



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 05:24 AM UTC

PDB ID : 6FAK / pdb_00006fak
Title : Human afamin orthorhombic crystal form by controlled hydration
Authors : Rupp, B.; Naschberger, A.; Bowler, M.W.
Deposited on : 2017-12-15
Resolution : 1.90 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

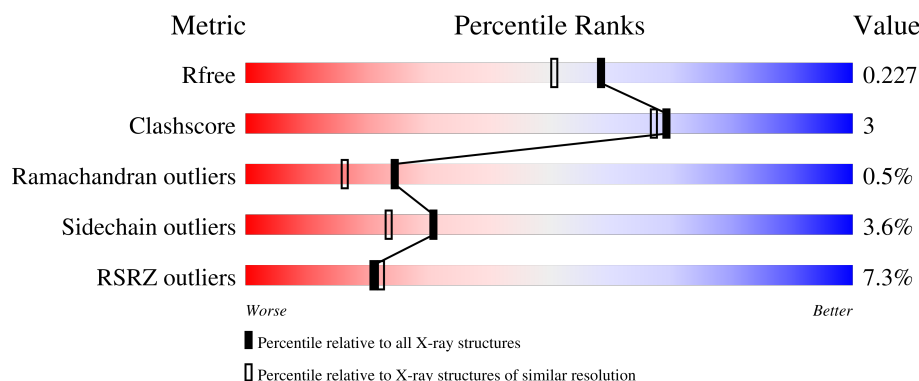
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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	586	7% 89% 9% ..
2	B	2	100%

2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 5300 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 Afamin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	575	Total	C	N	O	S	0	27	0
			4860	3055	823	940	42			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	579	LYS	-	expression tag	UNP P43652
A	580	GLY	-	expression tag	UNP P43652
A	581	GLU	-	expression tag	UNP P43652
A	582	ASN	-	expression tag	UNP P43652
A	583	LEU	-	expression tag	UNP P43652
A	584	TYR	-	expression tag	UNP P43652
A	585	PHE	-	expression tag	UNP P43652
A	586	GLN	-	expression tag	UNP P43652

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



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

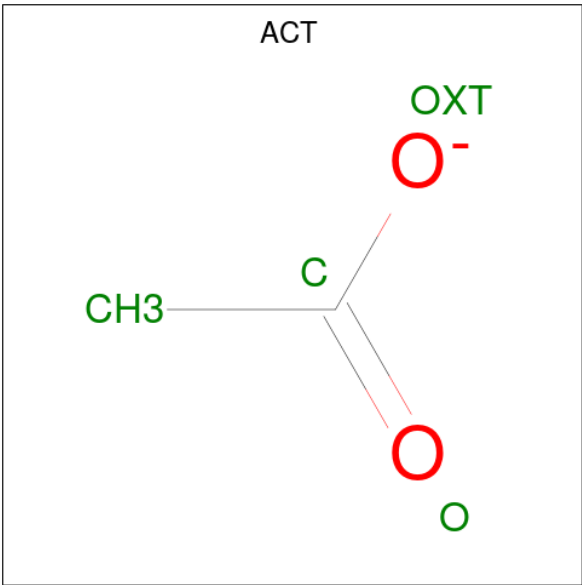
- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Cl	0	0
			1	1		

- Molecule 5 is SODIUM ION (CCD ID: NA) (formula: Na).

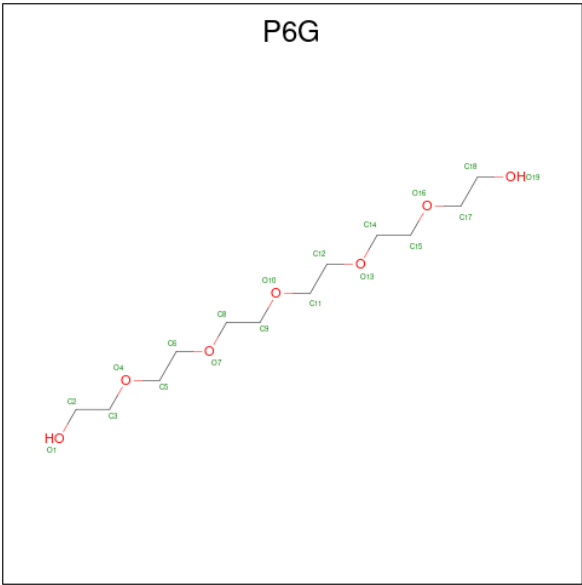
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Na	0	0
			1	1		

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



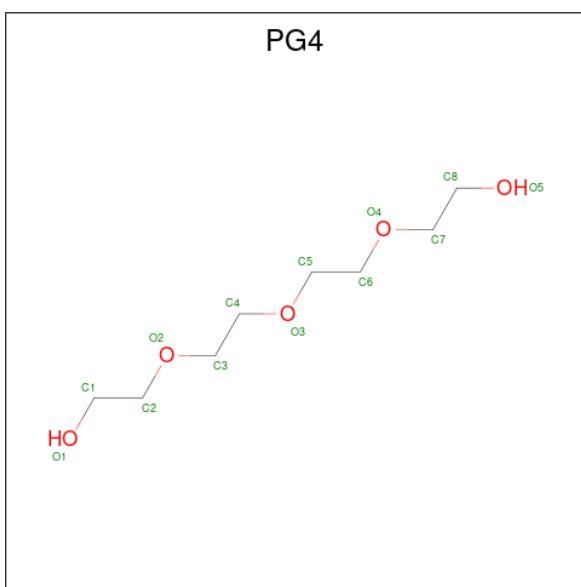
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula: C₁₂H₂₆O₇).



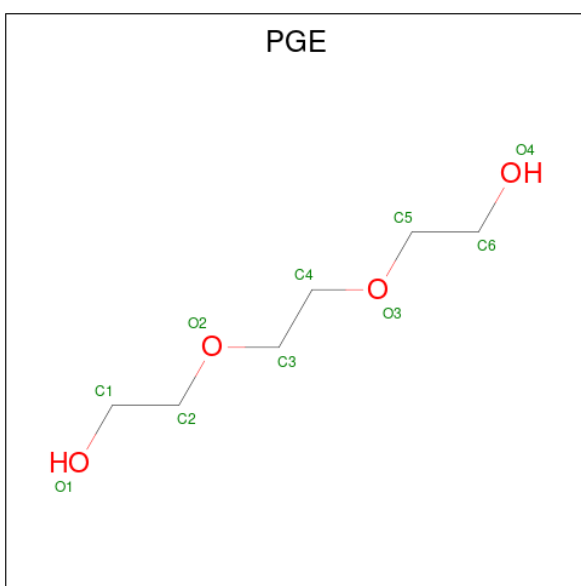
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			19	12	7		
7	A	1	Total	C	O	0	0
			18	12	6		

- Molecule 8 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅).



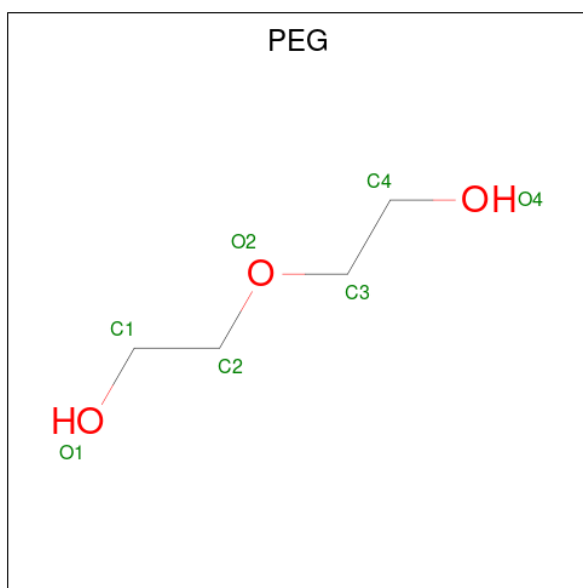
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			13	8	5		
8	A	1	Total	C	O	0	0
			13	8	5		

- Molecule 9 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



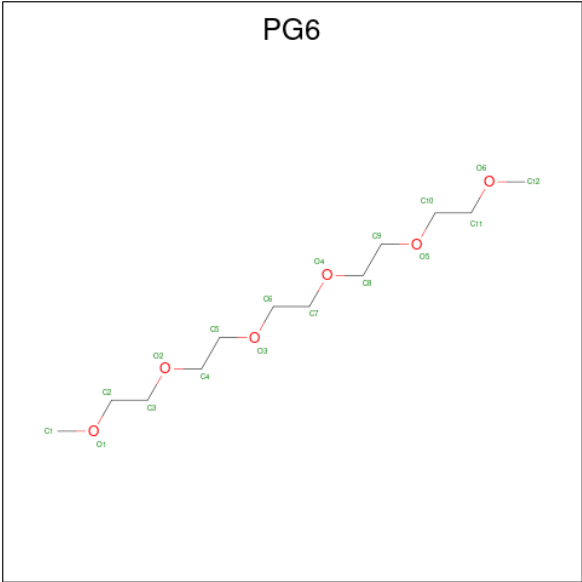
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	A	1	Total	C	O	0	0
			10	6	4		
9	A	1	Total	C	O	0	0
			10	6	4		

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



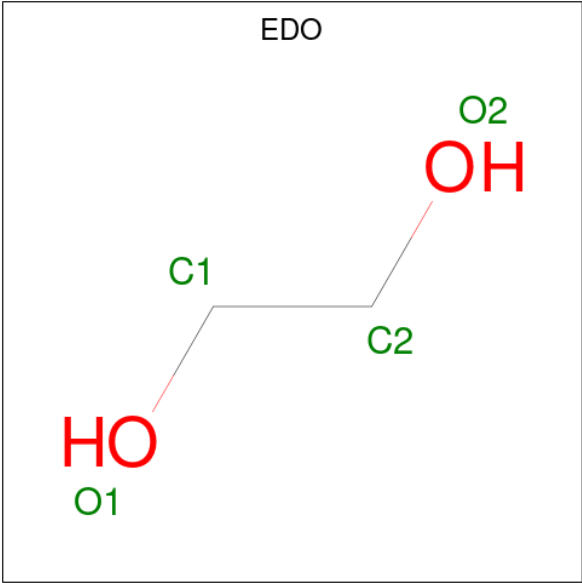
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	A	1	Total	C	O	0	0
			7	4	3		
10	A	1	Total	C	O	0	0
			6	4	2		
10	A	1	Total	C	O	0	0
			7	4	3		
10	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 11 is 1-(2-METHOXY-ETHOXY)-2-{2-[2-(2-METHOXY-ETHOXY)-ETHOXY]-ETHANE (CCD ID: PG6) (formula: $C_{12}H_{26}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	A	1	Total	C	O	0	0
			18	12	6		

- Molecule 12 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

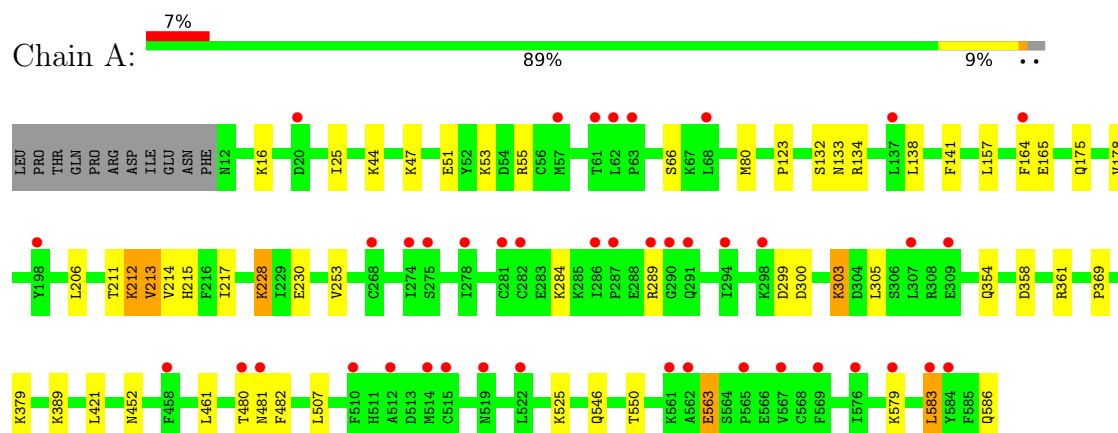
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	242	Total 242	O 242	0	0

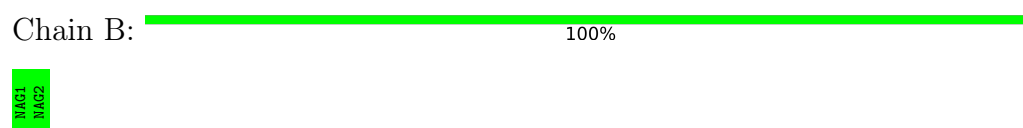
3 Residue-property plots [i](#)

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: Afamin



• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	109.77Å 113.33Å 48.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	78.85 – 1.90 78.85 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.6 (78.85-1.90) 98.6 (78.85-1.90)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.177 , 0.219 0.188 , 0.227	Depositor DCC
R_{free} test set	2460 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	30.8	Xtriage
Anisotropy	0.138	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 55.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.016 for k,h,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5300	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.90% 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: P6G, NA, PG4, PEG, PGE, ACT, PG6, EDO, NAG, CL

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	0.94	0/4961	1.00	2/6689 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	213	VAL	N-CA-C	-6.39	104.58	111.10
1	A	369	PRO	N-CA-C	5.33	117.20	110.70

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	4860	0	4695	35	0
2	B	28	0	25	0	0
3	A	28	0	26	0	0
4	A	1	0	0	0	0
5	A	1	0	0	0	0
6	A	4	0	3	0	0
7	A	37	0	49	1	0
8	A	26	0	36	0	0
9	A	20	0	28	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	A	27	0	37	0	0
11	A	18	0	26	3	0
12	A	8	0	12	0	0
13	A	242	0	0	3	0
All	All	5300	0	4937	35	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 (35) 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:206:LEU:HD11	1:A:211[A]:THR:HG22	1.62	0.81
1:A:583[A]:LEU:HD13	1:A:583[A]:LEU:O	1.82	0.78
1:A:211[B]:THR:HG23	1:A:212[B]:LYS:N	1.98	0.76
1:A:354[B]:GLN:NE2	1:A:481[B]:ASN:HD21	1.89	0.71
1:A:211[B]:THR:CG2	1:A:212[B]:LYS:N	2.60	0.65
1:A:354[B]:GLN:HE22	1:A:481[B]:ASN:HD21	1.47	0.61
1:A:583[A]:LEU:O	1:A:583[A]:LEU:CD1	2.50	0.60
1:A:481[B]:ASN:C	1:A:481[B]:ASN:OD1	2.48	0.56
1:A:212[B]:LYS:O	1:A:213:VAL:C	2.50	0.55
1:A:354[B]:GLN:CD	1:A:481[B]:ASN:HD21	2.15	0.55
1:A:481[B]:ASN:OD1	1:A:481[B]:ASN:O	2.24	0.54
1:A:452:ASN:HB3	11:A:814:PG6:H51	1.91	0.53
1:A:482:PHE:CE2	11:A:814:PG6:H11	2.45	0.51
1:A:51:GLU:O	1:A:55:ARG:HD2	2.10	0.51
1:A:586:GLN:HA	13:A:980:HOH:O	2.11	0.51
1:A:132[A]:SER:O	1:A:133[A]:ASN:HB2	2.12	0.50
1:A:358:ASP:HA	1:A:361[B]:ARG:HG3	1.93	0.49
1:A:354[B]:GLN:HE22	1:A:481[B]:ASN:ND2	2.09	0.49
1:A:482:PHE:HE2	11:A:814:PG6:H11	1.79	0.47
1:A:141:PHE:HZ	1:A:164:PHE:CD2	2.32	0.47
1:A:141:PHE:CZ	1:A:164:PHE:CD2	3.05	0.45
1:A:212[B]:LYS:O	1:A:215[B]:HIS:HB2	2.17	0.45
1:A:134:ARG:NE	1:A:165:GLU:OE1	2.30	0.45
1:A:525:LYS:HD2	13:A:954:HOH:O	2.16	0.45
1:A:421:LEU:HD11	1:A:461:LEU:HD11	2.00	0.44
1:A:214:VAL:HG13	1:A:217:ILE:HD12	1.99	0.43
1:A:123:PRO:HG3	1:A:178:VAL:HG22	1.99	0.43
1:A:212[B]:LYS:HB2	1:A:212[B]:LYS:HE3	1.48	0.43
1:A:379:LYS:HG2	7:A:804:P6G:H151	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:123:PRO:CG	1:A:178:VAL:HG22	2.49	0.43
1:A:25:ILE:HG23	1:A:253[B]:VAL:CG1	2.50	0.42
1:A:546:GLN:O	1:A:550:THR:HG23	2.21	0.41
1:A:228:LYS:HG2	13:A:960:HOH:O	2.20	0.41
1:A:299:ASP:OD1	1:A:300:ASP:N	2.54	0.41
1:A:44:LYS:HB2	1:A:80:MET:HE1	2.02	0.41

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	601/586 (103%)	570 (95%)	28 (5%)	3 (0%)	24 16

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	284	LYS
1	A	303	LYS
1	A	563	GLU

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	558/542 (103%)	536 (96%)	22 (4%)	28	21

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	16	LYS
1	A	47	LYS
1	A	53	LYS
1	A	66	SER
1	A	138	LEU
1	A	157	LEU
1	A	175	GLN
1	A	212[A]	LYS
1	A	212[B]	LYS
1	A	228	LYS
1	A	230	GLU
1	A	289	ARG
1	A	303	LYS
1	A	305	LEU
1	A	389	LYS
1	A	480[A]	THR
1	A	480[B]	THR
1	A	507	LEU
1	A	563	GLU
1	A	579	LYS
1	A	583[A]	LEU
1	A	583[B]	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	291	GLN
1	A	476	HIS
1	A	586	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 ⓘ

2 monosaccharides 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	$\# Z > 2$
2	NAG	B	1	1,2	14,14,15	0.28	0	17,19,21	0.55	0
2	NAG	B	2	2	14,14,15	0.36	0	17,19,21	0.53	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
2	NAG	B	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	B	2	2	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

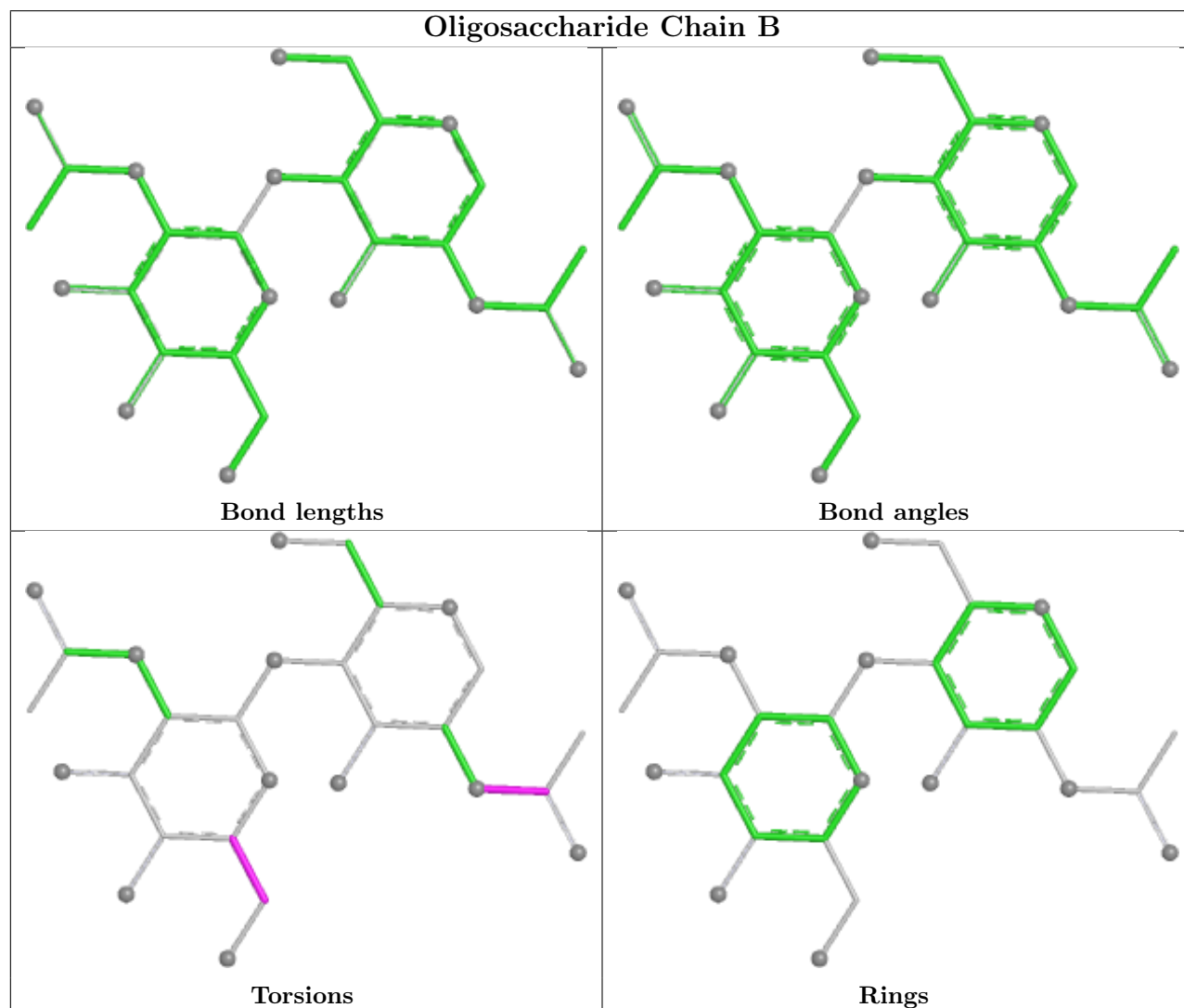
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1	NAG	C8-C7-N2-C2
2	B	1	NAG	O7-C7-N2-C2
2	B	2	NAG	O5-C5-C6-O6
2	B	2	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 2 are monoatomic - leaving 16 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
9	PGE	A	809	-	9,9,9	0.55	0	8,8,8	0.21	0
11	PG6	A	814	-	17,17,17	0.50	0	16,16,16	0.41	0
6	ACT	A	803	-	3,3,3	0.83	0	3,3,3	0.75	0
12	EDO	A	816	-	3,3,3	0.53	0	2,2,2	0.13	0
7	P6G	A	804	-	18,18,18	0.56	0	17,17,17	0.57	0
10	PEG	A	811	-	5,5,6	0.52	0	4,4,5	0.53	0
10	PEG	A	813	-	6,6,6	0.57	0	5,5,5	0.53	0
12	EDO	A	815	-	3,3,3	0.64	0	2,2,2	0.16	0
8	PG4	A	806	-	12,12,12	0.36	0	11,11,11	0.37	0
10	PEG	A	812	-	6,6,6	0.47	0	5,5,5	0.44	0
8	PG4	A	807	-	12,12,12	0.56	0	11,11,11	0.72	0
3	NAG	A	641	1	14,14,15	0.32	0	17,19,21	0.48	0
3	NAG	A	621	1	14,14,15	0.47	0	17,19,21	0.55	0
7	P6G	A	805	-	17,17,18	0.53	0	16,16,17	0.25	0
9	PGE	A	808	-	9,9,9	0.51	0	8,8,8	0.27	0
10	PEG	A	810	-	6,6,6	0.46	0	5,5,5	0.26	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
9	PGE	A	809	-	-	4/7/7/7	-
11	PG6	A	814	-	-	8/15/15/15	-
12	EDO	A	816	-	-	1/1/1/1	-
7	P6G	A	804	-	-	6/16/16/16	-
10	PEG	A	811	-	-	1/3/3/4	-
10	PEG	A	813	-	-	2/4/4/4	-
12	EDO	A	815	-	-	1/1/1/1	-
8	PG4	A	806	-	-	0/10/10/10	-
10	PEG	A	812	-	-	2/4/4/4	-
8	PG4	A	807	-	-	7/10/10/10	-
3	NAG	A	641	1	-	0/6/23/26	0/1/1/1
3	NAG	A	621	1	-	0/6/23/26	0/1/1/1
7	P6G	A	805	-	-	5/15/15/16	-
9	PGE	A	808	-	-	3/7/7/7	-
10	PEG	A	810	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	A	814	PG6	C7-C6-O3-C5
7	A	804	P6G	O7-C8-C9-O10
9	A	808	PGE	O2-C3-C4-O3
7	A	804	P6G	C15-C14-O13-C12
9	A	809	PGE	O2-C3-C4-O3
11	A	814	PG6	O4-C8-C9-O5
8	A	807	PG4	O3-C5-C6-O4
9	A	808	PGE	O1-C1-C2-O2
7	A	805	P6G	O4-C5-C6-O7
7	A	804	P6G	O13-C14-C15-O16
9	A	809	PGE	O1-C1-C2-O2
9	A	809	PGE	O3-C5-C6-O4
11	A	814	PG6	O5-C10-C11-O6
7	A	805	P6G	O16-C17-C18-O19
8	A	807	PG4	O1-C1-C2-O2
9	A	808	PGE	O3-C5-C6-O4
10	A	810	PEG	O2-C3-C4-O4
10	A	813	PEG	O1-C1-C2-O2
10	A	810	PEG	O1-C1-C2-O2
12	A	816	EDO	O1-C1-C2-O2
11	A	814	PG6	O2-C4-C5-O3
7	A	804	P6G	O1-C2-C3-O4
8	A	807	PG4	O4-C7-C8-O5
7	A	805	P6G	C2-C3-O4-C5
11	A	814	PG6	C8-C9-O5-C10
7	A	805	P6G	C14-C15-O16-C17
8	A	807	PG4	C8-C7-O4-C6
7	A	804	P6G	C5-C6-O7-C8
10	A	812	PEG	O2-C3-C4-O4
10	A	813	PEG	O2-C3-C4-O4
7	A	804	P6G	O10-C11-C12-O13
11	A	814	PG6	C2-C3-O2-C4
8	A	807	PG4	C6-C5-O3-C4
11	A	814	PG6	C6-C7-O4-C8
10	A	812	PEG	C1-C2-O2-C3
10	A	811	PEG	O2-C3-C4-O4
11	A	814	PG6	O1-C2-C3-O2
12	A	815	EDO	O1-C1-C2-O2
8	A	807	PG4	O2-C3-C4-O3

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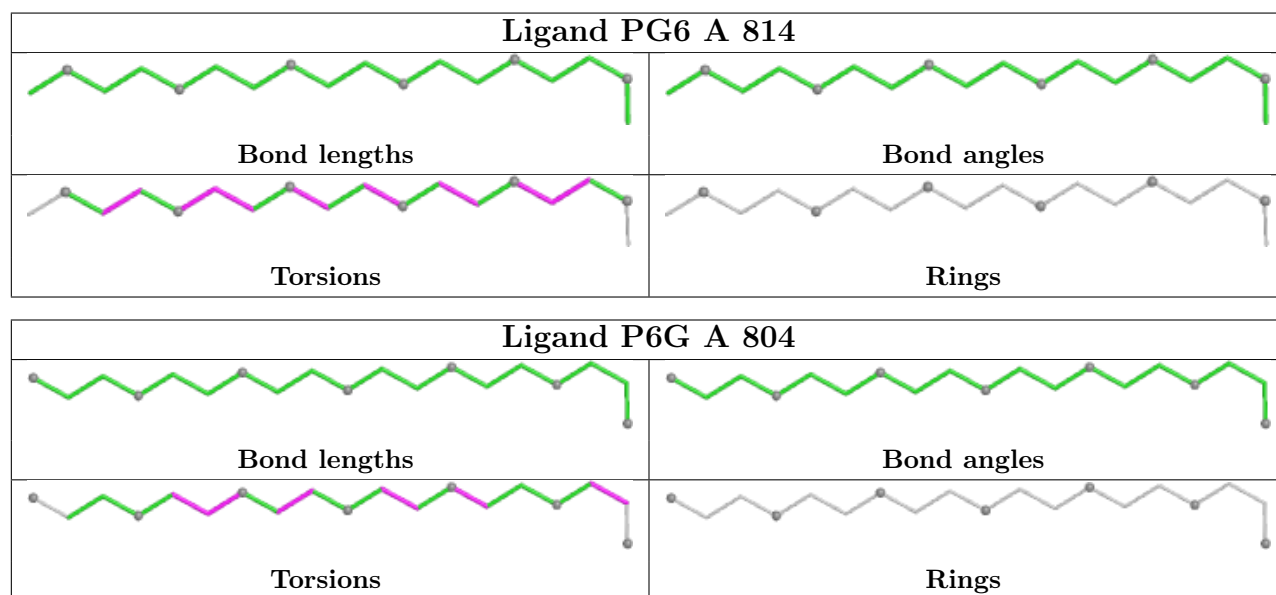
Mol	Chain	Res	Type	Atoms
7	A	805	P6G	C8-C9-O10-C11
9	A	809	PGE	C6-C5-O3-C4
8	A	807	PG4	C5-C6-O4-C7

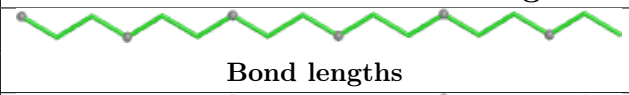
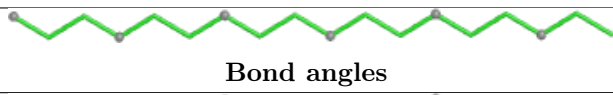
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	814	PG6	3	0
7	A	804	P6G	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.



Ligand P6G A 805	
 Bond lengths	 Bond angles
 Torsions	 Rings

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	575/586 (98%)	0.44	42 (7%) 21 22	9, 35, 92, 144	27 (4%)

All (42) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	583[A]	LEU	5.7
1	A	287	PRO	4.0
1	A	458	PHE	4.0
1	A	278	ILE	3.8
1	A	480[A]	THR	3.7
1	A	274	ILE	3.6
1	A	307	LEU	3.6
1	A	510	PHE	3.6
1	A	63	PRO	3.4
1	A	576	ILE	3.2
1	A	286	ILE	3.2
1	A	512	ALA	3.1
1	A	62	LEU	3.0
1	A	584	TYR	3.0
1	A	164	PHE	2.8
1	A	514	MET	2.8
1	A	561	LYS	2.7
1	A	281	CYS	2.6
1	A	282	CYS	2.6
1	A	294	ILE	2.5
1	A	522	LEU	2.5
1	A	275	SER	2.5
1	A	289	ARG	2.4
1	A	567	VAL	2.4
1	A	481[A]	ASN	2.4
1	A	198	TYR	2.3
1	A	298	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	137	LEU	2.3
1	A	569	PHE	2.3
1	A	61	THR	2.3
1	A	268	CYS	2.2
1	A	68	LEU	2.2
1	A	20	ASP	2.2
1	A	515	CYS	2.2
1	A	565	PRO	2.1
1	A	57	MET	2.1
1	A	579	LYS	2.1
1	A	309	GLU	2.1
1	A	562	ALA	2.1
1	A	519	ASN	2.0
1	A	290	GLY	2.0
1	A	291	GLN	2.0

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

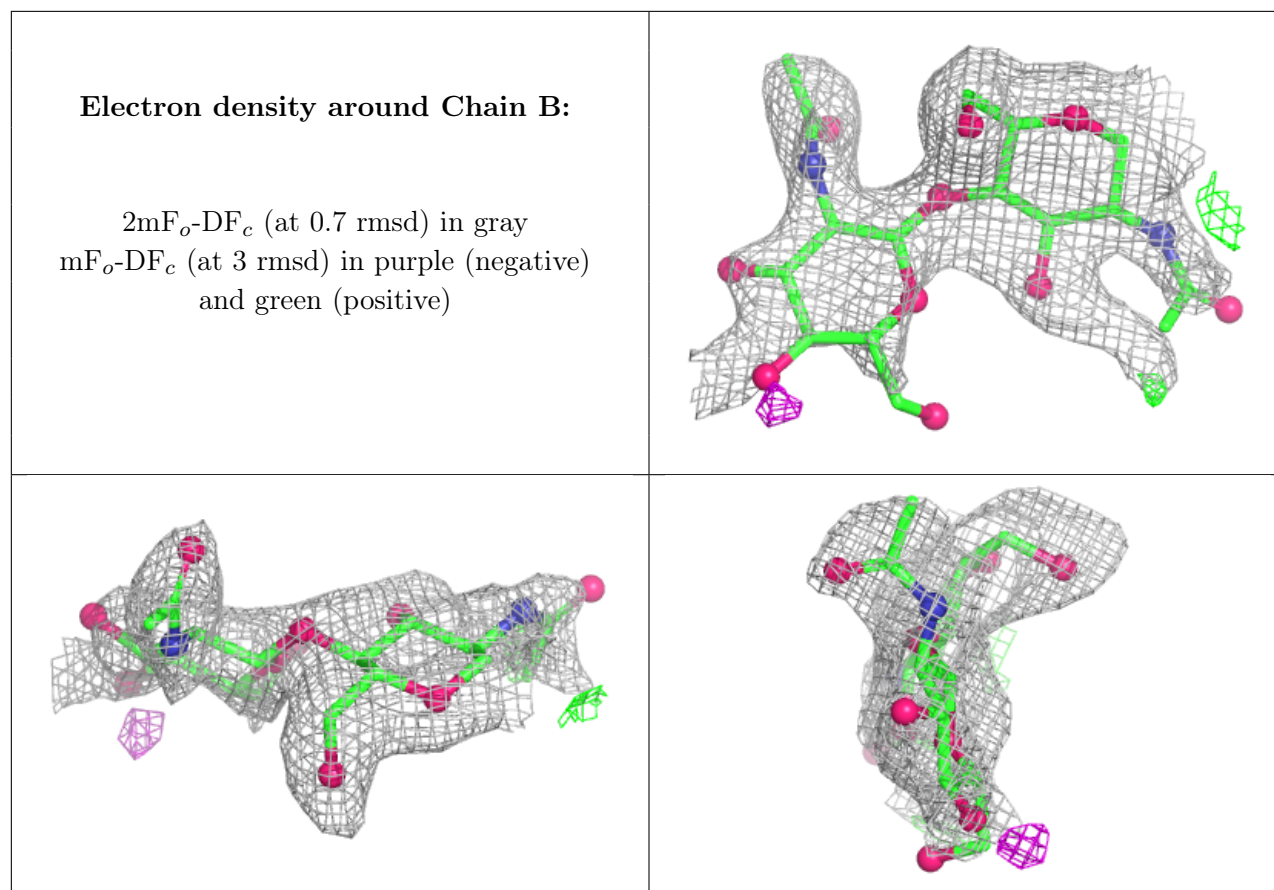
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	B	2	14/15	0.63	0.14	66,84,91,93	0
2	NAG	B	1	14/15	0.80	0.11	49,62,82,92	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



6.4 Ligands ⓘ

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	NAG	A	621	14/15	0.66	0.15	76,86,92,94	0
10	PEG	A	811	6/7	0.67	0.27	55,63,69,71	0
6	ACT	A	803	4/4	0.73	0.17	62,65,70,74	0
10	PEG	A	810	7/7	0.76	0.15	75,76,83,83	0
12	EDO	A	816	4/4	0.79	0.18	57,77,77,83	0
11	PG6	A	814	18/18	0.81	0.18	48,63,71,76	0
7	P6G	A	804	19/19	0.83	0.15	42,57,78,93	0
7	P6G	A	805	18/19	0.83	0.17	68,84,107,109	0
3	NAG	A	641	14/15	0.83	0.11	55,65,72,76	0
8	PG4	A	807	13/13	0.84	0.17	56,66,75,77	0
10	PEG	A	813	7/7	0.84	0.15	51,55,67,68	0
9	PGE	A	809	10/10	0.85	0.15	56,67,71,71	0
10	PEG	A	812	7/7	0.86	0.12	56,63,67,72	0

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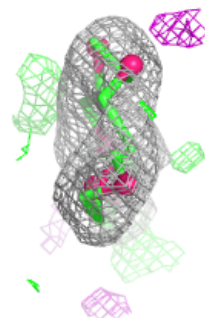
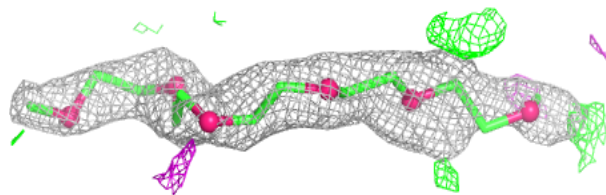
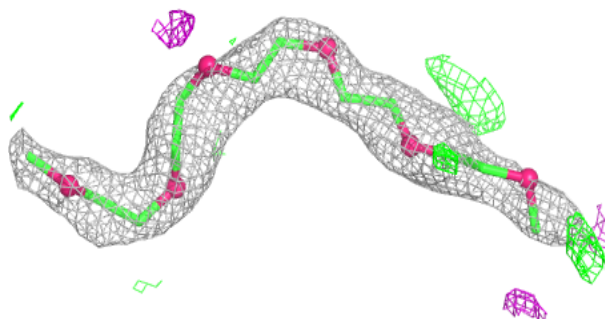
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
12	EDO	A	815	4/4	0.90	0.13	44,49,52,55	0
9	PGE	A	808	10/10	0.92	0.12	43,60,86,87	0
5	NA	A	802	1/1	0.94	0.17	45,45,45,45	0
8	PG4	A	806	13/13	0.94	0.09	31,37,56,61	0
4	CL	A	801	1/1	0.96	0.13	39,39,39,39	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.

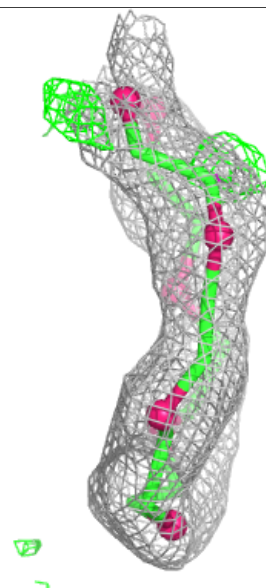
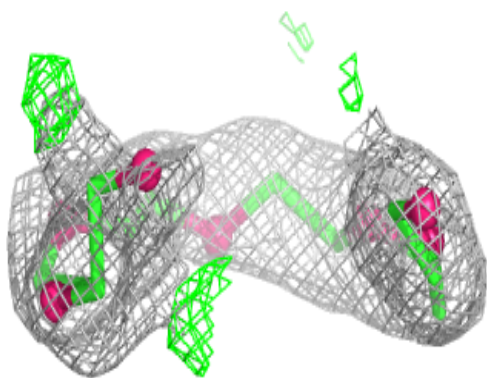
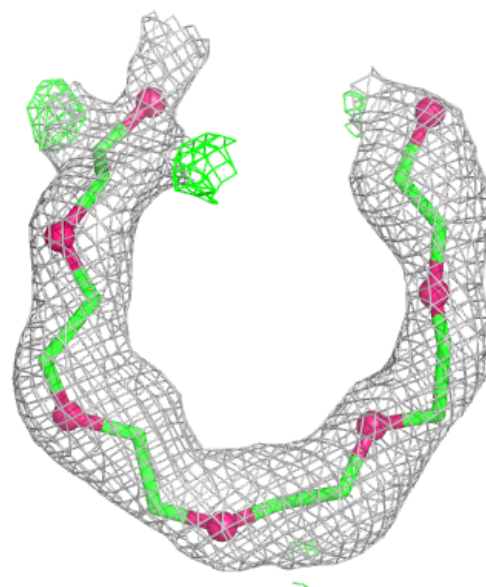
Electron density around PG6 A 814:

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



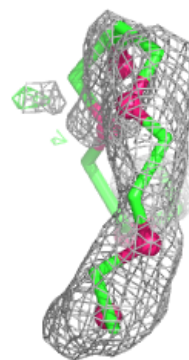
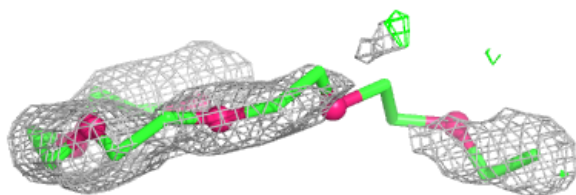
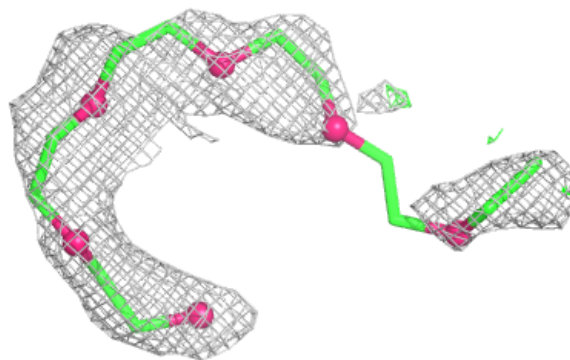
Electron density around P6G A 804:

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



Electron density around P6G A 805:

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



6.5 Other polymers ⓘ

There are no such residues in this entry.