



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:58 AM UTC

PDB ID : 6UUM / pdb_00006uum
Title : Crystal structure of antibody 438-B11 DSS mutant (Cys98A-Cys100aA)
Authors : Kumar, S.; Wilson, I.A.
Deposited on : 2019-10-30
Resolution : 2.10 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

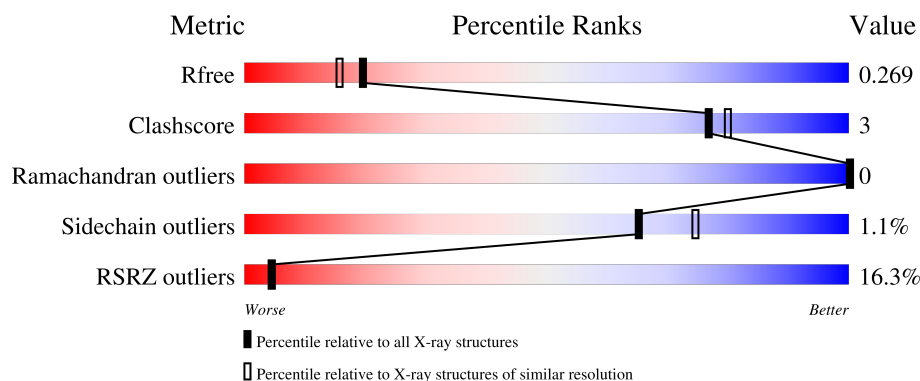
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	215	16% 93% 7%
1	F	215	19% 94% 6%
2	B	235	16% 88% 8% .
2	H	235	14% 90% 6% .

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
6	ACT	B	308	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7498 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.

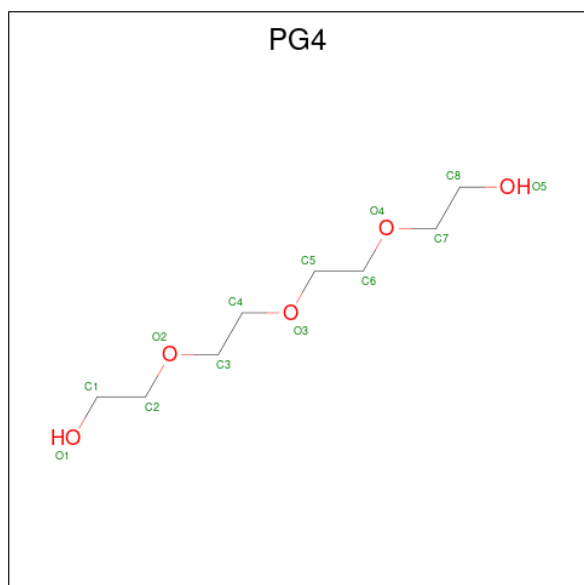
- Molecule 1 is a protein called B11 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	F	215	Total	C	N	O	S	0	0	0
			1649	1030	283	331	5			
1	A	215	Total	C	N	O	S	0	0	0
			1649	1030	283	331	5			

- Molecule 2 is a protein called B11 DSS Fab Heavy Chain.

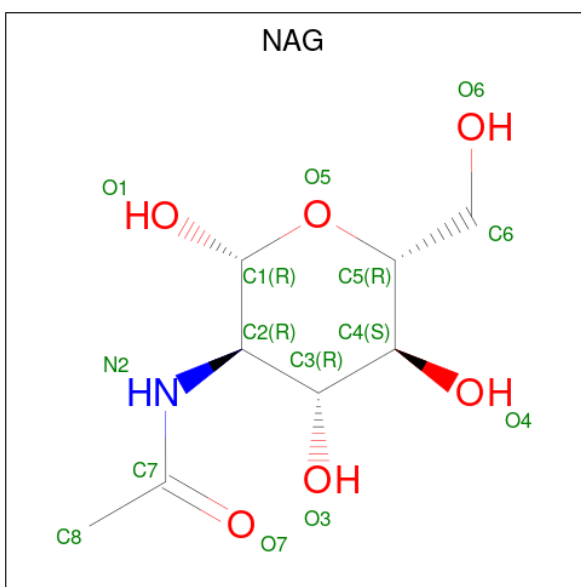
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	227	Total	C	N	O	S	0	0	0
			1717	1089	292	330	6			
2	B	227	Total	C	N	O	S	0	0	0
			1711	1086	292	327	6			

- Molecule 3 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅) (labeled as "Ligand of Interest" by depositor).



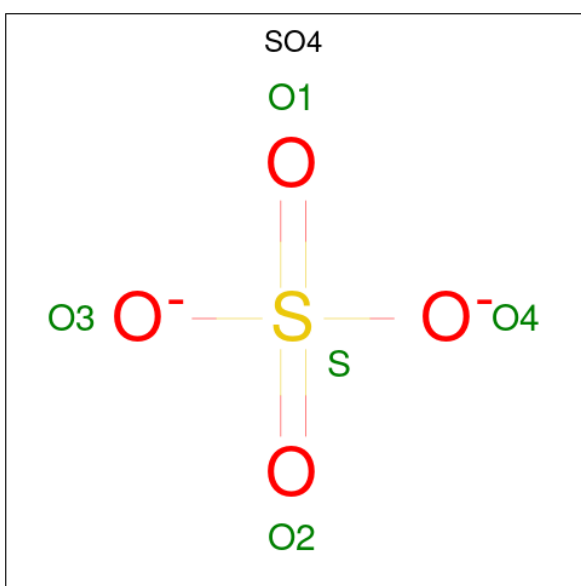
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	F	1	Total C O 13 8 5	0	0
3	F	1	Total C O 5 3 2	0	0
3	F	1	Total C O 13 8 5	0	0
3	H	1	Total C O 13 8 5	0	0
3	H	1	Total C O 13 8 5	0	0
3	H	1	Total C O 9 6 3	0	0
3	H	1	Total C O 13 8 5	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 13 8 5	0	0
3	A	1	Total C O 4 3 1	0	0
3	B	1	Total C O 13 8 5	0	0
3	B	1	Total C O 13 8 5	0	0
3	B	1	Total C O 10 7 3	0	0

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	F	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is SULFATE ION (CCD ID: SO₄) (formula: O₄S).



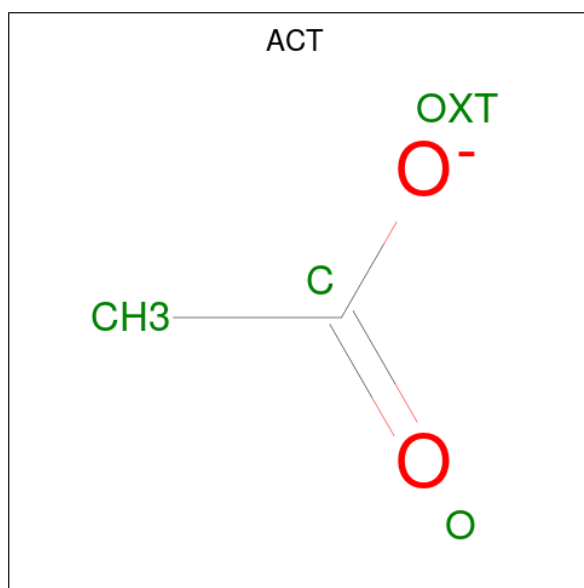
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	F	1	Total	O	S	0	0
			5	4	1		
5	F	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	F	1	Total	O	S	0	0
			5	4	1		
5	F	1	Total	O	S	0	0
			5	4	1		
5	F	1	Total	O	S	0	0
			5	4	1		
5	F	1	Total	O	S	0	0
			5	4	1		
5	F	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		
5	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 6 is ACETATE ION (CCD ID: ACT) (formula: C₂H₃O₂).



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

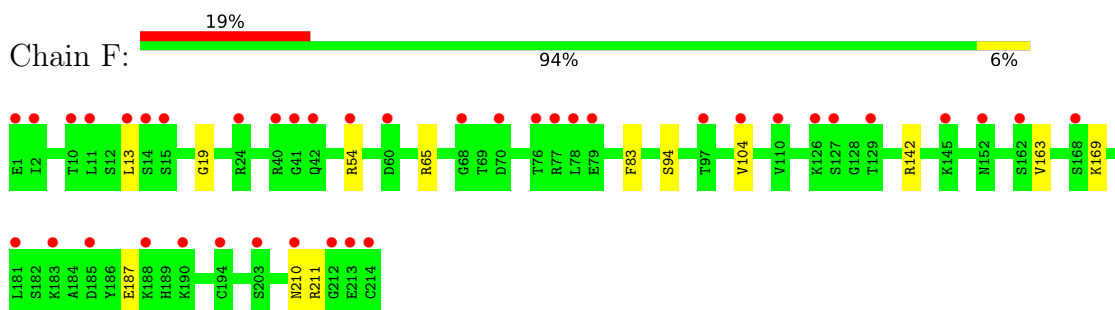
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	F	133	Total	O	0	0
			133	133		
7	H	150	Total	O	0	0
			150	150		
7	A	116	Total	O	0	0
			116	116		
7	B	131	Total	O	0	0
			131	131		

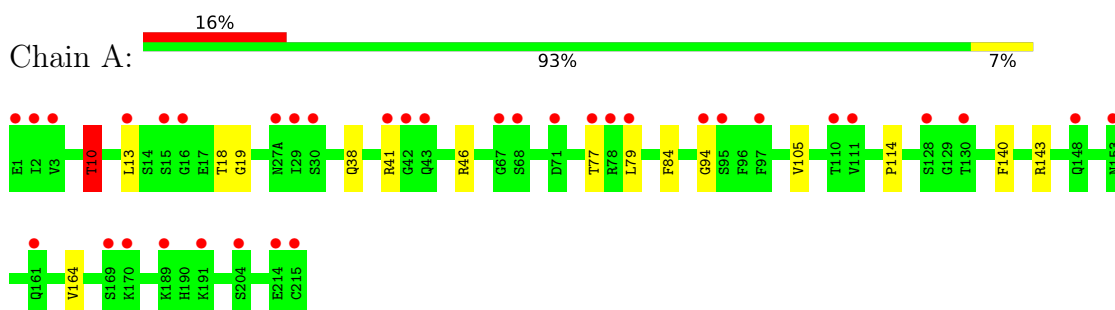
3 Residue-property plots [i](#)

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.

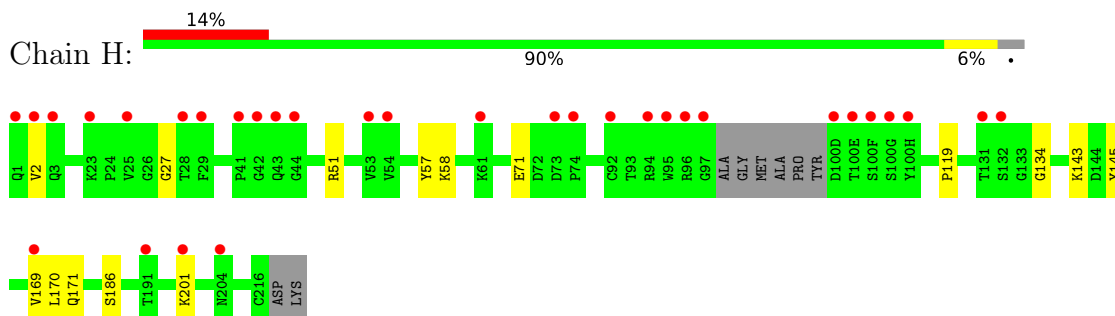
- Molecule 1: B11 Fab Light Chain



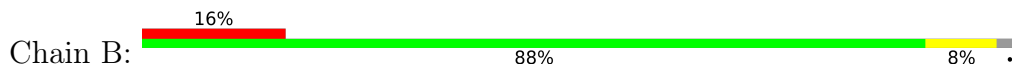
- Molecule 1: B11 Fab Light Chain

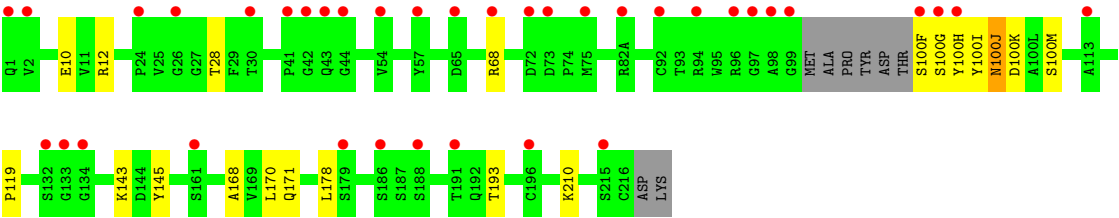


- Molecule 2: B11 DSS Fab Heavy Chain



- Molecule 2: B11 DSS Fab Heavy Chain





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	104.15Å 66.20Å 108.86Å 90.00° 117.96° 90.00°	Depositor
Resolution (Å)	48.08 – 2.10 48.08 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.6 (48.08-2.10) 99.8 (48.08-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.17	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.53 (at 2.10Å)	Xtriage
Refinement program	PHENIX 1.16_3549	Depositor
R, R_{free}	0.229 , 0.269 0.230 , 0.269	Depositor DCC
R_{free} test set	2008 reflections (2.60%)	wwPDB-VP
Wilson B-factor (Å ²)	28.5	Xtriage
Anisotropy	0.394	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.021 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	7498	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.96% 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: PG4, SO4, NAG, ACT

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	0.21	0/1684	0.40	1/2287 (0.0%)
1	F	0.14	0/1684	0.34	0/2287
2	B	0.18	0/1755	0.32	0/2390
2	H	0.13	0/1761	0.32	0/2399
All	All	0.17	0/6884	0.35	1/9363 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	10	THR	CB-CA-C	8.25	123.34	110.14

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	1649	0	1595	11	0
1	F	1649	0	1597	9	0
2	B	1711	0	1692	9	0
2	H	1717	0	1695	12	0
3	A	21	0	25	1	0
3	B	36	0	46	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	31	0	40	0	0
3	H	48	0	65	4	0
4	A	14	0	13	0	0
4	F	14	0	13	0	0
5	B	20	0	0	1	0
5	F	35	0	0	1	0
5	H	15	0	0	0	0
6	B	4	0	3	0	0
6	F	4	0	3	0	0
7	A	116	0	0	2	0
7	B	131	0	0	1	0
7	F	133	0	0	3	0
7	H	150	0	0	2	0
All	All	7498	0	6787	40	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 3.

All (40) 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:10:THR:CG2	7:A:606:HOH:O	2.32	0.78
1:A:10:THR:HG22	7:A:606:HOH:O	1.92	0.69
2:H:143:LYS:NZ	2:H:171:GLN:OE1	2.30	0.65
2:H:170:LEU:HB3	3:H:304:PG4:H11	1.82	0.62
2:B:68:ARG:NH2	7:B:402:HOH:O	2.34	0.60
1:F:54:ARG:NH2	7:F:406:HOH:O	2.36	0.59
2:H:169:VAL:HG23	3:H:304:PG4:H22	1.88	0.55
2:B:143:LYS:NZ	2:B:171:GLN:OE1	2.40	0.53
1:F:65:ARG:NH2	5:F:305:SO4:O4	2.40	0.53
2:H:119:PRO:HB3	2:H:145:TYR:HB3	1.90	0.52
2:H:2:VAL:HG12	2:H:27:GLY:HA3	1.92	0.51
2:H:169:VAL:HA	3:H:304:PG4:H32	1.92	0.51
1:F:210:ASN:ND2	7:F:412:HOH:O	2.43	0.50
2:B:119:PRO:HB3	2:B:145:TYR:HB3	1.93	0.50
1:A:41:ARG:HG3	3:A:402:PG4:H22	1.93	0.50
2:H:51:ARG:HG3	2:H:57:TYR:HB3	1.94	0.49
1:A:84:PHE:HA	1:A:105:VAL:HG23	1.95	0.48
1:A:114:PRO:HB3	1:A:140:PHE:HB3	1.95	0.48
2:B:193:THR:HG23	2:B:210:LYS:HE3	1.96	0.48
1:F:13:LEU:HD21	1:F:19:GLY:HA3	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:94:SER:HB3	2:H:58:LYS:HG2	1.95	0.47
2:H:51:ARG:NE	7:H:411:HOH:O	2.47	0.47
1:A:143:ARG:NH1	1:A:164:VAL:HG21	2.29	0.46
1:F:187:GLU:O	1:F:211:ARG:NH2	2.49	0.46
1:A:13:LEU:HD21	1:A:19:GLY:HA3	1.98	0.46
2:B:10:GLU:OE1	2:B:12:ARG:NH2	2.49	0.45
1:A:38:GLN:OE1	1:A:46:ARG:NH2	2.47	0.45
3:H:303:PG4:H22	3:H:303:PG4:H41	1.40	0.45
1:F:83:PHE:HA	1:F:104:VAL:HG23	2.00	0.44
1:A:94:GLY:O	2:B:100(J):ASN:ND2	2.44	0.44
1:F:142:ARG:NH1	1:F:163:VAL:HG21	2.33	0.43
2:B:28:THR:N	5:B:305:SO4:O2	2.48	0.43
1:F:169:LYS:NZ	7:F:422:HOH:O	2.51	0.43
2:B:170:LEU:HB3	3:B:303:PG4:H52	2.00	0.43
1:A:13:LEU:HB2	1:A:79:LEU:HD21	2.01	0.43
2:H:134:GLY:HA2	2:H:186:SER:OG	2.19	0.43
2:H:201:LYS:NZ	7:H:407:HOH:O	2.36	0.42
2:H:51:ARG:NH2	2:H:71:GLU:OE1	2.54	0.41
1:A:18:THR:HG23	1:A:77:THR:HA	2.03	0.41
2:B:168:ALA:HB2	2:B:178:LEU:HD23	2.02	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	213/215 (99%)	206 (97%)	7 (3%)	0	100	100
1	F	213/215 (99%)	205 (96%)	8 (4%)	0	100	100
2	B	223/235 (95%)	218 (98%)	5 (2%)	0	100	100
2	H	223/235 (95%)	218 (98%)	5 (2%)	0	100	100
All	All	872/900 (97%)	847 (97%)	25 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	185/185 (100%)	184 (100%)	1 (0%)	81	88
1	F	185/185 (100%)	185 (100%)	0	100	100
2	B	192/199 (96%)	185 (96%)	7 (4%)	31	34
2	H	194/199 (98%)	194 (100%)	0	100	100
All	All	756/768 (98%)	748 (99%)	8 (1%)	65	74

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	THR
2	B	100(F)	SER
2	B	100(G)	SER
2	B	100(H)	TYR
2	B	100(I)	TYR
2	B	100(J)	ASN
2	B	100(K)	ASP
2	B	100(M)	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	F	160	GLN
1	F	189	HIS
2	H	64	HIS
1	A	161	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](#)

31 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	$\# Z > 2$
3	PG4	B	303	-	9,9,12	0.54	0	8,8,11	0.20	0
3	PG4	H	304	-	12,12,12	0.54	0	11,11,11	0.26	0
5	SO4	H	306	-	4,4,4	0.25	0	6,6,6	0.08	0
3	PG4	B	301	-	12,12,12	0.54	0	11,11,11	0.22	0
5	SO4	F	309	-	4,4,4	0.24	0	6,6,6	0.08	0
5	SO4	B	304	-	4,4,4	0.23	0	6,6,6	0.07	0
6	ACT	F	312	-	3,3,3	1.37	0	3,3,3	1.37	0
3	PG4	H	303	-	8,8,12	0.55	0	7,7,11	0.37	0
5	SO4	B	306	-	4,4,4	0.23	0	6,6,6	0.08	0
3	PG4	A	401	-	3,3,12	0.45	0	2,2,11	0.39	0
3	PG4	F	304	-	12,12,12	0.54	0	11,11,11	0.24	0
3	PG4	A	402	-	12,12,12	0.54	0	11,11,11	0.24	0
3	PG4	F	301	-	12,12,12	0.54	0	11,11,11	0.22	0
4	NAG	A	404	1	14,14,15	0.25	0	17,19,21	0.55	0
5	SO4	F	311	-	4,4,4	0.24	0	6,6,6	0.09	0
3	PG4	F	302	-	4,4,12	0.43	0	3,3,11	0.32	0
3	PG4	B	302	-	12,12,12	0.54	0	11,11,11	0.20	0
5	SO4	F	306	-	4,4,4	0.24	0	6,6,6	0.08	0
5	SO4	H	305	-	4,4,4	0.24	0	6,6,6	0.07	0
5	SO4	B	305	-	4,4,4	0.23	0	6,6,6	0.10	0
3	PG4	H	301	-	12,12,12	0.55	0	11,11,11	0.27	0
5	SO4	F	308	-	4,4,4	0.24	0	6,6,6	0.10	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	SO4	F	307	-	4,4,4	0.24	0	6,6,6	0.06	0
6	ACT	B	308	-	3,3,3	1.36	0	3,3,3	1.35	0
3	PG4	H	302	-	12,12,12	0.55	0	11,11,11	0.23	0
5	SO4	B	307	-	4,4,4	0.23	0	6,6,6	0.08	0
4	NAG	F	303	1	14,14,15	0.27	0	17,19,21	0.53	0
3	PG4	A	403	-	3,3,12	0.53	0	2,2,11	0.32	0
5	SO4	F	305	-	4,4,4	0.24	0	6,6,6	0.13	0
5	SO4	H	307	-	4,4,4	0.23	0	6,6,6	0.08	0
5	SO4	F	310	-	4,4,4	0.24	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
3	PG4	B	303	-	-	3/7/7/10	-
3	PG4	F	302	-	-	0/2/2/10	-
3	PG4	H	304	-	-	5/10/10/10	-
3	PG4	H	302	-	-	4/10/10/10	-
3	PG4	B	302	-	-	3/10/10/10	-
3	PG4	B	301	-	-	2/10/10/10	-
3	PG4	A	403	-	-	0/0/1/10	-
3	PG4	A	402	-	-	6/10/10/10	-
4	NAG	F	303	1	-	0/6/23/26	0/1/1/1
3	PG4	H	303	-	-	3/6/6/10	-
3	PG4	F	301	-	-	3/10/10/10	-
4	NAG	A	404	1	-	2/6/23/26	0/1/1/1
3	PG4	H	301	-	-	2/10/10/10	-
3	PG4	A	401	-	-	0/1/1/10	-
3	PG4	F	304	-	-	6/10/10/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (39) torsion outliers are listed below:

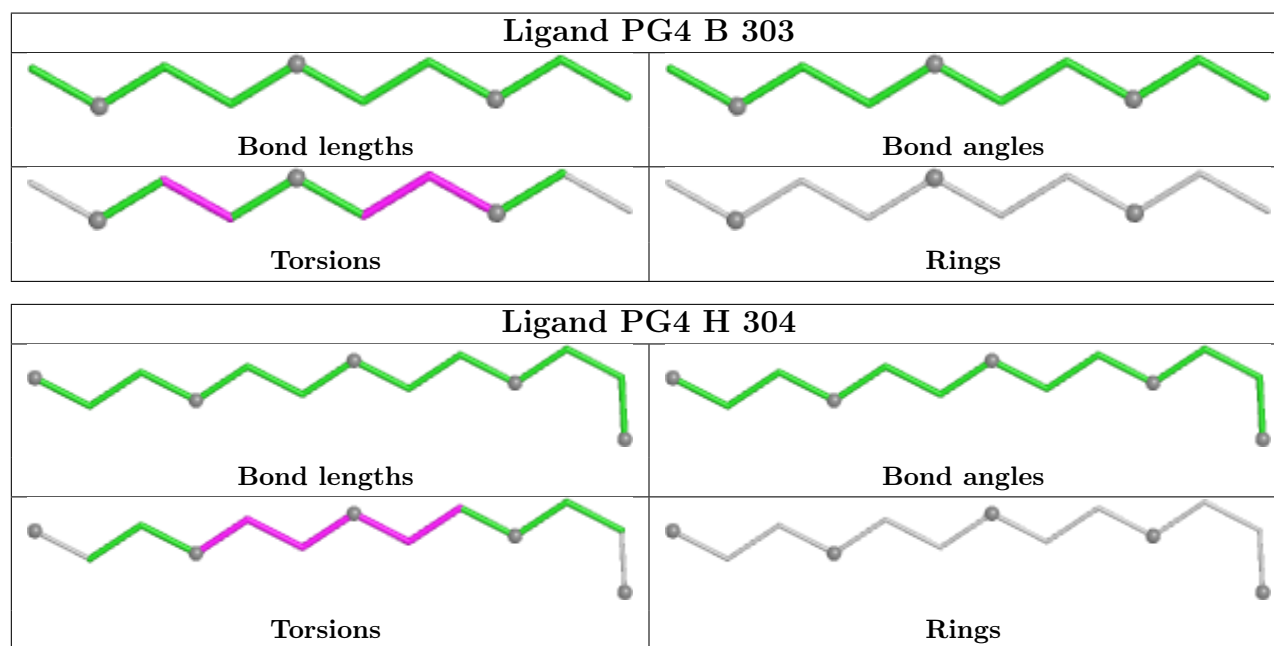
Mol	Chain	Res	Type	Atoms
3	H	303	PG4	C4-C3-O2-C2
3	H	304	PG4	C5-C6-O4-C7
3	H	301	PG4	O2-C3-C4-O3
3	H	304	PG4	O2-C3-C4-O3
3	B	302	PG4	O2-C3-C4-O3
3	A	402	PG4	O3-C5-C6-O4
3	A	402	PG4	O2-C3-C4-O3
3	B	303	PG4	O3-C5-C6-O4
3	H	301	PG4	O4-C7-C8-O5
3	H	302	PG4	O1-C1-C2-O2
3	H	304	PG4	O3-C5-C6-O4
3	H	302	PG4	O4-C7-C8-O5
3	B	303	PG4	C4-C3-O2-C2
3	B	302	PG4	C6-C5-O3-C4
3	A	402	PG4	C3-C4-O3-C5
3	H	303	PG4	C1-C2-O2-C3
3	H	302	PG4	C5-C6-O4-C7
3	F	304	PG4	O3-C5-C6-O4
3	B	301	PG4	O3-C5-C6-O4
3	F	301	PG4	O4-C7-C8-O5
3	H	303	PG4	O1-C1-C2-O2
3	H	304	PG4	C6-C5-O3-C4
3	F	304	PG4	C3-C4-O3-C5
3	F	304	PG4	C8-C7-O4-C6
3	B	302	PG4	C8-C7-O4-C6
4	A	404	NAG	C3-C2-N2-C7
3	F	301	PG4	C5-C6-O4-C7
3	H	304	PG4	C3-C4-O3-C5
3	F	301	PG4	O3-C5-C6-O4
3	F	304	PG4	O2-C3-C4-O3
3	F	304	PG4	C4-C3-O2-C2
3	B	301	PG4	O1-C1-C2-O2
4	A	404	NAG	C1-C2-N2-C7
3	H	302	PG4	C4-C3-O2-C2
3	A	402	PG4	C5-C6-O4-C7
3	F	304	PG4	C5-C6-O4-C7
3	B	303	PG4	O2-C3-C4-O3
3	A	402	PG4	C1-C2-O2-C3
3	A	402	PG4	C4-C3-O2-C2

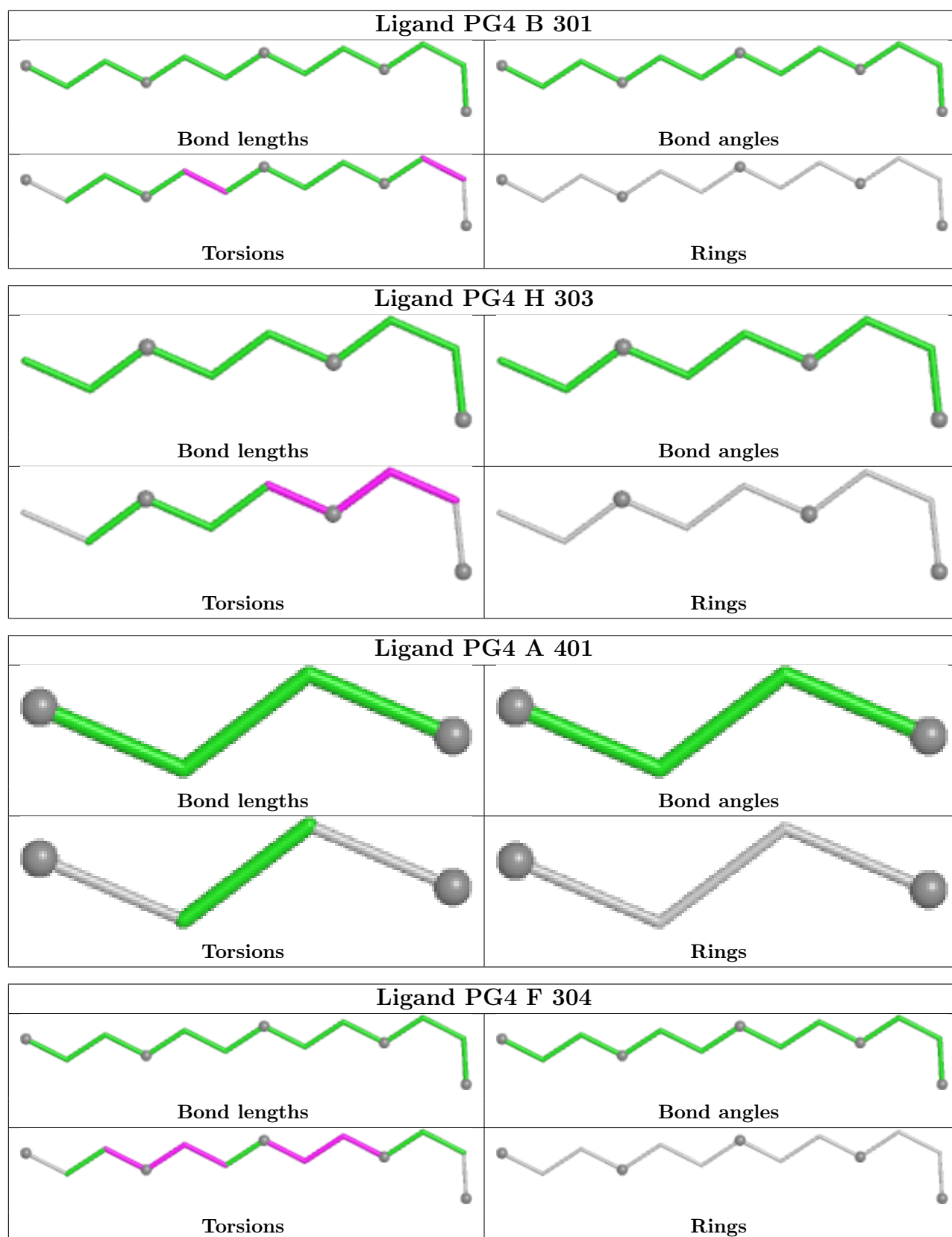
There are no ring outliers.

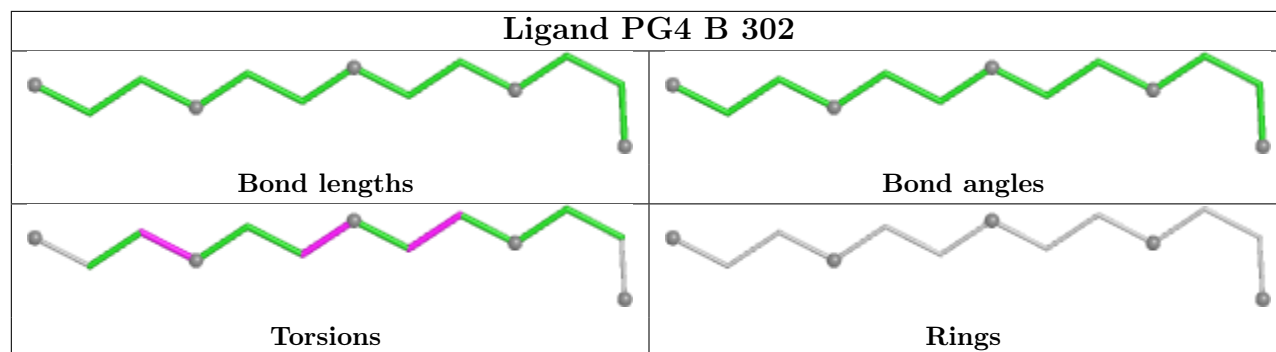
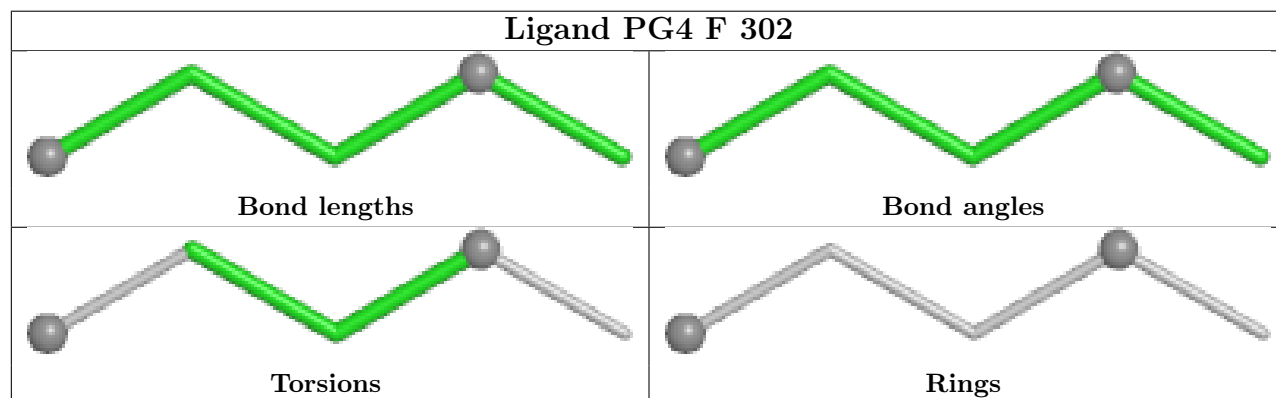
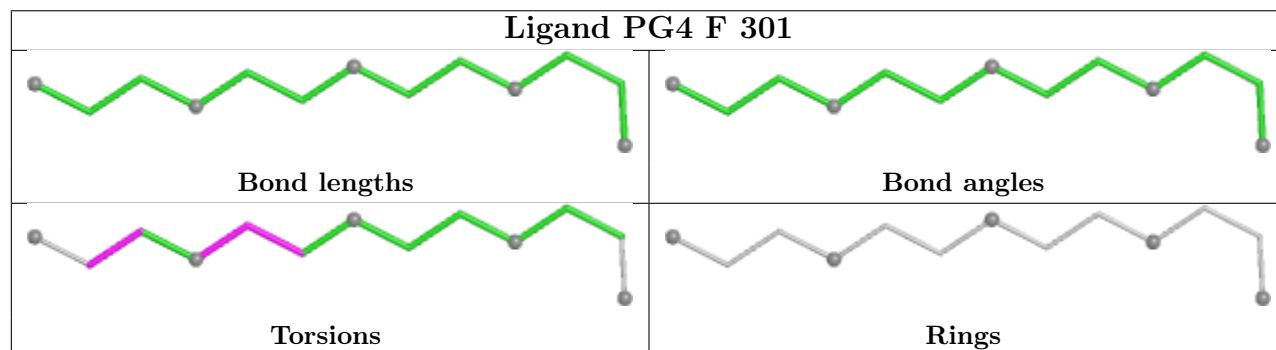
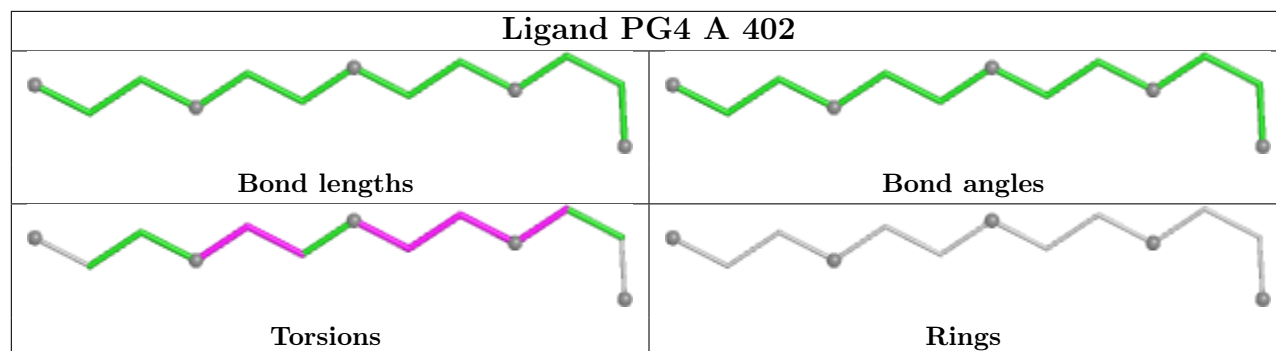
6 monomers are involved in 8 short contacts:

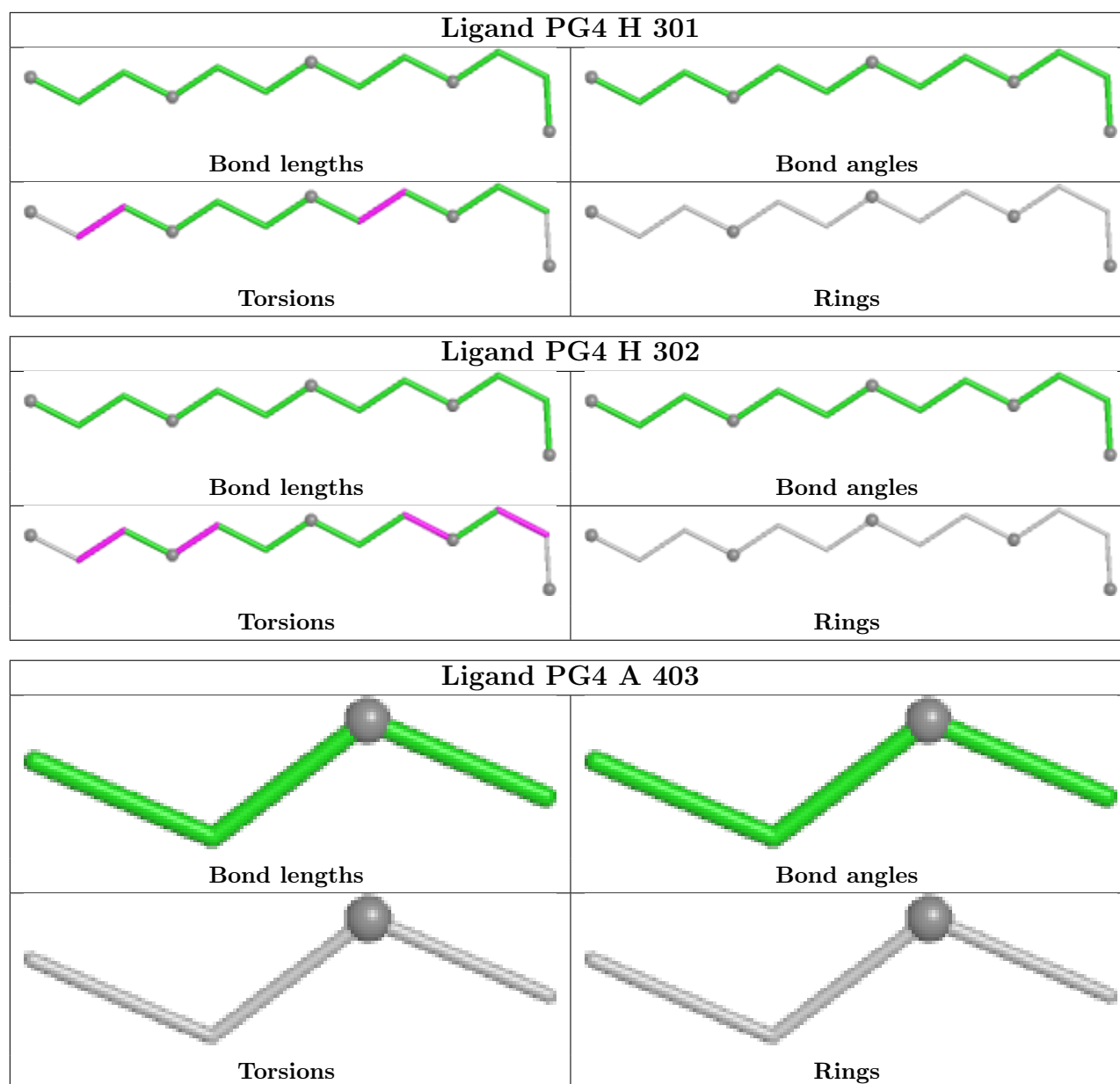
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	303	PG4	1	0
3	H	304	PG4	3	0
3	H	303	PG4	1	0
3	A	402	PG4	1	0
5	B	305	SO4	1	0
5	F	305	SO4	1	0

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	215/215 (100%)	1.10	35 (16%) 4 4	16, 34, 59, 97	0
1	F	215/215 (100%)	1.00	40 (18%) 3 3	18, 33, 56, 85	0
2	B	227/235 (96%)	0.98	37 (16%) 4 4	18, 32, 62, 110	0
2	H	227/235 (96%)	0.84	32 (14%) 6 6	17, 31, 63, 130	0
All	All	884/900 (98%)	0.98	144 (16%) 4 4	16, 32, 61, 130	0

All (144) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	41	ARG	8.2
1	A	42	GLY	8.0
1	F	212	GLY	7.8
2	B	98	ALA	7.3
2	B	42	GLY	6.5
1	A	77	THR	6.3
2	B	196	CYS	6.1
2	H	97	GLY	5.8
2	H	100(G)	SER	5.7
1	F	41	GLY	5.5
2	B	99	GLY	5.4
2	H	42	GLY	5.4
1	F	76	THR	5.0
2	H	100(H)	TYR	5.0
1	A	79	LEU	4.9
2	H	2	VAL	4.9
2	H	92	CYS	4.6
2	H	100(E)	THR	4.5
1	F	78	LEU	4.4
1	A	215	CYS	4.4
1	F	60	ASP	4.3

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Mol	Chain	Res	Type	RSRZ
2	B	186	SER	4.1
1	A	128	SER	4.1
2	H	100(F)	SER	4.1
1	F	127	SER	4.1
2	B	100(H)	TYR	4.0
2	B	92	CYS	4.0
2	B	113	ALA	3.9
2	B	43	GLN	3.9
2	B	97	GLY	3.9
1	A	13	LEU	3.8
1	A	191	LYS	3.8
2	H	204	ASN	3.7
1	A	71	ASP	3.7
2	B	188	SER	3.6
2	B	100(F)	SER	3.6
1	F	40	ARG	3.6
2	H	43	GLN	3.5
2	B	54	VAL	3.4
1	A	78	ARG	3.4
1	A	1	GLU	3.3
2	H	100(D)	ASP	3.3
1	F	168	SER	3.3
1	A	161	GLN	3.3
1	A	43	GLN	3.3
1	A	27(A)	ASN	3.3
2	B	75	MET	3.3
1	A	30	SER	3.3
1	F	188	LYS	3.3
1	F	203	SER	3.2
2	B	191	THR	3.2
1	F	190	LYS	3.2
1	F	181	LEU	3.2
2	H	201	LYS	3.2
1	F	183	LYS	3.1
1	F	110	VAL	3.1
1	A	15	SER	3.1
1	A	153	ASN	3.1
2	B	41	PRO	3.0
2	H	131	THR	3.0
2	B	132	SER	3.0
2	H	96	ARG	2.9
2	B	68	ARG	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	110	THR	2.9
1	F	15	SER	2.9
1	A	2	ILE	2.9
2	H	191	THR	2.9
2	B	65	ASP	2.8
1	F	1	GLU	2.8
1	F	13	LEU	2.8
1	F	145	LYS	2.8
1	A	111	VAL	2.8
2	H	54	VAL	2.8
1	F	77	ARG	2.7
2	H	95	TRP	2.8
2	B	134	GLY	2.7
1	A	3	VAL	2.7
2	H	132	SER	2.7
1	F	185	ASP	2.7
1	F	10	THR	2.7
1	F	129	THR	2.7
2	H	74	PRO	2.7
2	B	26	GLY	2.7
1	F	42	GLN	2.7
2	H	41	PRO	2.7
1	F	14	SER	2.7
2	B	2	VAL	2.7
2	B	179	SER	2.7
2	B	133	GLY	2.7
2	B	72	ASP	2.6
2	H	3	GLN	2.6
1	A	68	SER	2.6
2	H	169	VAL	2.6
1	A	148	GLN	2.6
2	H	1	GLN	2.6
2	H	29	PHE	2.5
2	H	53	VAL	2.5
1	A	169	SER	2.5
2	B	82(A)	ARG	2.5
2	B	30	THR	2.4
1	A	170	LYS	2.4
2	H	61	LYS	2.4
1	F	214	CYS	2.4
1	A	130	THR	2.4
1	F	126	LYS	2.4

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Mol	Chain	Res	Type	RSRZ
2	H	23	LYS	2.4
2	B	94	ARG	2.4
1	F	152	ASN	2.4
2	H	73	ASP	2.4
1	A	189	LYS	2.4
1	F	79	GLU	2.4
2	H	44	GLY	2.4
2	B	73	ASP	2.4
1	F	194	CYS	2.4
2	B	57	TYR	2.3
1	F	24	ARG	2.3
1	A	95	SER	2.3
1	A	204	SER	2.3
2	B	100(G)	SER	2.3
2	B	161	SER	2.3
1	A	29	ILE	2.3
2	H	94	ARG	2.2
1	A	214	GLU	2.2
1	F	2	ILE	2.2
1	F	104	VAL	2.2
2	H	25	VAL	2.2
1	F	213	GLU	2.2
2	B	215	SER	2.2
1	F	210	ASN	2.2
1	A	97	PHE	2.1
1	A	94	GLY	2.1
1	F	11	LEU	2.1
1	F	54	ARG	2.1
2	B	1	GLN	2.1
1	F	68	GLY	2.1
2	B	96	ARG	2.1
1	F	162	SER	2.1
2	H	28	THR	2.1
2	B	24	PRO	2.1
1	F	97	THR	2.0
1	A	16	GLY	2.0
1	A	67	GLY	2.0
2	B	44	GLY	2.0
1	F	70	ASP	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($\text{\AA}^2$)	Q<0.9
4	NAG	A	404	14/15	0.55	0.21	96,100,102,104	0
4	NAG	F	303	14/15	0.57	0.20	84,85,90,91	0
3	PG4	B	301	13/13	0.60	0.26	70,74,75,76	0
5	SO4	H	305	5/5	0.60	0.19	104,105,105,105	0
3	PG4	F	301	13/13	0.61	0.30	52,62,64,65	0
6	ACT	F	312	4/4	0.63	0.20	55,58,59,59	0
3	PG4	F	302	5/13	0.67	0.31	63,63,63,64	0
3	PG4	A	403	4/13	0.68	0.32	52,53,53,54	0
6	ACT	B	308	4/4	0.68	0.44	90,90,91,91	0
5	SO4	H	307	5/5	0.69	0.14	80,82,83,83	0
3	PG4	A	402	13/13	0.71	0.27	64,66,68,69	0
3	PG4	B	302	13/13	0.71	0.32	68,77,78,79	0
5	SO4	F	311	5/5	0.74	0.18	56,57,62,67	0
5	SO4	B	306	5/5	0.75	0.18	106,106,107,107	0
5	SO4	B	304	5/5	0.76	0.14	75,76,77,79	0
5	SO4	B	307	5/5	0.76	0.16	77,79,79,80	0
3	PG4	B	303	10/13	0.77	0.24	57,57,69,70	0
5	SO4	F	307	5/5	0.77	0.13	59,60,61,62	0
5	SO4	H	306	5/5	0.77	0.13	78,80,81,83	0
5	SO4	F	306	5/5	0.78	0.13	66,68,69,69	0
5	SO4	B	305	5/5	0.78	0.16	93,93,95,96	0
3	PG4	H	303	9/13	0.78	0.20	48,58,64,65	0
3	PG4	F	304	13/13	0.79	0.23	63,64,71,71	0
3	PG4	H	304	13/13	0.82	0.22	51,62,65,65	0
3	PG4	H	302	13/13	0.82	0.18	42,48,57,58	0
3	PG4	A	401	4/13	0.85	0.22	52,52,55,55	0
3	PG4	H	301	13/13	0.85	0.15	47,51,56,56	0

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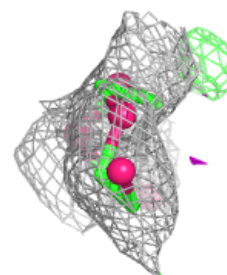
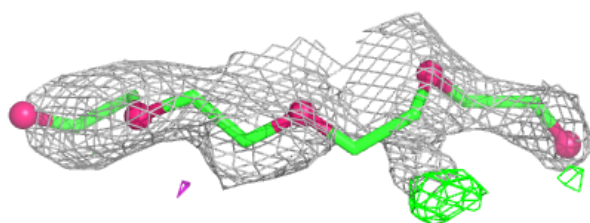
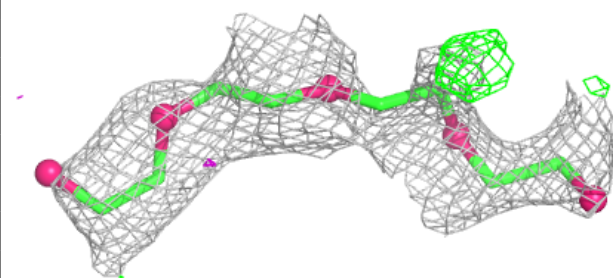
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	SO4	F	310	5/5	0.87	0.11	55,62,63,64	0
5	SO4	F	305	5/5	0.92	0.12	43,47,53,55	0
5	SO4	F	308	5/5	0.94	0.10	50,51,52,56	0
5	SO4	F	309	5/5	0.95	0.12	51,53,53,56	0

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.

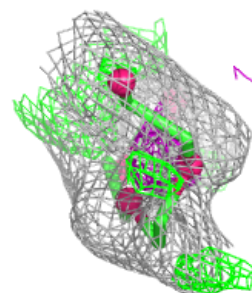
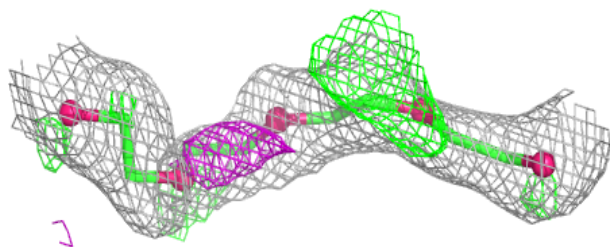
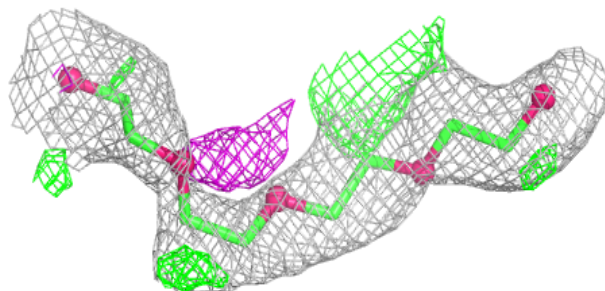
Electron density around PG4 B 301:

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

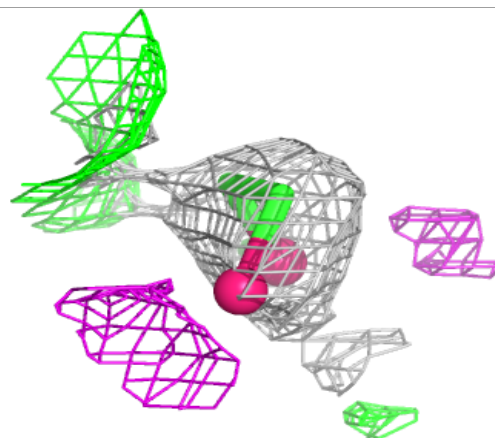
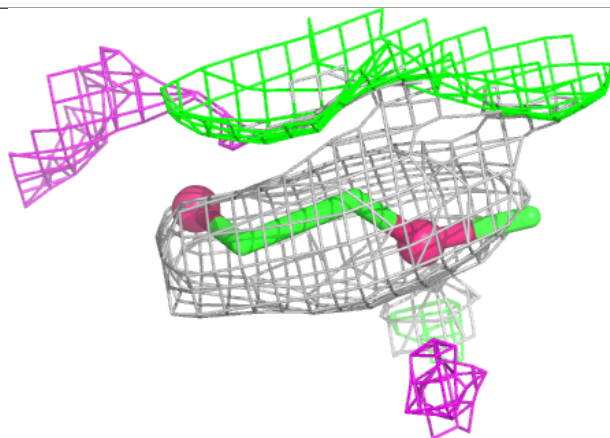
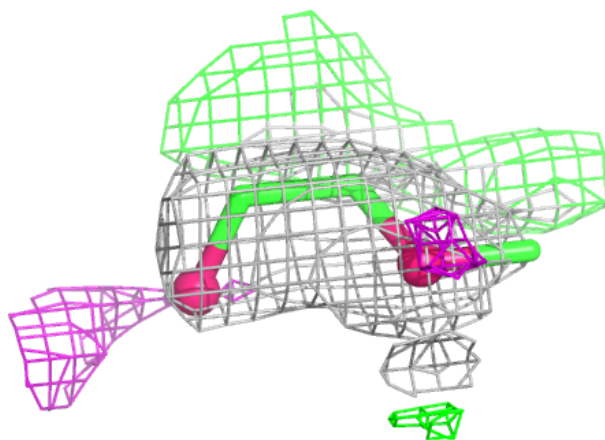


Electron density around PG4 F 301:

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

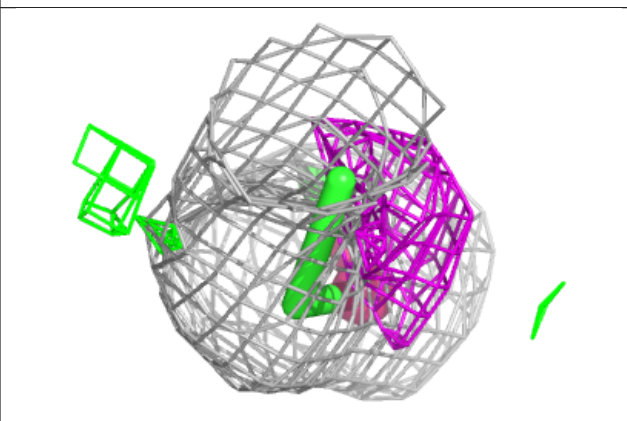
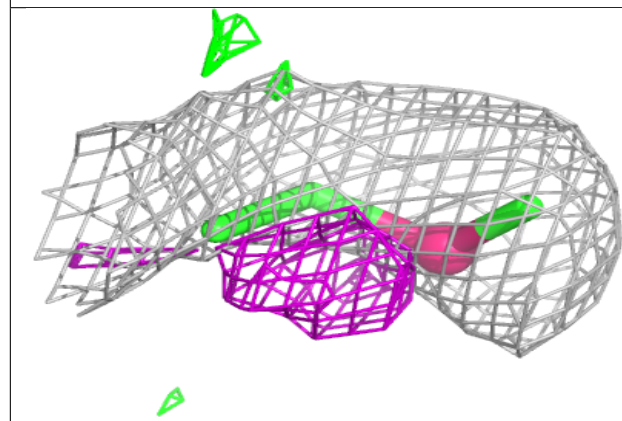
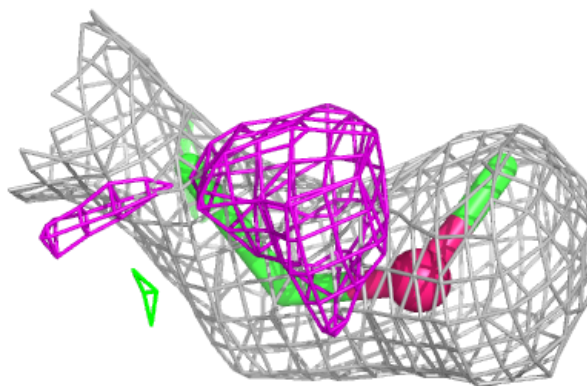
**Electron density around PG4 F 302:**

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

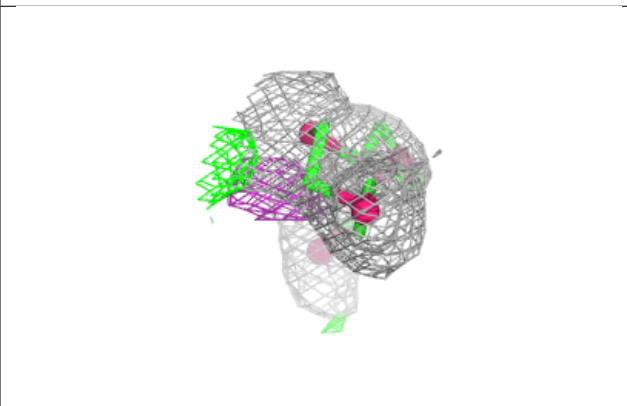
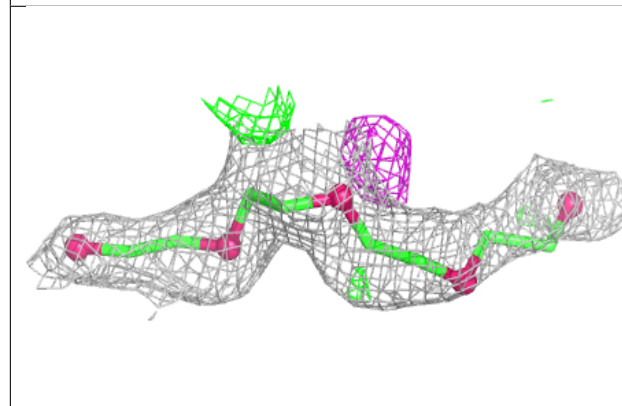
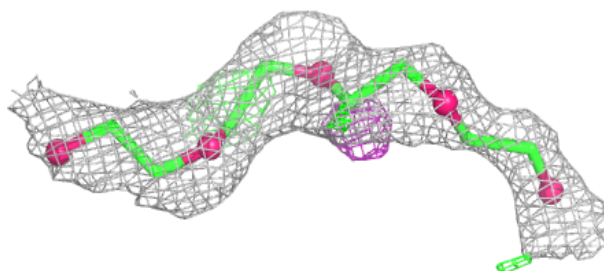


Electron density around PG4 A 403:

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

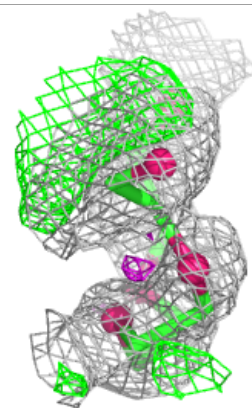
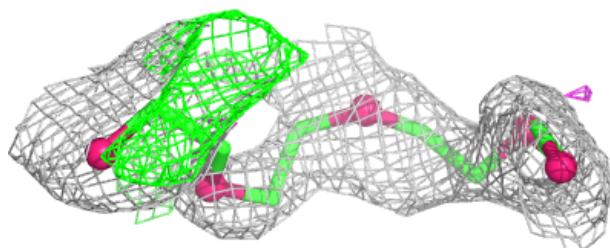
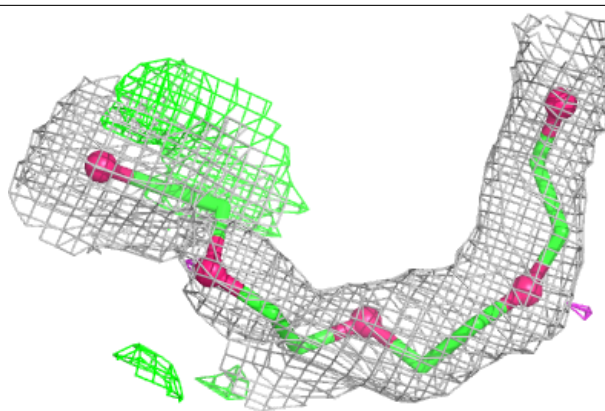
**Electron density around PG4 A 402:**

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

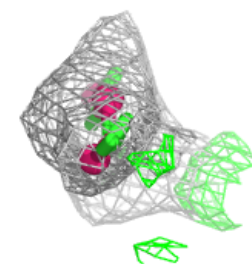
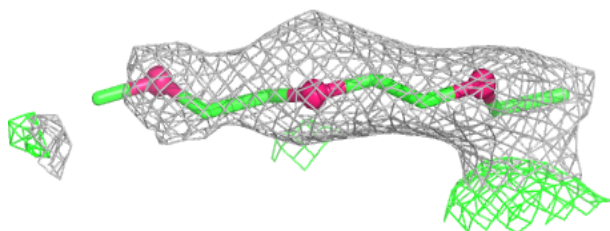
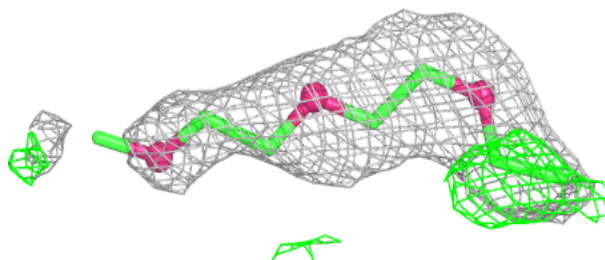


Electron density around PG4 B 302:

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

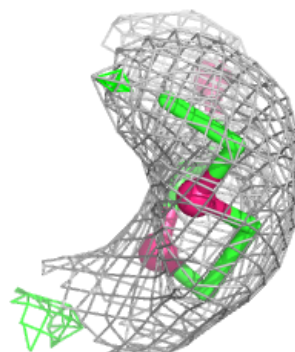
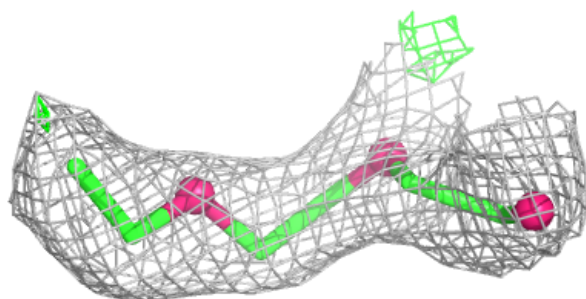
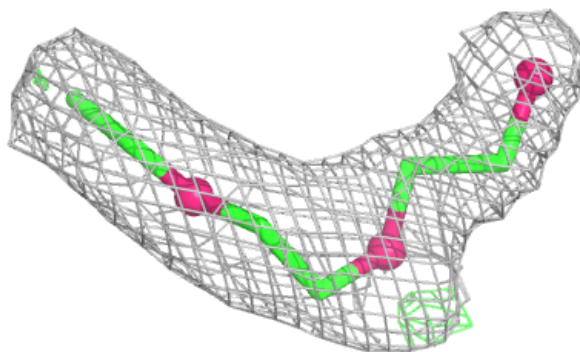
**Electron density around PG4 B 303:**

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

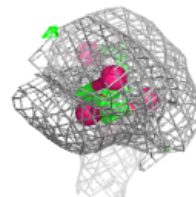
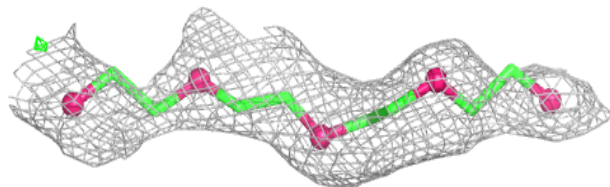
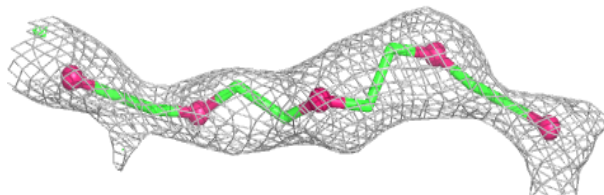


Electron density around PG4 H 303:

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

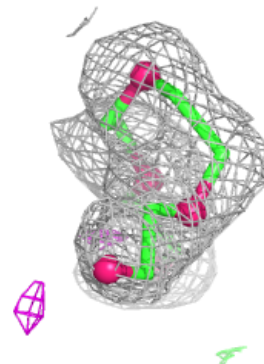
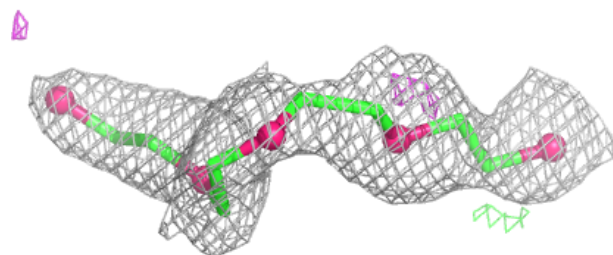
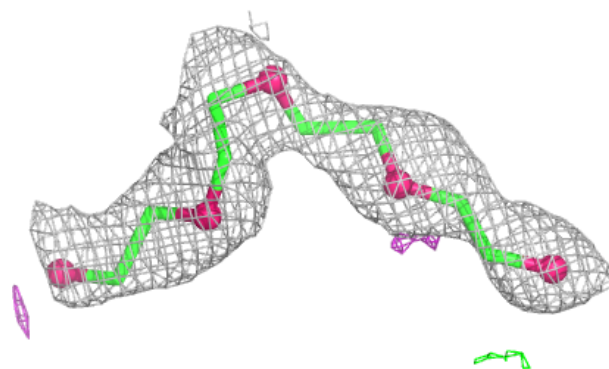
**Electron density around PG4 F 304:**

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

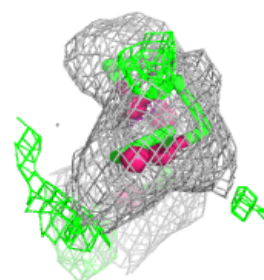
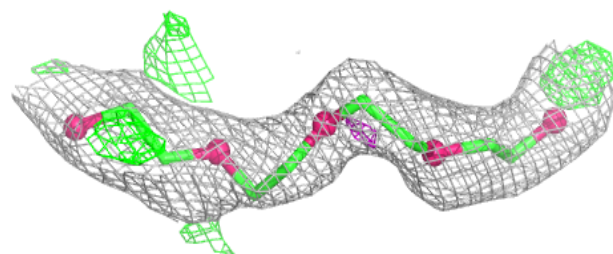
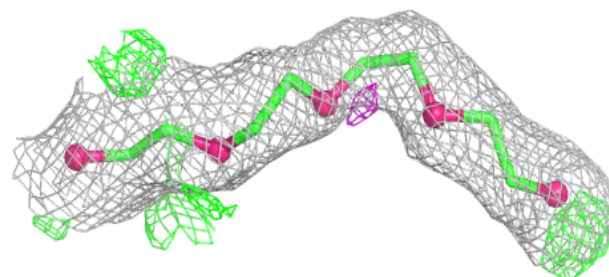


Electron density around PG4 H 304:

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

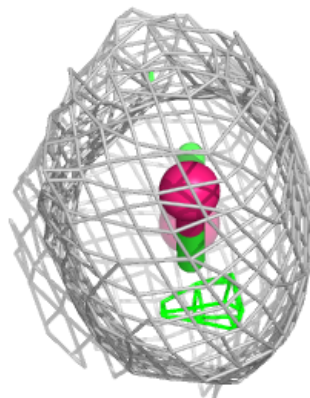
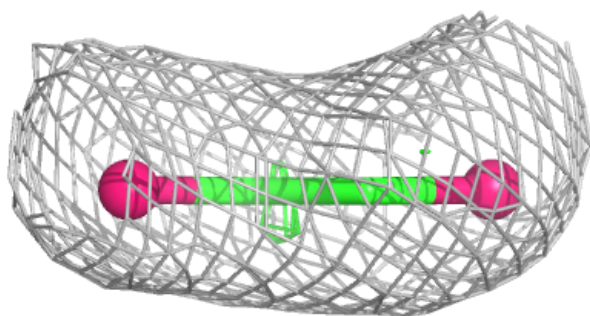
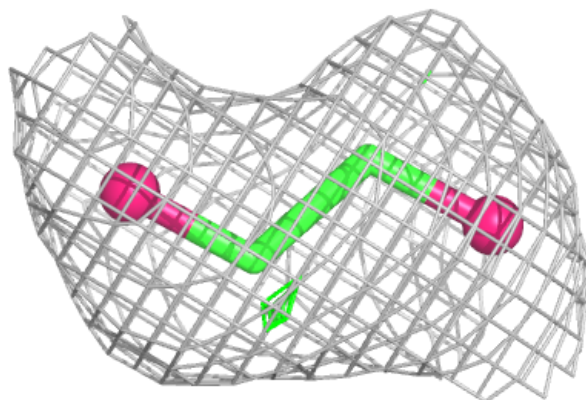
**Electron density around PG4 H 302:**

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



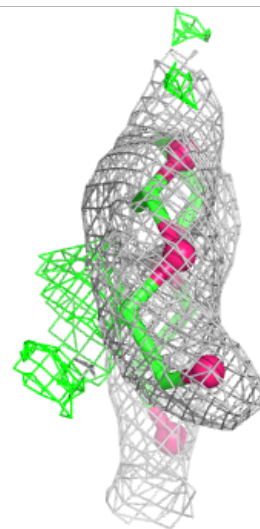
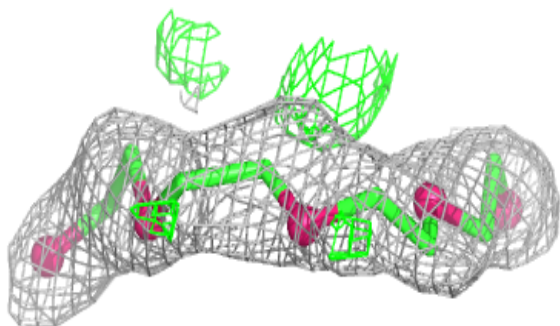
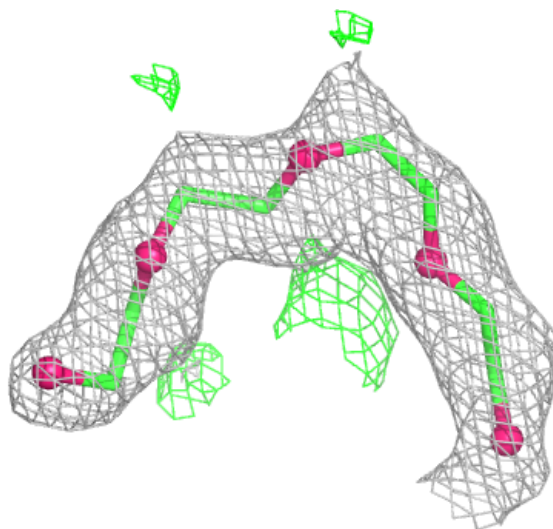
Electron density around PG4 A 401:

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



Electron density around PG4 H 301:

$2mF_o-DF_c$ (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.