



Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 09:50 am BST

PDB ID : 6USN
Title : Co-crystal structure of SPR with compound 5
Authors : Huang, X.; Wang, K.
Deposited on : 2019-10-28
Resolution : 2.77 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
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

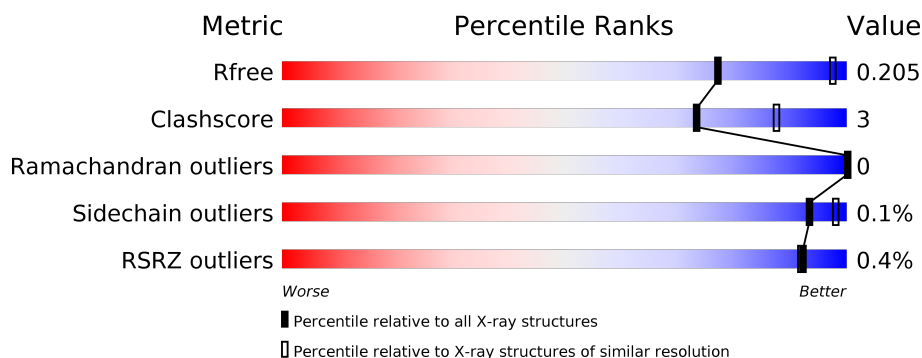
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.77 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	4107 (2.80-2.76)
Clashscore	141614	4575 (2.80-2.76)
Ramachandran outliers	138981	4487 (2.80-2.76)
Sidechain outliers	138945	4489 (2.80-2.76)
RSRZ outliers	127900	4027 (2.80-2.76)

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 $\leq 5\%$. 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	263	<div> <div>91%</div> <div>7%</div> <div>•</div> </div>
1	B	263	<div> <div>91%</div> <div>7%</div> <div>•</div> </div>
1	C	263	<div> <div>%</div> <div>90%</div> <div>8%</div> <div>•</div> </div>
1	D	263	<div> <div>87%</div> <div>11%</div> <div>•</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	SO4	C	304	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 8297 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 Sepiapterin reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	258	Total	C	N	O	S	0	0	0
			1937	1221	344	363	9			
1	B	258	Total	C	N	O	S	0	0	0
			1923	1213	340	361	9			
1	C	258	Total	C	N	O	S	0	1	0
			1921	1210	338	363	10			
1	D	258	Total	C	N	O	S	0	1	0
			1909	1203	337	359	10			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	expression tag	UNP P35270
A	-3	SER	-	expression tag	UNP P35270
B	-4	GLY	-	expression tag	UNP P35270
B	-3	SER	-	expression tag	UNP P35270
C	-4	GLY	-	expression tag	UNP P35270
C	-3	SER	-	expression tag	UNP P35270
D	-4	GLY	-	expression tag	UNP P35270
D	-3	SER	-	expression tag	UNP P35270

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: C₂₁H₂₈N₇O₁₇P₃).



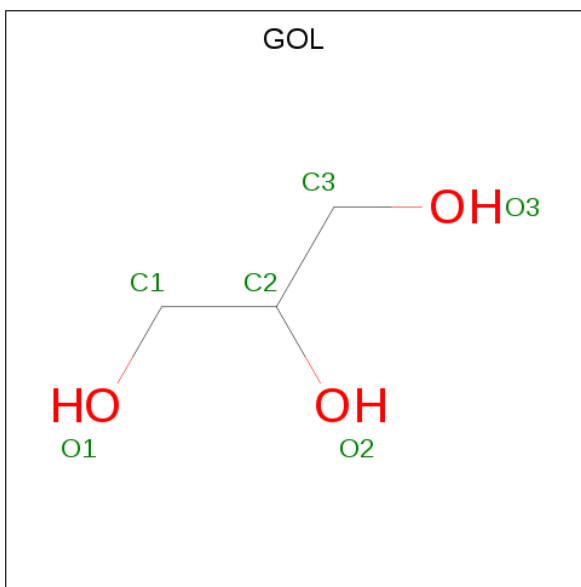
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 48	C 21	N 7	O 17	P 3	0	0
2	B	1	Total 48	C 21	N 7	O 17	P 3	0	0
2	C	1	Total 48	C 21	N 7	O 17	P 3	0	0
2	D	1	Total 48	C 21	N 7	O 17	P 3	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



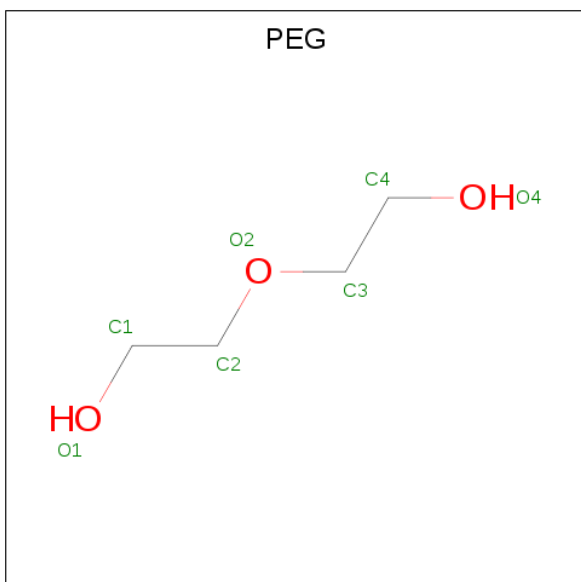
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	C	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



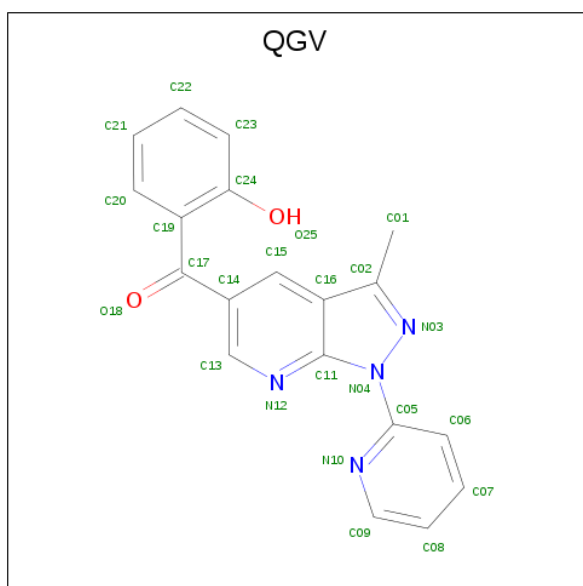
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			7	4	3		
5	B	1	Total	C	O	0	0
			7	4	3		
5	C	1	Total	C	O	0	0
			7	4	3		

- Molecule 6 is (2-hydroxyphenyl)[3-methyl-1-(pyridin-2-yl)-1H-pyrazolo[3,4-b]pyridin-5-yl]methanone (three-letter code: QGV) (formula: C₁₉H₁₄N₄O₂) (labeled as "Ligand of Interest" by author).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	0	0
			25	19	4	2		
6	B	1	Total	C	N	O	0	0
			25	19	4	2		
6	C	1	Total	C	N	O	0	0
			25	19	4	2		
6	D	1	Total	C	N	O	0	0
			25	19	4	2		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	52	Total	O	0	0
			52	52		
7	B	49	Total	O	0	0
			49	49		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	C	44	Total 44	O 44	0	0
7	D	29	Total 29	O 29	0	0

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: Sepiapterin reductase

Chain A: 




- Molecule 1: Sepiapterin reductase

Chain B: 




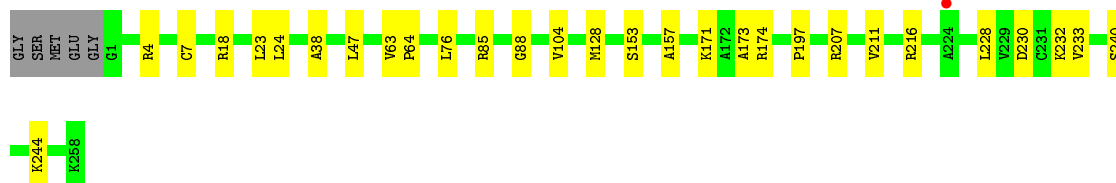
- Molecule 1: Sepiapterin reductase

Chain C: 



- Molecule 1: Sepiapterin reductase

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α , β , γ	146.29Å 146.29Å 179.50Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	47.88 – 2.77 47.88 – 2.78	Depositor EDS
% Data completeness (in resolution range)	99.8 (47.88-2.77) 92.5 (47.88-2.78)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.14 (at 2.77Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.168 , 0.201 0.174 , 0.205	Depositor DCC
R_{free} test set	1993 reflections (3.63%)	wwPDB-VP
Wilson B-factor (Å ²)	48.9	Xtriage
Anisotropy	0.285	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 40.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.048 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8297	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.83% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, NAP, PEG, SO4, QGV

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	0.28	0/1964	0.45	0/2658
1	B	0.28	0/1950	0.45	0/2642
1	C	0.27	0/1948	0.45	0/2642
1	D	0.26	0/1936	0.47	0/2628
All	All	0.27	0/7798	0.46	0/10570

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	1937	0	2001	13	0
1	B	1923	0	1975	12	0
1	C	1921	0	1955	13	0
1	D	1909	0	1936	16	0
2	A	48	0	24	2	0
2	B	48	0	25	1	0
2	C	48	0	25	0	0
2	D	48	0	25	1	0
3	A	20	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	20	0	0	0	0
3	C	15	0	0	0	0
3	D	35	0	0	0	0
4	A	18	0	24	0	0
4	B	6	0	8	0	0
4	C	6	0	8	0	0
5	A	7	0	10	2	0
5	B	7	0	10	1	0
5	C	7	0	10	1	0
6	A	25	0	0	1	0
6	B	25	0	0	0	0
6	C	25	0	0	0	0
6	D	25	0	0	0	0
7	A	52	0	0	2	0
7	B	49	0	0	2	0
7	C	44	0	0	3	0
7	D	29	0	0	0	0
All	All	8297	0	8036	53	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (53) 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:137:LYS:HG2	1:C:109:VAL:HG12	1.68	0.73
1:A:37:SER:OG	7:A:401:HOH:O	2.13	0.67
1:D:85:ARG:HH11	1:D:85:ARG:HG2	1.61	0.66
1:A:75:GLN:OE1	7:A:402:HOH:O	2.15	0.65
1:D:4:ARG:NH1	1:D:88:GLY:O	2.29	0.65
1:C:215:MET:HA	5:C:306:PEG:H31	1.79	0.63
1:C:216:ARG:O	1:C:220:GLN:HG3	2.00	0.61
1:C:59:ARG:HG3	7:C:429:HOH:O	2.02	0.59
1:B:207:ARG:HD3	7:B:408:HOH:O	2.02	0.58
1:D:18:ARG:HD2	1:D:47:LEU:HD13	1.86	0.57
1:C:195:PRO:HB2	1:C:198:LEU:HD21	1.88	0.55
1:C:230:ASP:HB3	1:C:233:VAL:HG23	1.89	0.55
1:D:240:SER:O	1:D:244:LYS:HG3	2.06	0.55
1:B:157:ALA:HB2	1:B:171:LYS:HB3	1.89	0.55
1:D:157:ALA:HB2	1:D:171:LYS:HB3	1.90	0.54
1:C:7[B]:CYS:SG	1:C:24:LEU:HD21	2.48	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:157:ALA:HB2	1:A:171:LYS:HB3	1.90	0.53
1:B:223:LYS:NZ	7:B:405:HOH:O	2.39	0.53
1:B:230:ASP:HB2	1:B:233:VAL:HG23	1.91	0.53
1:A:230:ASP:HB3	1:A:233:VAL:HG23	1.91	0.52
1:D:7[B]:CYS:SG	1:D:24:LEU:HD21	2.48	0.52
1:A:109:VAL:HG23	7:C:419:HOH:O	2.09	0.52
1:A:195:PRO:HB2	1:A:198:LEU:HD21	1.92	0.52
1:D:197:PRO:HB2	1:D:228:LEU:HD22	1.94	0.50
1:C:240:SER:O	1:C:244:LYS:HG3	2.13	0.48
1:B:21:ALA:HB3	1:B:22:PRO:HD3	1.96	0.48
1:B:2:LEU:O	1:B:91:ARG:HD2	2.14	0.48
1:B:153:SER:O	2:B:301:NAP:H6N	2.15	0.46
1:B:173:ALA:HB2	1:D:173:ALA:HB2	1.97	0.46
1:B:218:GLY:HA3	5:B:307:PEG:H31	1.98	0.45
1:C:103:ASP:OD2	1:C:106:LYS:HE2	2.17	0.45
1:A:63:VAL:HG11	1:A:76:LEU:HA	1.98	0.45
1:A:11:GLY:HA2	2:A:301:NAP:H1B	1.99	0.44
1:B:240:SER:O	1:B:244:LYS:HG3	2.19	0.43
1:D:153:SER:O	2:D:301:NAP:H6N	2.18	0.43
1:B:161:PHE:HB3	1:B:215:MET:HE1	2.01	0.43
1:B:38:ALA:O	1:B:64:PRO:HA	2.19	0.43
1:A:153:SER:O	2:A:301:NAP:H6N	2.18	0.42
1:C:55:ARG:O	1:C:55:ARG:HG2	2.19	0.42
1:D:104:VAL:O	1:D:211:VAL:HG23	2.20	0.41
1:D:230:ASP:HB3	1:D:233:VAL:HG23	2.01	0.41
1:D:23:LEU:HD11	1:D:232:LYS:HG3	2.01	0.41
1:A:218:GLY:HA3	5:A:309:PEG:H12	2.02	0.41
1:C:157:ALA:HB2	1:C:171:LYS:HB3	2.03	0.41
1:C:2:LEU:O	1:C:91:ARG:HD2	2.20	0.41
1:D:38:ALA:O	1:D:64:PRO:HA	2.20	0.41
1:C:62:ARG:NH1	7:C:403:HOH:O	2.29	0.41
1:D:207:ARG:O	1:D:216:ARG:HG3	2.20	0.41
1:D:63:VAL:HG11	1:D:76:LEU:HA	2.02	0.41
1:D:128:MET:SD	1:D:174:ARG:HG2	2.60	0.40
1:A:240:SER:O	1:A:244:LYS:HG3	2.22	0.40
1:A:83:LEU:HA	1:A:84:PRO:HD3	1.93	0.40
5:A:309:PEG:H22	6:A:310:QGV:N03	2.37	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	256/263 (97%)	253 (99%)	3 (1%)	0	100	100
1	B	256/263 (97%)	251 (98%)	5 (2%)	0	100	100
1	C	257/263 (98%)	253 (98%)	4 (2%)	0	100	100
1	D	257/263 (98%)	253 (98%)	4 (2%)	0	100	100
All	All	1026/1052 (98%)	1010 (98%)	16 (2%)	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	208/213 (98%)	208 (100%)	0	100	100
1	B	205/213 (96%)	205 (100%)	0	100	100
1	C	204/213 (96%)	203 (100%)	1 (0%)	88	95
1	D	201/213 (94%)	201 (100%)	0	100	100
All	All	818/852 (96%)	817 (100%)	1 (0%)	93	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	42	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such

sidechains are listed below:

Mol	Chain	Res	Type
1	B	203	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

34 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	A	301	-	45,52,52	3.91	14 (31%)	56,80,80	1.30	6 (10%)
3	SO4	D	304	-	4,4,4	0.12	0	6,6,6	0.13	0
3	SO4	C	302	-	4,4,4	0.14	0	6,6,6	0.11	0
3	SO4	D	308	-	4,4,4	0.14	0	6,6,6	0.06	0
3	SO4	D	307	-	4,4,4	0.15	0	6,6,6	0.12	0
4	GOL	A	307	-	5,5,5	0.29	0	5,5,5	0.26	0
6	QGV	B	308	-	26,28,28	1.57	4 (15%)	30,40,40	2.82	9 (30%)
3	SO4	A	304	-	4,4,4	0.15	0	6,6,6	0.06	0
2	NAP	D	301	-	45,52,52	3.90	15 (33%)	56,80,80	1.13	6 (10%)
3	SO4	B	303	-	4,4,4	0.15	0	6,6,6	0.10	0
3	SO4	A	302	-	4,4,4	0.15	0	6,6,6	0.07	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	SO4	B	304	-	4,4,4	0.15	0	6,6,6	0.06	0
6	QGV	C	307	-	26,28,28	1.57	4 (15%)	30,40,40	2.77	10 (33%)
5	PEG	C	306	-	6,6,6	0.56	0	5,5,5	0.36	0
3	SO4	D	305	-	4,4,4	0.13	0	6,6,6	0.08	0
3	SO4	B	302	-	4,4,4	0.14	0	6,6,6	0.13	0
5	PEG	B	307	-	6,6,6	0.60	0	5,5,5	0.21	0
2	NAP	B	301	-	45,52,52	3.90	13 (28%)	56,80,80	1.24	6 (10%)
3	SO4	A	303	-	4,4,4	0.16	0	6,6,6	0.05	0
6	QGV	A	310	-	26,28,28	1.58	4 (15%)	30,40,40	2.81	9 (30%)
3	SO4	D	303	-	4,4,4	0.14	0	6,6,6	0.09	0
4	GOL	A	306	-	5,5,5	0.30	0	5,5,5	0.31	0
6	QGV	D	309	-	26,28,28	1.60	4 (15%)	30,40,40	2.69	9 (30%)
2	NAP	C	301	-	45,52,52	3.88	13 (28%)	56,80,80	1.28	5 (8%)
4	GOL	B	306	-	5,5,5	0.40	0	5,5,5	0.22	0
3	SO4	A	305	-	4,4,4	0.12	0	6,6,6	0.14	0
4	GOL	C	305	-	5,5,5	0.30	0	5,5,5	0.30	0
3	SO4	D	302	-	4,4,4	0.14	0	6,6,6	0.09	0
3	SO4	B	305	-	4,4,4	0.13	0	6,6,6	0.09	0
3	SO4	D	306	-	4,4,4	0.15	0	6,6,6	0.07	0
5	PEG	A	309	-	6,6,6	0.58	0	5,5,5	0.24	0
4	GOL	A	308	-	5,5,5	0.28	0	5,5,5	0.25	0
3	SO4	C	303	-	4,4,4	0.14	0	6,6,6	0.08	0
3	SO4	C	304	-	4,4,4	0.14	0	6,6,6	0.07	0

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
6	QGV	A	310	-	-	2/8/12/12	0/4/4/4
2	NAP	A	301	-	-	3/31/67/67	0/5/5/5
6	QGV	C	307	-	-	0/8/12/12	0/4/4/4
5	PEG	C	306	-	-	2/4/4/4	-
4	GOL	A	307	-	-	0/4/4/4	-
4	GOL	B	306	-	-	2/4/4/4	-
6	QGV	B	308	-	-	0/8/12/12	0/4/4/4
2	NAP	D	301	-	-	12/31/67/67	0/5/5/5
5	PEG	B	307	-	-	1/4/4/4	-
2	NAP	B	301	-	-	6/31/67/67	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	306	-	-	2/4/4/4	-
5	PEG	A	309	-	-	3/4/4/4	-
4	GOL	A	308	-	-	0/4/4/4	-
4	GOL	C	305	-	-	0/4/4/4	-
6	QGV	D	309	-	-	0/8/12/12	0/4/4/4
2	NAP	C	301	-	-	14/31/67/67	0/5/5/5

All (71) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	NAP	C3B-C2B	-11.69	1.26	1.52
2	D	301	NAP	C3B-C2B	-11.65	1.27	1.52
2	C	301	NAP	C3B-C2B	-11.65	1.27	1.52
2	A	301	NAP	C3B-C2B	-11.49	1.27	1.52
2	A	301	NAP	O4D-C1D	10.40	1.55	1.41
2	B	301	NAP	O4D-C1D	10.34	1.55	1.41
2	D	301	NAP	O4D-C1D	10.13	1.55	1.41
2	C	301	NAP	O4D-C1D	9.88	1.54	1.41
2	D	301	NAP	C2D-C3D	-9.63	1.27	1.53
2	B	301	NAP	C2D-C3D	-9.60	1.27	1.53
2	C	301	NAP	C2D-C3D	-9.57	1.27	1.53
2	A	301	NAP	C2D-C3D	-9.43	1.27	1.53
2	A	301	NAP	O4B-C1B	-9.19	1.28	1.41
2	B	301	NAP	O4B-C1B	-8.88	1.28	1.41
2	C	301	NAP	O4B-C1B	-8.73	1.28	1.41
2	D	301	NAP	O4B-C1B	-8.63	1.29	1.41
2	C	301	NAP	O4D-C4D	-7.97	1.27	1.45
2	A	301	NAP	O4D-C4D	-7.87	1.27	1.45
2	C	301	NAP	C7N-N7N	7.76	1.47	1.33
2	D	301	NAP	O4D-C4D	-7.75	1.27	1.45
2	A	301	NAP	C7N-N7N	7.74	1.47	1.33
2	B	301	NAP	O4D-C4D	-7.72	1.27	1.45
2	B	301	NAP	C7N-N7N	7.71	1.47	1.33
2	D	301	NAP	C7N-N7N	7.70	1.47	1.33
6	D	309	QGV	C05-N04	-5.63	1.34	1.44
6	B	308	QGV	C05-N04	-5.59	1.34	1.44
6	A	310	QGV	C05-N04	-5.59	1.34	1.44
2	A	301	NAP	C5B-C4B	-5.38	1.34	1.51
6	C	307	QGV	C05-N04	-5.38	1.35	1.44
2	D	301	NAP	C3D-C4D	5.35	1.66	1.53
2	D	301	NAP	C5B-C4B	-5.31	1.35	1.51
2	B	301	NAP	C5B-C4B	-5.25	1.35	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	301	NAP	C3D-C4D	5.22	1.66	1.53
2	C	301	NAP	C5B-C4B	-5.14	1.35	1.51
2	A	301	NAP	C3D-C4D	5.12	1.66	1.53
2	B	301	NAP	C3D-C4D	5.09	1.66	1.53
2	C	301	NAP	O4B-C4B	4.74	1.55	1.45
2	D	301	NAP	O4B-C4B	4.74	1.55	1.45
2	B	301	NAP	O4B-C4B	4.57	1.55	1.45
2	A	301	NAP	O4B-C4B	4.47	1.55	1.45
2	A	301	NAP	O3B-C3B	4.37	1.53	1.43
2	D	301	NAP	O3B-C3B	4.35	1.53	1.43
2	C	301	NAP	O3B-C3B	4.34	1.53	1.43
2	B	301	NAP	O3B-C3B	4.24	1.53	1.43
2	C	301	NAP	O2D-C2D	4.18	1.52	1.43
2	D	301	NAP	O2D-C2D	4.16	1.52	1.43
2	A	301	NAP	O2D-C2D	4.12	1.52	1.43
2	B	301	NAP	O2D-C2D	4.10	1.52	1.43
2	A	301	NAP	O7N-C7N	-2.79	1.18	1.24
2	C	301	NAP	O7N-C7N	-2.76	1.18	1.24
2	D	301	NAP	C6A-N6A	2.75	1.44	1.34
2	B	301	NAP	C6A-N6A	2.67	1.43	1.34
2	D	301	NAP	O7N-C7N	-2.65	1.19	1.24
2	A	301	NAP	C6A-N6A	2.63	1.43	1.34
2	C	301	NAP	C6A-N6A	2.61	1.43	1.34
2	B	301	NAP	O7N-C7N	-2.59	1.19	1.24
6	C	307	QGV	O25-C24	2.45	1.41	1.36
6	A	310	QGV	O25-C24	2.37	1.41	1.36
6	D	309	QGV	O25-C24	2.36	1.41	1.36
6	A	310	QGV	C16-C11	-2.35	1.37	1.43
6	B	308	QGV	C16-C11	-2.27	1.37	1.43
6	C	307	QGV	C16-C11	-2.26	1.37	1.43
6	A	310	QGV	N03-N04	-2.24	1.35	1.39
6	D	309	QGV	N03-N04	-2.20	1.35	1.39
6	C	307	QGV	N03-N04	-2.19	1.35	1.39
6	D	309	QGV	C16-C11	-2.19	1.37	1.43
6	B	308	QGV	N03-N04	-2.18	1.35	1.39
2	D	301	NAP	C2A-N3A	2.10	1.35	1.32
2	D	301	NAP	C3N-C7N	2.07	1.53	1.50
2	A	301	NAP	C2A-N3A	2.04	1.35	1.32
6	B	308	QGV	O25-C24	2.02	1.40	1.36

All (60) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	307	QGV	C05-N04-N03	7.10	125.58	118.88
6	A	310	QGV	C05-N04-N03	6.96	125.45	118.88
6	B	308	QGV	C05-N04-N03	6.90	125.39	118.88
6	D	309	QGV	C05-N04-N03	6.89	125.39	118.88
6	A	310	QGV	C14-C13-N12	-6.71	119.86	125.19
6	B	308	QGV	C14-C13-N12	-6.22	120.26	125.19
6	B	308	QGV	C09-N10-C05	6.14	120.92	115.56
6	B	308	QGV	C07-C06-C05	6.00	120.84	117.09
6	D	309	QGV	C14-C13-N12	-5.99	120.43	125.19
6	C	307	QGV	C09-N10-C05	5.97	120.77	115.56
6	C	307	QGV	C07-C06-C05	5.93	120.79	117.09
6	A	310	QGV	C09-N10-C05	5.92	120.72	115.56
6	D	309	QGV	C09-N10-C05	5.89	120.70	115.56
6	C	307	QGV	C14-C13-N12	-5.88	120.53	125.19
6	A	310	QGV	C07-C06-C05	5.84	120.73	117.09
6	D	309	QGV	C07-C06-C05	5.51	120.53	117.09
2	C	301	NAP	N3A-C2A-N1A	-4.50	121.64	128.68
6	B	308	QGV	C06-C05-N10	-4.33	119.89	125.48
6	C	307	QGV	C06-C05-N10	-4.32	119.91	125.48
2	D	301	NAP	N3A-C2A-N1A	-4.30	121.95	128.68
6	D	309	QGV	C13-N12-C11	4.26	122.17	116.73
6	A	310	QGV	C13-N12-C11	4.26	122.17	116.73
2	B	301	NAP	N3A-C2A-N1A	-4.23	122.07	128.68
2	A	301	NAP	N3A-C2A-N1A	-4.23	122.07	128.68
6	A	310	QGV	C06-C05-N10	-4.20	120.06	125.48
6	B	308	QGV	C13-N12-C11	4.09	121.96	116.73
6	D	309	QGV	C06-C05-N10	-4.08	120.22	125.48
6	C	307	QGV	C13-N12-C11	4.06	121.91	116.73
2	C	301	NAP	PN-O3-PA	-3.49	120.87	132.83
2	B	301	NAP	O4D-C1D-C2D	-3.31	102.09	106.93
2	C	301	NAP	C3D-C2D-C1D	3.19	105.79	100.98
2	B	301	NAP	PN-O3-PA	-3.18	121.93	132.83
6	C	307	QGV	C01-C02-N03	3.15	126.57	119.65
2	A	301	NAP	C3N-C7N-N7N	3.12	121.50	117.75
6	B	308	QGV	C01-C02-N03	3.02	126.28	119.65
6	A	310	QGV	C01-C02-N03	2.99	126.22	119.65
2	A	301	NAP	PN-O3-PA	-2.98	122.60	132.83
6	D	309	QGV	C01-C02-N03	2.98	126.19	119.65
6	A	310	QGV	C15-C14-C13	2.93	119.79	116.87
6	B	308	QGV	C15-C14-C13	2.86	119.71	116.87
2	C	301	NAP	C3N-C7N-N7N	2.69	120.98	117.75
2	D	301	NAP	O4D-C1D-C2D	-2.67	103.03	106.93
2	C	301	NAP	C2D-C3D-C4D	2.64	107.77	102.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	308	QGV	C14-C15-C16	-2.64	118.51	121.06
2	A	301	NAP	O4D-C1D-C2D	-2.63	103.08	106.93
2	B	301	NAP	C3N-C7N-N7N	2.60	120.87	117.75
6	A	310	QGV	C14-C15-C16	-2.53	118.61	121.06
6	C	307	QGV	C14-C15-C16	-2.40	118.74	121.06
2	A	301	NAP	C6N-N1N-C2N	-2.35	119.83	121.97
2	A	301	NAP	C2D-C3D-C4D	2.35	107.21	102.64
6	D	309	QGV	C15-C14-C13	2.33	119.19	116.87
2	D	301	NAP	PN-O3-PA	-2.32	124.88	132.83
6	C	307	QGV	C15-C14-C13	2.32	119.17	116.87
2	B	301	NAP	C6N-N1N-C2N	-2.24	119.93	121.97
6	C	307	QGV	C19-C17-C14	2.23	123.21	119.53
6	D	309	QGV	C14-C15-C16	-2.18	118.95	121.06
2	D	301	NAP	O7N-C7N-N7N	-2.05	119.66	122.58
2	D	301	NAP	C2D-C3D-C4D	2.05	106.63	102.64
2	B	301	NAP	O7N-C7N-N7N	-2.03	119.70	122.58
2	D	301	NAP	C3D-C2D-C1D	2.02	104.02	100.98

There are no chirality outliers.

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	NAP	C2B-O2B-P2B-O1X
2	A	301	NAP	O4D-C1D-N1N-C2N
4	A	306	GOL	O1-C1-C2-C3
2	D	301	NAP	C5B-O5B-PA-O1A
2	D	301	NAP	C5B-O5B-PA-O2A
2	D	301	NAP	C2B-O2B-P2B-O1X
2	D	301	NAP	O4D-C1D-N1N-C2N
2	B	301	NAP	C2B-O2B-P2B-O1X
2	B	301	NAP	O4D-C1D-N1N-C2N
2	C	301	NAP	C5B-O5B-PA-O1A
2	C	301	NAP	C5B-O5B-PA-O2A
2	C	301	NAP	C2B-O2B-P2B-O1X
2	C	301	NAP	O4D-C1D-N1N-C2N
2	C	301	NAP	O4D-C1D-N1N-C6N
2	C	301	NAP	C2D-C1D-N1N-C6N
4	B	306	GOL	O1-C1-C2-C3
2	D	301	NAP	O4B-C4B-C5B-O5B
2	C	301	NAP	O4B-C4B-C5B-O5B
2	C	301	NAP	C3B-C4B-C5B-O5B
4	B	306	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
2	D	301	NAP	C3B-C4B-C5B-O5B
2	C	301	NAP	O4D-C4D-C5D-O5D
2	C	301	NAP	C3D-C4D-C5D-O5D
5	A	309	PEG	O1-C1-C2-O2
4	A	306	GOL	O1-C1-C2-O2
2	D	301	NAP	C3D-C4D-C5D-O5D
2	D	301	NAP	O4D-C4D-C5D-O5D
5	C	306	PEG	C4-C3-O2-C2
2	D	301	NAP	PN-O3-PA-O5B
2	C	301	NAP	PN-O3-PA-O5B
5	C	306	PEG	C1-C2-O2-C3
2	D	301	NAP	C5B-O5B-PA-O3
2	D	301	NAP	C2B-O2B-P2B-O3X
2	B	301	NAP	C2B-O2B-P2B-O3X
5	B	307	PEG	O1-C1-C2-O2
2	B	301	NAP	O4D-C4D-C5D-O5D
6	A	310	QGV	C13-C14-C17-C19
5	A	309	PEG	O2-C3-C4-O4
5	A	309	PEG	C1-C2-O2-C3
2	D	301	NAP	C5D-O5D-PN-O3
2	C	301	NAP	C5B-O5B-PA-O3
2	C	301	NAP	C2B-O2B-P2B-O2X
2	C	301	NAP	C2D-C1D-N1N-C2N
2	B	301	NAP	O4B-C4B-C5B-O5B
2	A	301	NAP	O4B-C4B-C5B-O5B
2	B	301	NAP	C3D-C4D-C5D-O5D
6	A	310	QGV	C13-C14-C17-O18

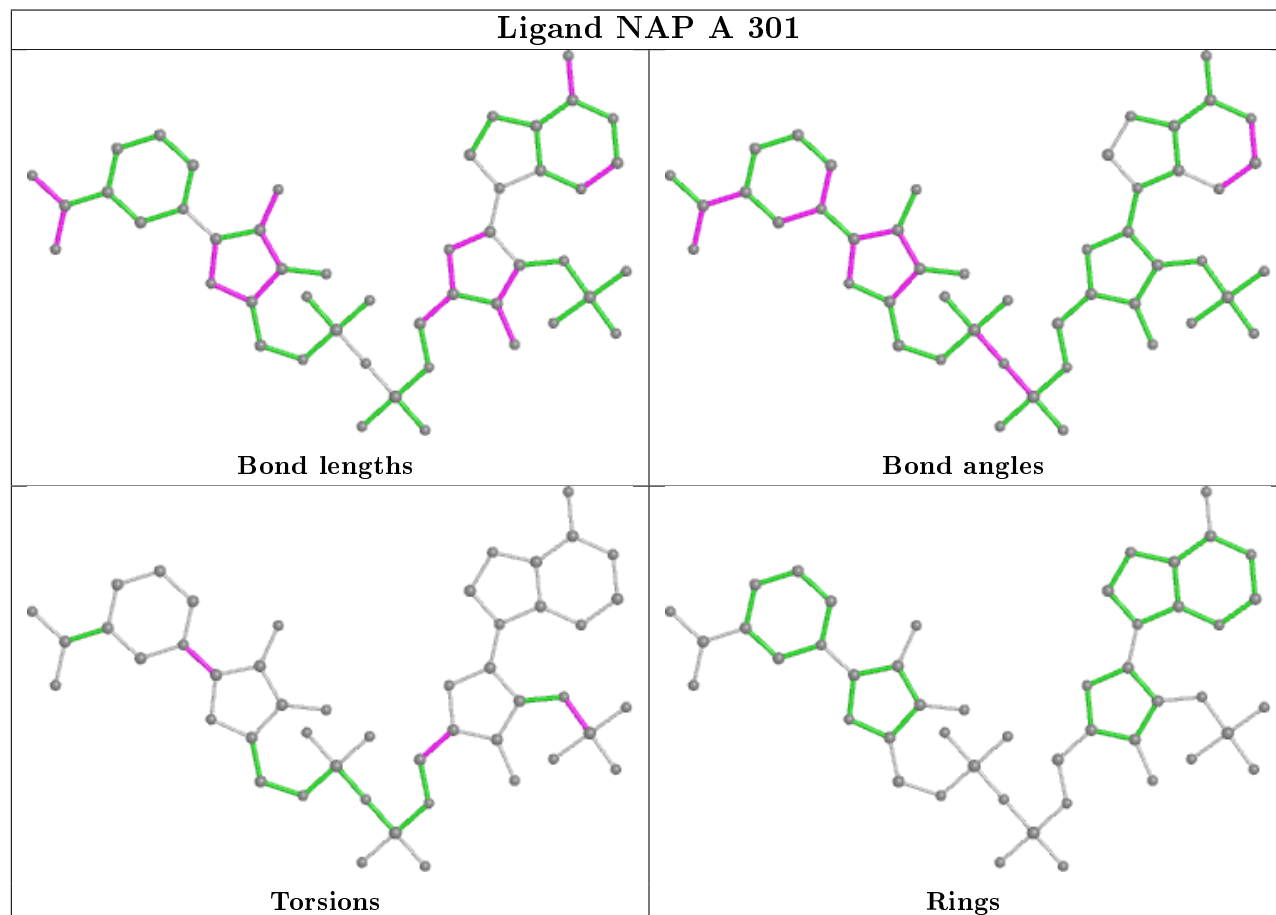
There are no ring outliers.

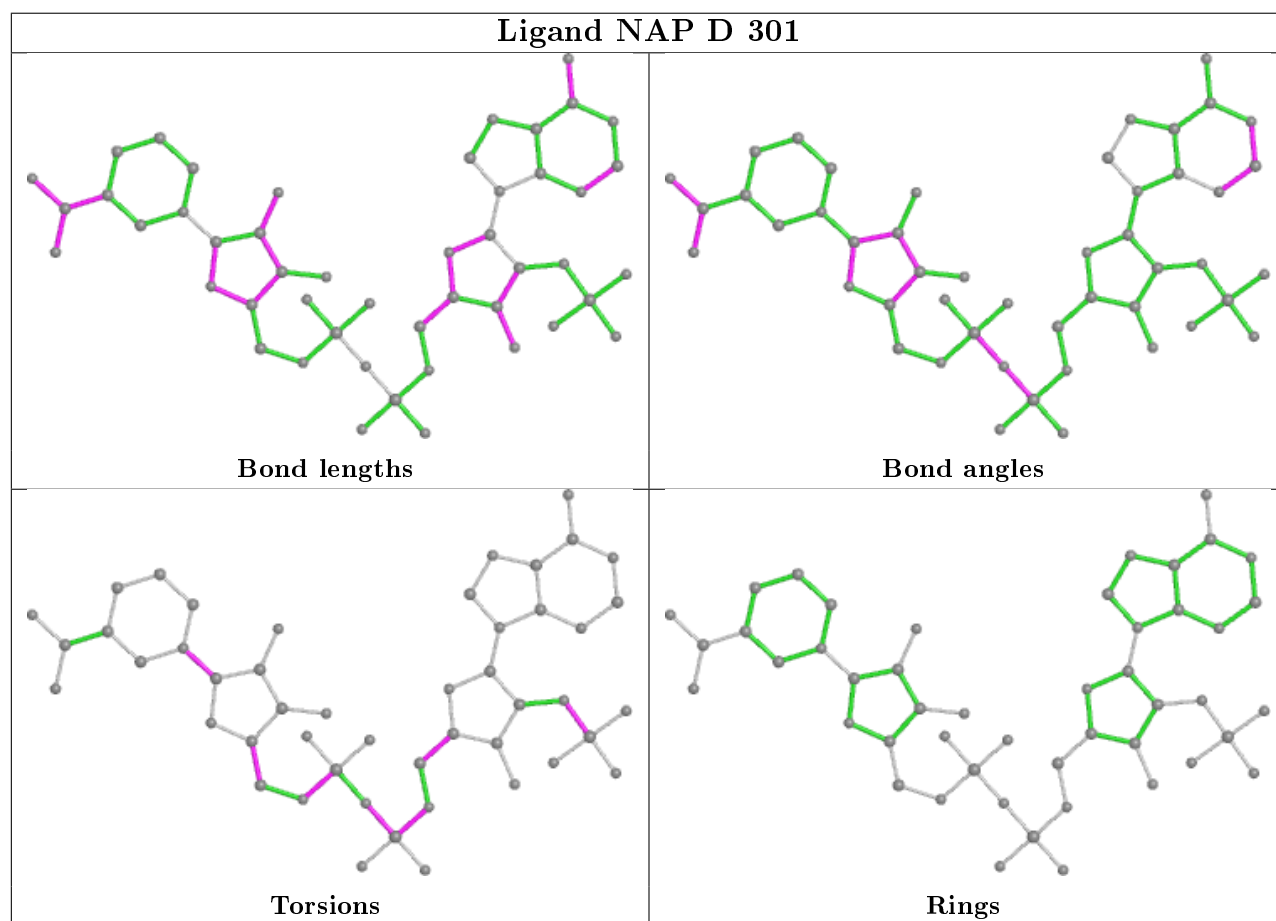
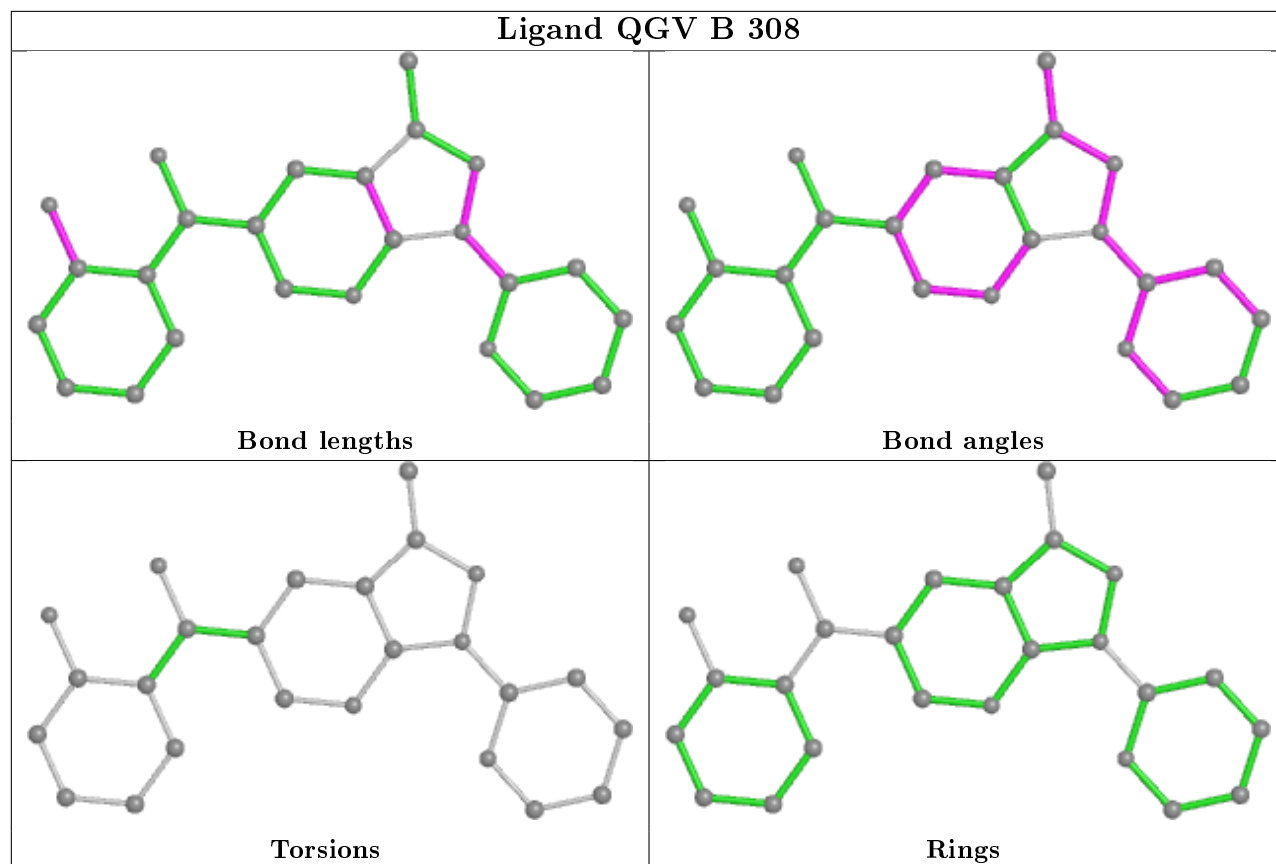
7 monomers are involved in 8 short contacts:

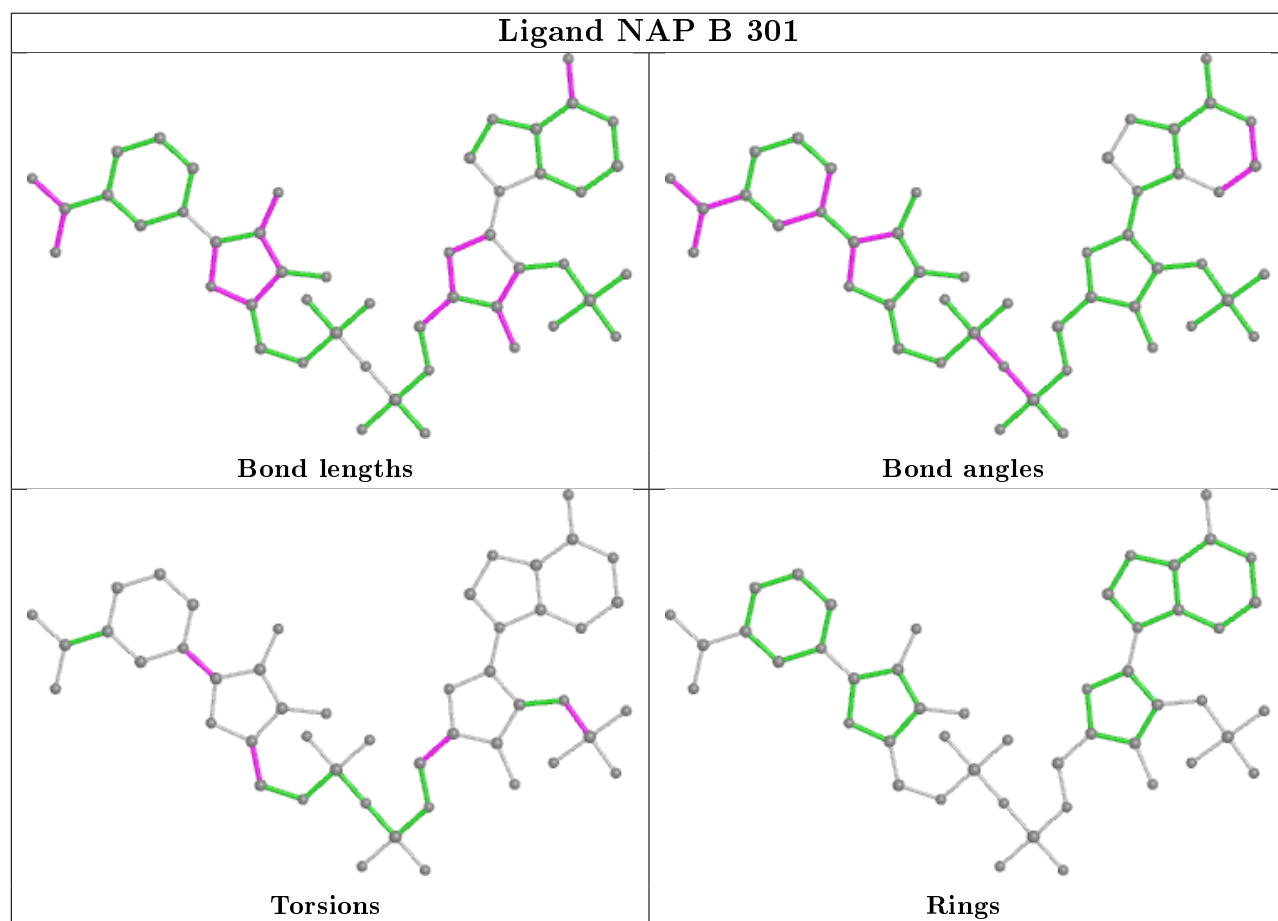
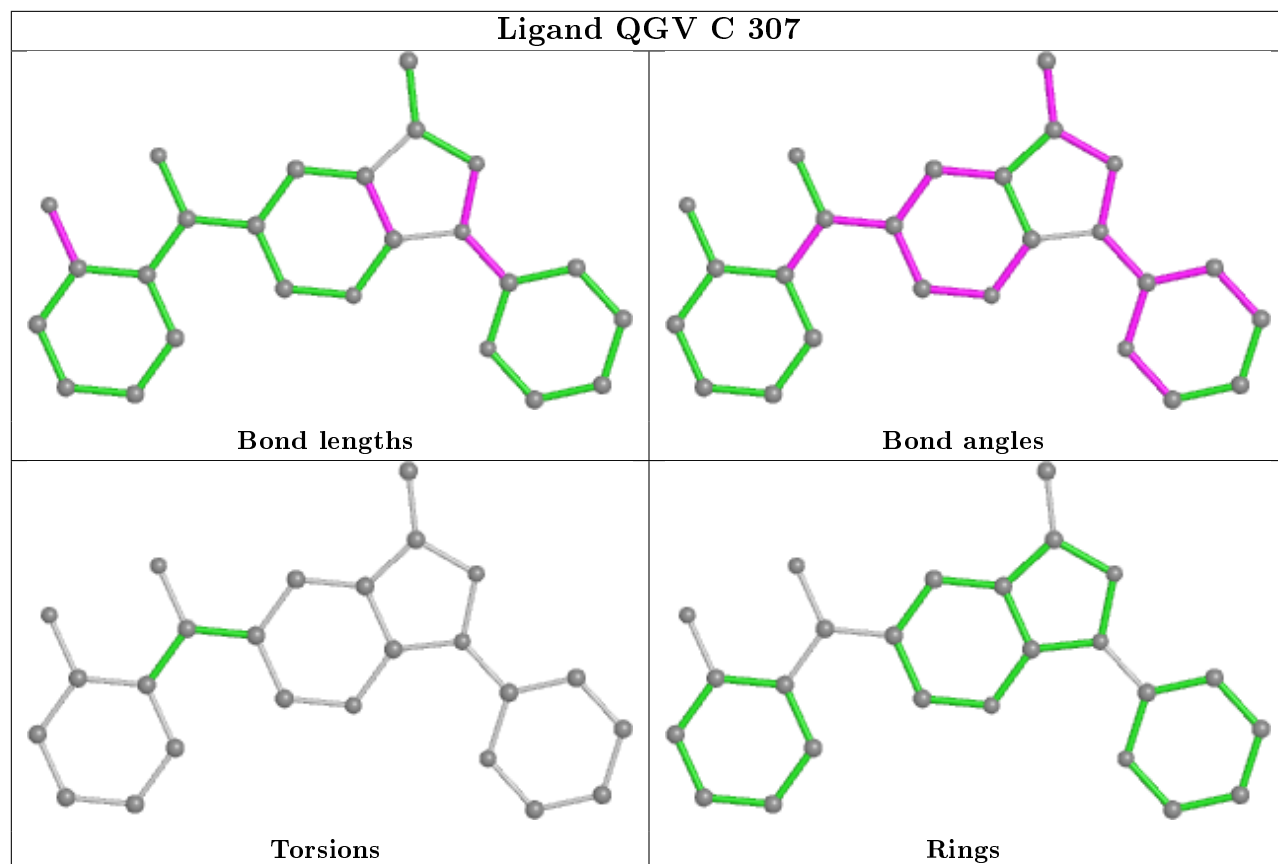
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	301	NAP	2	0
2	D	301	NAP	1	0
5	C	306	PEG	1	0
5	B	307	PEG	1	0
2	B	301	NAP	1	0
6	A	310	QGV	1	0
5	A	309	PEG	2	0

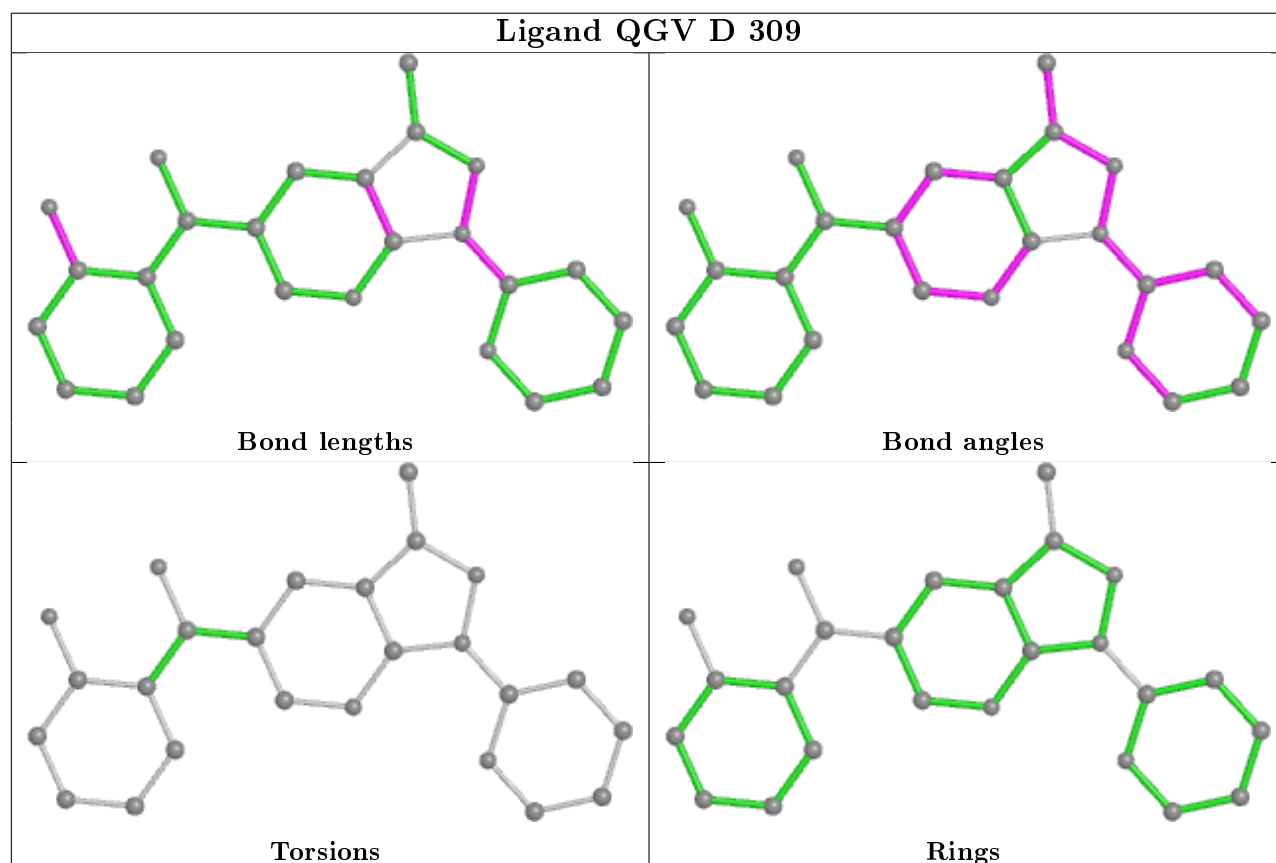
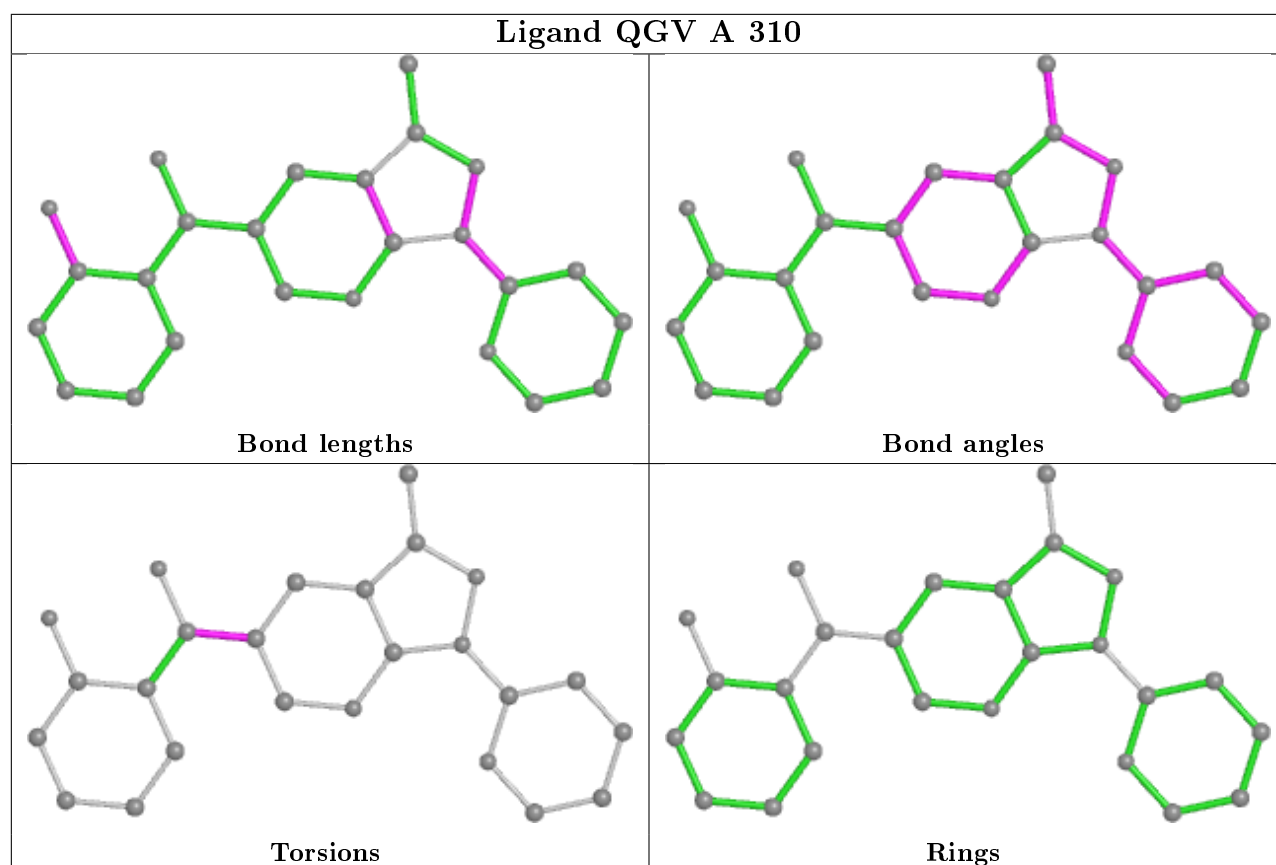
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

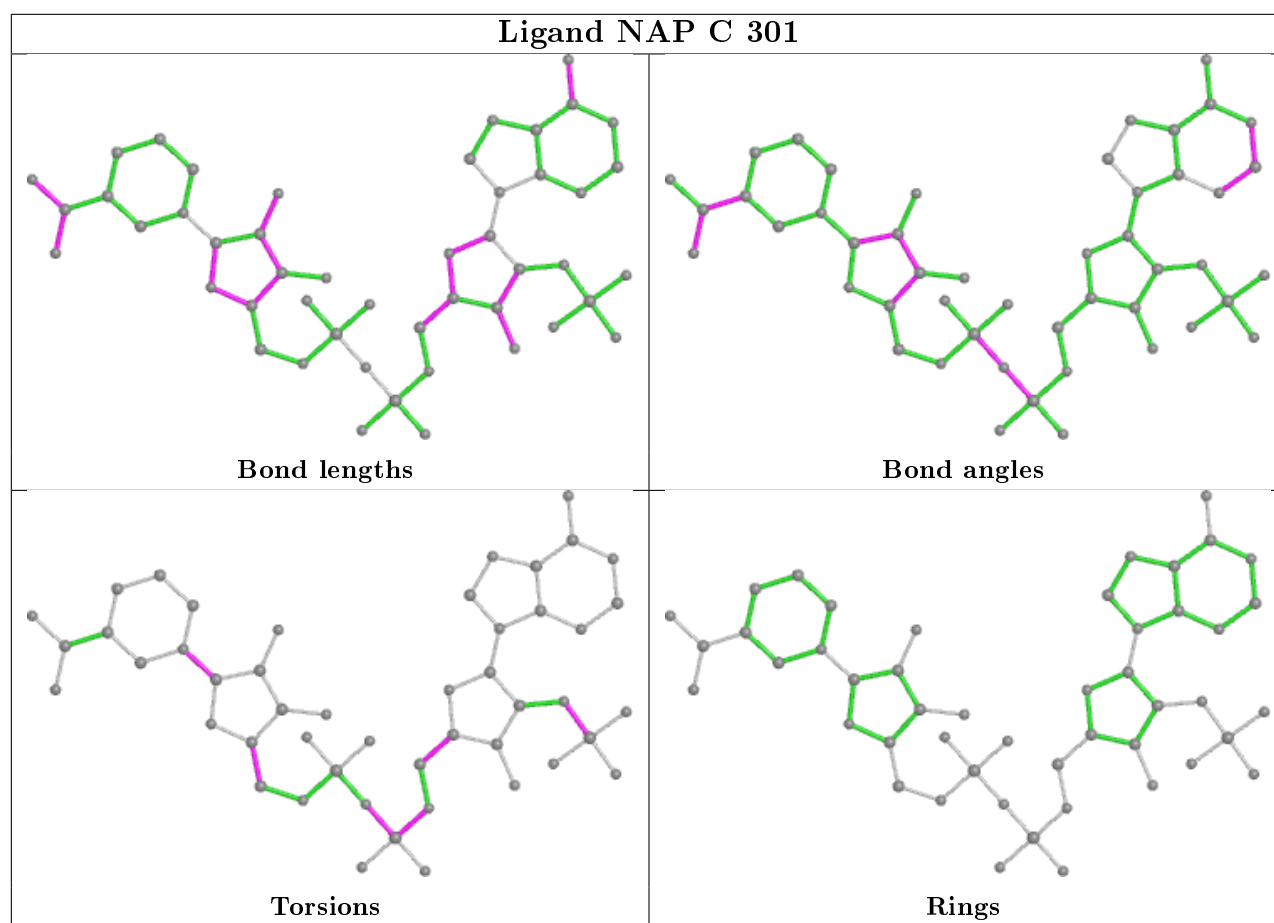
addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. 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 [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	258/263 (98%)	-0.43	0 100 100	28, 43, 66, 91	0
1	B	258/263 (98%)	-0.25	1 (0%) 92 92	34, 48, 76, 104	0
1	C	258/263 (98%)	-0.22	2 (0%) 86 84	31, 53, 75, 91	0
1	D	258/263 (98%)	-0.16	1 (0%) 92 92	34, 56, 87, 105	0
All	All	1032/1052 (98%)	-0.27	4 (0%) 92 92	28, 51, 77, 105	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	224	ALA	3.0
1	B	53	ALA	2.4
1	C	246	GLU	2.3
1	C	1	GLY	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 carbohydrates in this entry.

6.4 Ligands [i](#)

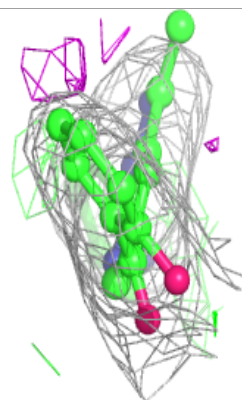
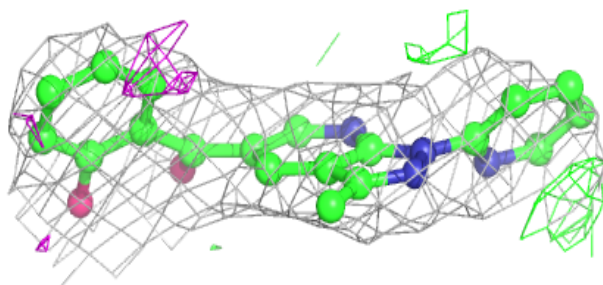
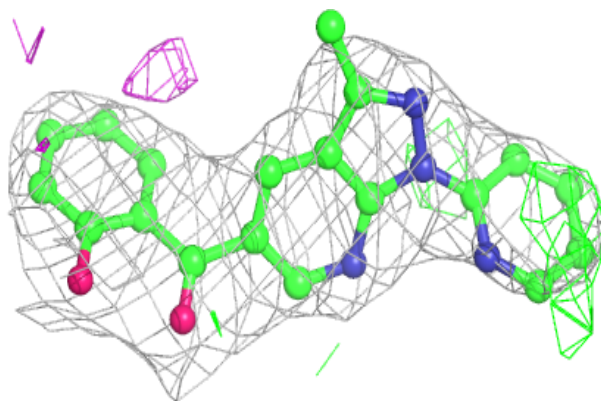
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	SO4	C	304	5/5	0.80	0.53	94,106,132,135	0
5	PEG	B	307	7/7	0.82	0.33	62,70,74,81	0
4	GOL	A	306	6/6	0.83	0.29	65,71,79,80	0
3	SO4	A	304	5/5	0.83	0.24	102,105,126,129	0
5	PEG	C	306	7/7	0.84	0.23	70,74,86,86	0
3	SO4	D	306	5/5	0.85	0.39	115,120,134,135	0
3	SO4	D	302	5/5	0.85	0.21	112,114,123,138	0
3	SO4	D	307	5/5	0.86	0.44	97,99,118,132	0
5	PEG	A	309	7/7	0.88	0.22	67,75,83,84	0
3	SO4	B	305	5/5	0.88	0.36	101,106,119,133	0
3	SO4	D	308	5/5	0.90	0.36	106,110,124,136	0
3	SO4	D	304	5/5	0.90	0.22	85,101,114,124	0
4	GOL	C	305	6/6	0.90	0.18	62,78,85,87	0
3	SO4	D	305	5/5	0.90	0.26	84,103,124,127	0
3	SO4	B	304	5/5	0.92	0.16	87,104,114,118	0
4	GOL	B	306	6/6	0.92	0.20	47,61,76,77	0
4	GOL	A	307	6/6	0.92	0.34	57,69,75,81	0
3	SO4	C	303	5/5	0.92	0.27	100,106,123,134	0
3	SO4	A	303	5/5	0.92	0.40	74,89,112,116	0
3	SO4	A	305	5/5	0.93	0.12	83,97,103,104	0
4	GOL	A	308	6/6	0.94	0.32	63,65,66,74	0
6	QGV	B	308	25/25	0.95	0.22	33,53,87,87	0
6	QGV	D	309	25/25	0.95	0.22	56,66,97,102	0
6	QGV	C	307	25/25	0.95	0.18	38,58,103,105	0
3	SO4	D	303	5/5	0.95	0.13	73,81,95,103	0
3	SO4	B	302	5/5	0.96	0.10	60,69,75,86	0
6	QGV	A	310	25/25	0.96	0.19	34,55,94,96	0
3	SO4	B	303	5/5	0.96	0.15	76,78,95,103	0
3	SO4	C	302	5/5	0.97	0.09	66,67,83,84	0
2	NAP	D	301	48/48	0.98	0.12	41,54,62,67	0
2	NAP	C	301	48/48	0.98	0.14	36,45,52,63	0
3	SO4	A	302	5/5	0.98	0.07	54,62,81,81	0
2	NAP	A	301	48/48	0.99	0.14	29,34,40,46	0
2	NAP	B	301	48/48	0.99	0.12	32,40,47,57	0

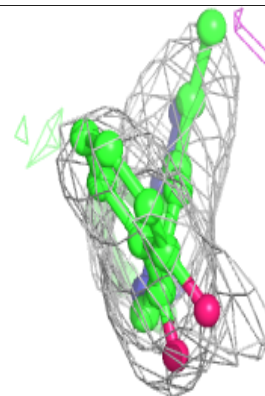
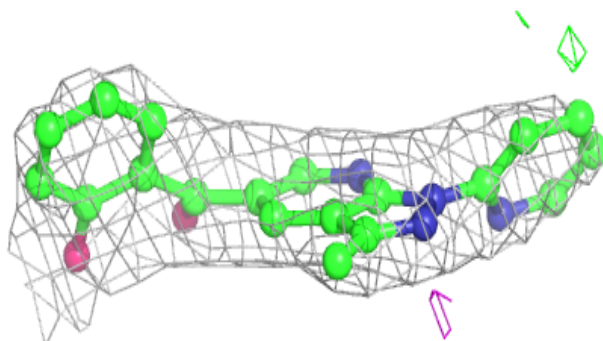
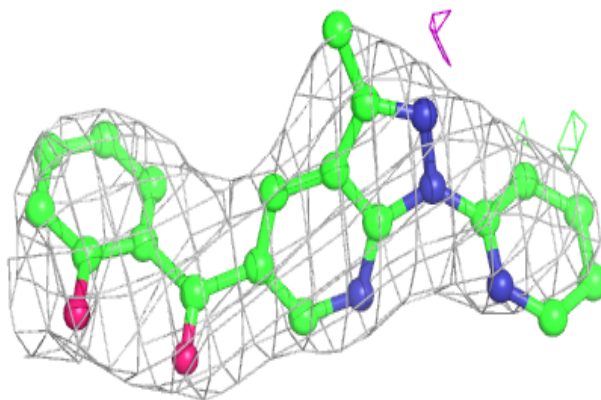
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around QGV B 308:

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

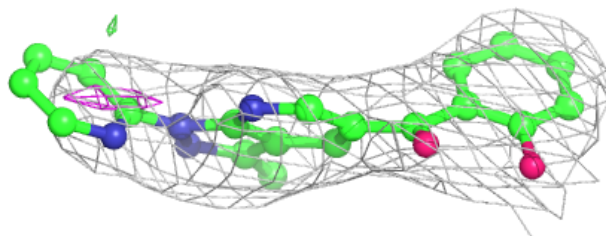
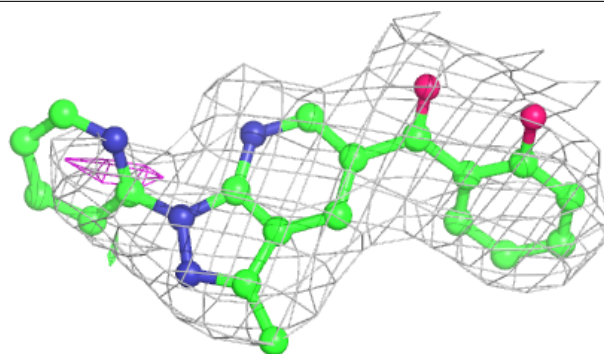
**Electron density around QGV D 309:**

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

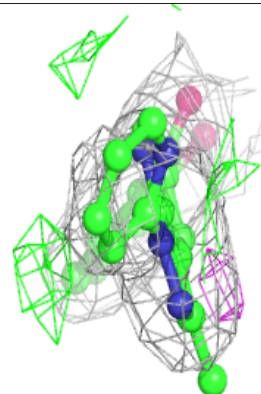
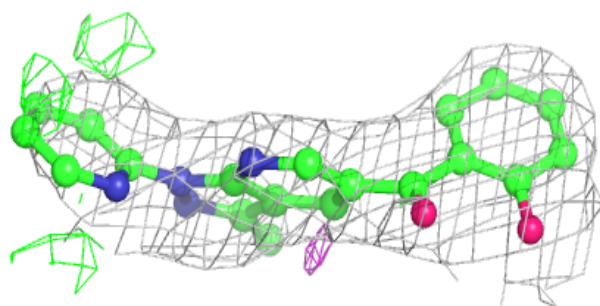
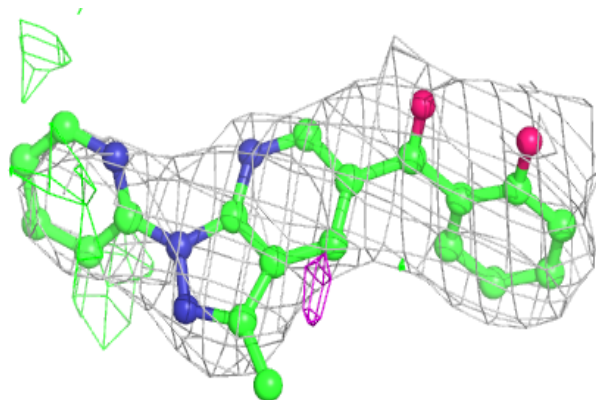


Electron density around QGV C 307:

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

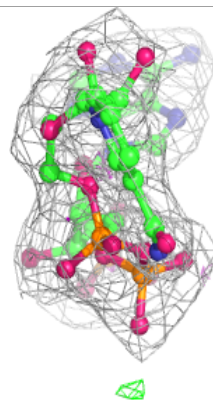
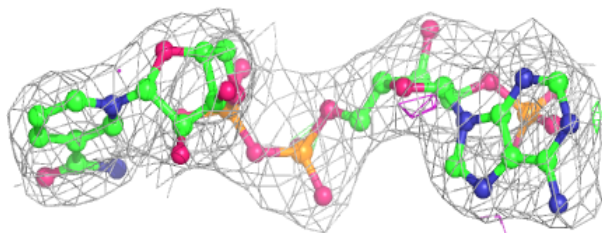
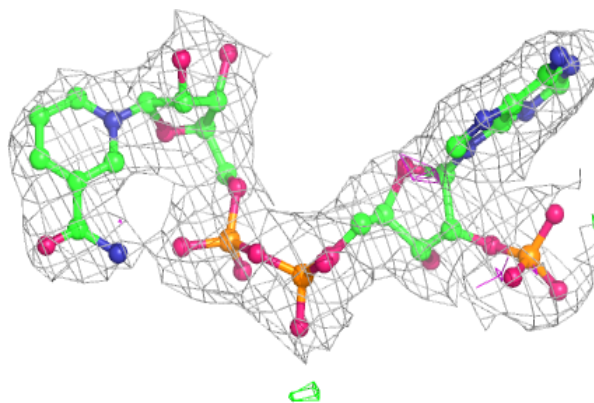
**Electron density around QGV A 310:**

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

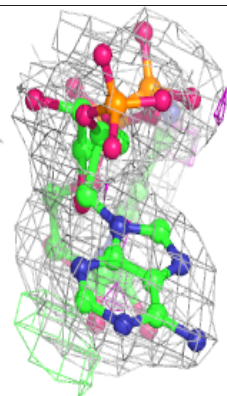
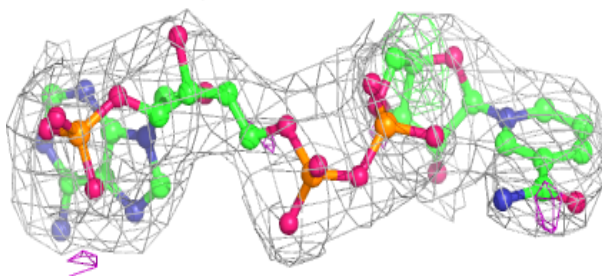
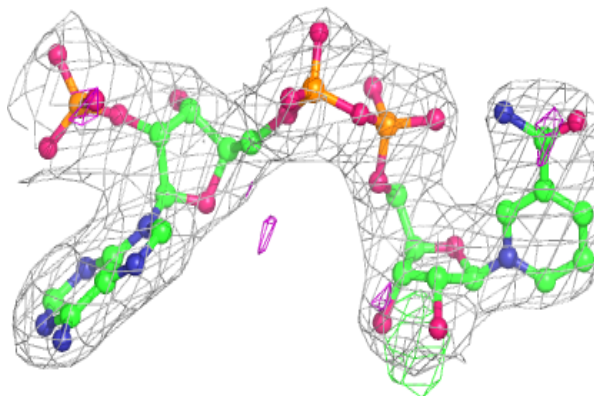


Electron density around NAP D 301:

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

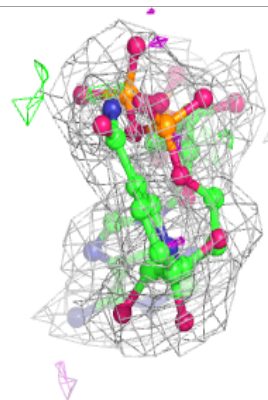
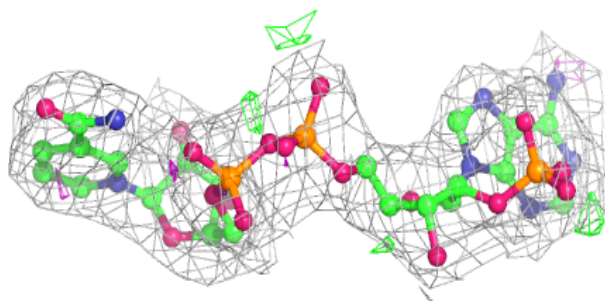
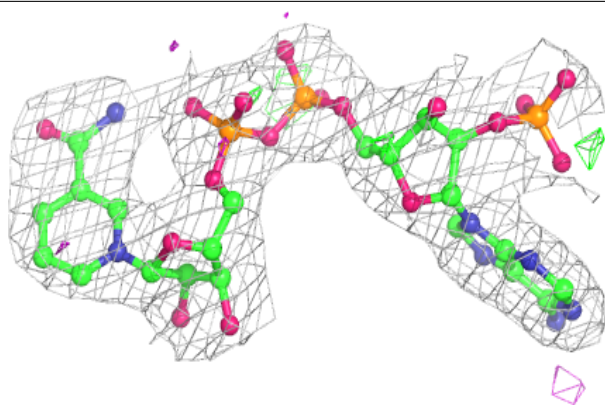
**Electron density around NAP C 301:**

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

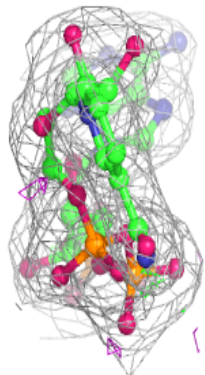
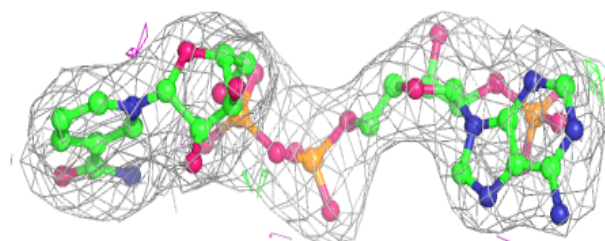
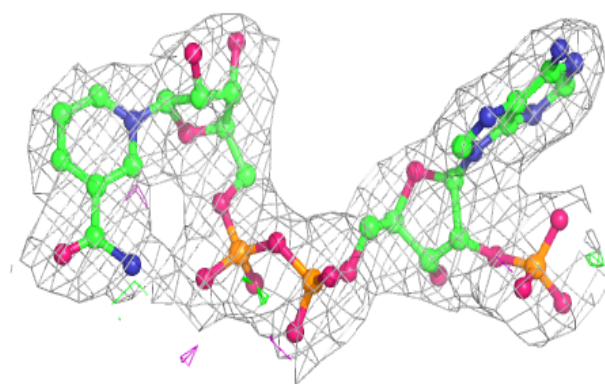


Electron density around NAP A 301:

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

**Electron density around NAP B 301:**

$2mF_o-DF_c$ (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.