



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 22, 2024 – 01:57 PM EDT

PDB ID : 6O2Z  
Title : Crystal structure of IDH1 R132H mutant in complex with compound 32  
Authors : Toms, A.V.; Lin, J.  
Deposited on : 2019-02-25  
Resolution : 2.50 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 2.37.1  
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) : 2.37.1

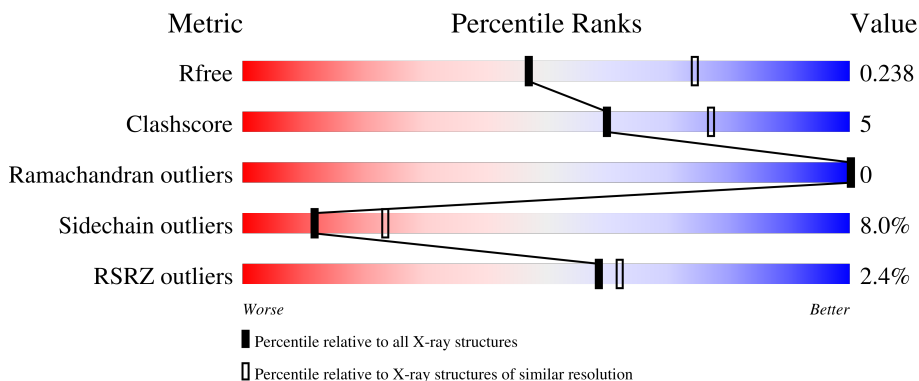
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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  $\geq 3$ , 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	425	 2% 82% 12%
1	B	425	 3% 81% 13%

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 6774 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.

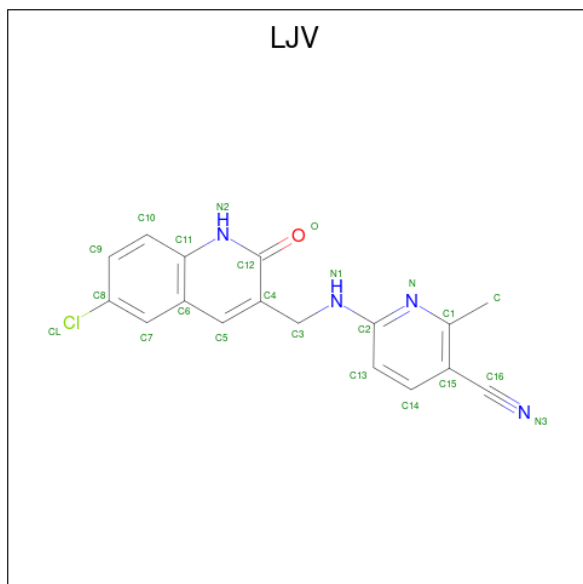
- Molecule 1 is a protein called Isocitrate dehydrogenase [NADP] cytoplasmic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	411	3243	2060	549	616	18	0	0	0
1	B	411	3237	2057	546	616	18	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

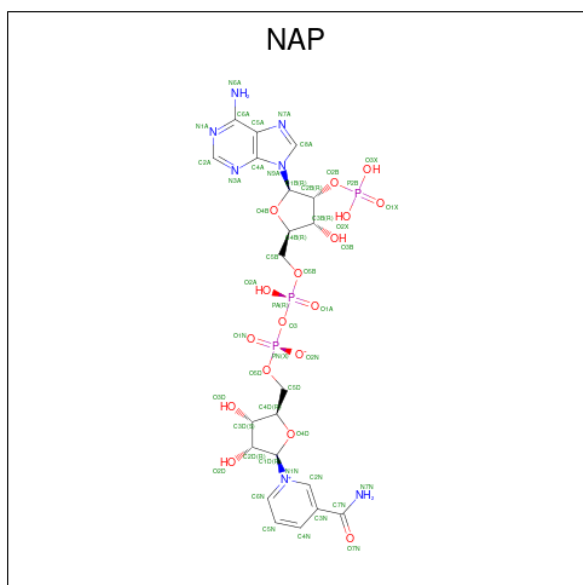
Chain	Residue	Modelled	Actual	Comment	Reference
A	132	HIS	ARG	engineered mutation	UNP O75874
A	415	SER	-	expression tag	UNP O75874
A	416	LEU	-	expression tag	UNP O75874
A	417	GLU	-	expression tag	UNP O75874
A	418	HIS	-	expression tag	UNP O75874
A	419	HIS	-	expression tag	UNP O75874
A	420	HIS	-	expression 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 6-[[[(6-chloro-2-oxo-1,2-dihydroquinolin-3-yl)methyl]amino]-2-methylpyridine-3-carbonitrile (three-letter code: LJV) (formula: C<sub>17</sub>H<sub>13</sub>ClN<sub>4</sub>O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	N	O		
2	A	1	Total	C	Cl	N	O	0	0
			23	17	1	4	1		
2	B	1	Total	C	Cl	N	O	0	0
			23	17	1	4	1		

- Molecule 3 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: C<sub>21</sub>H<sub>28</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>).



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

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

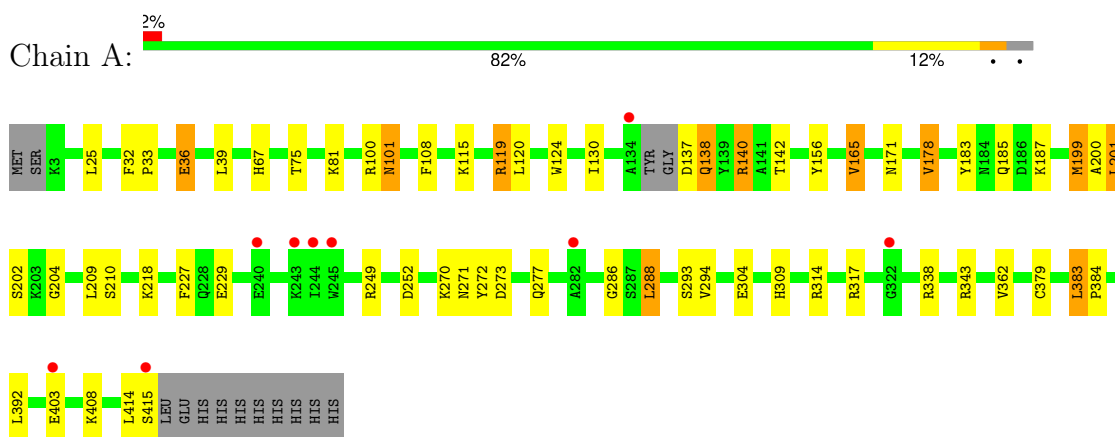
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	77	Total	O	0	0
			77	77		
5	B	63	Total	O	0	0
			63	63		

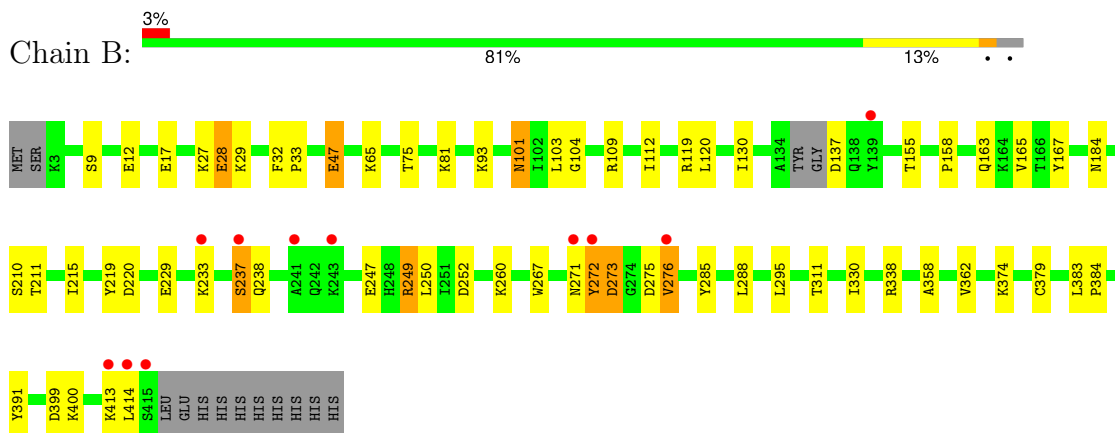
### 3 Residue-property plots

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



- Molecule 1: Isocitrate dehydrogenase [NADP] cytoplasmic



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.34Å 82.34Å 303.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.25 – 2.50 46.21 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.5 (46.25-2.50) 99.6 (46.21-2.50)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.44 (at 2.48Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, $R_{free}$	0.172 , 0.234 0.178 , 0.238	Depositor DCC
$R_{free}$ test set	1894 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	44.4	Xtrriage
Anisotropy	0.037	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 35.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	6774	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	47.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.98% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: LJV, GOL, 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	0.67	0/3310	0.85	0/4466
1	B	0.67	0/3304	0.82	1/4459 (0.0%)
All	All	0.67	0/6614	0.84	1/8925 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	101	ASN	CB-CA-C	5.63	121.65	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	273	ASP	Peptide

### 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	3243	0	3192	33	0
1	B	3237	0	3181	34	0
2	A	23	0	0	2	0
2	B	23	0	0	0	0
3	A	48	0	25	1	0
3	B	48	0	25	1	0
4	A	6	0	8	0	0
4	B	6	0	8	0	0
5	A	77	0	0	2	0
5	B	63	0	0	3	0
All	All	6774	0	6439	60	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 (60) 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:288:LEU:HB3	1:A:309:HIS:HB3	1.56	0.86
1:B:29:LYS:NZ	1:B:399:ASP:OD1	2.13	0.81
1:A:286:GLY:HA2	1:A:379:CYS:SG	2.33	0.68
1:B:137:ASP:OD2	5:B:601:HOH:O	2.12	0.67
1:A:119:ARG:HD2	1:A:124:TRP:O	1.94	0.66
1:B:75:THR:O	3:B:501:NAP:H2N	2.03	0.59
1:B:247:GLU:OE2	1:B:249:ARG:NH2	2.31	0.59
1:B:12:GLU:OE2	1:B:27:LYS:NZ	2.33	0.57
1:A:178:VAL:HG13	1:B:219:TYR:CE2	2.40	0.57
1:A:119:ARG:CD	1:A:124:TRP:O	2.53	0.57
1:A:140:ARG:HB3	1:A:183:TYR:CE1	2.43	0.54
1:A:178:VAL:HG13	1:B:219:TYR:CD2	2.42	0.54
1:A:119:ARG:NH2	5:A:605:HOH:O	2.42	0.51
1:A:210:SER:HA	1:A:249:ARG:O	2.09	0.51
1:B:210:SER:HA	1:B:249:ARG:O	2.11	0.50
1:B:211:THR:HB	1:B:220:ASP:HB3	1.93	0.50
1:A:156:TYR:HB3	1:A:165:VAL:HG22	1.94	0.49
1:B:109:ARG:HD3	1:B:276:VAL:HB	1.94	0.49
1:B:130:ILE:HD13	1:B:267:TRP:HB3	1.94	0.49
1:A:142:THR:HG21	1:B:167:TYR:HB3	1.96	0.48
1:A:36:GLU:OE2	1:A:36:GLU:HA	2.14	0.48
1:A:178:VAL:CG2	1:B:219:TYR:HA	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:47:GLU:H	1:B:47:GLU:CD	2.18	0.47
1:A:101:ASN:HD22	1:A:101:ASN:C	2.18	0.47
1:A:277:GLN:HB3	1:B:252:ASP:HB3	1.97	0.47
1:A:138:GLN:HG3	1:B:215:ILE:HG21	1.98	0.46
1:A:383:LEU:N	1:A:384:PRO:CD	2.79	0.46
1:B:17:GLU:HB2	1:B:311:THR:HB	1.98	0.46
1:B:272:TYR:CD1	1:B:272:TYR:N	2.84	0.46
1:B:288:LEU:HD11	1:B:379:CYS:SG	2.56	0.46
1:B:158:PRO:CG	1:B:163:GLN:HG2	2.47	0.45
1:B:28:GLU:HG2	1:B:29:LYS:HG3	1.99	0.45
1:B:383:LEU:N	1:B:384:PRO:CD	2.80	0.45
1:A:130:ILE:HG13	2:A:500:LJV:C4	2.46	0.44
1:B:237:SER:HB2	5:B:657:HOH:O	2.17	0.44
1:B:238:GLN:HG3	5:B:657:HOH:O	2.18	0.43
1:A:271:ASN:ND2	1:A:273:ASP:O	2.51	0.43
1:A:272:TYR:HB3	1:B:272:TYR:CE1	2.53	0.43
1:A:67:HIS:O	1:A:343:ARG:NH2	2.51	0.43
1:B:32:PHE:N	1:B:33:PRO:CD	2.83	0.42
1:A:185:GLN:NE2	5:A:612:HOH:O	2.51	0.42
1:B:374:LYS:HG3	1:B:391:TYR:CE2	2.54	0.42
1:A:75:THR:O	3:A:501:NAP:H2N	2.20	0.42
1:B:104:GLY:O	1:B:295:LEU:HD11	2.20	0.41
1:B:229:GLU:O	1:B:233:LYS:HG3	2.20	0.41
1:A:209:LEU:HD22	1:A:227:PHE:CG	2.54	0.41
1:A:201:LEU:HD12	1:A:201:LEU:HA	1.94	0.41
1:B:158:PRO:HG2	1:B:163:GLN:HG2	2.02	0.41
1:A:32:PHE:N	1:A:33:PRO:CD	2.84	0.41
1:A:187:LYS:HA	1:A:187:LYS:HD2	1.85	0.41
1:A:199:MET:CE	1:A:294:VAL:HG21	2.51	0.41
1:A:200:ALA:O	1:A:204:GLY:N	2.54	0.41
1:B:358:ALA:O	1:B:362:VAL:HG23	2.21	0.41
1:A:130:ILE:HG13	2:A:500:LJV:C12	2.51	0.41
1:B:112:ILE:HD13	1:B:330:ILE:HG22	2.03	0.41
1:A:101:ASN:C	1:A:101:ASN:ND2	2.74	0.40
1:A:108:PHE:O	1:A:293:SER:HA	2.22	0.40
1:B:65:LYS:HG3	1:B:103:LEU:CD2	2.51	0.40
1:A:362:VAL:HG23	1:A:408:LYS:HD2	2.04	0.40
1:B:155:THR:HA	1:B:165:VAL:O	2.21	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	407/425 (96%)	391 (96%)	16 (4%)	0	100	100
1	B	407/425 (96%)	382 (94%)	25 (6%)	0	100	100
All	All	814/850 (96%)	773 (95%)	41 (5%)	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	345/361 (96%)	313 (91%)	32 (9%)	9	17
1	B	344/361 (95%)	321 (93%)	23 (7%)	16	31
All	All	689/722 (95%)	634 (92%)	55 (8%)	12	23

All (55) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	25	LEU
1	A	36	GLU
1	A	39	LEU
1	A	81	LYS
1	A	100	ARG
1	A	101	ASN
1	A	115	LYS
1	A	119	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	120	LEU
1	A	137	ASP
1	A	138	GLN
1	A	140	ARG
1	A	165	VAL
1	A	171	ASN
1	A	178	VAL
1	A	199	MET
1	A	201	LEU
1	A	202	SER
1	A	218	LYS
1	A	229	GLU
1	A	252	ASP
1	A	270	LYS
1	A	288	LEU
1	A	304	GLU
1	A	314	ARG
1	A	317	ARG
1	A	338	ARG
1	A	383	LEU
1	A	392	LEU
1	A	403	GLU
1	A	414	LEU
1	A	415	SER
1	B	9	SER
1	B	28	GLU
1	B	47	GLU
1	B	81	LYS
1	B	93	LYS
1	B	101	ASN
1	B	119	ARG
1	B	120	LEU
1	B	184	ASN
1	B	237	SER
1	B	249	ARG
1	B	250	LEU
1	B	260	LYS
1	B	271	ASN
1	B	272	TYR
1	B	273	ASP
1	B	275	ASP
1	B	276	VAL

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Mol	Chain	Res	Type
1	B	285	TYR
1	B	338	ARG
1	B	400	LYS
1	B	413	LYS
1	B	414	LEU

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	101	ASN
1	B	271	ASN

### 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](#)

6 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	LJV	A	500	-	24,25,25	2.41	5 (20%)	29,35,35	1.63	5 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	GOL	B	502	-	5,5,5	0.13	0	5,5,5	0.31	0
2	LJV	B	500	-	24,25,25	2.37	3 (12%)	29,35,35	1.44	6 (20%)
3	NAP	B	501	-	46,52,52	1.67	5 (10%)	61,80,80	1.29	3 (4%)
4	GOL	A	502	-	5,5,5	0.09	0	5,5,5	0.29	0
3	NAP	A	501	-	46,52,52	1.71	6 (13%)	61,80,80	1.35	4 (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	LJV	A	500	-	-	2/7/7/7	0/3/3/3
4	GOL	B	502	-	-	2/4/4/4	-
2	LJV	B	500	-	-	1/7/7/7	0/3/3/3
3	NAP	B	501	-	-	9/31/67/67	0/5/5/5
4	GOL	A	502	-	-	2/4/4/4	-
3	NAP	A	501	-	-	9/31/67/67	0/5/5/5

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	500	LJV	C15-C16	-9.72	1.30	1.44
2	A	500	LJV	C15-C16	-9.26	1.31	1.44
3	B	501	NAP	C4N-C3N	7.37	1.50	1.39
3	A	501	NAP	C4N-C3N	6.97	1.50	1.39
3	A	501	NAP	C5N-C4N	6.17	1.49	1.38
3	B	501	NAP	C5N-C4N	5.78	1.48	1.38
2	A	500	LJV	C5-C4	3.72	1.40	1.34
2	B	500	LJV	C5-C4	3.21	1.39	1.34
2	A	500	LJV	C11-N2	-2.96	1.34	1.39
2	A	500	LJV	C12-C4	-2.95	1.38	1.45
3	A	501	NAP	C6N-C5N	-2.93	1.32	1.38
3	B	501	NAP	C2N-N1N	2.69	1.37	1.35
2	B	500	LJV	C11-N2	-2.67	1.35	1.39
3	B	501	NAP	C6N-C5N	-2.65	1.33	1.38
2	A	500	LJV	C7-C8	2.61	1.42	1.38
3	A	501	NAP	C2N-N1N	2.46	1.37	1.35
3	A	501	NAP	P2B-O2B	2.41	1.63	1.59
3	A	501	NAP	C6N-N1N	2.20	1.40	1.35
3	B	501	NAP	C6N-N1N	2.15	1.40	1.35

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	501	NAP	C5N-C4N-C3N	-6.84	113.64	120.36
3	A	501	NAP	C5N-C4N-C3N	-6.48	113.99	120.36
2	A	500	LJV	C2-N-C1	4.57	124.50	118.16
3	B	501	NAP	C6N-N1N-C2N	-3.74	118.69	121.88
2	A	500	LJV	O-C12-C4	-3.54	118.75	124.71
3	A	501	NAP	O2B-P2B-O1X	-3.44	97.08	109.33
2	A	500	LJV	C4-C12-N2	3.29	120.48	115.30
2	B	500	LJV	C4-C12-N2	3.03	120.07	115.30
2	A	500	LJV	C13-C2-N	-3.00	118.12	123.15
2	B	500	LJV	C15-C16-N3	-2.78	173.33	177.90
2	B	500	LJV	C11-N2-C12	-2.71	121.02	124.82
3	A	501	NAP	C6N-N1N-C2N	-2.69	119.59	121.88
2	B	500	LJV	C6-C5-C4	-2.62	118.14	121.90
2	A	500	LJV	C15-C1-N	-2.46	119.48	121.60
3	A	501	NAP	C5A-C6A-N6A	2.43	124.01	120.31
3	B	501	NAP	P2B-O2B-C2B	-2.25	117.43	123.43
2	B	500	LJV	C6-C11-N2	2.17	120.50	118.66
2	B	500	LJV	O-C12-C4	-2.14	121.12	124.71

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	500	LJV	N1-C3-C4-C5
2	A	500	LJV	C4-C3-N1-C2
2	B	500	LJV	C4-C3-N1-C2
3	A	501	NAP	C5D-O5D-PN-O3
3	A	501	NAP	C5D-O5D-PN-O2N
3	A	501	NAP	O4D-C1D-N1N-C2N
3	A	501	NAP	O4D-C1D-N1N-C6N
3	A	501	NAP	C2D-C1D-N1N-C2N
3	A	501	NAP	C2D-C1D-N1N-C6N
3	B	501	NAP	C5D-O5D-PN-O3
3	B	501	NAP	C5D-O5D-PN-O1N
3	B	501	NAP	C5D-O5D-PN-O2N
3	B	501	NAP	O4D-C1D-N1N-C6N
4	A	502	GOL	C1-C2-C3-O3
4	B	502	GOL	O1-C1-C2-C3
4	A	502	GOL	O2-C2-C3-O3
4	B	502	GOL	O1-C1-C2-O2
3	A	501	NAP	O4B-C4B-C5B-O5B

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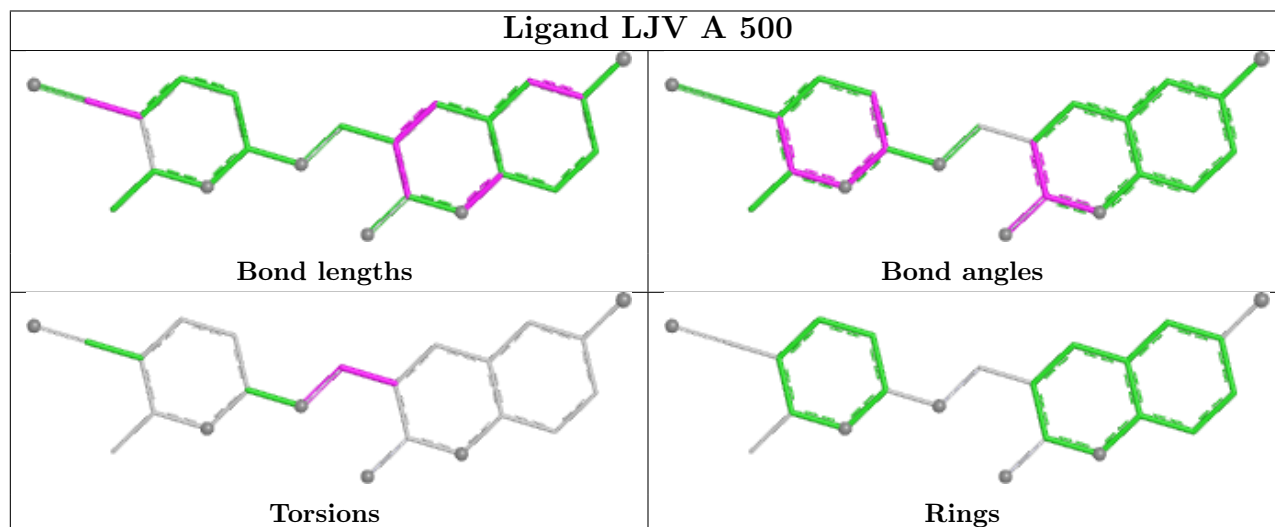
Mol	Chain	Res	Type	Atoms
3	A	501	NAP	C3B-C4B-C5B-O5B
3	B	501	NAP	PA-O3-PN-O1N
3	A	501	NAP	C5D-O5D-PN-O1N
3	B	501	NAP	PA-O3-PN-O2N
3	B	501	NAP	O4D-C1D-N1N-C2N
3	B	501	NAP	C4N-C3N-C7N-N7N
3	B	501	NAP	C4N-C3N-C7N-O7N

There are no ring outliers.

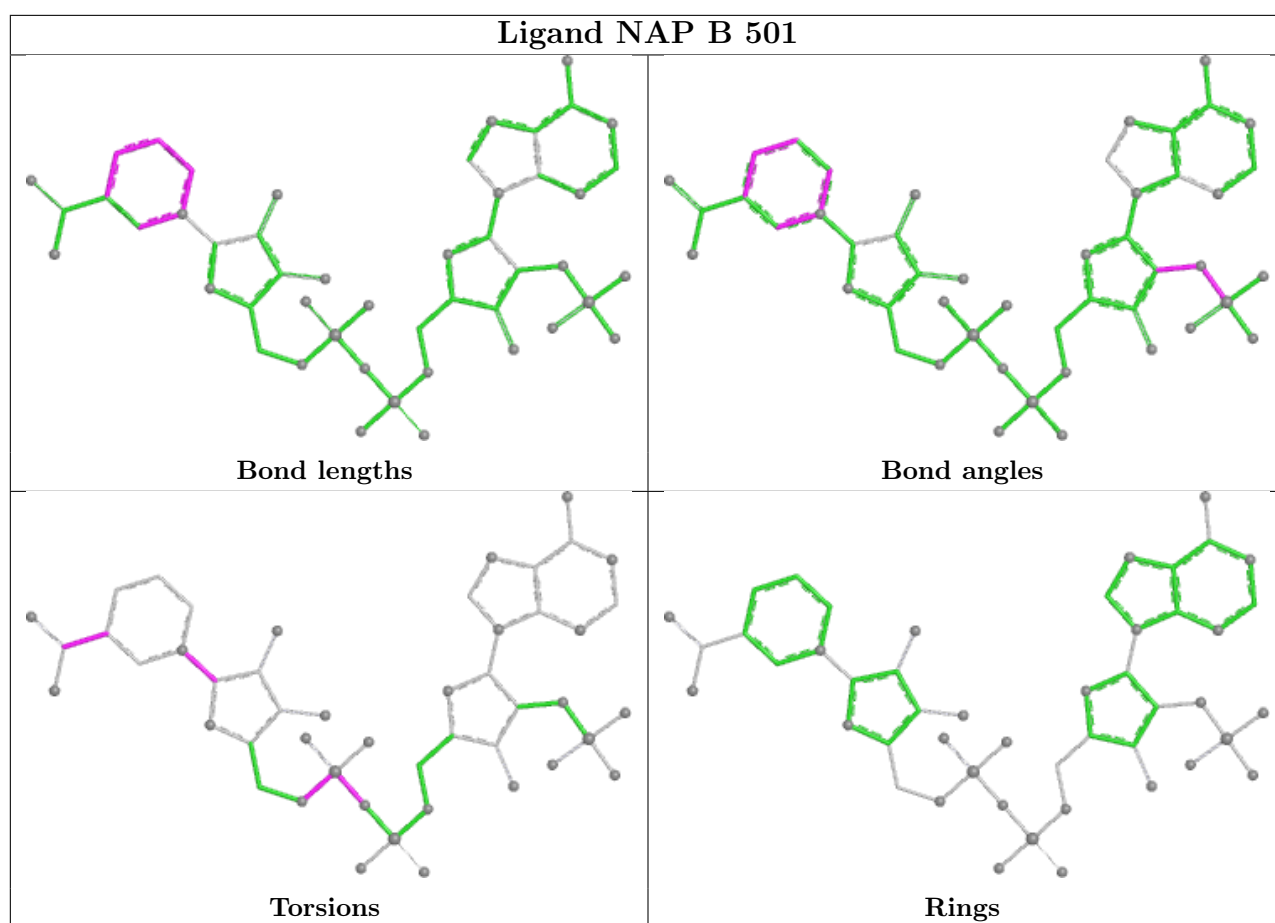
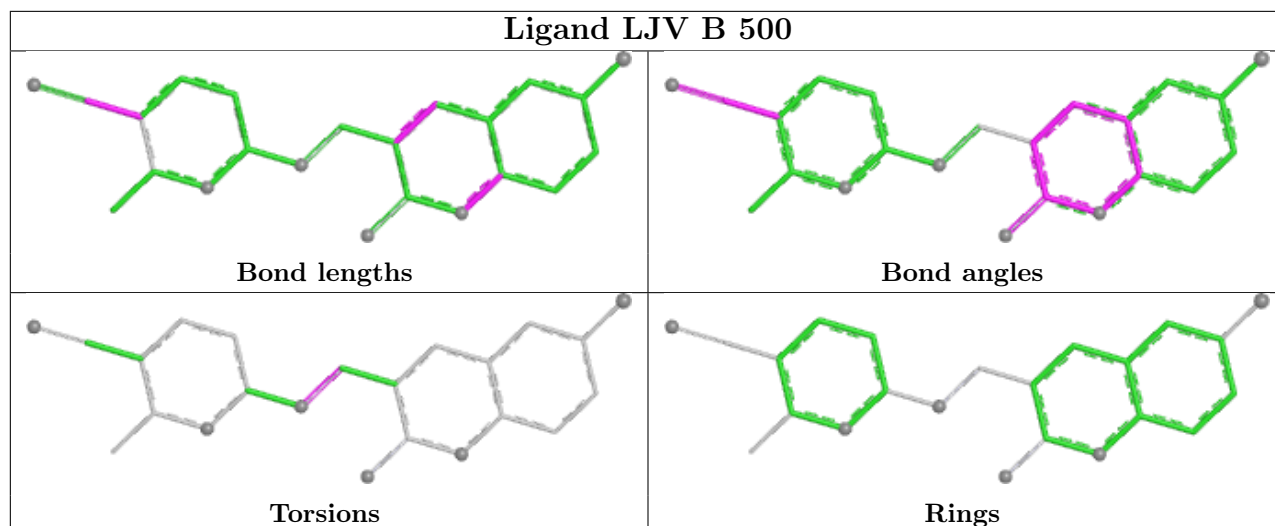
3 monomers are involved in 4 short contacts:

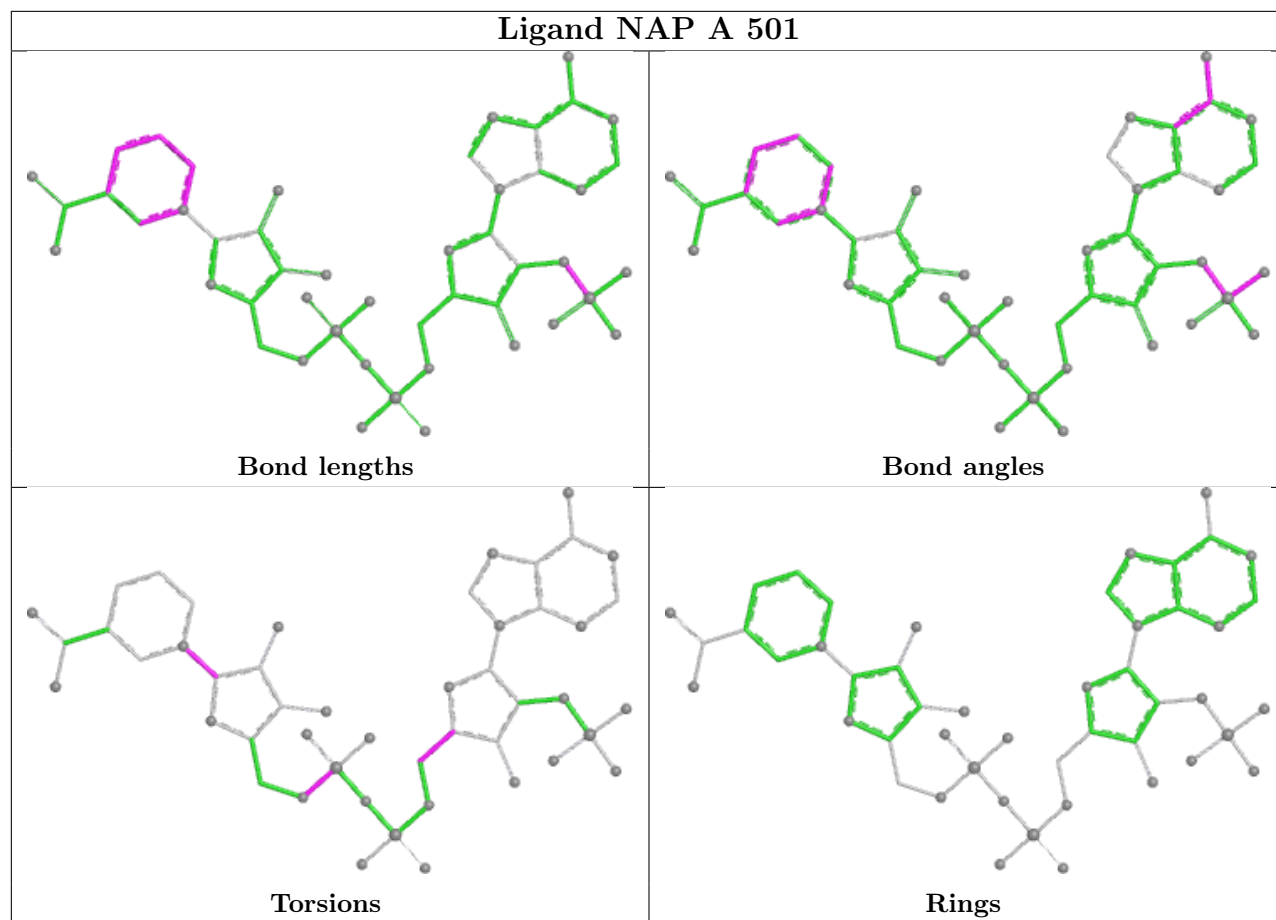
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	500	LJV	2	0
3	B	501	NAP	1	0
3	A	501	NAP	1	0

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 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	411/425 (96%)	-0.07	9 (2%) 62 65	27, 43, 72, 106	0
1	B	411/425 (96%)	0.05	11 (2%) 54 58	29, 45, 72, 130	0
All	All	822/850 (96%)	-0.01	20 (2%) 59 62	27, 44, 72, 130	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	415	SER	8.8
1	B	414	LEU	6.8
1	A	415	SER	5.5
1	A	134	ALA	4.7
1	B	243	LYS	3.3
1	B	241	ALA	3.1
1	A	245	TRP	2.9
1	A	322	GLY	2.8
1	A	243	LYS	2.7
1	B	271	ASN	2.5
1	B	413	LYS	2.5
1	B	237	SER	2.3
1	A	240	GLU	2.2
1	A	403	GLU	2.2
1	A	244	ILE	2.2
1	A	282	ALA	2.2
1	B	272	TYR	2.2
1	B	276	VAL	2.2
1	B	233	LYS	2.1
1	B	139	TYR	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 monosaccharides in this entry.

## 6.4 Ligands [i](#)

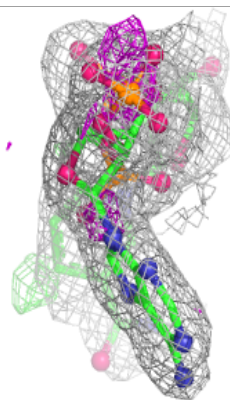
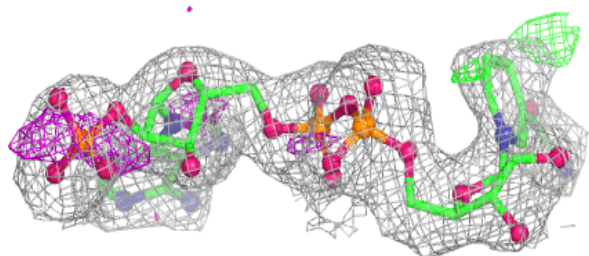
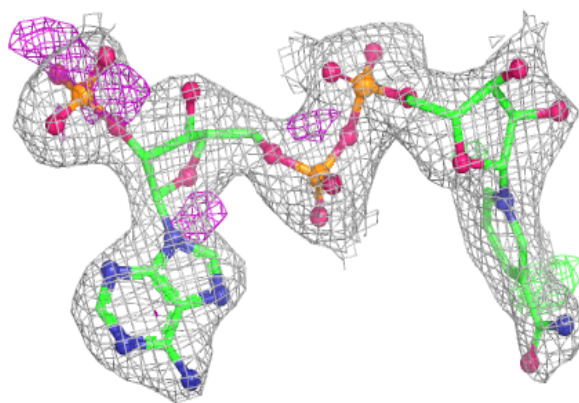
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	GOL	B	502	6/6	0.88	0.19	56,67,77,78	0
3	NAP	A	501	48/48	0.94	0.16	41,58,76,80	0
4	GOL	A	502	6/6	0.95	0.21	57,66,71,73	0
3	NAP	B	501	48/48	0.95	0.14	37,62,87,99	0
2	LJV	A	500	23/23	0.97	0.14	34,37,40,44	0
2	LJV	B	500	23/23	0.97	0.16	31,36,37,41	0

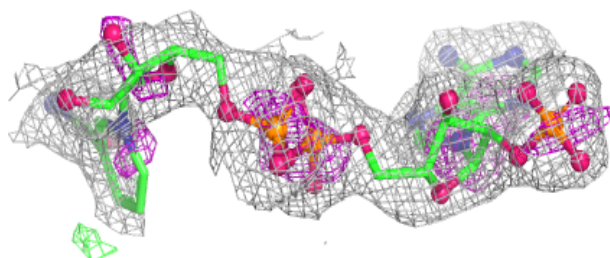
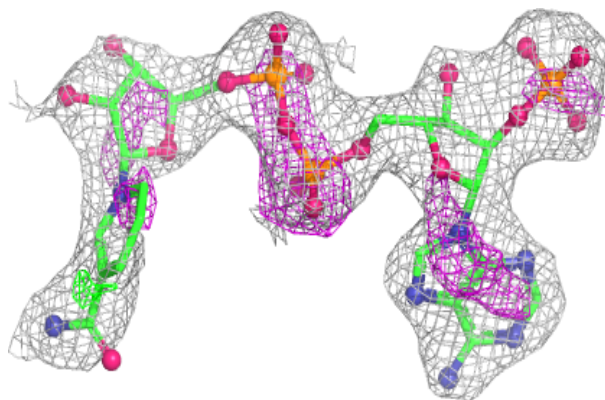
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around NAP A 501:**

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

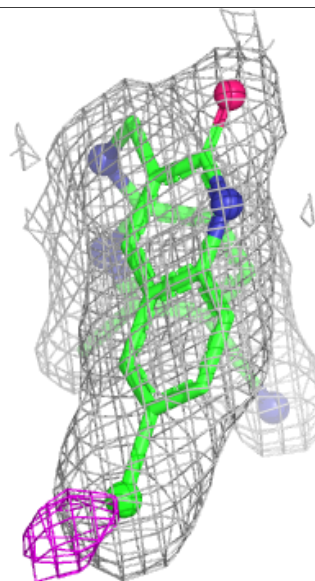
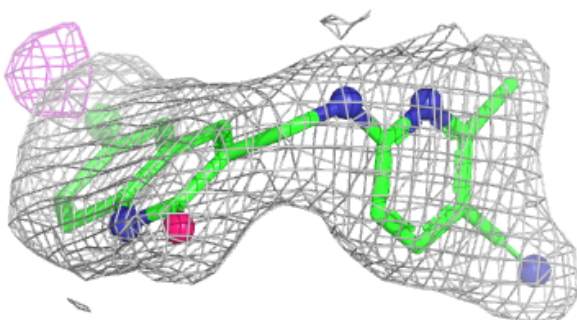
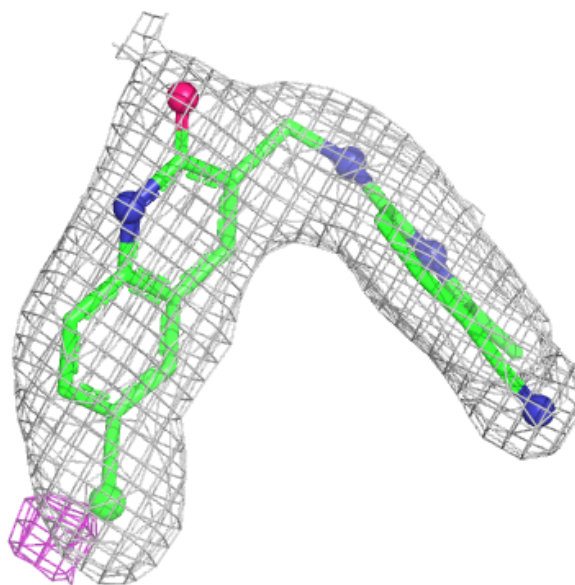
**Electron density around NAP B 501:**

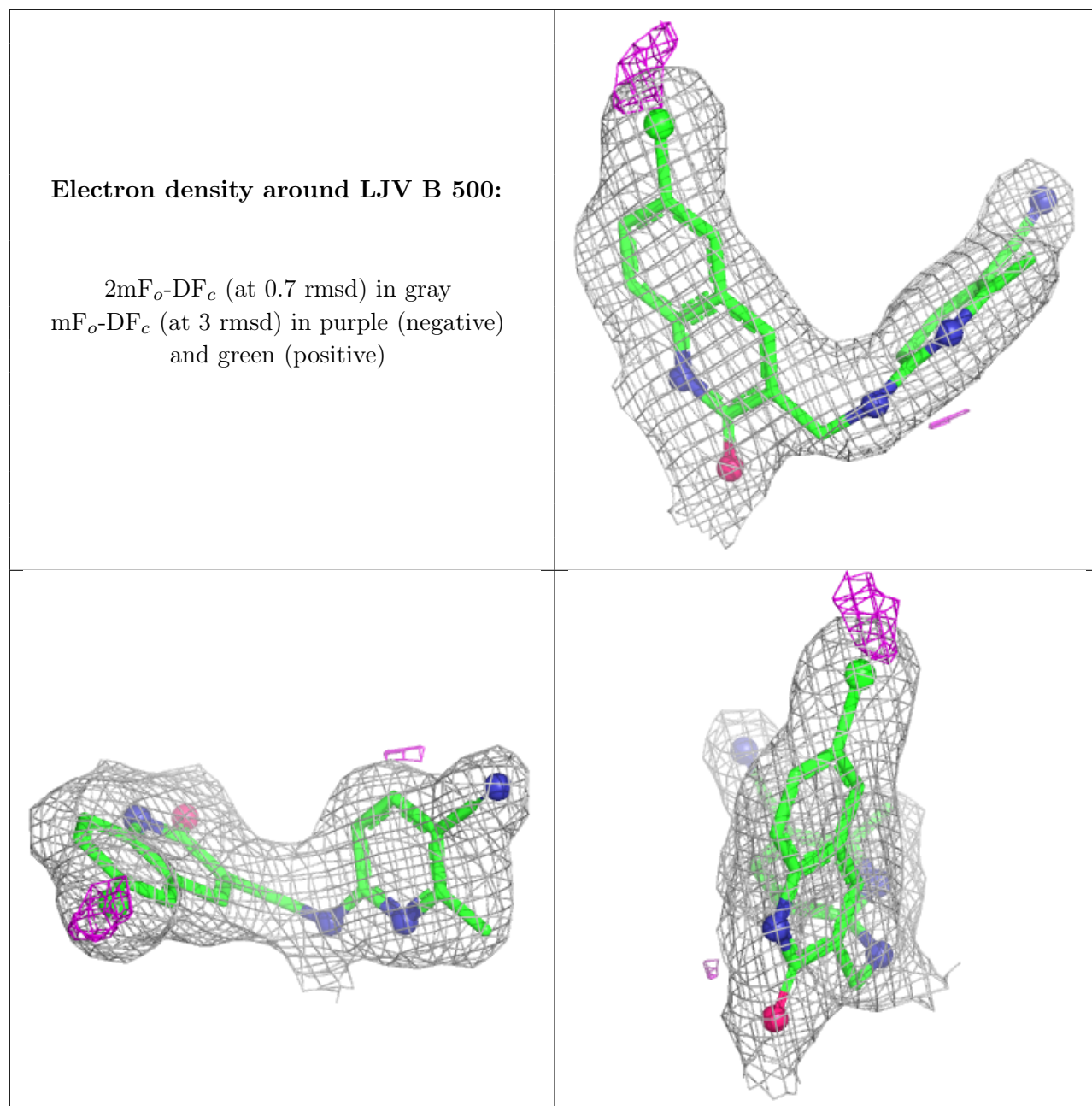
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around LJV A 500:**

$2mF_o-DF_c$  (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.