Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2023 – 12:04 AM EST

PDB ID	:	8G0S
Title	:	Crystal Structure of Acetyl-CoA synthetase in complex with a cyclopentyl ester AMP inhibitor from Cryptococcus neoformans H99 (tetragonal form)
Authors	:	Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on	:	2023-02-01
Resolution	:	2.90 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:

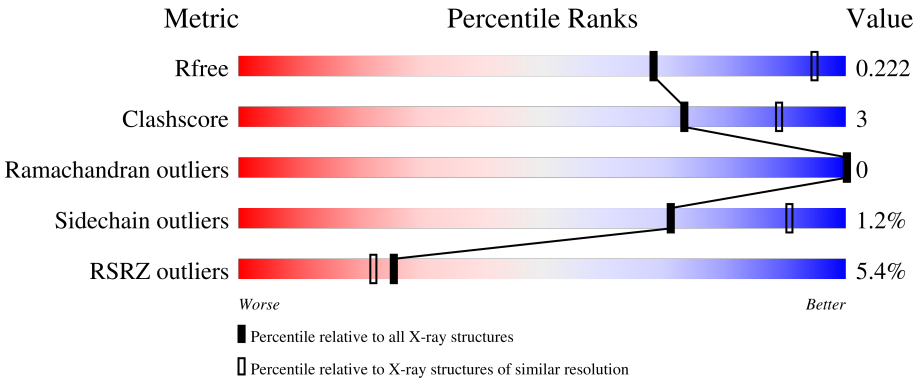
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.32.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.32.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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	694	4% 85% 9% 6%
1	B	694	5% 66% 8% 26%
1	C	694	5% 84% 9% 7%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 14194 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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	655	Total	C	N	O	S	0	2	0
			5081	3246	857	951	27			
1	B	515	Total	C	N	O	S	0	2	0
			4076	2611	692	749	24			
1	C	648	Total	C	N	O	S	0	0	0
			4948	3164	835	923	26			

There are 45 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	initiating methionine	UNP A0A854QMN0
A	-12	HIS	-	expression tag	UNP A0A854QMN0
A	-11	HIS	-	expression tag	UNP A0A854QMN0
A	-10	HIS	-	expression tag	UNP A0A854QMN0
A	-9	HIS	-	expression tag	UNP A0A854QMN0
A	-8	HIS	-	expression tag	UNP A0A854QMN0
A	-7	HIS	-	expression tag	UNP A0A854QMN0
A	-6	HIS	-	expression tag	UNP A0A854QMN0
A	-5	HIS	-	expression tag	UNP A0A854QMN0
A	-4	GLU	-	expression tag	UNP A0A854QMN0
A	-3	ASN	-	expression tag	UNP A0A854QMN0
A	-2	LEU	-	expression tag	UNP A0A854QMN0
A	-1	TYR	-	expression tag	UNP A0A854QMN0
A	0	PHE	-	expression tag	UNP A0A854QMN0
A	1	GLN	-	expression tag	UNP A0A854QMN0
B	-13	MET	-	initiating methionine	UNP A0A854QMN0
B	-12	HIS	-	expression tag	UNP A0A854QMN0
B	-11	HIS	-	expression tag	UNP A0A854QMN0
B	-10	HIS	-	expression tag	UNP A0A854QMN0
B	-9	HIS	-	expression tag	UNP A0A854QMN0
B	-8	HIS	-	expression tag	UNP A0A854QMN0
B	-7	HIS	-	expression tag	UNP A0A854QMN0
B	-6	HIS	-	expression tag	UNP A0A854QMN0

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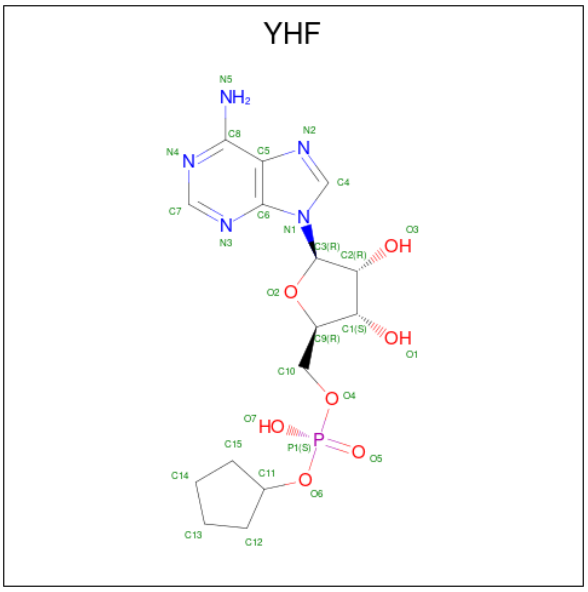
Chain	Residue	Modelled	Actual	Comment	Reference
B	-5	HIS	-	expression tag	UNP A0A854QMN0
B	-4	GLU	-	expression tag	UNP A0A854QMN0
B	-3	ASN	-	expression tag	UNP A0A854QMN0
B	-2	LEU	-	expression tag	UNP A0A854QMN0
B	-1	TYR	-	expression tag	UNP A0A854QMN0
B	0	PHE	-	expression tag	UNP A0A854QMN0
B	1	GLN	-	expression tag	UNP A0A854QMN0
C	-13	MET	-	initiating methionine	UNP A0A854QMN0
C	-12	HIS	-	expression tag	UNP A0A854QMN0
C	-11	HIS	-	expression tag	UNP A0A854QMN0
C	-10	HIS	-	expression tag	UNP A0A854QMN0
C	-9	HIS	-	expression tag	UNP A0A854QMN0
C	-8	HIS	-	expression tag	UNP A0A854QMN0
C	-7	HIS	-	expression tag	UNP A0A854QMN0
C	-6	HIS	-	expression tag	UNP A0A854QMN0
C	-5	HIS	-	expression tag	UNP A0A854QMN0
C	-4	GLU	-	expression tag	UNP A0A854QMN0
C	-3	ASN	-	expression tag	UNP A0A854QMN0
C	-2	LEU	-	expression tag	UNP A0A854QMN0
C	-1	TYR	-	expression tag	UNP A0A854QMN0
C	0	PHE	-	expression tag	UNP A0A854QMN0
C	1	GLN	-	expression tag	UNP A0A854QMN0

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Cl 1 1	0	0
2	B	1	Total Cl 1 1	0	0
2	C	1	Total Cl 1 1	0	0

- Molecule 3 is 5'-O-[(S)-(cyclopentyloxy)(hydroxy)phosphoryl]adenosine (three-letter code: YHF) (formula: $C_{15}H_{22}N_5O_7P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			28	15	5	7	1		
3	B	1	Total	C	N	O	P	0	0
			28	15	5	7	1		
3	C	1	Total	C	N	O	P	0	0
			28	15	5	7	1		

- Molecule 4 is water.

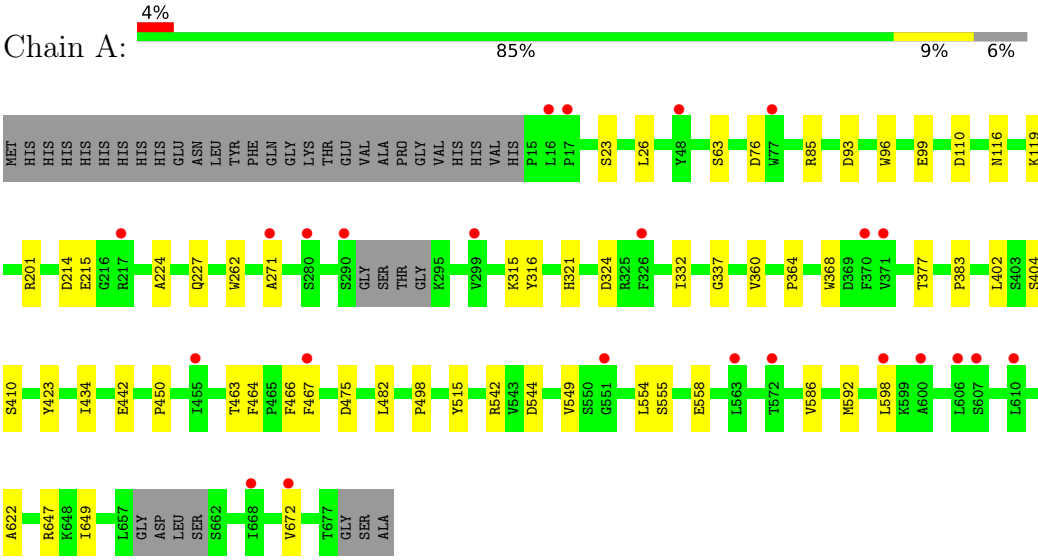
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	O	0	0
			2	2		

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.

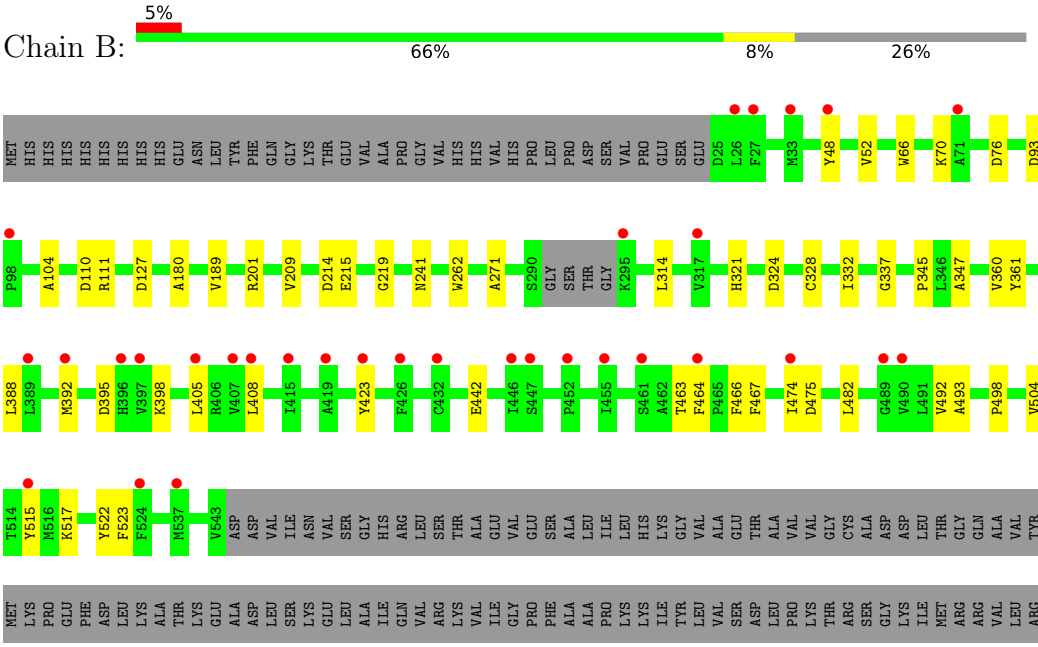
• Molecule 1: Acetyl-coenzyme A synthetase

Chain A:



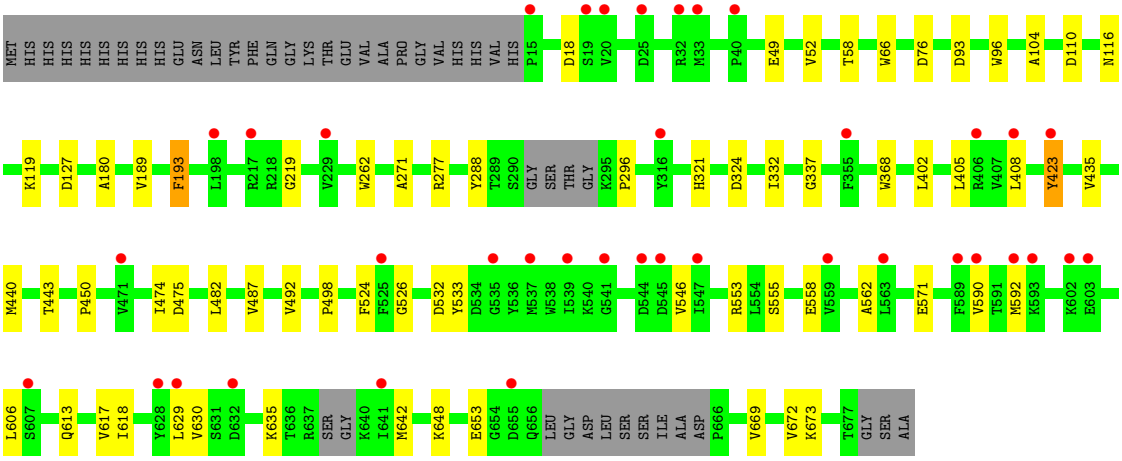
• Molecule 1: Acetyl-coenzyme A synthetase

Chain B:



• Molecule 1: Acetyl-coenzyme A synthetase

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	174.16Å 174.16Å 158.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	25.34 – 2.90 123.15 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (25.34-2.90) 100.0 (123.15-2.90)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.17 (at 2.91Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.190 , 0.223 0.190 , 0.222	Depositor DCC
R_{free} test set	2616 reflections (4.79%)	wwPDB-VP
Wilson B-factor (Å^2)	80.2	Xtriage
Anisotropy	0.410	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 64.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	14194	wwPDB-VP
Average B, all atoms (Å^2)	90.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.19% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: YHF, 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	0.29	0/5223	0.52	0/7117
1	B	0.29	0/4201	0.51	0/5720
1	C	0.29	0/5081	0.51	0/6935
All	All	0.29	0/14505	0.52	0/19772

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

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	5081	0	4908	30	0
1	B	4076	0	3928	29	0
1	C	4948	0	4703	36	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
3	A	28	0	0	0	0
3	B	28	0	0	0	0
3	C	28	0	0	0	0
4	A	2	0	0	0	0
All	All	14194	0	13539	91	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 (91) 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:395:ASP:HA	1:B:398:LYS:HE2	1.80	0.64
1:C:669:VAL:HG12	1:C:673:LYS:HE3	1.80	0.64
1:C:405:LEU:HD13	1:C:408:LEU:HD21	1.80	0.63
1:C:562:ALA:O	1:C:613:GLN:NE2	2.33	0.61
1:A:368:TRP:HB3	1:A:402:LEU:HD21	1.84	0.60
1:B:474:ILE:HD12	1:B:492:VAL:HG11	1.84	0.58
1:C:617:VAL:HG23	1:C:618:ILE:HG13	1.85	0.58
1:C:49:GLU:O	1:C:52:VAL:HG12	2.03	0.58
1:C:368:TRP:HB3	1:C:402:LEU:HD21	1.86	0.57
1:C:532:ASP:OD1	1:C:533:TYR:N	2.39	0.55
1:A:332:ILE:HA	1:A:337:GLY:HA3	1.89	0.55
1:A:617:VAL:HG23	1:A:618:ILE:HG13	1.88	0.55
1:B:209:VAL:HG22	1:B:241:ASN:HB2	1.88	0.55
1:B:189:VAL:HG22	1:B:201:ARG:HD3	1.90	0.54
1:A:592:MET:HG3	1:A:598:LEU:HD12	1.89	0.54
1:A:23:SER:HA	1:A:26:LEU:HB2	1.89	0.54
1:B:214:ASP:OD1	1:B:215:GLU:N	2.40	0.53
1:C:630:VAL:HG11	1:C:672:VAL:HG22	1.90	0.53
1:C:474:ILE:HD12	1:C:492:VAL:HG11	1.89	0.53
1:A:93:ASP:HB3	1:C:271:ALA:HB3	1.91	0.53
1:A:405:LEU:HD13	1:A:408:LEU:HD21	1.91	0.53
1:B:328:CYS:HA	1:B:380:TYR:HB3	1.91	0.53
1:A:315:LYS:HD3	1:A:316:TYR:CE2	2.45	0.52
1:B:388:LEU:O	1:B:392:MET:HG2	2.09	0.52
1:A:96:TRP:CD1	1:A:498:PRO:HA	2.45	0.52
1:C:116:ASN:ND2	1:C:119:LYS:HB2	2.26	0.51
1:A:116:ASN:ND2	1:A:119:LYS:HB2	2.26	0.51
1:A:321:HIS:N	1:A:324:ASP:OD2	2.45	0.50
1:B:332:ILE:HA	1:B:337:GLY:HA3	1.92	0.50
1:A:271:ALA:HB3	1:B:93:ASP:HB3	1.93	0.50
1:A:224:ALA:HB1	1:A:227:GLN:HG3	1.95	0.49
1:B:127:ASP:OD1	1:B:219:GLY:N	2.43	0.49
1:C:49:GLU:HA	1:C:52:VAL:HG12	1.95	0.49
1:C:435:VAL:HG12	1:C:450:PRO:HG2	1.95	0.49
1:C:475:ASP:HB2	1:C:482:LEU:HD21	1.95	0.49
1:A:99:GLU:O	1:C:277:ARG:NH2	2.46	0.48
1:B:66:TRP:CH2	1:B:70:LYS:HG3	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:127:ASP:OD1	1:C:219:GLY:N	2.45	0.48
1:A:63:SER:OG	1:A:85:ARG:NH2	2.46	0.48
1:A:189:VAL:HG22	1:A:201:ARG:HD3	1.95	0.48
1:A:408:LEU:HB2	1:A:434:ILE:HD13	1.95	0.47
1:C:592:MET:HE1	1:C:606:LEU:HD21	1.97	0.47
1:B:405:LEU:HD13	1:B:408:LEU:HD21	1.96	0.47
1:C:524:PHE:CZ	1:C:526:GLY:HA2	2.49	0.47
1:B:493:ALA:HB3	1:B:523:PHE:HB3	1.97	0.46
1:B:360:VAL:HA	1:B:364:PRO:HA	1.98	0.46
1:B:271:ALA:HB3	1:C:93:ASP:HB3	1.97	0.46
1:B:475:ASP:HB2	1:B:482:LEU:HD21	1.97	0.46
1:C:571:GLU:OE1	1:C:635:LYS:NZ	2.43	0.46
1:A:554:LEU:HD11	1:A:622:ALA:HA	1.97	0.45
1:C:58:THR:HG22	1:C:66:TRP:CD2	2.51	0.45
1:A:360:VAL:HA	1:A:364:PRO:HA	1.99	0.45
1:C:635:LYS:N	1:C:642:MET:HE3	2.31	0.45
1:C:482:LEU:HD13	1:C:487:VAL:HB	1.99	0.45
1:A:442:GLU:HG2	1:A:515:TYR:CZ	2.52	0.44
1:A:649:ILE:HG21	1:A:672:VAL:HG12	2.00	0.44
1:B:463:THR:OG1	1:B:464:PHE:N	2.50	0.44
1:B:111:ARG:NH2	1:B:347:ALA:O	2.49	0.44
1:C:408:LEU:HB3	1:C:423:TYR:CZ	2.53	0.43
1:B:48:TYR:CE2	1:B:52:VAL:HG21	2.52	0.43
1:B:321:HIS:N	1:B:324:ASP:OD2	2.45	0.43
1:A:463:THR:OG1	1:A:464:PHE:N	2.50	0.43
1:B:314:LEU:HD22	1:B:345:PRO:HA	1.99	0.43
1:C:555:SER:HB3	1:C:558:GLU:HG3	2.00	0.43
1:A:383:PRO:HG3	1:A:410:SER:OG	2.18	0.43
1:A:466:PHE:CG	1:A:467:PHE:N	2.86	0.43
1:B:96:TRP:CD1	1:B:498:PRO:HA	2.54	0.43
1:B:104:ALA:HB3	1:B:180:ALA:HB1	2.00	0.43
1:C:189:VAL:HG13	1:C:193:PHE:HD2	1.84	0.43
1:C:648:LYS:HB3	1:C:653:GLU:HB2	2.00	0.43
1:B:513:GLU:HA	1:B:517:LYS:HG3	2.00	0.42
1:A:377:THR:HA	1:A:404:SER:O	2.19	0.42
1:B:474:ILE:HD11	1:B:522:TYR:CE2	2.53	0.42
1:A:214:ASP:OD1	1:A:215:GLU:N	2.48	0.42
1:B:504:VAL:HG23	1:B:511:TYR:HB2	2.00	0.42
1:A:475:ASP:HB2	1:A:482:LEU:HD21	2.01	0.42
1:A:555:SER:HB3	1:A:558:GLU:HG3	2.01	0.41
1:C:288:TYR:CD1	1:C:296:PRO:HB2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:546:VAL:HG11	1:C:553:ARG:HD3	2.02	0.41
1:A:450:PRO:HB3	1:A:463:THR:HG21	2.02	0.41
1:C:440:MET:HB2	1:C:443:THR:HG23	2.03	0.41
1:C:58:THR:HG22	1:C:66:TRP:CE2	2.56	0.40
1:C:332:ILE:HA	1:C:337:GLY:HA3	2.03	0.40
1:C:590:VAL:HB	1:C:629:LEU:HD23	2.04	0.40
1:A:549:VAL:HG21	1:A:586:VAL:HG23	2.03	0.40
1:C:104:ALA:HB3	1:C:180:ALA:HB1	2.02	0.40
1:B:466:PHE:CG	1:B:467:PHE:N	2.89	0.40
1:C:96:TRP:CD1	1:C:498:PRO:HA	2.56	0.40
1:C:321:HIS:N	1:C:324:ASP:OD2	2.53	0.40
1:B:219:GLY:HA2	1:B:361:TYR:CG	2.56	0.40
1:B:442:GLU:HG2	1:B:515:TYR:CZ	2.57	0.40

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	651/694 (94%)	626 (96%)	25 (4%)	0	100	100
1	B	513/694 (74%)	496 (97%)	17 (3%)	0	100	100
1	C	640/694 (92%)	614 (96%)	26 (4%)	0	100	100
All	All	1804/2082 (87%)	1736 (96%)	68 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	528/576 (92%)	520 (98%)	8 (2%)	65	87
1	B	423/576 (73%)	419 (99%)	4 (1%)	78	93
1	C	500/576 (87%)	494 (99%)	6 (1%)	71	91
All	All	1451/1728 (84%)	1433 (99%)	18 (1%)	71	91

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	76	ASP
1	A	110	ASP
1	A	193	PHE
1	A	262	TRP
1	A	423	TYR
1	A	542	ARG
1	A	544	ASP
1	A	647	ARG
1	B	76	ASP
1	B	110	ASP
1	B	262	TRP
1	B	423	TYR
1	C	18	ASP
1	C	76	ASP
1	C	110	ASP
1	C	193	PHE
1	C	262	TRP
1	C	423	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	91	HIS
1	C	396	HIS

5.3.3 RNA

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 3 are monoatomic - leaving 3 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	YHF	A	702	-	28,31,31	0.54	0	31,46,46	0.72	1 (3%)
3	YHF	C	702	-	28,31,31	0.55	0	31,46,46	0.74	1 (3%)
3	YHF	B	702	-	28,31,31	0.56	0	31,46,46	0.92	2 (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
3	YHF	A	702	-	-	0/11/38/38	0/4/4/4
3	YHF	C	702	-	-	0/11/38/38	0/4/4/4
3	YHF	B	702	-	-	4/11/38/38	0/4/4/4

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	702	YHF	C13-C14-C15	-2.73	96.82	105.99
3	A	702	YHF	C5-C8-N5	2.40	124.00	120.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	702	YHF	C5-C8-N5	2.31	123.86	120.35
3	B	702	YHF	C5-C8-N5	2.23	123.74	120.35

There are no chirality outliers.

All (4) torsion outliers are listed below:

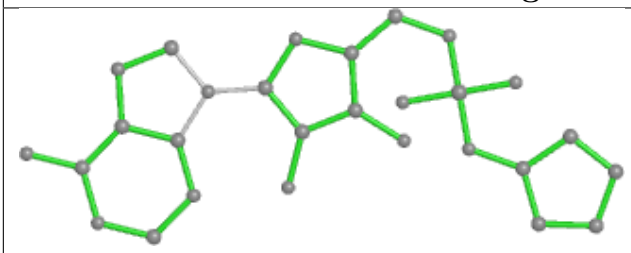
Mol	Chain	Res	Type	Atoms
3	B	702	YHF	C11-O6-P1-O7
3	B	702	YHF	C11-O6-P1-O5
3	B	702	YHF	C11-O6-P1-O4
3	B	702	YHF	C12-C11-O6-P1

There are no ring outliers.

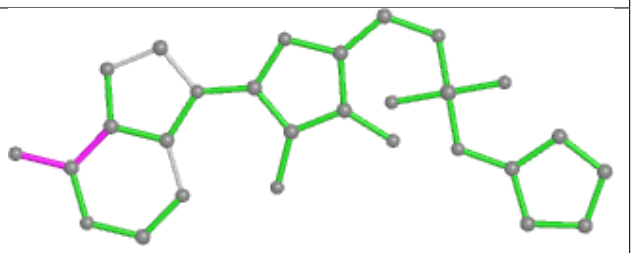
No monomer is involved in short contacts.

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.

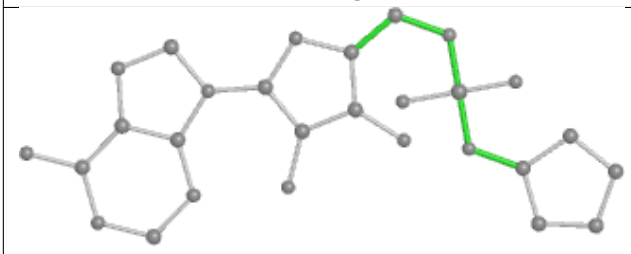
Ligand YHF A 702



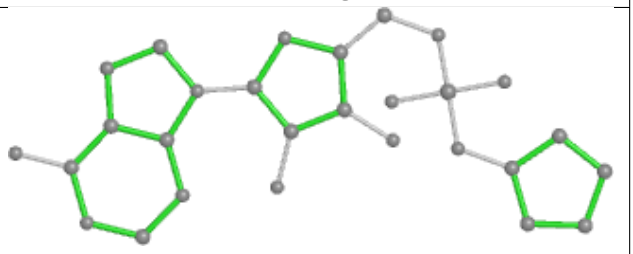
Bond lengths



Bond angles

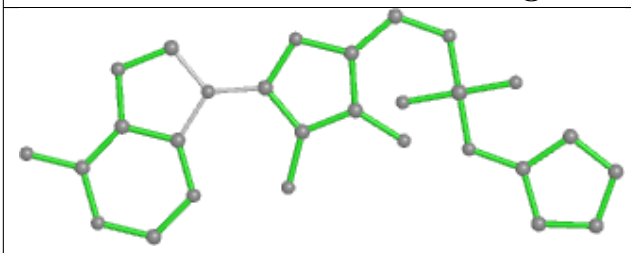


Torsions

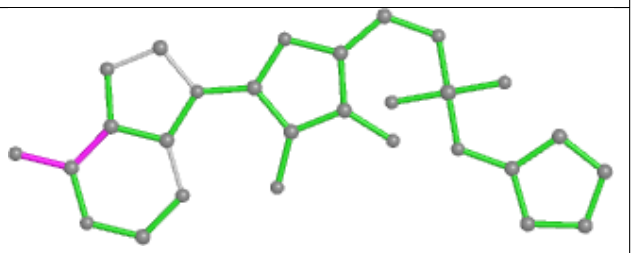


Rings

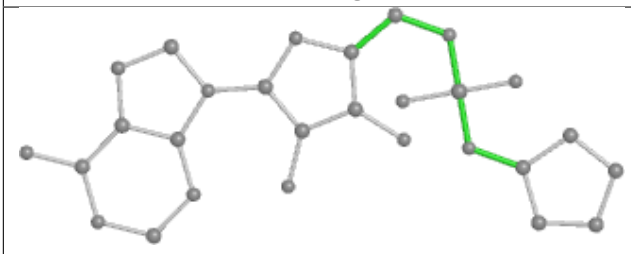
Ligand YHF C 702



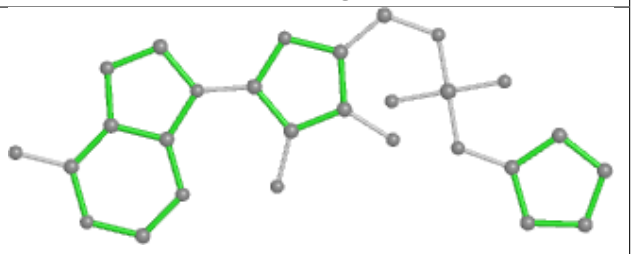
Bond lengths



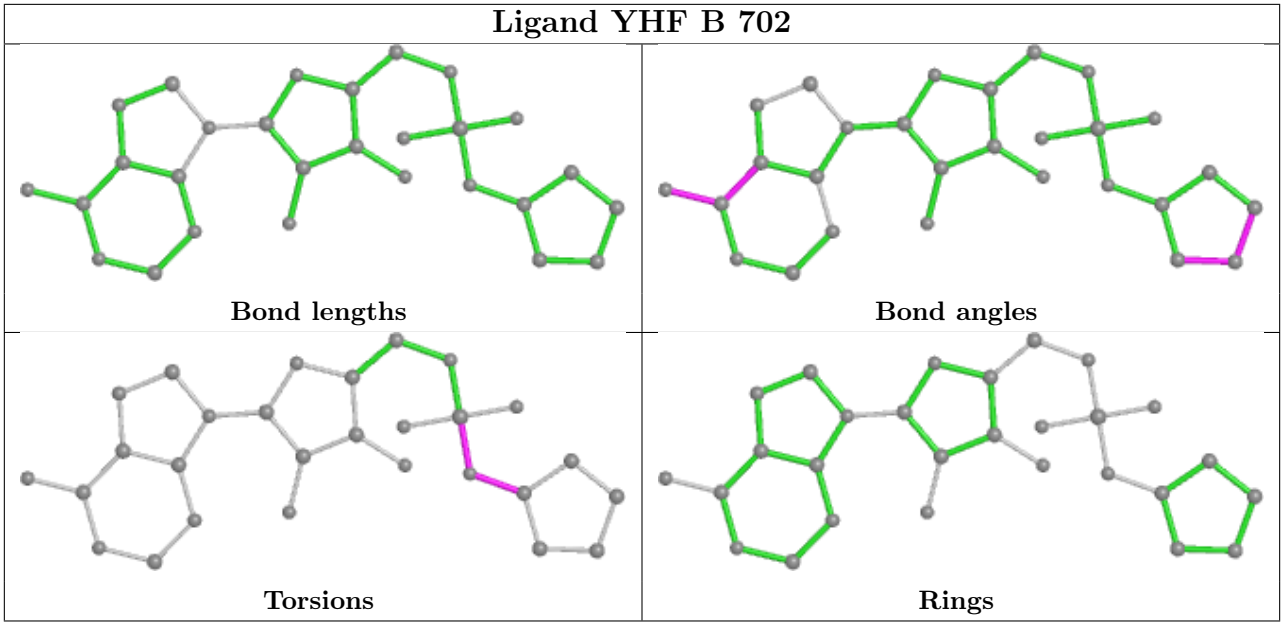
Bond angles



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, 95^{th} 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	655/694 (94%)	0.57	26 (3%)	38	33	61, 86, 133, 183	0
1	B	515/694 (74%)	0.67	34 (6%)	18	14	61, 86, 125, 164	0
1	C	648/694 (93%)	0.61	38 (5%)	22	18	58, 87, 161, 229	0
All	All	1818/2082 (87%)	0.61	98 (5%)	25	22	58, 86, 144, 229	0

All (98) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	415	ILE	5.8
1	C	563	LEU	4.7
1	A	621	PHE	4.6
1	B	455	ILE	4.5
1	C	589	PHE	4.5
1	B	452	PRO	4.2
1	B	423	TYR	4.1
1	C	592	MET	4.1
1	C	15	PRO	4.1
1	C	629	LEU	4.0
1	B	461	SER	3.9
1	C	33	MET	3.7
1	B	392	MET	3.5
1	B	537[A]	MET	3.4
1	C	603	GLU	3.4
1	B	26	LEU	3.4
1	B	426	PHE	3.3
1	B	419	ALA	3.3
1	B	380	TYR	3.2
1	A	598	LEU	3.0
1	C	541	GLY	3.0
1	B	397	VAL	3.0
1	B	474	ILE	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	559	VAL	3.0
1	B	48	TYR	2.9
1	C	593	LYS	2.9
1	B	317	VAL	2.9
1	A	290	SER	2.8
1	C	545	ASP	2.8
1	B	515	TYR	2.8
1	B	98	PRO	2.8
1	A	370	PHE	2.7
1	C	547	ILE	2.7
1	B	408	LEU	2.7
1	C	19	SER	2.7
1	A	217	ARG	2.6
1	B	389	LEU	2.6
1	B	396	HIS	2.6
1	C	25	ASP	2.6
1	C	641	ILE	2.6
1	A	271	ALA	2.6
1	C	406	ARG	2.5
1	C	20	VAL	2.5
1	B	447	SER	2.5
1	A	668	ILE	2.5
1	B	27	PHE	2.5
1	A	610	LEU	2.5
1	B	432	CYS	2.4
1	C	632	ASP	2.4
1	A	455	ILE	2.4
1	C	316	TYR	2.4
1	A	371	VAL	2.4
1	C	590	VAL	2.4
1	A	551	GLY	2.3
1	C	655	ASP	2.3
1	A	467	PHE	2.3
1	B	405	LEU	2.3
1	C	535	GLY	2.3
1	B	94	VAL	2.3
1	C	217	ARG	2.3
1	C	198	LEU	2.3
1	C	602	LYS	2.2
1	A	17	PRO	2.2
1	B	446	ILE	2.2
1	C	537	MET	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	628	TYR	2.2
1	A	77	TRP	2.2
1	B	489	GLY	2.2
1	B	33	MET	2.2
1	B	295	LYS	2.2
1	A	607	SER	2.2
1	C	607	SER	2.2
1	A	606	LEU	2.1
1	C	423	TYR	2.1
1	B	407	VAL	2.1
1	B	464	PHE	2.1
1	C	408	LEU	2.1
1	C	40	PRO	2.1
1	A	563	LEU	2.1
1	A	16	LEU	2.1
1	A	48	TYR	2.1
1	C	471	VAL	2.1
1	A	600	ALA	2.1
1	C	32	ARG	2.1
1	A	280[A]	SER	2.1
1	B	524	PHE	2.1
1	C	355	PHE	2.1
1	A	326	PHE	2.1
1	C	525	PHE	2.1
1	A	572	THR	2.0
1	B	71	ALA	2.0
1	A	193	PHE	2.0
1	A	299	VAL	2.0
1	C	229	VAL	2.0
1	C	539	ILE	2.0
1	C	544	ASP	2.0
1	A	672	VAL	2.0
1	B	490	VAL	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

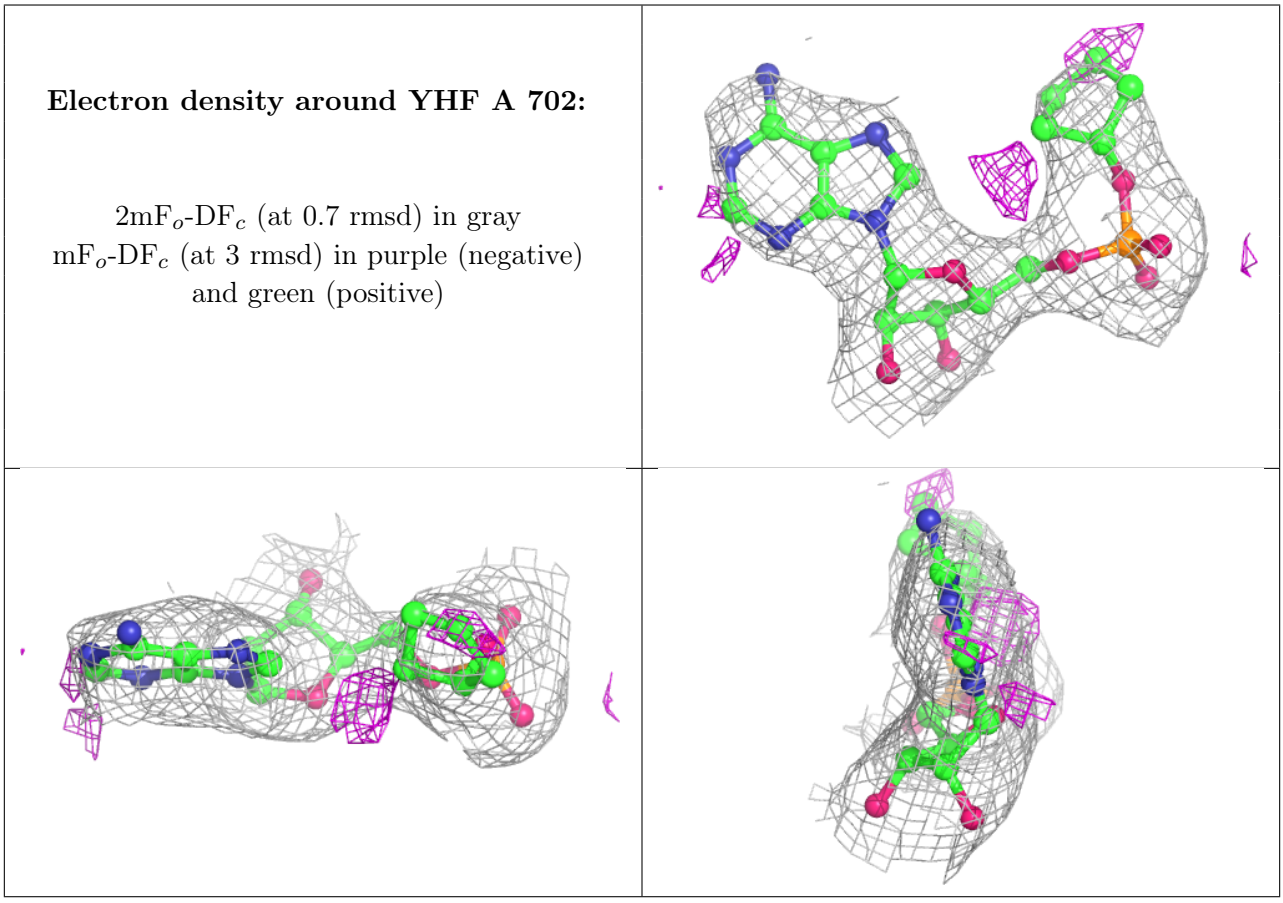
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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	CL	A	701	1/1	0.82	0.22	81,81,81,81	0
2	CL	B	701	1/1	0.88	0.15	89,89,89,89	0
3	YHF	A	702	28/28	0.95	0.25	65,76,83,87	0
3	YHF	B	702	28/28	0.95	0.25	78,96,101,103	0
2	CL	C	701	1/1	0.97	0.22	85,85,85,85	0
3	YHF	C	702	28/28	0.97	0.23	70,78,83,87	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.

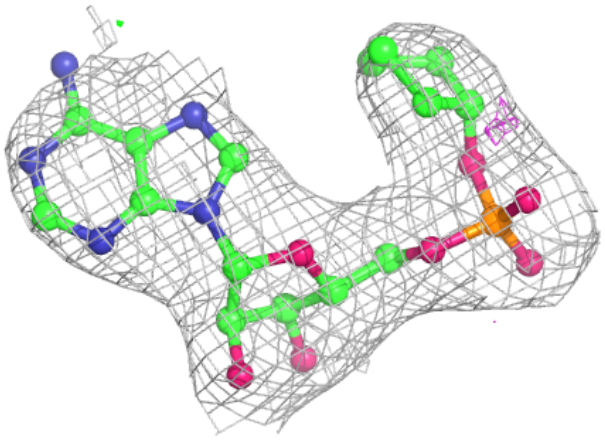
Electron density around YHF A 702:

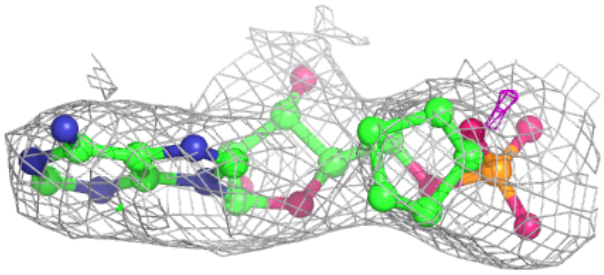
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

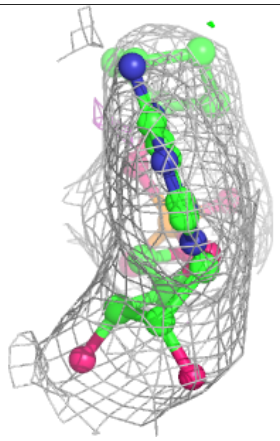


Electron density around YHF B 702:

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

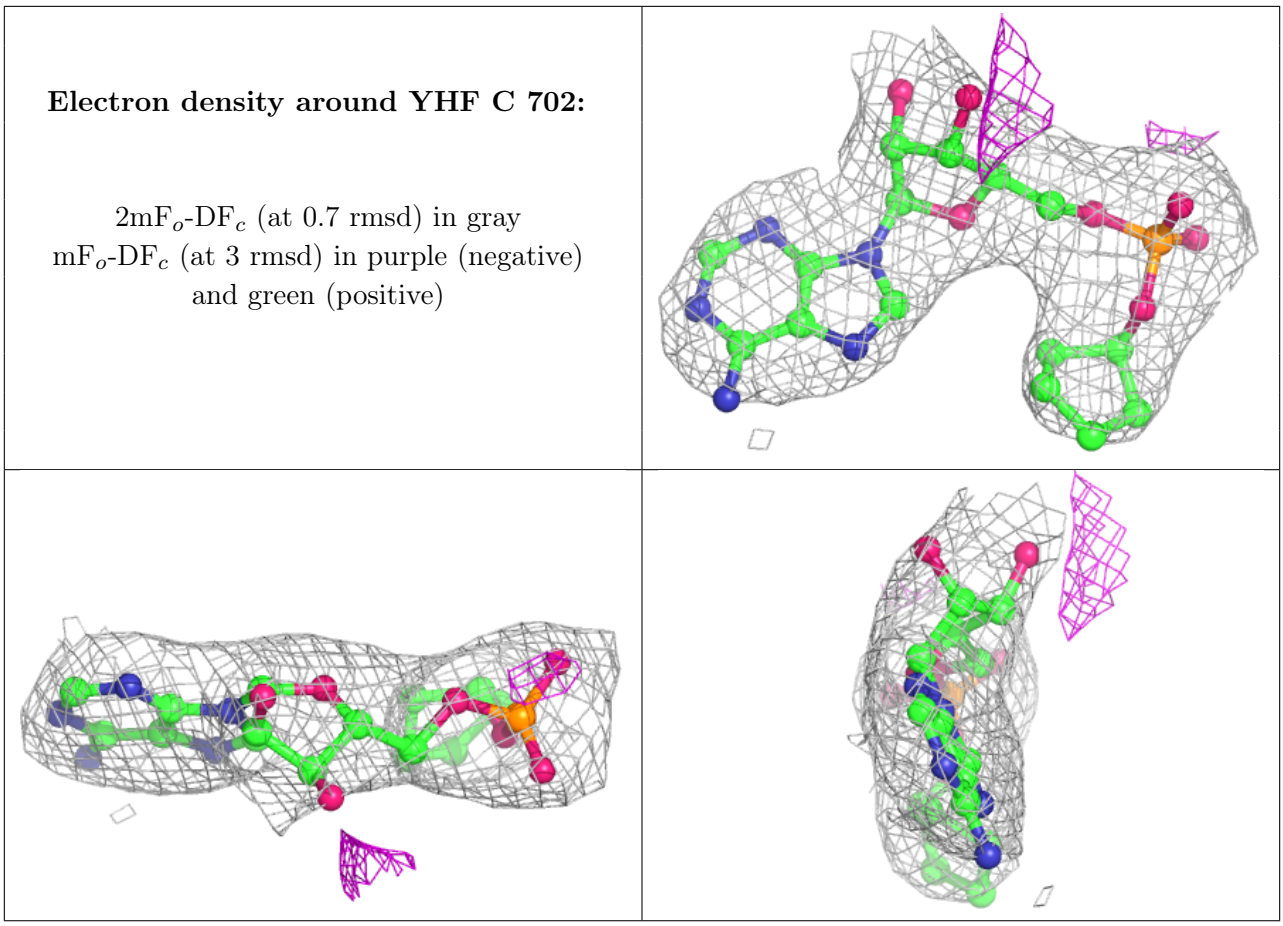






Electron density around YHF C 702:

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



6.5 Other polymers (i)

There are no such residues in this entry.