



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 16, 2024 – 01:44 am GMT

PDB ID : 6RA9
Title : Novel structural features and post-translational modifications in eukaryotic elongation factor 1A2 from *Oryctolagus cuniculus*
Authors : Carriles, A.A.; Hermoso, J.; Gago, F.
Deposited on : 2019-04-05
Resolution : 2.70 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

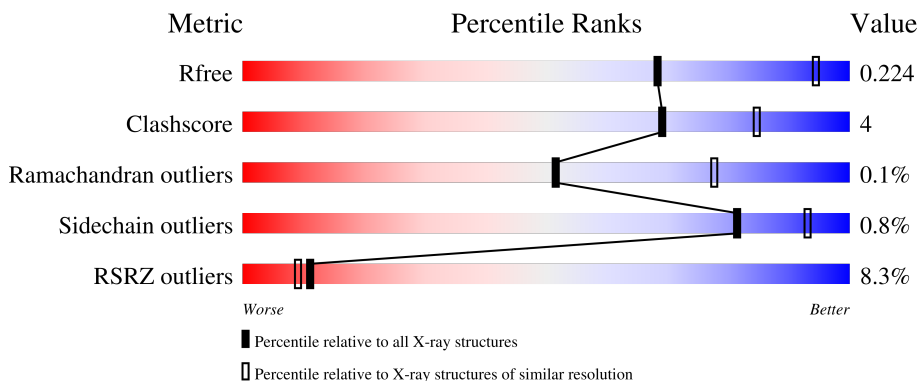
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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 $\leq 5\%$. 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	454	 3% 89% 10% .
2	B	461	 13% 88% 11% .

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
5	GOL	B	506	-	-	-	X
6	SO4	B	508	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7119 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.

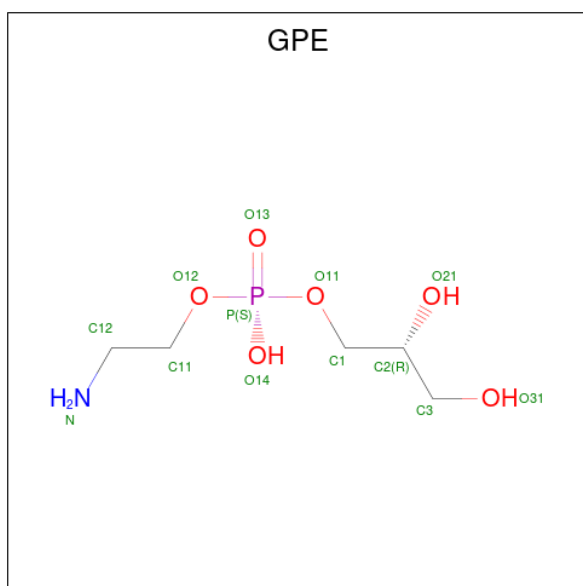
- Molecule 1 is a protein called Elongation factor 1-alpha 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
1	A	450	3380	2142	577	644	1	16	0	0	0

- Molecule 2 is a protein called Elongation factor 1-alpha 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	458	3436	2175	591	654	16	0	1	0

- Molecule 3 is L-ALPHA-GLYCEROPHOSPHORYLETHANOLAMINE (three-letter code: GPE) (formula: C₅H₁₄NO₆P).



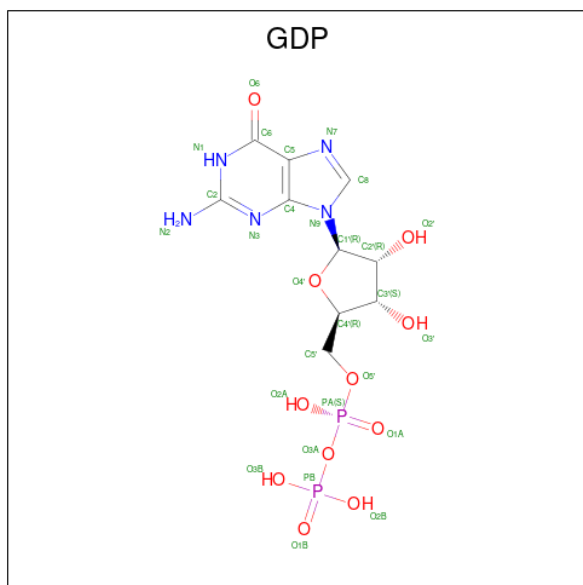
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	13	5	1	6	1	0	0
3	A	1	13	5	1	6	1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	P	0	0
			13	5	1	6	1		

- Molecule 4 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			28	10	5	11	2		
4	B	1	Total	C	N	O	P	0	0
			28	10	5	11	2		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	63	Total	O	0	0
			63	63		

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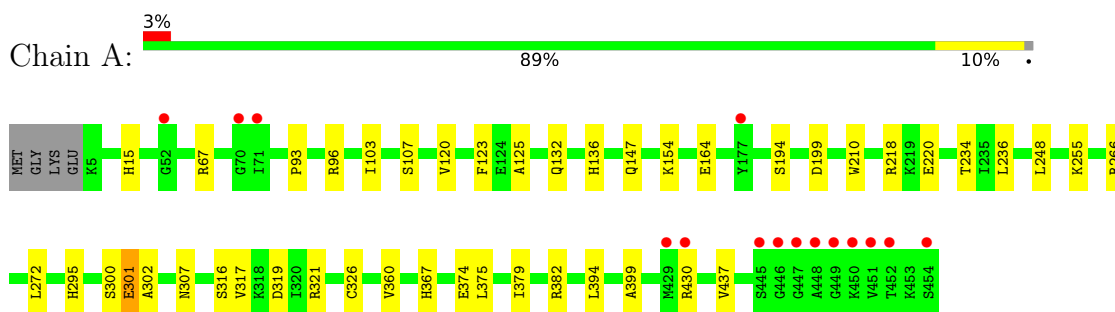
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	54	Total	O	0	0
			54	54		

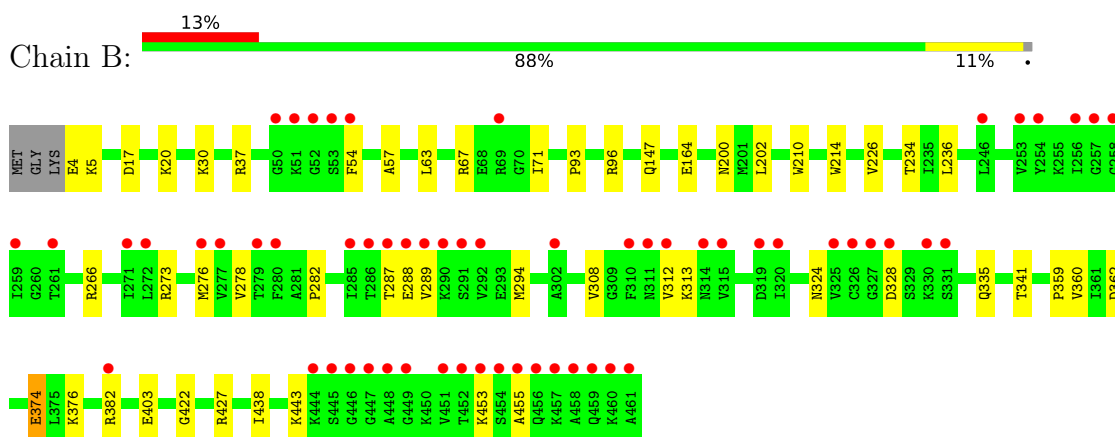
3 Residue-property plots [i](#)

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: Elongation factor 1-alpha 2



- Molecule 2: Elongation factor 1-alpha 2



4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	133.52Å 133.52Å 305.44Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	57.82 – 2.70 57.82 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.9 (57.82-2.70) 99.9 (57.82-2.70)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.74 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660, PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.179 , 0.224 0.179 , 0.224	Depositor DCC
R_{free} test set	2342 reflections (5.20%)	wwPDB-VP
Wilson B-factor (Å ²)	60.9	Xtrriage
Anisotropy	0.461	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 62.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7119	wwPDB-VP
Average B, all atoms (Å ²)	78.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.77% 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, GPE, GDP, SO4, SEP, POK

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	0.33	2/3424 (0.1%)	0.45	0/4649
2	B	0.29	1/3491 (0.0%)	0.46	0/4740
All	All	0.31	3/6915 (0.0%)	0.46	0/9389

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	374	GLU	CA-C	-7.66	1.33	1.52
1	A	301	GLU	CA-C	-7.63	1.33	1.52
1	A	374	GLU	CA-C	-7.46	1.33	1.52

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	3380	0	3312	26	0
2	B	3436	0	3354	28	0
3	A	26	0	24	1	0
3	B	13	0	11	0	0
4	A	28	0	12	1	0
4	B	28	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	12	0	16	0	0
5	B	24	0	32	1	0
6	A	25	0	0	1	0
6	B	30	0	0	0	0
7	A	63	0	0	0	0
7	B	54	0	0	0	0
All	All	7119	0	6773	51	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 4.

All (51) 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:B:341:THR:HG22	2:B:403:GLU:HG2	1.68	0.73
1:A:67:ARG:NH2	1:A:107:SER:OG	2.24	0.70
1:A:255:LYS:HB2	1:A:317:VAL:HG21	1.73	0.69
1:A:272:LEU:HB3	1:A:302:ALA:HB3	1.74	0.69
1:A:96:ARG:HA	1:A:382:ARG:HG2	1.79	0.64
1:A:295:HIS:CE1	2:B:4:GLU:HB3	2.36	0.60
1:A:120:VAL:HG21	1:A:125:ALA:HA	1.85	0.58
2:B:289:VAL:HG12	2:B:312:VAL:HG12	1.85	0.58
1:A:218:ARG:NH1	1:A:234:THR:O	2.36	0.58
2:B:376:LYS:HD2	2:B:403:GLU:HG3	1.87	0.57
1:A:103:ILE:HG23	1:A:437:VAL:HG13	1.89	0.55
1:A:120:VAL:HG12	1:A:123:PHE:HB2	1.87	0.55
1:A:295:HIS:HE1	2:B:5:LYS:H	1.56	0.55
2:B:335:GLN:HB2	2:B:443:LYS:HD3	1.91	0.53
2:B:287:THR:HA	2:B:455:ALA:HB2	1.91	0.53
1:A:360:VAL:HG11	1:A:367:HIS:CE1	2.44	0.53
2:B:278:VAL:HA	2:B:328:ASP:HA	1.91	0.52
2:B:422:GLY:HA2	2:B:438:ILE:HD12	1.90	0.51
2:B:276:MET:O	2:B:288:GLU:HA	2.12	0.50
1:A:316:SER:HB3	1:A:319:ASP:OD2	2.12	0.50
2:B:214:TRP:HA	5:B:505:GOL:H31	1.94	0.49
2:B:96:ARG:HA	2:B:382[B]:ARG:HG2	1.95	0.48
2:B:273:ARG:O	2:B:276:MET:HG3	2.14	0.48
1:A:164:GLU:HB2	1:A:210:TRP:CD2	2.49	0.47
2:B:214:TRP:HH2	2:B:234:THR:HG21	1.79	0.47
2:B:282:PRO:HD2	2:B:324:ASN:HD22	1.80	0.47
2:B:200:ASN:ND2	2:B:226:VAL:O	2.41	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:220:GLU:OE1	1:A:220:GLU:N	2.46	0.46
2:B:287:THR:HG21	2:B:313:LYS:O	2.16	0.46
1:A:132:GLN:HG3	6:A:507:SO4:O4	2.16	0.45
1:A:154:LYS:HG2	4:A:503:GDP:C6	2.51	0.45
2:B:362:ASP:OD2	2:B:427:ARG:HG3	2.16	0.45
1:A:375:LEU:HD13	1:A:394:LEU:HG	1.98	0.44
1:A:321:ARG:HG2	2:B:37:ARG:CZ	2.48	0.44
2:B:214:TRP:CH2	2:B:234:THR:HG21	2.53	0.44
2:B:30:LYS:HB3	2:B:202:LEU:HD22	1.99	0.44
1:A:248:LEU:HB3	1:A:326:CYS:HB3	2.01	0.43
2:B:282:PRO:HD2	2:B:324:ASN:ND2	2.34	0.43
1:A:15:HIS:ND1	1:A:132:GLN:HB2	2.34	0.43
2:B:147:GLN:NE2	2:B:236:LEU:O	2.44	0.43
2:B:54:PHE:HB2	2:B:57:ALA:HB2	2.01	0.42
1:A:379:ILE:HB	1:A:399:ALA:HB3	2.01	0.42
1:A:194:SER:HB3	1:A:199:ASP:HB2	2.00	0.42
2:B:20:LYS:HE3	2:B:93:PRO:HG2	2.02	0.42
1:A:301:GLU:HB2	3:A:502:GPE:HN1	1.65	0.42
2:B:164:GLU:HB2	2:B:210:TRP:CD2	2.55	0.41
1:A:93:PRO:HG2	1:A:136:HIS:CE1	2.55	0.41
1:A:147:GLN:HE22	1:A:236:LEU:H	1.68	0.41
2:B:294:MET:HB2	2:B:308:VAL:HG12	2.02	0.41
1:A:430:ARG:HA	1:A:430:ARG:HD3	1.91	0.40
2:B:63:LEU:O	2:B:67:ARG:HG2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [\(i\)](#)

5.3.1 Protein backbone [\(i\)](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	446/454 (98%)	431 (97%)	15 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	456/461 (99%)	433 (95%)	22 (5%)	1 (0%)	47	73
All	All	902/915 (99%)	864 (96%)	37 (4%)	1 (0%)	51	78

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	359	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	354/378 (94%)	353 (100%)	1 (0%)	92	98
2	B	356/383 (93%)	351 (99%)	5 (1%)	67	86
All	All	710/761 (93%)	704 (99%)	6 (1%)	81	93

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	307	ASN
2	B	17	ASP
2	B	71	ILE
2	B	360	VAL
2	B	374	GLU
2	B	453	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	307	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

3 non-standard protein/DNA/RNA residues 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
1	SEP	A	300	1	8,9,10	1.57	1 (12%)	8,12,14	1.62	2 (25%)
2	POK	B	266	2	11,14,15	1.40	1 (9%)	11,16,18	0.86	0
1	POK	A	266	1	11,14,15	1.37	1 (9%)	11,16,18	0.81	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
1	SEP	A	300	1	-	5/5/8/10	-
2	POK	B	266	2	-	3/13/14/16	-
1	POK	A	266	1	-	2/13/14/16	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	266	POK	CZ-NH1	3.69	1.39	1.29
1	A	266	POK	CZ-NH1	3.68	1.39	1.29
1	A	300	SEP	P-O1P	3.39	1.61	1.50

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	300	SEP	OG-CB-CA	3.13	111.19	108.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	300	SEP	P-OG-CB	-2.60	111.12	118.30

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	300	SEP	N-CA-CB-OG
1	A	300	SEP	CB-OG-P-O1P
1	A	300	SEP	CB-OG-P-O2P
1	A	300	SEP	CB-OG-P-O3P
1	A	266	POK	NH2-CAA-CMA-OMA
1	A	266	POK	NH2-CAA-CMA-OMB
2	B	266	POK	NH2-CAA-CMA-OMB
2	B	266	POK	NH2-CAA-CMA-OMA
1	A	300	SEP	CA-CB-OG-P
2	B	266	POK	CG-CD-NE-CZ

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

22 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	$\# Z > 2$
5	GOL	A	505	-	5,5,5	0.92	0	5,5,5	0.98	0
6	SO4	B	509	-	4,4,4	0.14	0	6,6,6	0.08	0
6	SO4	B	510	-	4,4,4	0.14	0	6,6,6	0.13	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	SO4	A	508	-	4,4,4	0.14	0	6,6,6	0.08	0
6	SO4	A	507	-	4,4,4	0.15	0	6,6,6	0.07	0
4	GDP	A	503	-	24,30,30	1.28	3 (12%)	30,47,47	1.47	5 (16%)
4	GDP	B	502	-	24,30,30	1.27	3 (12%)	30,47,47	1.46	4 (13%)
5	GOL	B	503	-	5,5,5	0.92	0	5,5,5	0.99	0
6	SO4	A	506	-	4,4,4	0.13	0	6,6,6	0.13	0
3	GPE	A	502	1	12,12,12	1.25	0	13,15,15	0.82	1 (7%)
5	GOL	A	504	-	5,5,5	0.89	0	5,5,5	1.00	0
6	SO4	B	508	-	4,4,4	0.15	0	6,6,6	0.14	0
6	SO4	B	507	-	4,4,4	0.14	0	6,6,6	0.08	0
5	GOL	B	504	-	5,5,5	0.89	0	5,5,5	1.01	0
5	GOL	B	506	-	5,5,5	0.89	0	5,5,5	0.99	0
5	GOL	B	505	-	5,5,5	0.96	0	5,5,5	0.96	0
6	SO4	B	511	-	4,4,4	0.14	0	6,6,6	0.07	0
3	GPE	B	501	2	12,12,12	1.26	1 (8%)	13,15,15	0.75	1 (7%)
3	GPE	A	501	1	12,12,12	1.27	1 (8%)	13,15,15	0.86	1 (7%)
6	SO4	A	510	-	4,4,4	0.15	0	6,6,6	0.09	0
6	SO4	B	512	-	4,4,4	0.15	0	6,6,6	0.10	0
6	SO4	A	509	-	4,4,4	0.13	0	6,6,6	0.08	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
4	GDP	A	503	-	-	2/12/32/32	0/3/3/3
5	GOL	B	506	-	-	2/4/4/4	-
4	GDP	B	502	-	-	6/12/32/32	0/3/3/3
5	GOL	B	503	-	-	0/4/4/4	-
5	GOL	A	505	-	-	0/4/4/4	-
5	GOL	B	505	-	-	4/4/4/4	-
3	GPE	B	501	2	-	8/13/13/13	-
3	GPE	A	502	1	-	8/13/13/13	-
5	GOL	A	504	-	-	4/4/4/4	-
3	GPE	A	501	1	-	6/13/13/13	-
5	GOL	B	504	-	-	0/4/4/4	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	503	GDP	C6-N1	-3.59	1.32	1.37
4	B	502	GDP	C6-N1	-3.55	1.32	1.37
4	B	502	GDP	C5-C4	-2.43	1.36	1.43
4	A	503	GDP	C5-C4	-2.40	1.36	1.43
4	B	502	GDP	C5-C6	-2.28	1.42	1.47
4	A	503	GDP	C5-C6	-2.27	1.42	1.47
3	A	501	GPE	P-O12	2.05	1.67	1.59
3	B	501	GPE	P-O12	2.00	1.67	1.59

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	GDP	O6-C6-N1	-4.36	115.50	120.65
4	B	502	GDP	O6-C6-N1	-3.98	115.95	120.65
4	B	502	GDP	C2-N1-C6	-3.78	118.14	125.10
4	A	503	GDP	C2-N1-C6	-3.61	118.45	125.10
4	A	503	GDP	N1-C2-N3	2.70	128.37	123.32
4	B	502	GDP	N1-C2-N3	2.70	128.36	123.32
3	A	501	GPE	O14-P-O13	-2.49	99.92	112.24
3	A	502	GPE	O14-P-O13	-2.29	100.94	112.24
4	B	502	GDP	C5-C6-N1	2.28	117.98	113.95
4	A	503	GDP	C5-C6-N1	2.21	117.85	113.95
4	A	503	GDP	O3B-PB-O2B	2.19	116.01	107.64
3	B	501	GPE	O14-P-O13	-2.18	101.44	112.24

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	501	GPE	O12-C11-C12-N
3	A	502	GPE	C1-O11-P-O12
3	A	502	GPE	C1-O11-P-O14
3	A	502	GPE	O11-C1-C2-C3
3	A	502	GPE	O11-C1-C2-O21
3	A	502	GPE	O12-C11-C12-N
3	B	501	GPE	C1-O11-P-O14
3	B	501	GPE	C1-O11-P-O13
3	B	501	GPE	C1-C2-C3-O31
3	B	501	GPE	O12-C11-C12-N
4	A	503	GDP	PA-O3A-PB-O3B
4	B	502	GDP	PA-O3A-PB-O3B
4	B	502	GDP	C5'-O5'-PA-O3A

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Mol	Chain	Res	Type	Atoms
4	B	502	GDP	O4'-C4'-C5'-O5'
5	A	504	GOL	O1-C1-C2-C3
5	A	504	GOL	C1-C2-C3-O3
5	B	505	GOL	C1-C2-C3-O3
5	B	506	GOL	O1-C1-C2-C3
5	A	504	GOL	O1-C1-C2-O2
4	B	502	GDP	C3'-C4'-C5'-O5'
3	B	501	GPE	C1-O11-P-O12
3	A	501	GPE	C1-C2-C3-O31
5	A	504	GOL	O2-C2-C3-O3
5	B	505	GOL	O2-C2-C3-O3
5	B	506	GOL	O1-C1-C2-O2
3	A	501	GPE	O21-C2-C3-O31
4	B	502	GDP	PA-O3A-PB-O2B
3	B	501	GPE	O21-C2-C3-O31
5	B	505	GOL	O1-C1-C2-O2
3	B	501	GPE	C2-C1-O11-P
3	A	501	GPE	C1-O11-P-O13
3	A	502	GPE	C1-O11-P-O13
3	A	501	GPE	C12-C11-O12-P
3	A	502	GPE	C12-C11-O12-P
3	B	501	GPE	C12-C11-O12-P
4	A	503	GDP	PA-O3A-PB-O2B
5	B	505	GOL	O1-C1-C2-C3
3	A	501	GPE	C11-O12-P-O13
3	A	502	GPE	C11-O12-P-O13
4	B	502	GDP	C5'-O5'-PA-O1A

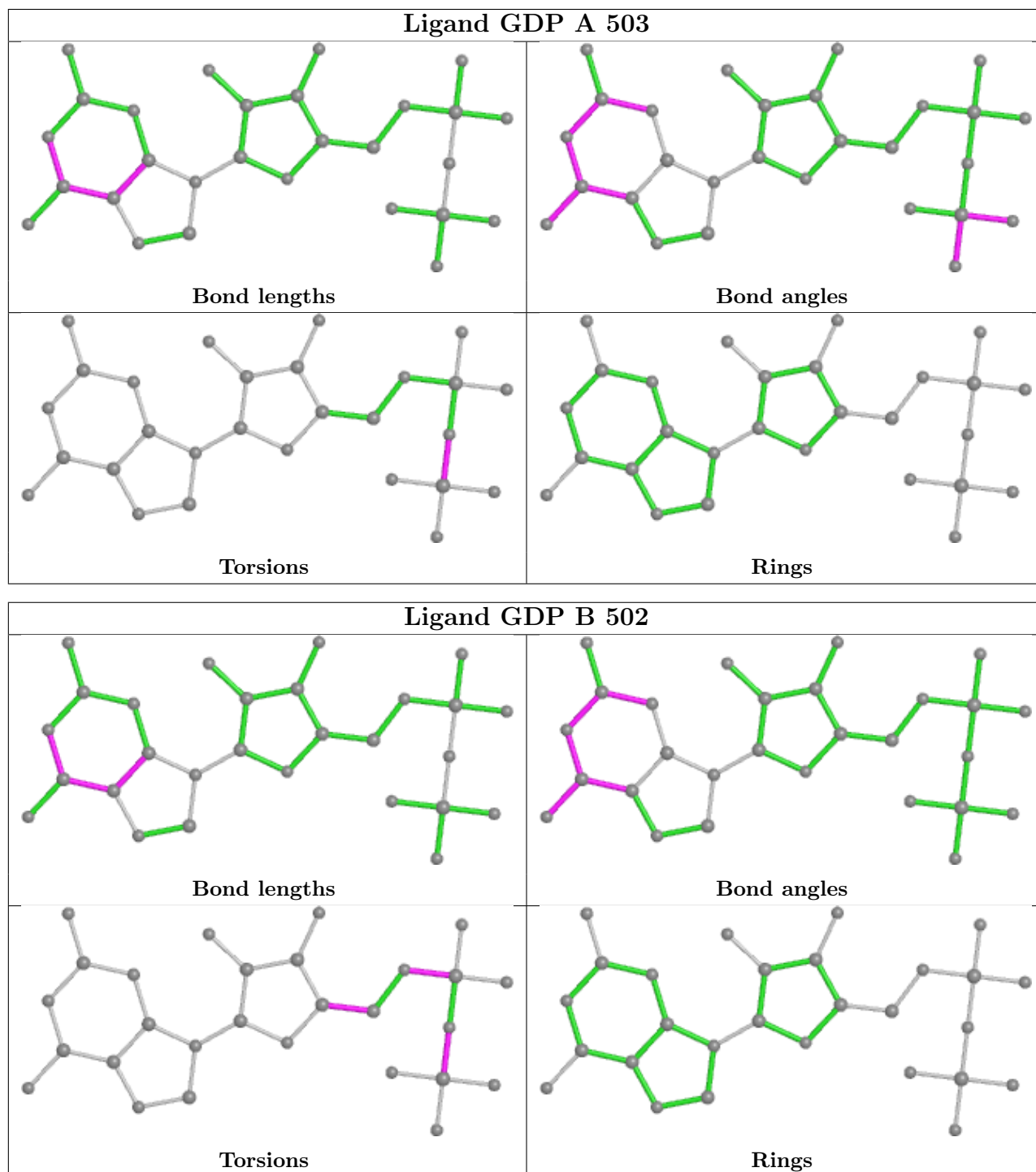
There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	507	SO4	1	0
4	A	503	GDP	1	0
3	A	502	GPE	1	0
5	B	505	GOL	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier.

Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	448/454 (98%)	0.10	15 (3%) 46 46	35, 68, 119, 173	0
2	B	457/461 (99%)	0.52	60 (13%) 3 2	36, 77, 147, 187	0
All	All	905/915 (98%)	0.31	75 (8%) 11 9	35, 71, 141, 187	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	312	VAL	5.6
2	B	461	ALA	5.4
2	B	272	LEU	5.2
2	B	455	ALA	5.1
2	B	288	GLU	4.9
1	A	451	VAL	4.8
1	A	448	ALA	4.8
2	B	302	ALA	4.7
1	A	449	GLY	4.4
2	B	289	VAL	4.3
1	A	454	SER	4.2
2	B	448	ALA	4.2
2	B	451	VAL	4.1
2	B	256	ILE	4.1
2	B	310	PHE	4.0
1	A	447	GLY	4.0
1	A	445	SER	4.0
2	B	456	GLN	3.9
2	B	315	VAL	3.9
2	B	54	PHE	3.8
2	B	458	ALA	3.7
2	B	319	ASP	3.7
2	B	459	GLN	3.7
2	B	277	VAL	3.6

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Mol	Chain	Res	Type	RSRZ
2	B	285	ILE	3.6
2	B	452	THR	3.5
2	B	287	THR	3.5
1	A	52	GLY	3.5
2	B	261	THR	3.4
2	B	286	THR	3.4
2	B	320	ILE	3.3
2	B	258	GLY	3.2
2	B	447	GLY	3.2
2	B	453	LYS	3.1
1	A	446	GLY	3.1
2	B	460	LYS	3.0
2	B	280	PHE	2.8
2	B	246	LEU	2.7
2	B	327	GLY	2.7
1	A	450	LYS	2.7
2	B	259	ILE	2.6
2	B	276	MET	2.6
2	B	311	ASN	2.6
2	B	449	GLY	2.5
2	B	291	SER	2.5
1	A	70	GLY	2.5
2	B	253	VAL	2.5
2	B	53	SER	2.5
1	A	71	ILE	2.5
2	B	314	ASN	2.4
2	B	330	LYS	2.4
2	B	290	LYS	2.4
2	B	271	ILE	2.4
1	A	430	ARG	2.4
2	B	446	GLY	2.4
2	B	51	LYS	2.3
2	B	52	GLY	2.3
2	B	279	THR	2.3
2	B	445	SER	2.3
2	B	382[A]	ARG	2.3
2	B	331	SER	2.2
1	A	429	MET	2.2
2	B	328	ASP	2.2
2	B	292	VAL	2.2
2	B	69	ARG	2.2
2	B	257	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	454	SER	2.2
2	B	325	VAL	2.1
1	A	177	TYR	2.1
2	B	254	TYR	2.1
2	B	50	GLY	2.1
2	B	444	LYS	2.1
2	B	326	CYS	2.1
2	B	457	LYS	2.0
1	A	452	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	POK	B	266	15/16	0.88	0.16	70,99,135,138	0
1	SEP	A	300	10/11	0.90	0.14	96,123,153,158	4
1	POK	A	266	15/16	0.92	0.20	45,79,117,120	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

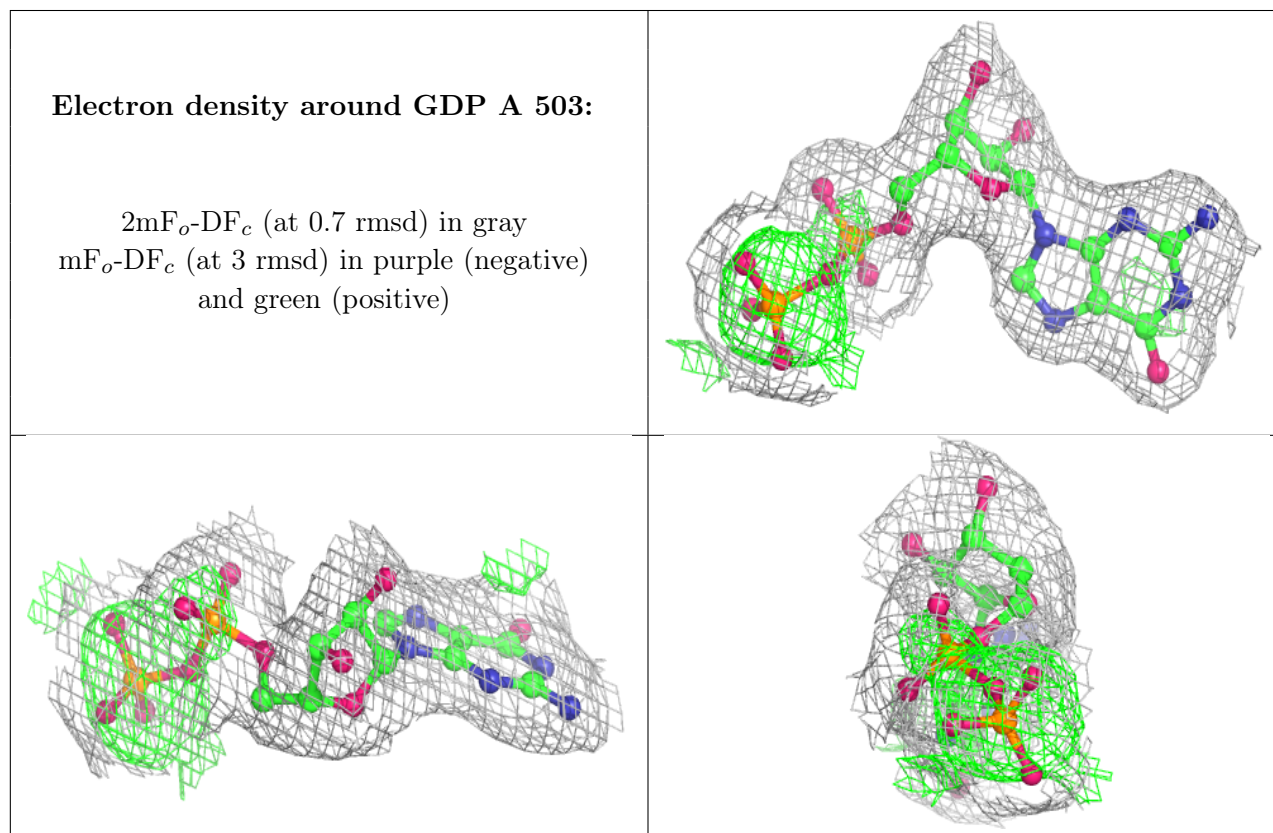
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	SO4	A	506	5/5	0.73	0.28	91,101,104,106	5
5	GOL	B	503	6/6	0.78	0.29	103,107,118,120	0
3	GPE	A	501	13/13	0.78	0.35	101,129,155,160	12
6	SO4	B	508	5/5	0.78	0.46	110,110,112,115	5
3	GPE	B	501	13/13	0.79	0.37	136,156,184,193	12
5	GOL	B	506	6/6	0.80	0.49	103,103,108,109	0

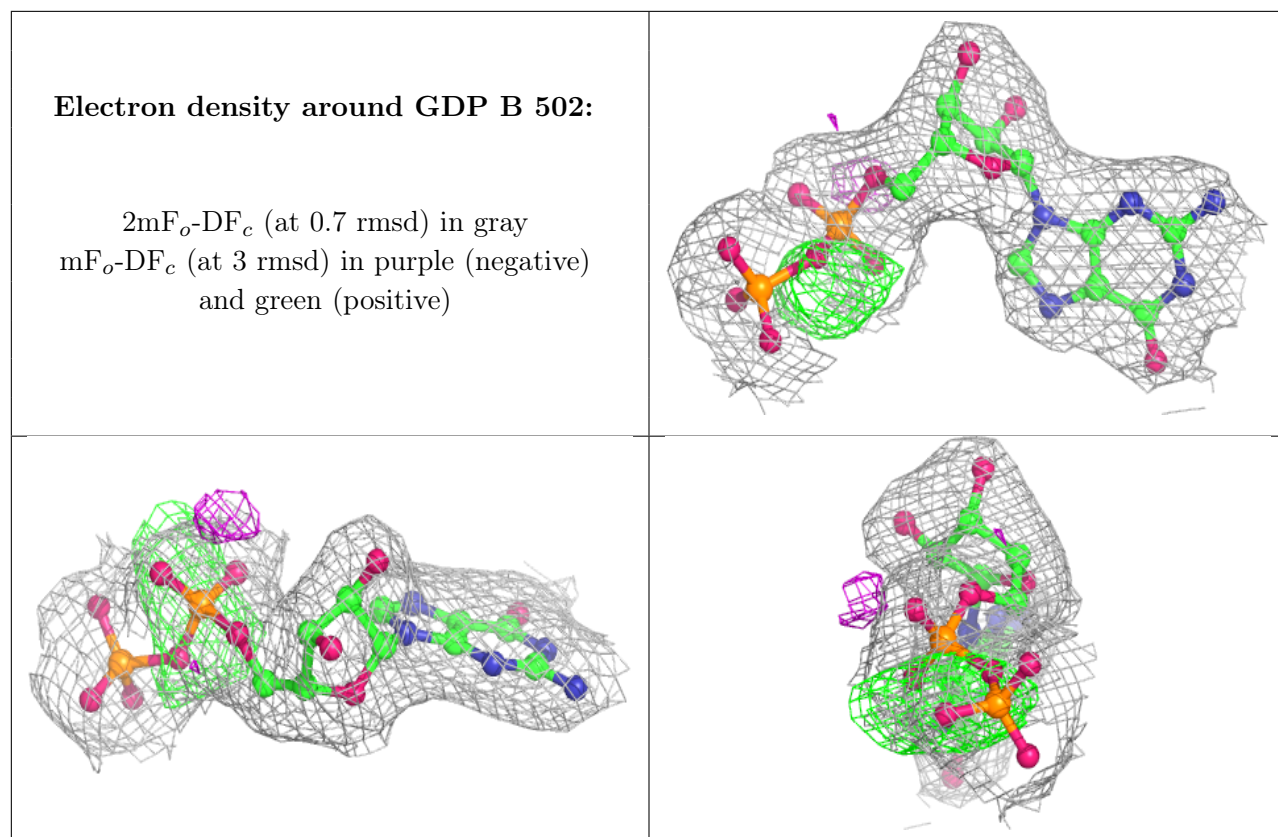
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	SO4	A	508	5/5	0.81	0.50	125,127,131,132	5
3	GPE	A	502	13/13	0.83	0.29	106,137,164,168	12
5	GOL	A	505	6/6	0.84	0.29	92,101,104,107	0
6	SO4	B	511	5/5	0.86	0.20	90,92,96,98	5
6	SO4	A	509	5/5	0.87	0.19	88,97,105,107	5
6	SO4	B	512	5/5	0.88	0.35	103,106,109,115	5
5	GOL	A	504	6/6	0.89	0.27	107,113,125,127	0
5	GOL	B	505	6/6	0.89	0.58	108,113,116,117	0
6	SO4	B	507	5/5	0.89	0.36	99,103,109,112	5
6	SO4	B	509	5/5	0.92	0.20	106,107,112,119	5
6	SO4	A	507	5/5	0.93	0.12	93,94,98,101	5
5	GOL	B	504	6/6	0.94	0.40	94,99,106,111	0
6	SO4	B	510	5/5	0.94	0.32	68,73,73,75	5
4	GDP	A	503	28/28	0.96	0.18	34,50,61,91	0
4	GDP	B	502	28/28	0.97	0.19	36,45,56,71	0
6	SO4	A	510	5/5	0.97	0.16	81,82,93,96	5

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.





6.5 Other polymers [i](#)

There are no such residues in this entry.