



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 11:29 AM UTC

PDB ID : 6MCP / pdb_00006mcp
Title : L. pneumophila effector kinase LegK7 (AMP-PNP bound) in complex with human MOB1A
Authors : Beyrakhova, K.A.; Xu, C.; Boniecki, M.T.; Cygler, M.
Deposited on : 2018-09-01
Resolution : 2.50 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

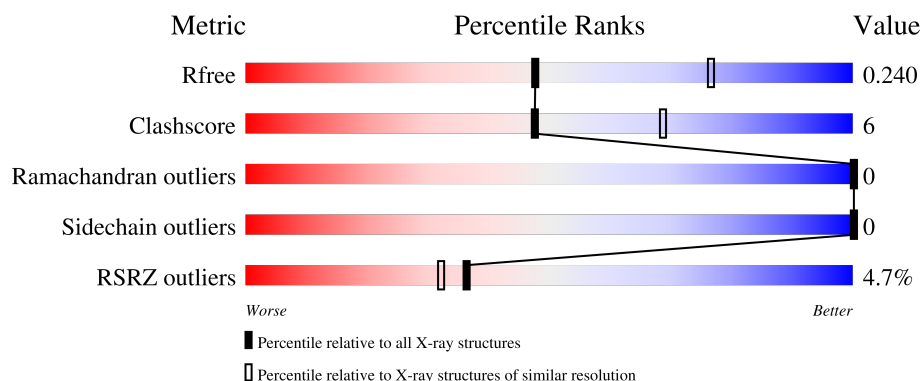
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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	523	5% 85% 14% .
1	C	523	6% 83% 14% .
2	B	187	3% 88% 10% .
2	D	187	2% 86% 11% .

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 11356 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 LegK7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	520	Total	C	N	O	S	0	1	0
			4142	2672	691	764	15			
1	C	507	Total	C	N	O	S	0	1	0
			3953	2556	662	721	14			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	8	SER	-	expression tag	UNP Q5ZU83
A	9	ASN	-	expression tag	UNP Q5ZU83
A	10	ALA	-	expression tag	UNP Q5ZU83
C	8	SER	-	expression tag	UNP Q5ZU83
C	9	ASN	-	expression tag	UNP Q5ZU83
C	10	ALA	-	expression tag	UNP Q5ZU83

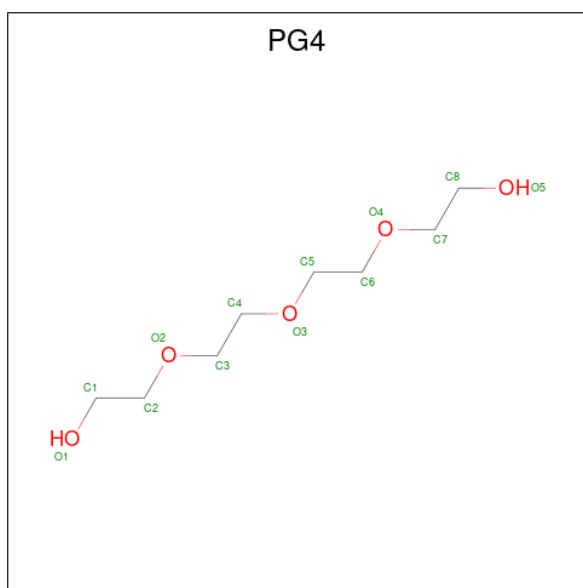
- Molecule 2 is a protein called MOB kinase activator 1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	183	Total	C	N	O	S	0	2	0
			1473	953	240	271	9			
2	D	181	Total	C	N	O	S	0	0	0
			1404	908	223	264	9			

There are 6 discrepancies between the modelled and reference sequences:

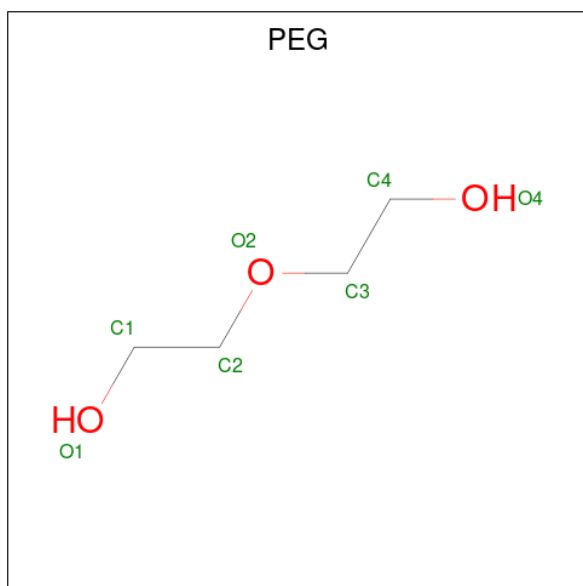
Chain	Residue	Modelled	Actual	Comment	Reference
B	30	SER	-	expression tag	UNP Q9H8S9
B	31	ASN	-	expression tag	UNP Q9H8S9
B	32	ALA	-	expression tag	UNP Q9H8S9
D	30	SER	-	expression tag	UNP Q9H8S9
D	31	ASN	-	expression tag	UNP Q9H8S9
D	32	ALA	-	expression tag	UNP Q9H8S9

- Molecule 3 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



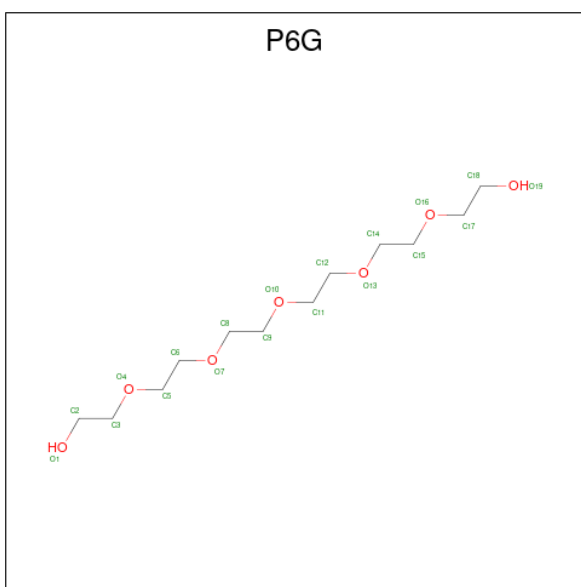
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	A	1	Total	C	O	0	0
			13	8	5		
3	D	1	Total	C	O	0	0
			13	8	5		

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



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

- Molecule 5 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula: $C_{12}H_{26}O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 19	C 12	O 7	0	0
5	A	1	Total 19	C 12	O 7	0	0
5	B	1	Total 19	C 12	O 7	0	0
5	C	1	Total 19	C 12	O 7	0	0

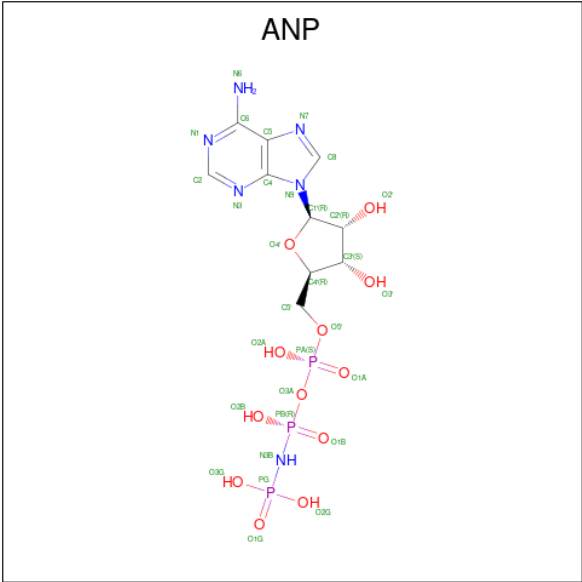
- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total Zn 1 1	0	0
6	D	1	Total Zn 1 1	0	0

- Molecule 7 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	C	1	Total Mn 1 1	0	0

- Molecule 8 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: $\text{C}_{10}\text{H}_{17}\text{N}_6\text{O}_{12}\text{P}_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
8	C	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

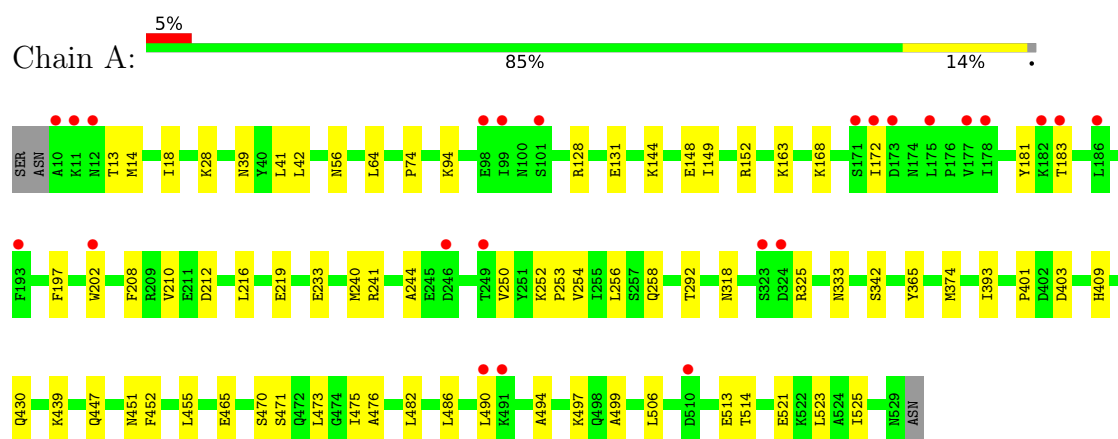
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	68	Total	O	0	0
			68	68		
9	B	23	Total	O	0	0
			23	23		
9	C	14	Total	O	0	0
			14	14		
9	D	4	Total	O	0	0
			4	4		

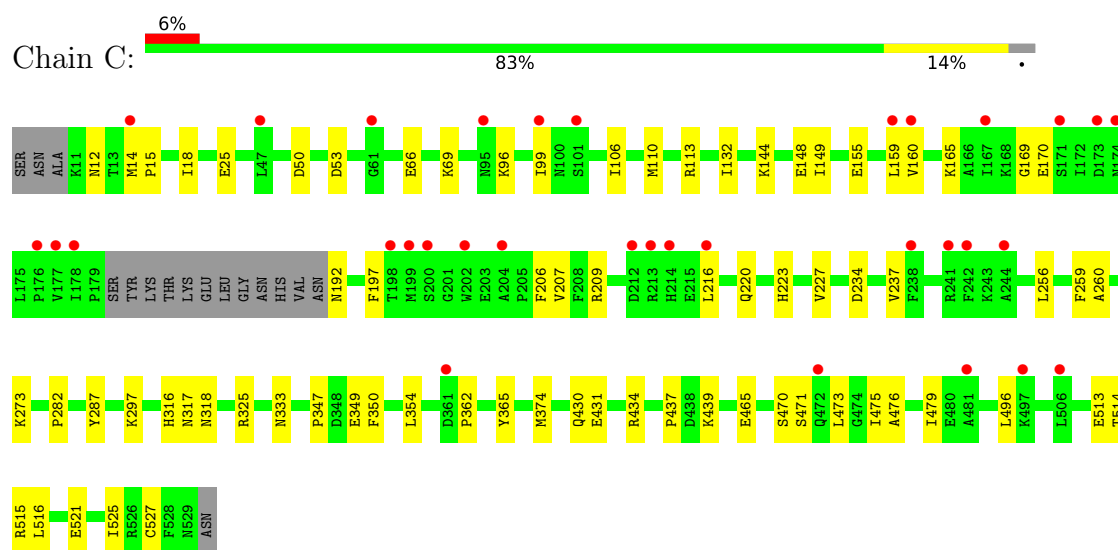
3 Residue-property plots [i](#)

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.

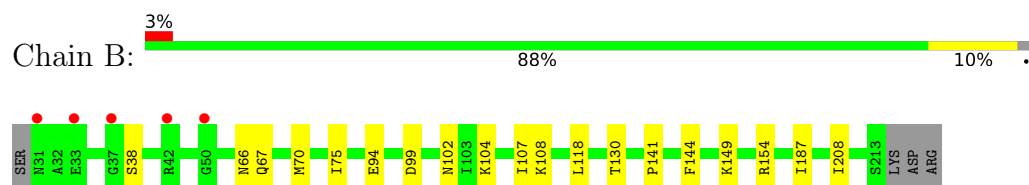
• Molecule 1: LegK7



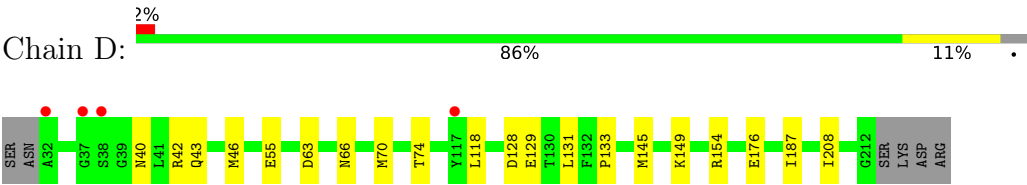
• Molecule 1: LegK7



• Molecule 2: MOB kinase activator 1A



● Molecule 2: MOB kinase activator 1A



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	106.86Å 112.43Å 155.22Å 90.00° 105.58° 90.00°	Depositor
Resolution (Å)	48.67 – 2.50 48.67 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.67-2.50) 99.8 (48.67-2.50)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.95 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.194 , 0.233 (Not available) , 0.240	Depositor DCC
R_{free} test set	3053 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	57.1	Xtrriage
Anisotropy	0.338	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 73.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11356	wwPDB-VP
Average B, all atoms (Å ²)	74.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 44.54 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.5048e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: MN, ZN, PG4, PEG, ANP, P6G

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	0.18	0/4238	0.36	0/5751
1	C	0.18	0/4046	0.38	0/5498
2	B	0.17	0/1516	0.32	0/2061
2	D	0.14	0/1443	0.32	0/1972
All	All	0.17	0/11243	0.36	0/15282

There are no bond length outliers.

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	4142	0	4033	49	0
1	C	3953	0	3774	50	0
2	B	1473	0	1399	12	0
2	D	1404	0	1279	13	0
3	A	26	0	36	2	0
3	D	13	0	18	1	0
4	A	49	0	70	3	0
4	B	14	0	20	0	0
4	C	49	0	70	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	14	0	20	1	0
5	A	38	0	52	5	0
5	B	19	0	26	1	0
5	C	19	0	26	2	0
6	B	1	0	0	0	0
6	D	1	0	0	0	0
7	C	1	0	0	0	0
8	C	31	0	13	2	0
9	A	68	0	0	2	0
9	B	23	0	0	1	0
9	C	14	0	0	0	0
9	D	4	0	0	0	0
All	All	11356	0	10836	124	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 6.

All (124) 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:C:155:GLU:O	1:C:159:LEU:HD12	1.75	0.85
1:A:28:LYS:HZ1	4:A:603:PEG:H22	1.55	0.71
1:C:209:ARG:NH2	1:C:234:ASP:OD1	2.24	0.71
1:A:430:GLN:NE2	9:A:701:HOH:O	2.24	0.70
1:A:403:ASP:OD2	1:A:409:HIS:ND1	2.25	0.69
2:B:67[A]:GLN:NE2	9:B:401:HOH:O	2.27	0.68
1:A:168:LYS:HA	1:A:240:MET:HE1	1.75	0.68
1:C:192:ASN:N	8:C:610:ANP:O2B	2.29	0.66
2:B:94:GLU:OE2	2:B:108:LYS:HD2	1.95	0.65
1:A:486:LEU:HG	1:A:523:LEU:HD12	1.79	0.64
1:C:69:LYS:HB3	4:C:607:PEG:H12	1.79	0.62
1:A:499:ALA:HB1	1:A:523:LEU:HD21	1.80	0.62
2:B:141:PRO:HD2	2:B:144:PHE:HB2	1.82	0.62
1:C:431:GLU:OE2	1:C:434:ARG:NH2	2.30	0.62
1:C:350:PHE:HA	1:C:374:MET:HE1	1.81	0.61
1:C:317:ASN:HB3	2:D:74:THR:HA	1.83	0.60
1:C:144:LYS:O	1:C:148:GLU:HG3	2.02	0.59
1:A:233:GLU:HB2	5:A:607:P6G:H91	1.86	0.58
2:D:145:MET:O	2:D:149:LYS:HG3	2.03	0.58
1:C:470:SER:HA	1:C:473:LEU:HD12	1.85	0.58
2:D:129:GLU:OE1	2:D:133:PRO:HA	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:439:LYS:HB3	1:C:473:LEU:HD23	1.85	0.57
1:C:496:LEU:HB2	1:C:527:CYS:HB3	1.87	0.56
1:A:172:ILE:H	1:A:172:ILE:HD12	1.71	0.56
1:A:181:TYR:HD2	1:A:183:THR:HG22	1.70	0.56
1:C:160:VAL:HG11	1:C:256:LEU:HD22	1.88	0.55
1:C:66:GLU:OE1	1:C:69:LYS:NZ	2.38	0.55
1:A:183:THR:OG1	1:C:170:GLU:OE1	2.26	0.54
2:B:187:ILE:HG12	2:B:208:ILE:HG12	1.90	0.54
1:A:144:LYS:O	1:A:148:GLU:HG3	2.09	0.53
1:A:208:PHE:CE1	1:A:256:LEU:HB2	2.44	0.53
1:C:165:LYS:O	1:C:169:GLY:N	2.39	0.53
1:A:365:TYR:HB2	4:A:609:PEG:H42	1.91	0.52
1:A:149:ILE:HD13	5:A:607:P6G:H61	1.92	0.52
1:A:430:GLN:HB3	1:A:514:THR:HG21	1.91	0.52
1:C:220:GLN:O	1:C:223[B]:HIS:ND1	2.41	0.52
1:A:219:GLU:OE2	1:A:325:ARG:NE	2.42	0.52
1:A:163:LYS:HG2	5:A:606:P6G:H171	1.92	0.52
2:B:99:ASP:OD2	2:B:102:ASN:ND2	2.35	0.51
1:C:521:GLU:O	1:C:525:ILE:HG12	2.11	0.51
1:C:25:GLU:N	1:C:25:GLU:OE1	2.44	0.51
2:D:40:ASN:ND2	2:D:43:GLN:H	2.08	0.51
1:C:149:ILE:HD13	5:C:602:P6G:H151	1.93	0.51
1:A:333:ASN:HA	1:A:374:MET:O	2.11	0.50
1:A:13:THR:HG22	1:A:41:LEU:HD23	1.92	0.50
1:C:430:GLN:HB3	1:C:514:THR:HG21	1.92	0.50
1:A:482:LEU:HD11	1:A:506:LEU:HD21	1.94	0.49
1:A:465:GLU:OE2	1:A:470:SER:HB3	2.13	0.49
1:C:197:PHE:CE2	1:C:206:PHE:HB2	2.47	0.49
1:A:152:ARG:HG3	1:A:202:TRP:HH2	1.78	0.49
1:A:197:PHE:HB3	5:A:606:P6G:H61	1.95	0.49
1:C:223[A]:HIS:HE1	1:C:325:ARG:HH12	1.59	0.49
1:C:106:ILE:HG12	1:C:110:MET:HE2	1.95	0.48
2:B:118:LEU:HD11	2:B:154:ARG:HB3	1.95	0.48
2:D:149:LYS:HZ3	3:D:302:PG4:H72	1.78	0.48
1:C:431:GLU:CD	1:C:515:ARG:HH21	2.21	0.48
2:D:118:LEU:HD11	2:D:154:ARG:HB3	1.97	0.47
2:B:104:LYS:HD2	2:B:107:ILE:HD11	1.96	0.47
2:B:130:THR:O	2:B:141:PRO:HG3	2.14	0.47
1:A:64:LEU:HD22	1:A:74:PRO:HG2	1.96	0.47
1:A:439:LYS:HB3	1:A:473:LEU:HD23	1.97	0.47
1:C:282:PRO:HB3	2:D:63:ASP:HA	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:210:VAL:HG22	1:A:254:VAL:HG22	1.97	0.47
1:C:362:PRO:HB2	4:C:608:PEG:H21	1.96	0.47
1:C:96:LYS:NZ	1:C:99:ILE:HD13	2.30	0.47
2:D:66:ASN:O	2:D:70:MET:HG2	2.15	0.47
2:B:149:LYS:HZ2	5:B:303:P6G:H81	1.79	0.47
1:A:244:ALA:HB2	1:A:250:VAL:HG13	1.95	0.46
1:C:479:ILE:HD13	1:C:516:LEU:HD23	1.98	0.46
1:A:342:SER:HB3	4:A:605:PEG:H32	1.96	0.46
1:C:216:LEU:HD11	1:C:237:VAL:HG21	1.97	0.46
1:C:287:TYR:OH	1:C:318:ASN:ND2	2.47	0.46
1:A:292:THR:HG21	1:A:447:GLN:HB2	1.96	0.46
2:D:187:ILE:HG12	2:D:208:ILE:HG12	1.98	0.46
1:A:56:ASN:HA	1:A:64:LEU:HD11	1.98	0.45
1:A:318:ASN:ND2	3:A:601:PG4:H51	2.32	0.45
1:A:181:TYR:CD2	1:A:183:THR:HG22	2.50	0.45
1:A:471:SER:HA	1:A:476:ALA:HB2	1.98	0.45
5:C:602:P6G:H151	5:C:602:P6G:H121	1.78	0.45
1:A:216:LEU:HD11	1:A:253:PRO:HB3	1.99	0.45
1:C:365:TYR:HB2	4:C:609:PEG:H31	1.99	0.44
1:C:14:MET:N	1:C:15:PRO:HD2	2.33	0.44
1:C:350:PHE:HD1	1:C:374:MET:HE3	1.82	0.44
5:A:606:P6G:H111	5:A:606:P6G:H81	1.61	0.44
3:A:611:PG4:H81	3:A:611:PG4:H62	1.88	0.43
1:C:273:LYS:HB2	1:C:273:LYS:HE3	1.61	0.43
1:A:152:ARG:HG3	1:A:202:TRP:CH2	2.54	0.43
1:A:497:LYS:O	1:A:497:LYS:HG2	2.17	0.43
8:C:610:ANP:N3B	8:C:610:ANP:O1A	2.45	0.43
1:C:223[A]:HIS:CE1	1:C:325:ARG:HH12	2.34	0.43
1:A:490:LEU:HD22	1:A:494:ALA:HB3	2.00	0.43
1:C:465:GLU:OE1	1:C:470:SER:OG	2.32	0.43
1:C:471:SER:HA	1:C:476:ALA:HB2	2.00	0.43
1:A:240:MET:SD	1:A:241:ARG:N	2.92	0.43
1:C:227:VAL:HG22	1:C:297:LYS:HB3	1.99	0.43
1:C:207:VAL:HG23	1:C:259:PHE:HB2	2.01	0.43
1:C:260:ALA:HA	1:C:316:HIS:HB2	2.01	0.42
1:C:333:ASN:HA	1:C:374:MET:O	2.19	0.42
1:C:350:PHE:CE2	1:C:354:LEU:HD11	2.54	0.42
2:D:42:ARG:O	2:D:46:MET:HG3	2.19	0.42
1:A:94:LYS:HD3	1:A:94:LYS:HA	1.77	0.42
1:C:14:MET:O	1:C:18:ILE:HG13	2.19	0.42
2:D:128:ASP:HB3	2:D:131:LEU:HD12	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:393:ILE:HG21	1:A:401:PRO:HD3	2.02	0.42
1:A:475:ILE:HG21	1:A:513:GLU:HG2	2.01	0.41
1:A:14:MET:O	1:A:18:ILE:HG13	2.21	0.41
1:A:521:GLU:O	1:A:525:ILE:HG13	2.20	0.41
2:B:75:ILE:H	2:B:75:ILE:HG13	1.80	0.41
1:C:349:GLU:OE1	1:C:437:PRO:HG3	2.20	0.41
2:D:176:GLU:H	2:D:176:GLU:CD	2.28	0.41
2:B:66:ASN:O	2:B:70:MET:HG2	2.21	0.41
1:C:113:ARG:HB2	1:C:132:ILE:HG21	2.02	0.41
1:C:475:ILE:HG21	1:C:513:GLU:HG2	2.01	0.41
1:C:12:ASN:O	1:C:12:ASN:ND2	2.47	0.41
1:A:39:ASN:HA	1:A:42:LEU:HD12	2.03	0.41
1:A:451:ASN:OD1	2:B:38:SER:HB2	2.21	0.41
1:A:452:PHE:HB3	1:A:455:LEU:HD12	2.03	0.41
1:C:50:ASP:O	1:C:53:ASP:OD2	2.39	0.41
1:A:128:ARG:HH11	1:A:131:GLU:CD	2.29	0.41
1:C:96:LYS:HZ1	1:C:99:ILE:HD13	1.86	0.41
1:C:347:PRO:HB2	1:C:349:GLU:CD	2.46	0.40
1:A:212:ASP:HA	1:A:252:LYS:NZ	2.37	0.40
1:A:258:GLN:HB2	9:A:711:HOH:O	2.20	0.40
2:D:55:GLU:OE2	4:D:304:PEG:H41	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	305/523 (58%)	297 (97%)	8 (3%)	0	100	100
1	C	382/523 (73%)	373 (98%)	9 (2%)	0	100	100
2	B	18/187 (10%)	18 (100%)	0	0	100	100
2	D	179/187 (96%)	176 (98%)	3 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	884/1420 (62%)	864 (98%)	20 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	432/476 (91%)	432 (100%)	0	100	100
1	C	400/476 (84%)	400 (100%)	0	100	100
2	B	156/167 (93%)	156 (100%)	0	100	100
2	D	143/167 (86%)	143 (100%)	0	100	100
All	All	1131/1286 (88%)	1131 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	65	ASN
1	A	271	GLN
1	A	318	ASN
1	A	390	GLN
1	A	396	GLN
1	A	430	GLN
2	B	165	GLN
1	C	100	ASN
1	C	111	GLN
1	C	318	ASN
1	C	447	GLN
1	C	483	ASN
2	D	40	ASN
2	D	54	ASN
2	D	165	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 29 ligands modelled in this entry, 3 are monoatomic - leaving 26 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	PG4	A	601	-	12,12,12	0.54	0	11,11,11	0.22	0
4	PEG	C	603	-	6,6,6	0.50	0	5,5,5	0.24	0
4	PEG	C	604	-	6,6,6	0.49	0	5,5,5	0.32	0
4	PEG	C	607	-	6,6,6	0.51	0	5,5,5	0.32	0
5	P6G	A	606	-	18,18,18	0.56	0	17,17,17	0.28	0
4	PEG	A	610	-	6,6,6	0.50	0	5,5,5	0.22	0
4	PEG	A	605	-	6,6,6	0.49	0	5,5,5	0.31	0
3	PG4	D	302	-	12,12,12	0.55	0	11,11,11	0.32	0
4	PEG	C	605	-	6,6,6	0.49	0	5,5,5	0.28	0
3	PG4	A	611	-	12,12,12	0.54	0	11,11,11	0.34	0
5	P6G	C	602	-	18,18,18	0.56	0	17,17,17	0.20	0
4	PEG	C	609	-	6,6,6	0.50	0	5,5,5	0.24	0
4	PEG	C	606	-	6,6,6	0.50	0	5,5,5	0.24	0
4	PEG	D	304	-	6,6,6	0.50	0	5,5,5	0.28	0
4	PEG	B	304	-	6,6,6	0.50	0	5,5,5	0.28	0
5	P6G	A	607	-	18,18,18	0.56	0	17,17,17	0.25	0
4	PEG	A	609	-	6,6,6	0.50	0	5,5,5	0.24	0
4	PEG	C	608	-	6,6,6	0.49	0	5,5,5	0.30	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	PEG	A	603	-	6,6,6	0.50	0	5,5,5	0.25	0
4	PEG	B	302	-	6,6,6	0.50	0	5,5,5	0.23	0
4	PEG	A	602	-	6,6,6	0.49	0	5,5,5	0.26	0
5	P6G	B	303	-	18,18,18	0.55	0	17,17,17	0.25	0
4	PEG	D	303	-	6,6,6	0.49	0	5,5,5	0.36	0
4	PEG	A	604	-	6,6,6	0.50	0	5,5,5	0.31	0
8	ANP	C	610	7	33,33,33	3.62	17 (51%)	45,52,52	2.05	14 (31%)
4	PEG	A	608	-	6,6,6	0.50	0	5,5,5	0.23	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	PG4	A	601	-	-	7/10/10/10	-
4	PEG	C	603	-	-	2/4/4/4	-
4	PEG	C	604	-	-	1/4/4/4	-
4	PEG	C	607	-	-	1/4/4/4	-
5	P6G	A	606	-	-	9/16/16/16	-
4	PEG	A	610	-	-	2/4/4/4	-
4	PEG	A	605	-	-	3/4/4/4	-
3	PG4	D	302	-	-	8/10/10/10	-
4	PEG	C	605	-	-	2/4/4/4	-
3	PG4	A	611	-	-	3/10/10/10	-
5	P6G	C	602	-	-	8/16/16/16	-
4	PEG	C	609	-	-	2/4/4/4	-
4	PEG	C	606	-	-	2/4/4/4	-
4	PEG	D	304	-	-	1/4/4/4	-
4	PEG	B	304	-	-	2/4/4/4	-
5	P6G	A	607	-	-	7/16/16/16	-
4	PEG	A	609	-	-	2/4/4/4	-
4	PEG	C	608	-	-	3/4/4/4	-
4	PEG	A	603	-	-	1/4/4/4	-
4	PEG	B	302	-	-	1/4/4/4	-
4	PEG	A	602	-	-	1/4/4/4	-
5	P6G	B	303	-	-	11/16/16/16	-
4	PEG	D	303	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PEG	A	604	-	-	2/4/4/4	-
8	ANP	C	610	7	-	4/18/38/38	0/3/3/3
4	PEG	A	608	-	-	1/4/4/4	-

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	610	ANP	PG-O1G	9.65	1.60	1.46
8	C	610	ANP	PG-N3B	-9.33	1.39	1.63
8	C	610	ANP	PB-O1B	8.40	1.58	1.46
8	C	610	ANP	C5-C4	-4.38	1.31	1.39
8	C	610	ANP	PA-O3A	-4.32	1.54	1.59
8	C	610	ANP	C5-N7	-4.30	1.31	1.39
8	C	610	ANP	C8-N9	-3.75	1.31	1.37
8	C	610	ANP	PG-O2G	-3.73	1.46	1.56
8	C	610	ANP	C5-C6	-3.49	1.31	1.41
8	C	610	ANP	C4-N9	-3.47	1.30	1.37
8	C	610	ANP	PB-O2B	-3.29	1.48	1.56
8	C	610	ANP	PB-N3B	-2.81	1.56	1.63
8	C	610	ANP	C3'-C4'	-2.75	1.46	1.53
8	C	610	ANP	PA-O1A	2.60	1.59	1.50
8	C	610	ANP	O4'-C4'	-2.41	1.39	1.45
8	C	610	ANP	PA-O2A	-2.08	1.45	1.55
8	C	610	ANP	PB-O3A	-2.01	1.56	1.59

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	610	ANP	N3-C2-N1	-6.30	119.04	128.58
8	C	610	ANP	C5-C4-N3	-4.62	120.35	126.72
8	C	610	ANP	N9-C8-N7	-3.93	108.36	113.94
8	C	610	ANP	O2B-PB-O3A	3.37	115.88	104.64
8	C	610	ANP	C2-N3-C4	3.21	119.68	111.83
8	C	610	ANP	C5-C6-N6	-2.71	116.59	123.29
8	C	610	ANP	O1B-PB-N3B	-2.69	107.81	111.77
8	C	610	ANP	C6-C5-C4	2.63	120.77	117.18
8	C	610	ANP	C5-N7-C8	2.61	107.55	103.45
8	C	610	ANP	C5-C4-N9	2.50	108.54	105.81
8	C	610	ANP	C5'-C4'-C3'	-2.45	106.39	115.21
8	C	610	ANP	C4-C5-N7	-2.36	107.89	110.58
8	C	610	ANP	N3-C4-N9	2.32	131.11	127.17
8	C	610	ANP	O2G-PG-O1G	-2.08	108.25	113.45

There are no chirality outliers.

All (88) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	C	610	ANP	PB-N3B-PG-O1G
8	C	610	ANP	PA-O3A-PB-O2B
8	C	610	ANP	O4'-C4'-C5'-O5'
3	D	302	PG4	O2-C3-C4-O3
5	A	606	P6G	C5-C6-O7-C8
5	A	607	P6G	O13-C14-C15-O16
5	A	607	P6G	O10-C11-C12-O13
8	C	610	ANP	C3'-C4'-C5'-O5'
4	A	604	PEG	O1-C1-C2-O2
5	A	606	P6G	O13-C14-C15-O16
5	A	607	P6G	O7-C8-C9-O10
4	C	604	PEG	O2-C3-C4-O4
4	C	606	PEG	O1-C1-C2-O2
5	A	606	P6G	C8-C9-O10-C11
5	C	602	P6G	O10-C11-C12-O13
5	B	303	P6G	O10-C11-C12-O13
4	A	605	PEG	O1-C1-C2-O2
5	A	606	P6G	O1-C2-C3-O4
5	A	607	P6G	O16-C17-C18-O19
4	A	602	PEG	O1-C1-C2-O2
4	B	304	PEG	O2-C3-C4-O4
4	C	608	PEG	O1-C1-C2-O2
4	C	609	PEG	O2-C3-C4-O4
3	A	601	PG4	O1-C1-C2-O2
5	A	607	P6G	O1-C2-C3-O4
5	C	602	P6G	O4-C5-C6-O7
3	D	302	PG4	O4-C7-C8-O5
3	A	601	PG4	C8-C7-O4-C6
4	A	609	PEG	O2-C3-C4-O4
4	A	610	PEG	O1-C1-C2-O2
4	C	607	PEG	O2-C3-C4-O4
3	D	302	PG4	C4-C3-O2-C2
4	C	603	PEG	O2-C3-C4-O4
3	D	302	PG4	O3-C5-C6-O4
5	A	606	P6G	O7-C8-C9-O10
5	C	602	P6G	O7-C8-C9-O10
4	D	303	PEG	C1-C2-O2-C3
5	B	303	P6G	C14-C15-O16-C17
3	D	302	PG4	C6-C5-O3-C4
4	A	609	PEG	C1-C2-O2-C3

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Mol	Chain	Res	Type	Atoms
3	A	601	PG4	C6-C5-O3-C4
3	A	611	PG4	C1-C2-O2-C3
4	C	608	PEG	O2-C3-C4-O4
5	B	303	P6G	O16-C17-C18-O19
5	A	607	P6G	C9-C8-O7-C6
5	A	606	P6G	O10-C11-C12-O13
4	B	302	PEG	C4-C3-O2-C2
4	C	603	PEG	C4-C3-O2-C2
3	A	611	PG4	C3-C4-O3-C5
4	C	606	PEG	C4-C3-O2-C2
4	A	608	PEG	C1-C2-O2-C3
5	C	602	P6G	C12-C11-O10-C9
5	A	606	P6G	C14-C15-O16-C17
5	A	607	P6G	C6-C5-O4-C3
4	C	608	PEG	C4-C3-O2-C2
5	B	303	P6G	C12-C11-O10-C9
3	A	601	PG4	O4-C7-C8-O5
5	C	602	P6G	C15-C14-O13-C12
3	D	302	PG4	C8-C7-O4-C6
4	A	605	PEG	C1-C2-O2-C3
4	A	605	PEG	O2-C3-C4-O4
5	A	606	P6G	C11-C12-O13-C14
5	B	303	P6G	C18-C17-O16-C15
4	C	605	PEG	C1-C2-O2-C3
3	D	302	PG4	O1-C1-C2-O2
4	D	303	PEG	O2-C3-C4-O4
5	B	303	P6G	C5-C6-O7-C8
5	A	606	P6G	O4-C5-C6-O7
5	C	602	P6G	O1-C2-C3-O4
5	C	602	P6G	C14-C15-O16-C17
3	D	302	PG4	C5-C6-O4-C7
5	B	303	P6G	C6-C5-O4-C3
4	C	609	PEG	C1-C2-O2-C3
4	A	603	PEG	C4-C3-O2-C2
3	A	601	PG4	C1-C2-O2-C3
4	C	605	PEG	O1-C1-C2-O2
3	A	601	PG4	C4-C3-O2-C2
4	D	304	PEG	O2-C3-C4-O4
5	B	303	P6G	C2-C3-O4-C5
5	B	303	P6G	O7-C8-C9-O10
3	A	611	PG4	C8-C7-O4-C6
4	A	604	PEG	C4-C3-O2-C2

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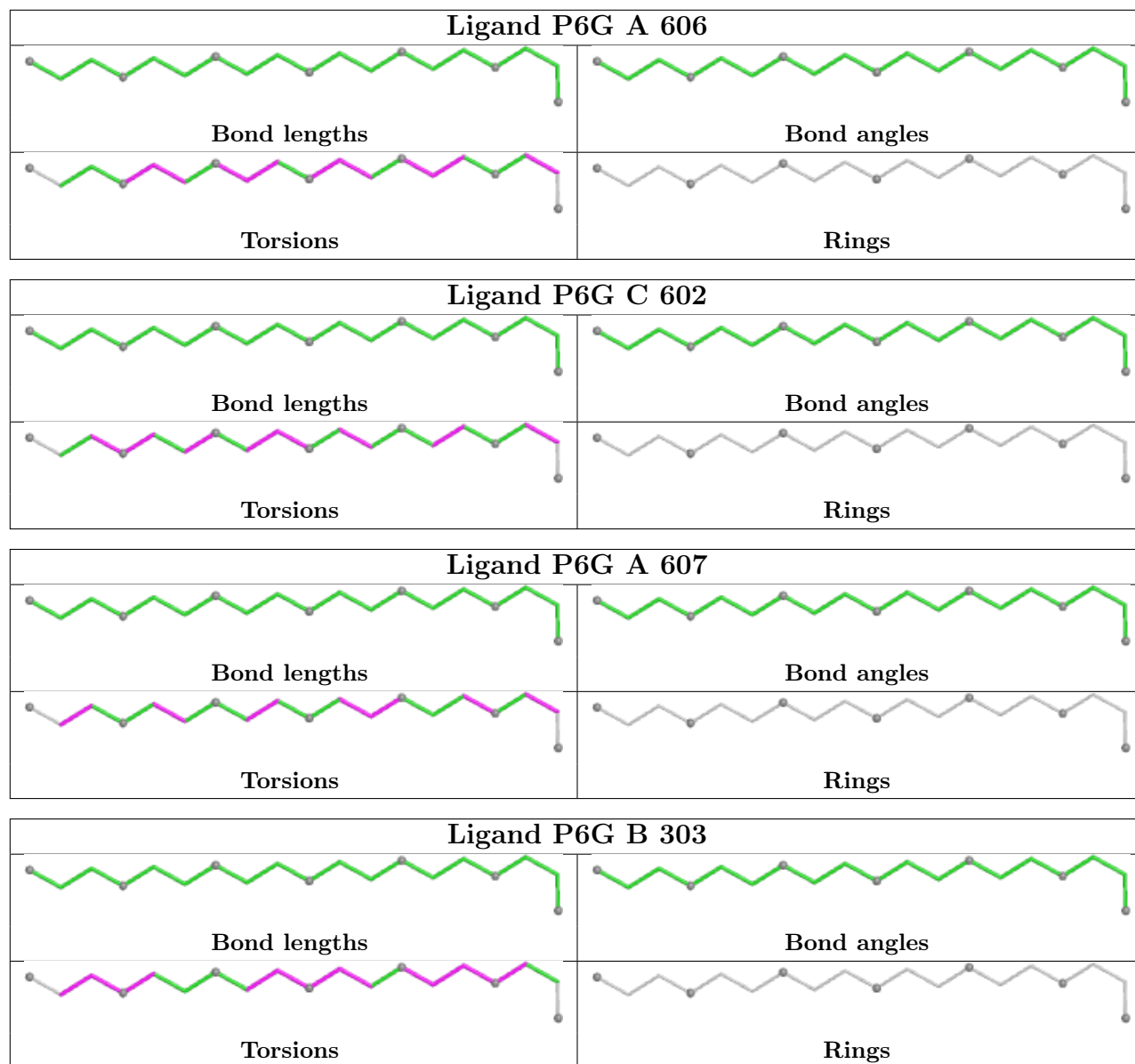
Mol	Chain	Res	Type	Atoms
4	A	610	PEG	C1-C2-O2-C3
5	C	602	P6G	C18-C17-O16-C15
3	A	601	PG4	O3-C5-C6-O4
4	B	304	PEG	C4-C3-O2-C2
5	B	303	P6G	O4-C5-C6-O7
5	B	303	P6G	C8-C9-O10-C11

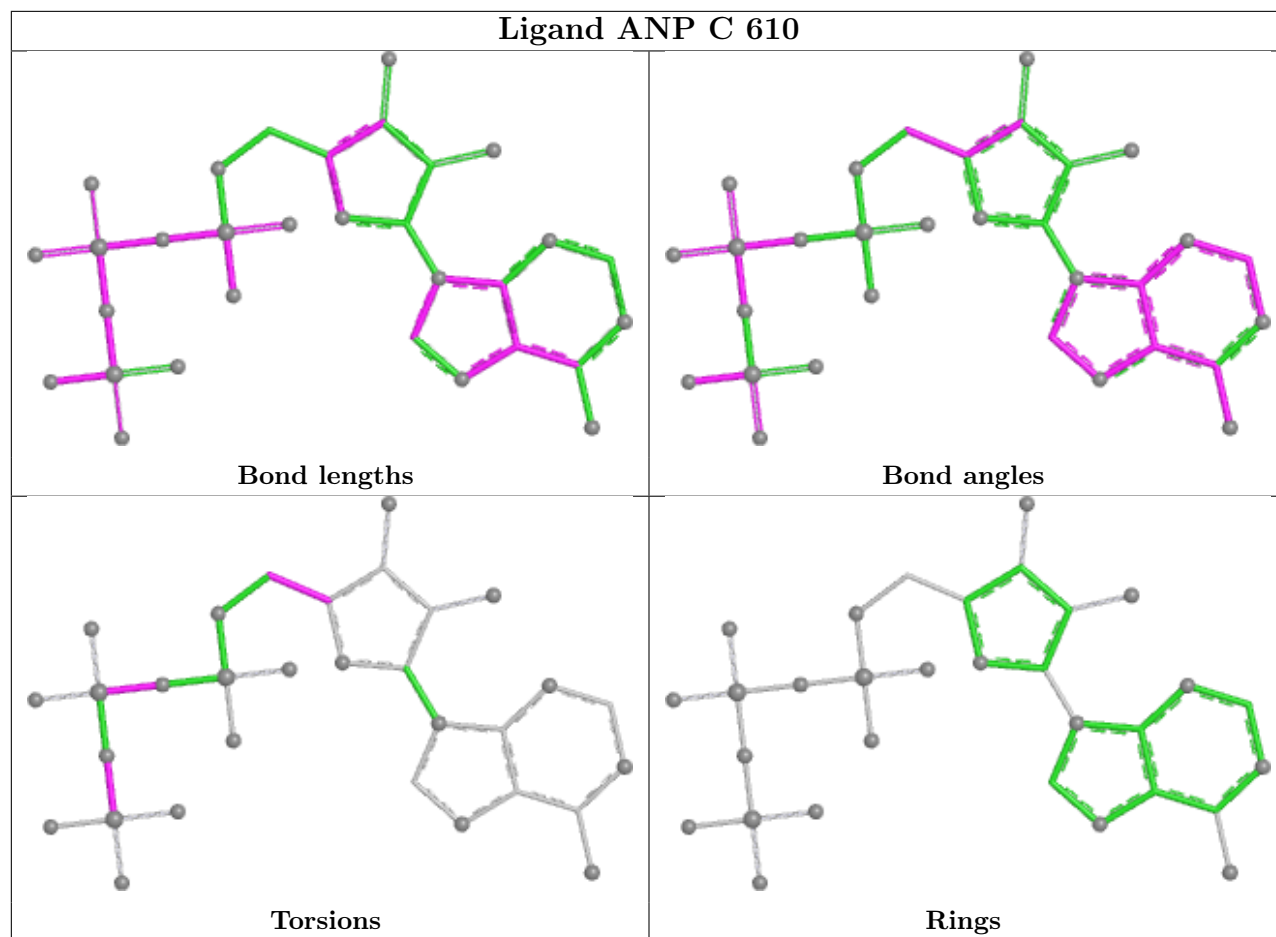
There are no ring outliers.

15 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	601	PG4	1	0
4	C	607	PEG	1	0
5	A	606	P6G	3	0
4	A	605	PEG	1	0
3	D	302	PG4	1	0
3	A	611	PG4	1	0
5	C	602	P6G	2	0
4	C	609	PEG	1	0
4	D	304	PEG	1	0
5	A	607	P6G	2	0
4	A	609	PEG	1	0
4	C	608	PEG	1	0
4	A	603	PEG	1	0
5	B	303	P6G	1	0
8	C	610	ANP	2	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	520/523 (99%)	0.14	24 (4%) 37 33	36, 58, 124, 167	1 (0%)
1	C	507/523 (96%)	0.51	33 (6%) 25 22	35, 82, 148, 189	1 (0%)
2	B	183/187 (97%)	-0.02	5 (2%) 56 51	27, 57, 88, 112	2 (1%)
2	D	181/187 (96%)	0.40	4 (2%) 62 58	54, 80, 117, 136	0
All	All	1391/1420 (97%)	0.29	66 (4%) 36 32	27, 70, 131, 189	4 (0%)

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	10	ALA	4.7
1	C	173	ASP	4.6
2	B	42[A]	ARG	4.3
1	A	99	ILE	4.2
1	C	101	SER	3.8
1	A	175	LEU	3.7
1	A	172	ILE	3.6
1	C	242	PHE	3.3
1	A	193	PHE	3.3
1	A	249	THR	3.2
2	D	38	SER	3.2
1	A	173	ASP	3.2
1	C	214	HIS	3.1
1	C	99	ILE	3.1
1	A	186	LEU	3.1
1	A	182	LYS	3.0
2	D	32	ALA	3.0
1	C	178	ILE	2.9
1	C	174	ASN	2.9
2	B	37	GLY	2.9
1	C	176	PRO	2.9

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Mol	Chain	Res	Type	RSRZ
1	C	212	ASP	2.9
1	C	244	ALA	2.8
1	A	491	LYS	2.8
1	C	198	THR	2.7
1	C	506	LEU	2.7
1	C	199	MET	2.7
1	C	213	ARG	2.7
1	C	481	ALA	2.7
1	A	246	ASP	2.6
1	C	61	GLY	2.6
1	C	238	PHE	2.6
1	C	202	TRP	2.6
1	C	216	LEU	2.6
1	A	11	LYS	2.6
1	C	167	ILE	2.5
2	D	37	GLY	2.5
1	C	47	LEU	2.5
1	A	101	SER	2.5
2	B	33	GLU	2.4
2	B	50	GLY	2.4
1	A	178	ILE	2.4
2	D	117	TYR	2.4
1	C	204	ALA	2.4
1	C	241	ARG	2.4
1	A	183	THR	2.3
1	A	171	SER	2.3
1	C	171	SER	2.3
1	C	361	ASP	2.3
1	A	324	ASP	2.3
1	C	160	VAL	2.3
1	A	202	TRP	2.2
1	C	472	GLN	2.2
1	C	200	SER	2.2
1	A	490	LEU	2.1
1	A	98	GLU	2.1
1	A	323	SER	2.1
1	C	177	VAL	2.1
1	C	95	ASN	2.1
2	B	31	ASN	2.1
1	C	159	LEU	2.1
1	A	177	VAL	2.1
1	C	497	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	510	ASP	2.1
1	C	14	MET	2.1
1	A	12	ASN	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
3	PG4	D	302	13/13	0.73	0.17	83,100,105,105	0
4	PEG	D	304	7/7	0.76	0.14	80,91,94,97	0
4	PEG	C	606	7/7	0.77	0.20	92,95,104,104	0
4	PEG	A	603	7/7	0.77	0.14	93,97,103,103	0
3	PG4	A	611	13/13	0.80	0.20	64,81,103,103	0
4	PEG	C	609	7/7	0.80	0.14	100,105,110,110	0
4	PEG	C	605	7/7	0.80	0.18	81,82,87,90	0
4	PEG	C	604	7/7	0.81	0.19	71,84,98,102	0
4	PEG	D	303	7/7	0.82	0.18	81,96,99,99	0
4	PEG	C	608	7/7	0.83	0.14	103,105,107,108	0
3	PG4	A	601	13/13	0.83	0.16	86,102,104,105	0
5	P6G	A	606	19/19	0.84	0.21	90,102,108,109	0
4	PEG	B	304	7/7	0.85	0.12	90,97,100,101	0
5	P6G	B	303	19/19	0.85	0.16	73,79,104,104	0
4	PEG	A	605	7/7	0.86	0.14	66,79,87,89	0
4	PEG	A	610	7/7	0.86	0.19	93,98,103,103	0
4	PEG	C	603	7/7	0.87	0.11	88,90,92,96	0
5	P6G	C	602	19/19	0.87	0.20	90,97,122,122	0
4	PEG	A	609	7/7	0.88	0.12	72,74,80,81	0
4	PEG	C	607	7/7	0.90	0.10	99,100,101,103	0

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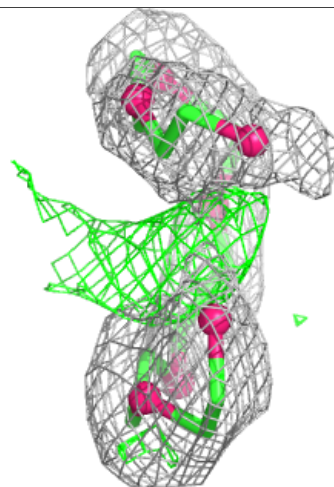
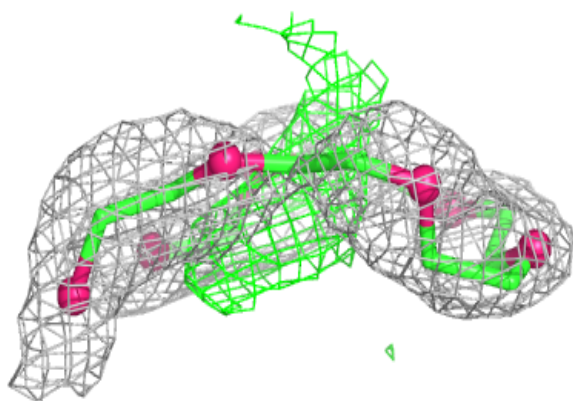
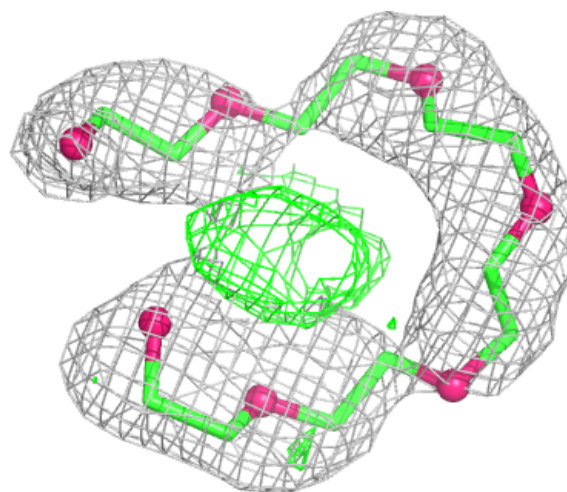
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	PEG	A	604	7/7	0.90	0.12	77,77,82,86	0
4	PEG	A	608	7/7	0.91	0.10	77,81,83,84	0
8	ANP	C	610	31/31	0.91	0.10	62,72,116,121	31
5	P6G	A	607	19/19	0.92	0.13	52,67,81,83	0
4	PEG	A	602	7/7	0.92	0.10	70,76,83,83	0
4	PEG	B	302	7/7	0.94	0.09	66,72,76,79	0
7	MN	C	601	1/1	0.97	0.11	95,95,95,95	0
6	ZN	D	301	1/1	0.99	0.05	71,71,71,71	0
6	ZN	B	301	1/1	1.00	0.03	51,51,51,51	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.

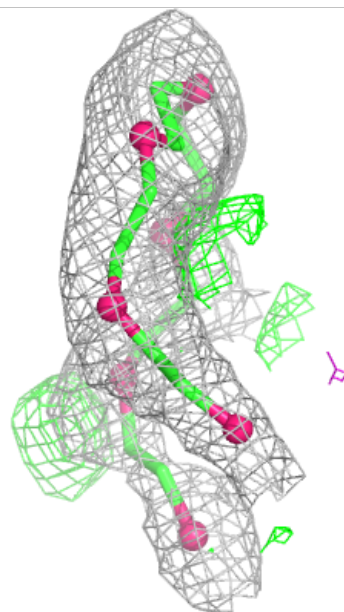
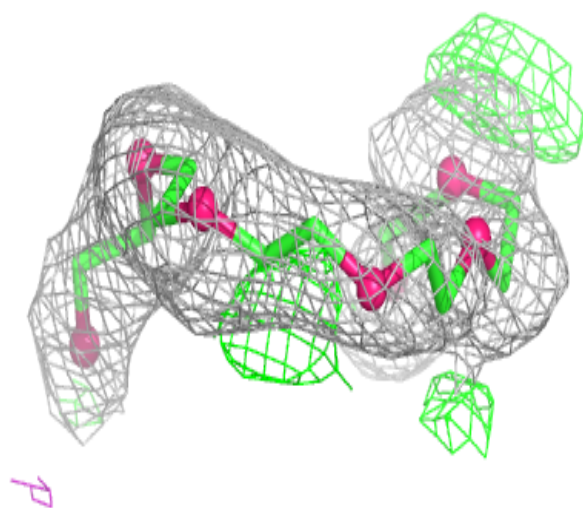
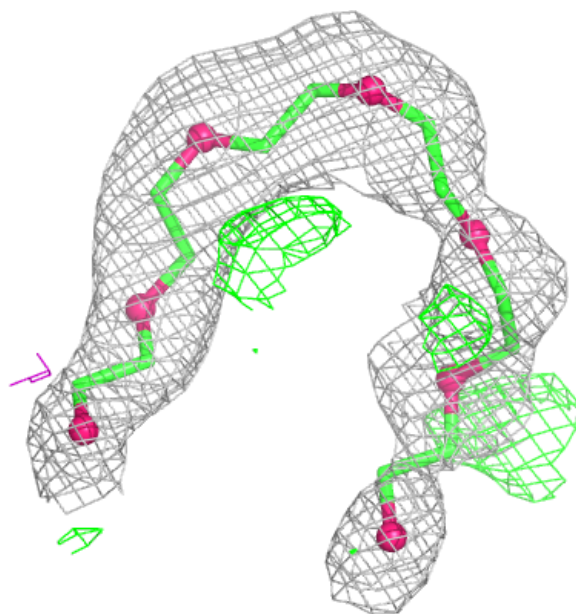
Electron density around P6G A 606:

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



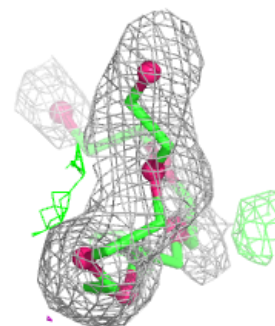
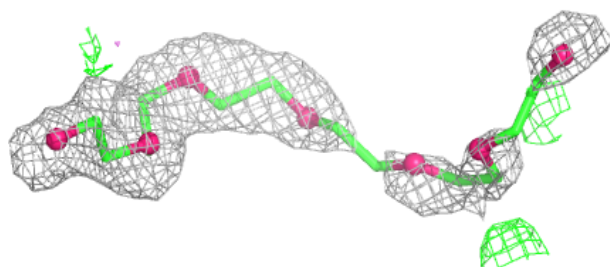
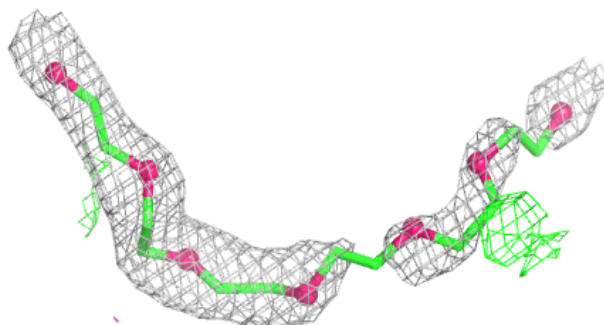
Electron density around P6G B 303:

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

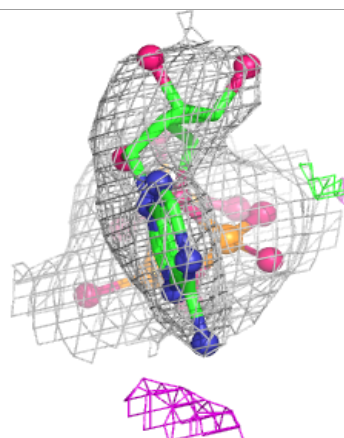
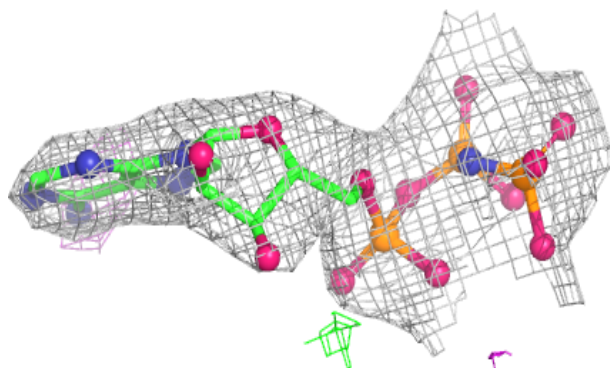
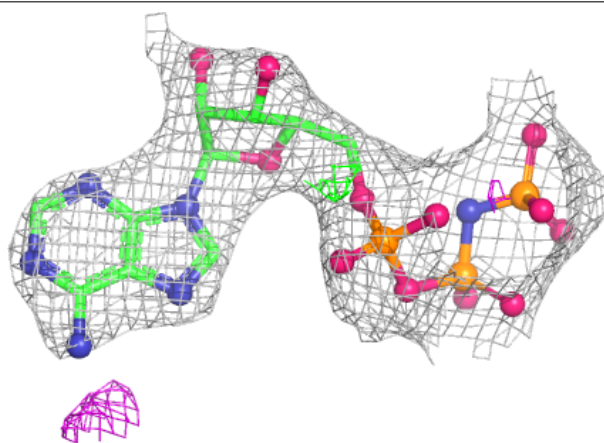


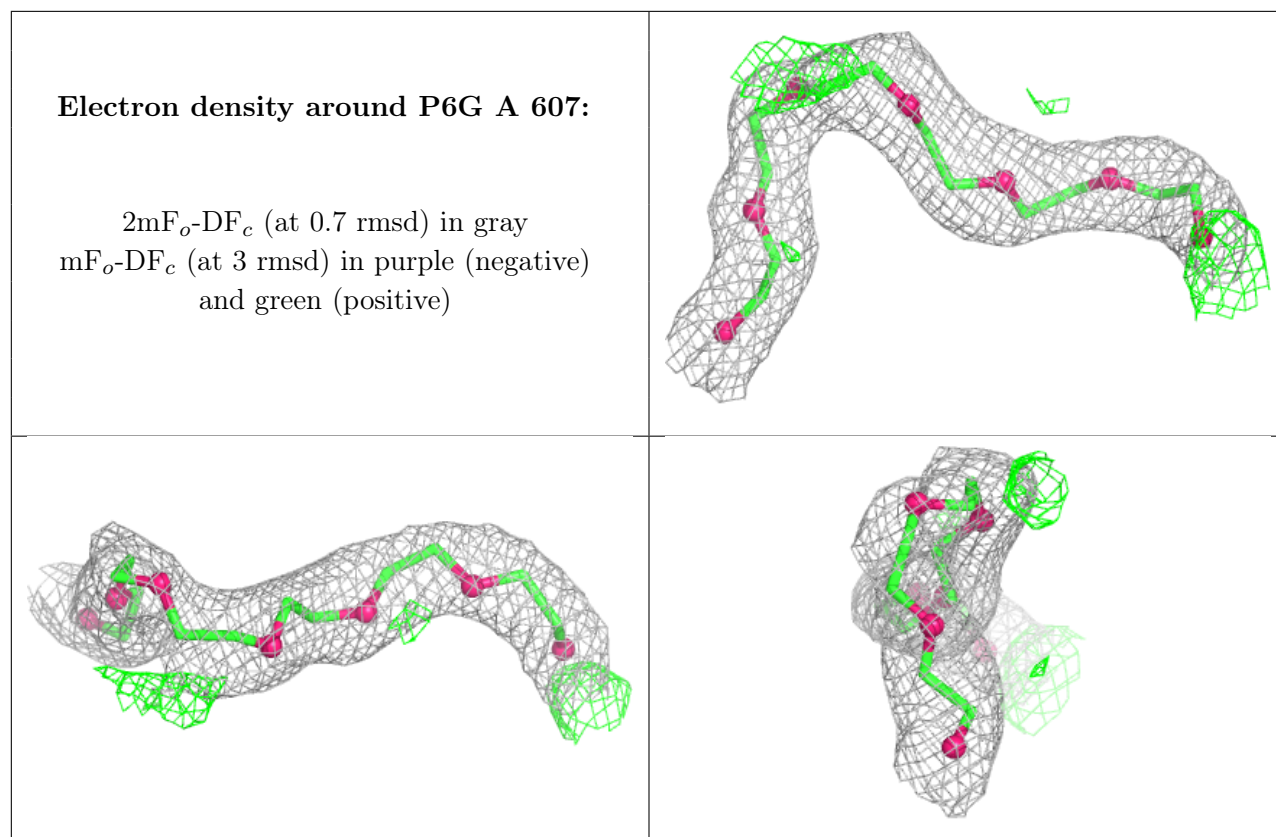
Electron density around P6G C 602:

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

**Electron density around ANP C 610:**

$2mF_o-DF_c$ (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.