wwPDB X-ray Structure Validation Summary Report (i)

Jan 6, 2026 – 02:09 PM EST

PDB ID	:	9N2R / pdb_00009n2r
Title	:	Structure of GTP-bound GM4951
Authors	:	Raj, R.; Beutler, B.
Deposited on	:	2025-01-29
Resolution	:	2.75 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

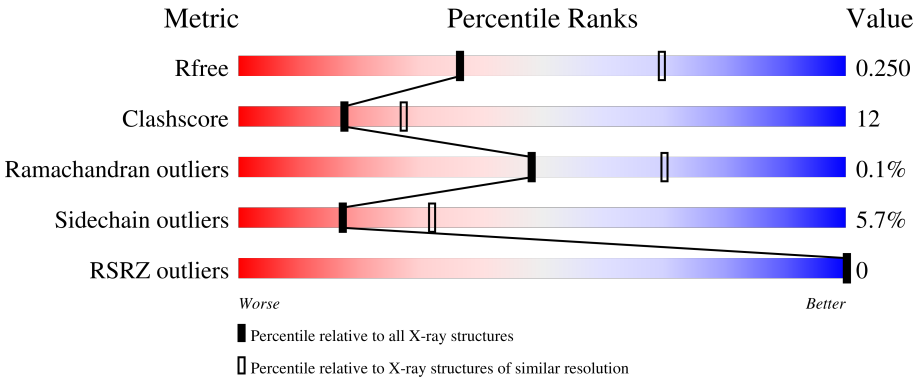
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.47

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 2.75 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}	164625	1606 (2.78-2.74)
Clashscore	180529	1689 (2.78-2.74)
Ramachandran outliers	177936	1665 (2.78-2.74)
Sidechain outliers	177891	1665 (2.78-2.74)
RSRZ outliers	164620	1606 (2.78-2.74)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	416	72% 19% • 6%
1	B	416	71% 20% • 6%
1	C	416	70% 22% • 6%
1	D	416	73% 19% • 7%
1	E	416	73% 20% • 5%

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Mol	Chain	Length	Quality of chain
1	F	416	71% 22% • 5%

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	GOL	C	501	-	-	X	-
2	GOL	F	503	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 19459 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 Interferon inducible GTPase 1C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	392	Total	C	N	O	S	0	0	0
			3190	2040	535	599	16			
1	A	390	Total	C	N	O	S	0	0	0
			3174	2029	532	597	16			
1	C	391	Total	C	N	O	S	0	0	0
			3184	2034	533	601	16			
1	D	388	Total	C	N	O	S	0	0	0
			3178	2035	531	596	16			
1	E	395	Total	C	N	O	S	0	0	0
			3198	2048	537	597	16			
1	F	394	Total	C	N	O	S	0	0	0
			3200	2046	535	603	16			

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	HIS	-	expression tag	UNP Q3UED7
B	-8	HIS	-	expression tag	UNP Q3UED7
B	-7	HIS	-	expression tag	UNP Q3UED7
B	-6	HIS	-	expression tag	UNP Q3UED7
B	-5	HIS	-	expression tag	UNP Q3UED7
B	-4	HIS	-	expression tag	UNP Q3UED7
B	-3	SER	-	expression tag	UNP Q3UED7
B	-2	GLN	-	expression tag	UNP Q3UED7
B	-1	ASP	-	expression tag	UNP Q3UED7
B	0	PRO	-	expression tag	UNP Q3UED7
A	-9	HIS	-	expression tag	UNP Q3UED7
A	-8	HIS	-	expression tag	UNP Q3UED7
A	-7	HIS	-	expression tag	UNP Q3UED7
A	-6	HIS	-	expression tag	UNP Q3UED7
A	-5	HIS	-	expression tag	UNP Q3UED7
A	-4	HIS	-	expression tag	UNP Q3UED7
A	-3	SER	-	expression tag	UNP Q3UED7

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLN	-	expression tag	UNP Q3UED7
A	-1	ASP	-	expression tag	UNP Q3UED7
A	0	PRO	-	expression tag	UNP Q3UED7
C	-9	HIS	-	expression tag	UNP Q3UED7
C	-8	HIS	-	expression tag	UNP Q3UED7
C	-7	HIS	-	expression tag	UNP Q3UED7
C	-6	HIS	-	expression tag	UNP Q3UED7
C	-5	HIS	-	expression tag	UNP Q3UED7
C	-4	HIS	-	expression tag	UNP Q3UED7
C	-3	SER	-	expression tag	UNP Q3UED7
C	-2	GLN	-	expression tag	UNP Q3UED7
C	-1	ASP	-	expression tag	UNP Q3UED7
C	0	PRO	-	expression tag	UNP Q3UED7
D	-9	HIS	-	expression tag	UNP Q3UED7
D	-8	HIS	-	expression tag	UNP Q3UED7
D	-7	HIS	-	expression tag	UNP Q3UED7
D	-6	HIS	-	expression tag	UNP Q3UED7
D	-5	HIS	-	expression tag	UNP Q3UED7
D	-4	HIS	-	expression tag	UNP Q3UED7
D	-3	SER	-	expression tag	UNP Q3UED7
D	-2	GLN	-	expression tag	UNP Q3UED7
D	-1	ASP	-	expression tag	UNP Q3UED7
D	0	PRO	-	expression tag	UNP Q3UED7
E	-9	HIS	-	expression tag	UNP Q3UED7
E	-8	HIS	-	expression tag	UNP Q3UED7
E	-7	HIS	-	expression tag	UNP Q3UED7
E	-6	HIS	-	expression tag	UNP Q3UED7
E	-5	HIS	-	expression tag	UNP Q3UED7
E	-4	HIS	-	expression tag	UNP Q3UED7
E	-3	SER	-	expression tag	UNP Q3UED7
E	-2	GLN	-	expression tag	UNP Q3UED7
E	-1	ASP	-	expression tag	UNP Q3UED7
E	0	PRO	-	expression tag	UNP Q3UED7
F	-9	HIS	-	expression tag	UNP Q3UED7
F	-8	HIS	-	expression tag	UNP Q3UED7
F	-7	HIS	-	expression tag	UNP Q3UED7
F	-6	HIS	-	expression tag	UNP Q3UED7
F	-5	HIS	-	expression tag	UNP Q3UED7
F	-4	HIS	-	expression tag	UNP Q3UED7
F	-3	SER	-	expression tag	UNP Q3UED7
F	-2	GLN	-	expression tag	UNP Q3UED7
F	-1	ASP	-	expression tag	UNP Q3UED7

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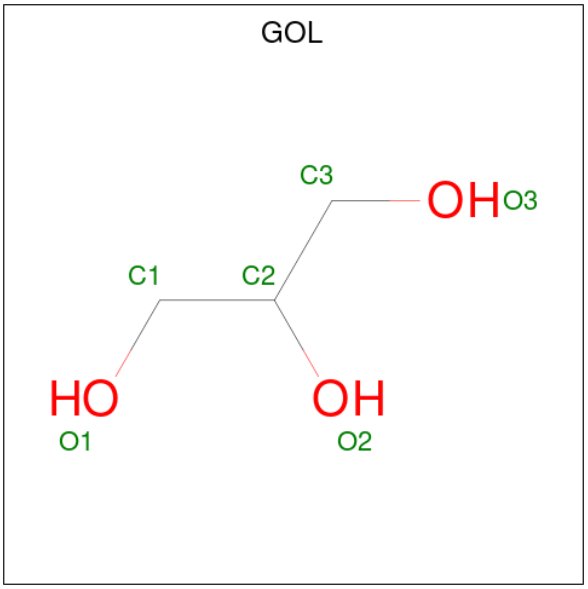
Chain	Residue	Modelled	Actual	Comment	Reference
F	0	PRO	-	expression tag	UNP Q3UED7

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

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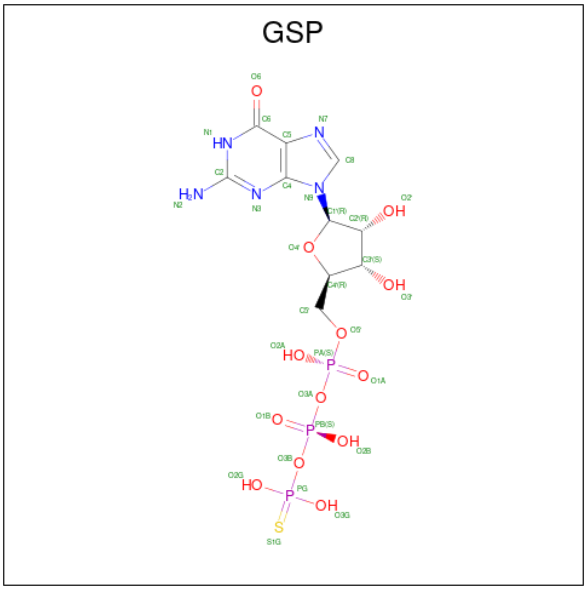
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	D	1	Total C O 6 3 3	0	0
2	D	1	Total C O 6 3 3	0	0
2	E	1	Total C O 6 3 3	0	0
2	F	1	Total C O 6 3 3	0	0
2	F	1	Total C O 6 3 3	0	0
2	F	1	Total C O 6 3 3	0	0

- Molecule 3 is 5'-GUANOSINE-DIPHOSPHATE-MONOTHIOPHOSPHATE (CCD ID: GSP) (formula: $C_{10}H_{16}N_5O_{13}P_3S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C N O P S 32 10 5 13 3 1	0	0
3	A	1	Total C N O P S 32 10 5 13 3 1	0	0
3	C	1	Total C N O P S 32 10 5 13 3 1	0	0
3	D	1	Total C N O P S 32 10 5 13 3 1	0	0
3	E	1	Total C N O P S 32 10 5 13 3 1	0	0

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	F	1	Total	C	N	O	P	S	0	0
			32	10	5	13	3	1		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		

- Molecule 5 is water.

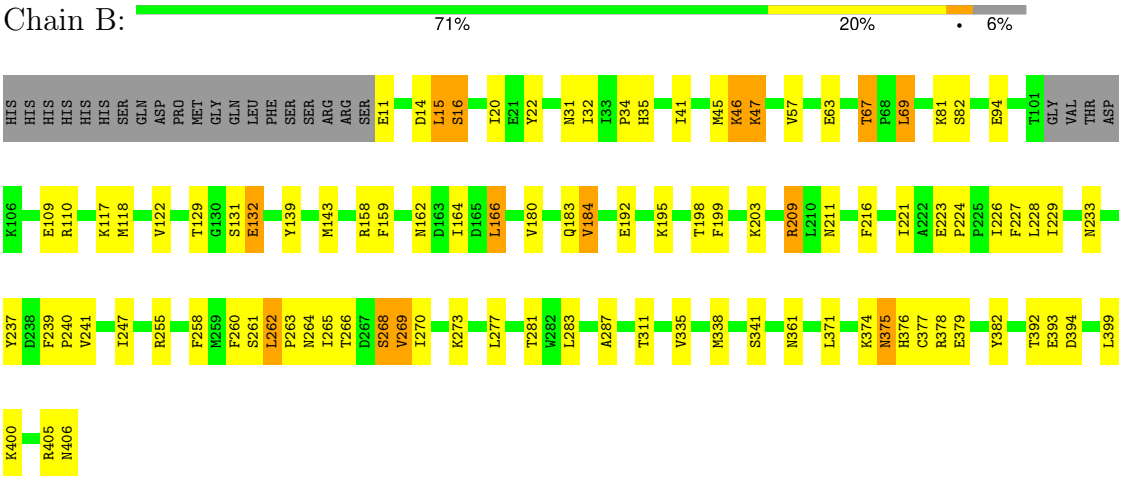
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	4	Total	O	0	0
			4	4		
5	A	5	Total	O	0	0
			5	5		
5	C	8	Total	O	0	0
			8	8		
5	D	2	Total	O	0	0
			2	2		
5	E	12	Total	O	0	0
			12	12		
5	F	8	Total	O	0	0
			8	8		

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.

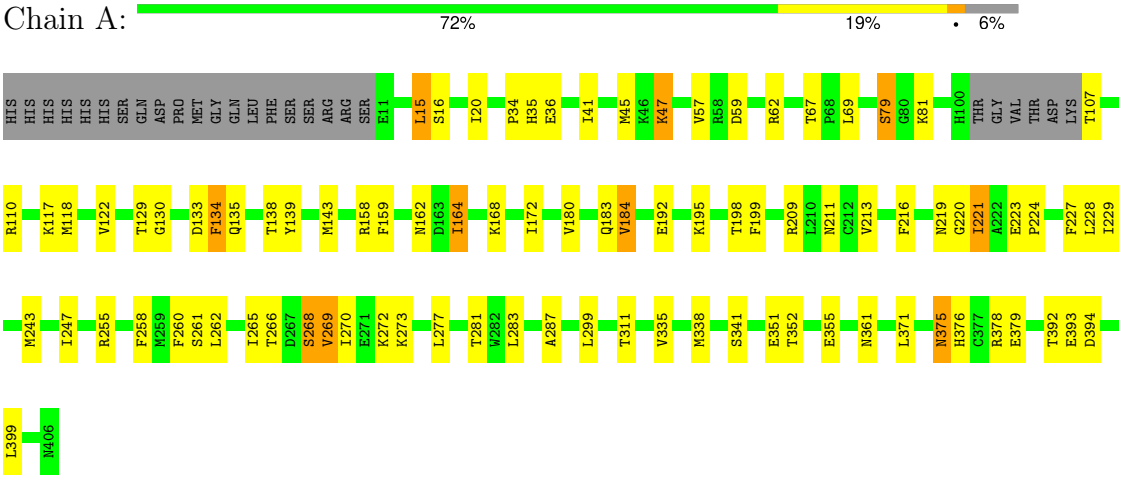
• Molecule 1: Interferon inducible GTPase 1C

Chain B:



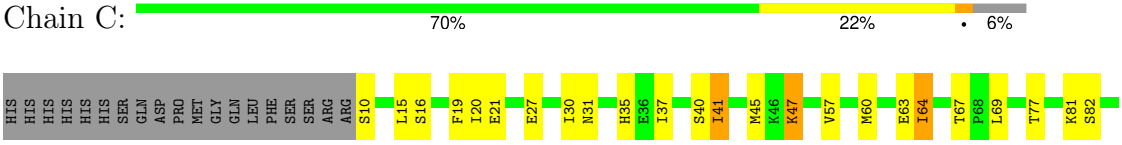
• Molecule 1: Interferon inducible GTPase 1C

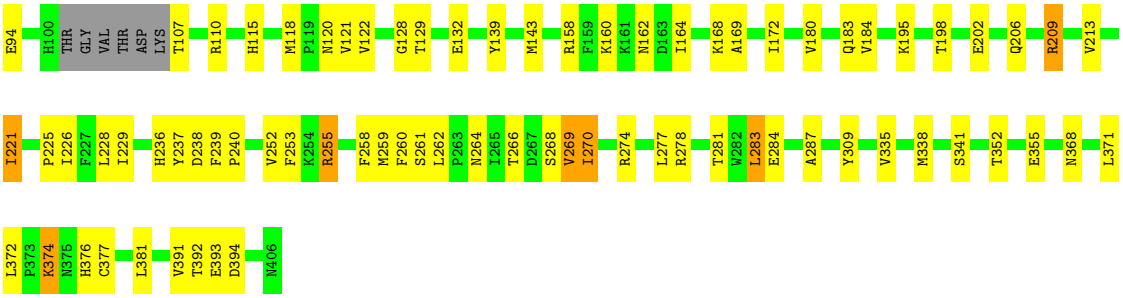
Chain A:



• Molecule 1: Interferon inducible GTPase 1C

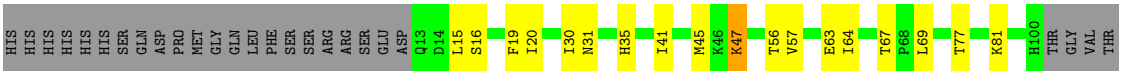
Chain C:

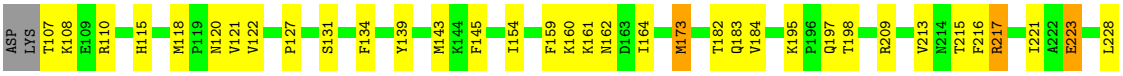


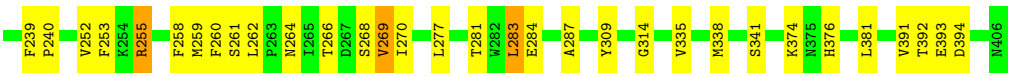


• Molecule 1: Interferon inducible GTPase 1C

Chain D:

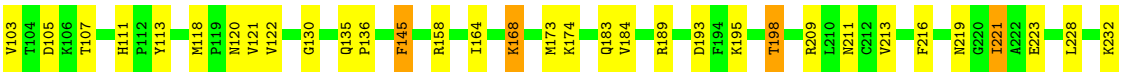


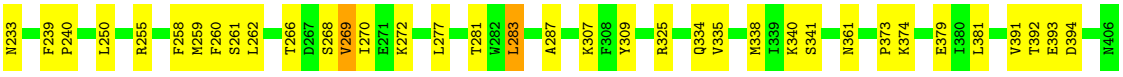




• Molecule 1: Interferon inducible GTPase 1C

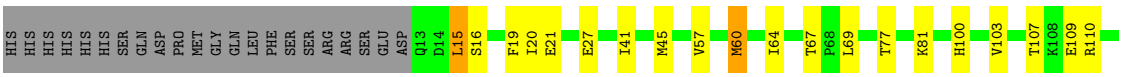
Chain E:

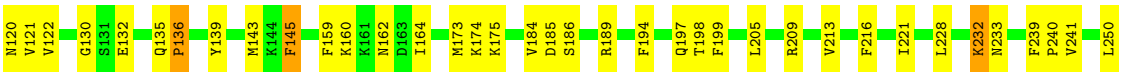


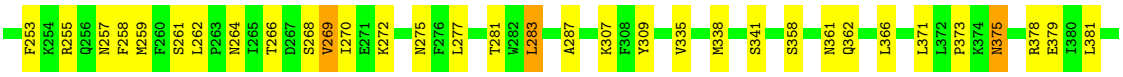


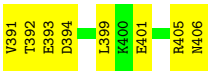
• Molecule 1: Interferon inducible GTPase 1C

Chain F:








V391
T392
E393
D394
L399
K400
E401
R405
N406

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	59.76Å 100.25Å 152.35Å 92.31° 101.24° 89.86°	Depositor
Resolution (Å)	46.02 – 2.75 46.02 – 2.75	Depositor EDS
% Data completeness (in resolution range)	68.0 (46.02-2.75) 68.0 (46.02-2.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.24 (at 2.77Å)	Xtriage
Refinement program	REFMAC 5.8.0349	Depositor
R, R_{free}	0.209 , 0.247 0.213 , 0.250	Depositor DCC
R_{free} test set	3116 reflections (3.47%)	wwPDB-VP
Wilson B-factor (Å^2)	47.5	Xtriage
Anisotropy	0.141	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 31.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.448 for h,-k,-h-l 0.004 for -h,k,-l 0.000 for -h,-k,h+l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	19459	wwPDB-VP
Average B, all atoms (Å^2)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.51% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GSP, MG, GOL

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	0.56	2/3241 (0.1%)	1.03	1/4376 (0.0%)
1	B	0.57	2/3257 (0.1%)	1.03	1/4396 (0.0%)
1	C	0.58	4/3251 (0.1%)	1.01	1/4389 (0.0%)
1	D	0.58	3/3246 (0.1%)	1.01	1/4379 (0.0%)
1	E	0.56	0/3267	1.02	2/4414 (0.0%)
1	F	0.58	1/3269 (0.0%)	1.03	2/4418 (0.0%)
All	All	0.57	12/19531 (0.1%)	1.02	8/26372 (0.0%)

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	159	PHE	C-N	-5.90	1.25	1.33
1	D	35	HIS	CE1-NE2	5.82	1.38	1.32
1	C	35	HIS	CE1-NE2	5.70	1.38	1.32
1	C	376	HIS	CE1-NE2	5.50	1.38	1.32
1	D	376	HIS	CE1-NE2	5.49	1.38	1.32

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	173	MET	N-CA-C	-7.12	101.13	110.53
1	F	393	GLU	CB-CG-CD	6.81	124.18	112.60
1	F	194	PHE	CA-CB-CG	6.69	120.49	113.80
1	E	393	GLU	CB-CG-CD	6.60	123.82	112.60
1	C	128	GLY	N-CA-C	-5.85	103.63	112.41

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	3174	0	3120	87	0
1	B	3190	0	3145	67	0
1	C	3184	0	3129	77	0
1	D	3178	0	3143	84	0
1	E	3198	0	3149	81	0
1	F	3200	0	3141	93	0
2	A	18	0	24	3	0
2	B	12	0	16	1	0
2	C	18	0	24	7	0
2	D	30	0	40	2	0
2	E	6	0	8	0	0
2	F	18	0	24	13	0
3	A	32	0	12	2	0
3	B	32	0	12	1	0
3	C	32	0	12	3	0
3	D	32	0	12	1	0
3	E	32	0	12	6	0
3	F	32	0	12	2	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	5	0	0	0	0
5	B	4	0	0	0	0
5	C	8	0	0	0	0
5	D	2	0	0	0	0
5	E	12	0	0	0	0
5	F	8	0	0	0	0
All	All	19459	0	19035	473	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 12.

The worst 5 of 473 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:E:82:SER:HB3	3:E:502:GSP:O2G	1.36	1.25

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:15:LEU:HD21	1:D:19:PHE:CE2	1.75	1.21
1:F:64:ILE:HD11	1:F:253:PHE:CE1	1.76	1.19
1:D:15:LEU:CD2	1:D:19:PHE:CE2	2.27	1.17
1:D:314:GLY:HA3	2:D:502:GOL:H31	1.35	1.08

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	386/416 (93%)	379 (98%)	6 (2%)	1 (0%)	37 55
1	B	388/416 (93%)	378 (97%)	9 (2%)	1 (0%)	37 55
1	C	387/416 (93%)	381 (98%)	6 (2%)	0	100 100
1	D	384/416 (92%)	378 (98%)	6 (2%)	0	100 100
1	E	393/416 (94%)	382 (97%)	11 (3%)	0	100 100
1	F	392/416 (94%)	383 (98%)	8 (2%)	1 (0%)	37 55
All	All	2330/2496 (93%)	2281 (98%)	46 (2%)	3 (0%)	48 70

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	132	GLU
1	A	134	PHE
1	F	136	PRO

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	351/382 (92%)	335 (95%)	16 (5%)	23	41
1	B	353/382 (92%)	328 (93%)	25 (7%)	12	22
1	C	353/382 (92%)	328 (93%)	25 (7%)	12	22
1	D	354/382 (93%)	340 (96%)	14 (4%)	27	47
1	E	352/382 (92%)	330 (94%)	22 (6%)	15	27
1	F	354/382 (93%)	335 (95%)	19 (5%)	18	34
All	All	2117/2292 (92%)	1996 (94%)	121 (6%)	17	32

5 of 121 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	221	ILE
1	F	122	VAL
1	D	122	VAL
1	F	109	GLU
1	F	307	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 47 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	54	ASN
1	F	44	ASN
1	E	111	HIS
1	E	236	HIS
1	F	93	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 25 ligands modelled in this entry, 2 are monoatomic - leaving 23 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	GOL	E	501	-	5,5,5	0.14	0	5,5,5	0.58	0
3	GSP	C	504	4	29,34,34	1.10	3 (10%)	32,54,54	0.80	1 (3%)
2	GOL	D	501	-	5,5,5	0.13	0	5,5,5	0.37	0
2	GOL	C	502	-	5,5,5	0.17	0	5,5,5	0.61	0
2	GOL	D	503	-	5,5,5	0.05	0	5,5,5	0.16	0
2	GOL	D	504	-	5,5,5	0.19	0	5,5,5	0.48	0
2	GOL	A	501	-	5,5,5	0.15	0	5,5,5	0.61	0
3	GSP	F	504	-	29,34,34	1.03	3 (10%)	32,54,54	0.70	1 (3%)
2	GOL	B	501	-	5,5,5	0.22	0	5,5,5	0.48	0
2	GOL	B	502	-	5,5,5	0.14	0	5,5,5	0.35	0
2	GOL	C	503	-	5,5,5	0.15	0	5,5,5	0.38	0
2	GOL	C	501	-	5,5,5	0.04	0	5,5,5	0.28	0
3	GSP	B	503	-	29,34,34	1.05	2 (6%)	32,54,54	0.87	0
2	GOL	A	503	-	5,5,5	0.12	0	5,5,5	0.38	0
2	GOL	F	501	-	5,5,5	0.14	0	5,5,5	0.35	0
2	GOL	D	505	-	5,5,5	0.22	0	5,5,5	0.46	0
2	GOL	F	502	-	5,5,5	0.16	0	5,5,5	0.40	0
3	GSP	A	504	-	29,34,34	1.11	3 (10%)	32,54,54	0.73	0
2	GOL	F	503	-	5,5,5	0.35	0	5,5,5	0.75	0
2	GOL	D	502	-	5,5,5	0.23	0	5,5,5	0.64	0
3	GSP	E	502	-	29,34,34	1.13	3 (10%)	32,54,54	0.81	1 (3%)
3	GSP	D	506	-	29,34,34	1.08	3 (10%)	32,54,54	0.77	1 (3%)
2	GOL	A	502	-	5,5,5	0.25	0	5,5,5	0.55	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
2	GOL	E	501	-	-	2/4/4/4	-
3	GSP	C	504	4	-	9/17/38/38	0/3/3/3
2	GOL	D	501	-	-	0/4/4/4	-
2	GOL	C	502	-	-	0/4/4/4	-
2	GOL	D	503	-	-	2/4/4/4	-
2	GOL	D	504	-	-	1/4/4/4	-
2	GOL	A	501	-	-	2/4/4/4	-
3	GSP	F	504	-	-	6/17/38/38	0/3/3/3
2	GOL	B	501	-	-	0/4/4/4	-
2	GOL	B	502	-	-	4/4/4/4	-
2	GOL	C	503	-	-	2/4/4/4	-
2	GOL	C	501	-	-	0/4/4/4	-
3	GSP	B	503	-	-	2/17/38/38	0/3/3/3
2	GOL	A	503	-	-	2/4/4/4	-
2	GOL	F	501	-	-	2/4/4/4	-
2	GOL	D	505	-	-	3/4/4/4	-
2	GOL	F	502	-	-	2/4/4/4	-
3	GSP	A	504	-	-	3/17/38/38	0/3/3/3
2	GOL	F	503	-	-	4/4/4/4	-
2	GOL	D	502	-	-	1/4/4/4	-
3	GSP	E	502	-	-	5/17/38/38	0/3/3/3
3	GSP	D	506	-	-	5/17/38/38	0/3/3/3
2	GOL	A	502	-	-	2/4/4/4	-

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	504	GSP	PG-S1G	2.77	1.96	1.90
3	B	503	GSP	C5-C6	-2.69	1.42	1.47
3	F	504	GSP	C5-C6	-2.69	1.42	1.47
3	A	504	GSP	C5-C6	-2.66	1.42	1.47
3	D	506	GSP	C5-C6	-2.66	1.42	1.47

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	504	GSP	O6-C6-C5	2.12	128.52	124.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	502	GSP	O6-C6-C5	2.08	128.45	124.32
3	D	506	GSP	O6-C6-C5	2.06	128.41	124.32
3	F	504	GSP	O6-C6-C5	2.03	128.34	124.32

There are no chirality outliers.

5 of 59 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	GOL	O1-C1-C2-C3
2	A	502	GOL	O1-C1-C2-C3
2	C	503	GOL	O1-C1-C2-C3
2	D	505	GOL	O1-C1-C2-C3
2	E	501	GOL	C1-C2-C3-O3

There are no ring outliers.

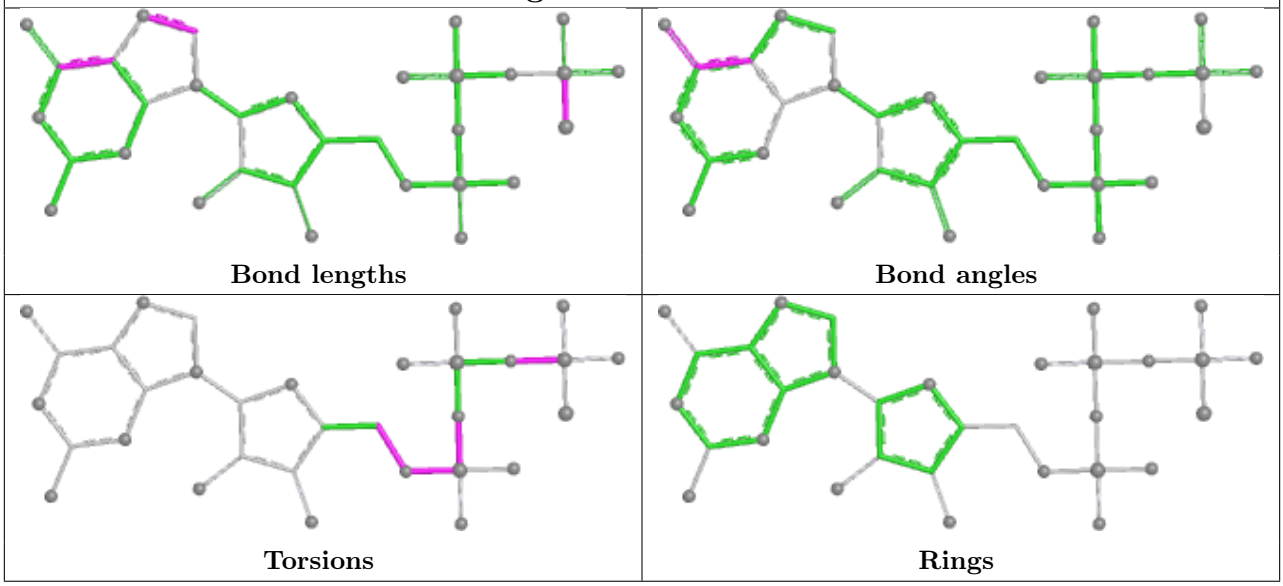
14 monomers are involved in 41 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	504	GSP	3	0
2	C	502	GOL	2	0
3	F	504	GSP	2	0
2	B	502	GOL	1	0
2	C	503	GOL	1	0
2	C	501	GOL	4	0
3	B	503	GSP	1	0
2	A	503	GOL	3	0
2	F	502	GOL	2	0
3	A	504	GSP	2	0
2	F	503	GOL	11	0
2	D	502	GOL	2	0
3	E	502	GSP	6	0
3	D	506	GSP	1	0

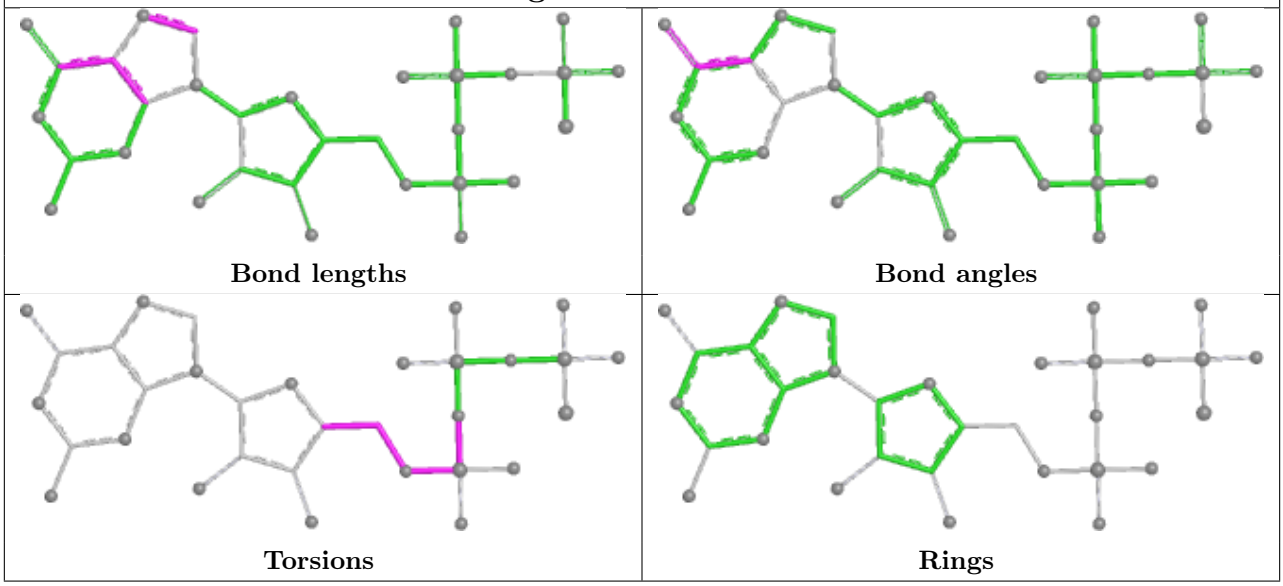
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and

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

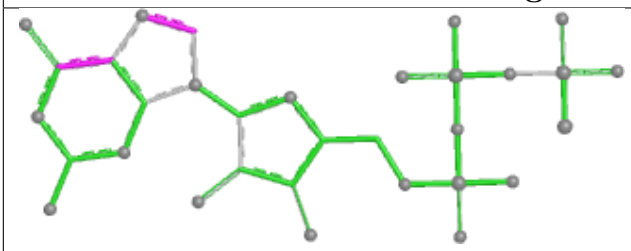
Ligand GSP C 504



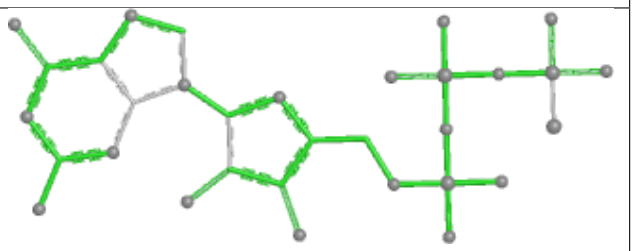
Ligand GSP F 504



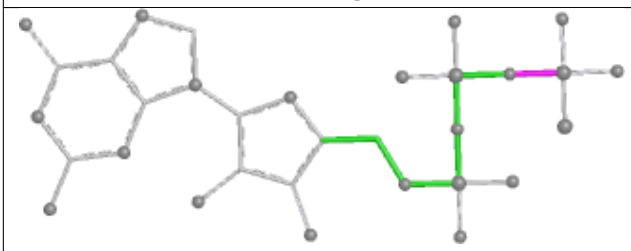
Ligand GSP B 503



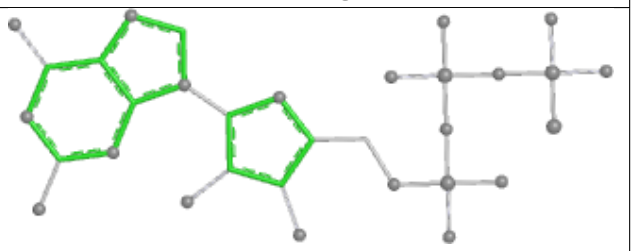
Bond lengths



Bond angles

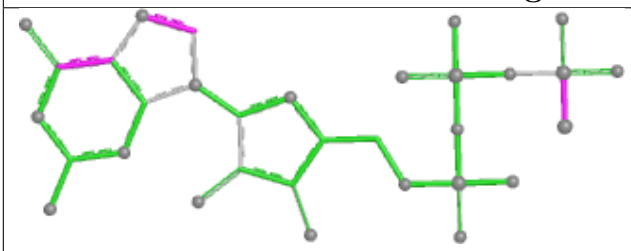


Torsions

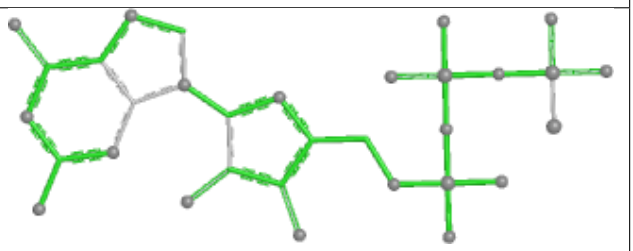


Rings

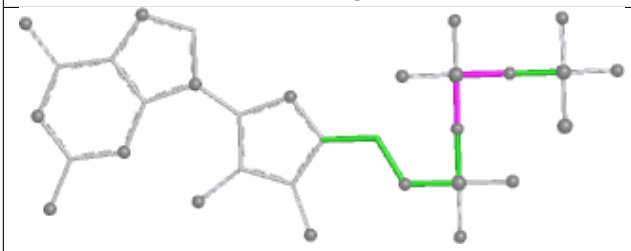
Ligand GSP A 504



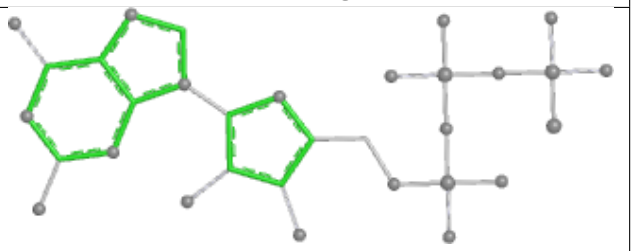
Bond lengths



Bond angles

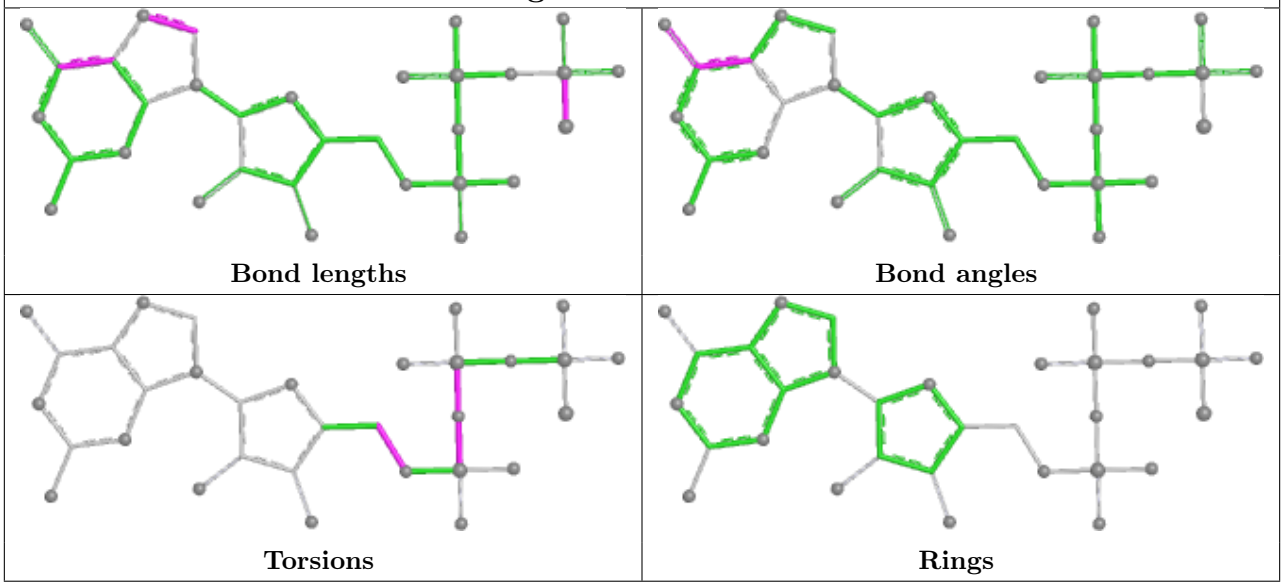


Torsions

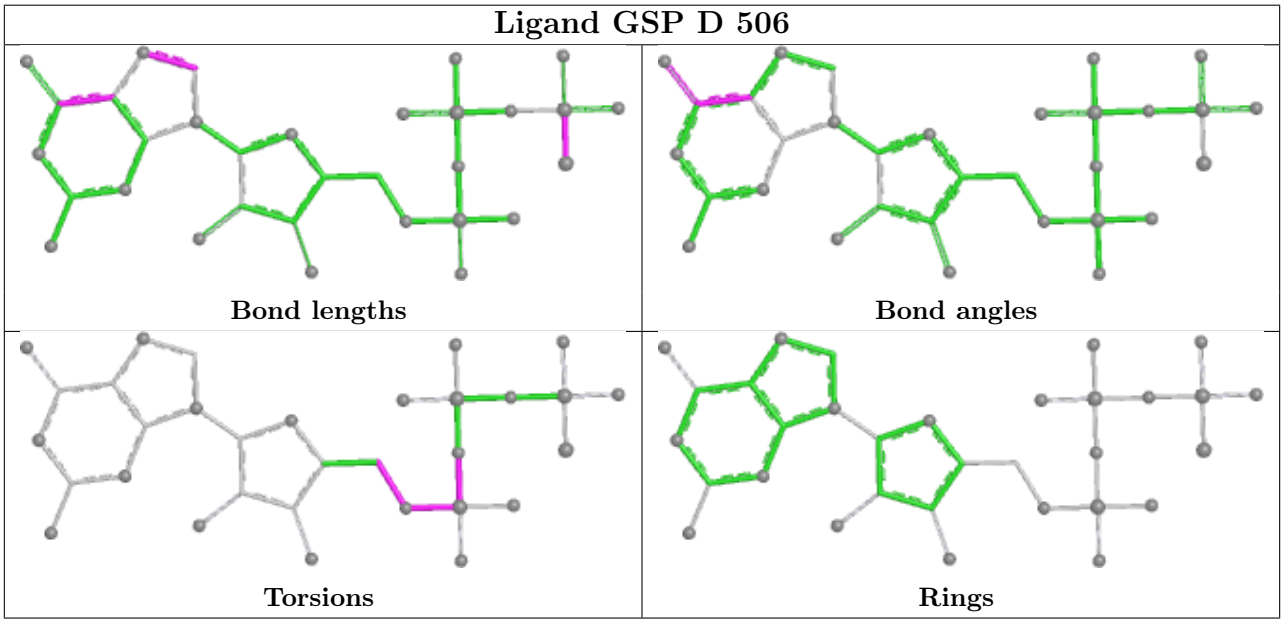


Rings

Ligand GSP E 502



Ligand GSP D 506



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^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	390/416 (93%)	-1.73	0	100	100	24, 58, 105, 139	0
1	B	392/416 (94%)	-1.73	0	100	100	23, 56, 111, 138	0
1	C	391/416 (93%)	-1.76	0	100	100	22, 52, 103, 151	0
1	D	388/416 (93%)	-1.76	0	100	100	21, 51, 97, 123	0
1	E	395/416 (94%)	-1.75	0	100	100	19, 50, 102, 131	0
1	F	394/416 (94%)	-1.73	0	100	100	18, 50, 103, 158	0
All	All	2350/2496 (94%)	-1.74	0	100	100	18, 53, 104, 158	0

There are no RSRZ outliers to report.

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

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

6.3 Carbohydrates

There are no oligosaccharides in this entry.

6.4 Ligands

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	GOL	A	501	6/6	0.98	0.06	62,68,70,71	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	MG	D	507	1/1	0.98	0.05	31,31,31,31	0
2	GOL	A	502	6/6	0.99	0.04	64,67,72,73	0
2	GOL	A	503	6/6	0.99	0.06	60,73,78,80	0
2	GOL	C	501	6/6	0.99	0.05	56,73,80,88	0
2	GOL	C	502	6/6	0.99	0.04	67,70,78,79	0
2	GOL	C	503	6/6	0.99	0.06	71,83,83,84	0
2	GOL	D	501	6/6	0.99	0.06	60,74,76,87	0
2	GOL	D	502	6/6	0.99	0.03	46,53,61,61	0
2	GOL	D	503	6/6	0.99	0.07	84,90,92,108	0
2	GOL	D	504	6/6	0.99	0.05	68,74,77,78	0
2	GOL	D	505	6/6	0.99	0.04	64,76,81,81	0
2	GOL	F	501	6/6	0.99	0.05	60,61,64,66	0
2	GOL	F	502	6/6	0.99	0.06	74,76,80,99	0
3	GSP	A	504	32/32	0.99	0.03	31,51,97,111	3
3	GSP	E	502	32/32	0.99	0.03	60,69,105,112	32
3	GSP	F	504	32/32	0.99	0.04	57,81,97,103	32
2	GOL	B	501	6/6	0.99	0.06	60,69,73,80	0
2	GOL	B	502	6/6	1.00	0.04	58,66,73,74	0
3	GSP	C	504	32/32	1.00	0.03	42,57,94,106	3
3	GSP	D	506	32/32	1.00	0.03	43,54,95,103	3
2	GOL	E	501	6/6	1.00	0.04	43,47,50,53	0
2	GOL	F	503	6/6	1.00	0.03	41,47,48,49	0
4	MG	C	505	1/1	1.00	0.04	26,26,26,26	0
3	GSP	B	503	32/32	1.00	0.02	35,51,122,153	3

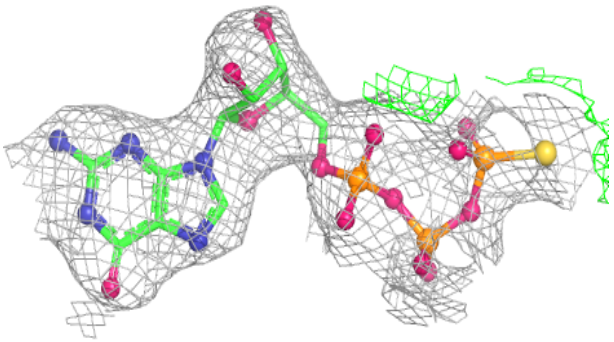
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

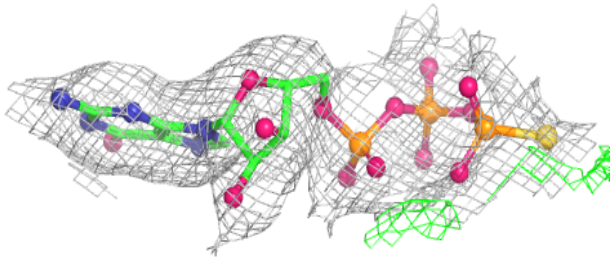
Electron density around MG D 507:

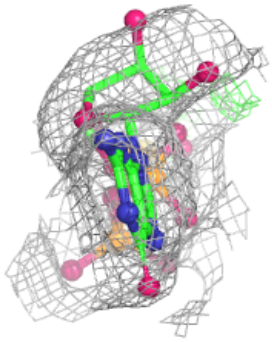
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

Electron density around GSP A 504:

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

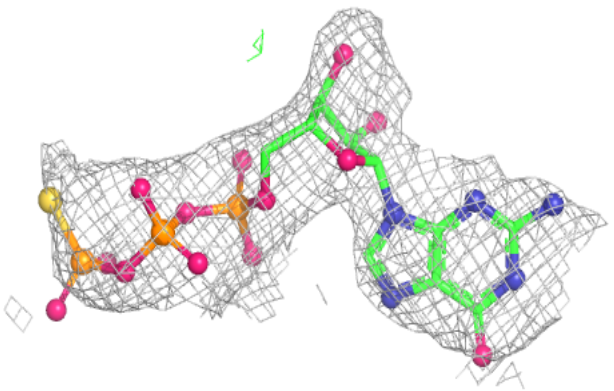


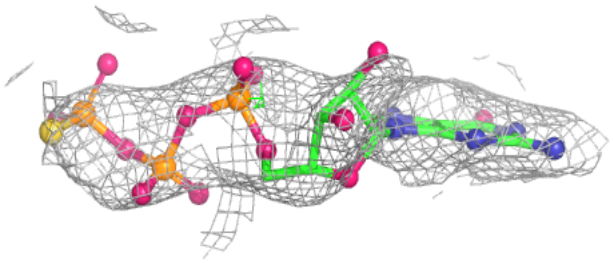


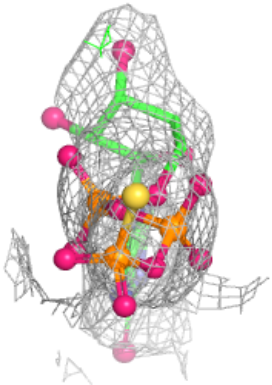


Electron density around GSP E 502:

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

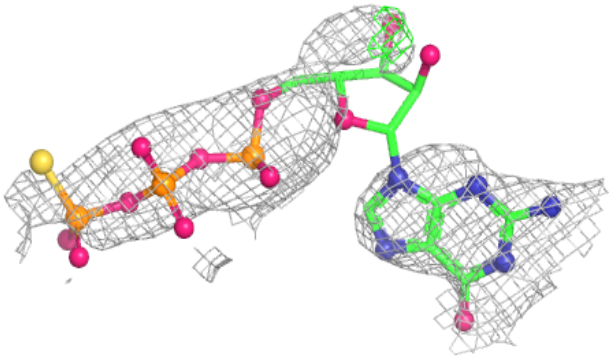


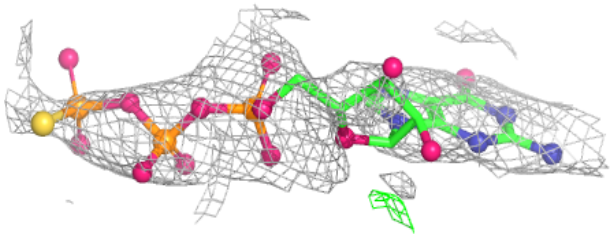


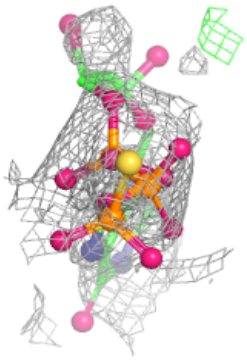


Electron density around GSP F 504:

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

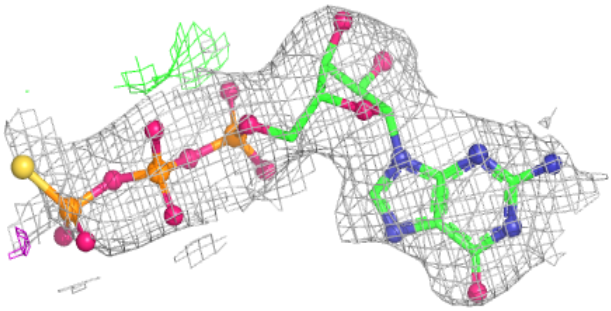


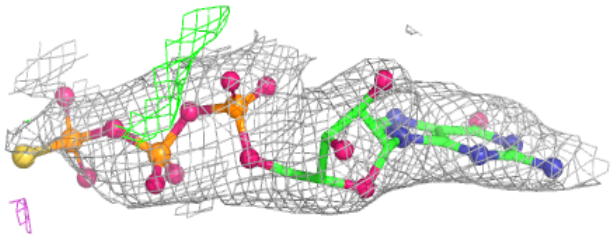




Electron density around GSP C 504:

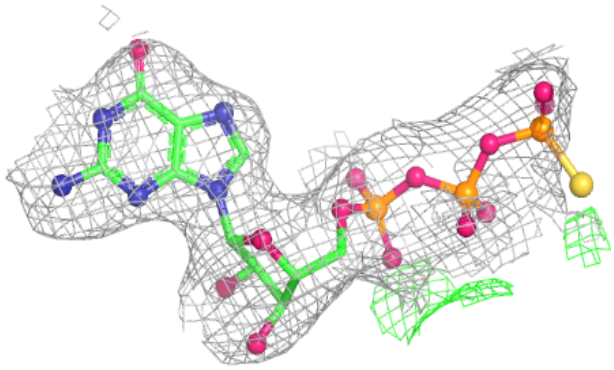
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

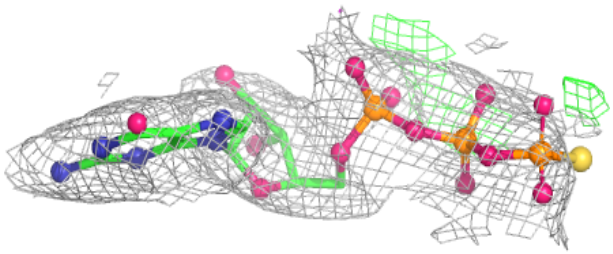


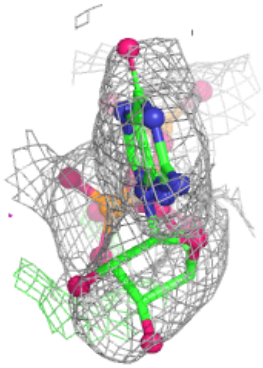


Electron density around GSP D 506:

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

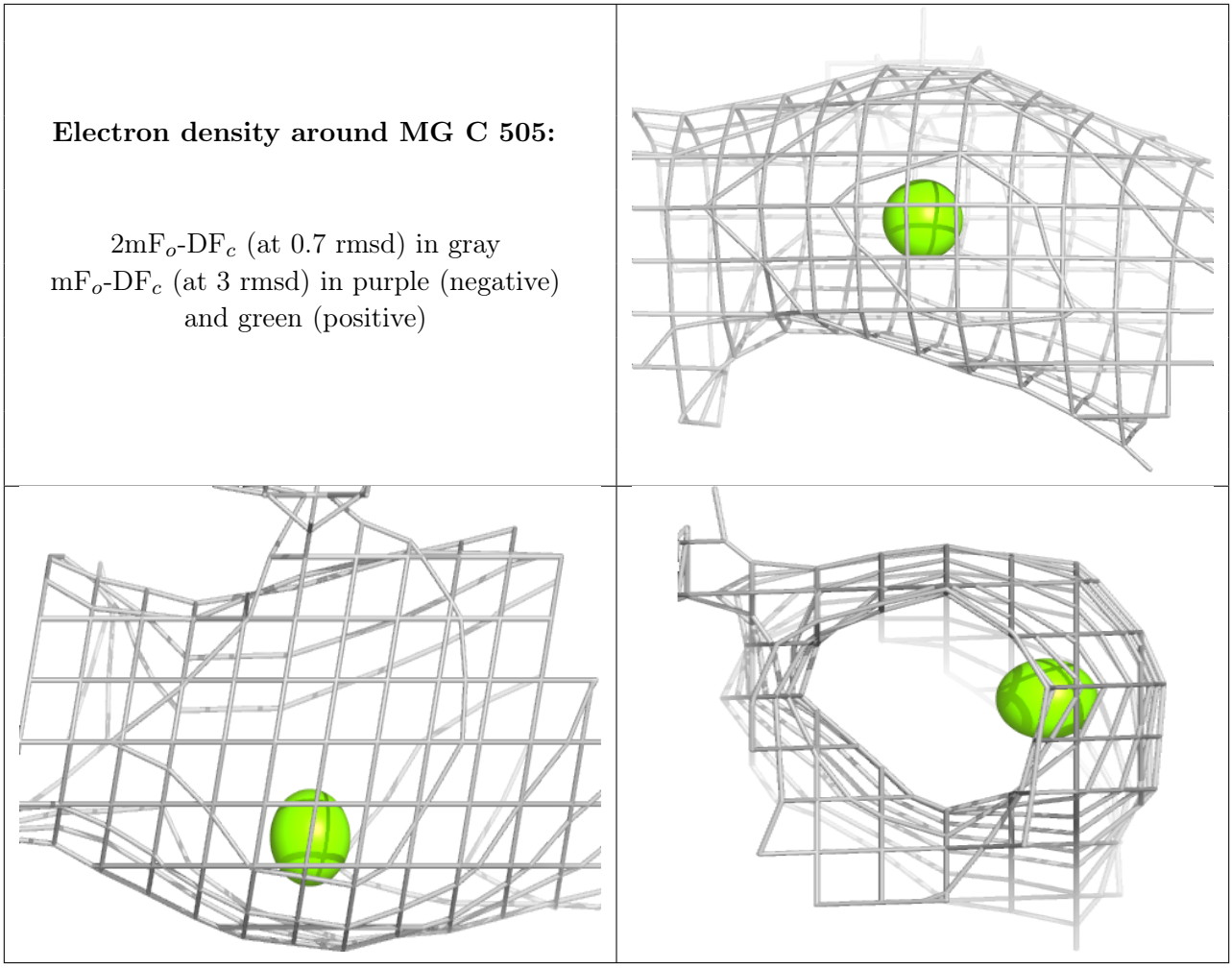






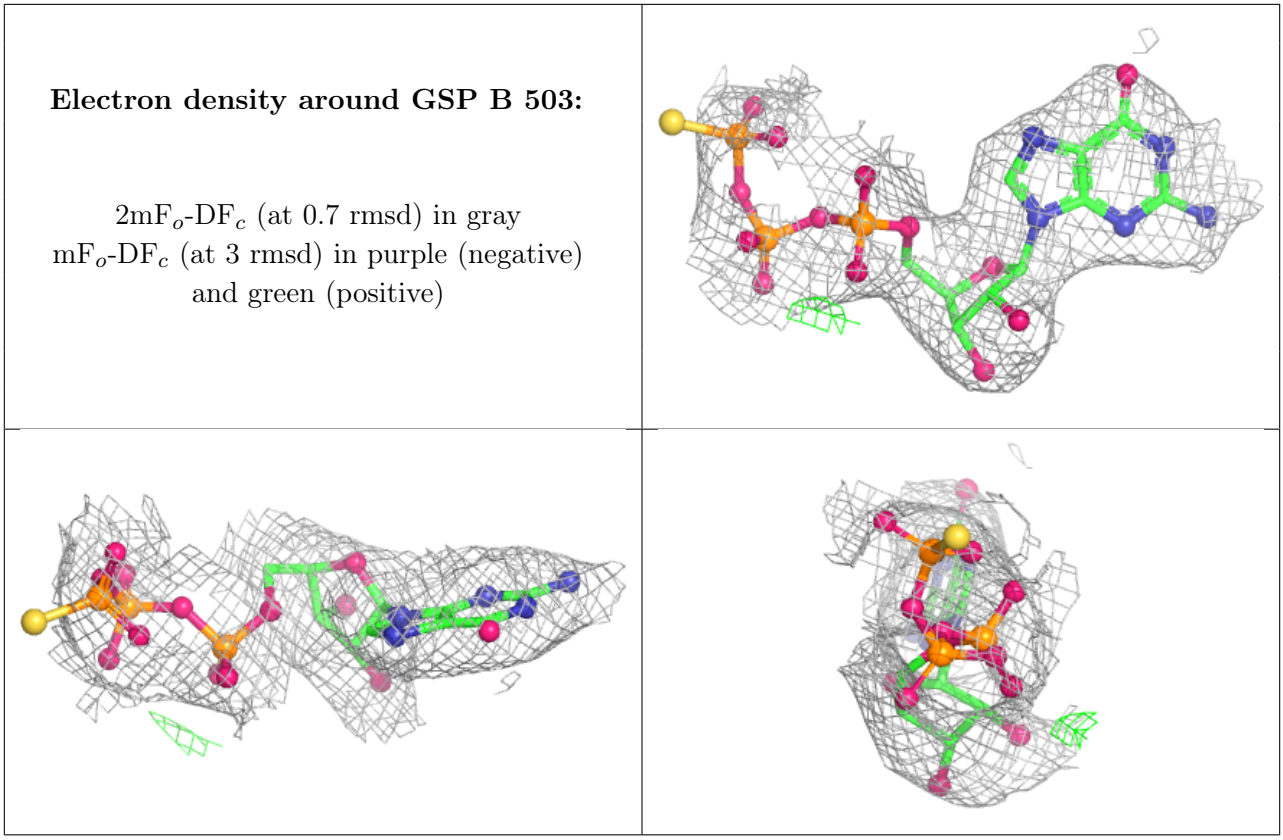
Electron density around MG C 505:

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



Electron density around GSP B 503:

$2mF_o$-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.