



# wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 17, 2020 – 07:28 PM BST

PDB ID : 6Y32  
Title : Structure of the GTPase heterodimer of human SRP54 and SRalpha  
Authors : Juaire, K.D.; Becker, M.M.M.; Wild, K.; Sinning, I.  
Deposited on : 2020-02-17  
Resolution : 2.60 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.14.5  
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) : 2.14.5

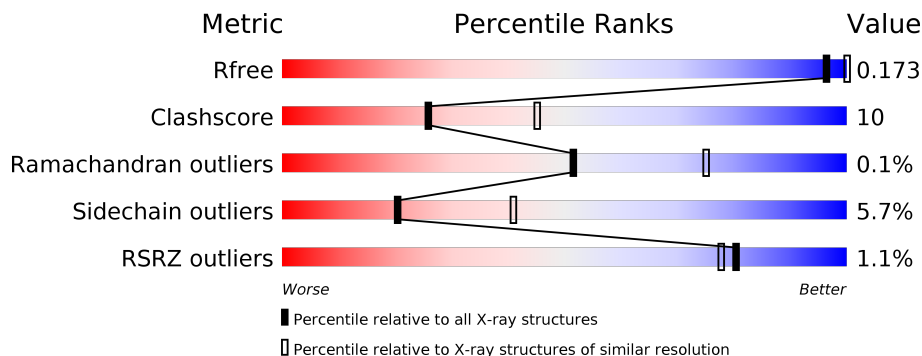
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	304	 2% 68% 20% 10%
1	C	304	 2% 68% 19% 12%
1	E	304	 % 68% 18% 12%
1	G	304	 % 63% 23% 12%
2	B	315	 % 73% 20% 7%
2	D	315	 2% 68% 25% 5%

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Mol	Chain	Length	Quality of chain
2	F	315	 71% 22% • •
2	H	315	%  73% 21% • 5%

## 2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 18356 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 Signal recognition particle 54 kDa protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	274	Total 2120	C 1353	N 354	O 401	S 12	0	0	0
1	C	268	Total 2075	C 1326	N 348	O 390	S 11	0	0	0
1	E	268	Total 2075	C 1326	N 348	O 390	S 11	0	0	0
1	G	267	Total 2067	C 1322	N 346	O 388	S 11	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	initiating methionine	UNP P61011
A	-6	GLY	-	expression tag	UNP P61011
A	-5	HIS	-	expression tag	UNP P61011
A	-4	HIS	-	expression tag	UNP P61011
A	-3	HIS	-	expression tag	UNP P61011
A	-2	HIS	-	expression tag	UNP P61011
A	-1	HIS	-	expression tag	UNP P61011
A	0	HIS	-	expression tag	UNP P61011
C	-7	MET	-	initiating methionine	UNP P61011
C	-6	GLY	-	expression tag	UNP P61011
C	-5	HIS	-	expression tag	UNP P61011
C	-4	HIS	-	expression tag	UNP P61011
C	-3	HIS	-	expression tag	UNP P61011
C	-2	HIS	-	expression tag	UNP P61011
C	-1	HIS	-	expression tag	UNP P61011
C	0	HIS	-	expression tag	UNP P61011
E	-7	MET	-	initiating methionine	UNP P61011
E	-6	GLY	-	expression tag	UNP P61011
E	-5	HIS	-	expression tag	UNP P61011
E	-4	HIS	-	expression tag	UNP P61011
E	-3	HIS	-	expression tag	UNP P61011

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-2	HIS	-	expression tag	UNP P61011
E	-1	HIS	-	expression tag	UNP P61011
E	0	HIS	-	expression tag	UNP P61011
G	-7	MET	-	initiating methionine	UNP P61011
G	-6	GLY	-	expression tag	UNP P61011
G	-5	HIS	-	expression tag	UNP P61011
G	-4	HIS	-	expression tag	UNP P61011
G	-3	HIS	-	expression tag	UNP P61011
G	-2	HIS	-	expression tag	UNP P61011
G	-1	HIS	-	expression tag	UNP P61011
G	0	HIS	-	expression tag	UNP P61011

- Molecule 2 is a protein called Signal recognition particle receptor subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	302	Total 2297	C 1444	N 407	O 430	S 16	0	0	0
2	D	305	Total 2322	C 1460	N 412	O 434	S 16	0	0	0
2	F	304	Total 2316	C 1456	N 411	O 433	S 16	0	0	0
2	H	300	Total 2284	C 1436	N 404	O 428	S 16	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

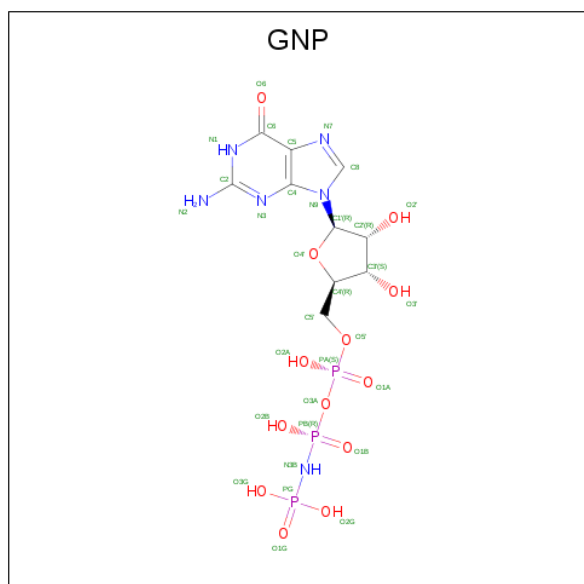
Chain	Residue	Modelled	Actual	Comment	Reference
B	330	MET	-	initiating methionine	UNP P08240
B	331	GLY	-	expression tag	UNP P08240
B	639	HIS	-	expression tag	UNP P08240
B	640	HIS	-	expression tag	UNP P08240
B	641	HIS	-	expression tag	UNP P08240
B	642	HIS	-	expression tag	UNP P08240
B	643	HIS	-	expression tag	UNP P08240
B	644	HIS	-	expression tag	UNP P08240
D	330	MET	-	initiating methionine	UNP P08240
D	331	GLY	-	expression tag	UNP P08240
D	639	HIS	-	expression tag	UNP P08240
D	640	HIS	-	expression tag	UNP P08240
D	641	HIS	-	expression tag	UNP P08240
D	642	HIS	-	expression tag	UNP P08240
D	643	HIS	-	expression tag	UNP P08240

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Chain	Residue	Modelled	Actual	Comment	Reference
D	644	HIS	-	expression tag	UNP P08240
F	330	MET	-	initiating methionine	UNP P08240
F	331	GLY	-	expression tag	UNP P08240
F	639	HIS	-	expression tag	UNP P08240
F	640	HIS	-	expression tag	UNP P08240
F	641	HIS	-	expression tag	UNP P08240
F	642	HIS	-	expression tag	UNP P08240
F	643	HIS	-	expression tag	UNP P08240
F	644	HIS	-	expression tag	UNP P08240
H	330	MET	-	initiating methionine	UNP P08240
H	331	GLY	-	expression tag	UNP P08240
H	639	HIS	-	expression tag	UNP P08240
H	640	HIS	-	expression tag	UNP P08240
H	641	HIS	-	expression tag	UNP P08240
H	642	HIS	-	expression tag	UNP P08240
H	643	HIS	-	expression tag	UNP P08240
H	644	HIS	-	expression tag	UNP P08240

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula:  $C_{10}H_{17}N_6O_{13}P_3$ ) (labeled as "Ligand of Interest" by author).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
3	A	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	B	1	Total	C	N	O	P	0	0
			32	10	6	13	3		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	C	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	D	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	E	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	F	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	G	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
3	H	1	Total	C	N	O	P	0	0
			32	10	6	13	3		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	G	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		
4	E	1	Total	Mg	0	0
			1	1		
4	H	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		
4	C	1	Total	Mg	0	0
			1	1		
4	A	1	Total	Mg	0	0
			1	1		
4	F	1	Total	Mg	0	0
			1	1		

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
5	B	1	5	4	1	0	0
5	B	1	5	4	1	0	0
5	B	1	5	4	1	0	0
5	C	1	5	4	1	0	0
5	D	1	5	4	1	0	0
5	F	1	5	4	1	0	0
5	F	1	5	4	1	0	0
5	F	1	5	4	1	0	0
5	G	1	5	4	1	0	0
5	H	1	5	4	1	0	0
5	H	1	5	4	1	0	0
5	H	1	5	4	1	0	0
5	H	1	5	4	1	0	0
5	H	1	5	4	1	0	0



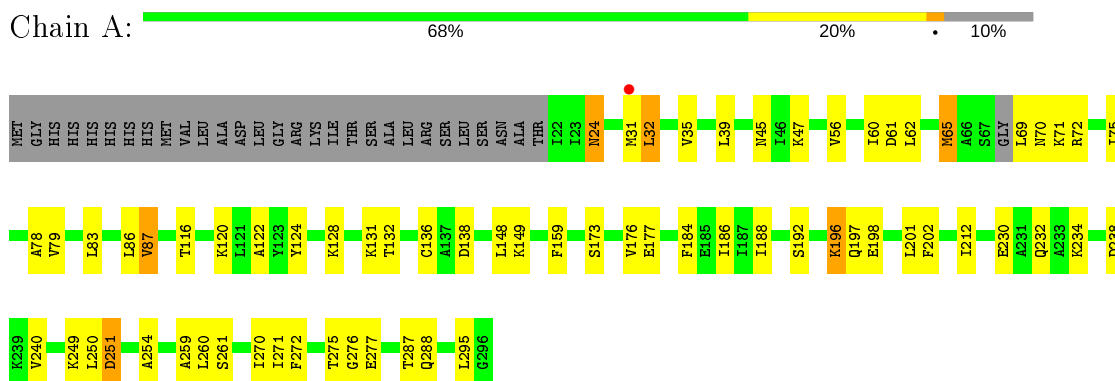
- Molecule 6 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
6	A	56	Total 56	O 56	0	0
6	B	80	Total 80	O 80	0	0
6	C	47	Total 47	O 47	0	0
6	D	50	Total 50	O 50	0	0
6	E	49	Total 49	O 49	0	0
6	F	55	Total 55	O 55	0	0
6	G	45	Total 45	O 45	0	0
6	H	84	Total 84	O 84	0	0

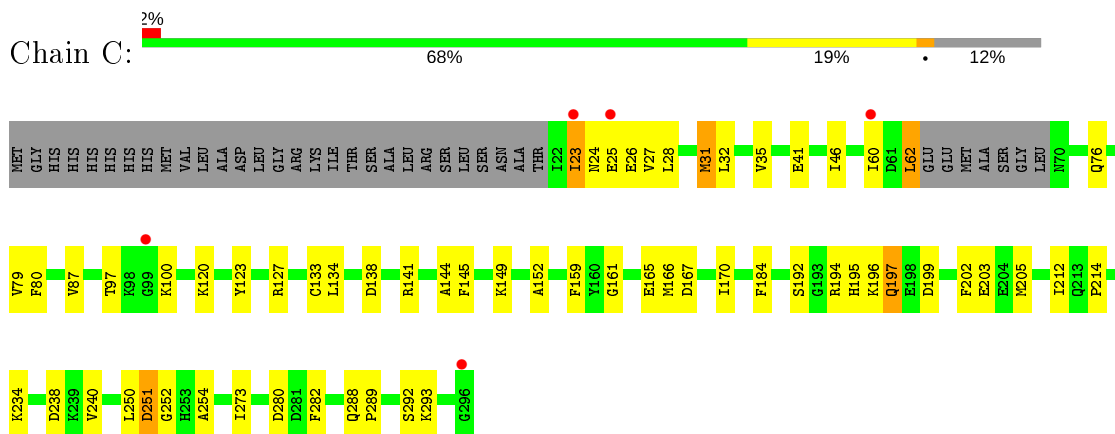
### 3 Residue-property plots [i](#)

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.

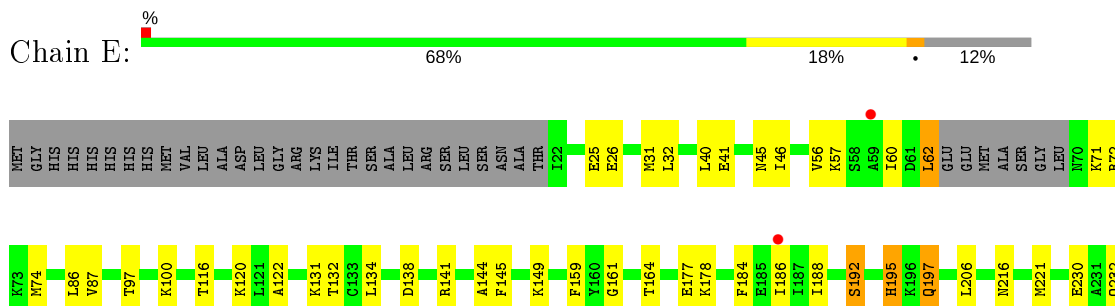
- Molecule 1: Signal recognition particle 54 kDa protein

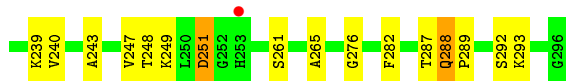


- Molecule 1: Signal recognition particle 54 kDa protein

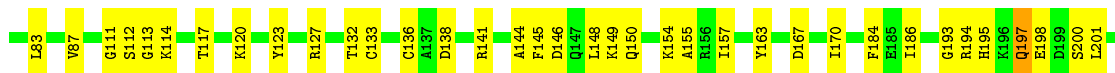


- Molecule 1: Signal recognition particle 54 kDa protein

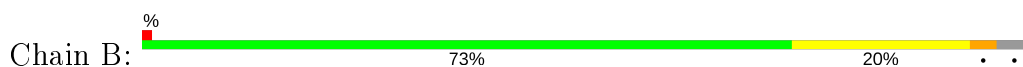




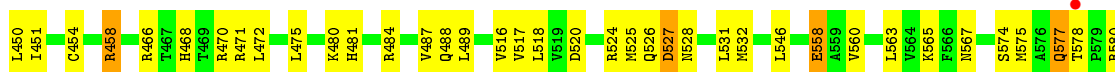
• Molecule 1: Signal recognition particle 54 kDa protein



• Molecule 2: Signal recognition particle receptor subunit alpha

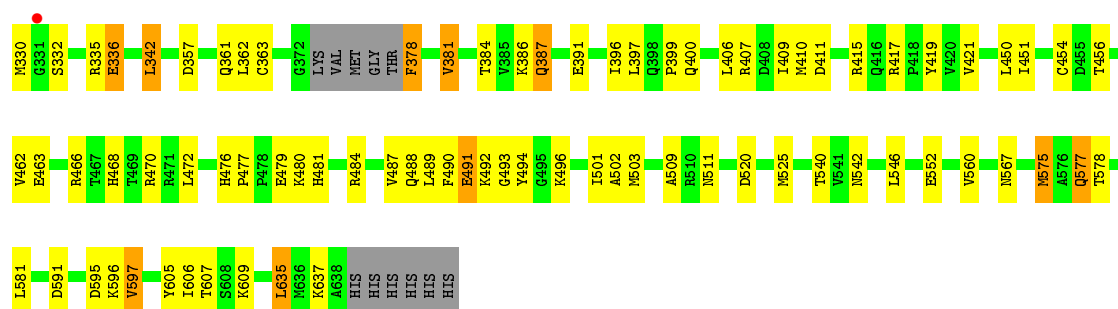


• Molecule 2: Signal recognition particle receptor subunit alpha

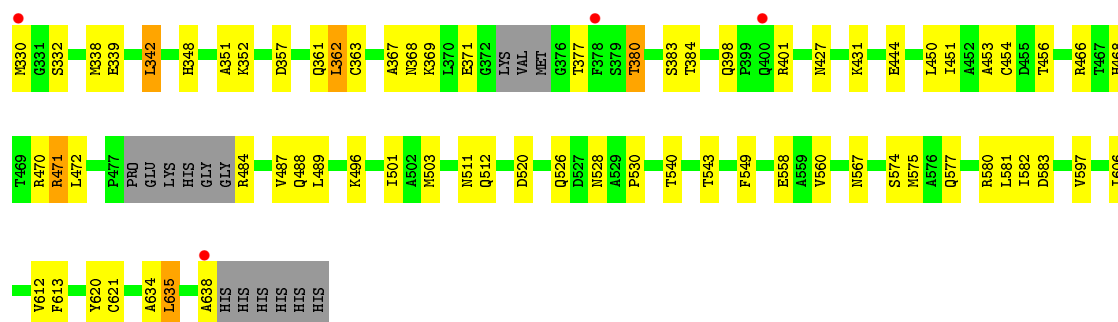


• Molecule 2: Signal recognition particle receptor subunit alpha





- Molecule 2: Signal recognition particle receptor subunit alpha



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	155.82Å 70.63Å 172.57Å 90.00° 116.81° 90.00°	Depositor
Resolution (Å)	49.55 – 2.60 49.55 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.5 (49.55-2.60) 99.4 (49.55-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.39 (at 2.61Å)	Xtrriage
Refinement program	PHENIX 1.15.2_3472	Depositor
R, $R_{free}$	0.149 , 0.184 0.151 , 0.173	Depositor DCC
$R_{free}$ test set	5157 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	44.9	Xtrriage
Anisotropy	0.822	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 41.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.42$ , $\langle L^2 \rangle = 0.24$	Xtrriage
Estimated twinning fraction	0.254 for h,-k,-h-l	Xtrriage
Reported twinning fraction	0.260 for h,-k,-h-l	Depositor
Outliers	0 of 103282 reflections	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	18356	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	59.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.04% 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: MG, GNP, SO4

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	0.39	0/2153	0.55	0/2899
1	C	0.38	0/2108	0.55	0/2839
1	E	0.40	0/2108	0.54	0/2839
1	G	0.36	0/2100	0.52	0/2828
2	B	0.43	0/2323	0.63	1/3136 (0.0%)
2	D	0.41	0/2351	0.59	0/3177
2	F	0.41	0/2345	0.56	0/3168
2	H	0.42	0/2310	0.59	0/3120
All	All	0.40	0/17798	0.57	1/24006 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	333	LEU	CA-CB-CG	5.48	127.90	115.30

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	2120	0	2165	41	0
1	C	2075	0	2123	38	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	2075	0	2123	41	0
1	G	2067	0	2117	50	0
2	B	2297	0	2361	58	0
2	D	2322	0	2379	61	0
2	F	2316	0	2376	53	0
2	H	2284	0	2346	48	0
3	A	32	0	13	3	0
3	B	32	0	13	1	0
3	C	32	0	13	1	0
3	D	32	0	13	2	0
3	E	32	0	13	2	0
3	F	32	0	13	0	0
3	G	32	0	13	5	0
3	H	32	0	13	1	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	G	1	0	0	0	0
4	H	1	0	0	0	0
5	B	15	0	0	1	0
5	C	5	0	0	0	0
5	D	5	0	0	1	0
5	F	15	0	0	0	0
5	G	5	0	0	1	0
5	H	25	0	0	1	0
6	A	56	0	0	0	0
6	B	80	0	0	6	0
6	C	47	0	0	2	0
6	D	50	0	0	4	0
6	E	49	0	0	4	0
6	F	55	0	0	4	0
6	G	45	0	0	2	0
6	H	84	0	0	6	0
All	All	18356	0	18094	378	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 10.

The worst 5 of 378 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)
2:F:560:VAL:HG13	2:F:606:ILE:CD1	1.47	1.44
2:F:560:VAL:HG13	2:F:606:ILE:HD11	1.14	1.13
2:F:560:VAL:CG1	2:F:606:ILE:HD11	1.87	1.03
2:F:560:VAL:HG13	2:F:606:ILE:HD13	1.37	1.00
2:F:560:VAL:CG1	2:F:606:ILE:CD1	2.41	0.97

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	270/304 (89%)	267 (99%)	3 (1%)	0	100	100
1	C	264/304 (87%)	255 (97%)	8 (3%)	1 (0%)	34	57
1	E	264/304 (87%)	257 (97%)	7 (3%)	0	100	100
1	G	263/304 (86%)	258 (98%)	4 (2%)	1 (0%)	34	57
2	B	296/315 (94%)	284 (96%)	12 (4%)	0	100	100
2	D	301/315 (96%)	286 (95%)	15 (5%)	0	100	100
2	F	300/315 (95%)	289 (96%)	11 (4%)	0	100	100
2	H	294/315 (93%)	285 (97%)	9 (3%)	0	100	100
All	All	2252/2476 (91%)	2181 (97%)	69 (3%)	2 (0%)	51	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	252	GLY
1	G	252	GLY



### 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	229/253 (90%)	218 (95%)	11 (5%)	25	49
1	C	224/253 (88%)	209 (93%)	15 (7%)	16	33
1	E	224/253 (88%)	211 (94%)	13 (6%)	20	40
1	G	223/253 (88%)	215 (96%)	8 (4%)	35	61
2	B	247/259 (95%)	233 (94%)	14 (6%)	20	41
2	D	249/259 (96%)	230 (92%)	19 (8%)	13	26
2	F	249/259 (96%)	232 (93%)	17 (7%)	16	32
2	H	246/259 (95%)	235 (96%)	11 (4%)	27	52
All	All	1891/2048 (92%)	1783 (94%)	108 (6%)	20	41

5 of 108 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	395	GLN
1	E	26	GLU
2	H	362	LEU
2	D	449	VAL
2	D	527	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
2	F	476	HIS
2	H	512	GLN
1	G	55	ASN
1	E	55	ASN
2	F	481	HIS

### 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 30 ligands modelled in this entry, 8 are monoatomic - leaving 22 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	$\# Z  > 2$
5	SO4	B	703	-	4,4,4	0.15	0	6,6,6	0.25	0
5	SO4	B	704	-	4,4,4	0.13	0	6,6,6	0.20	0
3	GNP	G	301	4	28,34,34	2.45	10 (35%)	30,54,54	2.16	8 (26%)
3	GNP	E	301	4	28,34,34	2.41	10 (35%)	30,54,54	1.91	7 (23%)
5	SO4	H	706	-	4,4,4	0.13	0	6,6,6	0.31	0
3	GNP	F	701	4	28,34,34	2.21	10 (35%)	30,54,54	1.95	7 (23%)
5	SO4	H	703	-	4,4,4	0.17	0	6,6,6	0.33	0
5	SO4	F	705	-	4,4,4	0.17	0	6,6,6	0.38	0
5	SO4	G	303	-	4,4,4	0.22	0	6,6,6	0.61	0
5	SO4	C	303	-	4,4,4	0.11	0	6,6,6	0.12	0
5	SO4	F	703	-	4,4,4	0.18	0	6,6,6	0.41	0
5	SO4	H	707	-	4,4,4	0.14	0	6,6,6	0.40	0
5	SO4	F	704	-	4,4,4	0.16	0	6,6,6	0.15	0
5	SO4	B	705	-	4,4,4	0.16	0	6,6,6	0.15	0
3	GNP	B	701	4	28,34,34	2.27	10 (35%)	30,54,54	2.08	8 (26%)
3	GNP	H	701	4	28,34,34	2.23	8 (28%)	30,54,54	2.16	5 (16%)
3	GNP	C	301	4	28,34,34	2.40	10 (35%)	30,54,54	1.90	5 (16%)
5	SO4	H	705	-	4,4,4	0.15	0	6,6,6	0.07	0
5	SO4	D	703	-	4,4,4	0.15	0	6,6,6	0.36	0
3	GNP	D	701	4	28,34,34	2.20	9 (32%)	30,54,54	1.99	8 (26%)
5	SO4	H	704	-	4,4,4	0.16	0	6,6,6	0.05	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	GNP	A	301	4	28,34,34	2.48	12 (42%)	30,54,54	2.06	10 (33%)

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
3	GNP	D	701	4	-	4/17/38/38	0/3/3/3
3	GNP	F	701	4	-	9/17/38/38	0/3/3/3
3	GNP	B	701	4	-	4/17/38/38	0/3/3/3
3	GNP	H	701	4	-	3/17/38/38	0/3/3/3
3	GNP	C	301	4	-	6/17/38/38	0/3/3/3
3	GNP	A	301	4	-	5/17/38/38	0/3/3/3
3	GNP	G	301	4	-	9/17/38/38	0/3/3/3
3	GNP	E	301	4	-	6/17/38/38	0/3/3/3

The worst 5 of 79 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	301	GNP	C4-N9	-8.24	1.36	1.47
3	A	301	GNP	C4-N9	-8.24	1.36	1.47
3	G	301	GNP	C4-N9	-8.20	1.36	1.47
3	E	301	GNP	C4-N9	-7.92	1.37	1.47
3	H	701	GNP	C4-N9	-7.71	1.37	1.47

The worst 5 of 58 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	301	GNP	C4-C5-N7	6.33	110.85	102.46
3	A	301	GNP	C4-C5-N7	6.24	110.74	102.46
3	B	701	GNP	C4-C5-N7	6.23	110.72	102.46
3	H	701	GNP	C4-C5-N7	6.19	110.67	102.46
3	E	301	GNP	C4-C5-N7	6.08	110.52	102.46

There are no chirality outliers.

5 of 46 torsion outliers are listed below:

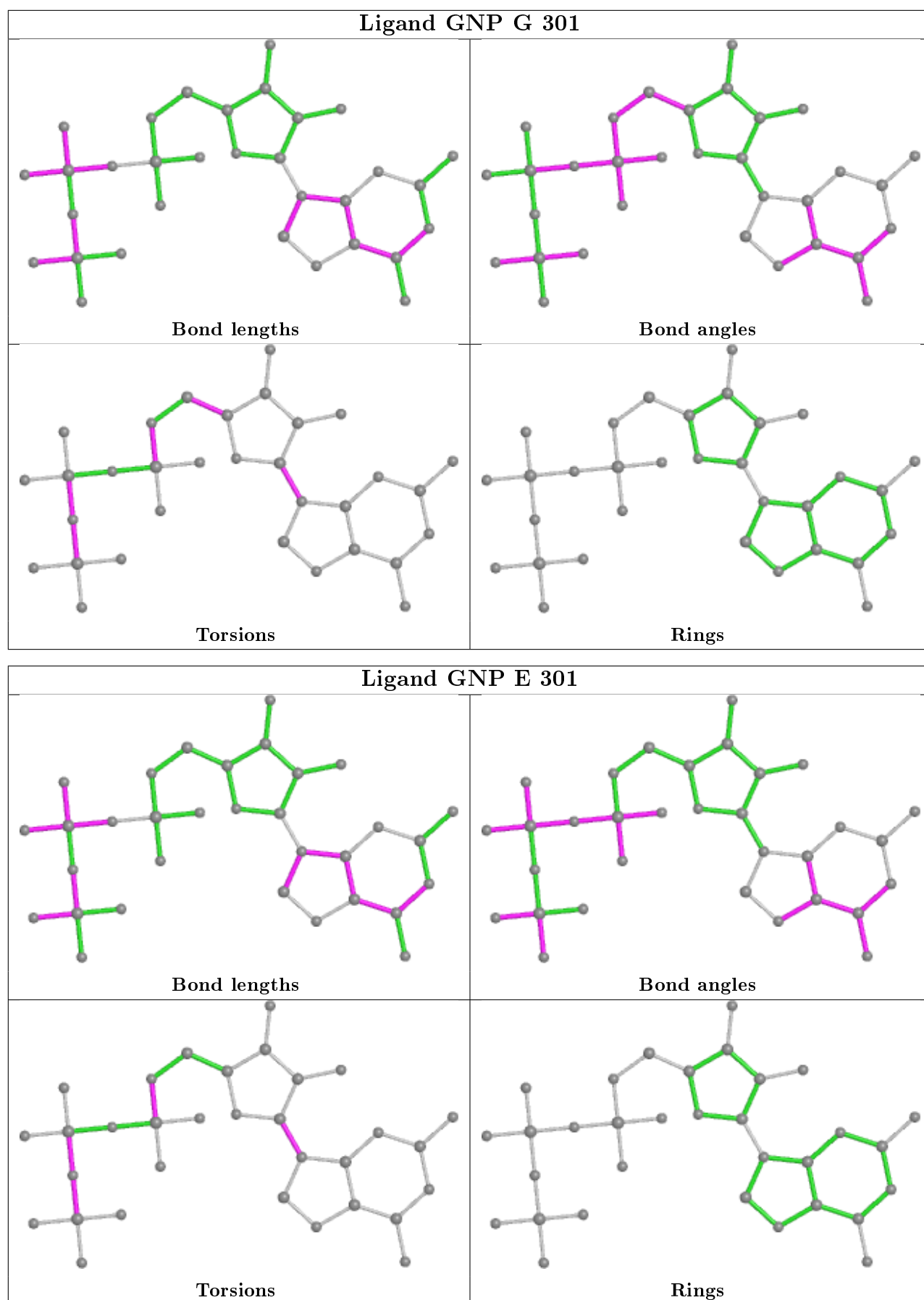
Mol	Chain	Res	Type	Atoms
3	F	701	GNP	PB-N3B-PG-O1G
3	F	701	GNP	PG-N3B-PB-O1B
3	F	701	GNP	PG-N3B-PB-O3A
3	F	701	GNP	C5'-O5'-PA-O3A
3	F	701	GNP	C5'-O5'-PA-O1A

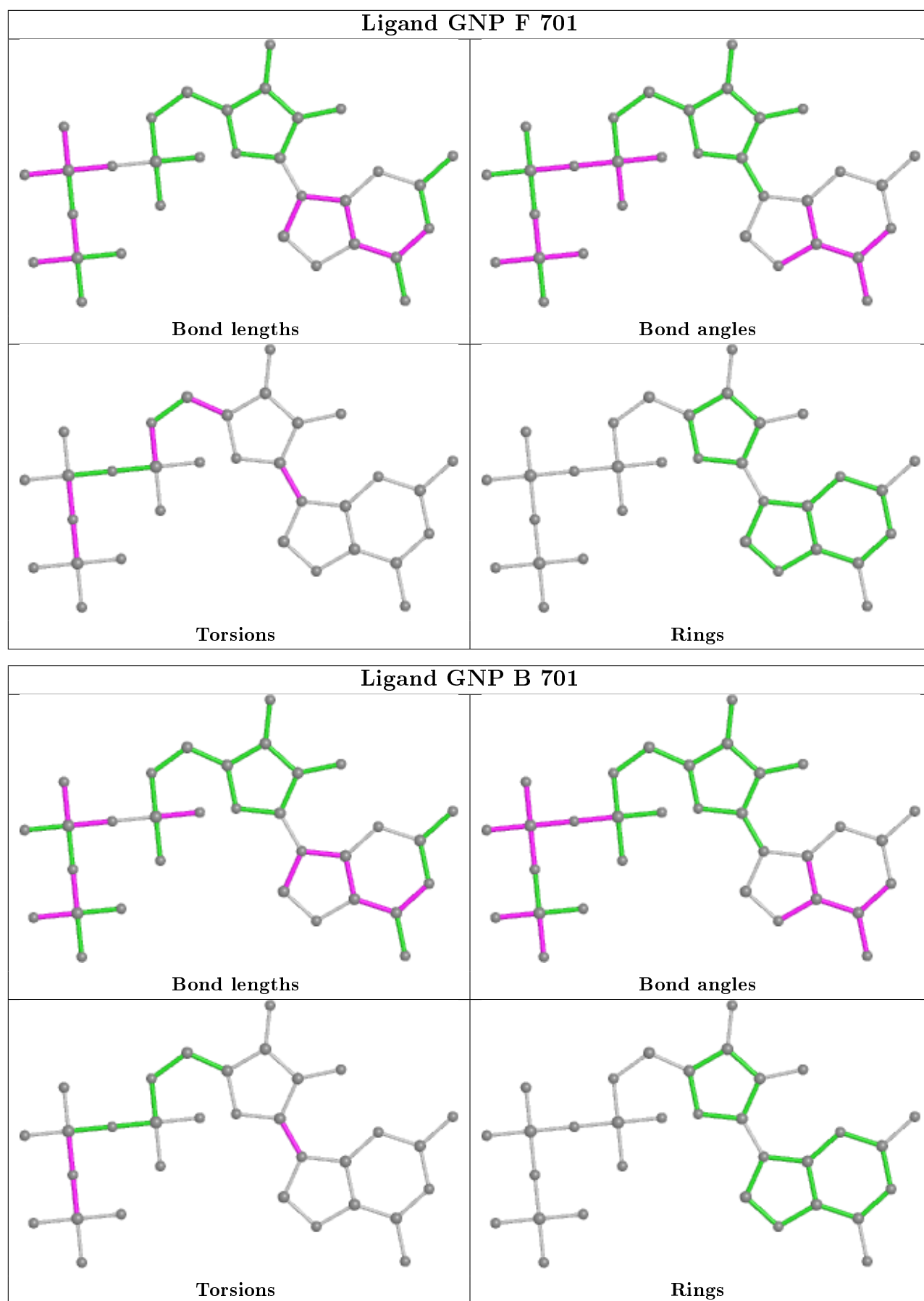
There are no ring outliers.

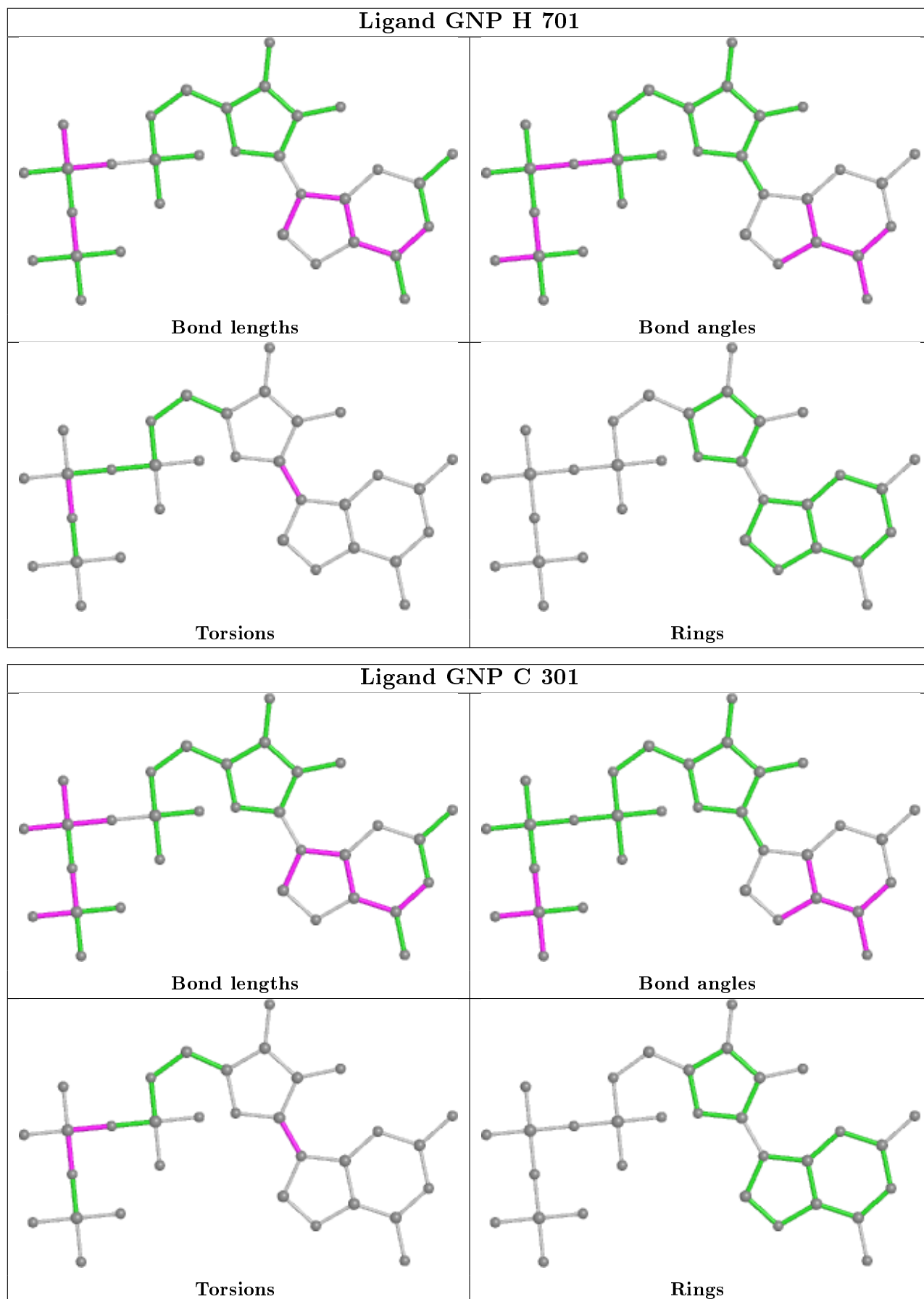
11 monomers are involved in 19 short contacts:

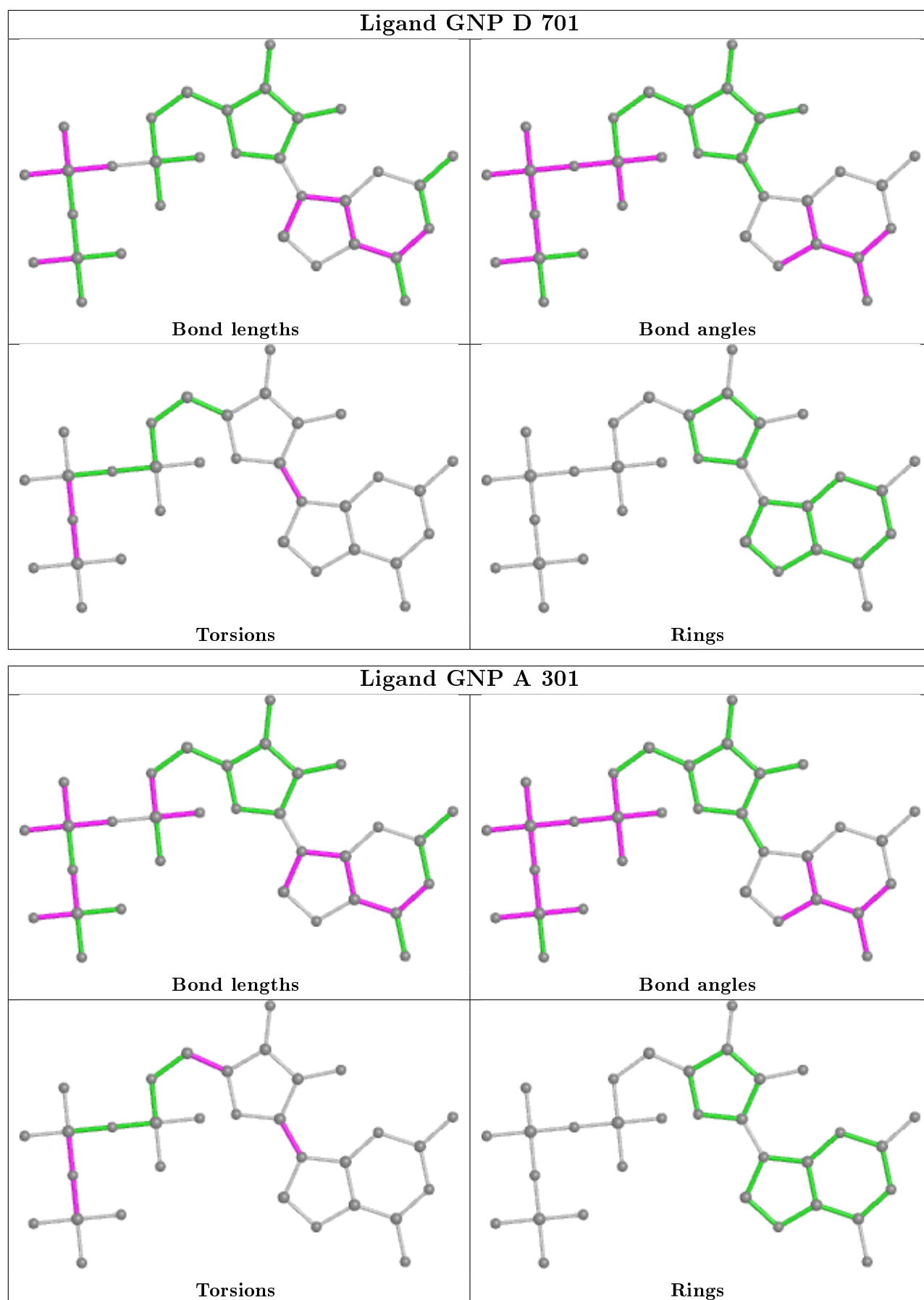
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	704	SO4	1	0
3	G	301	GNP	5	0
3	E	301	GNP	2	0
5	H	706	SO4	1	0
5	G	303	SO4	1	0
3	B	701	GNP	1	0
3	H	701	GNP	1	0
3	C	301	GNP	1	0
5	D	703	SO4	1	0
3	D	701	GNP	2	0
3	A	301	GNP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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, 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	274/304 (90%)	-0.14	1 (0%) 92 91	38, 59, 95, 118	0
1	C	268/304 (88%)	-0.09	5 (1%) 66 62	37, 57, 98, 145	0
1	E	268/304 (88%)	-0.15	3 (1%) 80 78	32, 57, 97, 124	0
1	G	267/304 (87%)	-0.10	4 (1%) 73 70	35, 61, 99, 139	0
2	B	302/315 (95%)	-0.11	3 (0%) 82 80	34, 46, 91, 130	0
2	D	305/315 (96%)	-0.08	5 (1%) 72 68	31, 52, 98, 149	0
2	F	304/315 (96%)	-0.15	1 (0%) 94 93	29, 53, 98, 139	0
2	H	300/315 (95%)	-0.13	4 (1%) 77 73	34, 48, 92, 130	0
All	All	2288/2476 (92%)	-0.12	26 (1%) 80 78	29, 54, 97, 149	0

The worst 5 of 26 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	638	ALA	7.2
2	B	638	ALA	5.7
2	F	331	GLY	5.6
1	E	59	ALA	5.5
1	C	296	GLY	4.9

### 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

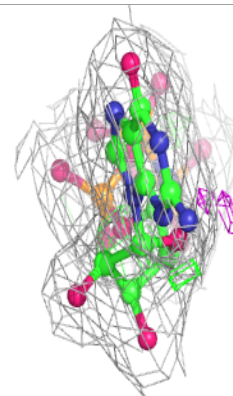
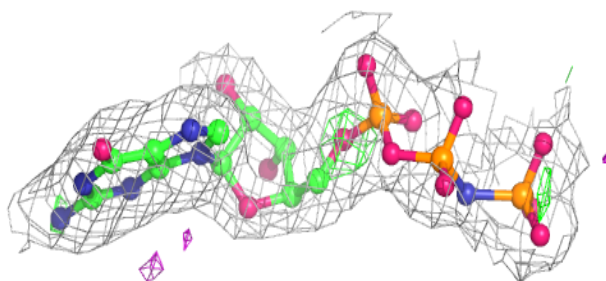
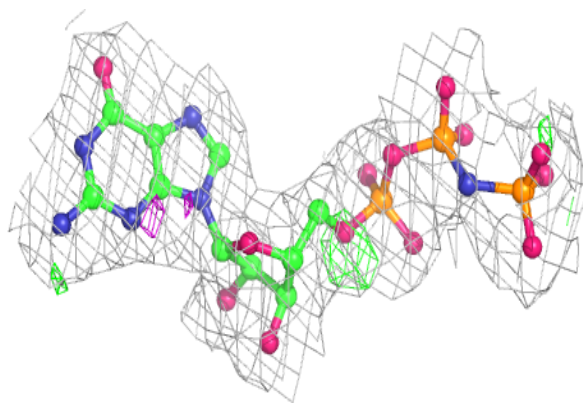
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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
5	SO4	G	303	5/5	0.79	0.28	122,124,126,131	0
5	SO4	D	703	5/5	0.85	0.30	119,121,123,125	0
5	SO4	H	707	5/5	0.86	0.14	113,114,115,117	0
5	SO4	H	705	5/5	0.88	0.14	122,125,126,126	0
5	SO4	H	704	5/5	0.89	0.33	176,176,177,178	0
5	SO4	F	705	5/5	0.89	0.18	140,142,143,144	0
5	SO4	H	706	5/5	0.90	0.17	122,125,126,129	0
5	SO4	F	703	5/5	0.91	0.14	83,84,87,87	0
5	SO4	H	703	5/5	0.93	0.17	90,91,92,93	0
5	SO4	B	704	5/5	0.93	0.18	111,111,112,112	0
5	SO4	C	303	5/5	0.94	0.10	126,127,127,127	0
5	SO4	F	704	5/5	0.95	0.12	84,87,88,91	0
5	SO4	B	705	5/5	0.95	0.20	105,108,108,113	0
4	MG	D	702	1/1	0.95	0.18	34,34,34,34	0
5	SO4	B	703	5/5	0.96	0.16	74,77,78,78	0
4	MG	G	302	1/1	0.96	0.14	30,30,30,30	0
4	MG	E	302	1/1	0.97	0.10	38,38,38,38	0
3	GNP	G	301	32/32	0.98	0.16	20,35,49,53	0
4	MG	F	702	1/1	0.98	0.10	31,31,31,31	0
4	MG	A	302	1/1	0.98	0.12	35,35,35,35	0
3	GNP	D	701	32/32	0.98	0.17	23,34,45,62	0
3	GNP	H	701	32/32	0.98	0.17	17,36,47,76	0
3	GNP	C	301	32/32	0.98	0.16	27,39,51,52	0
3	GNP	F	701	32/32	0.98	0.17	19,36,55,98	0
3	GNP	A	301	32/32	0.98	0.15	13,36,44,50	0
4	MG	C	302	1/1	0.99	0.10	32,32,32,32	0
3	GNP	E	301	32/32	0.99	0.14	21,40,50,51	0
4	MG	B	702	1/1	0.99	0.13	30,30,30,30	0
3	GNP	B	701	32/32	0.99	0.16	21,32,42,45	0
4	MG	H	702	1/1	0.99	0.18	29,29,29,29	0

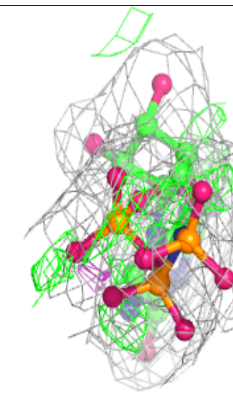
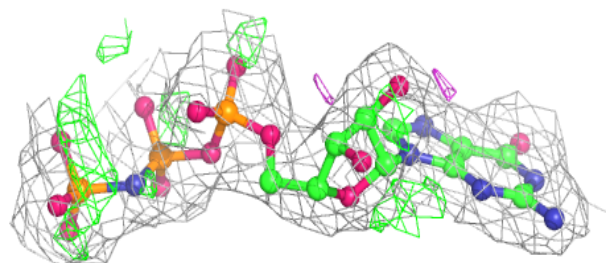
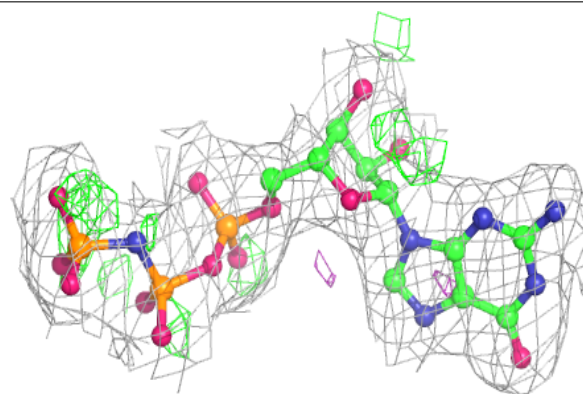
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around GNP G 301:**

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

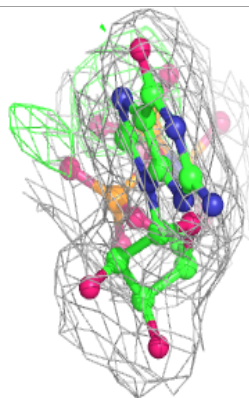
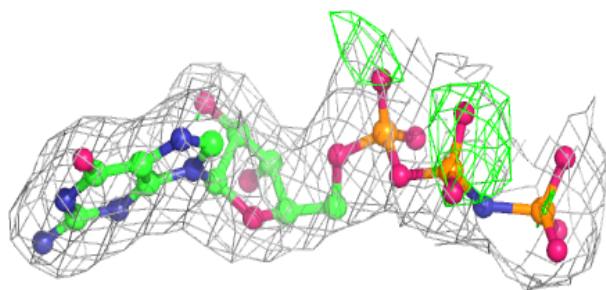
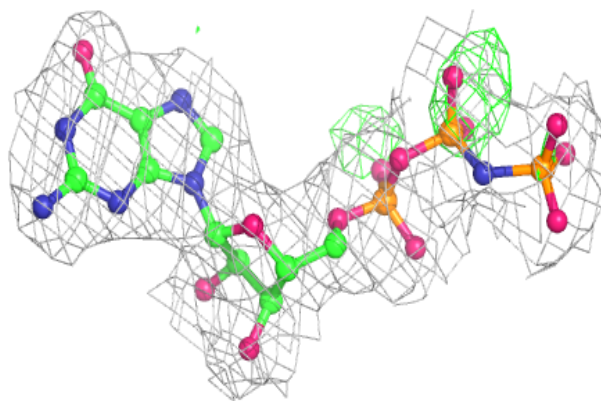
**Electron density around GNP D 701:**

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

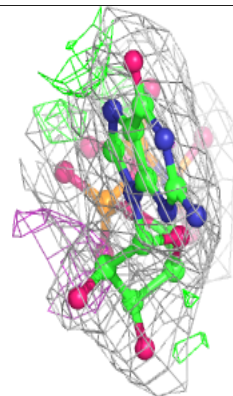
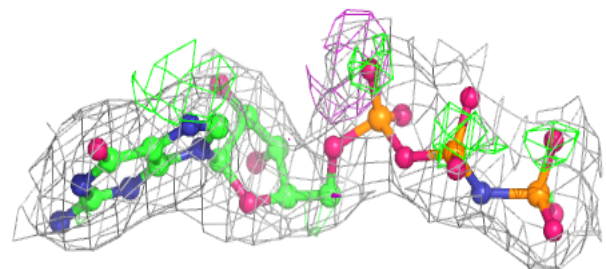
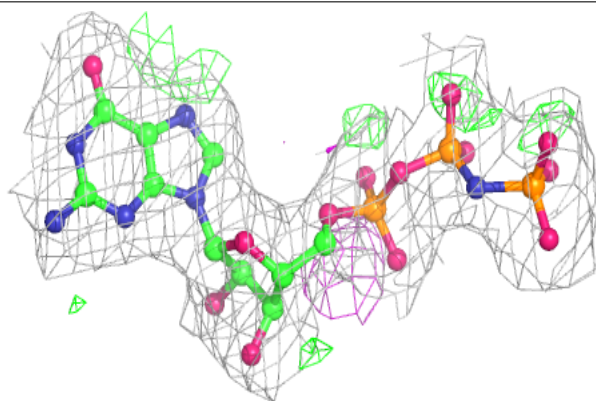


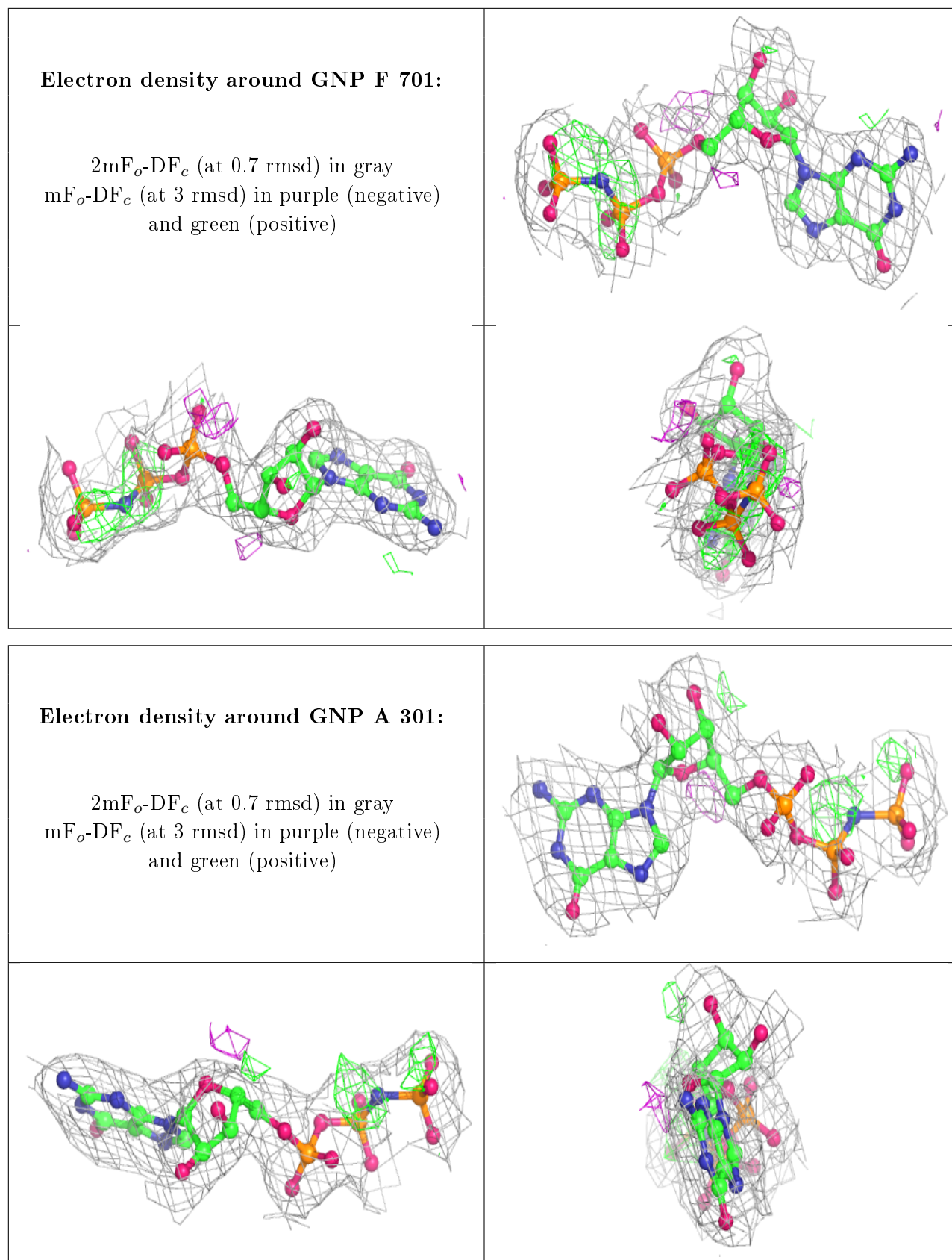
**Electron density around GNP H 701:**

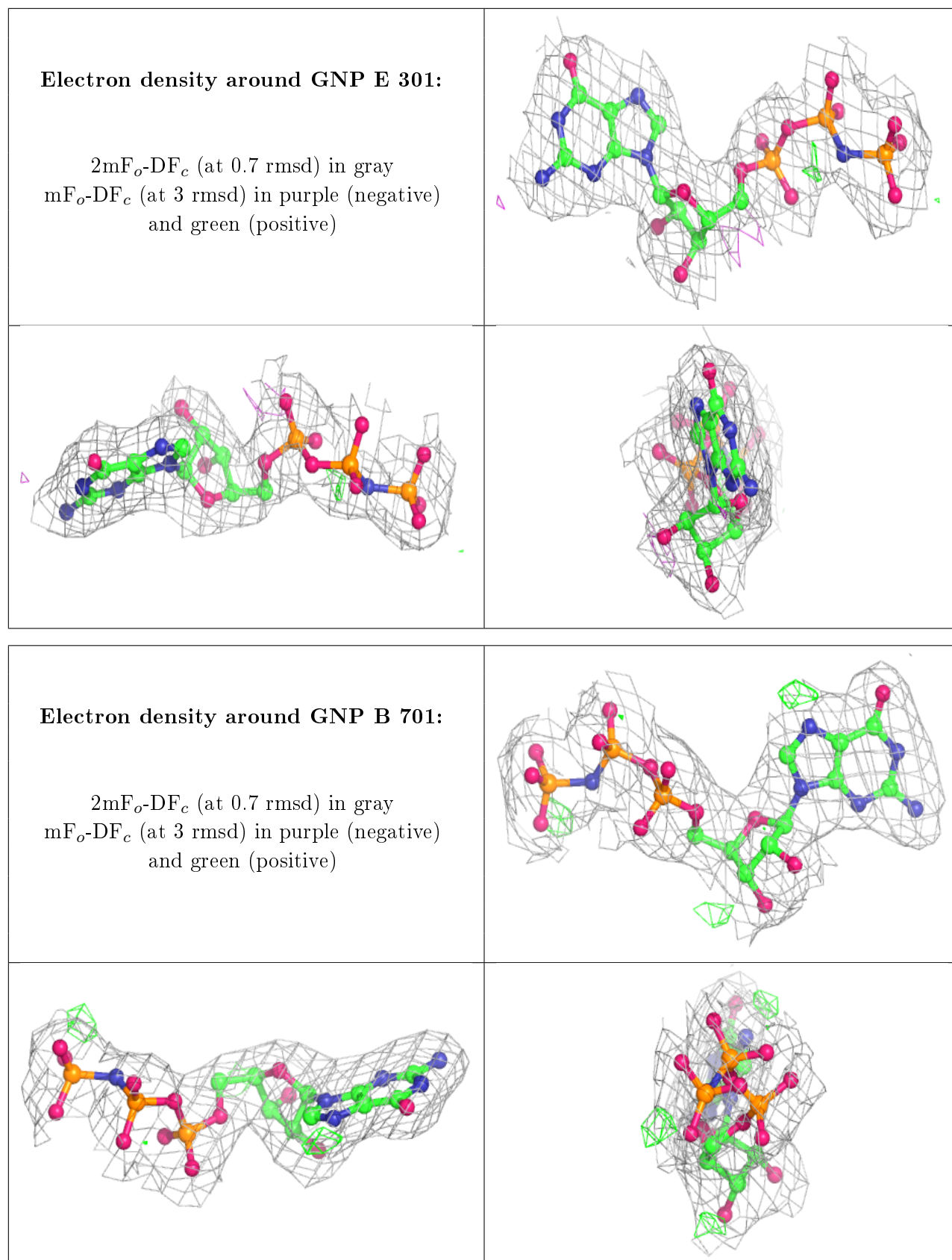
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around GNP 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)







## 6.5 Other polymers

There are no such residues in this entry.