WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Jun 12, 2024 – 05:55 PM EDT

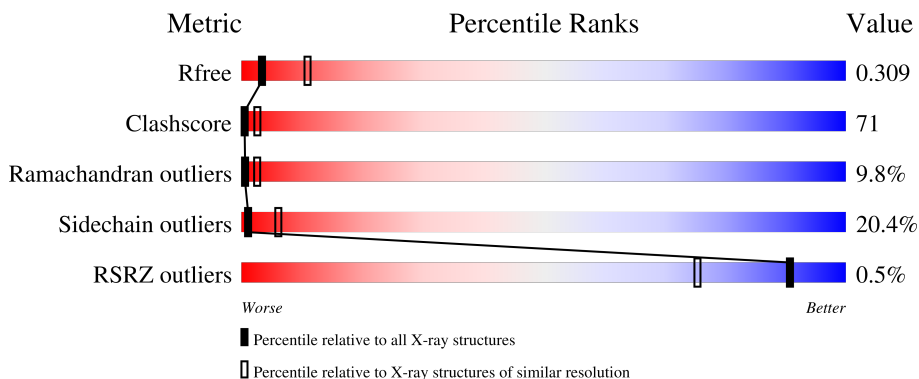|		
PDB ID	:	1DDX
Title	:	CRYSTAL STRUCTURE OF A MIXTURE OF ARACHIDONIC ACID AND PROSTAGLANDIN BOUND TO THE CYCLOOXYGENASE ACTIVE SITE OF COX-2: PROSTAGLANDIN STRUCTURE
Authors	:	Kiefer, J.R.; Pawlitz, J.L.; Moreland, K.T.; Stegeman, R.A.; Gierse, J.K.; Stevens, A.M.; Goodwin, D.C.; Rowlinson, S.W.; Marnett, L.J.; Stallings, W.C.; Kurumbail, R.G.
Deposited on	:	1999-11-11
Resolution	:	3.00 Å(reported)

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 3.00 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	Percentile Ranks	Value
Rfree		0.309
Clashscore		71
Ramachandran outliers		9.8%
Sidechain outliers		20.4%
RSRZ outliers		0.5%

Worse — *Better*

▮ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	552	19% 59% 21% •
1	B	552	.% / 19% 59% 20% •
1	C	552	20% 57% 22% •

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Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)	
Validation Pipeline (wwPDB-VP)	:	2.36.2	

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Mol	Chain	Length	Quality of chain
1	D	552	% 18% 60% 20% .
2	E	2	100%
2	F	2	100%
2	G	2	100%
2	H	2	100%

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
2	NAG	E	2	-	-	-	X
2	NAG	F	2	-	-	-	X
2	NAG	G	2	-	-	-	X
2	NAG	H	2	-	-	-	X
3	NAG	C	2681	-	-	-	X
4	BOG	A	702	-	-	-	X
4	BOG	C	2702	-	-	-	X
4	BOG	D	3702	-	-	-	X
5	PGX	A	701	-	-	X	X
5	PGX	B	1701	-	-	X	X
5	PGX	C	2701	-	-	X	X
5	PGX	D	3701	-	-	X	X

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 18477 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 PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	552	Total	C	N	O	S	0	0	0
			4475	2885	750	815	25			
1	B	552	Total	C	N	O	S	0	0	0
			4475	2885	750	815	25			
1	C	552	Total	C	N	O	S	0	0	0
			4475	2885	750	815	25			
1	D	552	Total	C	N	O	S	0	0	0
			4475	2885	750	815	25			

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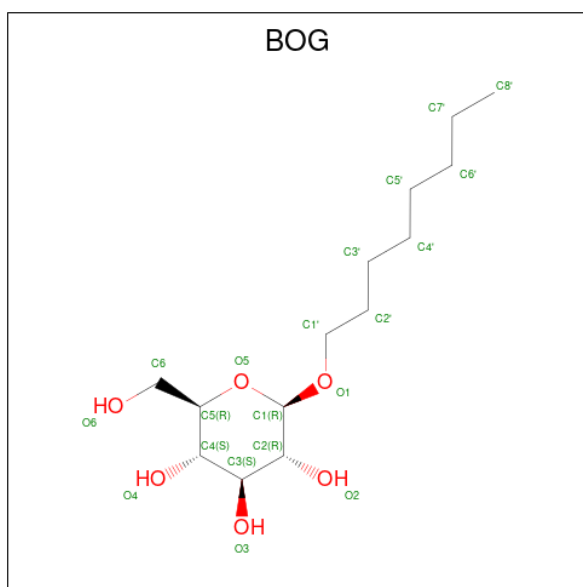

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	H	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

NAG

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

- Molecule 4 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: $C_{14}H_{28}O_6$).

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 20	C 14	O 6	0	0
4	B	1	Total 20	C 14	O 6	0	0
4	C	1	Total 20	C 14	O 6	0	0
4	D	1	Total 20	C 14	O 6	0	0

- Molecule 5 is 7-[6-(3-HYDROPEROXY-OCT-1-ENYL)-2,3-DIOXA-BICYCLO[2.2.1]HEPT -5-YL]-HEPT-5-ENOIC ACID (three-letter code: PGX) (formula: $C_{20}H_{32}O_6$).
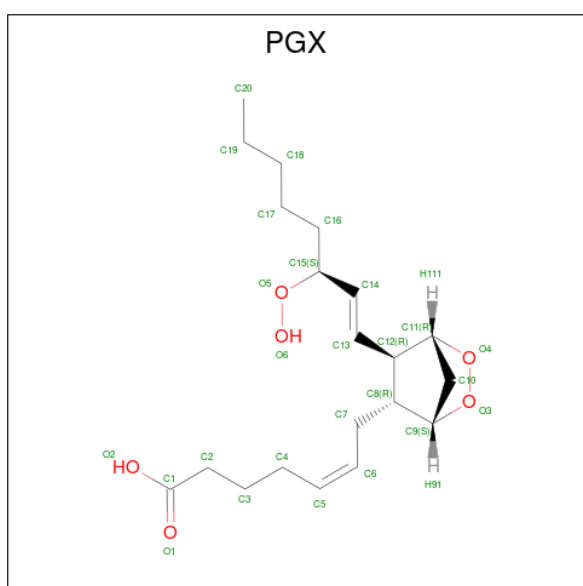
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 25	C 20	O 5	0	0
5	B	1	Total 25	C 20	O 5	0	0
5	C	1	Total 25	C 20	O 5	0	0
5	D	1	Total 25	C 20	O 5	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	45	Total 45	O 45	0	0
6	B	39	Total 39	O 39	0	0
6	C	46	Total 46	O 46	0	0
6	D	43	Total 43	O 43	0	0

3 Residue-property plots ⓘ

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: PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2)

- Molecule 1: PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2)

• Molecule 1: PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2)

Chain C:

• Molecule 1: PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2)

Chain D:

• Molecule 1: PROTEIN (PROSTAGLANDIN H2 SYNTHASE-2)

%

Chain D:
18%   60%   20%   •

L3534 M3535 G3536 N3537 P3538 I3539 C3540 Q3543 Y3544 W3545 K3546 P3547 S3548 T3549 F3550 G3551 G3552 E3553 V3554 G3555 F3556 K3557 I3558 I3559 N3560 S3563 I3564 Q3565 S3566 L3567 I3568 C3569 N3570 N3571 V3572 K3573 P3576 F3577 T3578 S3579 F3580 N3581 V3582 Q3583

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

Chain E:

100%

NAG1 NAG2

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

Chain F:

100%

NAG1 NAG2

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

Chain G:

100%

NAG1 NAG2

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

Chain H:

100%

NAG1 NAG2

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	180.24Å 134.80Å 122.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.00 36.19 – 3.00	Depositor EDS
% Data completeness (in resolution range)	76.1 (20.00-3.00) 75.8 (36.19-3.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$< I/\sigma(I) >$ [1]	1.34 (at 3.00Å)	Xtriage
Refinement program	X-PLOR 3.851	Depositor
R, R_{free}	0.267 , 0.324 0.254 , 0.309	Depositor DCC
R_{free} test set	4329 reflections (9.43%)	wwPDB-VP
Wilson B-factor (Å^2)	34.0	Xtriage
Anisotropy	0.915	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 60.9	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	18477	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 48.65 % 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 8.3521e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: PGX, NAG, BOG

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	0.45	0/4602	0.65	0/6239
1	B	0.45	0/4602	0.65	0/6239
1	C	0.45	0/4602	0.65	0/6239
1	D	0.46	0/4602	0.64	0/6239
All	All	0.45	0/18408	0.64	0/24956

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 ⓘ

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	4475	0	4373	650	0
1	B	4475	0	4373	653	0
1	C	4475	0	4373	663	0
1	D	4475	0	4373	668	0
2	E	28	0	25	0	0
2	F	28	0	25	0	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
3	A	28	0	26	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	28	0	26	0	0
3	C	28	0	26	0	0
3	D	28	0	26	0	0
4	A	20	0	28	0	0
4	B	20	0	28	0	0
4	C	20	0	28	0	0
4	D	20	0	28	1	0
5	A	25	0	30	9	0
5	B	25	0	30	13	0
5	C	25	0	30	14	0
5	D	25	0	30	11	0
6	A	45	0	0	14	0
6	B	39	0	0	12	0
6	C	46	0	0	20	0
6	D	43	0	0	15	0
All	All	18477	0	17928	2579	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 71.

The worst 5 of 2579 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:D:3312:VAL:HA	1:D:3315:ILE:HD12	1.33	1.09
1:A:312:VAL:HA	1:A:315:ILE:HD12	1.33	1.08
1:B:1312:VAL:HA	1:B:1315:ILE:HD12	1.36	1.07
1:B:1301:TYR:HA	1:B:1304:ILE:HD12	1.37	1.07
1:A:99:VAL:HA	1:A:102:ILE:HD12	1.37	1.06

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	550/552 (100%)	374 (68%)	124 (22%)	52 (10%)	0	3
1	B	550/552 (100%)	379 (69%)	119 (22%)	52 (10%)	0	3
1	C	550/552 (100%)	372 (68%)	120 (22%)	58 (10%)	0	2
1	D	550/552 (100%)	376 (68%)	121 (22%)	53 (10%)	0	3
All	All	2200/2208 (100%)	1501 (68%)	484 (22%)	215 (10%)	0	2

5 of 215 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	121	SER
1	A	122	TYR
1	A	176	GLU
1	A	180	LYS
1	A	348	TYR

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	493/493 (100%)	391 (79%)	102 (21%)	1	6
1	B	493/493 (100%)	391 (79%)	102 (21%)	1	6
1	C	493/493 (100%)	393 (80%)	100 (20%)	1	6
1	D	493/493 (100%)	394 (80%)	99 (20%)	1	6
All	All	1972/1972 (100%)	1569 (80%)	403 (20%)	1	6

5 of 403 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	2165	VAL
1	C	2482	THR
1	D	3543	GLN
1	C	2190	ASP
1	C	2322	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 59 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1571	ASN
1	D	3560	ASN
1	C	2396	ASN
1	D	3464	ASN
1	D	3374	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 ⓘ

8 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	E	1	1,2	14,14,15	0.68	0	17,19,21	0.66	0
2	NAG	E	2	2	14,14,15	0.78	0	17,19,21	0.50	0
2	NAG	F	1	1,2	14,14,15	0.88	0	17,19,21	0.72	0
2	NAG	F	2	2	14,14,15	0.91	0	17,19,21	0.52	0
2	NAG	G	1	1,2	14,14,15	0.66	0	17,19,21	0.68	0
2	NAG	G	2	2	14,14,15	0.78	0	17,19,21	0.50	0
2	NAG	H	1	1,2	14,14,15	0.75	0	17,19,21	0.67	0
2	NAG	H	2	2	14,14,15	0.82	0	17,19,21	0.55	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	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	1/6/23/26	0/1/1/1
2	NAG	F	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	1/6/23/26	0/1/1/1
2	NAG	G	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	G	2	2	-	1/6/23/26	0/1/1/1
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	1/6/23/26	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	F	2	NAG	C3-C2-N2-C7
2	E	2	NAG	C3-C2-N2-C7
2	G	2	NAG	C3-C2-N2-C7
2	H	2	NAG	C3-C2-N2-C7

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.

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings
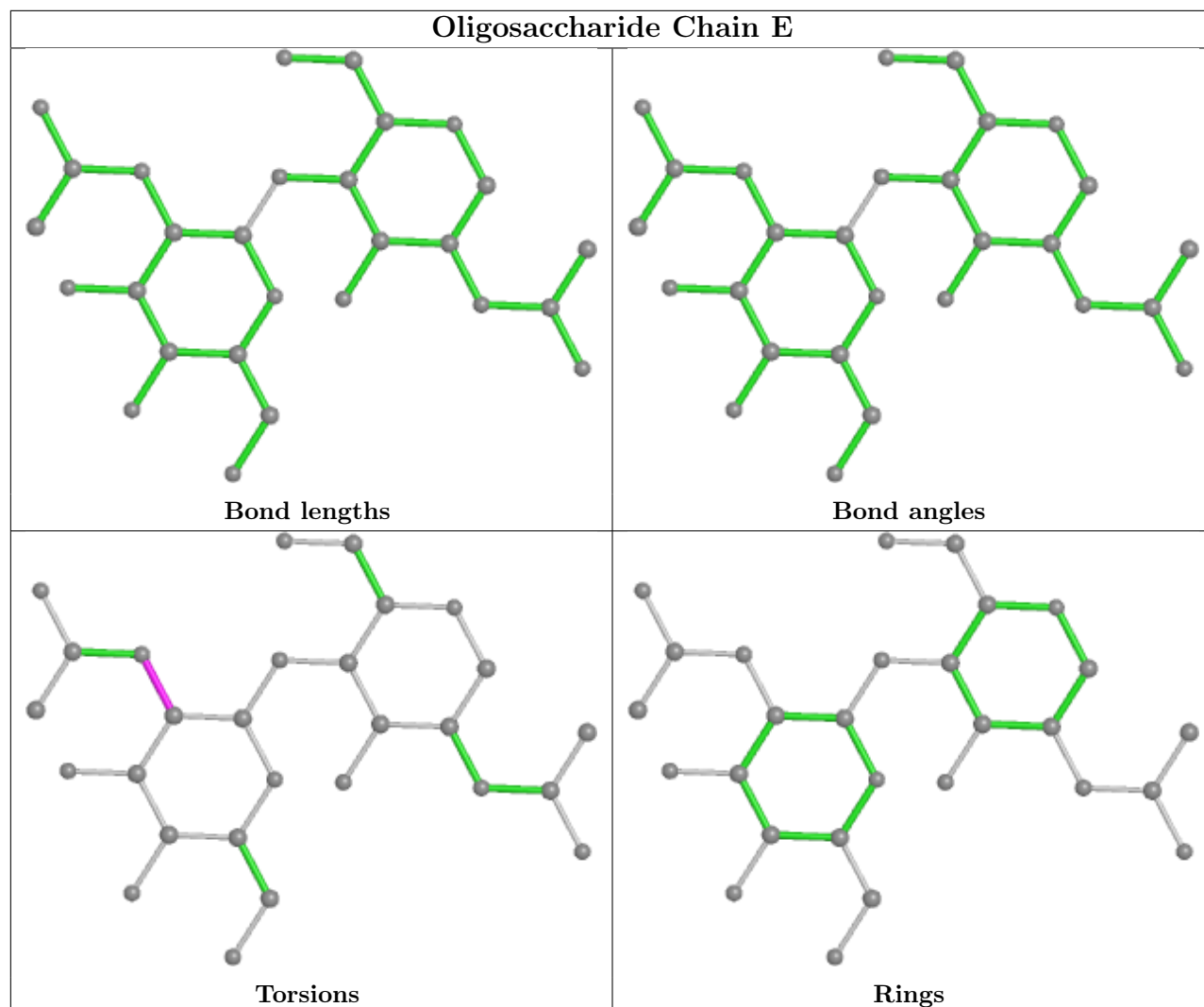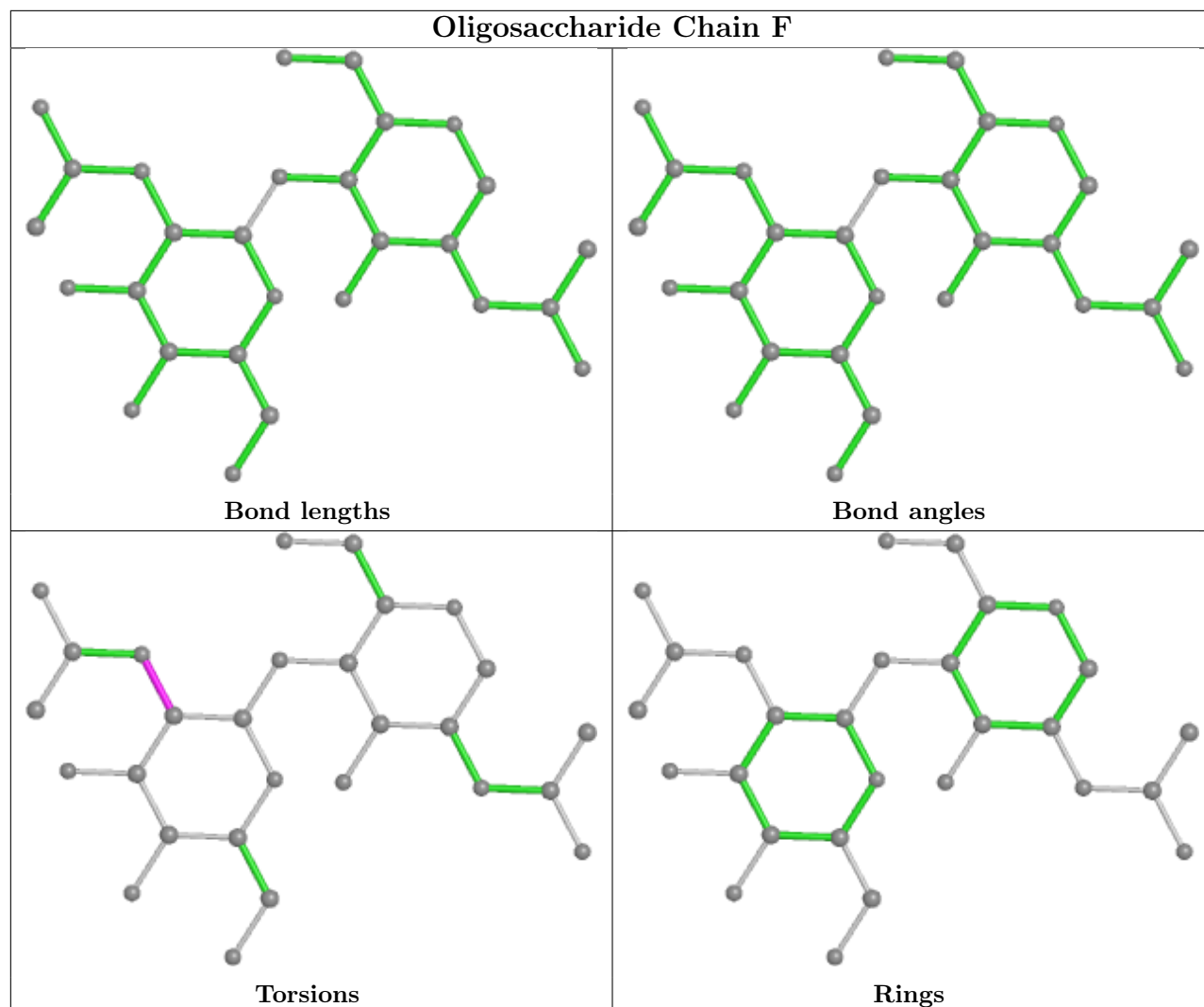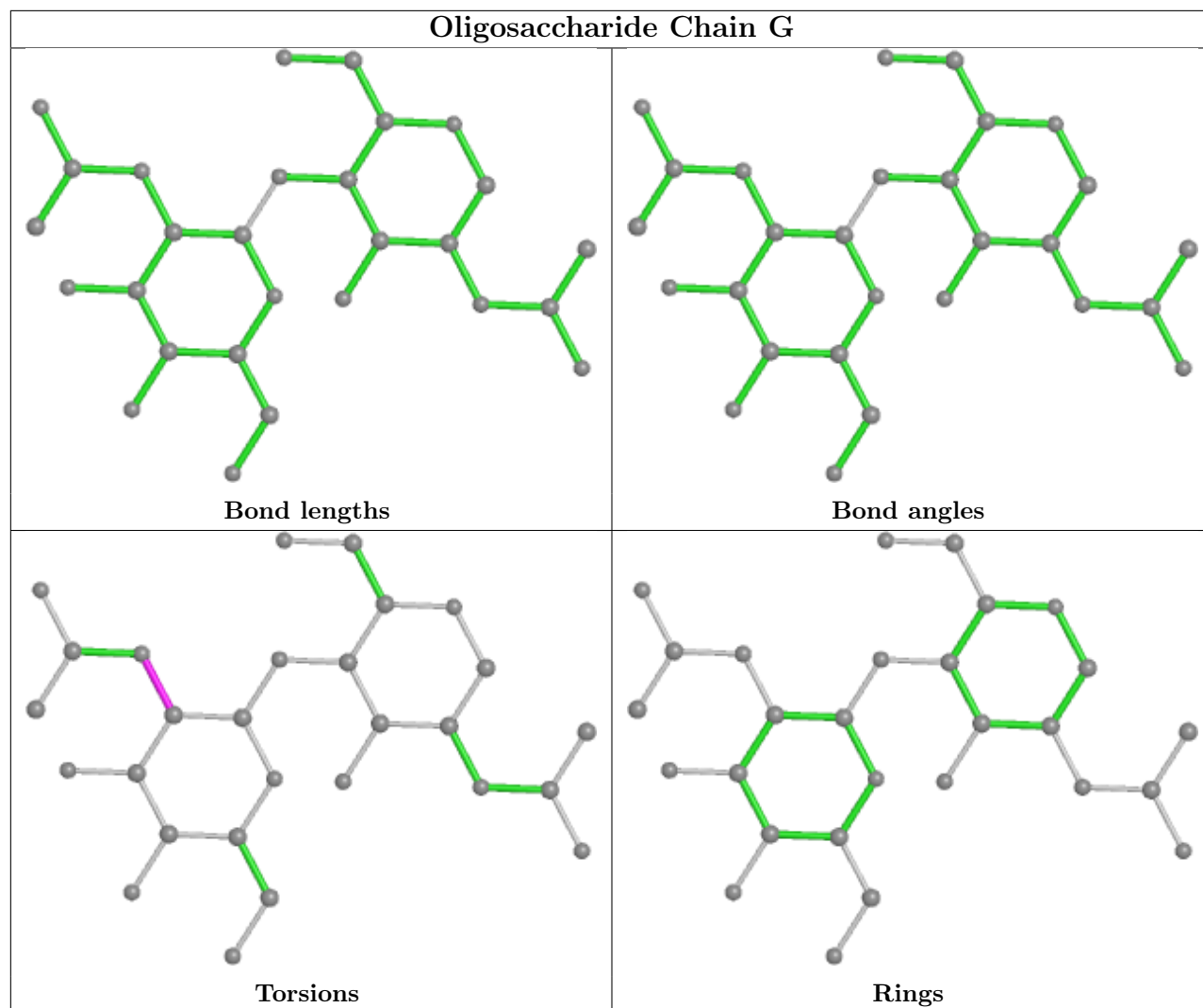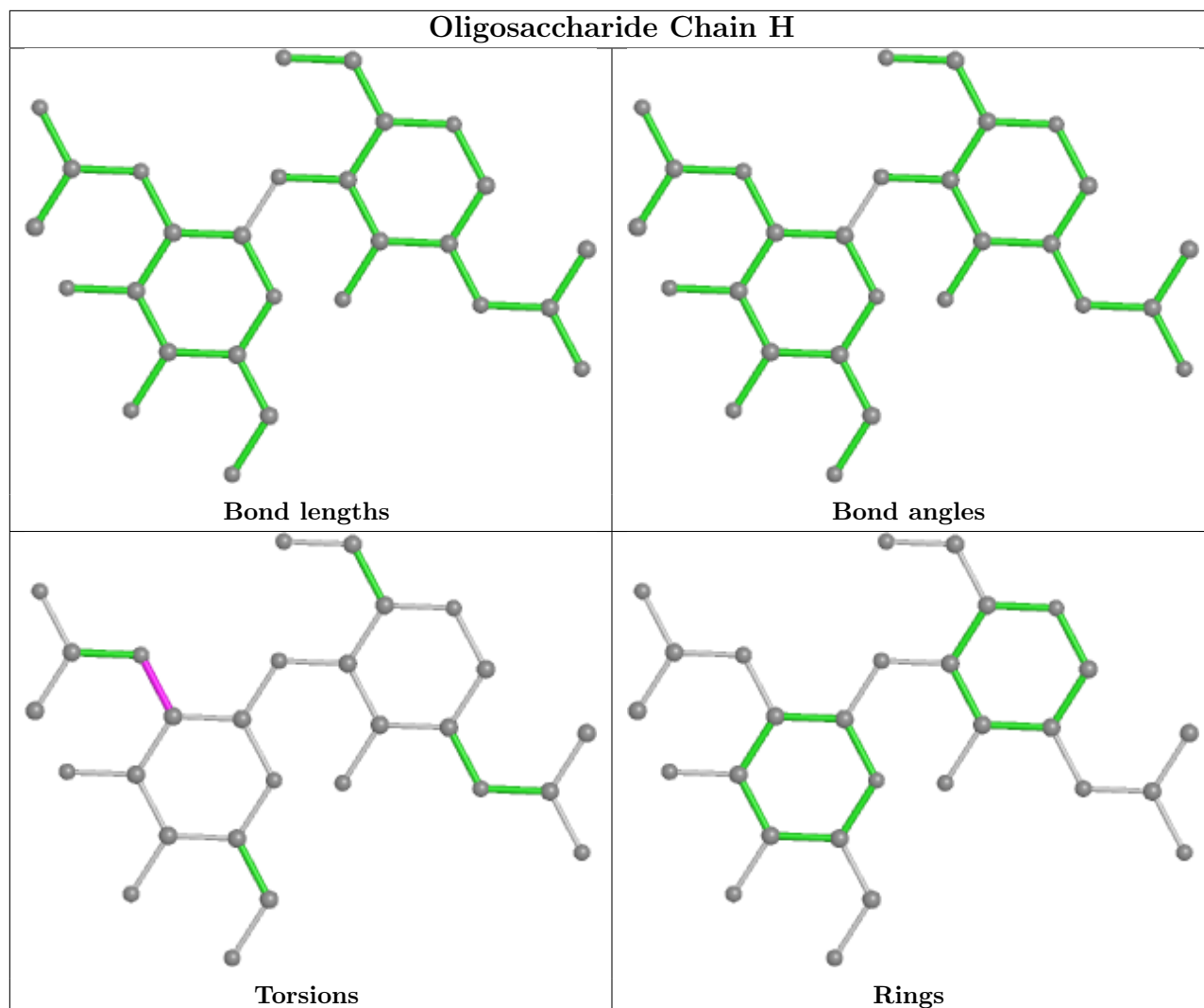
5.6   Ligand geometry ⓘ

16 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	NAG	D	3671	1	14,14,15	0.60	0	17,19,21	0.97	1 (5%)
5	PGX	A	701	-	24,26,27	1.48	2 (8%)	24,33,34	1.49	1 (4%)
3	NAG	C	2671	1	14,14,15	0.70	0	17,19,21	1.05	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	NAG	D	3681	1	14,14,15	0.61	0	17,19,21	0.49	0
4	BOG	A	702	-	20,20,20	0.90	2 (10%)	25,25,25	0.61	0
4	BOG	B	1702	-	20,20,20	0.87	2 (10%)	25,25,25	0.62	0
3	NAG	B	1671	1	14,14,15	0.56	0	17,19,21	0.87	1 (5%)
3	NAG	B	1681	1	14,14,15	0.67	0	17,19,21	0.62	0
3	NAG	A	671	1	14,14,15	0.69	0	17,19,21	1.09	2 (11%)
4	BOG	D	3702	-	20,20,20	0.89	2 (10%)	25,25,25	0.59	0
4	BOG	C	2702	-	20,20,20	0.97	2 (10%)	25,25,25	0.60	0
3	NAG	C	2681	1	14,14,15	0.70	0	17,19,21	0.60	0
5	PGX	B	1701	-	24,26,27	1.49	2 (8%)	24,33,34	1.48	1 (4%)
5	PGX	D	3701	-	24,26,27	1.47	2 (8%)	24,33,34	1.49	1 (4%)
5	PGX	C	2701	-	24,26,27	1.44	1 (4%)	24,33,34	1.47	1 (4%)
3	NAG	A	681	1	14,14,15	0.69	0	17,19,21	0.67	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	NAG	D	3671	1	-	2/6/23/26	0/1/1/1
5	PGX	A	701	-	-	11/19/40/42	0/2/2/2
3	NAG	C	2671	1	-	2/6/23/26	0/1/1/1
3	NAG	D	3681	1	-	2/6/23/26	0/1/1/1
4	BOG	A	702	-	-	2/11/31/31	0/1/1/1
4	BOG	B	1702	-	-	2/11/31/31	0/1/1/1
3	NAG	B	1671	1	-	2/6/23/26	0/1/1/1
3	NAG	B	1681	1	-	2/6/23/26	0/1/1/1
3	NAG	A	671	1	-	2/6/23/26	0/1/1/1
4	BOG	D	3702	-	-	2/11/31/31	0/1/1/1
4	BOG	C	2702	-	-	2/11/31/31	0/1/1/1
3	NAG	C	2681	1	-	2/6/23/26	0/1/1/1
5	PGX	B	1701	-	-	11/19/40/42	0/2/2/2
5	PGX	D	3701	-	-	11/19/40/42	0/2/2/2
5	PGX	C	2701	-	-	11/19/40/42	0/2/2/2
3	NAG	A	681	1	-	2/6/23/26	0/1/1/1

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1701	PGX	O4-O3	-5.54	1.24	1.46
5	D	3701	PGX	O4-O3	-5.50	1.24	1.46
5	C	2701	PGX	O4-O3	-5.50	1.24	1.46
5	A	701	PGX	O4-O3	-5.42	1.24	1.46
4	C	2702	BOG	O1-C1	2.84	1.45	1.40

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	D	3701	PGX	C11-C10-C9	-6.25	85.67	103.73
5	A	701	PGX	C11-C10-C9	-6.19	85.86	103.73
5	B	1701	PGX	C11-C10-C9	-6.16	85.95	103.73
5	C	2701	PGX	C11-C10-C9	-6.15	85.99	103.73
3	A	671	NAG	C2-N2-C7	-2.68	119.09	122.90

There are no chirality outliers.

5 of 68 torsion outliers are listed below:

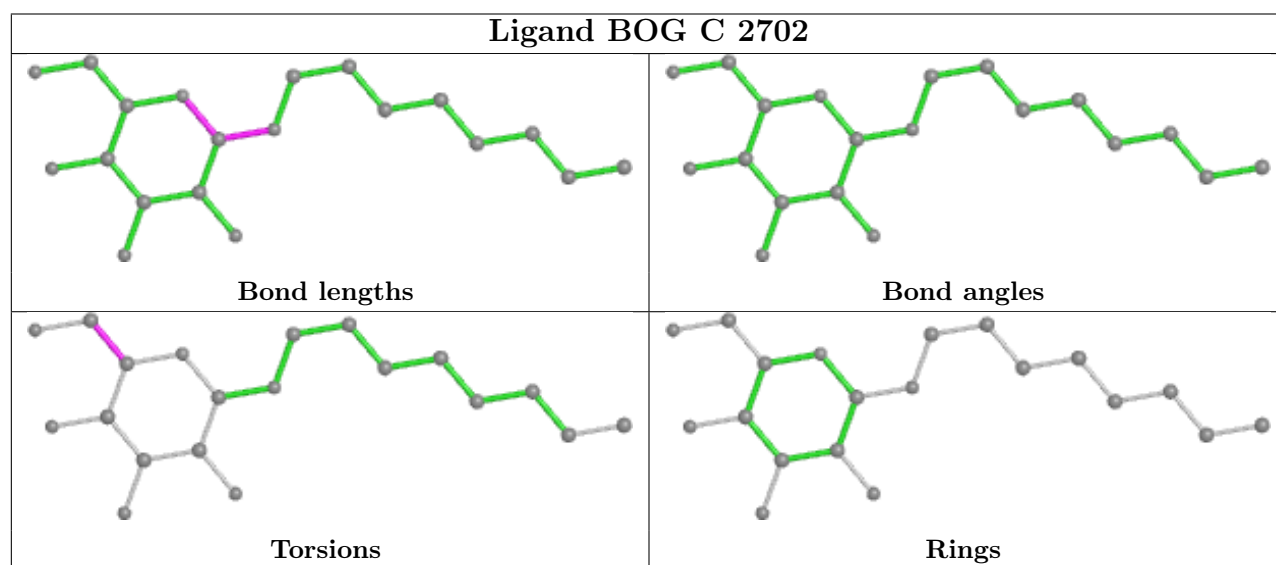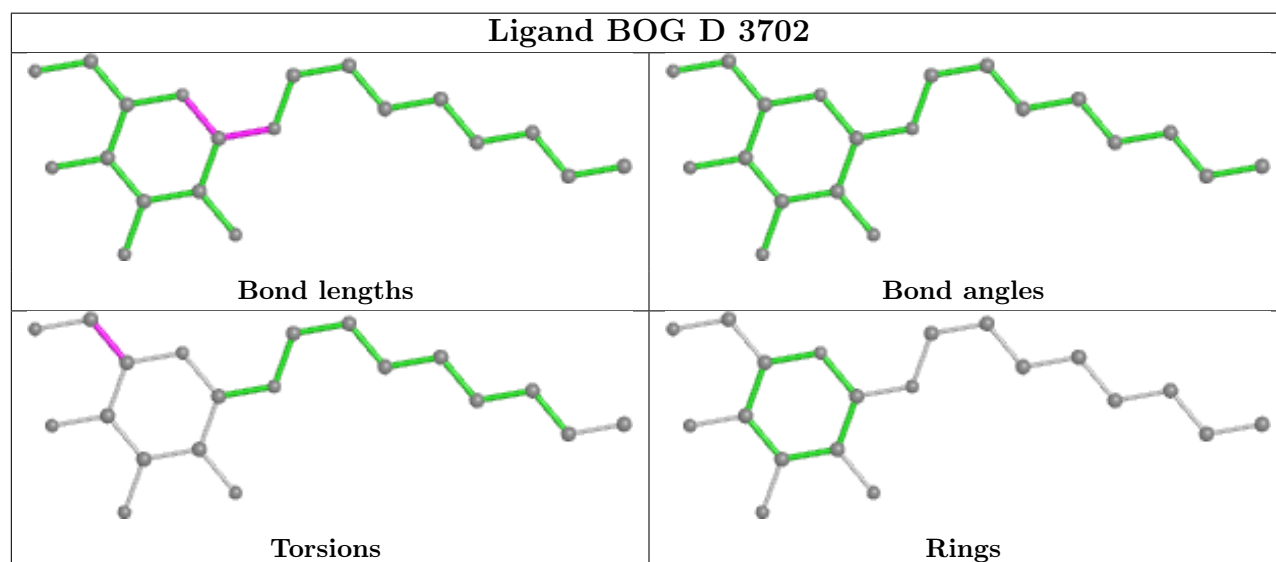| Mol	Chain	Res	Type	Atoms
5	A	701	PGX	C6-C7-C8-C12
5	A	701	PGX	C8-C12-C13-C14
5	A	701	PGX	C11-C12-C13-C14
5	A	701	PGX	C14-C15-C16-C17
5	A	701	PGX	O5-C15-C16-C17

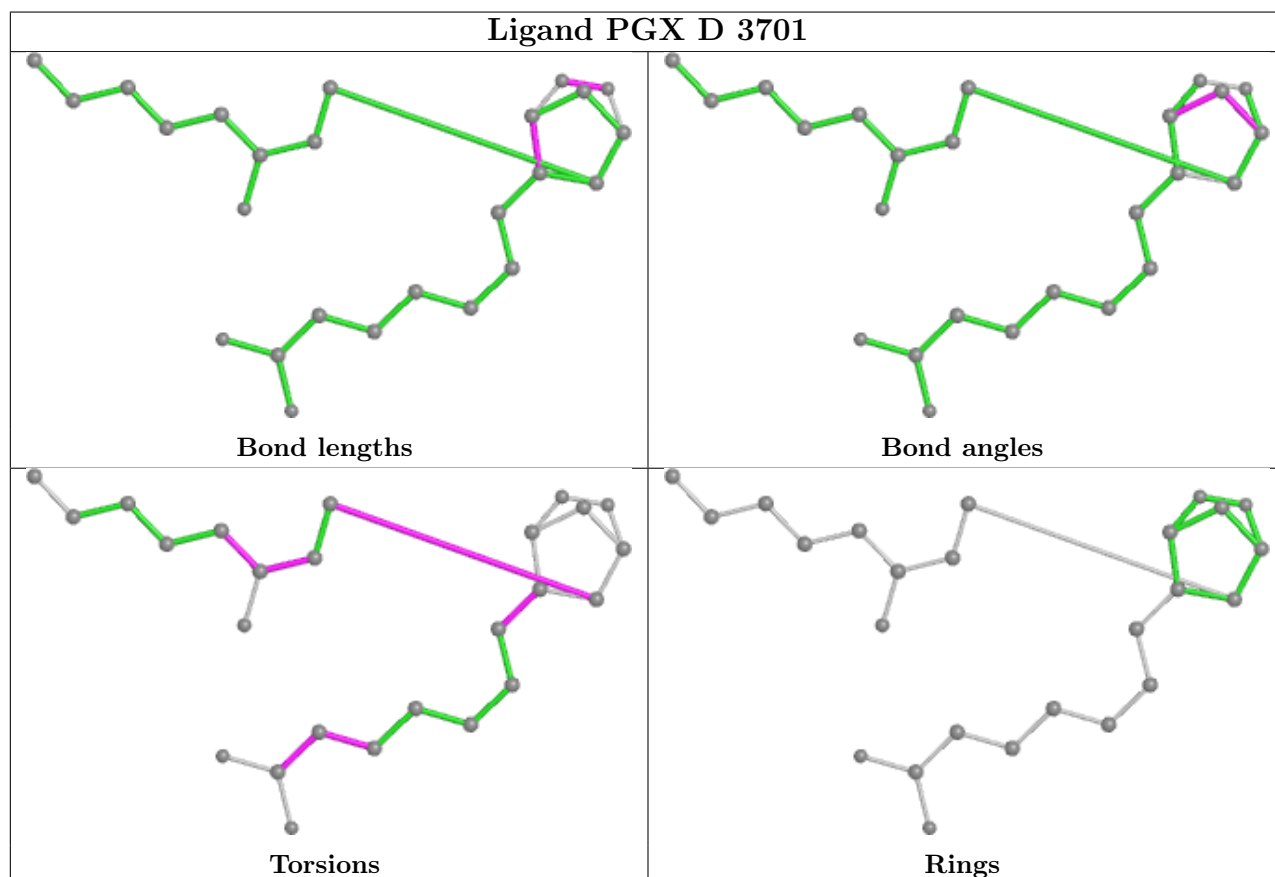There are no ring outliers.

5 monomers are involved in 48 short contacts:

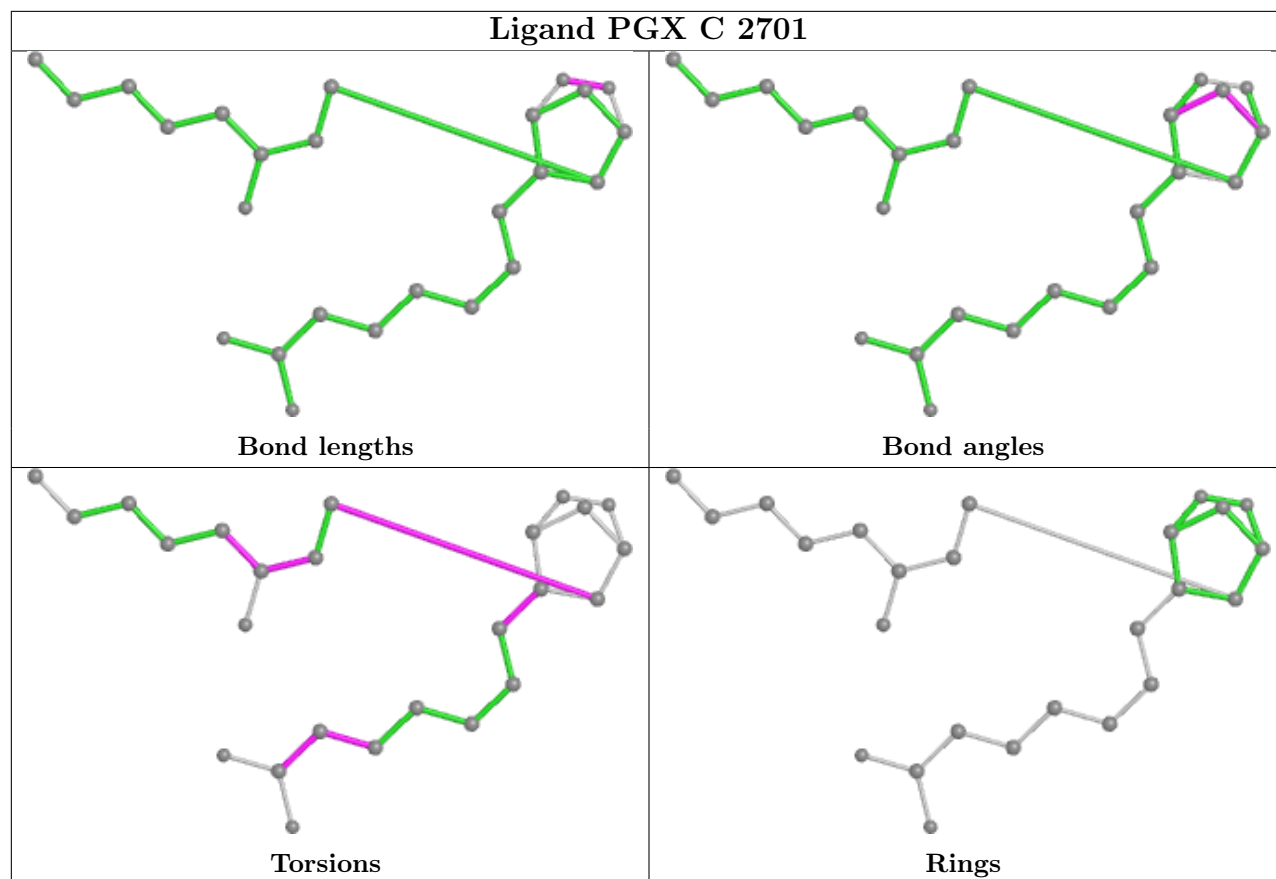| Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	701	PGX	9	0
4	D	3702	BOG	1	0
5	B	1701	PGX	13	0
5	D	3701	PGX	11	0
5	C	2701	PGX	14	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand PGX A 701

Bond lengths

Bond angles

Torsions

Rings

Ligand BOG A 702

Bond lengths

Bond angles

Torsions

Rings

Ligand BOG B 1702

Bond lengths

Bond angles

Torsions

Rings

Ligand BOG D 3702

Bond lengths

Bond angles

Torsions

Rings

Ligand BOG C 2702

Bond lengths

Bond angles

Torsions

Rings

Ligand PGX B 1701

Bond lengths

Bond angles

Torsions

Rings

Ligand PGX D 3701

Bond lengths

Bond angles

Torsions

Rings

Ligand PGX C 2701

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	552/552 (100%)	-0.19	2 (0%)	92	79	2, 25, 52, 71	0
1	B	552/552 (100%)	-0.13	5 (0%)	84	63	3, 25, 51, 70	0
1	C	552/552 (100%)	-0.20	2 (0%)	92	79	2, 25, 51, 70	0
1	D	552/552 (100%)	-0.14	3 (0%)	91	75	3, 25, 51, 70	0
All	All	2208/2208 (100%)	-0.17	12 (0%)	91	75	2, 25, 51, 71	0

The worst 5 of 12 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	105	ASN	3.1
1	B	1103	VAL	3.1
1	D	3105(D)	ILE	3.1
1	C	2083	LYS	2.9
1	B	1102	ILE	2.9

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(Å²)	Q<0.9
2	NAG	F	2	14/15	0.55	0.47	78,81,84,84	0
2	NAG	H	2	14/15	0.56	0.48	77,80,85,86	0

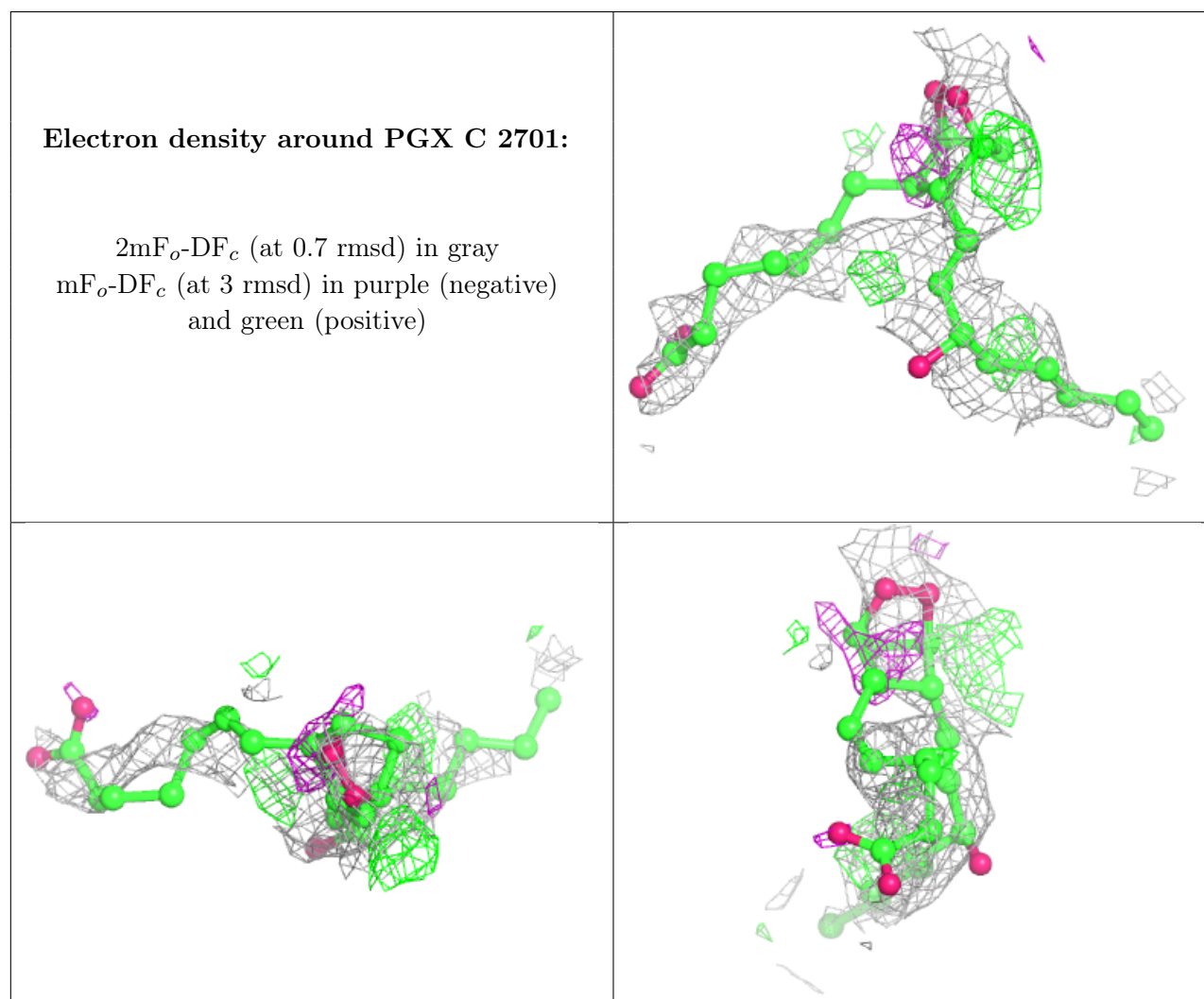*Continued on next page...*

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	NAG	G	2	14/15	0.60	0.50	78,81,85,85	0
2	NAG	E	2	14/15	0.68	0.63	77,81,84,84	0
2	NAG	F	1	14/15	0.79	0.34	52,60,67,74	0
2	NAG	E	1	14/15	0.83	0.38	52,59,65,72	0
2	NAG	H	1	14/15	0.84	0.36	51,62,66,71	0
2	NAG	G	1	14/15	0.86	0.24	51,59,64,72	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.

Electron density around Chain E:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
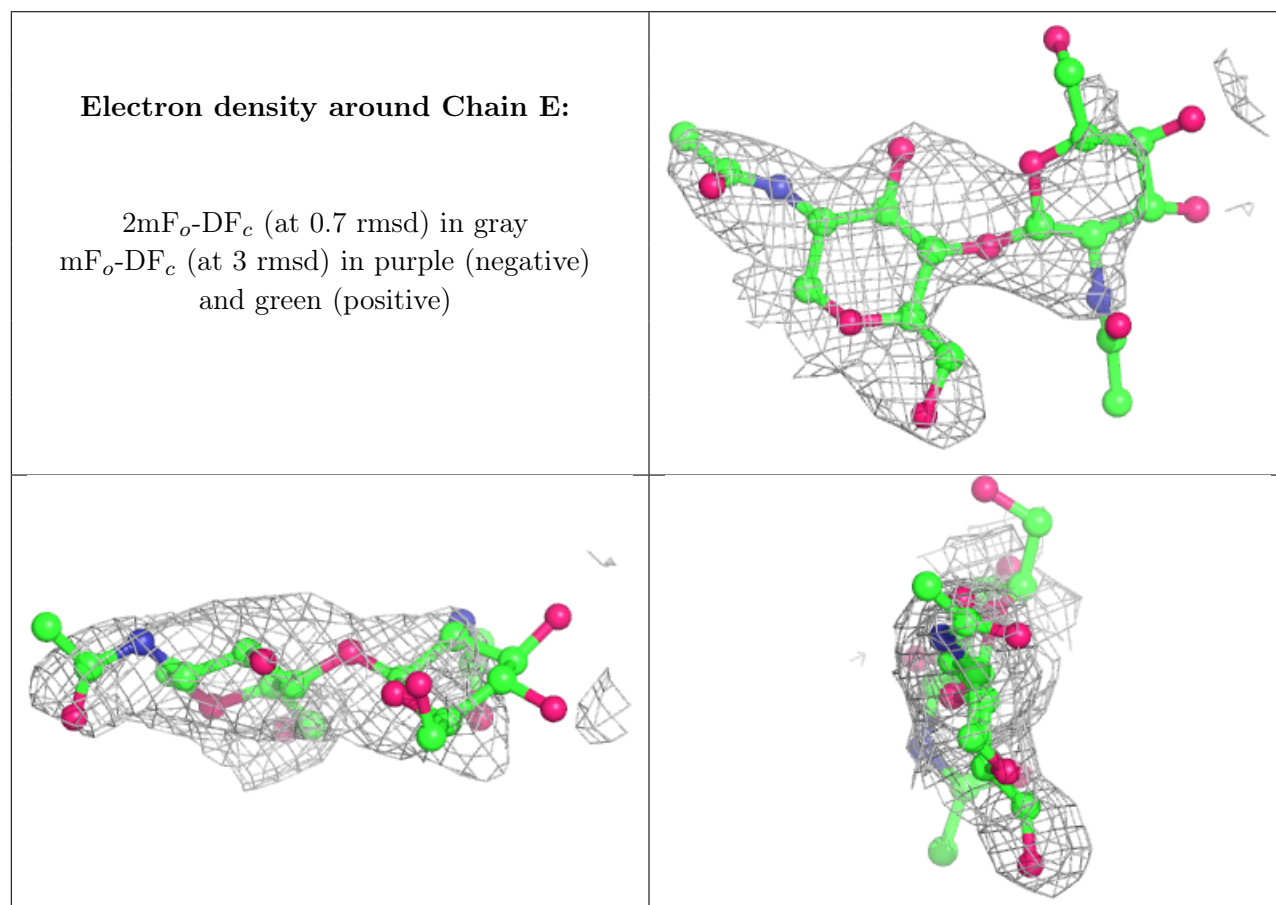
Electron density around Chain F:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
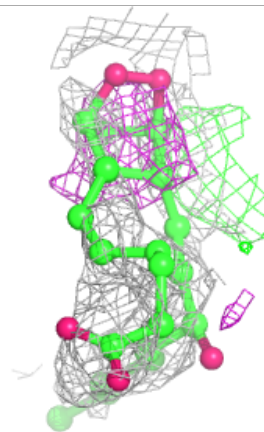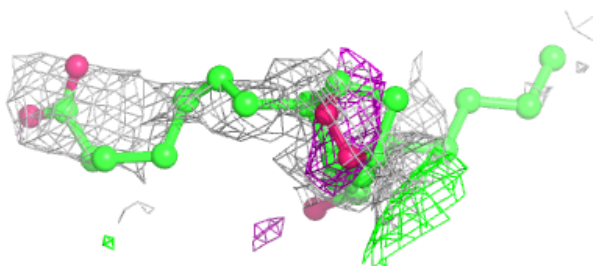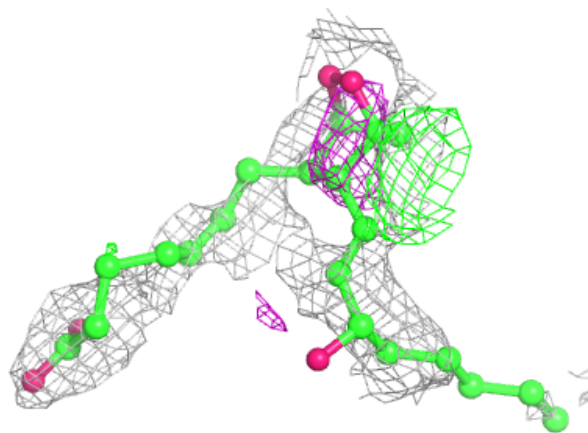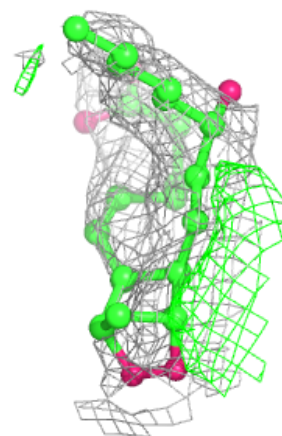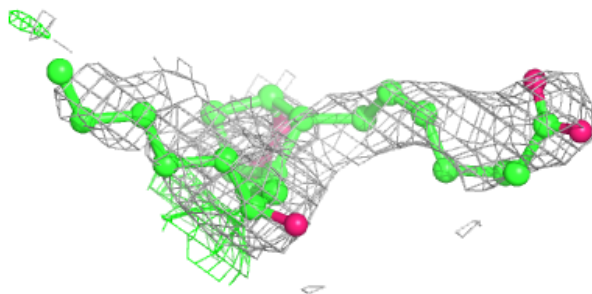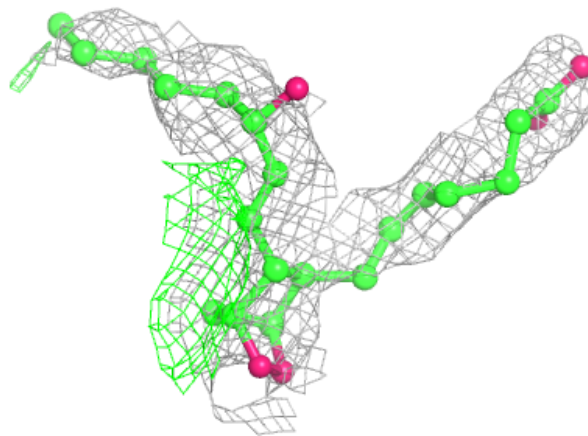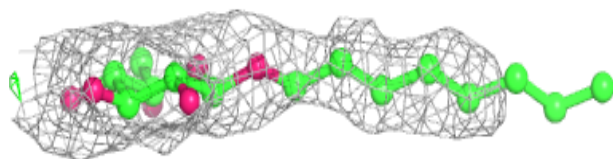mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
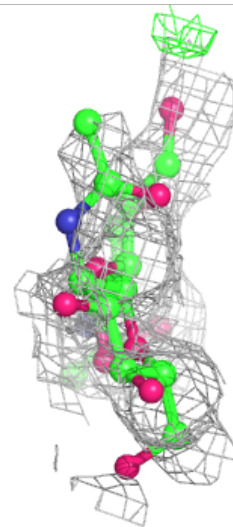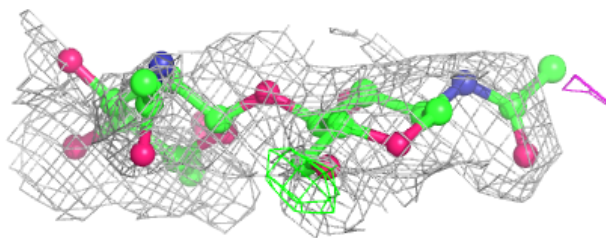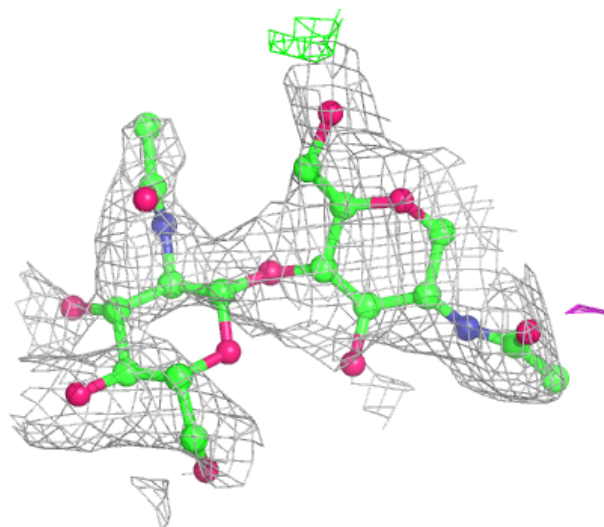
Electron density around Chain G:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
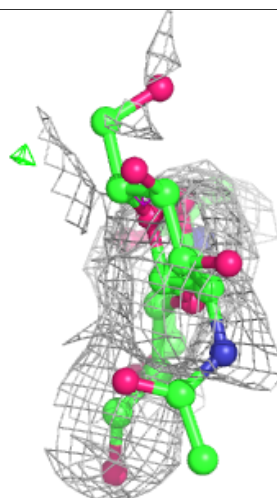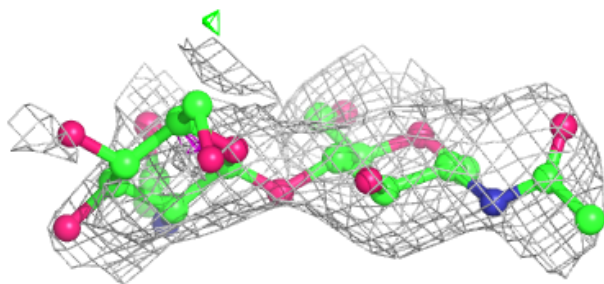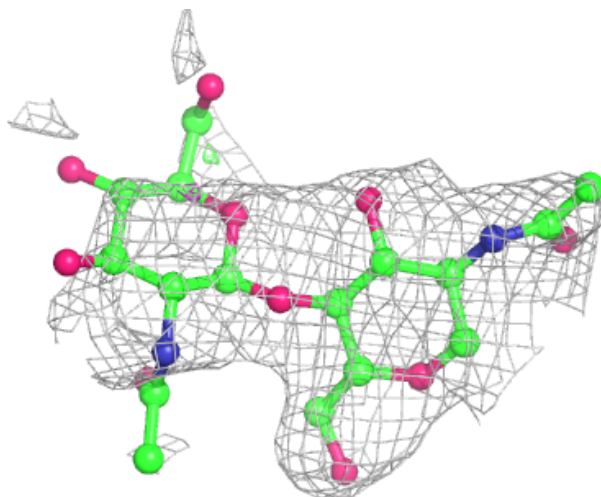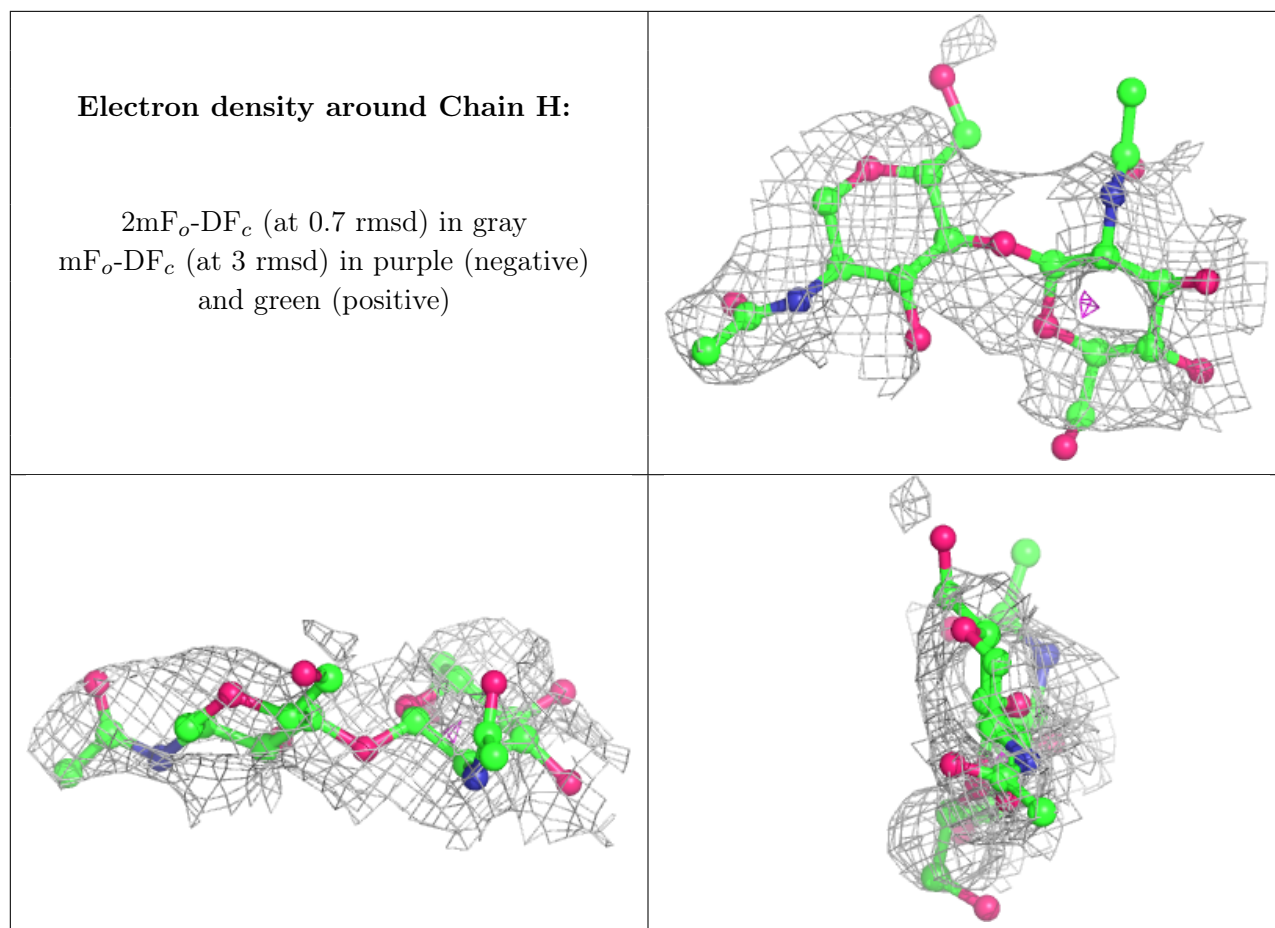
Electron density around Chain H:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

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	C	2681	14/15	0.53	0.54	66,69,73,73	0
5	PGX	C	2701	25/26	0.63	0.53	75,79,84,84	0
5	PGX	B	1701	25/26	0.67	0.49	72,78,84,85	0
3	NAG	A	681	14/15	0.70	0.40	67,70,73,74	0
5	PGX	D	3701	25/26	0.71	0.43	74,78,86,87	0
5	PGX	A	701	25/26	0.72	0.48	73,78,86,87	0
3	NAG	B	1681	14/15	0.75	0.38	66,71,73,75	0
4	BOG	D	3702	20/20	0.75	0.42	46,53,59,62	0
4	BOG	C	2702	20/20	0.76	0.48	56,60,64,66	0
4	BOG	A	702	20/20	0.76	0.55	54,58,62,65	0
4	BOG	B	1702	20/20	0.79	0.39	50,54,59,59	0
3	NAG	D	3681	14/15	0.84	0.28	66,70,72,73	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	NAG	C	2671	14/15	0.86	0.18	7,10,25,28	0
3	NAG	A	671	14/15	0.89	0.18	2,9,25,27	0
3	NAG	B	1671	14/15	0.89	0.18	5,10,25,26	0
3	NAG	D	3671	14/15	0.91	0.14	2,9,23,25	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 PGX C 2701:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
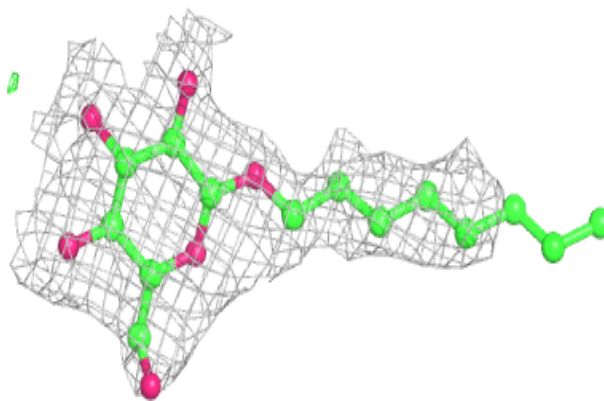and green (positive)

Electron density around PGX B 1701:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
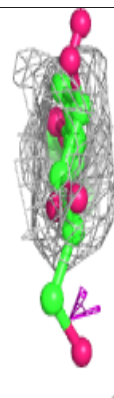mF_o-DF_c (at 3 rmsd) in purple (negative)
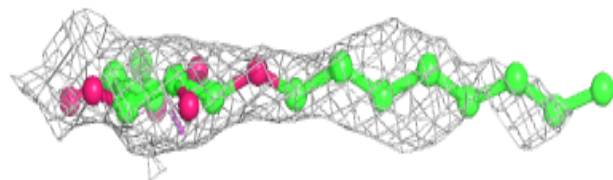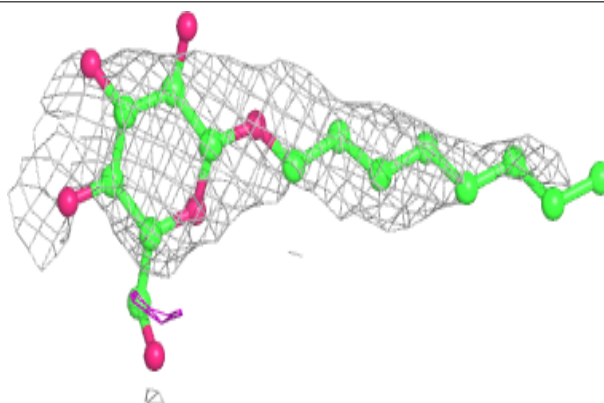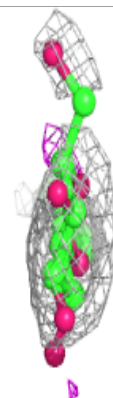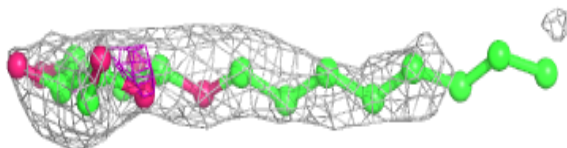and green (positive)
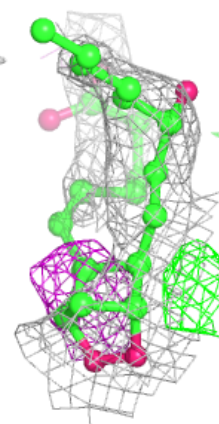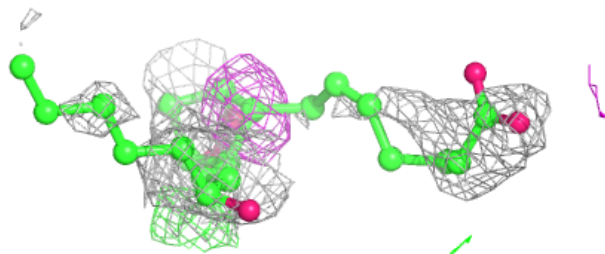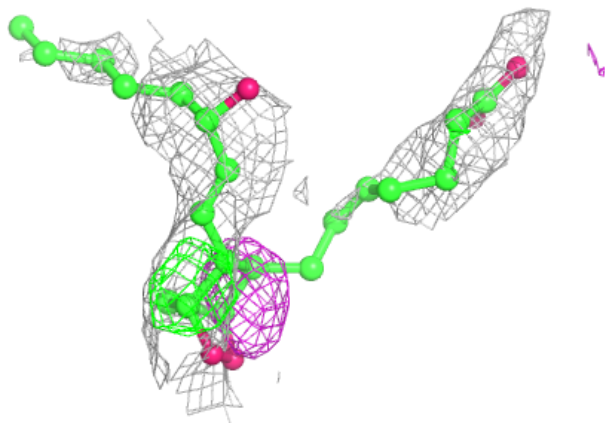
Electron density around PGX D 3701:

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

Electron density around PGX A 701:

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

Electron density around BOG D 3702:

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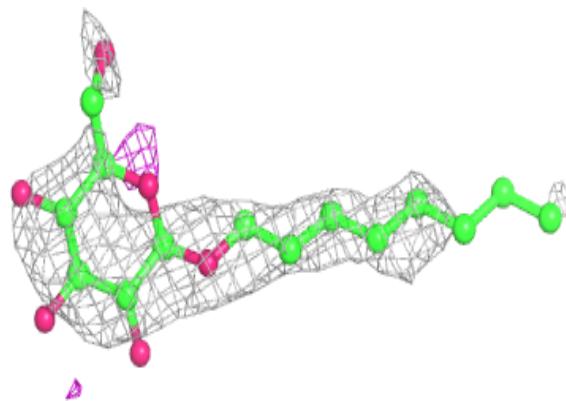mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around BOG C 2702:

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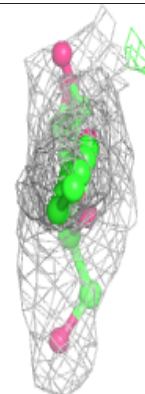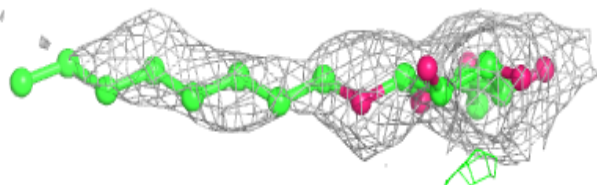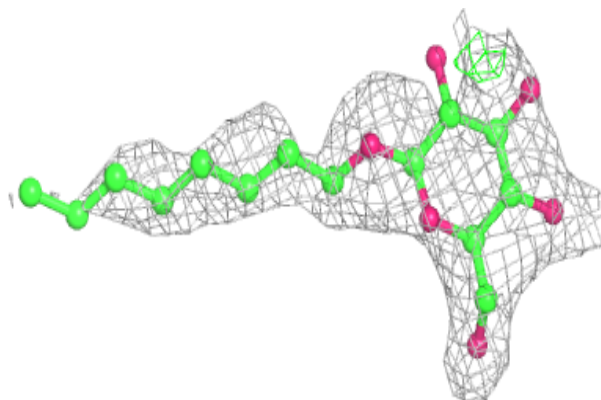mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around BOG A 702:

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

Electron density around BOG B 1702:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.