



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:15 PM UTC

PDB ID : 5G22 / pdb_00005g22
Title : Plasmodium vivax N-myristoyltransferase in complex with a quinoline inhibitor (compound 26)
Authors : Goncalves, V.; Brannigan, J.A.; Laporte, A.; Bell, A.S.; Roberts, S.M.; Wilkinson, A.J.; Leatherbarrow, R.J.; Tate, E.W.
Deposited on : 2016-04-06
Resolution : 2.32 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

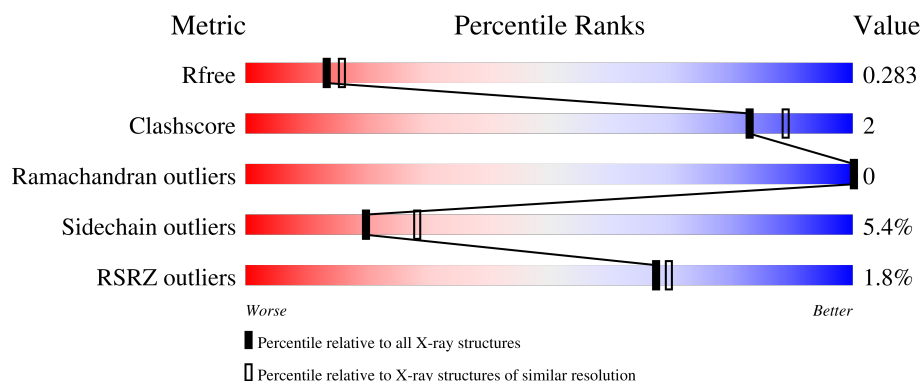
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.32 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	7754 (2.34-2.30)
Clashscore	190562	8383 (2.34-2.30)
Ramachandran outliers	187476	8303 (2.34-2.30)
Sidechain outliers	187428	8303 (2.34-2.30)
RSRZ outliers	180081	7760 (2.34-2.30)

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	385	0% 90% 10%
1	B	385	0% 88% 10% .
1	C	385	3% 85% 10% . .

2 Entry composition [i](#)

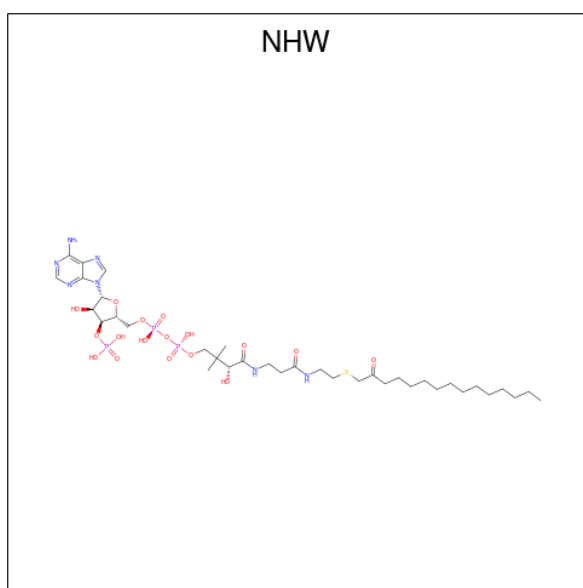
There are 7 unique types of molecules in this entry. The entry contains 10381 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 GLYCYLPEPTIDE N-TETRADECANOYLTRANSFERASE.

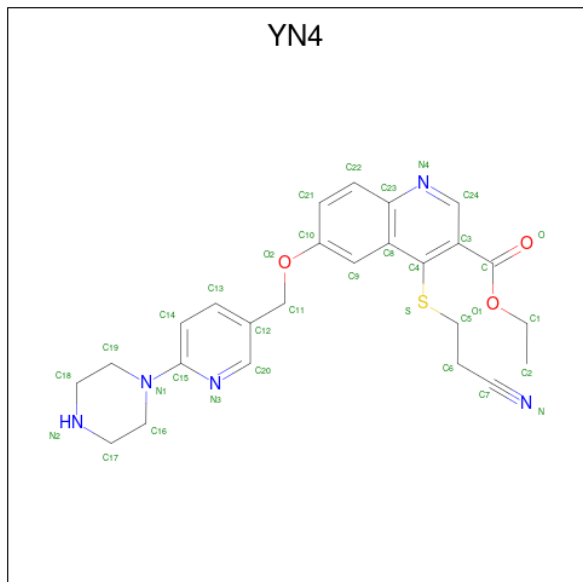
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	385	Total	C	N	O	S	0	9	0
			3232	2103	529	589	11			
1	B	385	Total	C	N	O	S	0	12	0
			3258	2120	537	590	11			
1	C	369	Total	C	N	O	S	0	15	0
			3147	2055	504	577	11			

- Molecule 2 is 2-oxopentadecyl-CoA (CCD ID: NHW) (formula: $C_{36}H_{64}N_7O_{17}P_3S$).



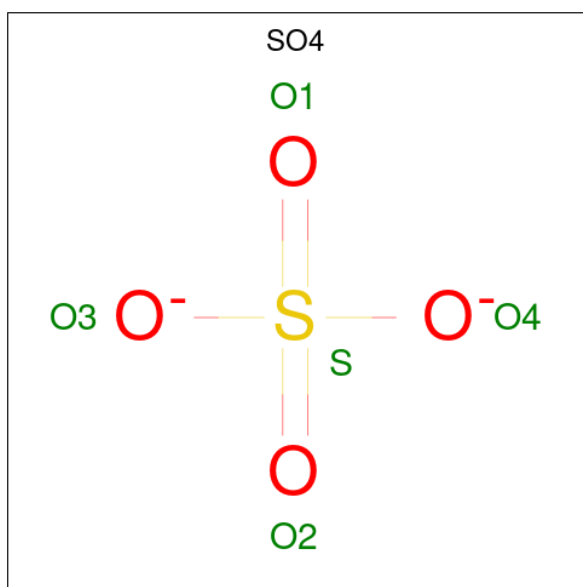
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P S	0	0
			64	36	7	17	3 1		
2	B	1	Total	C	N	O	P S	0	0
			64	36	7	17	3 1		
2	C	1	Total	C	N	O	P S	0	0
			64	36	7	17	3 1		

- Molecule 3 is ETHYL 4-[(2-CYANOETHYL)SULFANYL]-6-[[6-(PIPERAZIN-1-YL)] (CCD ID: YN4) (formula: $C_{25}H_{27}N_5O_3S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			34	25	5	3	1		
3	B	1	Total	C	N	O	S	0	0
			34	25	5	3	1		
3	C	1	Total	C	N	O	S	0	0
			34	25	5	3	1		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



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

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Mg	0	0
			1	1		
5	B	1	Total	Mg	0	0
			1	1		
5	C	1	Total	Mg	0	0
			1	1		

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

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

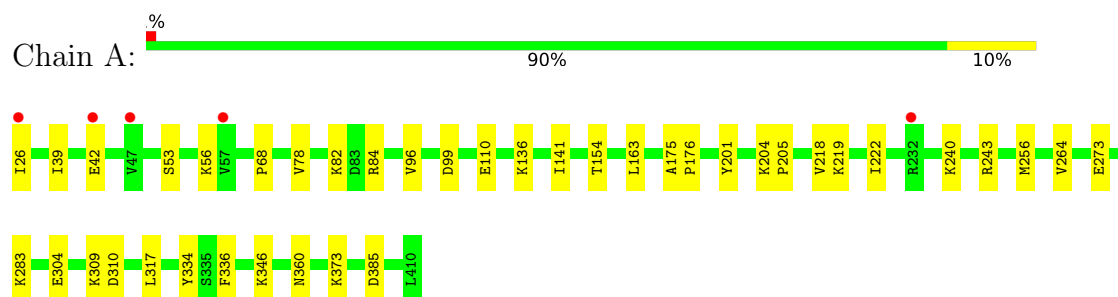
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	123	Total	O	0	0
			123	123		
7	B	138	Total	O	0	0
			138	138		
7	C	178	Total	O	0	0
			178	178		

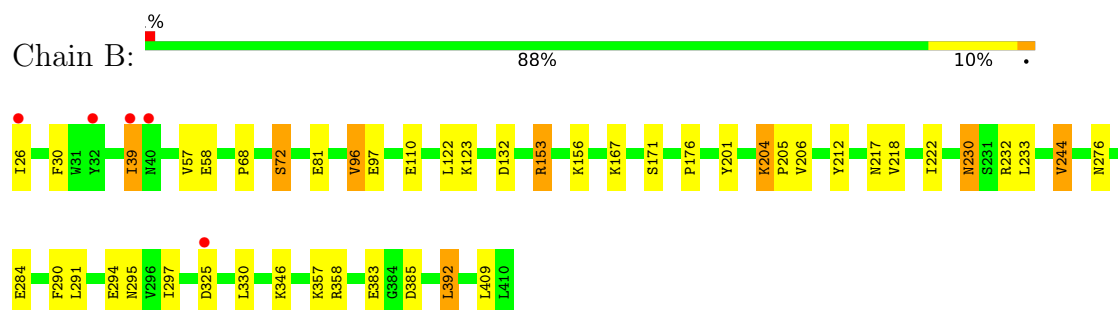
3 Residue-property plots [i](#)

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.

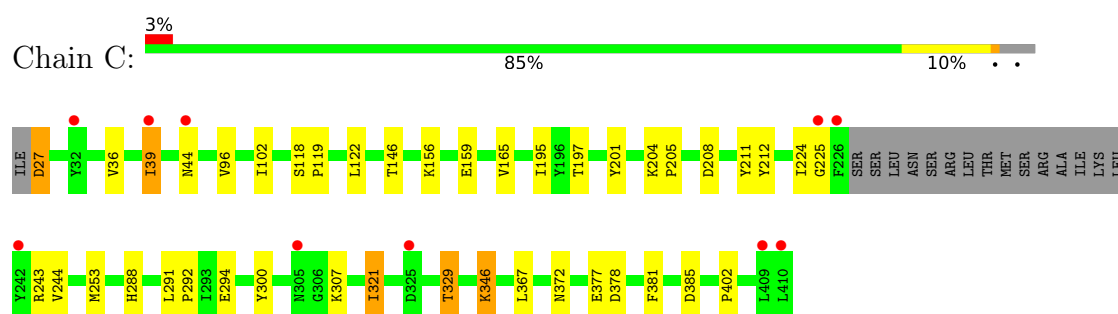
• Molecule 1: GLYCYLPEPTIDE N-TETRADECANOYLTRANSFERASE



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4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	57.97Å 123.36Å 179.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	101.64 – 2.32 101.64 – 2.32	Depositor EDS
% Data completeness (in resolution range)	99.1 (101.64-2.32) 99.1 (101.64-2.32)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.43 (at 2.32Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.220 , 0.283 0.220 , 0.283	Depositor DCC
R_{free} test set	2828 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	24.6	Xtriage
Anisotropy	0.332	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 31.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.40$, $\langle L^2 \rangle = 0.23$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.86	EDS
Total number of atoms	10381	wwPDB-VP
Average B, all atoms (Å ²)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% 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: NHW, YN4, CL, SO4, MG

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	0.89	2/3337 (0.1%)	1.07	4/4518 (0.1%)
1	B	0.88	0/3372	1.07	11/4561 (0.2%)
1	C	0.90	1/3263 (0.0%)	1.07	7/4418 (0.2%)
All	All	0.89	3/9972 (0.0%)	1.07	22/13497 (0.2%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	336	PHE	CA-C	6.42	1.55	1.52
1	C	329	THR	CA-C	5.72	1.59	1.52
1	A	68	PRO	CA-C	5.47	1.57	1.52

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	372	ASN	N-CA-C	6.58	118.46	111.28
1	C	36	VAL	CA-C-N	-6.52	113.92	120.31
1	C	36	VAL	C-N-CA	-6.52	113.92	120.31
1	A	82	LYS	N-CA-C	6.25	117.79	110.97
1	B	132	ASP	N-CA-C	5.95	117.76	111.28
1	B	385	ASP	N-CA-C	5.74	117.21	111.07
1	A	222	ILE	N-CA-C	5.63	115.82	110.42
1	B	291	LEU	CA-C-N	-5.51	114.30	120.14
1	B	291	LEU	C-N-CA	-5.51	114.30	120.14
1	C	243	ARG	N-CA-C	5.43	118.29	108.69
1	A	385	ASP	N-CA-C	5.34	119.85	113.23
1	B	290	PHE	N-CA-C	5.34	120.45	113.88
1	B	96	VAL	N-CA-C	5.34	117.31	109.63
1	A	273	GLU	N-CA-C	5.29	119.22	112.34
1	C	225	GLY	N-CA-C	5.29	125.71	113.18

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Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	C	329	THR	N-CA-C	5.21	117.94	109.24
1	B	72	SER	N-CA-C	5.19	117.28	109.23
1	B	57	VAL	CA-C-N	5.17	127.93	120.38
1	B	57	VAL	C-N-CA	5.17	127.93	120.38
1	B	68	PRO	CA-C-N	5.04	126.14	119.84
1	B	68	PRO	C-N-CA	5.04	126.14	119.84
1	C	288	HIS	N-CA-C	5.03	116.45	111.07

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3232	0	3243	9	0
1	B	3258	0	3285	22	0
1	C	3147	0	3145	15	0
2	A	64	0	60	0	0
2	B	64	0	60	0	0
2	C	64	0	60	3	0
3	A	34	0	0	1	0
3	B	34	0	0	0	0
3	C	34	0	0	0	0
4	A	5	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
7	A	123	0	0	0	0
7	B	138	0	0	2	0
7	C	178	0	0	1	0
All	All	10381	0	9853	48	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 2.

All (48) 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:153[A]:ARG:HH11	1:B:153[A]:ARG:HB2	1.22	1.04
1:B:153[A]:ARG:HH11	1:B:153[A]:ARG:CB	1.87	0.88
1:C:208:ASP:O	1:C:402[A]:PRO:HG3	1.84	0.77
1:B:39:ILE:HD11	1:B:201:TYR:HE2	1.62	0.64
1:A:141:ILE:HD12	1:A:163:LEU:HD13	1.80	0.63
1:B:276[B]:ASN:ND2	7:B:2098:HOH:O	2.31	0.63
1:B:218:VAL:O	1:B:222:ILE:HG12	1.99	0.61
1:B:206:VAL:HG11	1:B:392:LEU:HD22	1.84	0.60
1:C:39:ILE:HD11	1:C:201:TYR:CE2	2.36	0.59
1:C:211:TYR:HB3	1:C:367:LEU:HD23	1.84	0.59
1:C:224:ILE:HD13	1:C:321:ILE:HD13	1.84	0.59
1:A:204:LYS:HG3	1:A:205:PRO:HD2	1.84	0.58
1:B:30:PHE:CD1	1:B:176:PRO:HB3	2.41	0.56
1:B:217:ASN:HB3	7:B:2080:HOH:O	2.04	0.56
1:B:153[A]:ARG:CB	1:B:153[A]:ARG:NH1	2.67	0.53
1:B:244:VAL:HG21	1:B:357:LYS:HD3	1.90	0.52
1:C:27:ASP:OD1	1:C:27:ASP:N	2.43	0.51
1:A:317:LEU:HB3	1:A:334:TYR:CE1	2.46	0.51
1:A:175:ALA:HB3	1:A:176:PRO:HD3	1.93	0.51
1:B:167[B]:LYS:HB2	1:B:167[B]:LYS:NZ	2.26	0.50
1:B:58:GLU:H	1:B:58:GLU:CD	2.19	0.49
1:B:153[A]:ARG:HH11	1:B:153[A]:ARG:CG	2.25	0.48
1:A:304:GLU:HG2	1:A:309:LYS:HE3	1.96	0.48
1:C:212:TYR:HB3	1:C:381:PHE:HB3	1.95	0.47
1:B:284[B]:GLU:H	1:B:284[B]:GLU:CD	2.24	0.45
1:A:39:ILE:HD12	1:A:201:TYR:HE2	1.81	0.45
1:B:206:VAL:HG11	1:B:392:LEU:CD2	2.45	0.45
1:C:253[A]:MET:HG3	1:C:300:TYR:HB3	1.99	0.45
1:A:78:VAL:O	1:A:84:ARG:NH1	2.40	0.44
1:B:294:GLU:HG2	1:B:295:ASN:OD1	2.18	0.44
1:C:291:LEU:HA	1:C:292:PRO:HD3	1.84	0.44
2:C:1000:NHW:H8A	7:C:2177:HOH:O	2.18	0.44
1:C:39:ILE:HD11	1:C:201:TYR:HE2	1.81	0.44
1:A:204:LYS:HG3	1:A:205:PRO:CD	2.49	0.43
1:B:153[A]:ARG:NH1	1:B:153[A]:ARG:CG	2.77	0.43
1:C:118:SER:HB2	1:C:119:PRO:HD2	2.00	0.42
1:A:256:MET:HE3	1:A:264:VAL:HG21	2.01	0.42
1:B:97:GLU:OE2	1:B:167[A]:LYS:NZ	2.44	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:165:VAL:HG23	2:C:1000:NHW:H14B	2.00	0.42
3:A:1001:YN4:C5	3:A:1001:YN4:C9	2.98	0.42
1:B:212:TYR:CE2	1:B:383:GLU:HB2	2.55	0.42
1:B:230:ASN:HD22	1:B:230:ASN:HA	1.65	0.42
1:C:204:LYS:HG2	1:C:205:PRO:HD2	2.02	0.41
1:C:197:THR:O	2:C:1000:NHW:HP	2.21	0.41
1:C:146:THR:HG21	1:C:159:GLU:OE1	2.20	0.41
1:B:230:ASN:HB2	1:B:233:LEU:H	1.86	0.41
1:B:204:LYS:HG2	1:B:205:PRO:HD2	2.03	0.40
1:C:346:LYS:HE2	1:C:378:ASP:HB3	2.03	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	392/385 (102%)	372 (95%)	20 (5%)	0	100	100
1	B	395/385 (103%)	381 (96%)	14 (4%)	0	100	100
1	C	380/385 (99%)	363 (96%)	17 (4%)	0	100	100
All	All	1167/1155 (101%)	1116 (96%)	51 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	360/351 (103%)	341 (95%)	19 (5%)	20	29
1	B	363/351 (103%)	338 (93%)	25 (7%)	14	19
1	C	351/351 (100%)	334 (95%)	17 (5%)	23	33
All	All	1074/1053 (102%)	1013 (94%)	61 (6%)	20	26

All (61) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	ILE
1	A	42	GLU
1	A	53	SER
1	A	56	LYS
1	A	96	VAL
1	A	99	ASP
1	A	110	GLU
1	A	136	LYS
1	A	154	THR
1	A	218	VAL
1	A	219	LYS
1	A	240[A]	LYS
1	A	240[B]	LYS
1	A	243	ARG
1	A	283	LYS
1	A	310	ASP
1	A	346	LYS
1	A	360	ASN
1	A	373	LYS
1	B	26	ILE
1	B	39	ILE
1	B	72	SER
1	B	81	GLU
1	B	96	VAL
1	B	110	GLU
1	B	122	LEU
1	B	123	LYS
1	B	153[A]	ARG
1	B	153[B]	ARG
1	B	156	LYS
1	B	171	SER
1	B	204	LYS
1	B	230	ASN
1	B	232	ARG

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Mol	Chain	Res	Type
1	B	244	VAL
1	B	297	ILE
1	B	325	ASP
1	B	330	LEU
1	B	346[A]	LYS
1	B	346[B]	LYS
1	B	358[A]	ARG
1	B	358[B]	ARG
1	B	392	LEU
1	B	409	LEU
1	C	27	ASP
1	C	39	ILE
1	C	44	ASN
1	C	96	VAL
1	C	102	ILE
1	C	122	LEU
1	C	156	LYS
1	C	195[A]	ILE
1	C	195[B]	ILE
1	C	244	VAL
1	C	294	GLU
1	C	307	LYS
1	C	321	ILE
1	C	329	THR
1	C	346	LYS
1	C	377	GLU
1	C	385	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	GLN
1	A	106	ASN
1	A	249	ASN
1	A	295	ASN
1	A	331	ASN
1	A	350	GLN
1	A	372	ASN
1	B	34	GLN
1	B	230	ASN
1	B	249	ASN
1	B	372	ASN

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Mol	Chain	Res	Type
1	B	404	HIS
1	C	34	GLN
1	C	44	ASN
1	C	106	ASN
1	C	187	ASN
1	C	320	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 13 ligands modelled in this entry, 6 are monoatomic - leaving 7 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	$\# Z > 2$
4	SO4	A	1411	-	4,4,4	0.38	0	6,6,6	0.33	0
2	NHW	B	1000	5	64,66,66	1.12	5 (7%)	87,92,92	1.51	16 (18%)
2	NHW	A	1000	-	64,66,66	1.06	2 (3%)	87,92,92	1.78	18 (20%)
3	YN4	B	1001	-	37,37,37	2.07	8 (21%)	46,49,49	2.16	15 (32%)
3	YN4	C	1001	-	37,37,37	2.11	7 (18%)	46,49,49	2.05	12 (26%)
2	NHW	C	1000	5	64,66,66	1.11	5 (7%)	87,92,92	1.75	16 (18%)
3	YN4	A	1001	-	37,37,37	2.07	7 (18%)	46,49,49	2.25	15 (32%)

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	NHW	B	1000	5	-	8/65/81/81	0/3/3/3
2	NHW	A	1000	-	-	4/65/81/81	0/3/3/3
3	YN4	B	1001	-	-	5/21/29/29	0/4/4/4
3	YN4	C	1001	-	-	1/21/29/29	0/4/4/4
2	NHW	C	1000	5	-	6/65/81/81	0/3/3/3
3	YN4	A	1001	-	-	5/21/29/29	0/4/4/4

All (34) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1001	YN4	C4-S	-6.76	1.68	1.77
3	C	1001	YN4	C3-C4	5.88	1.51	1.40
3	B	1001	YN4	C4-S	-5.64	1.70	1.77
3	B	1001	YN4	C3-C4	5.43	1.50	1.40
3	C	1001	YN4	C4-C8	5.26	1.50	1.43
3	B	1001	YN4	O1-C	5.04	1.45	1.33
3	C	1001	YN4	O1-C	4.98	1.45	1.33
3	A	1001	YN4	C4-C8	4.93	1.50	1.43
3	A	1001	YN4	O1-C	4.69	1.45	1.33
3	C	1001	YN4	C4-S	-4.58	1.71	1.77
2	C	1000	NHW	P1A-O3A	4.52	1.64	1.59
3	A	1001	YN4	C3-C4	4.30	1.48	1.40
3	B	1001	YN4	C4-C8	4.26	1.49	1.43
3	C	1001	YN4	C8-C23	4.13	1.49	1.42
3	B	1001	YN4	C8-C23	3.96	1.48	1.42
3	A	1001	YN4	C8-C23	3.42	1.47	1.42
2	A	1000	NHW	P2A-O3A	3.22	1.63	1.59
2	C	1000	NHW	C5A-N7A	-3.02	1.33	1.39
2	A	1000	NHW	C5A-N7A	-3.02	1.33	1.39
2	C	1000	NHW	P2A-O3A	2.91	1.62	1.59
2	B	1000	NHW	P1A-O3A	-2.86	1.56	1.59
2	B	1000	NHW	O4X-C4X	2.77	1.51	1.45
3	C	1001	YN4	C9-C10	2.69	1.41	1.37
3	B	1001	YN4	C9-C10	2.66	1.41	1.37
2	B	1000	NHW	C5A-N7A	-2.64	1.34	1.39
3	A	1001	YN4	C9-C10	2.57	1.41	1.37
3	A	1001	YN4	C24-N4	2.34	1.35	1.31
3	B	1001	YN4	C22-C21	2.30	1.41	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1000	NHW	CP-C1M	2.24	1.55	1.51
3	C	1001	YN4	C22-C21	2.23	1.41	1.36
2	B	1000	NHW	P2A-O3A	-2.19	1.57	1.59
3	B	1001	YN4	C24-N4	2.12	1.35	1.31
2	B	1000	NHW	CP-S1	2.08	1.86	1.81
2	C	1000	NHW	C8A-N9A	-2.07	1.34	1.37

All (92) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1001	YN4	C24-N4-C23	6.84	124.88	116.96
3	A	1001	YN4	C24-N4-C23	6.79	124.82	116.96
2	C	1000	NHW	C5A-C4A-N3A	-6.23	118.14	126.72
3	C	1001	YN4	C24-N4-C23	6.14	124.06	116.96
2	A	1000	NHW	C5A-C4A-N3A	-5.87	118.63	126.72
2	C	1000	NHW	N3A-C2A-N1A	-5.65	120.04	128.58
3	C	1001	YN4	C16-N1-C19	5.32	123.53	111.57
3	A	1001	YN4	C16-N1-C19	5.22	123.30	111.57
2	B	1000	NHW	C5A-C4A-N3A	-5.15	119.63	126.72
2	C	1000	NHW	N3A-C4A-N9A	5.02	135.70	127.17
3	B	1001	YN4	C16-N1-C19	4.87	122.53	111.57
2	A	1000	NHW	N3A-C2A-N1A	-4.84	121.25	128.58
3	A	1001	YN4	O1-C-C3	4.83	121.72	112.24
2	B	1000	NHW	N3A-C2A-N1A	-4.74	121.41	128.58
2	A	1000	NHW	N3A-C4A-N9A	4.56	134.92	127.17
2	C	1000	NHW	C2A-N3A-C4A	4.21	122.11	111.83
2	A	1000	NHW	N9A-C8A-N7A	-4.10	108.12	113.94
3	B	1001	YN4	O1-C-C3	4.10	120.28	112.24
3	A	1001	YN4	C17-N2-C18	4.09	121.95	110.40
3	B	1001	YN4	C11-O2-C10	3.98	127.11	117.62
2	A	1000	NHW	C2A-N3A-C4A	3.94	121.47	111.83
3	B	1001	YN4	C5-C6-C7	-3.93	101.01	111.91
3	C	1001	YN4	C11-O2-C10	3.83	126.74	117.62
3	A	1001	YN4	C8-C23-N4	-3.69	118.91	122.82
3	C	1001	YN4	O1-C-O	-3.56	116.54	123.67
2	A	1000	NHW	C5A-N7A-C8A	3.50	108.95	103.45
3	B	1001	YN4	O1-C-O	-3.42	116.82	123.67
2	C	1000	NHW	C5A-N7A-C8A	3.36	108.74	103.45
2	C	1000	NHW	N9A-C8A-N7A	-3.35	109.18	113.94
2	B	1000	NHW	N3A-C4A-N9A	3.35	132.86	127.17
2	B	1000	NHW	C2A-N3A-C4A	3.35	120.00	111.83
3	A	1001	YN4	N3-C15-N1	3.33	121.52	116.76

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1001	YN4	O1-C-C3	3.32	118.77	112.24
3	C	1001	YN4	C17-N2-C18	3.26	119.61	110.40
2	A	1000	NHW	O4X-C1X-C2X	-3.19	99.78	106.62
2	C	1000	NHW	C2-S1-CP	-3.14	96.54	101.72
2	A	1000	NHW	C6-C5-N4	-3.12	110.65	116.34
2	A	1000	NHW	C13-C11-C12	-3.07	103.15	108.22
2	A	1000	NHW	C4A-N9A-C8A	3.06	108.95	105.74
2	B	1000	NHW	O3A-P2A-O5A	-3.06	101.50	110.70
3	B	1001	YN4	C8-C23-N4	-3.04	119.60	122.82
3	B	1001	YN4	C5-S-C4	3.04	111.06	101.87
2	C	1000	NHW	O3A-P2A-O5A	-2.98	101.75	110.70
3	A	1001	YN4	O1-C-O	-2.92	117.82	123.67
3	B	1001	YN4	C17-N2-C18	2.87	118.51	110.40
2	A	1000	NHW	O2A-P1A-O3A	2.85	114.99	107.27
3	C	1001	YN4	C8-C23-N4	-2.80	119.85	122.82
3	C	1001	YN4	C12-C20-N3	-2.78	119.85	123.99
2	B	1000	NHW	O2A-P1A-O3A	2.76	114.73	107.27
3	A	1001	YN4	C9-C8-C4	2.73	125.21	122.86
2	A	1000	NHW	C7-C6-C5	2.69	116.87	112.39
3	A	1001	YN4	C12-C20-N3	-2.67	120.02	123.99
2	A	1000	NHW	C4A-C5A-N7A	-2.67	107.53	110.58
2	C	1000	NHW	P3X-O3X-C3X	-2.67	116.30	123.43
3	B	1001	YN4	C22-C23-N4	2.65	122.81	118.55
2	B	1000	NHW	N9A-C8A-N7A	-2.60	110.24	113.94
2	B	1000	NHW	O1M-C1M-CP	-2.58	118.49	122.17
3	A	1001	YN4	C20-N3-C15	2.58	121.63	117.41
2	C	1000	NHW	C4A-C5A-N7A	-2.57	107.65	110.58
3	B	1001	YN4	C3-C24-N4	-2.56	121.88	125.20
3	A	1001	YN4	C11-O2-C10	2.53	123.65	117.62
2	C	1000	NHW	O4X-C1X-C2X	-2.47	101.33	106.62
3	A	1001	YN4	C8-C4-S	2.46	123.76	119.05
2	A	1000	NHW	O4A-P2A-O3A	2.45	113.90	107.27
3	C	1001	YN4	C5-C6-C7	-2.44	105.14	111.91
2	A	1000	NHW	C13-C11-C10	2.43	112.91	108.77
2	A	1000	NHW	O1M-C1M-CP	-2.42	118.72	122.17
2	C	1000	NHW	C4A-N9A-C8A	2.42	108.28	105.74
3	B	1001	YN4	C20-N3-C15	2.40	121.33	117.41
3	A	1001	YN4	C5-S-C4	2.36	109.00	101.87
3	B	1001	YN4	N3-C15-N1	2.31	120.06	116.76
3	C	1001	YN4	C20-N3-C15	2.30	121.17	117.41
2	B	1000	NHW	C2-C3-N4	-2.29	107.64	112.41
2	B	1000	NHW	O8A-P3X-O7A	-2.26	99.34	107.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1001	YN4	C12-C20-N3	-2.24	120.66	123.99
2	B	1000	NHW	O4A-P2A-O3A	2.23	113.30	107.27
2	B	1000	NHW	C5A-N7A-C8A	2.21	106.93	103.45
2	C	1000	NHW	C13-C11-C10	2.19	112.51	108.77
3	A	1001	YN4	C13-C12-C20	2.19	120.31	117.10
3	A	1001	YN4	C14-C15-N3	-2.18	119.17	123.46
2	B	1000	NHW	C4A-C5A-N7A	-2.16	108.11	110.58
2	C	1000	NHW	O4A-P2A-O3A	2.15	113.08	107.27
3	C	1001	YN4	C13-C12-C20	2.12	120.21	117.10
2	B	1000	NHW	O8A-P3X-O3X	-2.09	97.70	105.85
2	A	1000	NHW	O4A-P2A-O5A	2.09	122.17	112.44
3	C	1001	YN4	N3-C15-N1	2.08	119.73	116.76
2	C	1000	NHW	C3M-C2M-C1M	-2.07	109.34	114.59
3	B	1001	YN4	C14-C15-N3	-2.06	119.40	123.46
2	A	1000	NHW	O4X-C4X-C5X	-2.03	102.84	109.33
2	B	1000	NHW	C2A-N1A-C6A	2.01	122.03	118.73
2	C	1000	NHW	CP-C1M-C2M	2.01	119.80	115.55
2	B	1000	NHW	P3X-O3X-C3X	-2.00	118.08	123.43

There are no chirality outliers.

All (29) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1000	NHW	C12-O6A-P2A-O5A
3	A	1001	YN4	S-C5-C6-C7
3	A	1001	YN4	C8-C4-S-C5
3	A	1001	YN4	C3-C4-S-C5
3	B	1001	YN4	S-C5-C6-C7
3	B	1001	YN4	C6-C5-S-C4
2	C	1000	NHW	C4M-C5M-C6M-C7M
2	B	1000	NHW	C4M-C5M-C6M-C7M
2	A	1000	NHW	C7M-C8M-C9M-CAM
3	B	1001	YN4	C21-C10-O2-C11
3	B	1001	YN4	C9-C10-O2-C11
3	A	1001	YN4	C21-C10-O2-C11
3	A	1001	YN4	C9-C10-O2-C11
2	A	1000	NHW	C4M-C5M-C6M-C7M
2	A	1000	NHW	C2M-C3M-C4M-C5M
3	B	1001	YN4	C5-C6-C7-N
2	B	1000	NHW	C7M-C8M-C9M-CAM
2	B	1000	NHW	C2M-C3M-C4M-C5M
2	C	1000	NHW	C9M-CAM-CBM-CCM

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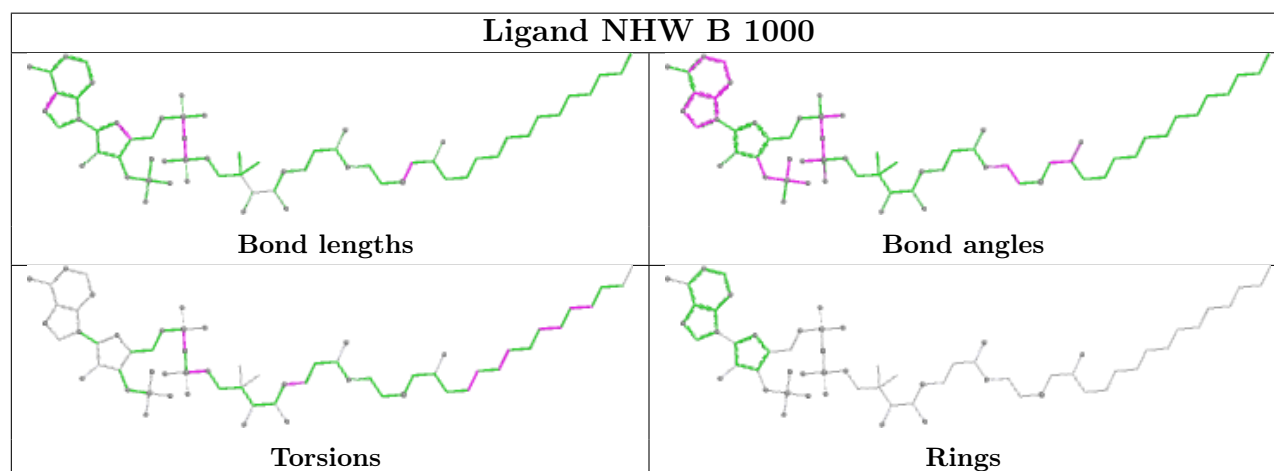
Mol	Chain	Res	Type	Atoms
2	B	1000	NHW	C9M-CAM-CBM-CCM
3	C	1001	YN4	S-C5-C6-C7
2	C	1000	NHW	P2A-O3A-P1A-O1A
2	C	1000	NHW	P2A-O3A-P1A-O2A
2	B	1000	NHW	P2A-O3A-P1A-O2A
2	B	1000	NHW	C6-C7-N8-C9
2	C	1000	NHW	C7M-C8M-C9M-CAM
2	C	1000	NHW	C2M-C3M-C4M-C5M
2	A	1000	NHW	P2A-O3A-P1A-O1A
2	B	1000	NHW	P2A-O3A-P1A-O1A

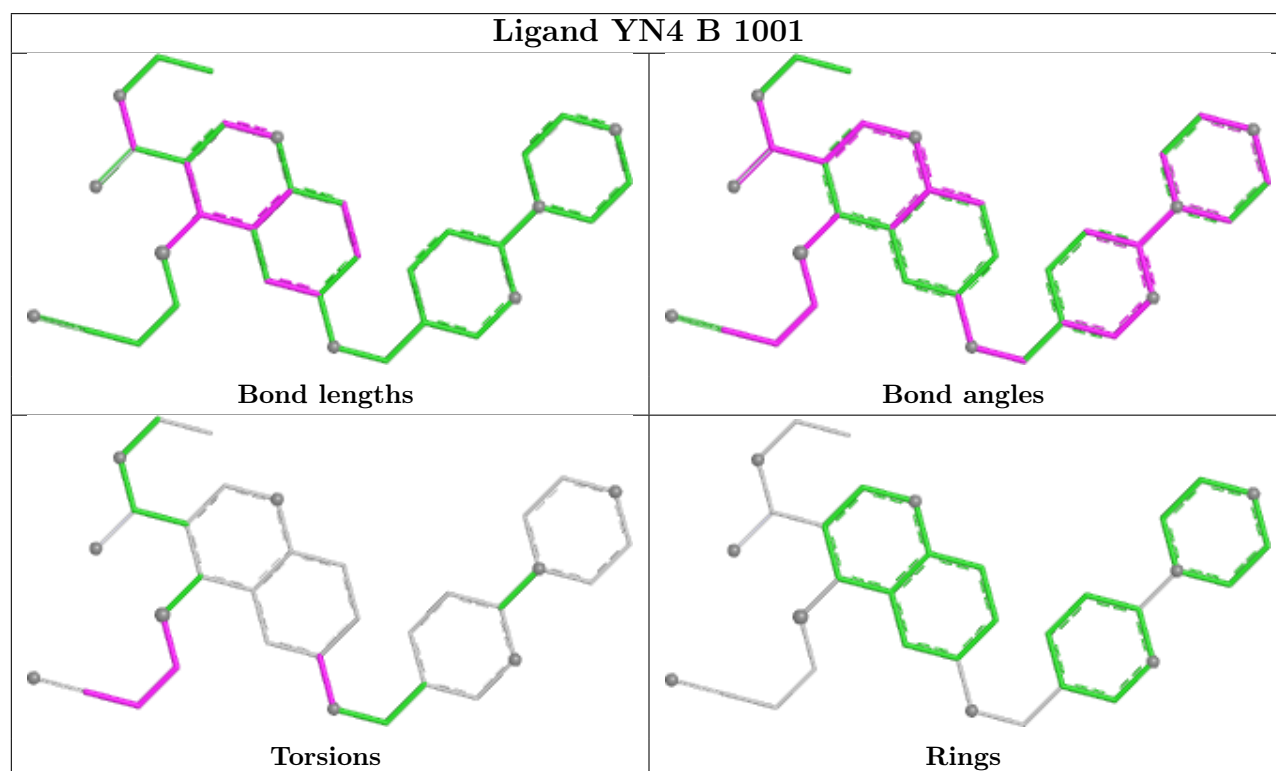
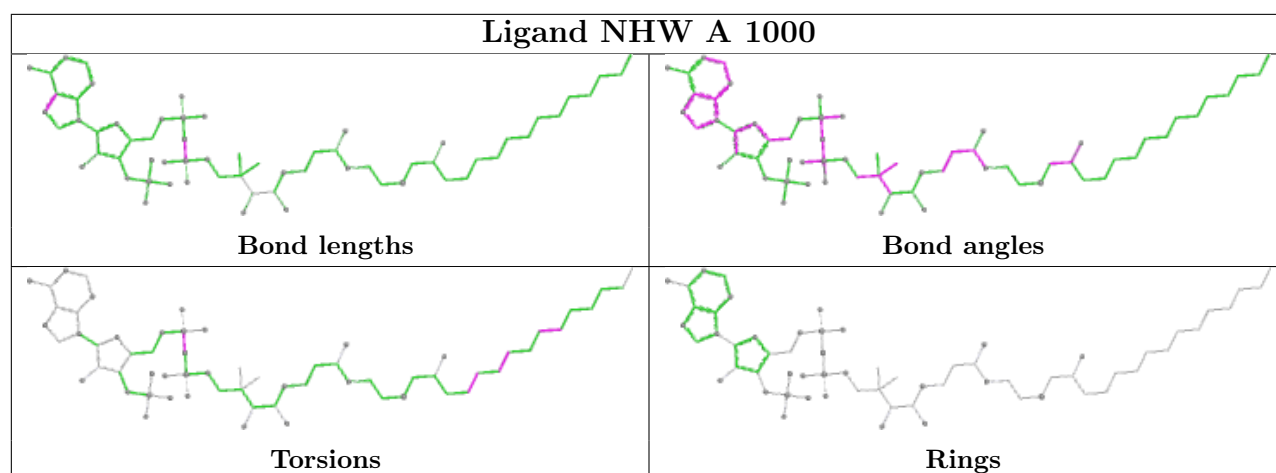
There are no ring outliers.

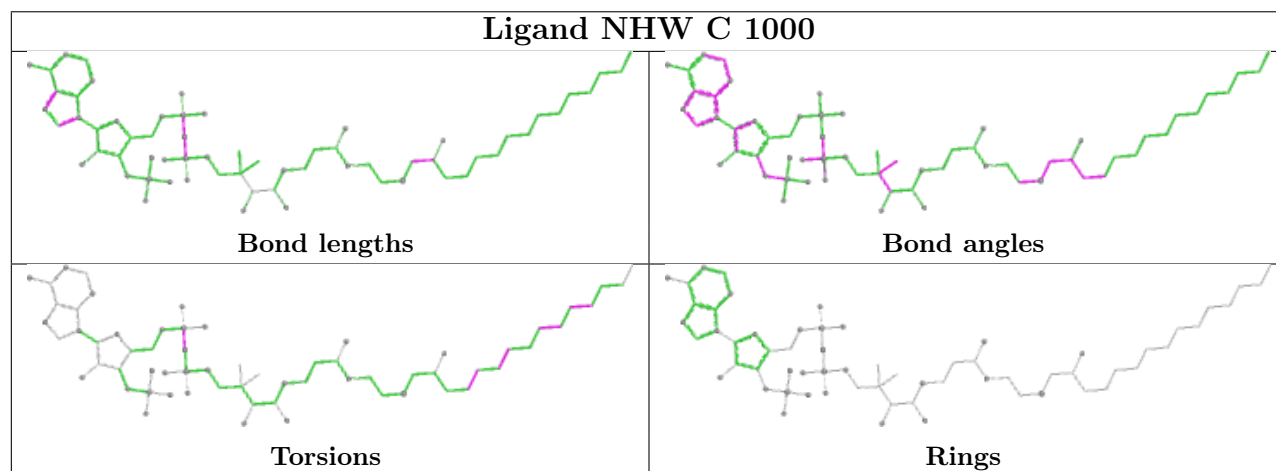
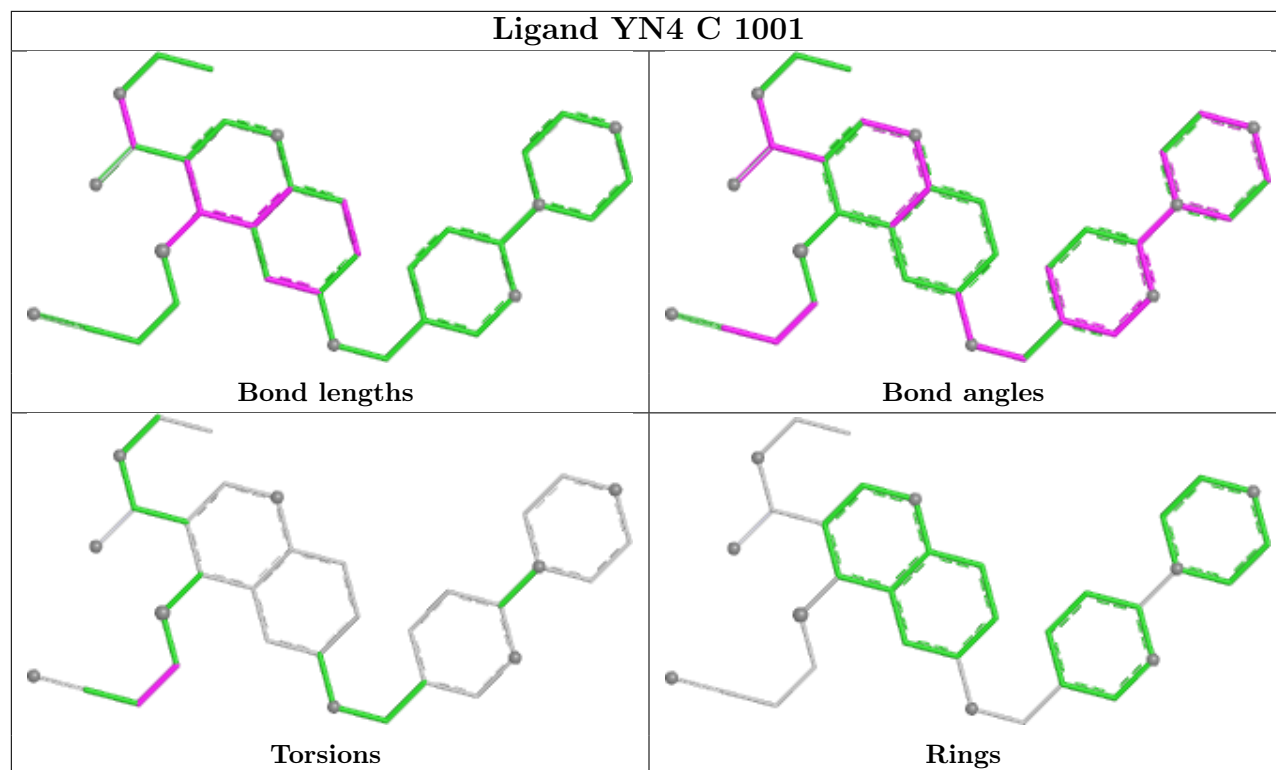
2 monomers are involved in 4 short contacts:

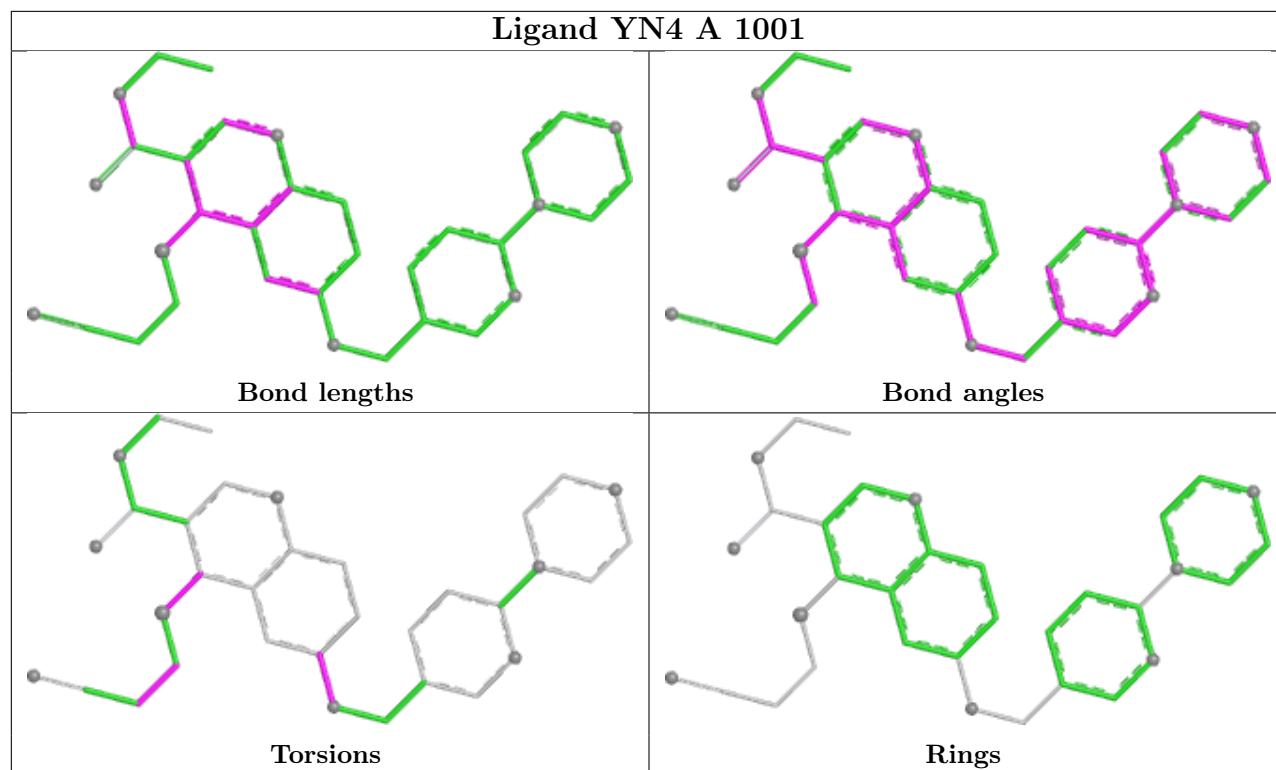
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1000	NHW	3	0
3	A	1001	YN4	1	0

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.









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	385/385 (100%)	0.27	5 (1%) 75 76	8, 20, 35, 55	28 (7%)
1	B	385/385 (100%)	0.21	5 (1%) 75 76	8, 18, 35, 63	28 (7%)
1	C	369/385 (95%)	0.30	10 (2%) 56 59	8, 19, 39, 69	29 (7%)
All	All	1139/1155 (98%)	0.26	20 (1%) 67 70	8, 19, 37, 69	85 (7%)

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	242	TYR	4.0
1	C	305[A]	ASN	3.7
1	B	325	ASP	3.7
1	C	226	PHE	3.3
1	B	32	TYR	3.2
1	A	26	ILE	3.2
1	B	39	ILE	3.0
1	C	410	LEU	3.0
1	B	26	ILE	2.9
1	C	39	ILE	2.9
1	C	225	GLY	2.7
1	B	40	ASN	2.6
1	C	325	ASP	2.6
1	C	44	ASN	2.5
1	C	409	LEU	2.4
1	A	232	ARG	2.4
1	A	57	VAL	2.3
1	C	32	TYR	2.2
1	A	42	GLU	2.1
1	A	47	VAL	2.1

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

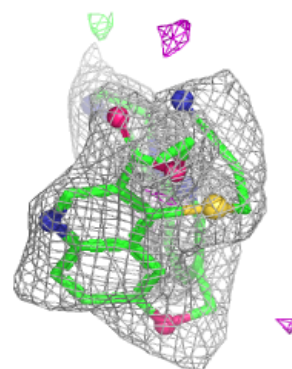
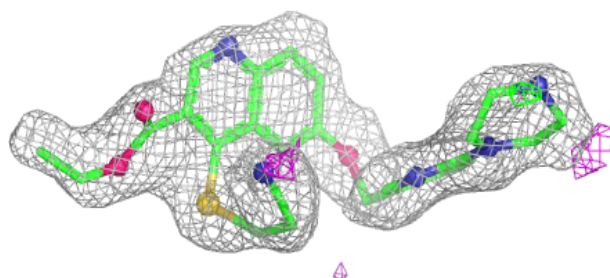
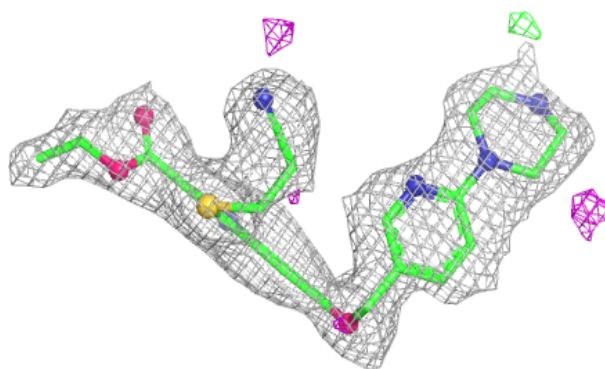
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	YN4	A	1001	34/34	0.86	0.12	26,27,37,38	0
3	YN4	B	1001	34/34	0.89	0.10	26,28,41,46	0
3	YN4	C	1001	34/34	0.89	0.11	25,29,34,38	0
5	MG	C	1411	1/1	0.91	0.10	29,29,29,29	0
5	MG	B	1411	1/1	0.92	0.10	33,33,33,33	0
2	NHW	C	1000	64/64	0.95	0.08	11,16,23,25	0
4	SO4	A	1411	5/5	0.95	0.08	39,40,42,43	0
2	NHW	A	1000	64/64	0.95	0.07	8,15,18,20	0
2	NHW	B	1000	64/64	0.95	0.07	12,14,16,18	0
5	MG	A	1412	1/1	0.96	0.08	36,36,36,36	0
6	CL	B	1412	1/1	0.97	0.04	29,29,29,29	0
6	CL	C	1412	1/1	0.98	0.08	26,26,26,26	0
6	CL	A	1413	1/1	0.99	0.08	26,26,26,26	0

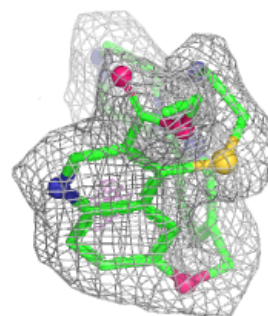
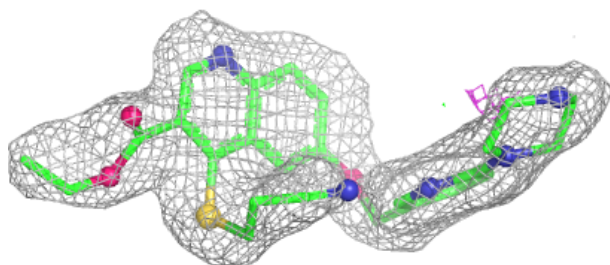
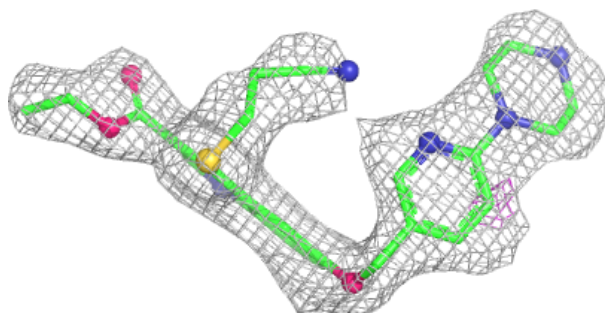
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around YN4 A 1001:

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

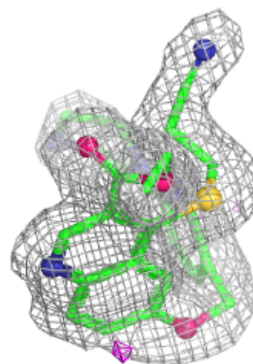
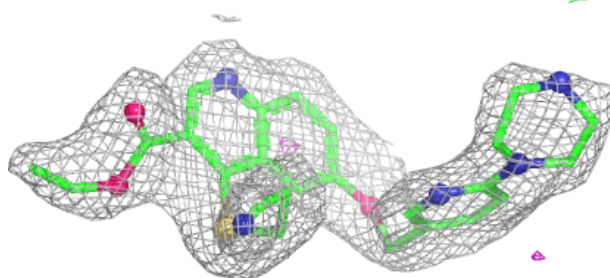
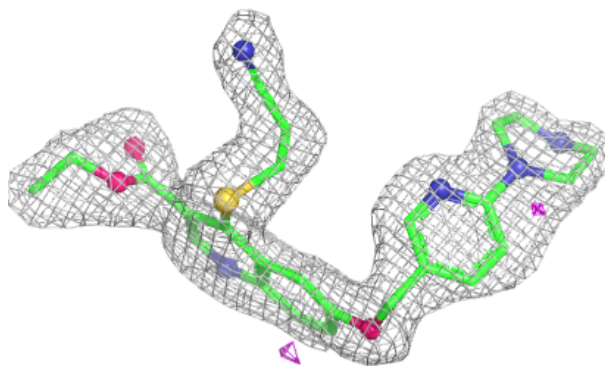
**Electron density around YN4 B 1001:**

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

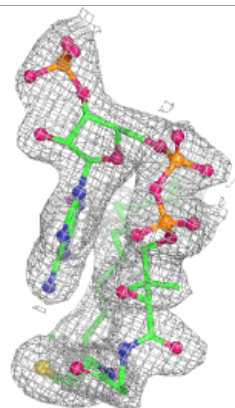
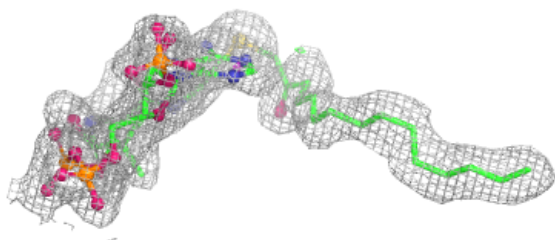
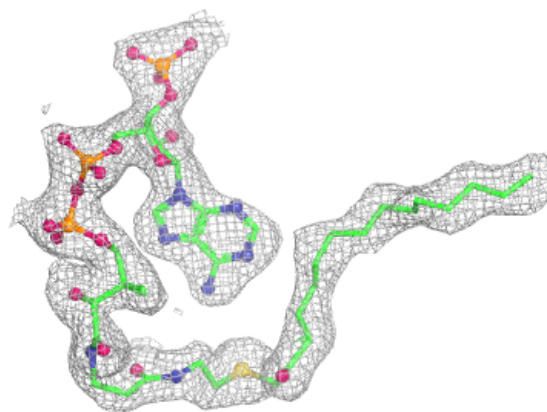


Electron density around YN4 C 1001:

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

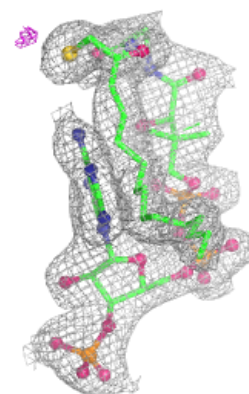
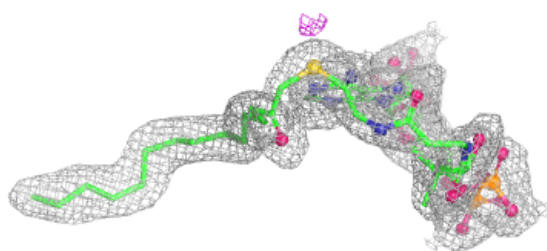
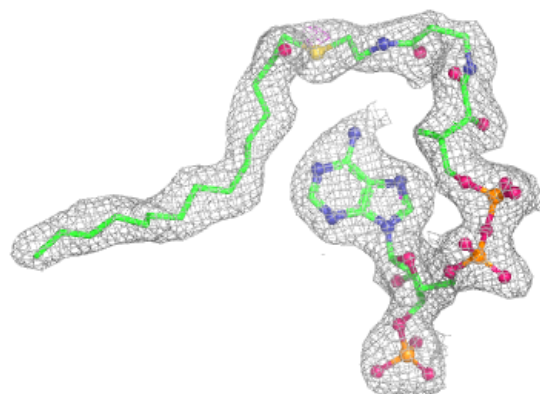
**Electron density around NHW C 1000:**

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

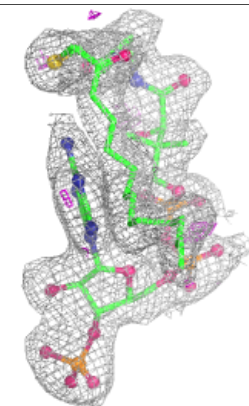
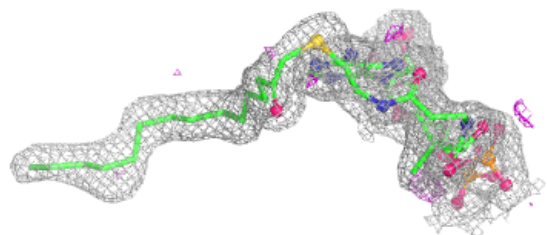
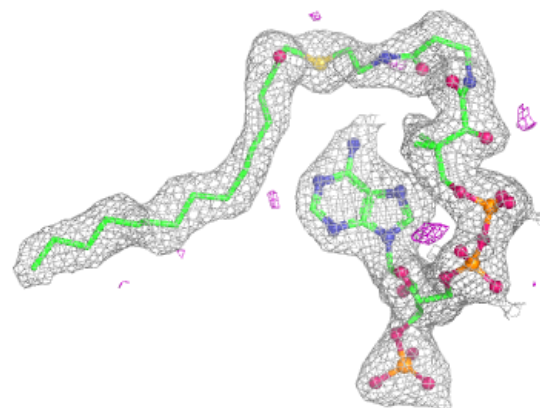


Electron density around NHW A 1000:

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

**Electron density around NHW B 1000:**

$2mF_o-DF_c$ (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.