Full wwPDB X-ray Structure Validation Report ⓘ

Nov 6, 2023 – 06:20 PM EST

PDB ID	:	6B2F
Title	:	Phosphotriesterase variant S5 + TS analogue
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Deposited on	:	2017-09-20
Resolution	:	1.77 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The 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:

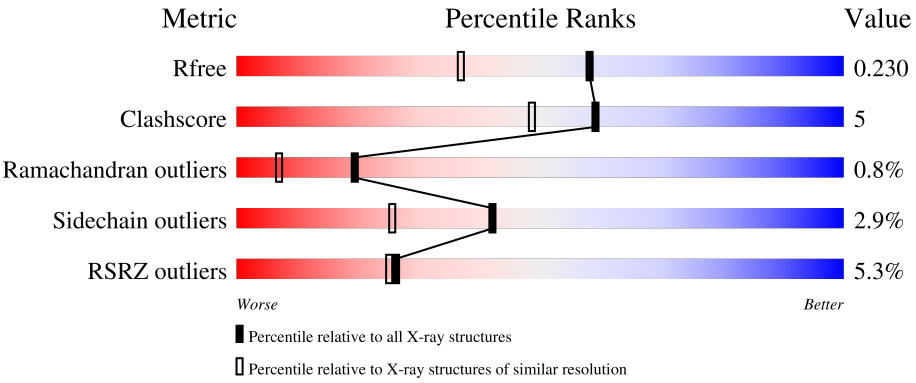
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.77 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	9185 (1.80-1.76)
Clashscore	141614	10184 (1.80-1.76)
Ramachandran outliers	138981	10051 (1.80-1.76)
Sidechain outliers	138945	10050 (1.80-1.76)
RSRZ outliers	127900	9032 (1.80-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	333	4% 84% 10% • 5%
1	G	333	6% 85% 12% ••

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
3	MPD	G	2403	-	-	-	X

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 5427 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 Phosphotriesterase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	318	Total	C	N	O	S	0	12	0
			2530	1591	467	466	6			
1	G	326	Total	C	N	O	S	0	5	0
			2530	1592	460	472	6			

There are 14 discrepancies between the modelled and reference sequences:

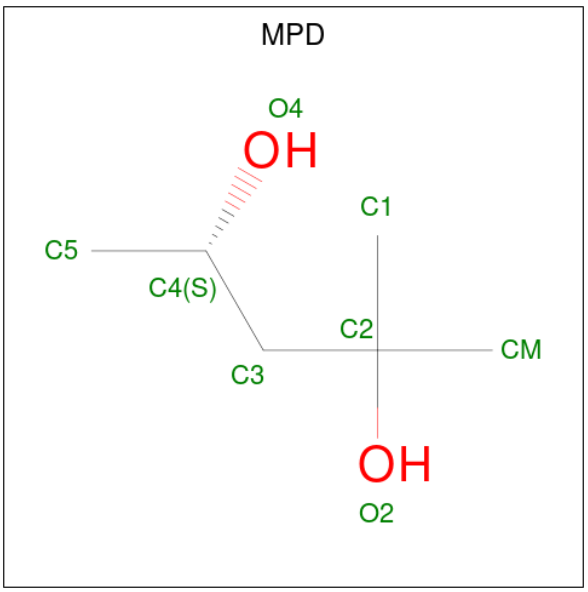
Chain	Residue	Modelled	Actual	Comment	Reference
A	216	LEU	PHE	conflict	UNP A0A060GYS1
A	233	ALA	ASP	conflict	UNP A0A060GYS1
A	254	SER	HIS	conflict	UNP A0A060GYS1
A	271	HIS	LEU	conflict	UNP A0A060GYS1
A	293	THR	MET	conflict	UNP A0A060GYS1
A	306	ILE	PHE	conflict	UNP A0A060GYS1
A	320	GLY	VAL	conflict	UNP A0A060GYS1
G	216	LEU	PHE	conflict	UNP A0A060GYS1
G	233	ALA	ASP	conflict	UNP A0A060GYS1
G	254	SER	HIS	conflict	UNP A0A060GYS1
G	271	HIS	LEU	conflict	UNP A0A060GYS1
G	293	THR	MET	conflict	UNP A0A060GYS1
G	306	ILE	PHE	conflict	UNP A0A060GYS1
G	320	GLY	VAL	conflict	UNP A0A060GYS1

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Zn	0	0
			2	2		
2	G	2	Total	Zn	0	0
			2	2		

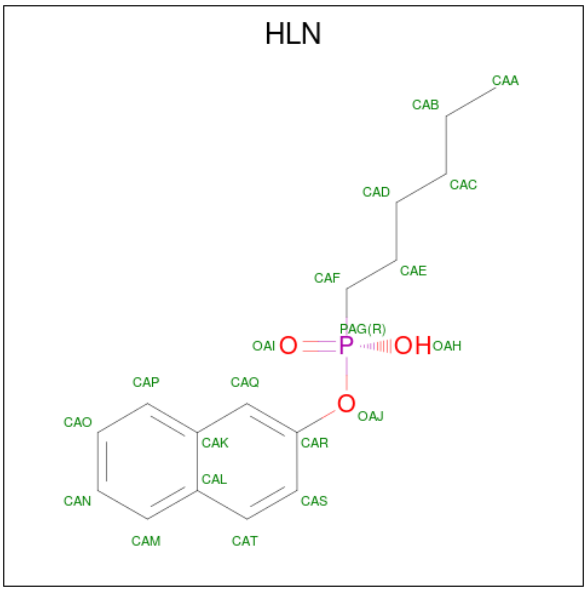
- Molecule 3 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula:

$C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 8 6 2	0	0
3	A	1	Total C O 8 6 2	0	0
3	A	1	Total C O 8 6 2	0	0
3	A	1	Total C O 8 6 2	0	0
3	G	1	Total C O 8 6 2	0	0
3	G	1	Total C O 8 6 2	0	0

- Molecule 4 is hexyl(naphthalen-2-yloxy)phosphinic acid (three-letter code: HLN) (formula: $C_{16}H_{21}O_3P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	O	P	0	0
			20	16	3	1		
4	G	1	Total	C	O	P	0	0
			20	16	3	1		

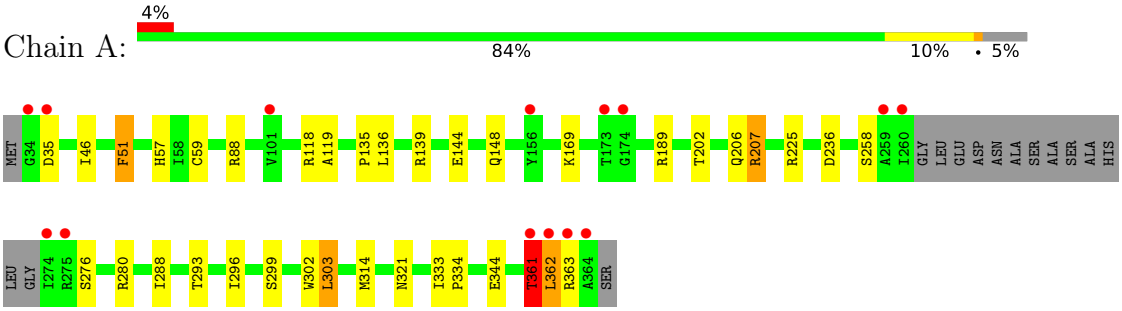
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	131	Total	O	0	0
			131	131		
5	G	144	Total	O	0	0
			144	144		

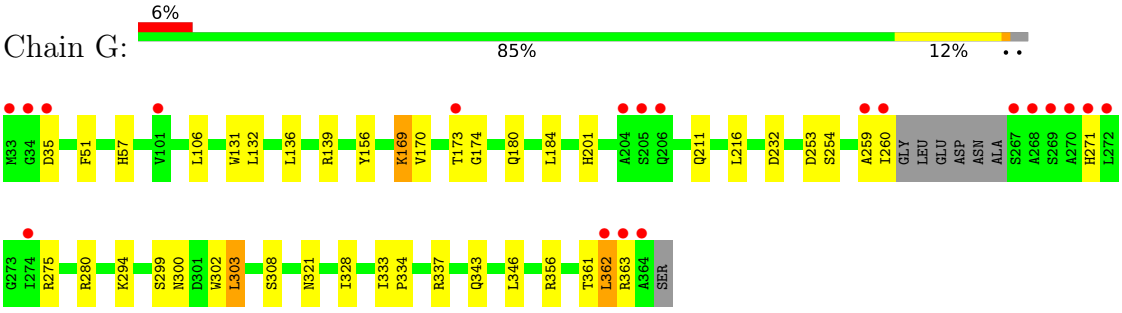
3 Residue-property plots (i)

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: Phosphotriesterase



• Molecule 1: Phosphotriesterase



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	84.66Å 85.02Å 87.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.56 – 1.77 30.56 – 1.77	Depositor EDS
% Data completeness (in resolution range)	97.8 (30.56-1.77) 97.9 (30.56-1.77)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.12 (at 1.77Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.196 , 0.230 0.196 , 0.230	Depositor DCC
R_{free} test set	3055 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	19.6	Xtriage
Anisotropy	0.474	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 47.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.027 for -h,l,k 0.029 for -l,-k,-h 0.025 for k,h,-l 0.013 for k,l,h 0.013 for l,h,k	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	5427	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.24% 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: MPD, ZN, KCX, HLN

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	0/2560	0.60	1/3469 (0.0%)
1	G	0.37	0/2561	0.60	0/3474
All	All	0.38	0/5121	0.60	1/6943 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	361	THR	C-N-CA	5.93	136.53	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	2530	0	2565	25	0
1	G	2530	0	2558	21	1
2	A	2	0	0	0	0
2	G	2	0	0	0	0
3	A	32	0	56	5	0
3	G	16	0	28	2	0
4	A	20	0	20	0	0
4	G	20	0	20	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	131	0	0	3	0
5	G	144	0	0	2	0
All	All	5427	0	5247	49	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (49) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:314:MET:SD	5:A:2521:HOH:O	2.33	0.85
1:A:207[A]:ARG:NH1	1:A:236:ASP:OD2	2.16	0.78
1:A:118[A]:ARG:NH1	5:A:2504:HOH:O	2.29	0.66
1:A:288:ILE:HG12	1:A:293:THR:HG22	1.79	0.64
3:A:2407:MPD:O4	3:A:2407:MPD:O2	2.17	0.61
1:A:225:ARG:HD2	1:A:361:THR:O	2.01	0.60
1:A:88:ARG:NH1	1:A:119:ALA:O	2.36	0.59
1:A:288:ILE:HA	1:A:293:THR:HG22	1.90	0.54
3:A:2407:MPD:HM1	3:A:2407:MPD:H53	1.92	0.51
3:A:2406:MPD:O4	3:A:2406:MPD:O2	2.27	0.50
1:G:361:THR:O	1:G:362:LEU:HB2	2.10	0.50
1:A:136[B]:LEU:HD23	1:G:308:SER:HB3	1.94	0.49
1:A:206:GLN:O	1:A:207[B]:ARG:HG2	2.12	0.49
1:G:259:ALA:O	1:G:260:ILE:HB	2.11	0.49
1:G:169:KCX:OQ2	1:G:201:HIS:HB2	2.12	0.49
1:A:258:SER:OG	1:A:280:ARG:NE	2.46	0.49
3:G:2405:MPD:O2	3:G:2405:MPD:O4	2.23	0.48
1:G:136:LEU:HD13	1:G:139:ARG:NH2	2.29	0.48
1:A:59:CYS:HB3	5:A:2600:HOH:O	2.13	0.48
1:A:144:GLU:O	1:A:148[A]:GLN:HG2	2.13	0.47
1:G:57:HIS:O	1:G:303:LEU:HA	2.13	0.47
1:G:156:TYR:HB2	3:G:2405:MPD:O4	2.13	0.47
1:G:253:ASP:HB3	5:G:2622:HOH:O	2.13	0.47
1:A:293:THR:HA	1:A:296:ILE:HD12	1.96	0.46
1:A:148[B]:GLN:HE22	3:A:2405:MPD:H13	1.80	0.46
1:A:189:ARG:HH22	3:A:2407:MPD:H11	1.81	0.46
1:G:337[A]:ARG:NH2	1:G:343:GLN:OE1	2.47	0.46
1:G:173:THR:HG23	1:G:180:GLN:HE22	1.81	0.46
1:G:170:VAL:HG21	1:G:184:LEU:HD23	1.98	0.45
1:G:232:ASP:OD2	1:G:280:ARG:NH1	2.47	0.45
1:G:174:GLY:O	1:G:211[A]:GLN:NE2	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:106:LEU:HD12	5:G:2519:HOH:O	2.16	0.45
1:G:333:ILE:HG23	1:G:346:LEU:HD13	1.99	0.45
1:A:135:PRO:O	1:A:139[A]:ARG:HG3	2.17	0.44
1:G:302:TRP:CH2	1:G:321:ASN:HB3	2.53	0.43
1:A:333:ILE:HB	1:A:334:PRO:HD3	2.01	0.43
1:A:344:GLU:CD	1:A:344:GLU:H	2.22	0.43
1:G:333:ILE:HB	1:G:334:PRO:HD3	2.00	0.43
1:A:136[A]:LEU:HG	1:A:139[A]:ARG:NH2	2.34	0.43
1:A:57:HIS:O	1:A:303:LEU:HA	2.19	0.42
1:G:294:LYS:O	1:G:356[B]:ARG:NH2	2.52	0.42
1:G:300:ASN:OD1	1:G:328:ILE:HG12	2.19	0.42
1:A:361:THR:HA	1:A:362:LEU:CB	2.49	0.42
1:G:131:TRP:CG	1:G:132:LEU:N	2.88	0.42
1:A:51:PHE:C	1:A:51:PHE:HD1	2.24	0.41
1:A:57:HIS:HB2	1:A:303:LEU:HB3	2.03	0.41
1:A:302:TRP:CH2	1:A:321:ASN:HB3	2.56	0.41
1:A:51:PHE:C	1:A:51:PHE:CD1	2.94	0.41
1:G:356[B]:ARG:HB3	1:G:356[B]:ARG:NH1	2.36	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:271:HIS:O	1:G:280:ARG:NH2[2_555]	2.06	0.14

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	325/333 (98%)	313 (96%)	10 (3%)	2 (1%)	25 11
1	G	327/333 (98%)	313 (96%)	11 (3%)	3 (1%)	17 5

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	652/666 (98%)	626 (96%)	21 (3%)	5 (1%)	19 7

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	275	ARG
1	G	362	LEU
1	A	362	LEU
1	A	363	ARG
1	G	363	ARG

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	264/264 (100%)	254 (96%)	10 (4%)	33 16
1	G	264/264 (100%)	258 (98%)	6 (2%)	50 34
All	All	528/528 (100%)	512 (97%)	16 (3%)	42 24

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	35	ASP
1	A	46	ILE
1	A	51	PHE
1	A	202	THR
1	A	207[A]	ARG
1	A	207[B]	ARG
1	A	276	SER
1	A	299	SER
1	A	303	LEU
1	A	361	THR
1	G	35	ASP
1	G	51	PHE
1	G	216	LEU

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Mol	Chain	Res	Type
1	G	254	SER
1	G	299	SER
1	G	303	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA

There are no RNA molecules in this entry.

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

2 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	KCX	G	169	1,2	9,11,12	1.24	2 (22%)	5,12,14	1.78	2 (40%)
1	KCX	A	169	1,2	9,11,12	1.26	1 (11%)	5,12,14	1.22	1 (20%)

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	KCX	G	169	1,2	-	0/9/10/12	-
1	KCX	A	169	1,2	-	2/9/10/12	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	169	KCX	CE-NZ	2.88	1.52	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	G	169	KCX	OQ1-CX	2.69	1.26	1.21
1	G	169	KCX	CE-NZ	2.11	1.51	1.46

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	G	169	KCX	OQ1-CX-NZ	-3.28	119.87	124.96
1	A	169	KCX	OQ1-CX-NZ	-2.57	120.98	124.96
1	G	169	KCX	CE-NZ-CX	-2.12	118.49	121.89

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	169	KCX	C-CA-CB-CG
1	A	169	KCX	O-C-CA-CB

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	G	169	KCX	1	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 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	$\#\|Z\|>2$
3	MPD	G	2405	-	7,7,7	0.70	0	9,10,10	0.29	0
4	HLN	G	2404	2	21,21,21	2.18	3 (14%)	25,28,28	0.99	1 (4%)
3	MPD	A	2405	-	7,7,7	0.68	0	9,10,10	0.37	0
3	MPD	G	2403	-	7,7,7	0.75	0	9,10,10	0.41	0
3	MPD	A	2403	-	7,7,7	0.66	0	9,10,10	0.35	0
4	HLN	A	2404	2	21,21,21	2.08	2 (9%)	25,28,28	1.30	2 (8%)
3	MPD	A	2407	-	7,7,7	0.64	0	9,10,10	0.58	0
3	MPD	A	2406	-	7,7,7	0.65	0	9,10,10	0.51	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
3	MPD	G	2405	-	-	1/5/5/5	-
4	HLN	G	2404	2	-	8/12/12/12	0/2/2/2
3	MPD	A	2405	-	-	0/5/5/5	-
3	MPD	G	2403	-	-	1/5/5/5	-
3	MPD	A	2403	-	-	1/5/5/5	-
4	HLN	A	2404	2	-	4/12/12/12	0/2/2/2
3	MPD	A	2407	-	-	1/5/5/5	-
3	MPD	A	2406	-	-	3/5/5/5	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	2404	HLN	PAG-OAJ	7.85	1.66	1.58
4	A	2404	HLN	PAG-OAJ	7.32	1.66	1.58
4	A	2404	HLN	PAG-CAF	4.83	1.87	1.80
4	G	2404	HLN	PAG-CAF	4.50	1.86	1.80
4	G	2404	HLN	PAG-OAH	-2.45	1.50	1.56

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	2404	HLN	OAJ-PAG-OAI	-4.47	102.79	113.39
4	G	2404	HLN	CAD-CAE-CAF	-2.93	106.32	112.61
4	A	2404	HLN	OAH-PAG-CAF	2.79	112.07	105.63

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2406	MPD	C2-C3-C4-C5
4	A	2404	HLN	CAR-OAJ-PAG-CAF
4	G	2404	HLN	CAE-CAF-PAG-OAH
4	G	2404	HLN	CAE-CAF-PAG-OAI
4	G	2404	HLN	CAE-CAF-PAG-OAJ
4	G	2404	HLN	CAR-OAJ-PAG-OAH
4	G	2404	HLN	CAR-OAJ-PAG-OAI
4	A	2404	HLN	CAR-OAJ-PAG-OAI
4	G	2404	HLN	CAB-CAC-CAD-CAE
4	A	2404	HLN	CAD-CAE-CAF-PAG
4	A	2404	HLN	CAA-CAB-CAC-CAD
4	G	2404	HLN	CAA-CAB-CAC-CAD
4	G	2404	HLN	CAC-CAD-CAE-CAF
3	A	2406	MPD	C1-C2-C3-C4
3	A	2403	MPD	O2-C2-C3-C4
3	A	2407	MPD	O2-C2-C3-C4
3	G	2403	MPD	O2-C2-C3-C4
3	G	2405	MPD	O2-C2-C3-C4
3	A	2406	MPD	C2-C3-C4-O4

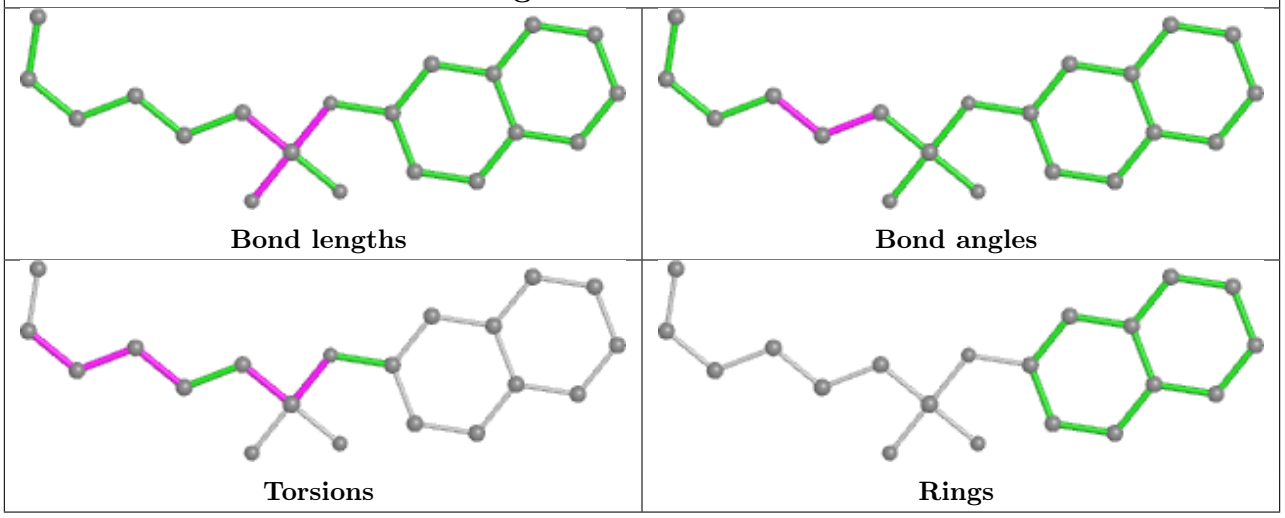
There are no ring outliers.

4 monomers are involved in 7 short contacts:

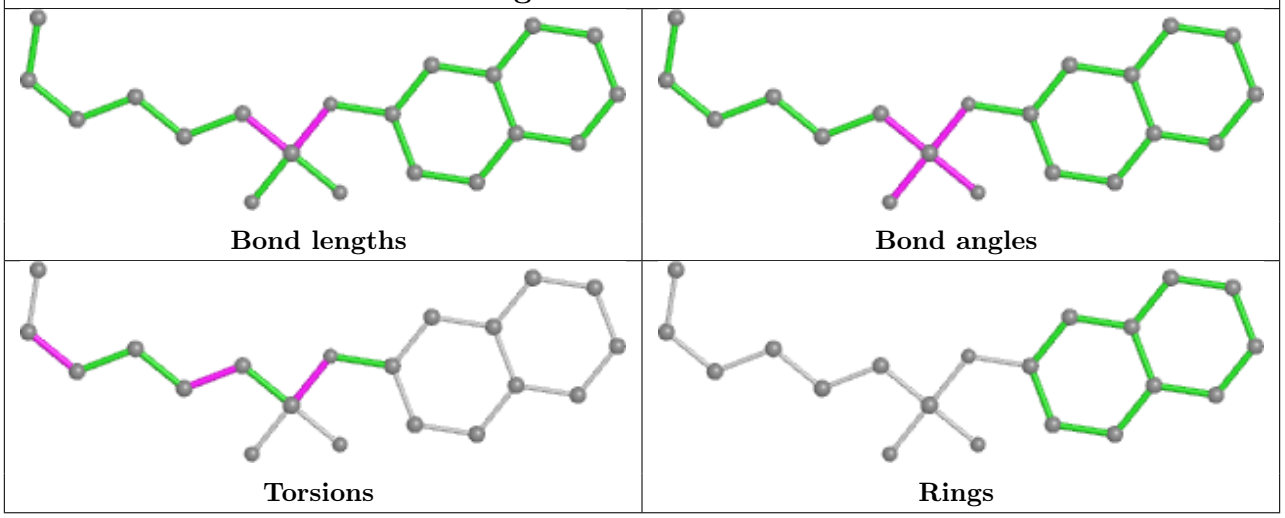
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	2405	MPD	2	0
3	A	2405	MPD	1	0
3	A	2407	MPD	3	0
3	A	2406	MPD	1	0

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 HLN G 2404



Ligand HLN A 2404



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	317/333 (95%)	0.18	14 (4%)	34	32	13, 22, 41, 67	0
1	G	325/333 (97%)	0.35	20 (6%)	20	19	14, 25, 50, 82	0
All	All	642/666 (96%)	0.27	34 (5%)	26	25	13, 24, 46, 82	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	268	ALA	13.7
1	A	274	ILE	13.1
1	G	33	MET	11.1
1	G	267	SER	10.6
1	G	270	ALA	10.2
1	G	269	SER	10.2
1	G	274	ILE	9.9
1	A	34	GLY	7.6
1	A	259	ALA	6.9
1	G	363	ARG	6.6
1	A	260	ILE	6.3
1	G	364	ALA	6.3
1	G	362	LEU	6.2
1	G	259	ALA	5.8
1	A	275	ARG	5.5
1	G	260	ILE	5.2
1	A	35	ASP	4.8
1	G	35	ASP	4.0
1	G	34	GLY	3.7
1	G	272	LEU	3.4
1	G	271	HIS	3.3
1	A	363	ARG	3.2
1	G	101	VAL	3.0
1	A	173	THR	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	362	LEU	2.7
1	A	361	THR	2.6
1	G	206	GLN	2.4
1	A	156	TYR	2.3
1	G	173	THR	2.3
1	G	204	ALA	2.2
1	G	205	SER	2.2
1	A	364	ALA	2.1
1	A	101	VAL	2.1
1	A	174	GLY	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, 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
1	KCX	G	169	12/13	0.93	0.17	15,18,25,28	0
1	KCX	A	169	12/13	0.96	0.16	13,15,20,21	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, 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
3	MPD	A	2407	8/8	0.63	0.31	35,40,40,42	0
3	MPD	G	2403	8/8	0.63	0.42	39,40,43,44	0
3	MPD	A	2405	8/8	0.77	0.25	41,44,45,46	0
3	MPD	A	2406	8/8	0.78	0.32	42,44,46,47	0
3	MPD	G	2405	8/8	0.78	0.30	47,50,51,52	0
3	MPD	A	2403	8/8	0.79	0.26	39,41,44,45	0

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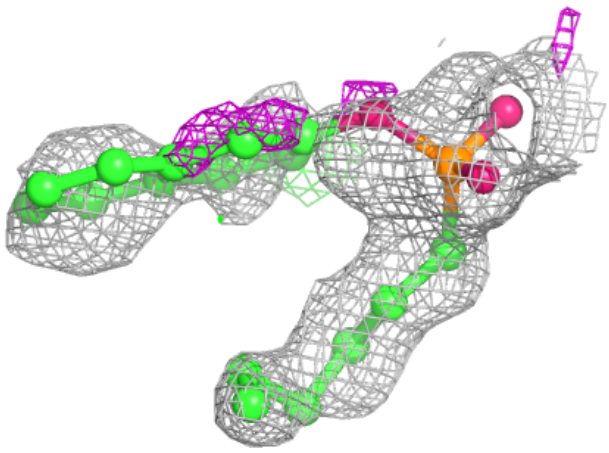
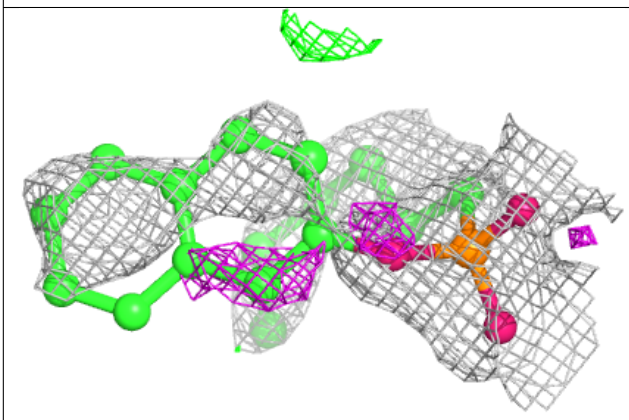
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	HLN	A	2404	20/20	0.89	0.21	22,52,74,74	0
4	HLN	G	2404	20/20	0.91	0.21	24,47,62,62	0
2	ZN	A	2402	1/1	0.99	0.06	19,19,19,19	1
2	ZN	G	2402	1/1	0.99	0.05	23,23,23,23	1
2	ZN	G	2401	1/1	1.00	0.05	16,16,16,16	1
2	ZN	A	2401	1/1	1.00	0.06	16,16,16,16	0

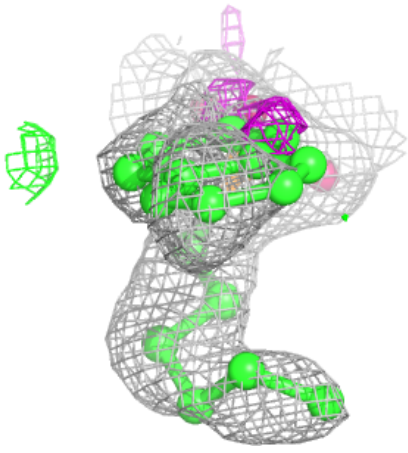
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around HLN A 2404:

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

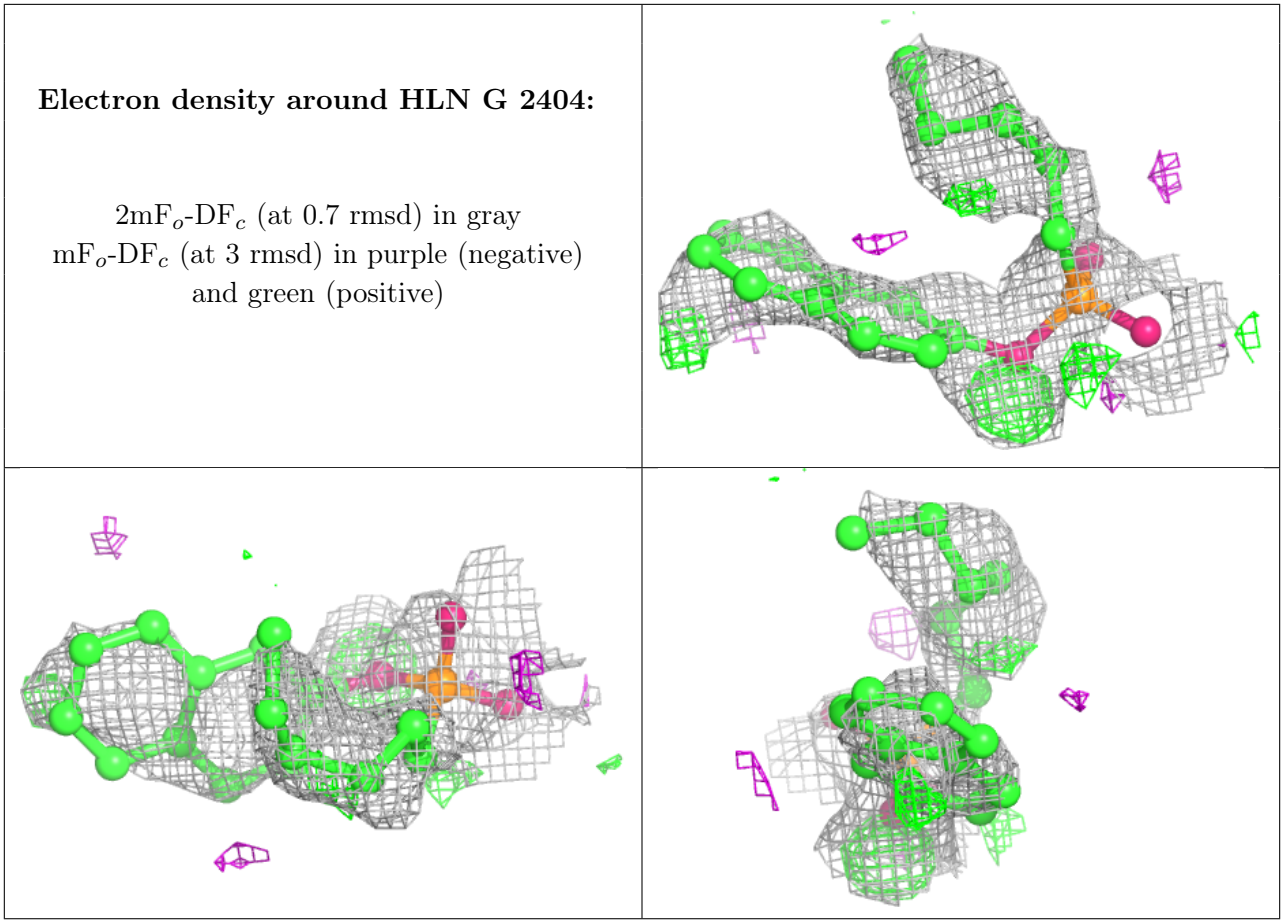






Electron density around HLN G 2404:

$2mF_o$-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.