Full wwPDB X-ray Structure Validation Report (i)

May 25, 2020 – 10:49 pm BST

PDB ID	:	4WE3
Title	:	STRUCTURE OF THE BINARY COMPLEX OF A ZINGIBER OFFICINALE DOUBLE BOND REDUCTASE IN COMPLEX WITH NADP MONOCLINIC CRYSTAL FORM
Authors	:	Collery, J.; Langlois d'Estaintot, B.; Buratto, J.; Granier, T.; Gallois, B.; Willis, M.A.; Sang, Y.; Flores-Sanchez, I.J.; Gang, D.R.
Deposited on	:	2014-09-09
Resolution	:	2.60 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 (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

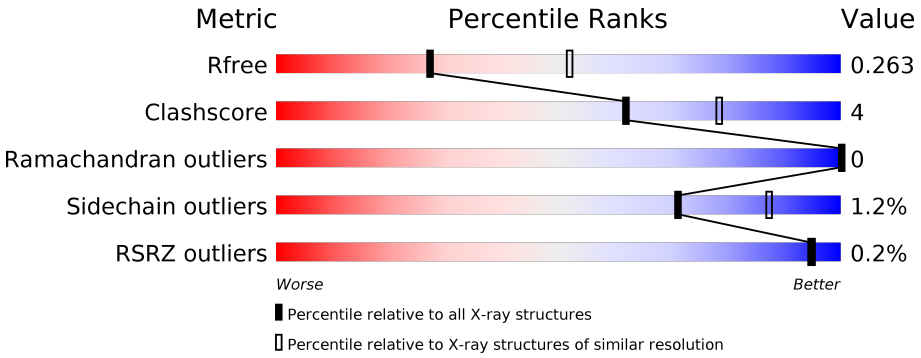
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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 on 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	358	87% 8% • •
1	B	358	% 84% 11% • 5%
1	C	358	88% 7% • •
1	D	358	84% 10% • •

2 Entry composition

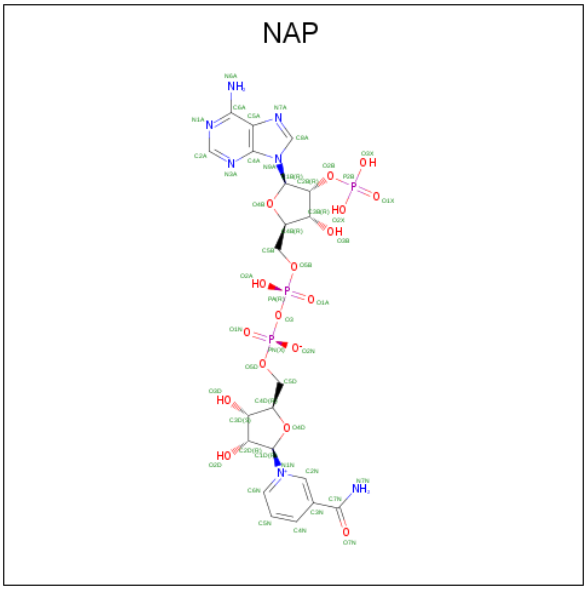
There are 3 unique types of molecules in this entry. The entry contains 10479 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Double Bond Reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	342	Total	C	N	O	S	0	0	0
			2577	1671	431	464	11			
1	B	340	Total	C	N	O	S	0	0	0
			2463	1592	398	461	12			
1	C	343	Total	C	N	O	S	0	0	0
			2588	1681	422	473	12			
1	D	342	Total	C	N	O	S	0	0	0
			2513	1616	423	462	12			

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	D	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is water.

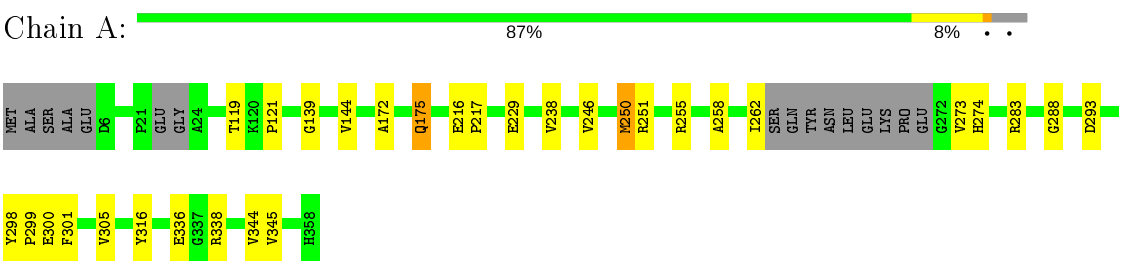
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	33	Total	O	0	0
			33	33		
3	B	31	Total	O	0	0
			31	31		
3	C	54	Total	O	0	0
			54	54		
3	D	28	Total	O	0	0
			28	28		

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.

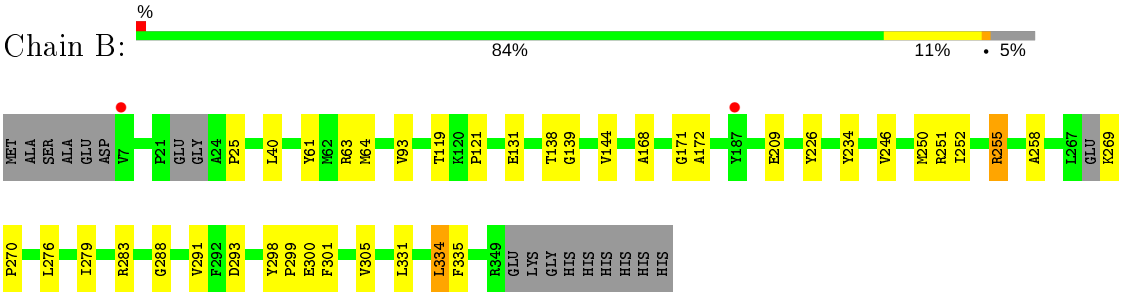
- Molecule 1: Double Bond Reductase

Chain A:



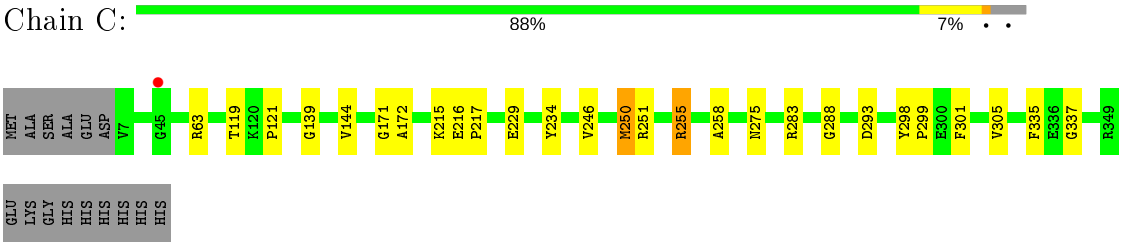
- Molecule 1: Double Bond Reductase

Chain B:



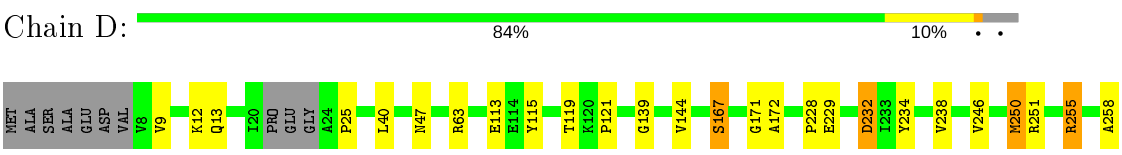
- Molecule 1: Double Bond Reductase

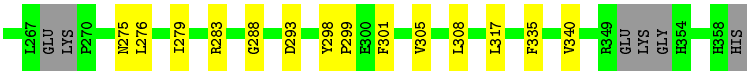
Chain C:



- Molecule 1: Double Bond Reductase

Chain D:




L267
GLU
LYS
P270
N275
L276
I279
R283
G288
D293
Y298
P299
E300
F301
V305
L308
L317
F335
V340
R349
GLU
LYS
GLY
H354
H358
HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	131.70Å 133.45Å 90.94Å 90.00° 101.39° 90.00°	Depositor
Resolution (Å)	46.40 – 2.60 46.39 – 2.49	Depositor EDS
% Data completeness (in resolution range)	99.4 (46.40-2.60) 99.4 (46.39-2.49)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.46 (at 2.48Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.222 , 0.265 0.225 , 0.263	Depositor DCC
R_{free} test set	2656 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å^2)	51.5	Xtriage
Anisotropy	0.216	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 34.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	10479	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 20.61 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.3726e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: NAP

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	0.59	0/2641	0.70	1/3583 (0.0%)
1	B	0.53	0/2522	0.69	3/3440 (0.1%)
1	C	0.61	0/2650	0.70	2/3597 (0.1%)
1	D	0.51	0/2571	0.70	3/3492 (0.1%)
All	All	0.56	0/10384	0.70	9/14112 (0.1%)

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	232	ASP	CB-CG-OD1	7.18	124.76	118.30
1	B	139	GLY	N-CA-C	6.90	130.35	113.10
1	B	168	ALA	N-CA-CB	6.36	119.01	110.10
1	D	255	ARG	NE-CZ-NH1	6.26	123.43	120.30
1	A	139	GLY	N-CA-C	6.15	128.47	113.10
1	D	139	GLY	N-CA-C	6.12	128.41	113.10
1	C	139	GLY	N-CA-C	6.09	128.33	113.10
1	B	255	ARG	NE-CZ-NH1	5.42	123.01	120.30
1	C	255	ARG	NE-CZ-NH1	5.16	122.88	120.30

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	2577	0	2456	20	0
1	B	2463	0	2196	28	0
1	C	2588	0	2479	19	0
1	D	2513	0	2287	27	0
2	A	48	0	25	1	0
2	B	48	0	25	3	0
2	C	48	0	25	1	0
2	D	48	0	25	2	0
3	A	33	0	0	2	0
3	B	31	0	0	2	0
3	C	54	0	0	1	0
3	D	28	0	0	0	0
All	All	10479	0	9518	88	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (88) 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:A:255:ARG:HD3	3:A:525:HOH:O	1.96	0.64
1:A:283:ARG:HD3	1:B:293:ASP:OD2	1.98	0.64
1:D:228:PRO:HG2	1:D:229:GLU:OE2	1.99	0.63
1:B:40:LEU:HD22	1:B:93:VAL:HG11	1.80	0.63
1:C:144:VAL:HG11	1:C:172:ALA:HB1	1.81	0.63
1:B:209:GLU:HG2	1:B:226:TYR:CD1	2.35	0.62
1:C:283:ARG:HD3	1:D:293:ASP:OD2	2.01	0.61
1:D:232:ASP:OD1	1:D:251:ARG:NE	2.31	0.61
1:B:144:VAL:HG11	1:B:172:ALA:HB1	1.83	0.60
1:A:293:ASP:OD2	1:B:283:ARG:HD3	2.02	0.59
1:C:63:ARG:NH1	1:C:63:ARG:O	2.31	0.59
1:D:144:VAL:HG11	1:D:172:ALA:HB1	1.83	0.59
1:A:144:VAL:HG11	1:A:172:ALA:HB1	1.86	0.57
1:A:274:HIS:HB3	1:B:270:PRO:HB2	1.85	0.57
2:B:400:NAP:H4B	2:B:400:NAP:O1A	2.05	0.57
1:A:238:VAL:O	1:A:262:ILE:N	2.33	0.56
1:B:61:TYR:HA	1:B:64:MET:CE	2.36	0.55
1:D:12:LYS:O	1:D:113:GLU:HB2	2.06	0.55
1:B:171:GLY:HA3	2:B:400:NAP:O1A	2.07	0.54
1:D:167:SER:OG	1:D:238:VAL:CG2	2.56	0.54
1:C:301:PHE:CE1	1:C:305:VAL:HG21	2.42	0.54
1:B:269:LYS:CB	1:B:270:PRO:CD	2.85	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:131:GLU:CB	3:B:507:HOH:O	2.56	0.53
1:A:258:ALA:HB3	1:A:288:GLY:HA2	1.91	0.52
1:C:215:LYS:O	1:C:215:LYS:CG	2.56	0.52
1:C:337:GLY:HA3	3:C:540:HOH:O	2.10	0.52
1:D:13:GLN:NE2	1:D:113:GLU:OE2	2.42	0.52
1:A:119:THR:O	1:A:121:PRO:HD3	2.10	0.51
1:C:119:THR:O	1:C:121:PRO:HD3	2.11	0.51
1:D:25:PRO:HG3	1:D:63:ARG:HD3	1.93	0.50
1:B:119:THR:O	1:B:121:PRO:HD3	2.11	0.50
2:A:400:NAP:O1A	2:A:400:NAP:H4B	2.12	0.50
1:B:276:LEU:HD22	1:B:279:ILE:HD12	1.93	0.50
1:B:25:PRO:HG3	1:B:63:ARG:HD3	1.94	0.49
1:D:171:GLY:HA3	2:D:400:NAP:O1A	2.11	0.49
1:B:301:PHE:CE1	1:B:305:VAL:HG21	2.48	0.49
1:D:301:PHE:CE1	1:D:305:VAL:HG21	2.47	0.49
1:B:209:GLU:HG2	1:B:226:TYR:CE1	2.48	0.49
1:D:9:VAL:CG1	1:D:40:LEU:HD11	2.42	0.48
1:D:276:LEU:HD22	1:D:279:ILE:HD12	1.94	0.48
1:D:119:THR:O	1:D:121:PRO:HD3	2.13	0.48
1:B:209:GLU:CG	1:B:226:TYR:CE1	2.97	0.48
1:C:171:GLY:HA3	2:C:400:NAP:O1A	2.14	0.48
1:C:258:ALA:HB3	1:C:288:GLY:HA2	1.94	0.47
1:D:258:ALA:HB3	1:D:288:GLY:HA2	1.96	0.47
1:D:167:SER:OG	1:D:238:VAL:HG23	2.14	0.47
1:A:336:GLU:OE1	1:A:338:ARG:NH2	2.47	0.47
1:B:258:ALA:HB3	1:B:288:GLY:HA2	1.96	0.47
1:B:251:ARG:O	1:B:252:ILE:C	2.52	0.46
1:A:300:GLU:HB3	3:A:524:HOH:O	2.15	0.46
1:C:298:TYR:HB3	1:C:299:PRO:HD3	1.98	0.46
1:D:113:GLU:HG3	1:D:115:TYR:H	1.81	0.45
1:B:276:LEU:CD2	1:B:279:ILE:HD12	2.47	0.45
1:D:63:ARG:HB2	1:D:335:PHE:CZ	2.52	0.45
1:B:138:THR:HA	3:B:524:HOH:O	2.16	0.45
1:D:317:LEU:HD21	1:D:340:VAL:HG12	1.99	0.45
1:D:255:ARG:HG3	1:D:255:ARG:HH11	1.82	0.44
1:A:298:TYR:HB3	1:A:299:PRO:HD3	1.98	0.44
1:B:63:ARG:HB2	1:B:335:PHE:CZ	2.53	0.44
1:A:273:VAL:HG21	1:B:276:LEU:HD12	2.00	0.44
1:B:298:TYR:HB3	1:B:299:PRO:HD3	2.00	0.44
1:D:276:LEU:CD2	1:D:279:ILE:HD12	2.48	0.43
1:A:301:PHE:CE1	1:A:305:VAL:HG21	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:246:VAL:HG12	1:C:250:MET:HE3	2.00	0.43
1:C:283:ARG:CD	1:D:293:ASP:OD2	2.66	0.43
1:D:9:VAL:HG13	1:D:40:LEU:HD11	2.00	0.43
1:A:175:GLN:OE1	1:A:316:TYR:HD1	2.01	0.43
1:B:331:LEU:O	1:B:334:LEU:HB2	2.18	0.42
1:C:255:ARG:HG3	1:C:255:ARG:HH11	1.84	0.42
1:C:63:ARG:HB2	1:C:335:PHE:CZ	2.54	0.42
1:A:216:GLU:HA	1:A:217:PRO:HD3	1.92	0.42
1:A:293:ASP:OD2	1:B:283:ARG:CD	2.68	0.42
1:D:234:TYR:CD2	1:D:246:VAL:HG11	2.55	0.42
1:D:298:TYR:HB3	1:D:299:PRO:HD3	2.00	0.42
1:B:234:TYR:CD2	1:B:246:VAL:HG11	2.54	0.41
1:D:246:VAL:HG12	1:D:250:MET:HE3	2.02	0.41
1:B:255:ARG:HG3	1:B:255:ARG:HH11	1.84	0.41
1:B:291:VAL:H	2:B:400:NAP:H72N	1.67	0.41
1:C:293:ASP:OD2	1:D:283:ARG:HD3	2.21	0.41
1:A:229:GLU:O	1:A:251:ARG:HD2	2.21	0.41
1:A:246:VAL:HG12	1:A:250:MET:HE3	2.02	0.41
1:C:216:GLU:HA	1:C:217:PRO:HD3	1.95	0.41
2:D:400:NAP:H4B	2:D:400:NAP:O1A	2.20	0.41
1:A:344:VAL:HG12	1:A:345:VAL:N	2.35	0.41
1:C:293:ASP:OD2	1:D:283:ARG:CD	2.69	0.41
1:C:229:GLU:O	1:C:251:ARG:HD2	2.21	0.40
1:A:255:ARG:HH11	1:A:255:ARG:HG3	1.86	0.40
1:C:234:TYR:CD2	1:C:246:VAL:HG11	2.56	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	336/358 (94%)	329 (98%)	7 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	334/358 (93%)	325 (97%)	9 (3%)	0	100	100
1	C	341/358 (95%)	334 (98%)	7 (2%)	0	100	100
1	D	334/358 (93%)	321 (96%)	13 (4%)	0	100	100
All	All	1345/1432 (94%)	1309 (97%)	36 (3%)	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	254/300 (85%)	252 (99%)	2 (1%)	81	92
1	B	224/300 (75%)	221 (99%)	3 (1%)	69	86
1	C	257/300 (86%)	255 (99%)	2 (1%)	81	92
1	D	233/300 (78%)	228 (98%)	5 (2%)	53	77
All	All	968/1200 (81%)	956 (99%)	12 (1%)	71	87

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	175	GLN
1	A	250	MET
1	B	250	MET
1	B	300	GLU
1	B	334	LEU
1	C	250	MET
1	C	275	ASN
1	D	47	ASN
1	D	167	SER
1	D	250	MET
1	D	275	ASN
1	D	308	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	HIS
1	C	248	HIS
1	C	275	ASN
1	C	294	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	NAP	C	400	-	45,52,52	1.14	4 (8%)	56,80,80	1.34	9 (16%)
2	NAP	D	400	-	45,52,52	1.01	3 (6%)	56,80,80	1.45	8 (14%)
2	NAP	A	400	-	45,52,52	1.18	4 (8%)	56,80,80	1.47	8 (14%)
2	NAP	B	400	-	45,52,52	1.08	4 (8%)	56,80,80	1.45	11 (19%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAP	C	400	-	-	12/31/67/67	0/5/5/5
2	NAP	D	400	-	-	6/31/67/67	0/5/5/5
2	NAP	A	400	-	-	12/31/67/67	0/5/5/5
2	NAP	B	400	-	-	7/31/67/67	0/5/5/5

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	400	NAP	C2N-N1N	-3.25	1.31	1.35
2	A	400	NAP	O4D-C1D	3.18	1.45	1.41
2	A	400	NAP	O4B-C1B	2.86	1.45	1.41
2	C	400	NAP	C2A-N3A	2.68	1.36	1.32
2	B	400	NAP	C5A-C4A	2.66	1.48	1.40
2	A	400	NAP	C5A-C4A	2.65	1.47	1.40
2	C	400	NAP	O4B-C1B	2.60	1.44	1.41
2	D	400	NAP	C5A-C4A	2.51	1.47	1.40
2	A	400	NAP	C2A-N3A	2.50	1.36	1.32
2	B	400	NAP	C2A-N3A	2.48	1.36	1.32
2	D	400	NAP	C2D-C1D	-2.48	1.50	1.53
2	B	400	NAP	O4D-C1D	2.44	1.44	1.41
2	C	400	NAP	C2D-C1D	-2.27	1.50	1.53
2	D	400	NAP	O4D-C1D	2.16	1.44	1.41
2	B	400	NAP	O4B-C4B	-2.04	1.40	1.45

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	400	NAP	O7N-C7N-N7N	-4.59	116.06	122.58
2	B	400	NAP	PN-O3-PA	-4.41	117.68	132.83
2	A	400	NAP	O7N-C7N-N7N	-4.41	116.31	122.58
2	A	400	NAP	O7N-C7N-C3N	4.26	124.74	119.63
2	C	400	NAP	C5A-C6A-N6A	-3.84	114.52	120.35
2	C	400	NAP	N3A-C2A-N1A	-3.69	122.90	128.68
2	A	400	NAP	N3A-C2A-N1A	-3.67	122.94	128.68
2	B	400	NAP	N3A-C2A-N1A	-3.50	123.21	128.68
2	D	400	NAP	O7N-C7N-C3N	3.48	123.80	119.63
2	D	400	NAP	N3A-C2A-N1A	-3.40	123.37	128.68
2	D	400	NAP	O3X-P2B-O1X	3.08	122.75	110.68
2	D	400	NAP	PN-O3-PA	-2.98	122.59	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	400	NAP	C5N-C4N-C3N	-2.92	116.88	120.34
2	C	400	NAP	C2N-C3N-C4N	2.92	121.56	118.26
2	A	400	NAP	O3B-C3B-C2B	2.87	119.30	111.17
2	B	400	NAP	C6N-N1N-C2N	-2.81	119.41	121.97
2	B	400	NAP	O3X-P2B-O2X	2.79	118.31	107.64
2	B	400	NAP	C5N-C4N-C3N	-2.67	117.19	120.34
2	B	400	NAP	C2D-C3D-C4D	2.63	107.75	102.64
2	A	400	NAP	PN-O3-PA	-2.57	123.99	132.83
2	C	400	NAP	PN-O3-PA	-2.55	124.08	132.83
2	A	400	NAP	O4D-C1D-C2D	-2.48	103.31	106.93
2	C	400	NAP	N6A-C6A-N1A	2.46	123.69	118.57
2	C	400	NAP	O3X-P2B-O2X	2.44	116.98	107.64
2	A	400	NAP	N6A-C6A-N1A	2.29	123.33	118.57
2	D	400	NAP	C3N-C2N-N1N	2.28	122.65	120.43
2	B	400	NAP	C3N-C7N-N7N	2.18	120.37	117.75
2	B	400	NAP	O2X-P2B-O2B	-2.16	96.30	105.99
2	B	400	NAP	C4A-C5A-N7A	-2.15	107.16	109.40
2	C	400	NAP	O5D-C5D-C4D	2.14	116.37	108.99
2	B	400	NAP	O7N-C7N-N7N	-2.12	119.56	122.58
2	D	400	NAP	O3X-P2B-O2B	-2.09	96.62	105.99
2	B	400	NAP	O3D-C3D-C4D	-2.07	105.06	111.05
2	D	400	NAP	O2A-PA-O1A	2.04	122.31	112.24
2	A	400	NAP	C3N-C2N-N1N	2.01	122.39	120.43
2	C	400	NAP	O2B-P2B-O1X	-2.01	101.65	109.39

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	400	NAP	C5D-O5D-PN-O2N
2	C	400	NAP	O4D-C1D-N1N-C6N
2	D	400	NAP	O4D-C1D-N1N-C6N
2	A	400	NAP	C2B-O2B-P2B-O1X
2	A	400	NAP	O4D-C4D-C5D-O5D
2	A	400	NAP	O4D-C1D-N1N-C6N
2	A	400	NAP	C3D-C4D-C5D-O5D
2	A	400	NAP	C4B-C5B-O5B-PA
2	B	400	NAP	C4B-C5B-O5B-PA
2	A	400	NAP	C1B-C2B-O2B-P2B
2	A	400	NAP	C3B-C2B-O2B-P2B
2	C	400	NAP	O4B-C4B-C5B-O5B
2	C	400	NAP	C4B-C5B-O5B-PA

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Mol	Chain	Res	Type	Atoms
2	D	400	NAP	C4B-C5B-O5B-PA
2	B	400	NAP	O4B-C4B-C5B-O5B
2	C	400	NAP	C2B-O2B-P2B-O1X
2	B	400	NAP	C2B-O2B-P2B-O1X
2	C	400	NAP	C5D-O5D-PN-O3
2	D	400	NAP	C2B-O2B-P2B-O2X
2	A	400	NAP	C5D-O5D-PN-O3
2	C	400	NAP	C5D-O5D-PN-O1N
2	A	400	NAP	C5B-O5B-PA-O1A
2	D	400	NAP	PA-O3-PN-O2N
2	C	400	NAP	C3B-C4B-C5B-O5B
2	A	400	NAP	O4B-C4B-C5B-O5B
2	B	400	NAP	C3B-C4B-C5B-O5B
2	C	400	NAP	O4D-C4D-C5D-O5D
2	C	400	NAP	C2B-O2B-P2B-O2X
2	C	400	NAP	C2B-O2B-P2B-O3X
2	A	400	NAP	C2B-O2B-P2B-O3X
2	D	400	NAP	O4B-C4B-C5B-O5B
2	B	400	NAP	O4D-C4D-C5D-O5D
2	C	400	NAP	PA-O3-PN-O1N
2	D	400	NAP	PA-O3-PN-O1N
2	A	400	NAP	PA-O3-PN-O2N
2	B	400	NAP	PA-O3-PN-O1N
2	B	400	NAP	PA-O3-PN-O2N

There are no ring outliers.

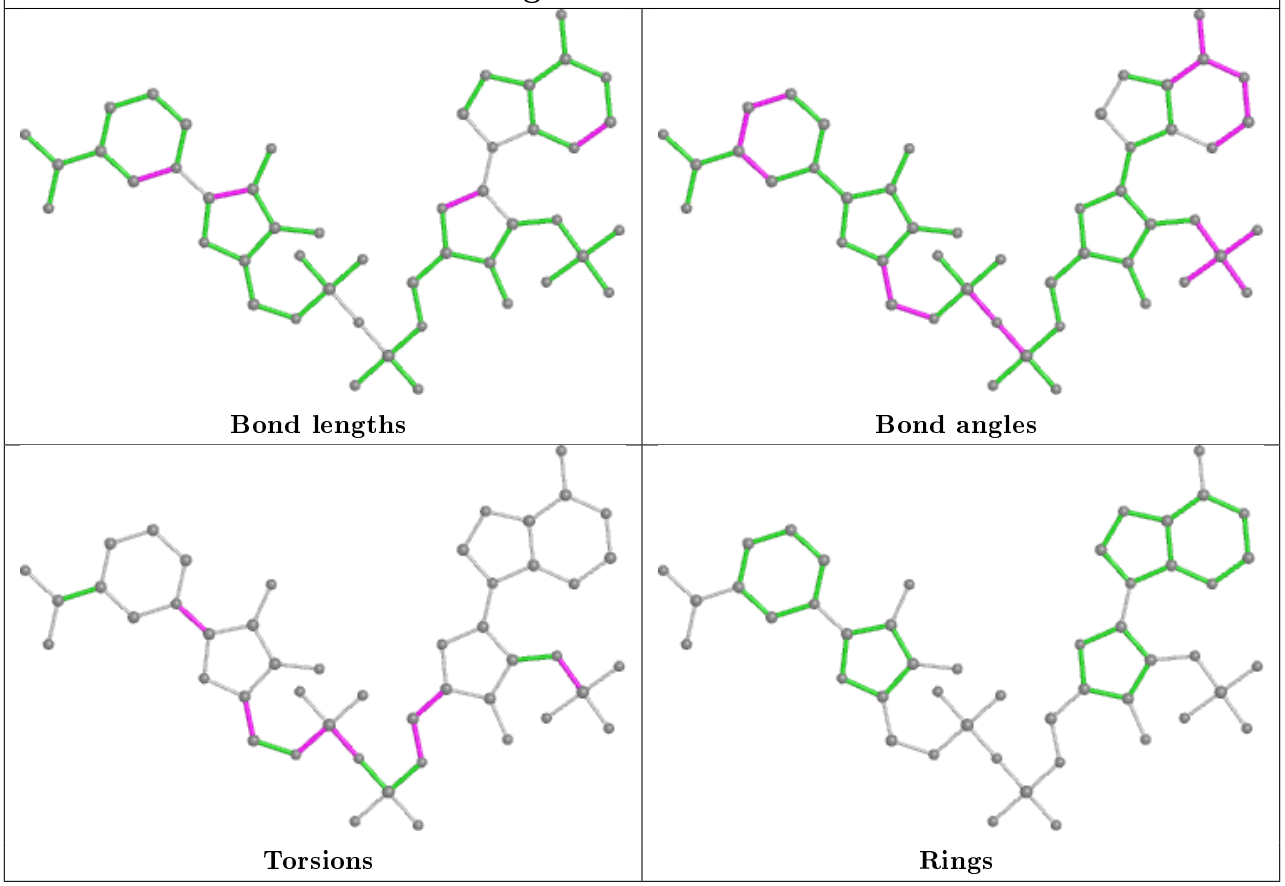
4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	400	NAP	1	0
2	D	400	NAP	2	0
2	A	400	NAP	1	0
2	B	400	NAP	3	0

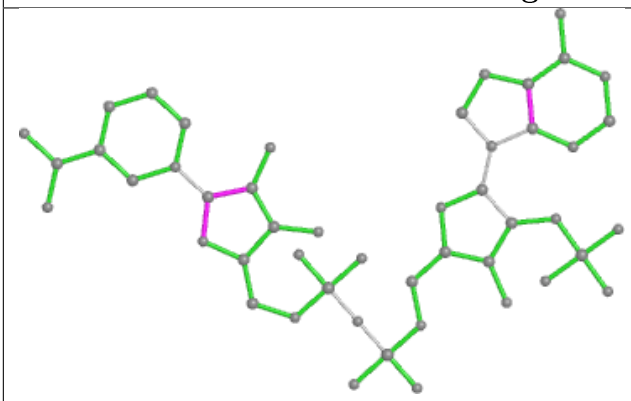
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the

average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

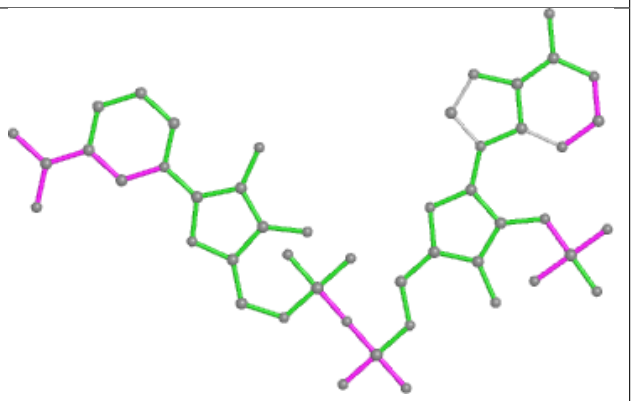
Ligand NAP C 400



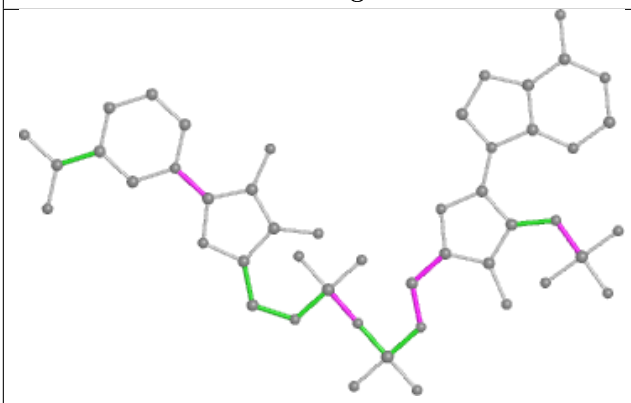
Ligand NAP D 400



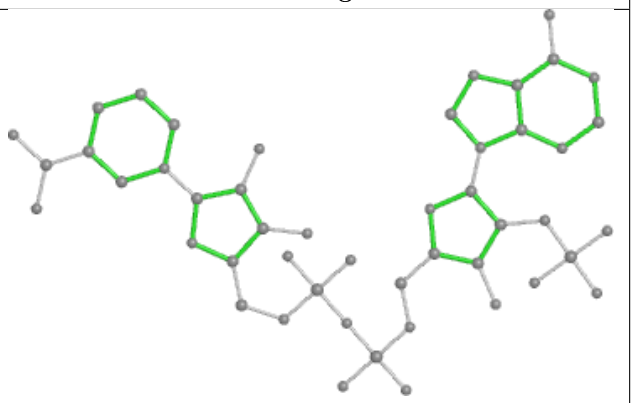
Bond lengths



Bond angles

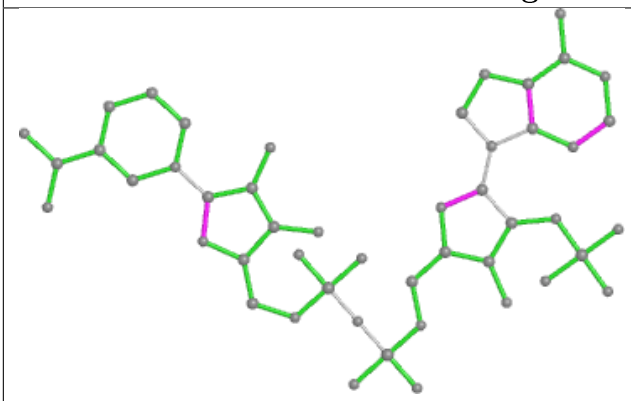


Torsions

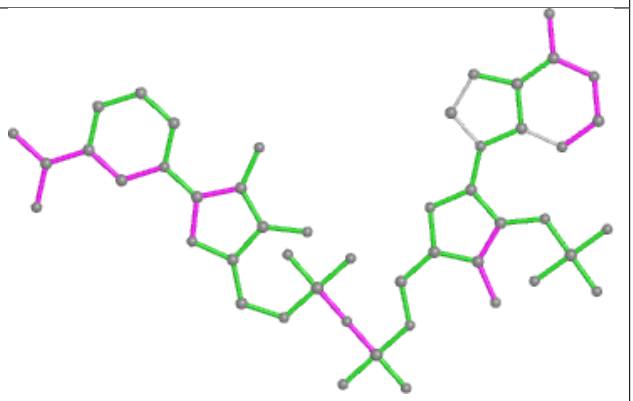


Rings

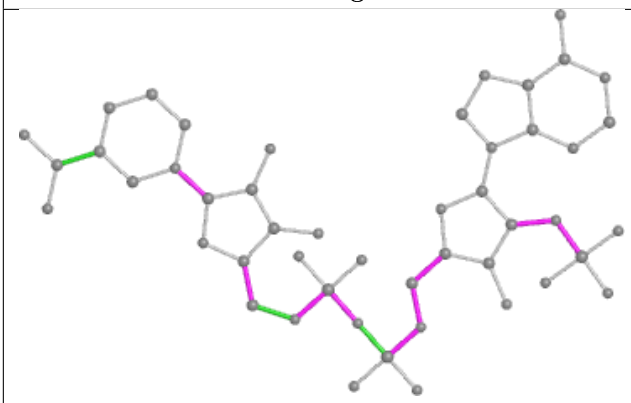
Ligand NAP A 400



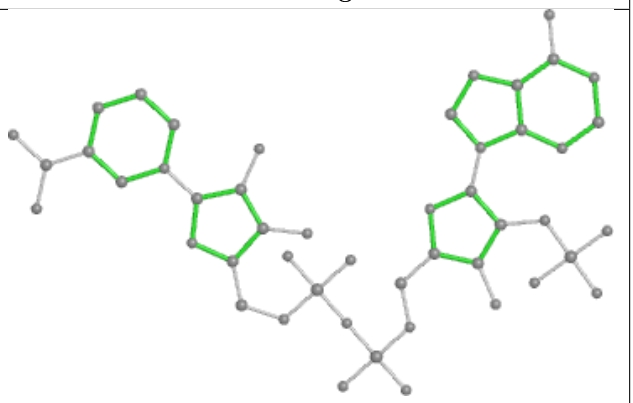
Bond lengths



Bond angles

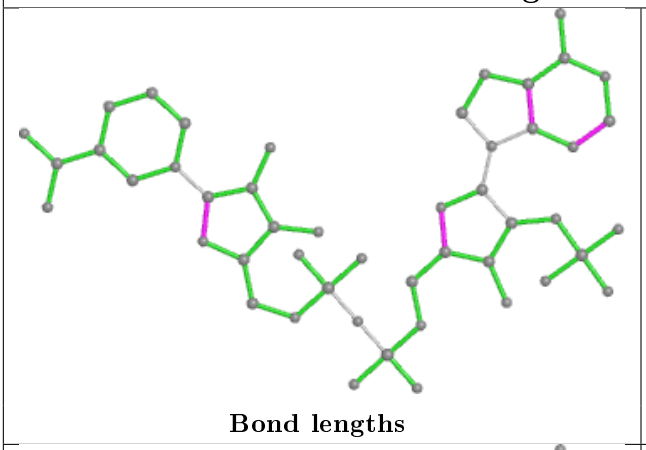


Torsions

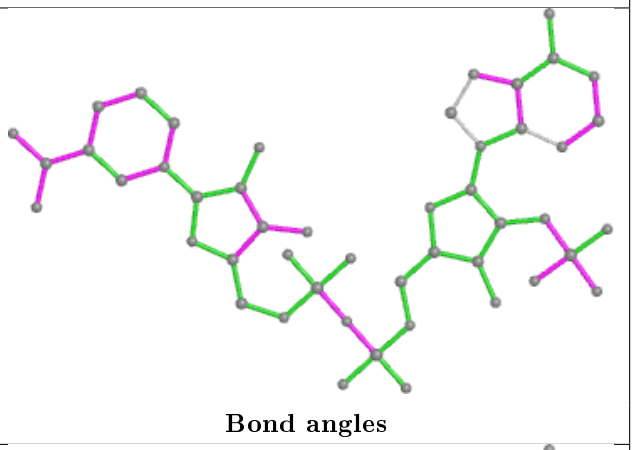


Rings

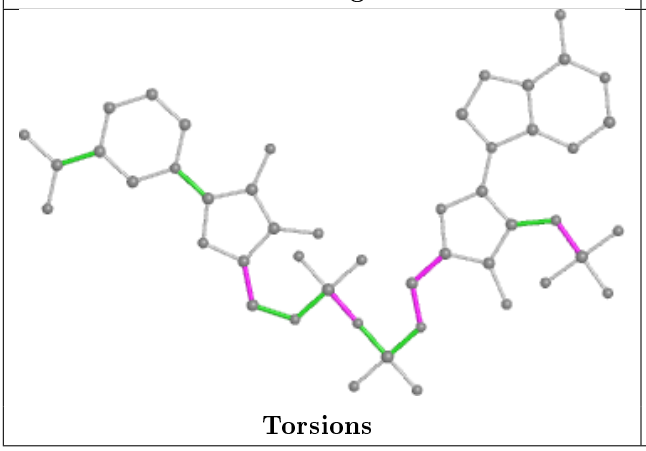
Ligand NAP B 400



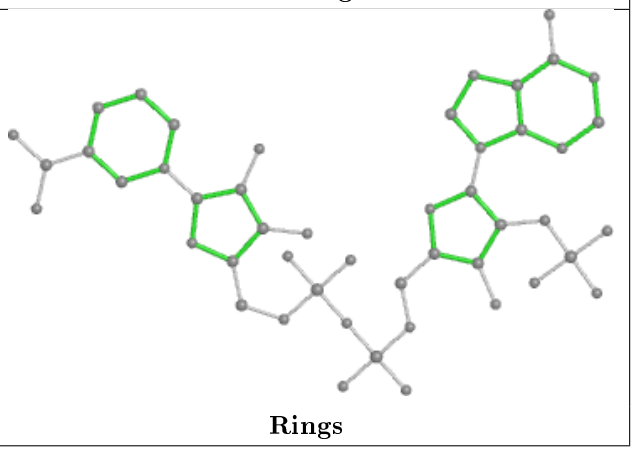
Bond lengths



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	342/358 (95%)	-0.46	0 100 100	28, 44, 73, 100	0
1	B	340/358 (94%)	-0.30	2 (0%) 89 88	32, 60, 85, 105	0
1	C	343/358 (95%)	-0.47	1 (0%) 94 93	26, 43, 69, 89	0
1	D	342/358 (95%)	-0.41	0 100 100	30, 57, 80, 106	0
All	All	1367/1432 (95%)	-0.41	3 (0%) 95 95	26, 52, 80, 106	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	7	VAL	2.6
1	C	45	GLY	2.3
1	B	187	TYR	2.1

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

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

6.3 Carbohydrates

There are no carbohydrates in this entry.

6.4 Ligands

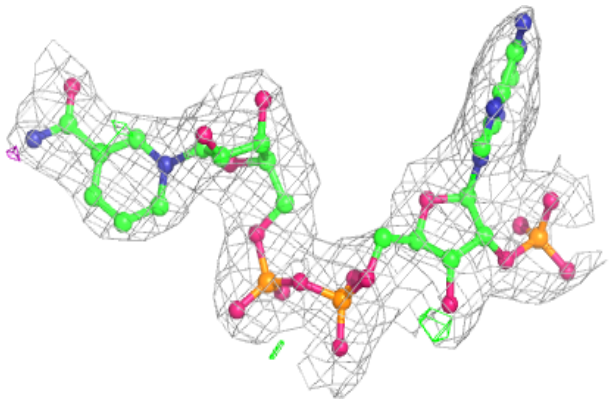
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

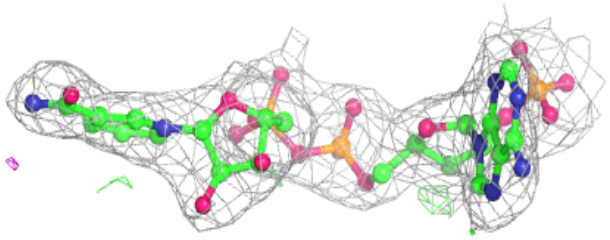
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAP	A	400	48/48	0.94	0.14	38,55,76,89	0
2	NAP	B	400	48/48	0.95	0.13	44,49,56,66	0
2	NAP	C	400	48/48	0.97	0.12	27,35,38,41	0
2	NAP	D	400	48/48	0.97	0.12	29,43,51,54	0

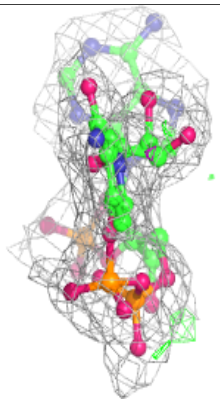
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NAP A 400:

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

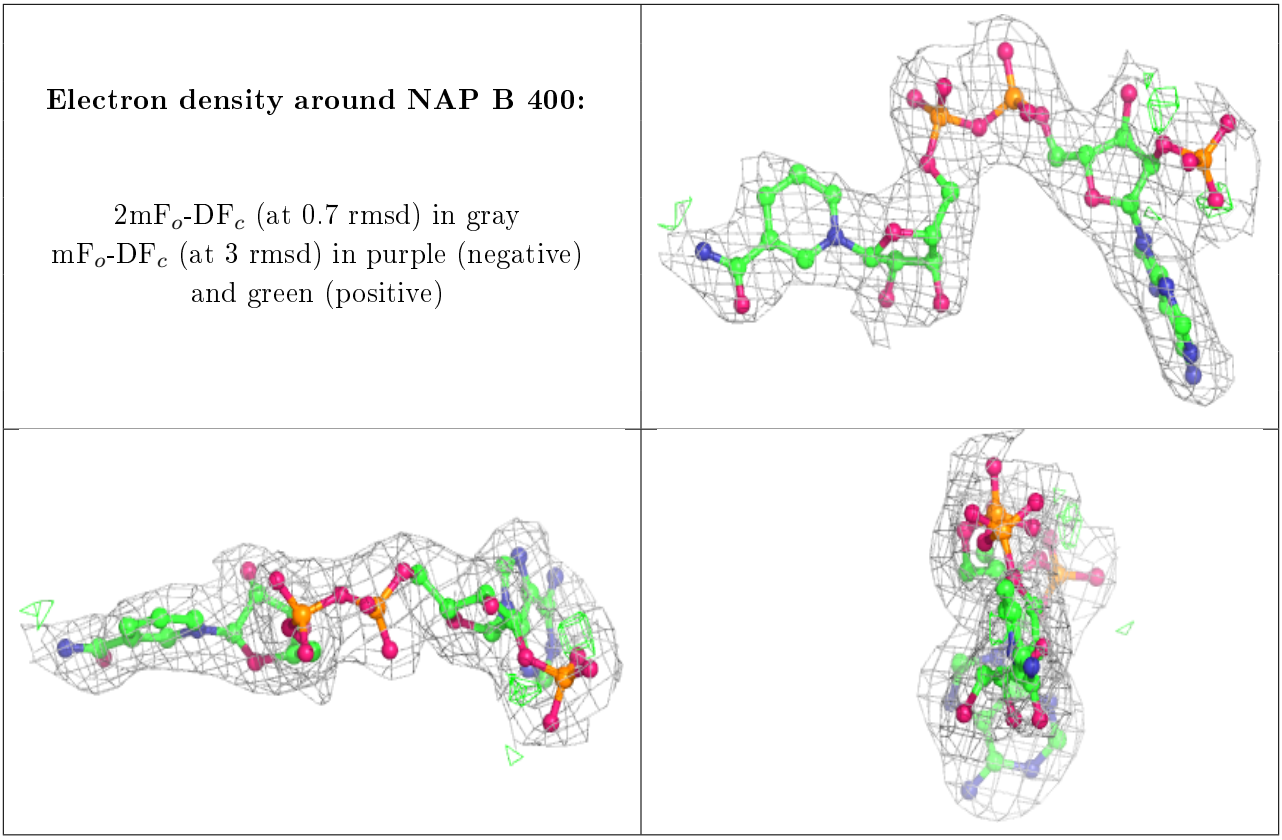






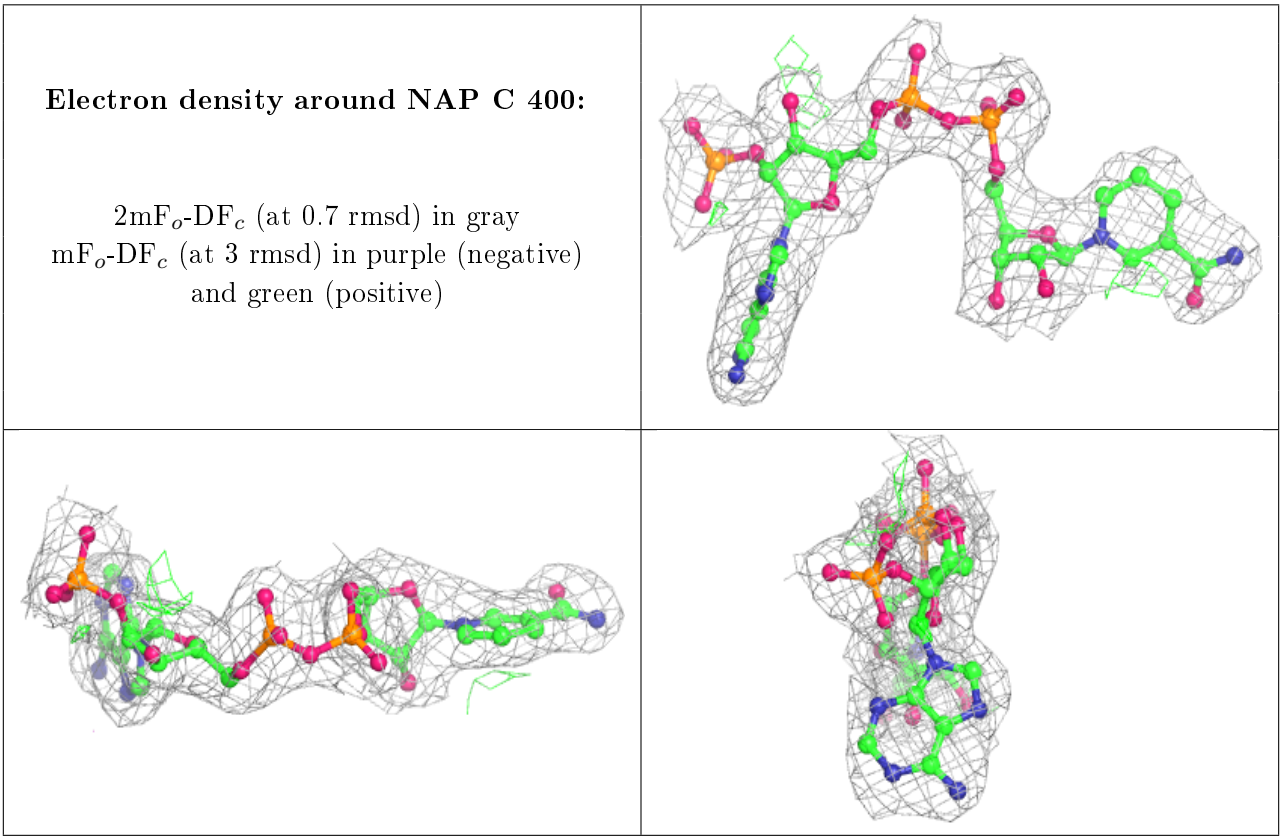
Electron density around NAP B 400:

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



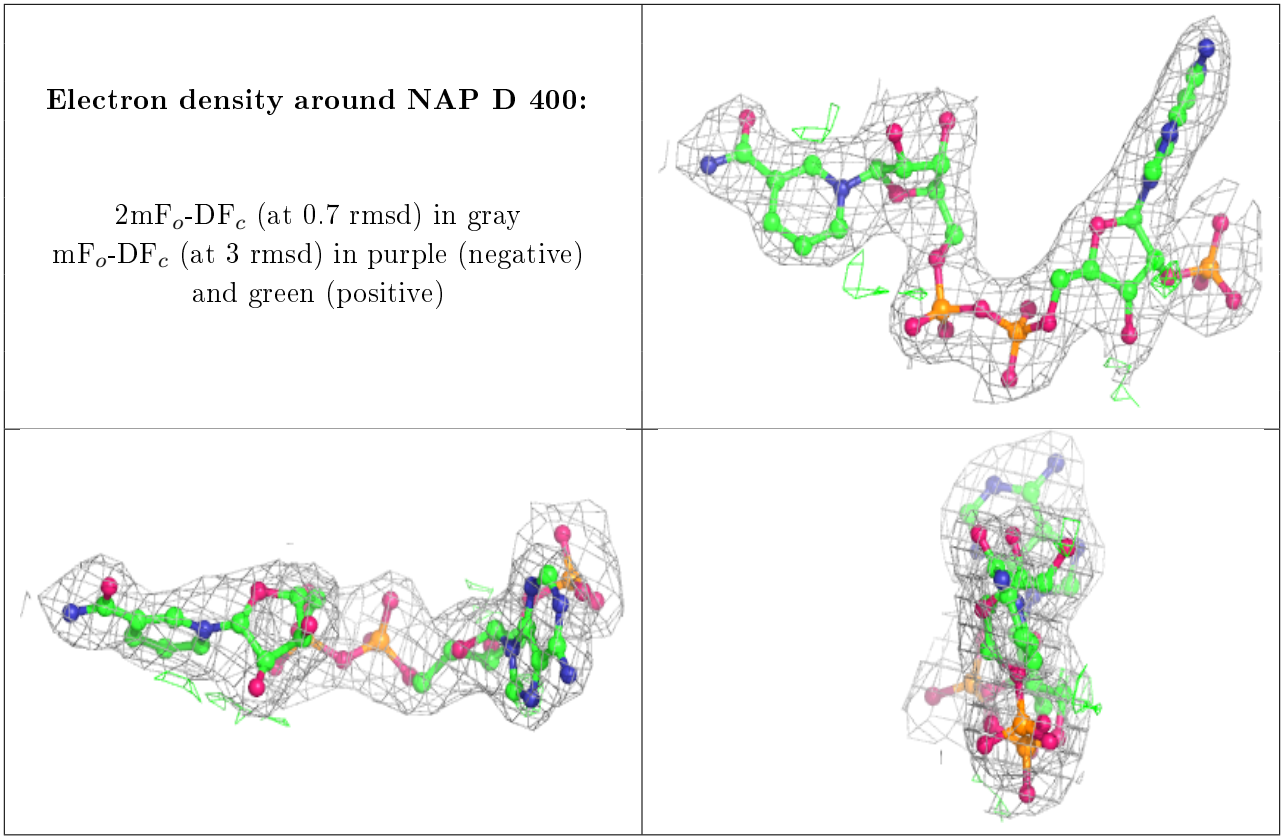
Electron density around NAP C 400:

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



Electron density around NAP D 400:

$2mF_o$-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.