



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 02:39 PM UTC

PDB ID : 6NUB / pdb_00006nub
Title : Pyruvate Kinase M2 Mutant - S437Y in Complex with L-serine
Authors : Srivastava, D.; Nandi, S.; Dey, M.
Deposited on : 2019-01-31
Resolution : 1.70 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
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) : 2.49

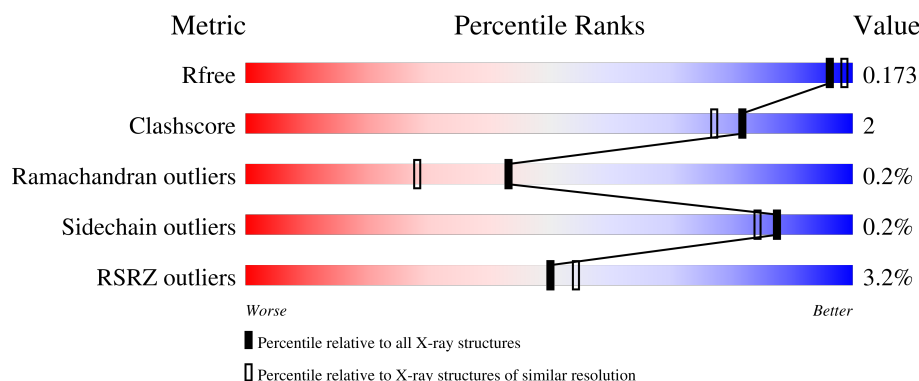
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

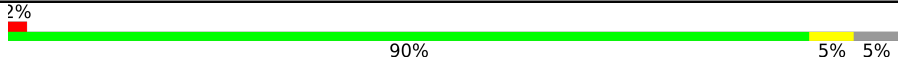
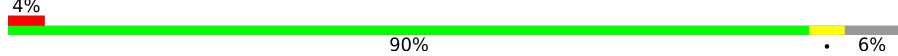
The reported resolution of this entry is 1.70 Å.

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}	180053	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	550	
1	B	550	

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
4	OXL	A	603	-	X	-	-
4	OXL	B	603	-	X	-	-

2 Entry composition

There are 11 unique types of molecules in this entry. The entry contains 9203 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 Pyruvate kinase PKM.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	522	Total	C	N	O	S	51	18	0
			4059	2568	714	749	28			
1	B	519	Total	C	N	O	S	3	17	0
			4020	2546	704	741	29			

There are 40 discrepancies between the modelled and reference sequences:

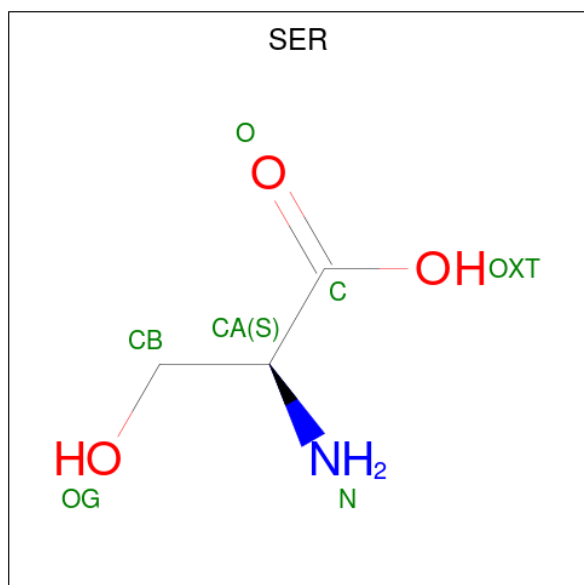
Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MET	-	initiating methionine	UNP P14618
A	-17	GLY	-	expression tag	UNP P14618
A	-16	SER	-	expression tag	UNP P14618
A	-15	SER	-	expression tag	UNP P14618
A	-14	HIS	-	expression tag	UNP P14618
A	-13	HIS	-	expression tag	UNP P14618
A	-12	HIS	-	expression tag	UNP P14618
A	-11	HIS	-	expression tag	UNP P14618
A	-10	HIS	-	expression tag	UNP P14618
A	-9	HIS	-	expression tag	UNP P14618
A	-8	SER	-	expression tag	UNP P14618
A	-7	SER	-	expression tag	UNP P14618
A	-6	GLY	-	expression tag	UNP P14618
A	-5	LEU	-	expression tag	UNP P14618
A	-4	VAL	-	expression tag	UNP P14618
A	-3	PRO	-	expression tag	UNP P14618
A	-2	ARG	-	expression tag	UNP P14618
A	-1	GLY	-	expression tag	UNP P14618
A	0	SER	-	expression tag	UNP P14618
A	437	TYR	SER	engineered mutation	UNP P14618
B	-18	MET	-	initiating methionine	UNP P14618
B	-17	GLY	-	expression tag	UNP P14618
B	-16	SER	-	expression tag	UNP P14618
B	-15	SER	-	expression tag	UNP P14618
B	-14	HIS	-	expression tag	UNP P14618

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-13	HIS	-	expression tag	UNP P14618
B	-12	HIS	-	expression tag	UNP P14618
B	-11	HIS	-	expression tag	UNP P14618
B	-10	HIS	-	expression tag	UNP P14618
B	-9	HIS	-	expression tag	UNP P14618
B	-8	SER	-	expression tag	UNP P14618
B	-7	SER	-	expression tag	UNP P14618
B	-6	GLY	-	expression tag	UNP P14618
B	-5	LEU	-	expression tag	UNP P14618
B	-4	VAL	-	expression tag	UNP P14618
B	-3	PRO	-	expression tag	UNP P14618
B	-2	ARG	-	expression tag	UNP P14618
B	-1	GLY	-	expression tag	UNP P14618
B	0	SER	-	expression tag	UNP P14618
B	437	TYR	SER	engineered mutation	UNP P14618

- Molecule 2 is SERINE (CCD ID: SER) (formula: $C_3H_7NO_3$).

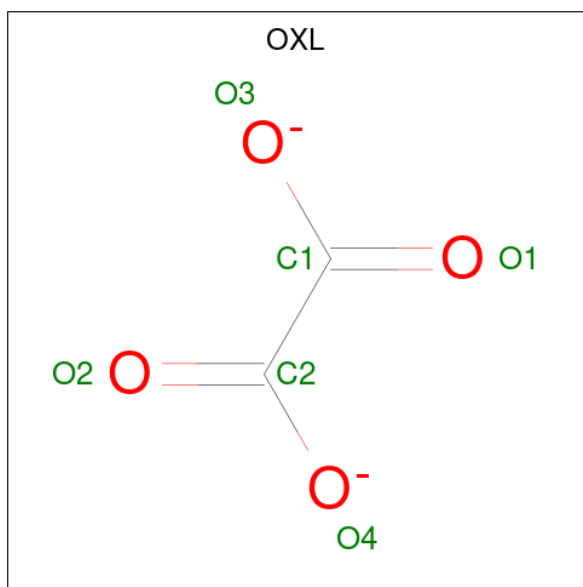


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			7	3	1	3		
2	B	1	Total	C	N	O	0	0
			7	3	1	3		

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0
3	B	1	Total Mg 1 1	0	0

- Molecule 4 is OXALATE ION (CCD ID: OXL) (formula: C_2O_4).

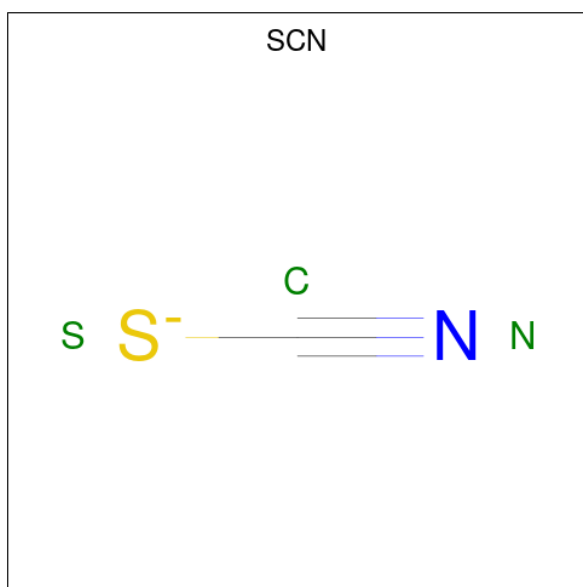


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 6 2 4	0	0
4	B	1	Total C O 6 2 4	0	0

- Molecule 5 is POTASSIUM ION (CCD ID: K) (formula: K).

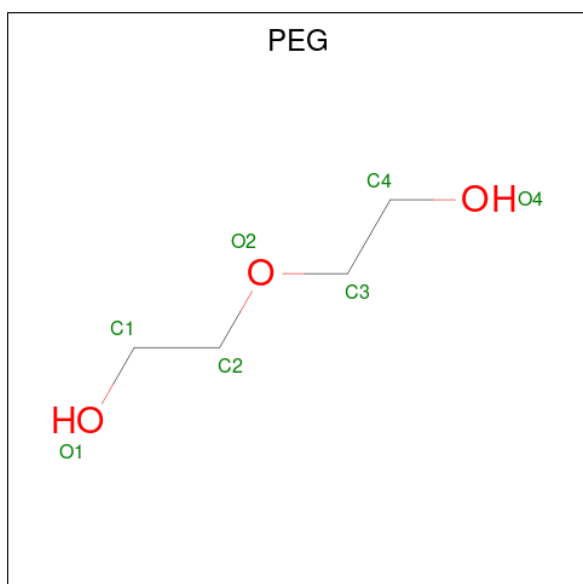
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total K 1 1	0	0
5	B	1	Total K 1 1	0	0

- Molecule 6 is THIOCYANATE ION (CCD ID: SCN) (formula: CNS).



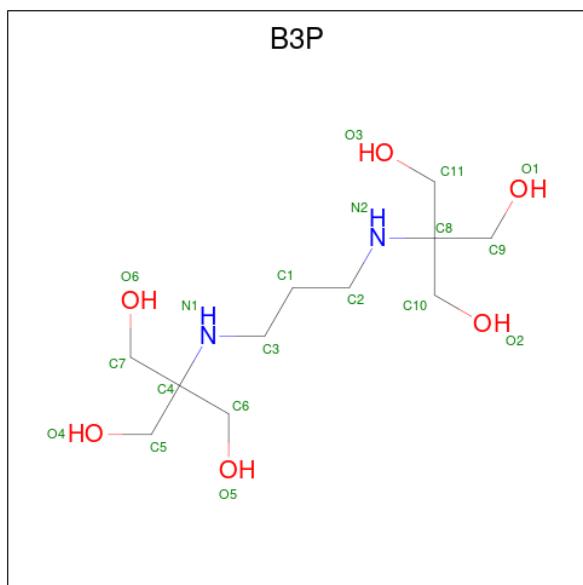
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	S	0	0
			3	1	1	1		
6	A	1	Total	C	N	S	0	0
			3	1	1	1		
6	B	1	Total	C	N	S	0	0
			3	1	1	1		
6	B	1	Total	C	N	S	0	0
			3	1	1	1		
6	B	1	Total	C	N	S	0	0
			3	1	1	1		

- Molecule 7 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



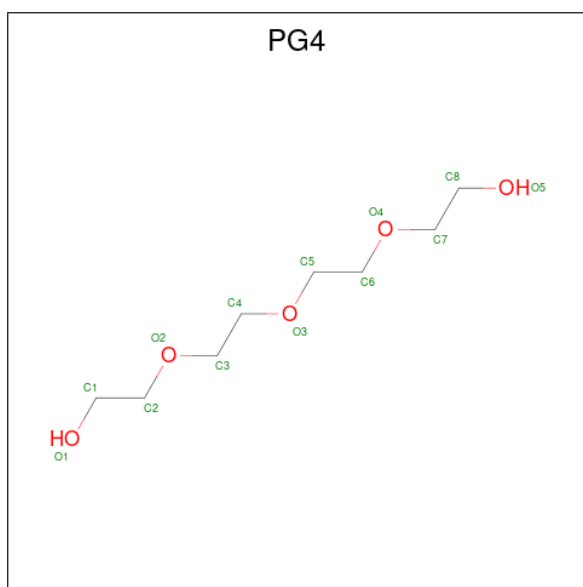
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 8 is 2-[3-(2-HYDROXY-1,1-DIHYDROXYMETHYL-ETHYLAMINO)-PROPYLAMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: B3P) (formula: $C_{11}H_{26}N_2O_6$).



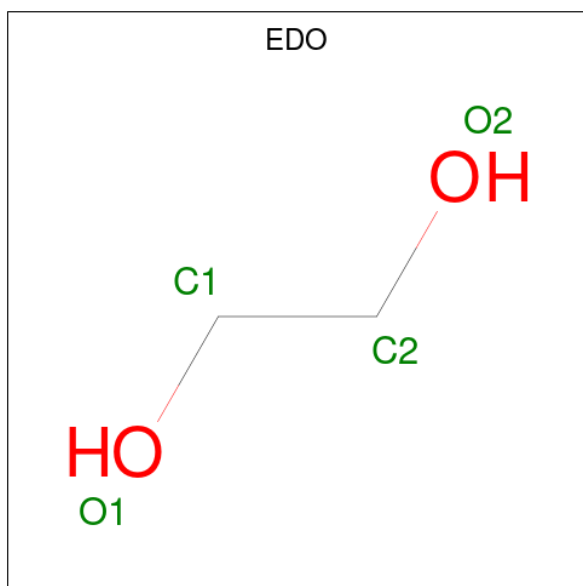
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	N	O	0	0
			19	11	2	6		
8	B	1	Total	C	N	O	0	0
			19	11	2	6		

- Molecule 9 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	B	1	Total	C	O	0	0
			13	8	5		

- Molecule 10 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	B	1	Total	C	O	0	0
			4	2	2		

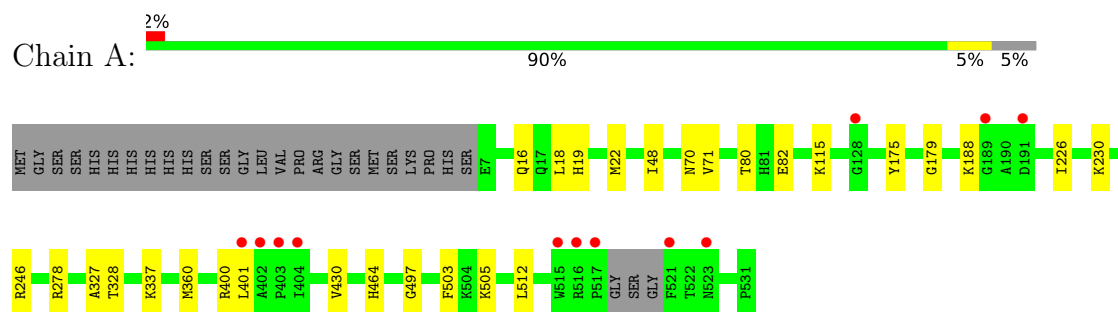
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	494	Total 494	O 494	0	0
11	B	523	Total 523	O 523	0	0

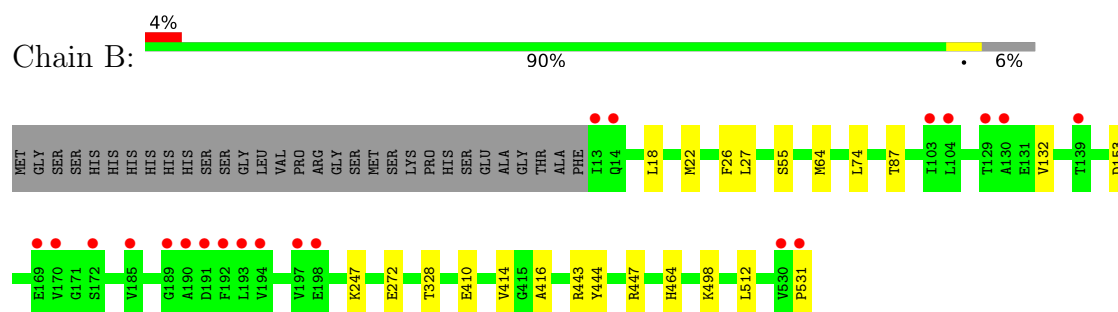
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Pyruvate kinase PKM



• Molecule 1: Pyruvate kinase PKM



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	110.11Å 94.23Å 109.13Å 90.00° 95.63° 90.00°	Depositor
Resolution (Å)	36.81 – 1.70 36.81 – 1.70	Depositor EDS
% Data completeness (in resolution range)	99.6 (36.81-1.70) 99.5 (36.81-1.70)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.76 (at 1.70Å)	Xtriage
Refinement program	PHENIX (1.15.2_3472: ???)	Depositor
R, R_{free}	0.154 , 0.174 0.153 , 0.173	Depositor DCC
R_{free} test set	6223 reflections (2.57%)	wwPDB-VP
Wilson B-factor (Å ²)	13.2	Xtriage
Anisotropy	0.519	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 48.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9203	wwPDB-VP
Average B, all atoms (Å ²)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.41% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: B3P, K, MG, PG4, SCN, PEG, EDO, OXL

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	0.31	1/4168 (0.0%)	0.51	0/5630
1	B	0.30	0/4134	0.52	0/5590
All	All	0.31	1/8302 (0.0%)	0.52	0/11220

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	278	ARG	C-O	-5.86	1.17	1.24

There are no bond angle outliers.

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	4059	0	4134	21	0
1	B	4020	0	4099	16	0
2	A	7	0	4	1	0
2	B	7	0	4	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	6	0	0	0	0
4	B	6	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	1	0	0	0	0
5	B	1	0	0	0	0
6	A	6	0	0	0	0
6	B	9	0	0	0	0
7	A	7	0	10	2	0
8	A	19	0	26	2	0
8	B	19	0	26	0	0
9	B	13	0	18	2	0
10	B	4	0	6	3	0
11	A	494	0	0	7	0
11	B	523	0	0	6	0
All	All	9203	0	8327	41	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 2.

All (41) 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:B:247:LYS:NZ	11:B:701:HOH:O	2.15	0.79
1:A:246:ARG:NH1	11:A:701:HOH:O	2.21	0.74
1:B:447[B]:ARG:NH1	11:B:703:HOH:O	2.27	0.67
1:A:16:GLN:NE2	11:A:705:HOH:O	2.32	0.61
1:A:505:LYS:HD3	7:A:607:PEG:H32	1.83	0.61
1:A:505:LYS:HG2	7:A:607:PEG:H41	1.85	0.58
9:B:608:PG4:H51	11:B:948:HOH:O	2.03	0.58
1:A:430[B]:VAL:HG12	1:A:512:LEU:HD12	1.86	0.58
1:B:74[A]:LEU:HD11	1:B:87:THR:HG21	1.86	0.57
1:A:19:HIS:HA	1:A:22[B]:MET:HE2	1.85	0.57
1:B:26:PHE:CZ	10:B:609:EDO:H12	2.42	0.55
1:A:464:HIS:HD1	2:A:601:SER:N	2.05	0.54
1:B:464:HIS:HD1	2:B:601:SER:N	2.05	0.54
1:A:226:ILE:O	1:A:230[B]:LYS:HG2	2.07	0.54
1:A:400:ARG:NH2	11:A:709:HOH:O	2.41	0.53
1:A:80:THR:OG1	1:A:82[A]:GLU:OE2	2.26	0.52
1:A:401:LEU:HD12	1:B:27:LEU:HD23	1.91	0.52
1:A:175:TYR:HB3	1:A:179:GLY:HA2	1.92	0.52
1:B:26:PHE:HZ	10:B:609:EDO:H12	1.76	0.50
1:A:18:LEU:O	1:A:22[B]:MET:HG3	2.11	0.50
1:A:337[B]:LYS:NZ	11:A:712:HOH:O	2.45	0.48
1:B:443:ARG:HD3	11:B:708:HOH:O	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:B:608:PG4:H71	11:B:1135:HOH:O	2.13	0.47
1:B:416:ALA:HB2	1:B:512:LEU:HD21	1.97	0.46
8:A:608:B3P:H22	8:A:608:B3P:H92	1.48	0.46
8:A:608:B3P:H32	8:A:608:B3P:H62	1.49	0.46
1:B:498:LYS:NZ	1:B:531:PRO:O	2.25	0.46
1:B:18:LEU:O	1:B:22[B]:MET:HG3	2.17	0.44
1:A:115:LYS:NZ	11:A:710:HOH:O	2.43	0.44
1:B:410[B]:GLU:OE1	11:B:702:HOH:O	2.20	0.44
1:A:18:LEU:HD23	1:A:18:LEU:HA	1.84	0.43
1:B:132:VAL:HG11	1:B:153:ASP:HA	2.00	0.43
1:A:327:ALA:HB1	1:A:360:MET:HE2	2.01	0.43
1:A:70:ASN:HB3	1:A:464:HIS:CG	2.55	0.42
1:A:497:GLY:HA3	1:A:503:PHE:CZ	2.54	0.42
11:A:993:HOH:O	10:B:609:EDO:H11	2.20	0.41
1:B:55:SER:HB2	1:B:64[B]:MET:SD	2.60	0.41
1:B:74[A]:LEU:HD11	1:B:87:THR:CG2	2.51	0.41
1:A:246:ARG:NH2	11:A:727:HOH:O	2.54	0.40
1:A:48:ILE:HG12	1:A:71:VAL:HB	2.03	0.40
1:B:414[B]:VAL:HG12	1:B:444:TYR:CE2	2.56	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	536/550 (98%)	527 (98%)	8 (2%)	1 (0%)	43	28
1	B	534/550 (97%)	526 (98%)	7 (1%)	1 (0%)	43	28
All	All	1070/1100 (97%)	1053 (98%)	15 (1%)	2 (0%)	43	28

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	328	THR
1	B	328	THR

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	427/452 (94%)	426 (100%)	1 (0%)	87	84
1	B	426/452 (94%)	425 (100%)	1 (0%)	87	84
All	All	853/904 (94%)	851 (100%)	2 (0%)	87	84

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	188	LYS
1	B	272	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	ASN
1	A	210	ASN
1	A	393	GLN
1	A	458	GLN
1	B	16	GLN
1	B	210	ASN
1	B	393	GLN
1	B	458	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 4 are monoatomic - leaving 14 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	SER	A	601	-	4,6,6	1.18	1 (25%)	2,7,7	1.79	1 (50%)
6	SCN	B	605	-	1,2,2	0.20	0	0,1,1	-	-
10	EDO	B	609	-	3,3,3	0.36	0	2,2,2	0.97	0
6	SCN	A	606	-	1,2,2	0.35	0	0,1,1	-	-
4	OXL	A	603	3	5,5,5	1.41	0	6,6,6	2.52	3 (50%)
4	OXL	B	603	3	5,5,5	1.49	0	6,6,6	2.54	3 (50%)
6	SCN	A	605	-	1,2,2	0.58	0	0,1,1	-	-
6	SCN	B	607	-	1,2,2	0.41	0	0,1,1	-	-
7	PEG	A	607	-	6,6,6	0.50	0	5,5,5	0.70	0
8	B3P	A	608	-	18,18,18	0.68	0	23,23,23	1.29	3 (13%)
9	PG4	B	608	-	12,12,12	0.52	0	11,11,11	0.62	0
6	SCN	B	606	-	1,2,2	0.34	0	0,1,1	-	-
2	SER	B	601	-	4,6,6	1.05	0	2,7,7	1.38	0
8	B3P	B	610	-	18,18,18	0.63	0	23,23,23	1.27	2 (8%)

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	SER	A	601	-	-	0/6/6/6	-
10	EDO	B	609	-	-	0/1/1/1	-
4	OXL	A	603	3	-	4/4/4/4	-
4	OXL	B	603	3	-	4/4/4/4	-
8	B3P	A	608	-	-	13/28/28/28	-
7	PEG	A	607	-	-	4/4/4/4	-
9	PG4	B	608	-	-	5/10/10/10	-
2	SER	B	601	-	-	0/6/6/6	-
8	B3P	B	610	-	-	4/28/28/28	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	SER	OXT-C	-2.07	1.24	1.30

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	603	OXL	O3-C1-C2	4.32	121.21	112.83
4	B	603	OXL	O4-C2-C1	4.19	120.97	112.83
8	B	610	B3P	C2-N2-C8	-3.68	110.79	116.17
8	A	608	B3P	C2-N2-C8	-3.57	110.94	116.17
4	A	603	OXL	O4-C2-C1	3.55	119.72	112.83
4	B	603	OXL	O3-C1-C2	3.52	119.65	112.83
8	B	610	B3P	C3-N1-C4	-2.73	112.17	116.17
8	A	608	B3P	C3-N1-C4	-2.61	112.34	116.17
2	A	601	SER	OXT-C-O	-2.52	118.37	124.08
4	B	603	OXL	O2-C2-C1	-2.52	115.39	120.63
8	A	608	B3P	O4-C5-C4	-2.31	106.99	111.68
4	A	603	OXL	O1-C1-C2	-2.15	116.15	120.63

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	608	B3P	C5-C4-N1-C3
8	A	608	B3P	C6-C4-N1-C3
8	A	608	B3P	C7-C4-N1-C3
8	A	608	B3P	C9-C8-N2-C2
8	A	608	B3P	C11-C8-N2-C2
8	A	608	B3P	O3-C11-C8-N2

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Mol	Chain	Res	Type	Atoms
8	A	608	B3P	O3-C11-C8-C9
8	A	608	B3P	O3-C11-C8-C10
8	A	608	B3P	C2-C1-C3-N1
7	A	607	PEG	O1-C1-C2-O2
9	B	608	PG4	O3-C5-C6-O4
7	A	607	PEG	O2-C3-C4-O4
9	B	608	PG4	O4-C7-C8-O5
8	A	608	B3P	N2-C8-C9-O1
8	A	608	B3P	C10-C8-N2-C2
8	B	610	B3P	C10-C8-N2-C2
8	A	608	B3P	C1-C2-N2-C8
9	B	608	PG4	O2-C3-C4-O3
4	A	603	OXL	O3-C1-C2-O4
4	B	603	OXL	O3-C1-C2-O4
9	B	608	PG4	C6-C5-O3-C4
7	A	607	PEG	C1-C2-O2-C3
9	B	608	PG4	C5-C6-O4-C7
4	A	603	OXL	O1-C1-C2-O2
4	B	603	OXL	O1-C1-C2-O2
8	B	610	B3P	C9-C8-N2-C2
8	A	608	B3P	C11-C8-C9-O1
8	B	610	B3P	C5-C4-C7-O6
4	A	603	OXL	O1-C1-C2-O4
7	A	607	PEG	C4-C3-O2-C2
4	B	603	OXL	O3-C1-C2-O2
4	B	603	OXL	O1-C1-C2-O4
4	A	603	OXL	O3-C1-C2-O2
8	B	610	B3P	C6-C4-N1-C3

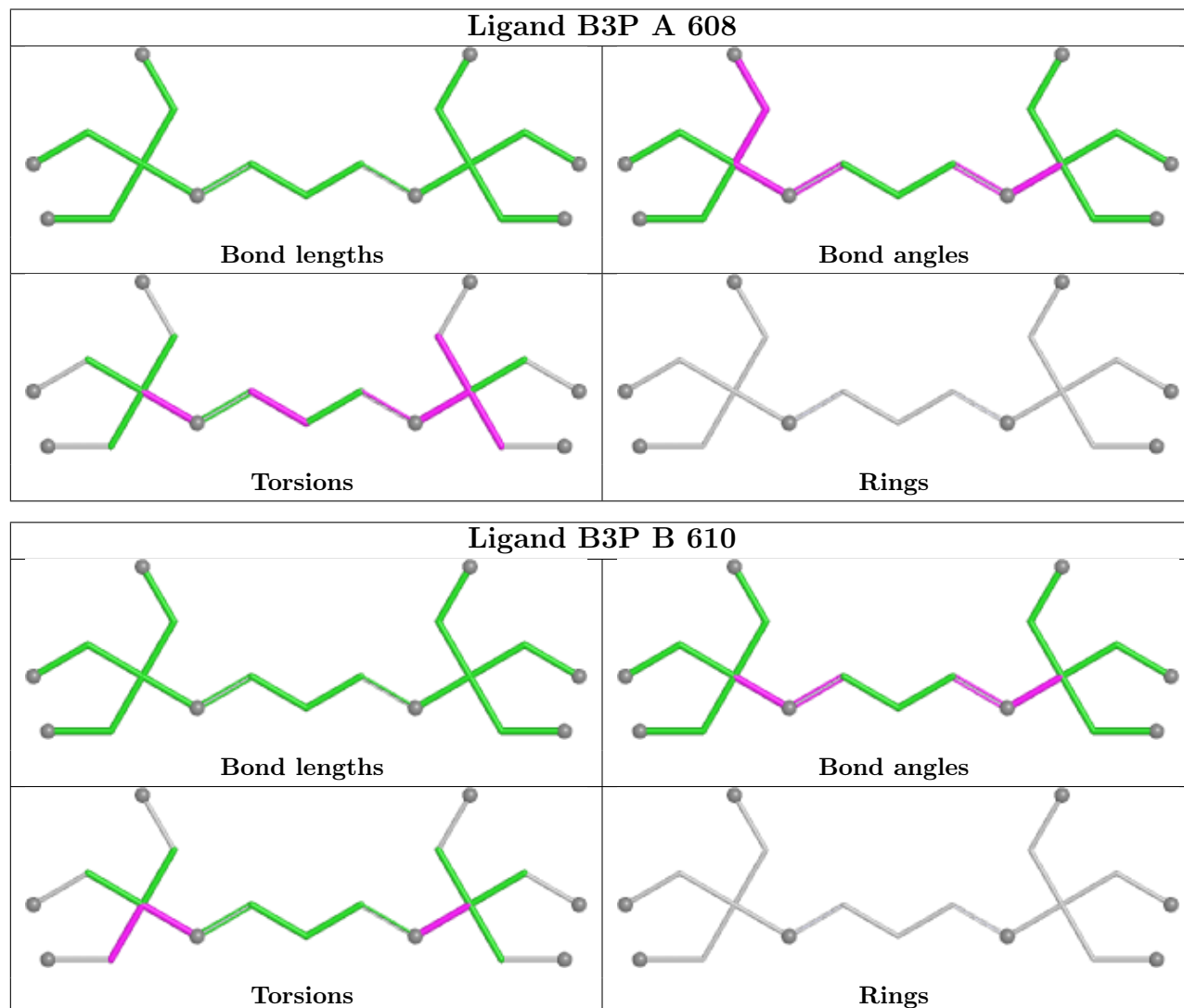
There are no ring outliers.

6 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	SER	1	0
10	B	609	EDO	3	0
7	A	607	PEG	2	0
8	A	608	B3P	2	0
9	B	608	PG4	2	0
2	B	601	SER	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 ⓘ

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	516/550 (93%)	-0.28	12 (2%) 61 65	6, 13, 33, 56	21 (4%)
1	B	519/550 (94%)	-0.21	21 (4%) 42 46	5, 13, 34, 58	18 (3%)
All	All	1035/1100 (94%)	-0.24	33 (3%) 50 54	5, 13, 33, 58	39 (3%)

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	404	ILE	4.6
1	B	130	ALA	4.3
1	B	129	THR	4.3
1	B	185	VAL	4.1
1	B	13	ILE	3.8
1	A	403	PRO	3.8
1	A	521	PHE	3.5
1	A	401	LEU	3.3
1	A	515	TRP	3.3
1	B	190	ALA	3.3
1	A	517	PRO	3.2
1	B	194	VAL	3.2
1	B	104	LEU	3.1
1	A	191	ASP	3.0
1	B	191	ASP	2.9
1	B	197	VAL	2.9
1	A	402	ALA	2.9
1	B	139	THR	2.8
1	B	14	GLN	2.7
1	B	531	PRO	2.6
1	A	189	GLY	2.5
1	A	516	ARG	2.5
1	B	170	VAL	2.5
1	B	530	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	103	ILE	2.3
1	B	198	GLU	2.3
1	B	193	LEU	2.2
1	A	128	GLY	2.2
1	B	192	PHE	2.2
1	B	189	GLY	2.2
1	B	169	GLU	2.1
1	A	523	ASN	2.1
1	B	172	SER	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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
9	PG4	B	608	13/13	0.76	0.16	23,30,38,41	0
8	B3P	A	608	19/19	0.78	0.17	17,26,39,41	19
7	PEG	A	607	7/7	0.78	0.16	23,25,32,40	0
6	SCN	A	605	3/3	0.82	0.29	39,39,42,46	0
8	B3P	B	610	19/19	0.90	0.09	17,26,32,33	0
10	EDO	B	609	4/4	0.94	0.14	9,18,19,31	0
6	SCN	B	607	3/3	0.96	0.10	10,10,16,24	0
6	SCN	A	606	3/3	0.96	0.13	19,19,24,30	0
6	SCN	B	605	3/3	0.96	0.15	18,18,26,27	0
4	OXL	A	603	6/6	0.97	0.04	9,10,12,15	0
2	SER	B	601	7/7	0.97	0.05	9,10,12,13	0
4	OXL	B	603	6/6	0.98	0.03	9,10,11,12	0
2	SER	A	601	7/7	0.98	0.04	8,8,9,11	0
6	SCN	B	606	3/3	0.98	0.08	26,26,28,29	0

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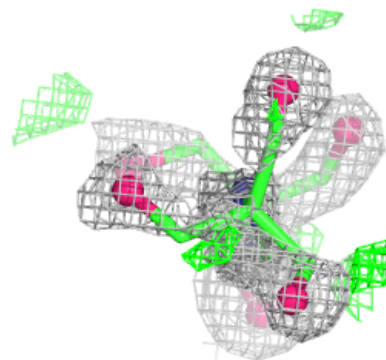
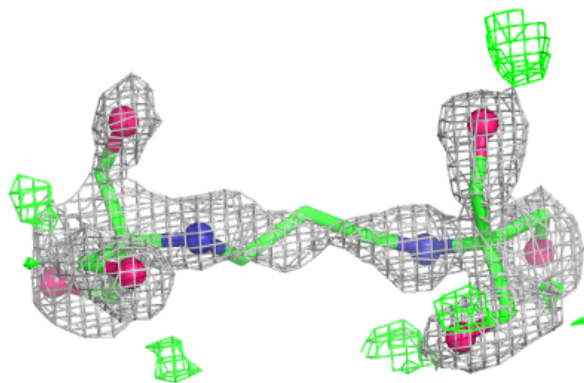
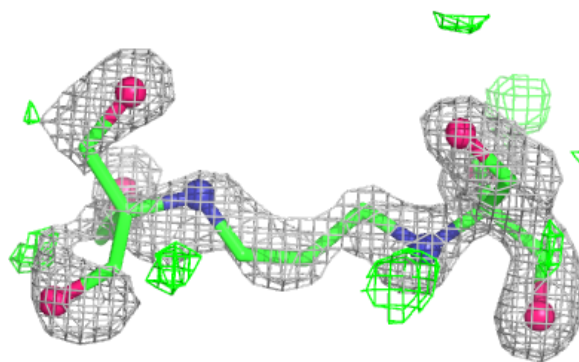
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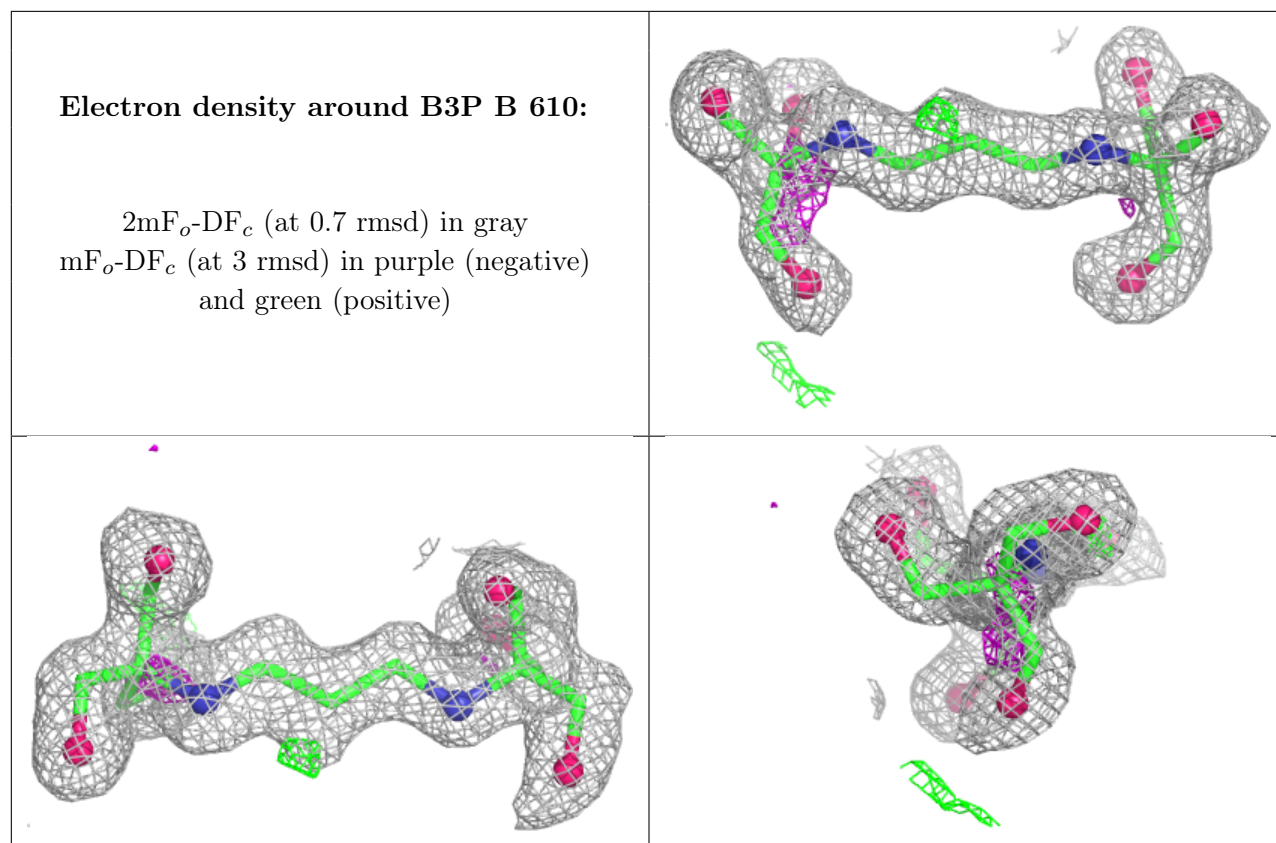
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	K	A	604	1/1	0.99	0.02	10,10,10,10	0
5	K	B	604	1/1	0.99	0.03	11,11,11,11	0
3	MG	A	602	1/1	0.99	0.04	10,10,10,10	0
3	MG	B	602	1/1	1.00	0.03	10,10,10,10	0

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 B3P A 608:

$2mF_o-DF_c$ (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.