Full wwPDB X-ray Structure Validation Report (i)

Oct 4, 2023 – 02:25 AM EDT

PDB ID	:	6U4J
Title	:	Crystal structure of IDH1 R132H mutant in complex with FT-2102
Authors	:	Toms, A.V.; Lin, J.
Deposited on	:	2019-08-25
Resolution	:	2.11 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 types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

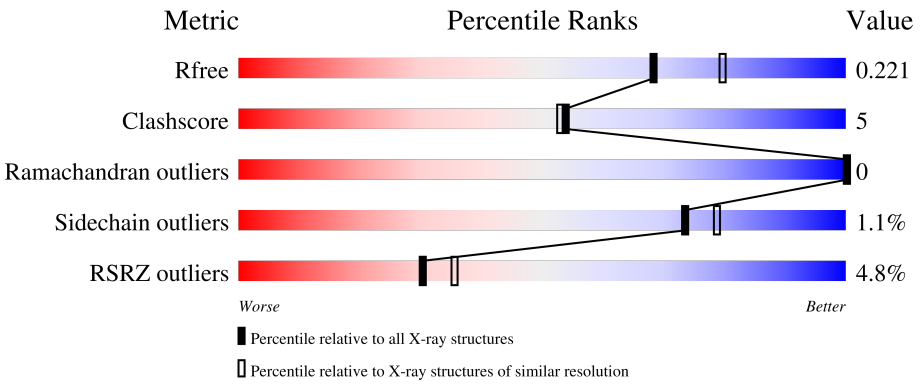
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.11 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	6241 (2.14-2.10)
Clashscore	141614	6778 (2.14-2.10)
Ramachandran outliers	138981	6705 (2.14-2.10)
Sidechain outliers	138945	6706 (2.14-2.10)
RSRZ outliers	127900	6112 (2.14-2.10)

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	425	3% 92% 6% •
1	B	425	6% 89% 7% • •

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 7718 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.

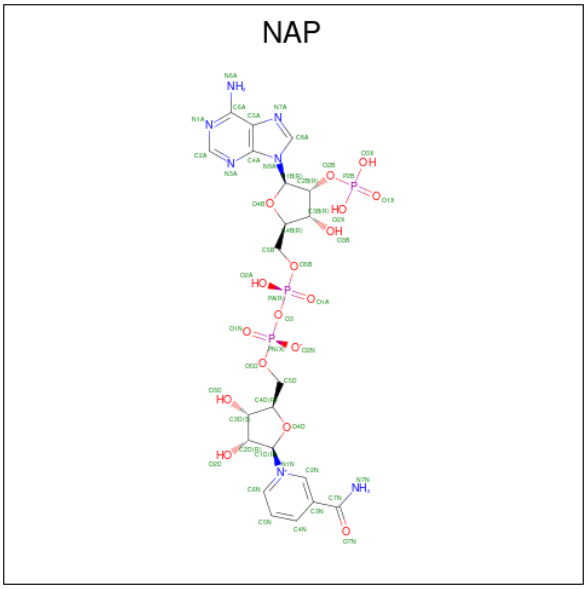
- Molecule 1 is a protein called Isocitrate dehydrogenase [NADP] cytoplasmic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	415	3343	2124	567	633	19	0	7	0
1	B	412	3306	2101	561	625	19	0	5	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	132	HIS	ARG	engineered mutation	UNP O75874
A	415	SER	-	expression tag	UNP O75874
A	416	LEU	-	expression tag	UNP O75874
A	417	GLU	-	expression tag	UNP O75874
A	418	HIS	-	expression tag	UNP O75874
A	419	HIS	-	expression tag	UNP O75874
A	420	HIS	-	expression tag	UNP O75874
A	421	HIS	-	expression tag	UNP O75874
A	422	HIS	-	expression tag	UNP O75874
A	423	HIS	-	expression tag	UNP O75874
A	424	HIS	-	expression tag	UNP O75874
A	425	HIS	-	expression tag	UNP O75874
B	132	HIS	ARG	engineered mutation	UNP O75874
B	415	SER	-	expression tag	UNP O75874
B	416	LEU	-	expression tag	UNP O75874
B	417	GLU	-	expression tag	UNP O75874
B	418	HIS	-	expression tag	UNP O75874
B	419	HIS	-	expression tag	UNP O75874
B	420	HIS	-	expression tag	UNP O75874
B	421	HIS	-	expression tag	UNP O75874
B	422	HIS	-	expression tag	UNP O75874
B	423	HIS	-	expression tag	UNP O75874
B	424	HIS	-	expression tag	UNP O75874
B	425	HIS	-	expression tag	UNP O75874

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

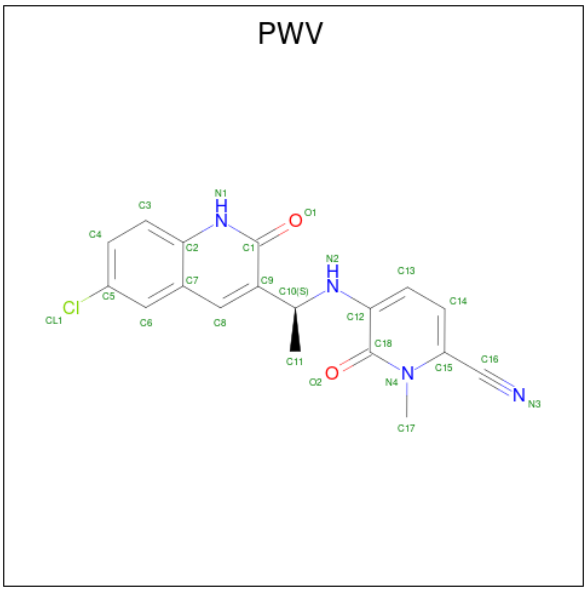


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	96	42	14	34	6	0	1
			Total	C	N	O	P		
2	B	1	48	21	7	17	3	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

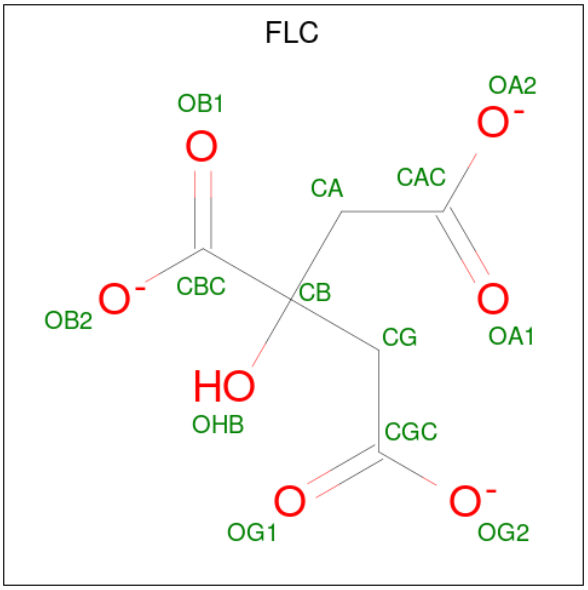
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
3	A	1	1	1	0	0
			Total	Cl		
3	B	1	1	1	0	0

- Molecule 4 is 5-{[(1S)-1-(6-chloro-2-oxo-1,2-dihydroquinolin-3-yl)ethyl]amino}-1-methyl-6-oxo-1,6-dihydropyridine-2-carbonitrile (three-letter code: PWV) (formula: $C_{18}H_{15}ClN_4O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	N	O		
4	A	1	25	18	1	4	2	0	0
			Total	C	Cl	N	O		
4	B	1	25	18	1	4	2	0	0

- Molecule 5 is CITRATE ANION (three-letter code: FLC) (formula: $C_6H_5O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	B	1	13	6	7	0	0

- Molecule 6 is water.

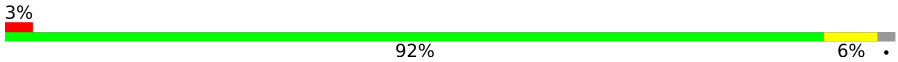
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
6	A	491	491	491	0	0
			Total	O		
6	B	369	369	369	0	0

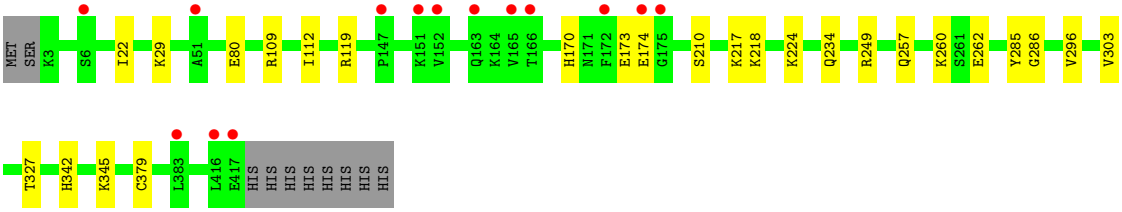
3 Residue-property plots (i)

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: Isocitrate dehydrogenase [NADP] cytoplasmic

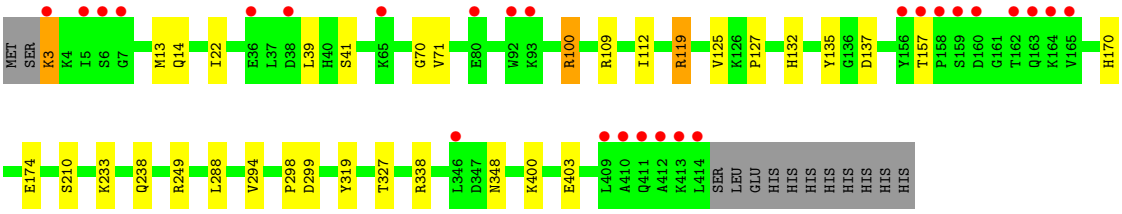
Chain A:





• Molecule 1: Isocitrate dehydrogenase [NADP] cytoplasmic

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	69.33Å 97.83Å 75.24Å 90.00° 98.41° 90.00°	Depositor
Resolution (Å)	47.66 – 2.11 47.66 – 2.11	Depositor EDS
% Data completeness (in resolution range)	100.0 (47.66-2.11) 100.0 (47.66-2.11)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.25 (at 2.10Å)	Xtriage
Refinement program	BUSTER 2.11.7	Depositor
R, R_{free}	0.168 , 0.220 0.170 , 0.221	Depositor DCC
R_{free} test set	2785 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å^2)	41.5	Xtriage
Anisotropy	0.099	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 56.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	7718	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.12% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: FLC, NAP, PWV, 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	0.51	0/3412	0.63	0/4600
1	B	0.50	0/3375	0.64	0/4550
All	All	0.51	0/6787	0.64	0/9150

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3343	0	3308	24	0
1	B	3306	0	3270	45	0
2	A	96	0	50	2	0
2	B	48	0	25	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	25	0	0	0	0
4	B	25	0	0	0	0
5	B	13	0	5	0	0
6	A	491	0	0	22	0
6	B	369	0	0	43	0
All	All	7718	0	6658	72	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (72) 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:109:ARG:HD3	6:A:815:HOH:O	1.25	1.36
1:B:13:MET:CE	6:B:604:HOH:O	1.73	1.26
1:B:319:TYR:CE2	6:B:605:HOH:O	2.03	1.11
1:B:41:SER:OG	6:B:601:HOH:O	1.70	1.09
1:A:174:GLU:OE1	6:A:602:HOH:O	1.75	1.03
1:B:39:LEU:HB3	6:B:601:HOH:O	1.60	1.00
1:B:319:TYR:HE2	6:B:605:HOH:O	1.39	0.99
1:B:137:ASP:OD2	6:B:602:HOH:O	1.85	0.92
1:B:13:MET:HE1	6:B:604:HOH:O	1.50	0.91
1:B:294:VAL:CG2	6:B:725:HOH:O	2.20	0.87
1:B:71:VAL:N	6:B:604:HOH:O	2.12	0.79
1:B:338[A]:ARG:NH1	6:B:603:HOH:O	2.00	0.79
1:A:285:TYR:OH	6:A:604:HOH:O	2.03	0.75
1:B:3:LYS:HB2	6:B:919:HOH:O	1.84	0.74
1:B:233:LYS:HG3	6:B:665:HOH:O	1.89	0.72
1:A:173:GLU:OE1	6:A:605:HOH:O	2.06	0.72
1:B:348:ASN:ND2	6:B:610:HOH:O	2.23	0.71
1:A:119[A]:ARG:NH1	6:A:611:HOH:O	2.25	0.68
1:B:127:PRO:HG3	6:B:624:HOH:O	1.94	0.67
1:A:29:LYS:HE3	6:A:781:HOH:O	1.97	0.64
1:A:286:GLY:O	6:A:606:HOH:O	2.15	0.64
1:B:338[A]:ARG:HG3	6:B:725:HOH:O	1.98	0.63
1:B:125:VAL:HG23	6:B:676:HOH:O	1.98	0.62
1:B:294:VAL:HG23	6:B:639:HOH:O	1.99	0.62
1:A:170:HIS:HD2	6:A:760:HOH:O	1.83	0.61
1:B:288:LEU:HB2	6:B:829:HOH:O	1.99	0.61
1:B:288:LEU:CD1	6:B:879:HOH:O	2.48	0.61
1:A:218:LYS:NZ	6:A:603:HOH:O	2.00	0.60
1:A:217:LYS:HE3	6:A:917:HOH:O	2.01	0.60
1:A:286:GLY:HA2	1:A:379:CYS:SG	2.42	0.59
1:B:157:THR:O	6:B:606:HOH:O	2.17	0.58
1:B:70:GLY:CA	6:B:604:HOH:O	2.51	0.57
1:B:132:HIS:HD2	6:B:698:HOH:O	1.88	0.56
2:A:501[B]:NAP:N7N	6:A:616:HOH:O	2.33	0.55
2:A:501[A]:NAP:O2N	6:A:607:HOH:O	2.18	0.55
1:B:403:GLU:OE2	6:B:608:HOH:O	2.19	0.54
1:B:39:LEU:HD13	6:B:601:HOH:O	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:119[A]:ARG:HG3	6:A:612:HOH:O	2.08	0.53
1:B:298:PRO:HD2	6:B:858:HOH:O	2.09	0.52
1:A:345:LYS:NZ	6:A:610:HOH:O	2.24	0.52
1:B:13:MET:HE2	6:B:604:HOH:O	1.70	0.52
1:B:288:LEU:HD23	6:B:829:HOH:O	2.11	0.51
1:A:286:GLY:O	6:A:608:HOH:O	2.19	0.50
1:B:125:VAL:CG2	6:B:676:HOH:O	2.58	0.50
1:A:224:LYS:NZ	6:A:615:HOH:O	2.32	0.50
1:B:174:GLU:HG2	6:B:848:HOH:O	2.11	0.50
2:B:501:NAP:N7N	6:B:607:HOH:O	2.18	0.49
1:B:170:HIS:HD2	6:B:876:HOH:O	1.94	0.49
1:B:70:GLY:C	6:B:604:HOH:O	2.49	0.49
1:B:288:LEU:CG	6:B:829:HOH:O	2.61	0.49
1:B:294:VAL:HG22	6:B:725:HOH:O	2.03	0.48
1:B:14:GLN:HB3	6:B:808:HOH:O	2.12	0.48
1:B:294:VAL:HG21	6:B:931:HOH:O	2.13	0.48
1:B:100:ARG:HG2	1:B:135:TYR:CE2	2.49	0.47
1:B:288:LEU:HD11	6:B:879:HOH:O	2.14	0.47
1:A:170:HIS:CD2	6:A:760:HOH:O	2.64	0.47
1:B:238:GLN:HG3	6:B:798:HOH:O	2.15	0.46
1:B:174:GLU:CG	6:B:848:HOH:O	2.63	0.45
1:A:262:GLU:HG2	6:A:809:HOH:O	2.17	0.45
1:A:218:LYS:CE	6:A:603:HOH:O	2.60	0.44
1:B:109:ARG:HD3	6:B:640:HOH:O	2.17	0.44
1:A:210:SER:HA	1:A:249:ARG:O	2.18	0.44
1:B:210:SER:HA	1:B:249:ARG:O	2.18	0.44
1:A:22:ILE:HD11	1:A:327:THR:HB	2.00	0.44
1:B:22:ILE:HD11	1:B:327:THR:HB	1.99	0.44
1:B:400:LYS:NZ	6:B:627:HOH:O	2.47	0.43
1:A:296:VAL:HG13	6:A:717:HOH:O	2.19	0.42
1:B:119:ARG:N	6:B:614:HOH:O	2.34	0.42
1:A:234:GLN:NE2	6:A:639:HOH:O	2.53	0.41
1:A:303:VAL:HG22	1:A:342:HIS:CD2	2.56	0.41
1:B:288:LEU:CB	6:B:829:HOH:O	2.66	0.40
1:A:257:GLN:HG2	6:A:617:HOH:O	2.22	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	420/425 (99%)	414 (99%)	6 (1%)	0	100	100
1	B	415/425 (98%)	408 (98%)	7 (2%)	0	100	100
All	All	835/850 (98%)	822 (98%)	13 (2%)	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	358/361 (99%)	355 (99%)	3 (1%)	81	86
1	B	353/361 (98%)	348 (99%)	5 (1%)	67	72
All	All	711/722 (98%)	703 (99%)	8 (1%)	73	79

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	80	GLU
1	A	112	ILE
1	A	260	LYS
1	B	3	LYS
1	B	100	ARG
1	B	112	ILE
1	B	119	ARG
1	B	299	ASP

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

Mol	Chain	Res	Type
1	A	132	HIS
1	A	234	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 2 are monoatomic - leaving 6 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	$\#\|Z\| > 2$
2	NAP	B	501	-	45,52,52	0.73	0	56,80,80	0.78	0
4	PWV	A	503	-	25,27,27	1.11	3 (12%)	32,39,39	1.41	3 (9%)
5	FLC	B	503	-	12,12,12	1.05	0	17,17,17	1.36	2 (11%)
2	NAP	A	501[A]	-	45,52,52	0.63	0	56,80,80	0.75	1 (1%)
2	NAP	A	501[B]	-	45,52,52	0.57	0	56,80,80	0.68	2 (3%)
4	PWV	B	504	-	25,27,27	1.23	2 (8%)	32,39,39	1.12	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
2	NAP	B	501	-	-	5/31/67/67	0/5/5/5
4	PWV	A	503	-	-	0/6/10/10	0/3/3/3
5	FLC	B	503	-	-	3/16/16/16	-
2	NAP	A	501[A]	-	-	5/31/67/67	0/5/5/5
2	NAP	A	501[B]	-	-	7/31/67/67	0/5/5/5
4	PWV	B	504	-	-	0/6/10/10	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	504	PWV	C8-C9	3.72	1.38	1.34
4	B	504	PWV	C12-C18	-3.47	1.39	1.47
4	A	503	PWV	C8-C9	3.37	1.38	1.34
4	A	503	PWV	C12-C18	-2.41	1.41	1.47
4	A	503	PWV	C14-C15	2.29	1.40	1.36

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	503	PWV	C13-C12-C18	5.51	123.44	120.30
4	B	504	PWV	C13-C12-C18	3.90	122.52	120.30
5	B	503	FLC	OB1-CBC-CB	-3.30	117.58	122.25
4	A	503	PWV	O2-C18-C12	2.64	125.37	122.29
4	A	503	PWV	C11-C10-N2	-2.37	105.92	110.38
4	B	504	PWV	C11-C10-N2	-2.31	106.05	110.38
5	B	503	FLC	OB2-CBC-CB	2.20	116.88	113.05
2	A	501[B]	NAP	C2N-N1N-C1D	-2.11	114.44	119.14
2	A	501[A]	NAP	C5A-C6A-N6A	2.10	123.55	120.35
2	A	501[B]	NAP	C5A-C6A-N6A	2.09	123.53	120.35

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501[A]	NAP	O4D-C1D-N1N-C2N
2	A	501[A]	NAP	O4D-C1D-N1N-C6N
2	A	501[A]	NAP	C2D-C1D-N1N-C2N
2	A	501[B]	NAP	C5B-O5B-PA-O2A
2	A	501[B]	NAP	C5B-O5B-PA-O3

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Mol	Chain	Res	Type	Atoms
2	A	501[B]	NAP	C2B-O2B-P2B-O1X
2	A	501[B]	NAP	C5D-O5D-PN-O1N
2	A	501[B]	NAP	C5D-O5D-PN-O2N
2	B	501	NAP	C5D-O5D-PN-O1N
2	B	501	NAP	O4D-C1D-N1N-C2N
5	B	503	FLC	CAC-CA-CB-CBC
5	B	503	FLC	CAC-CA-CB-OHB
2	A	501[A]	NAP	PN-O3-PA-O5B
2	A	501[A]	NAP	C2B-O2B-P2B-O3X
2	B	501	NAP	C5D-O5D-PN-O3
2	A	501[B]	NAP	C5B-O5B-PA-O1A
2	B	501	NAP	C5D-O5D-PN-O2N
2	A	501[B]	NAP	C5D-O5D-PN-O3
2	B	501	NAP	C2B-O2B-P2B-O3X
5	B	503	FLC	CAC-CA-CB-CG

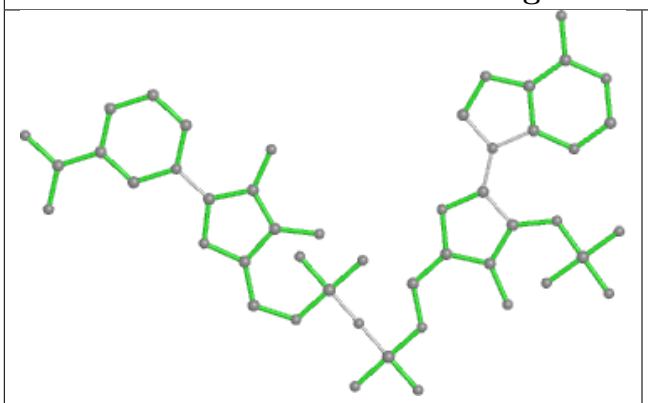
There are no ring outliers.

3 monomers are involved in 3 short contacts:

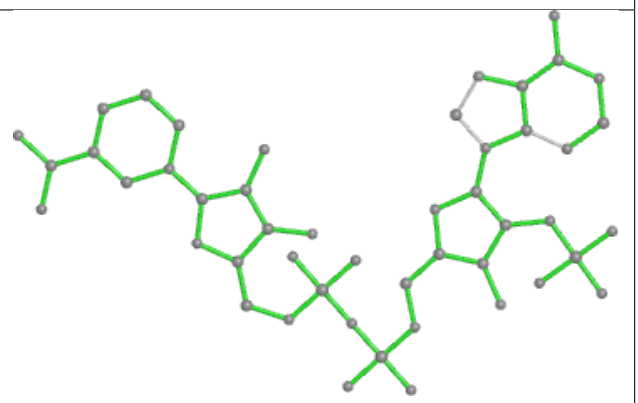
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	NAP	1	0
2	A	501[A]	NAP	1	0
2	A	501[B]	NAP	1	0

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 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.

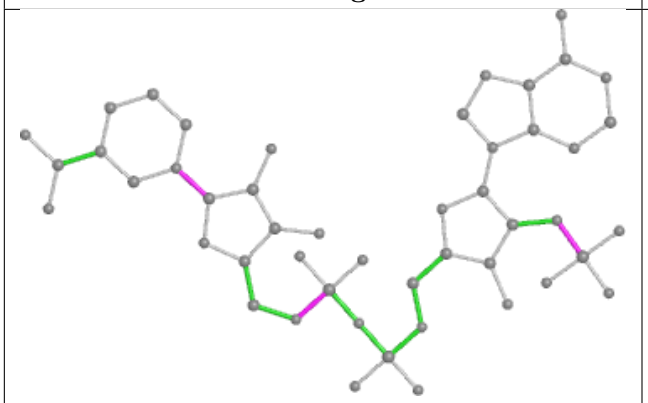
Ligand NAP B 501



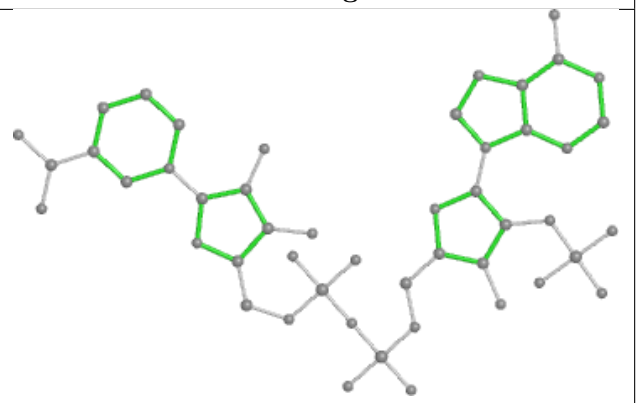
Bond lengths



Bond angles

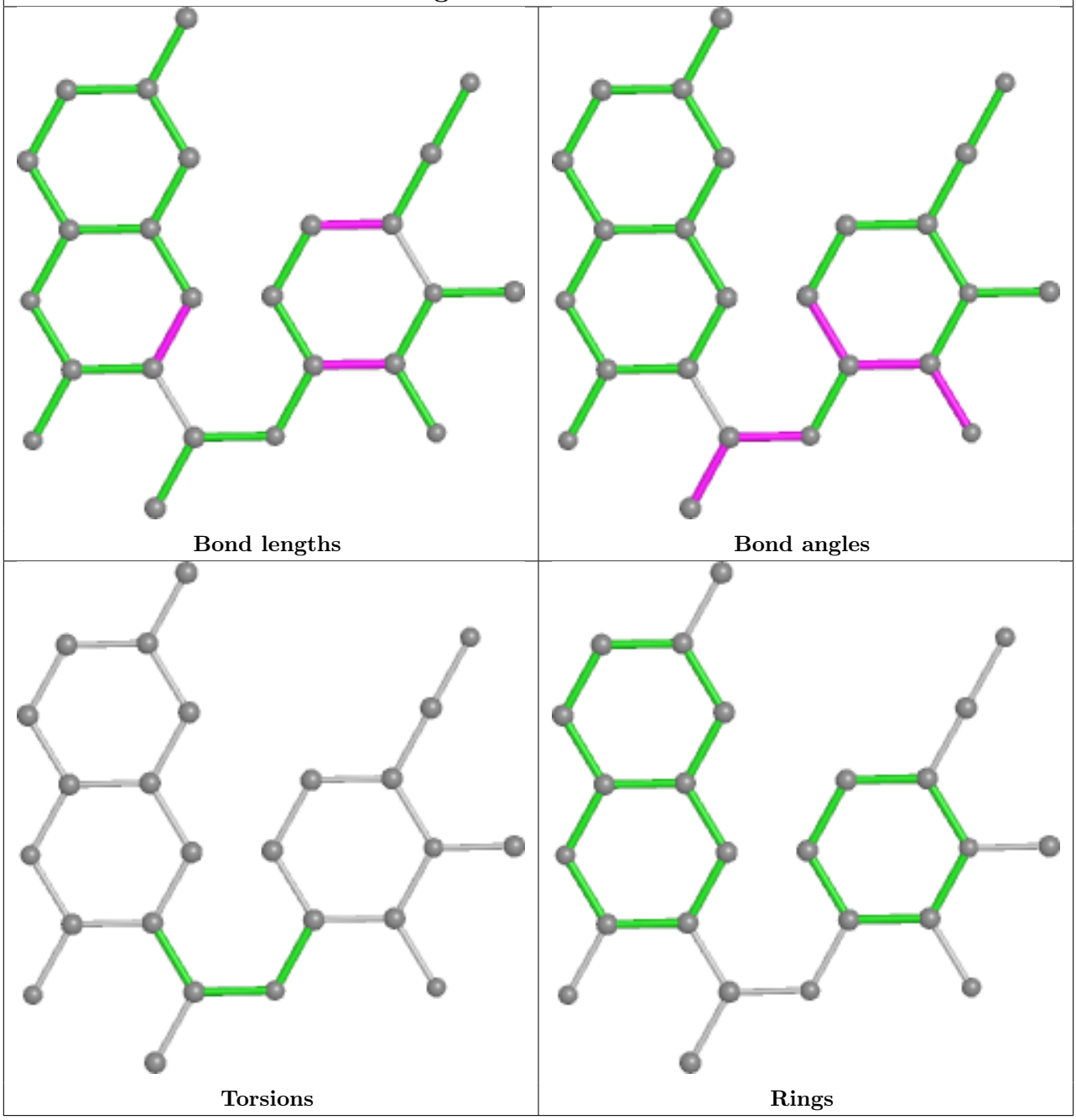


Torsions

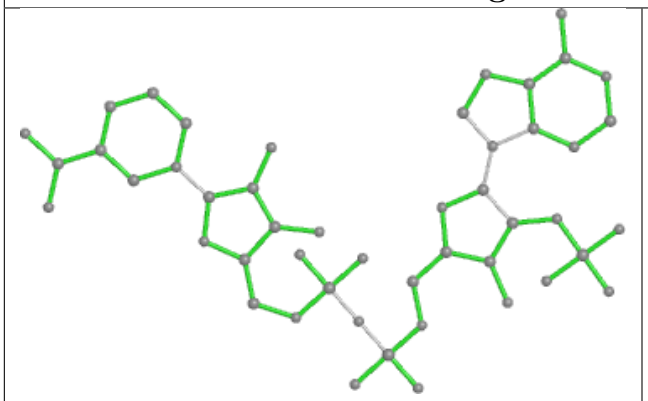


Rings

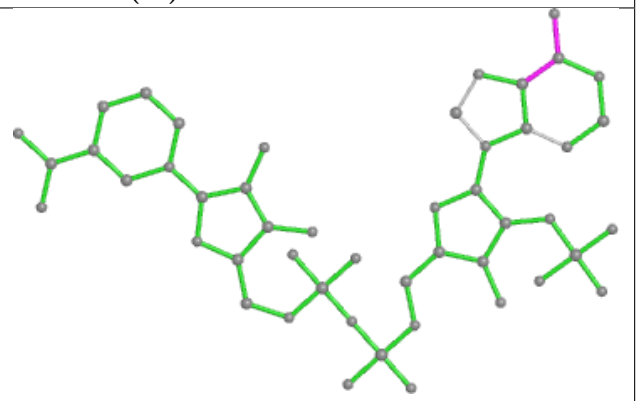
Ligand PWV A 503



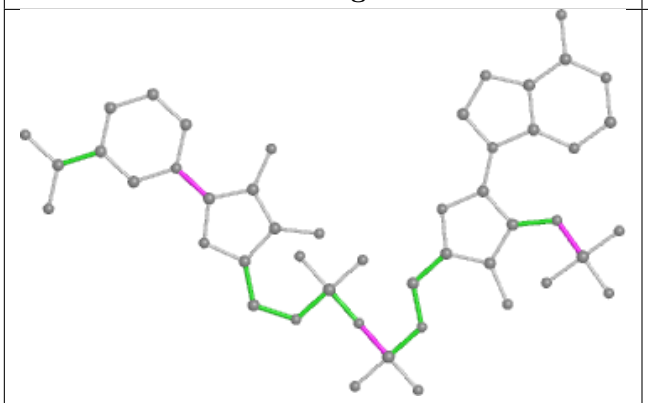
Ligand NAP A 501 (A)



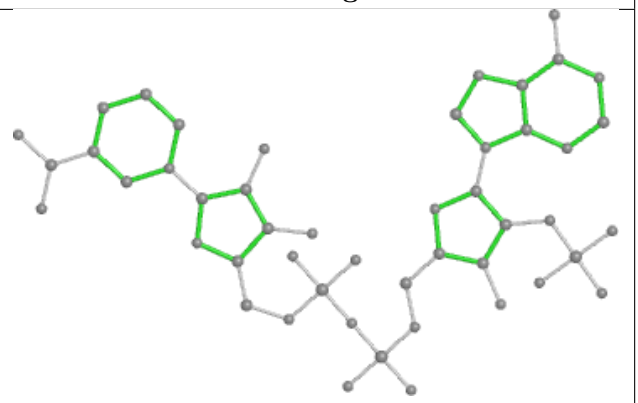
Bond lengths



Bond angles

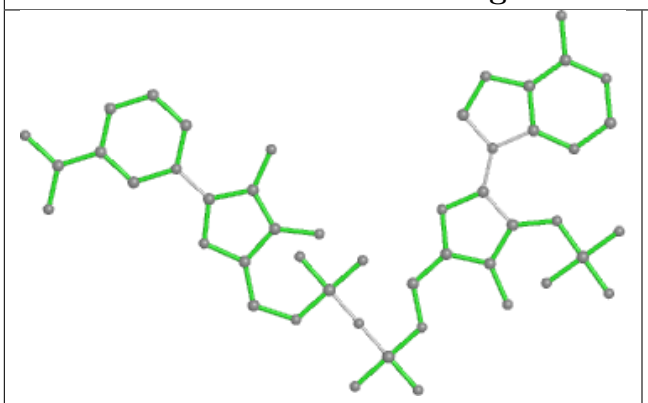


Torsions

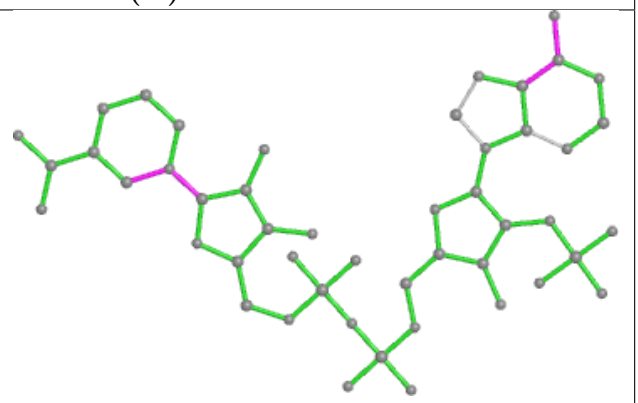


Rings

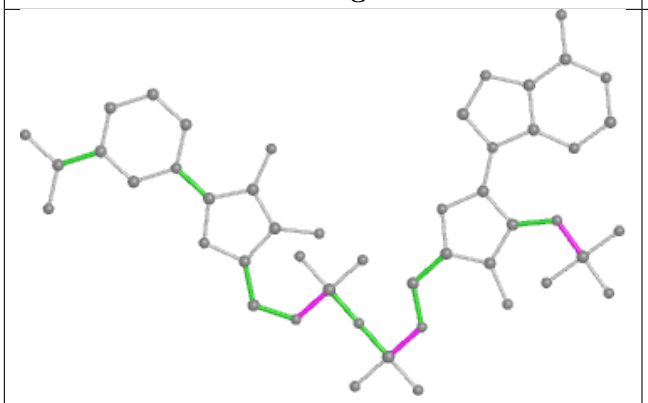
Ligand NAP A 501 (B)



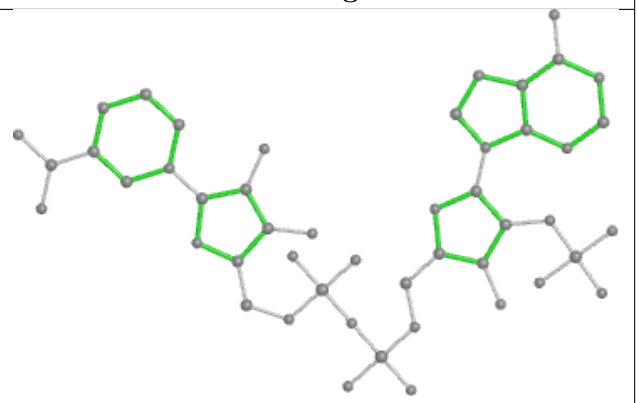
Bond lengths



Bond angles

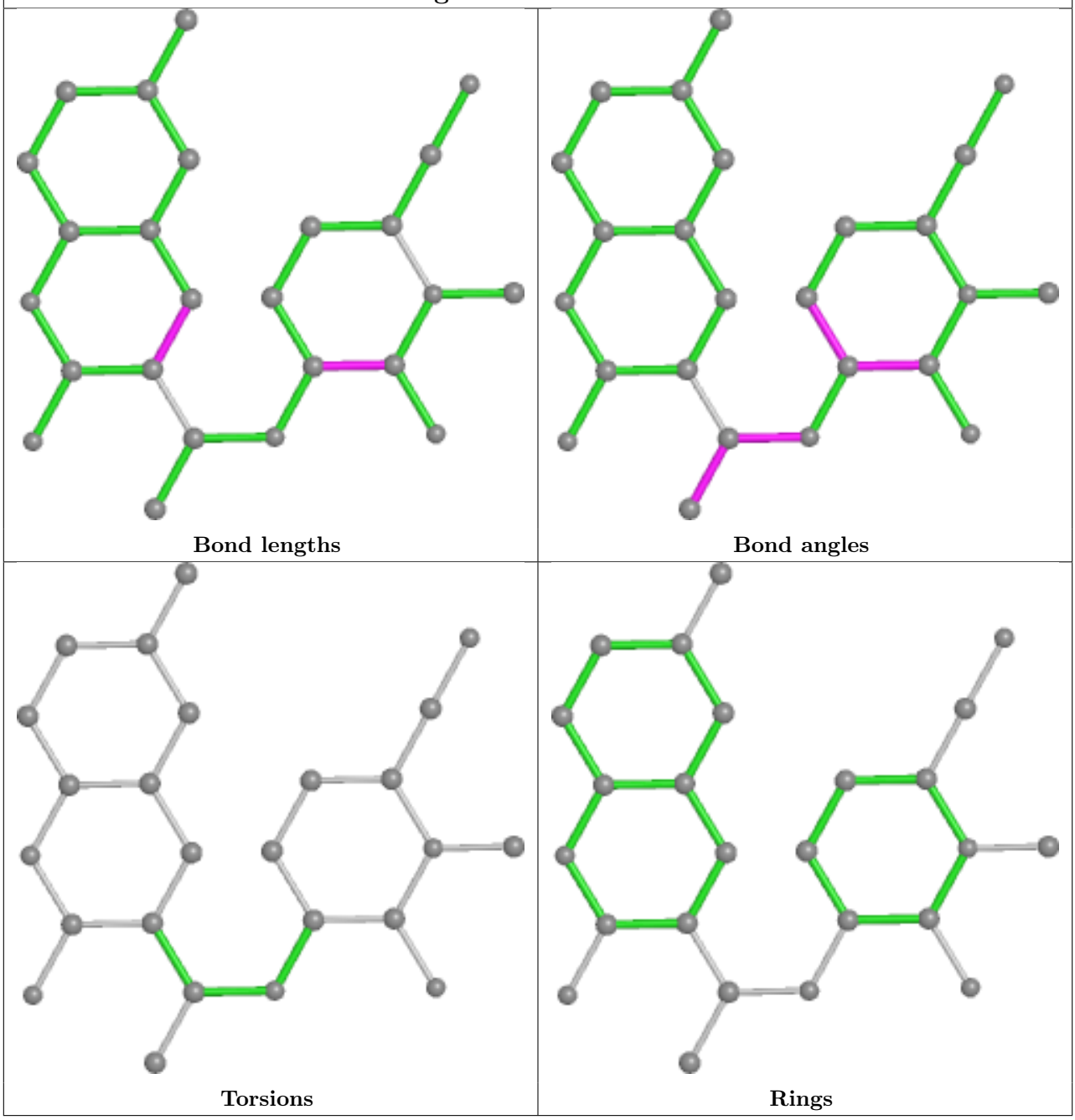


Torsions



Rings

Ligand PWV B 504



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	415/425 (97%)	0.01	14 (3%)	45	51	29, 44, 73, 129	0
1	B	412/425 (96%)	0.24	26 (6%)	20	24	31, 51, 93, 133	0
All	All	827/850 (97%)	0.12	40 (4%)	30	35	29, 47, 87, 133	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	414	LEU	8.9
1	A	416	LEU	5.3
1	B	3	LYS	4.9
1	B	411	GLN	4.7
1	B	410	ALA	4.5
1	B	413	LYS	4.3
1	B	164	LYS	3.9
1	B	80	GLU	3.8
1	B	412	ALA	3.5
1	B	157	THR	3.5
1	A	417	GLU	3.4
1	B	156	TYR	3.3
1	B	163	GLN	3.2
1	B	7	GLY	3.2
1	A	165	VAL	3.1
1	A	6	SER	3.1
1	B	65	LYS	3.0
1	B	158	PRO	3.0
1	B	165	VAL	3.0
1	A	152	VAL	2.9
1	B	6	SER	2.9
1	B	159	SER	2.8
1	B	93	LYS	2.8
1	B	92	TRP	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	38[A]	ASP	2.7
1	B	160	ASP	2.6
1	A	175	GLY	2.6
1	B	5	ILE	2.5
1	B	162	THR	2.5
1	A	147	PRO	2.4
1	B	36	GLU	2.4
1	A	151	LYS	2.3
1	A	51	ALA	2.2
1	B	409	LEU	2.2
1	A	172	PHE	2.2
1	B	346	LEU	2.2
1	A	163	GLN	2.1
1	A	383	LEU	2.1
1	A	166	THR	2.1
1	A	174	GLU	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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	FLC	B	503	13/13	0.66	0.25	106,110,112,114	0
4	PWV	B	504	25/25	0.95	0.18	28,37,44,56	0
4	PWV	A	503	25/25	0.96	0.15	29,35,45,51	0
2	NAP	B	501	48/48	0.97	0.13	30,45,53,57	0
3	CL	B	502	1/1	0.98	0.15	58,58,58,58	0
2	NAP	A	501[B]	48/48	0.98	0.14	31,35,45,51	48
2	NAP	A	501[A]	48/48	0.98	0.14	31,39,44,46	48

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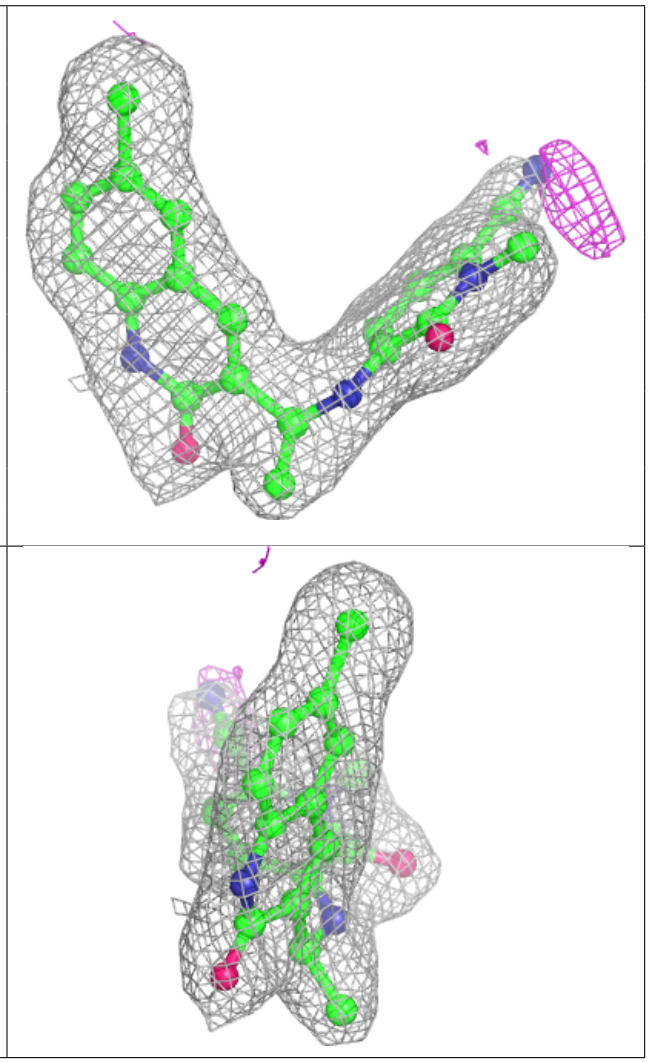
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CL	A	502	1/1	0.98	0.11	55,55,55,55	0

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.

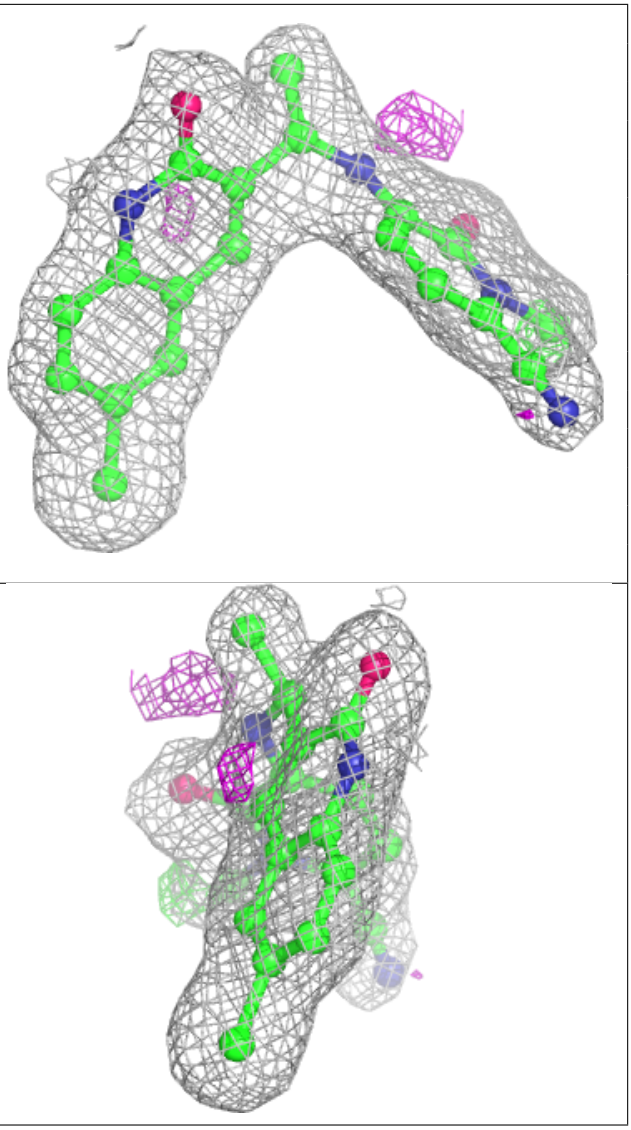
Electron density around PWV B 504:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)



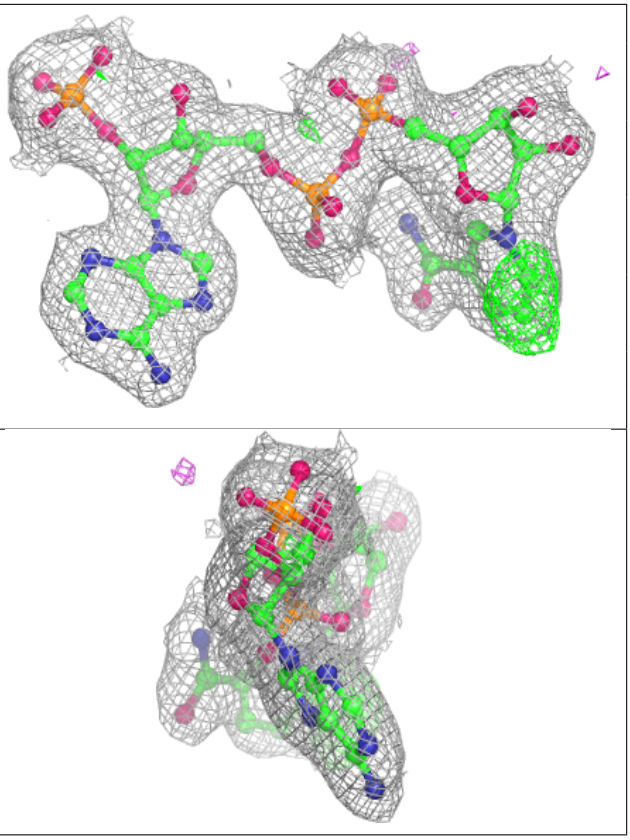
Electron density around PWV A 503:

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



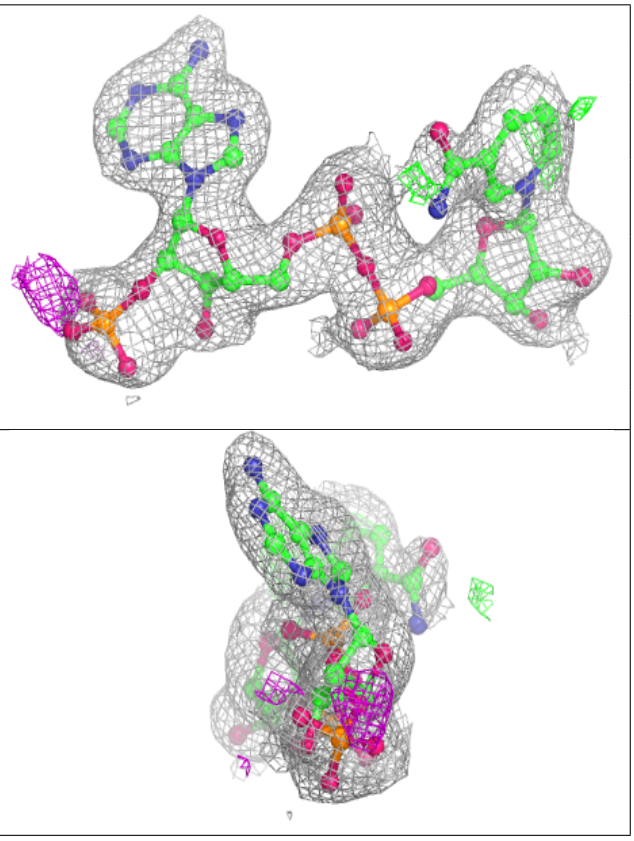
Electron density around NAP B 501:

$2mF_o$-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 A 501 (B):

$2mF_o$-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 A 501 (A):

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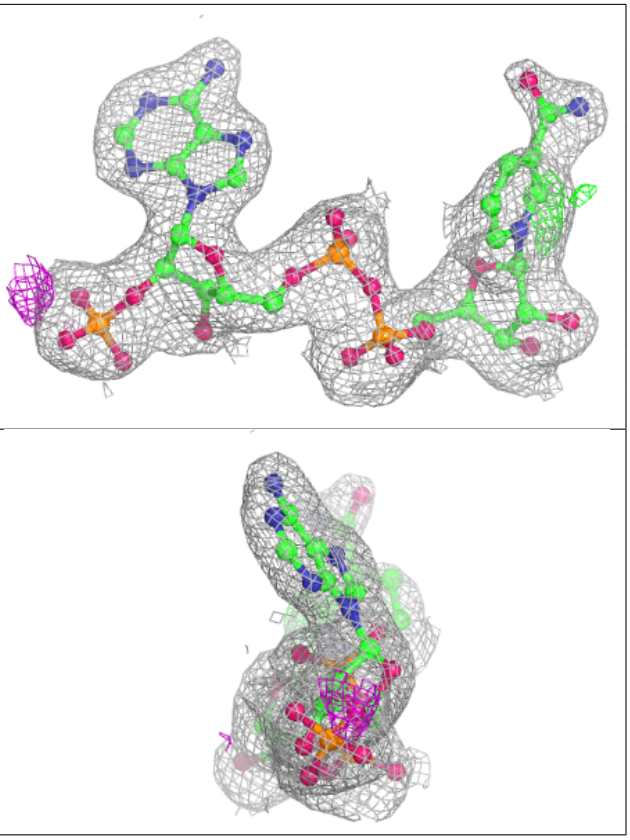
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.