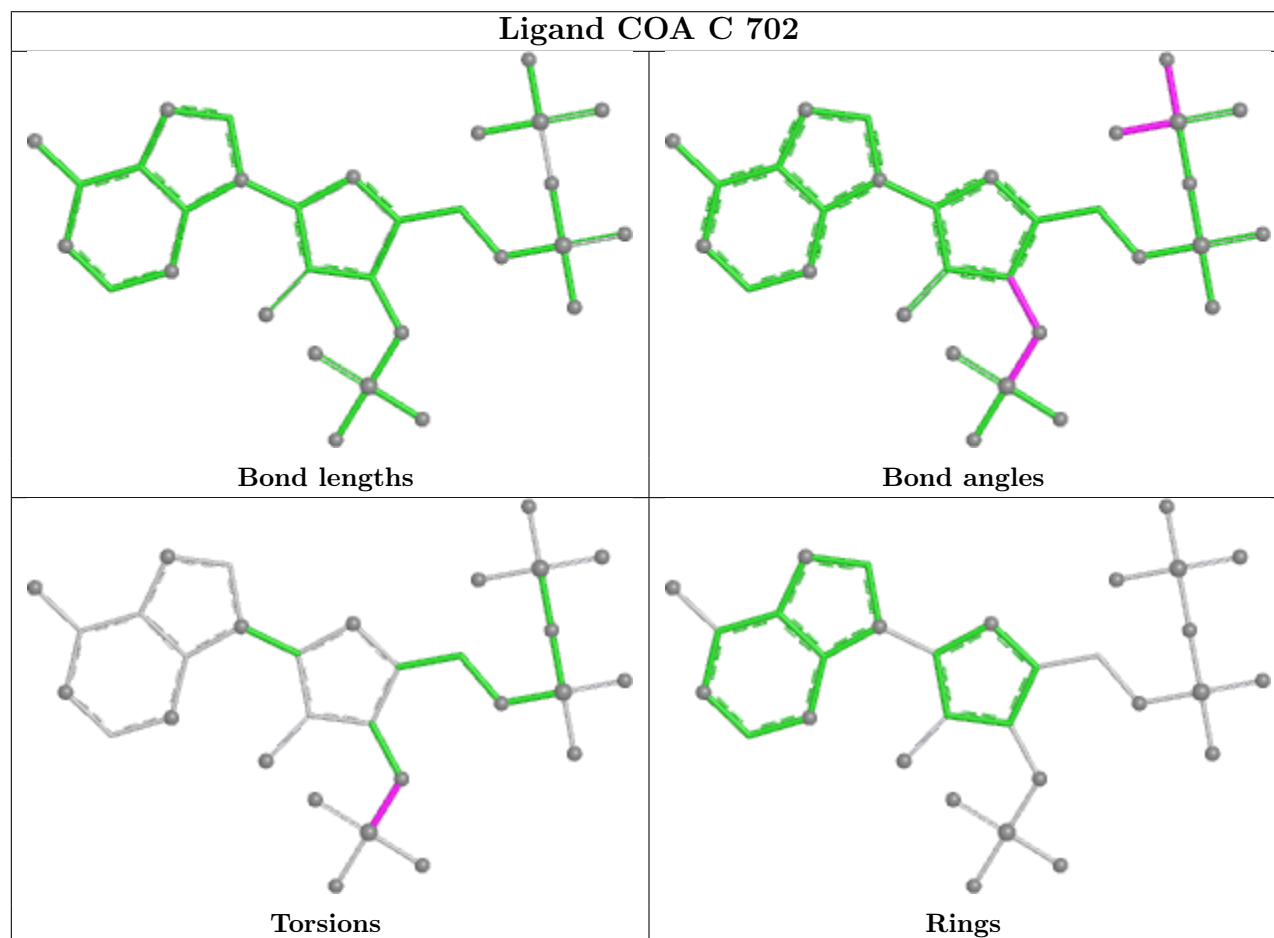
Mol	Chain	Res	Type	Atoms
2	A	701	YHT	C11-O6-P1-O7
2	C	701	YHT	O6-C11-C12-C13
3	A	702	COA	CDP-CBP-CCP-O6A
3	A	702	COA	CEP-CBP-CCP-O6A
3	A	702	COA	CAP-CBP-CCP-O6A
3	A	702	COA	CAP-C9P-N8P-C7P
4	A	703	GOL	O1-C1-C2-O2
4	A	703	GOL	O1-C1-C2-C3
4	A	705	GOL	C1-C2-C3-O3
4	B	702	GOL	O1-C1-C2-C3
3	A	702	COA	O9P-C9P-N8P-C7P
5	A	706	PGE	O2-C3-C4-O3
5	A	706	PGE	O3-C5-C6-O4
5	B	703	PGE	O3-C5-C6-O4
4	A	705	GOL	O1-C1-C2-C3
4	A	705	GOL	O2-C2-C3-O3
4	B	702	GOL	O1-C1-C2-O2
4	A	703	GOL	O2-C2-C3-O3
4	A	704	GOL	O2-C2-C3-O3
3	A	702	COA	C5P-C6P-C7P-N8P
5	A	706	PGE	C4-C3-O2-C2
5	B	703	PGE	O2-C3-C4-O3
3	A	702	COA	CCP-O6A-P2A-O4A
4	A	705	GOL	O1-C1-C2-O2
3	A	702	COA	C3B-O3B-P3B-O8A
2	A	701	YHT	O4-C10-C9-C1
3	A	702	COA	P2A-O3A-P1A-O1A
4	A	703	GOL	C1-C2-C3-O3
3	A	702	COA	O5P-C5P-C6P-C7P
3	A	702	COA	OAP-CAP-CBP-CDP
2	B	701	YHT	O4-C10-C9-C1
2	A	701	YHT	O6-C11-C12-C13
3	C	702	COA	C3B-O3B-P3B-O7A
3	A	702	COA	P2A-O3A-P1A-O2A

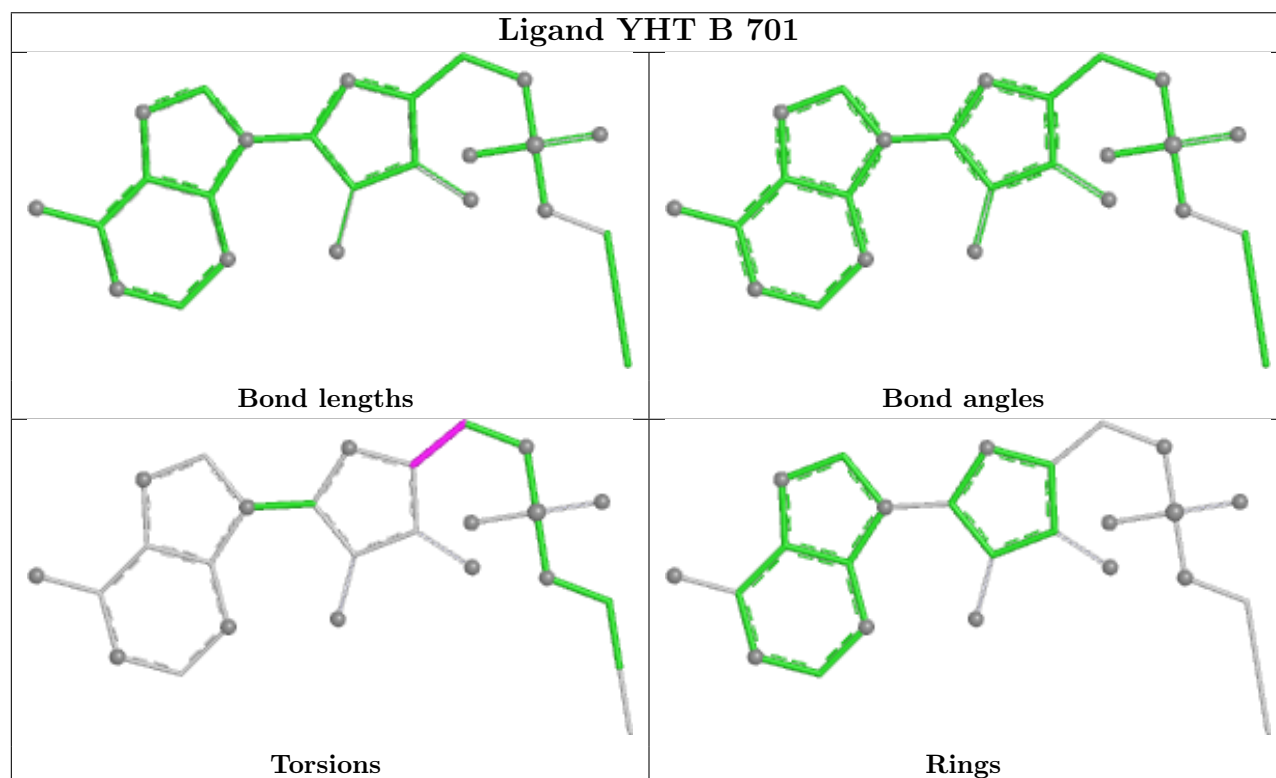
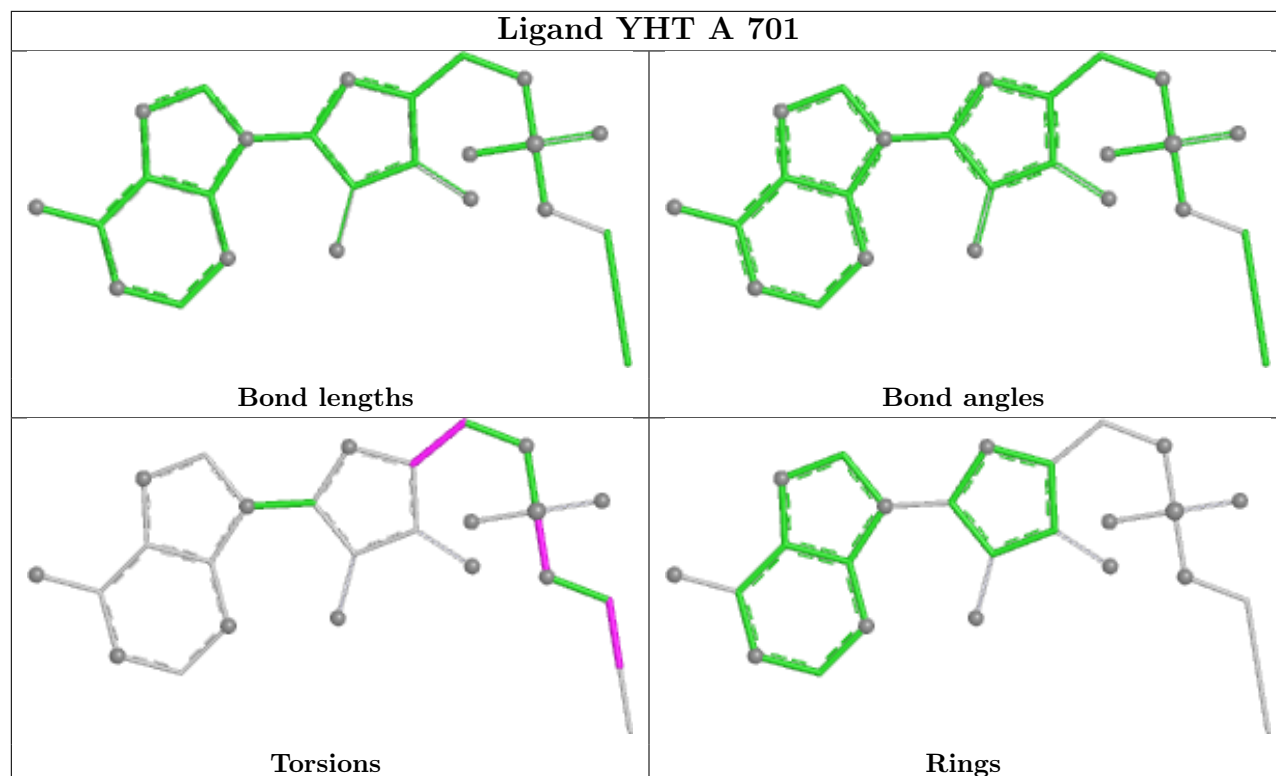
There are no ring outliers.

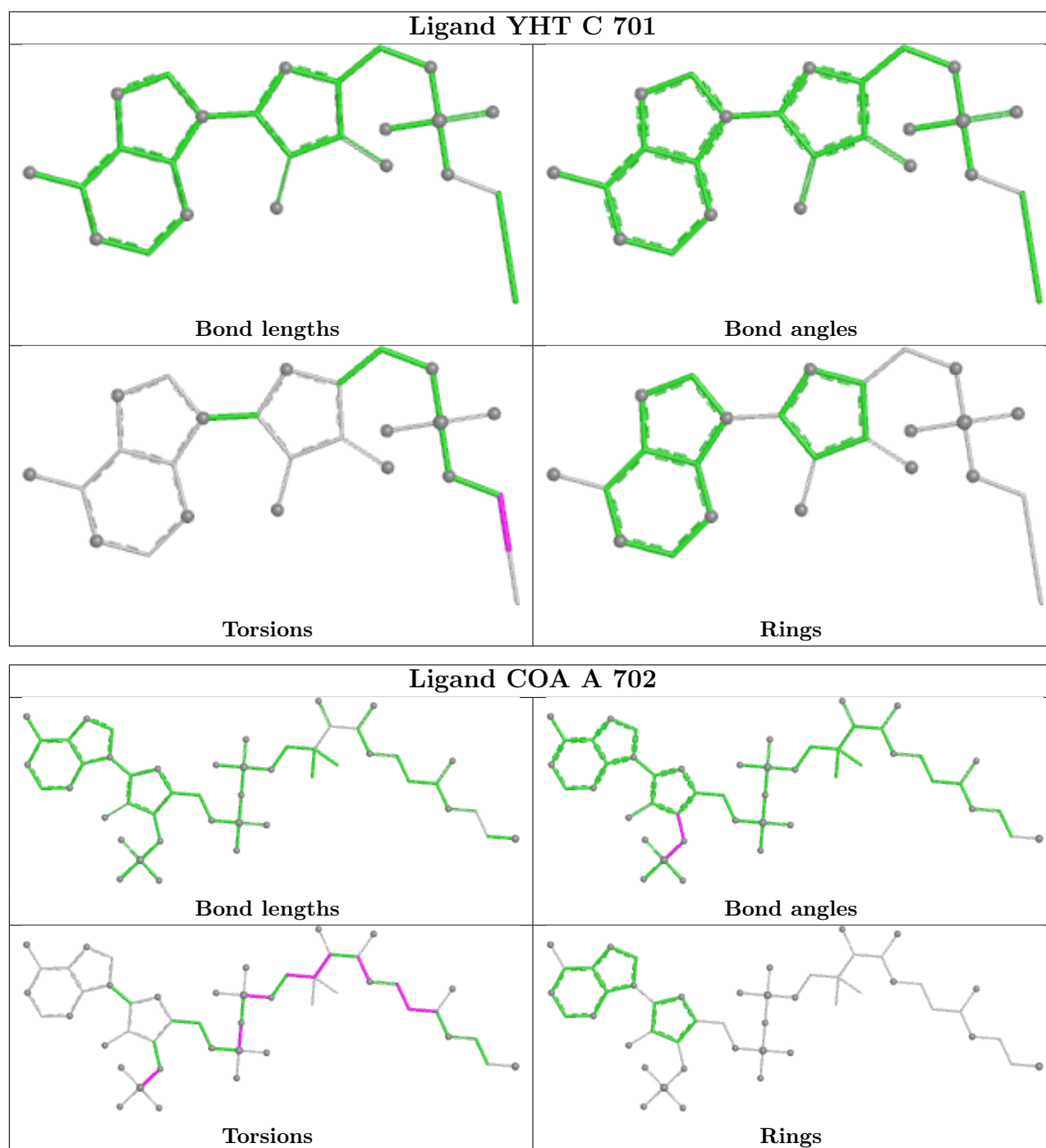
1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	704	GOL	2	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.







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	666/686 (97%)	-0.14	10 (1%) 72 71	49, 68, 99, 195	0
1	B	604/686 (88%)	0.11	38 (6%) 26 26	51, 72, 146, 199	0
1	C	582/686 (84%)	0.33	25 (4%) 40 38	65, 100, 151, 186	0
All	All	1852/2058 (89%)	0.09	73 (3%) 43 40	49, 77, 143, 199	0

All (73) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	630	VAL	4.7
1	B	295	SER	4.2
1	B	552	VAL	4.1
1	B	588	GLY	4.0
1	C	20	GLN	4.0
1	B	591	VAL	3.9
1	C	57	LYS	3.8
1	B	623	PRO	3.7
1	B	595	VAL	3.7
1	B	400	GLN	3.7
1	C	563	GLU	3.6
1	A	604	GLU	3.5
1	C	579	VAL	3.5
1	A	602	SER	3.5
1	B	568	LEU	3.5
1	C	568	LEU	3.4
1	C	552	VAL	3.4
1	A	20	GLN	3.3
1	A	601	ASN	3.3
1	B	564	ILE	3.3
1	B	649	LEU	3.3
1	B	583	HIS	3.3
1	C	564	ILE	3.3

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Mol	Chain	Res	Type	RSRZ
1	C	615	LEU	3.1
1	B	587	THR	3.0
1	C	586	ILE	3.0
1	B	652	VAL	3.0
1	B	20	GLN	3.0
1	A	298	THR	2.9
1	A	297	SER	2.9
1	B	586	ILE	2.8
1	C	580	VAL	2.7
1	C	554	VAL	2.7
1	B	651	LYS	2.7
1	B	550	ASP	2.7
1	B	613	LEU	2.7
1	B	615	LEU	2.7
1	C	577	ALA	2.7
1	C	613	LEU	2.6
1	C	556	GLY	2.6
1	C	301	PRO	2.6
1	C	624	PHE	2.6
1	A	600	GLY	2.5
1	B	653	SER	2.5
1	C	548	VAL	2.5
1	B	619	LYS	2.5
1	B	553	ASN	2.4
1	B	584	ASP	2.4
1	B	617	VAL	2.4
1	B	607	GLU	2.3
1	A	233	CYS	2.3
1	B	592	ILE	2.3
1	A	603	ASP	2.3
1	B	462	ASN	2.3
1	B	554	VAL	2.3
1	C	51	HIS	2.3
1	B	629	SER	2.3
1	B	551	VAL	2.3
1	C	569	ILE	2.2
1	C	614	VAL	2.2
1	C	562	ALA	2.1
1	C	620	THR	2.1
1	B	582	ILE	2.1
1	B	589	GLN	2.1
1	B	559	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	557	HIS	2.1
1	B	621	ILE	2.1
1	C	617	VAL	2.1
1	B	562	ALA	2.0
1	B	620	THR	2.0
1	C	623	PRO	2.0
1	B	572	LYS	2.0
1	A	609	LEU	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(Å ²)	Q<0.9
3	COA	C	702	31/48	0.32	0.15	134,159,166,170	0
6	SO4	B	707	5/5	0.42	0.13	91,104,126,132	0
6	SO4	A	714	5/5	0.44	0.14	104,107,119,128	0
6	SO4	C	704	5/5	0.47	0.14	110,115,117,129	0
6	SO4	B	710	5/5	0.50	0.16	117,125,136,140	0
6	SO4	B	708	5/5	0.51	0.13	113,116,135,140	0
6	SO4	C	705	5/5	0.53	0.11	103,112,116,122	0
6	SO4	B	706	5/5	0.54	0.14	108,108,132,134	0
6	SO4	C	703	5/5	0.63	0.11	141,146,152,156	0
6	SO4	B	709	5/5	0.70	0.15	72,84,101,120	0
4	GOL	A	703	6/6	0.74	0.30	74,76,82,83	0
3	COA	A	702	48/48	0.77	0.15	79,95,110,118	0
6	SO4	A	713	5/5	0.79	0.08	121,121,128,132	0
5	PGE	A	706	10/10	0.79	0.22	73,85,93,95	0
6	SO4	A	708	5/5	0.83	0.20	70,76,89,90	0

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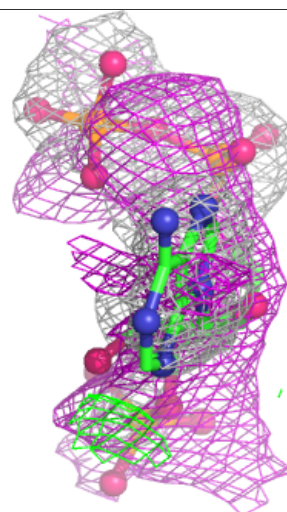
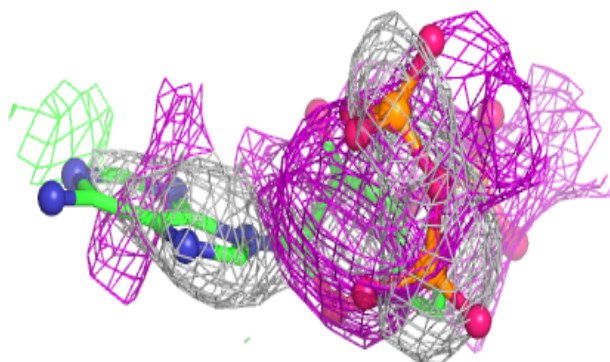
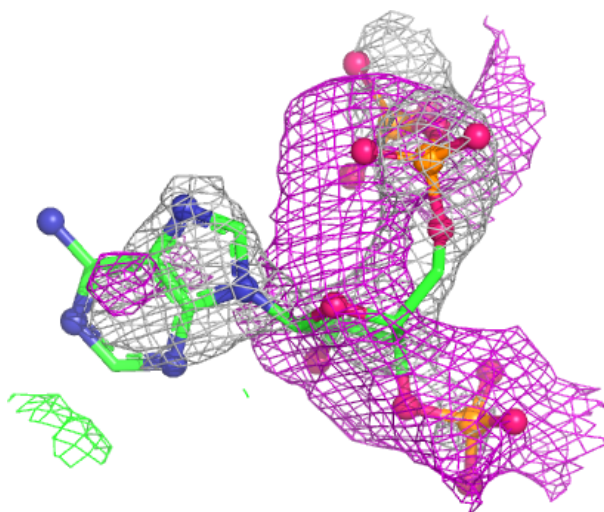
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	SO4	A	712	5/5	0.83	0.30	88,90,110,116	0
6	SO4	A	710	5/5	0.84	0.16	81,85,94,98	0
6	SO4	A	709	5/5	0.84	0.15	80,87,105,110	0
7	CL	B	705	1/1	0.84	0.19	103,103,103,103	0
4	GOL	A	705	6/6	0.85	0.19	71,86,92,94	0
7	CL	B	704	1/1	0.86	0.17	121,121,121,121	0
4	GOL	B	702	6/6	0.87	0.17	83,87,94,96	0
2	YHT	C	701	26/26	0.87	0.14	92,106,108,110	0
6	SO4	A	711	5/5	0.88	0.17	78,84,94,103	0
6	SO4	A	707	5/5	0.89	0.11	86,90,99,102	0
4	GOL	A	704	6/6	0.90	0.15	66,74,76,79	0
5	PGE	B	703	10/10	0.90	0.15	83,92,97,98	0
2	YHT	B	701	26/26	0.95	0.09	61,69,72,75	0
2	YHT	A	701	26/26	0.97	0.08	54,58,66,68	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.

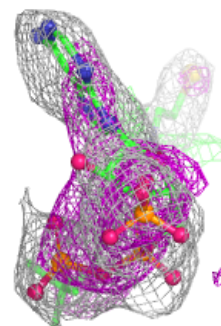
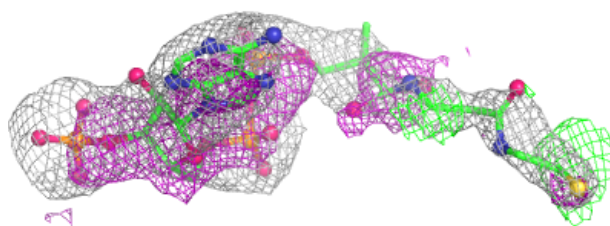
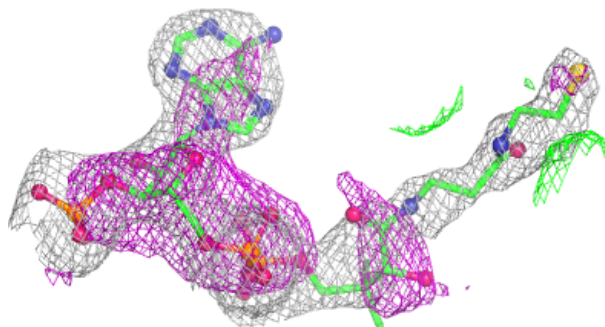
Electron density around COA C 702:

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

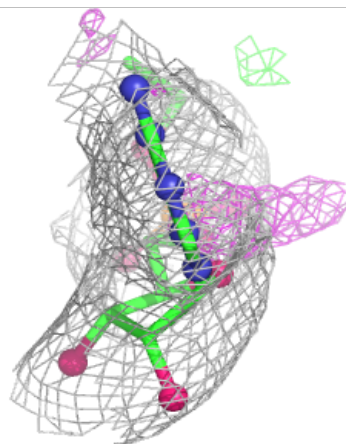
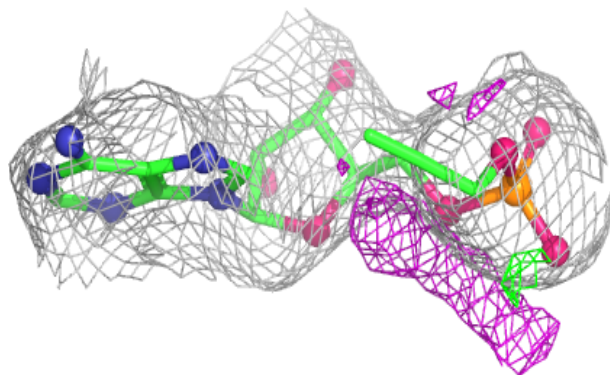
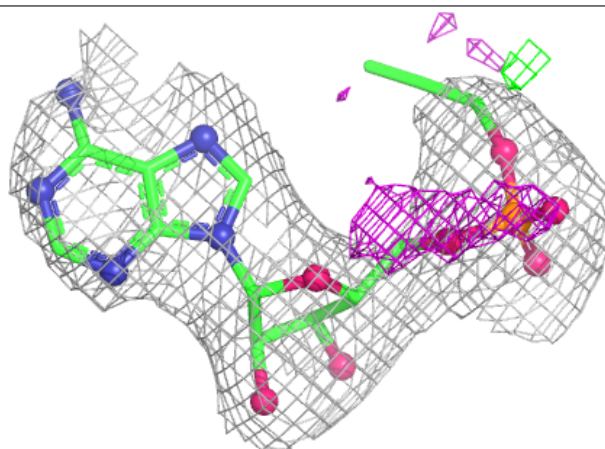


Electron density around COA A 702:

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

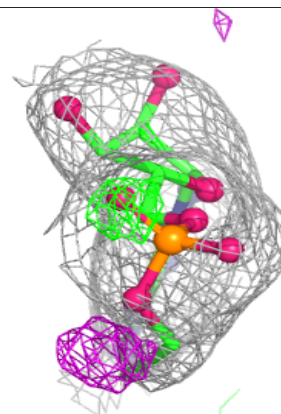
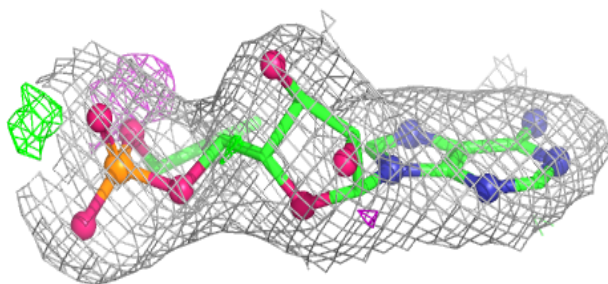
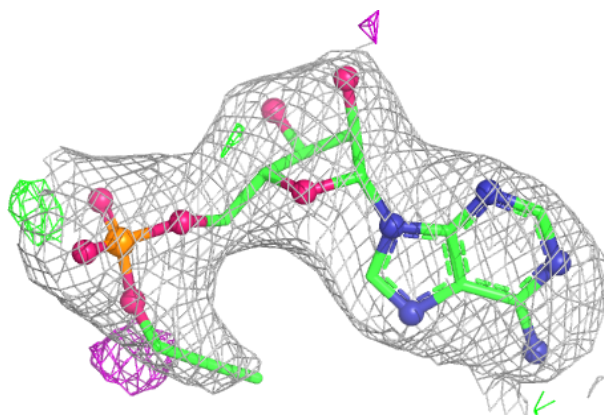
**Electron density around YHT C 701:**

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

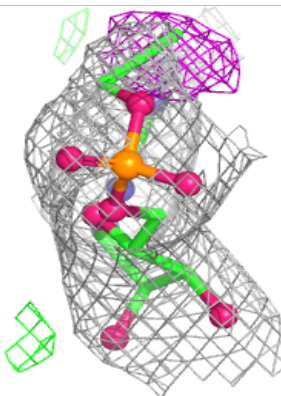
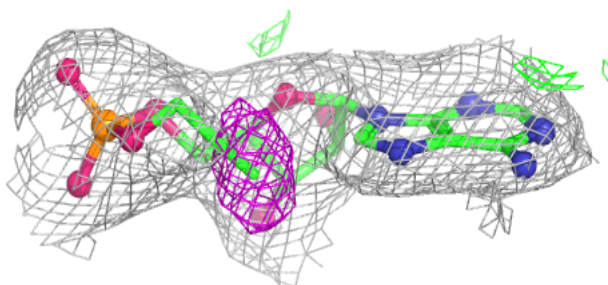
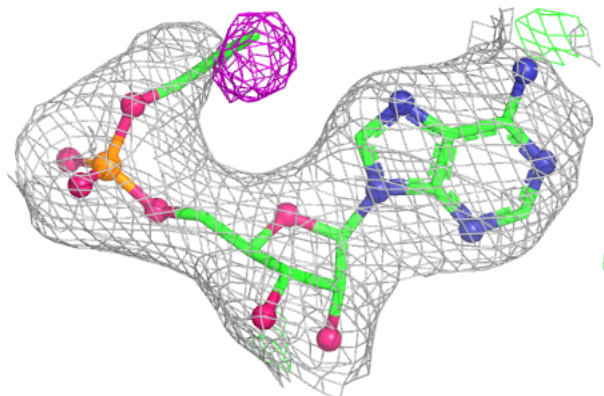


Electron density around YHT B 701:

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

**Electron density around YHT A 701:**

$2mF_o-DF_c$ (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.