WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Nov 10, 2024 – 11:19 PM EST

PDB ID	:	1IGZ
Title	:	Crystal Structure of Linoleic acid Bound in the Cyclooxygenase Channel of Prostaglandin Endoperoxide H Synthase-1.
Authors	:	Malkowski, M.G.; Thuresson, E.D.; Smith, W.L.; Garavito, R.M.
Deposited on	:	2001-04-18
Resolution	:	2.90 Å(reported)

The following versions of software and data (see references ⓘ) were used in the production of this report:

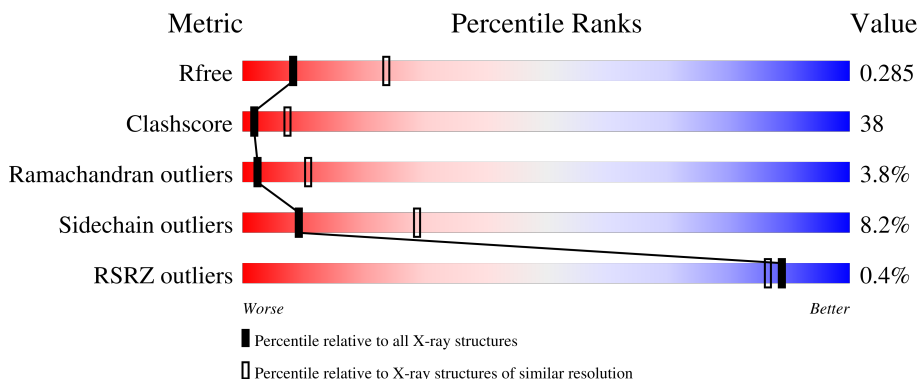|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.90 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	Percentile Ranks	Value
Rfree		0.285
Clashscore		38
Ramachandran outliers		3.8%
Sidechain outliers		8.2%
RSRZ outliers		0.4%

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$_{free}$	164625	2335 (2.90-2.90)
Clashscore	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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 <=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	576	43% 46% 8% •
2	B	2	100%
3	C	5	40% 60%
4	D	2	50% 50%

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	BOG	A	751	-	-	X	-
7	COH	A	601	X	-	-	-
8	EIC	A	700	-	-	X	-

2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 4705 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 Prostaglandin Endoperoxide H Synthase-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	553	Total	C	N	O	S	0	0	0
			4389	2852	735	774	28			

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-alpha-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 an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
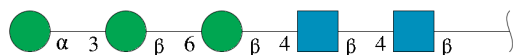
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	5	Total	C	N	O	0	0	0
			61	34	2	25			

- Molecule 4 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
4	D	2	Total 28	C 16	N 2	O 10	0	0	0

- Molecule 5 is beta-D-glucopyranose (three-letter code: BGC) (formula: $C_6H_{12}O_6$).

BGC
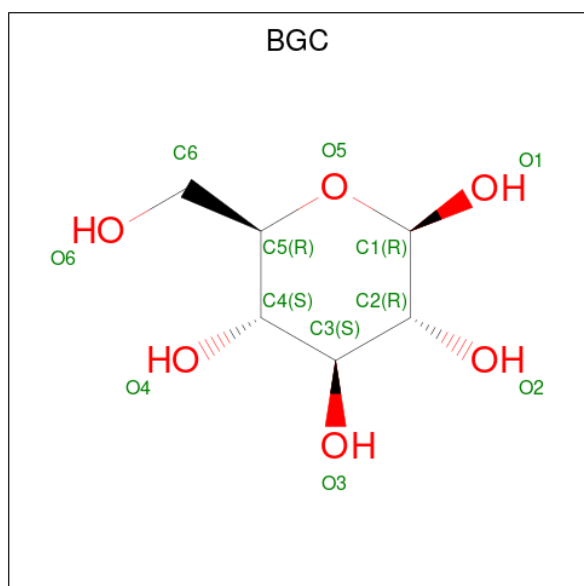
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 12	C 6	O 6	0	0

- Molecule 6 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: $C_{14}H_{28}O_6$).

BOG
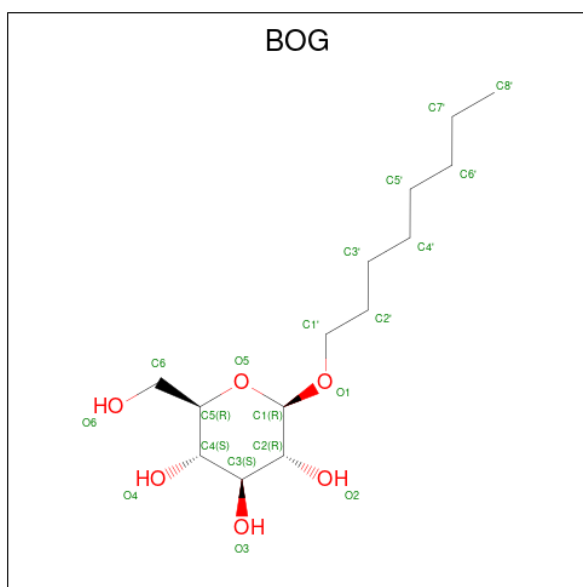
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 20	C 14	O 6	0	0
6	A	1	Total 20	C 14	O 6	0	0

• Molecule 7 is PROTOPORPHYRIN IX CONTAINING CO (three-letter code: COH) (formula: $C_{34}H_{32}CoN_4O_4$).

COH
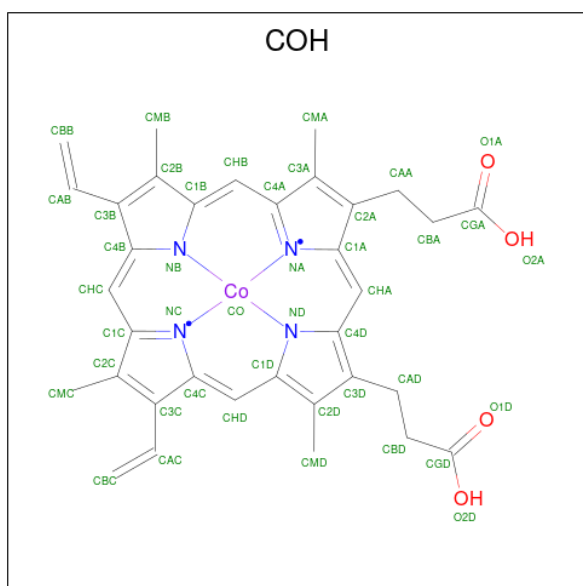
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	A	1	Total 43	C 34	Co 1	N 4	O 4	0	0

- Molecule 8 is LINOLEIC ACID (three-letter code: EIC) (formula: $C_{18}H_{32}O_2$).
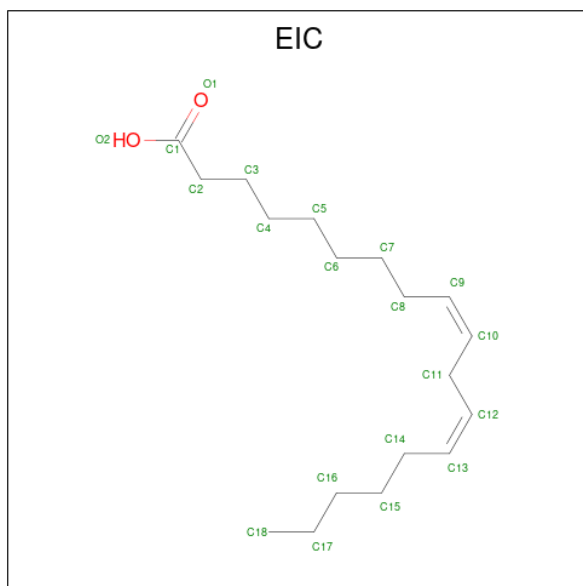
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			20	18	2		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	84	Total	O	0	0
			84	84		

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: Prostaglandin Endoperoxide H Synthase-1

Chain A:
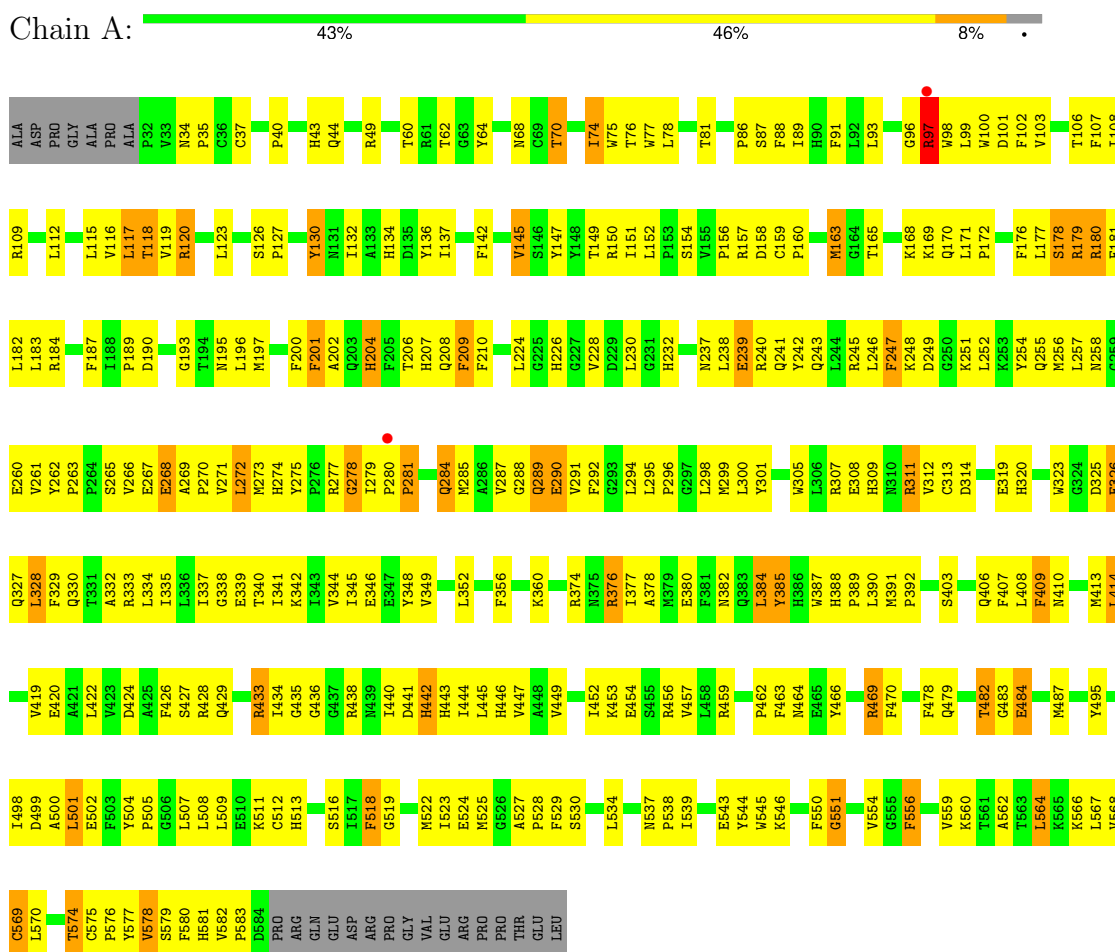
• Molecule 2: 2-acetamido-2-deoxy-alpha-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose
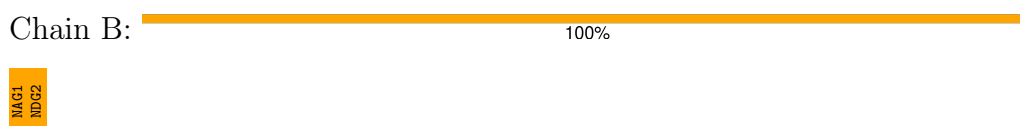
Chain B:

• Molecule 3: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-6)-beta-D-mannopyranos e-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyran ose

Chain C:

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

Chain D:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α, β, γ	182.05Å 182.05Å 103.65Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	15.00 – 2.90 15.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	92.7 (15.00-2.90) 95.5 (15.00-2.90)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.25 (at 2.91Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.234 , 0.270 0.234 , 0.285	Depositor DCC
R_{free} test set	882 reflections (3.90%)	wwPDB-VP
Wilson B-factor (Å^2)	61.6	Xtriage
Anisotropy	0.014	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 52.9	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	4705	wwPDB-VP
Average B, all atoms (Å^2)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.51% of the height of the origin peak. No significant pseudotranslation is detected.*

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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: EIC, MAN, BOG, NDG, BGC, NAG, COH, BMA

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	0.47	1/4528 (0.0%)	0.73	2/6168 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	179	ARG	CZ-NH1	6.10	1.41	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	179	ARG	NE-CZ-NH2	-12.82	113.89	120.30
1	A	97	ARG	NE-CZ-NH1	-5.03	117.78	120.30

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	4389	0	4202	339	0
2	B	28	0	24	3	0
3	C	61	0	52	2	0
4	D	28	0	25	1	0
5	A	12	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	40	0	56	17	0
7	A	43	0	30	2	0
8	A	20	0	31	9	0
9	A	84	0	0	17	0
All	All	4705	0	4432	345	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 38.

All (345) 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:272:LEU:HD12	1:A:273:MET:H	1.18	1.08
1:A:501:LEU:HD12	1:A:502:GLU:H	1.28	0.97
1:A:272:LEU:HD12	1:A:273:MET:N	1.86	0.90
1:A:501:LEU:HD12	1:A:502:GLU:N	1.89	0.88
1:A:243:GLN:HG3	1:A:270:PRO:HG2	1.54	0.87
1:A:240:ARG:HG3	1:A:271:VAL:HG21	1.57	0.85
1:A:195:ASN:ND2	1:A:427:SER:HA	1.91	0.84
1:A:263:PRO:HG2	1:A:299:MET:HE3	1.60	0.84
1:A:246:LEU:HG	1:A:246:LEU:O	1.79	0.82
1:A:157:ARG:NH1	1:A:459:ARG:HD2	1.96	0.80
1:A:334:LEU:HA	1:A:337:ILE:HD12	1.62	0.79
1:A:130:TYR:HB3	1:A:134:HIS:O	1.83	0.79
1:A:442:HIS:HD2	1:A:443:HIS:H	1.32	0.78
1:A:145:VAL:HG12	1:A:224:LEU:HD22	1.66	0.78
1:A:178:SER:OG	1:A:449:VAL:HG22	1.83	0.78
1:A:513:HIS:HB2	1:A:516:SER:OG	1.84	0.78
1:A:263:PRO:HG2	1:A:299:MET:CE	2.13	0.77
1:A:523:ILE:HG23	8:A:700:EIC:H52	1.66	0.77
1:A:530:SER:OG	8:A:700:EIC:H112	1.85	0.77
1:A:115:LEU:HD23	6:A:751:BOG:H5'2	1.65	0.76
1:A:150:ARG:NH1	1:A:154:SER:HB3	2.01	0.75
1:A:344:VAL:O	1:A:348:TYR:HB3	1.87	0.75
1:A:150:ARG:HD3	1:A:152:LEU:O	1.87	0.75
1:A:390:LEU:HD21	1:A:434:ILE:HD11	1.68	0.75
1:A:151:ILE:HG23	1:A:469:ARG:NH1	2.02	0.75
1:A:582:VAL:HG23	1:A:583:PRO:HD2	1.69	0.74
1:A:40:PRO:HB3	2:B:1:NAG:H62	1.68	0.74
1:A:89:ILE:HD12	6:A:751:BOG:H8'3	1.69	0.73
1:A:424:ASP:O	1:A:428:ARG:HD2	1.87	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:156:PRO:HB2	1:A:159:CYS:SG	2.28	0.73
2:B:1:NAG:H61	2:B:2:NDG:H8C3	1.69	0.73
1:A:564:LEU:HD22	1:A:578:VAL:CG2	2.18	0.73
1:A:564:LEU:HD22	1:A:578:VAL:HG21	1.71	0.72
1:A:280:PRO:N	1:A:281:PRO:HD3	2.05	0.72
1:A:334:LEU:HD23	1:A:337:ILE:HD12	1.72	0.72
1:A:326:GLU:OE1	1:A:326:GLU:HA	1.89	0.71
1:A:442:HIS:CD2	1:A:443:HIS:H	2.08	0.71
1:A:442:HIS:CD2	1:A:443:HIS:N	2.60	0.70
1:A:109:ARG:HH21	1:A:360:LYS:HB2	1.58	0.69
1:A:323:TRP:HE3	1:A:328:LEU:HD23	1.57	0.69
1:A:100:TRP:HB2	9:A:869:HOH:O	1.92	0.69
1:A:208:GLN:NE2	1:A:228:VAL:HA	2.08	0.69
1:A:88:PHE:O	1:A:91:PHE:HB3	1.93	0.69
1:A:109:ARG:NH2	1:A:360:LYS:HB2	2.08	0.68
1:A:97:ARG:HB2	9:A:868:HOH:O	1.93	0.68
1:A:163:MET:HA	1:A:163:MET:CE	2.23	0.68
1:A:70:THR:OG1	9:A:867:HOH:O	2.10	0.68
1:A:263:PRO:HD2	1:A:285:MET:CE	2.23	0.67
1:A:291:VAL:CG2	1:A:294:LEU:HD12	2.24	0.67
1:A:115:LEU:O	1:A:119:VAL:HG23	1.93	0.67
1:A:145:VAL:HG13	1:A:226:HIS:HE2	1.60	0.67
1:A:260:GLU:HA	9:A:877:HOH:O	1.94	0.67
1:A:261:VAL:HB	1:A:307:ARG:HD3	1.77	0.67
1:A:120:ARG:CZ	6:A:751:BOG:H1	2.25	0.66
1:A:209:PHE:HB2	1:A:377:ILE:HG13	1.77	0.66
1:A:204:HIS:ND1	1:A:301:TYR:HB3	2.09	0.66
1:A:478:PHE:O	1:A:482:THR:HG23	1.96	0.65
1:A:340:THR:O	1:A:344:VAL:HG23	1.96	0.65
1:A:228:VAL:O	1:A:337:ILE:HG23	1.97	0.65
1:A:459:ARG:HG2	1:A:459:ARG:HH21	1.61	0.65
1:A:239:GLU:CD	1:A:239:GLU:H	2.01	0.64
1:A:208:GLN:NE2	1:A:230:LEU:H	1.95	0.64
1:A:348:TYR:CE2	8:A:700:EIC:H121	2.33	0.64
1:A:298:LEU:N	1:A:298:LEU:HD12	2.13	0.63
1:A:89:ILE:HG23	6:A:751:BOG:H8'1	1.80	0.63
1:A:40:PRO:O	1:A:68:ASN:HB3	1.99	0.63
1:A:344:VAL:O	1:A:349:VAL:HG23	2.00	0.62
1:A:163:MET:HB3	1:A:462:PRO:HG3	1.80	0.62
1:A:388:HIS:N	1:A:389:PRO:HD2	2.15	0.62
1:A:384:LEU:C	1:A:384:LEU:HD23	2.19	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:196:LEU:HD11	1:A:429:GLN:NE2	2.15	0.62
1:A:163:MET:HA	1:A:163:MET:HE3	1.81	0.62
1:A:305:TRP:O	1:A:308:GLU:HB3	2.00	0.61
1:A:484:GLU:OE2	1:A:487:MET:N	2.33	0.61
1:A:151:ILE:HG23	1:A:469:ARG:HH12	1.65	0.61
1:A:242:TYR:CD2	1:A:247:PHE:HZ	2.17	0.61
1:A:256:MET:O	1:A:257:LEU:HD23	2.00	0.61
1:A:115:LEU:HD21	6:A:752:BOG:H8'2	1.81	0.61
1:A:295:LEU:HB2	1:A:298:LEU:HD13	1.82	0.61
1:A:403:SER:N	1:A:406:GLN:OE1	2.33	0.61
1:A:120:ARG:NE	6:A:751:BOG:H1	2.15	0.61
1:A:384:LEU:HD23	1:A:384:LEU:O	2.02	0.60
1:A:182:LEU:HB3	1:A:440:ILE:HD12	1.84	0.60
1:A:287:VAL:HG23	1:A:289:GLN:H	1.66	0.60
1:A:103:VAL:HG13	1:A:108:ILE:HG22	1.84	0.59
1:A:145:VAL:HG13	1:A:226:HIS:NE2	2.17	0.59
1:A:132:ILE:HG22	1:A:147:TYR:HD1	1.67	0.59
1:A:202:ALA:O	1:A:206:THR:HG23	2.03	0.59
1:A:388:HIS:HB3	1:A:444:ILE:CD1	2.33	0.59
1:A:376:ARG:HB2	1:A:376:ARG:NH1	2.18	0.59
6:A:751:BOG:H3'1	6:A:752:BOG:H8'2	1.85	0.59
1:A:442:HIS:NE2	1:A:443:HIS:CE1	2.71	0.59
1:A:263:PRO:HD2	1:A:285:MET:HE1	1.85	0.58
1:A:280:PRO:HA	1:A:284:GLN:HG3	1.85	0.58
1:A:295:LEU:HD21	1:A:408:LEU:CD2	2.33	0.58
1:A:115:LEU:HD21	6:A:751:BOG:H3'1	1.85	0.58
1:A:207:HIS:HB3	1:A:289:GLN:HE21	1.68	0.57
1:A:237:ASN:ND2	1:A:240:ARG:H	2.02	0.57
1:A:333:ARG:HG2	1:A:337:ILE:HD11	1.85	0.57
1:A:433:ARG:NH1	1:A:436:GLY:HA3	2.19	0.57
1:A:201:PHE:CD2	1:A:201:PHE:C	2.78	0.57
1:A:408:LEU:HB3	1:A:409:PHE:CD1	2.38	0.57
1:A:279:ILE:CG2	1:A:281:PRO:HD2	2.34	0.57
1:A:291:VAL:HG23	1:A:294:LEU:HD12	1.86	0.56
1:A:43:HIS:O	1:A:44:GLN:HB2	2.04	0.56
2:B:1:NAG:H61	2:B:2:NDG:C8	2.35	0.56
1:A:126:SER:HA	1:A:127:PRO:C	2.25	0.56
1:A:151:ILE:CG2	1:A:469:ARG:NH1	2.68	0.56
1:A:265:SER:HA	1:A:285:MET:HA	1.87	0.56
1:A:74:ILE:HD13	1:A:74:ILE:O	2.05	0.56
1:A:279:ILE:C	1:A:281:PRO:CD	2.73	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:452:ILE:O	1:A:456:ARG:HG3	2.05	0.56
3:C:1:NAG:H62	3:C:2:NAG:C1	2.36	0.55
1:A:263:PRO:HD2	1:A:285:MET:HE2	1.88	0.55
1:A:210:PHE:CE1	1:A:382:ASN:HA	2.41	0.55
1:A:150:ARG:NH1	1:A:154:SER:CB	2.69	0.55
1:A:266:VAL:HA	1:A:269:ALA:O	2.07	0.55
1:A:295:LEU:HD21	1:A:408:LEU:HD23	1.89	0.55
1:A:504:TYR:HB3	1:A:505:PRO:HD3	1.89	0.55
1:A:320:HIS:O	1:A:323:TRP:HB2	2.06	0.55
1:A:462:PRO:HB3	1:A:499:ASP:O	2.07	0.55
1:A:204:HIS:ND1	1:A:301:TYR:CB	2.69	0.55
1:A:245:ARG:NH2	1:A:325:ASP:OD2	2.40	0.55
1:A:444:ILE:O	1:A:447:VAL:HG23	2.07	0.55
1:A:184:ARG:NH1	1:A:187:PHE:HD2	2.05	0.54
1:A:470:PHE:CD1	1:A:525:MET:HA	2.42	0.54
1:A:287:VAL:HG21	1:A:292:PHE:HB2	1.89	0.54
1:A:279:ILE:HG22	1:A:281:PRO:HD2	1.88	0.54
1:A:86:PRO:HA	6:A:751:BOG:H62	1.90	0.54
1:A:342:LYS:HD2	1:A:559:VAL:O	2.08	0.54
1:A:376:ARG:HB2	1:A:376:ARG:HH11	1.72	0.54
1:A:103:VAL:HG13	1:A:108:ILE:CG2	2.38	0.54
1:A:582:VAL:CG2	1:A:583:PRO:HD2	2.36	0.54
1:A:89:ILE:HG23	6:A:751:BOG:C8'	2.37	0.54
1:A:319:GLU:HB3	1:A:320:HIS:ND1	2.23	0.54
1:A:495:TYR:CE2	1:A:502:GLU:HG3	2.43	0.54
1:A:243:GLN:CG	1:A:270:PRO:HG2	2.32	0.53
1:A:255:GLN:OE1	1:A:257:LEU:HD21	2.08	0.53
1:A:280:PRO:N	1:A:281:PRO:CD	2.70	0.53
1:A:295:LEU:CD2	1:A:408:LEU:HD23	2.38	0.53
1:A:97:ARG:C	9:A:869:HOH:O	2.46	0.53
1:A:274:HIS:CD2	1:A:290:GLU:HB3	2.43	0.53
1:A:495:TYR:HE2	1:A:502:GLU:HG3	1.73	0.53
1:A:527:ALA:HB3	1:A:528:PRO:HD3	1.90	0.53
1:A:102:PHE:O	1:A:106:THR:HG23	2.08	0.53
1:A:230:LEU:C	1:A:232:HIS:H	2.11	0.53
1:A:245:ARG:HB2	1:A:247:PHE:CE1	2.43	0.53
1:A:255:GLN:HG2	1:A:263:PRO:O	2.08	0.53
1:A:262:TYR:HB3	1:A:285:MET:CE	2.39	0.53
1:A:298:LEU:HD12	1:A:298:LEU:H	1.72	0.53
1:A:388:HIS:CE1	1:A:447:VAL:HG11	2.43	0.53
1:A:96:GLY:O	1:A:98:TRP:N	2.43	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:TRP:N	9:A:869:HOH:O	2.41	0.52
1:A:530:SER:OG	8:A:700:EIC:H142	2.08	0.52
1:A:279:ILE:HB	9:A:834:HOH:O	2.09	0.52
1:A:115:LEU:HD21	6:A:752:BOG:C8'	2.40	0.51
1:A:289:GLN:HB3	1:A:292:PHE:CD1	2.46	0.51
1:A:348:TYR:HE2	8:A:700:EIC:H121	1.73	0.51
1:A:77:TRP:O	1:A:81:THR:HG23	2.10	0.51
1:A:464:ASN:HB3	9:A:839:HOH:O	2.09	0.51
1:A:145:VAL:HG11	1:A:224:LEU:HB3	1.92	0.51
1:A:274:HIS:HD2	1:A:290:GLU:HB3	1.75	0.51
1:A:537:ASN:OD1	1:A:539:ILE:HG23	2.10	0.51
1:A:300:LEU:CD1	1:A:419:VAL:HG22	2.41	0.51
1:A:195:ASN:HD22	1:A:427:SER:HA	1.74	0.51
1:A:279:ILE:C	1:A:281:PRO:HD3	2.31	0.51
1:A:294:LEU:HD22	1:A:409:PHE:CD2	2.44	0.51
1:A:312:VAL:HG11	1:A:332:ALA:HA	1.93	0.51
1:A:512:CYS:HA	1:A:519:GLY:HA2	1.91	0.51
1:A:152:LEU:HD12	1:A:466:TYR:CE1	2.46	0.51
3:C:2:NAG:O3	3:C:3:BMA:O2	2.12	0.51
1:A:498:ILE:O	1:A:501:LEU:HB3	2.11	0.51
1:A:308:GLU:O	1:A:311:ARG:N	2.44	0.51
1:A:385:TYR:OH	8:A:700:EIC:C12	2.59	0.51
1:A:309:HIS:C	1:A:309:HIS:CD2	2.84	0.51
1:A:275:TYR:HB2	1:A:284:GLN:OE1	2.11	0.50
1:A:262:TYR:HB3	1:A:285:MET:HE1	1.93	0.50
1:A:261:VAL:HG23	9:A:877:HOH:O	2.11	0.50
1:A:287:VAL:HG23	1:A:288:GLY:N	2.27	0.50
1:A:327:GLN:O	1:A:329:PHE:N	2.44	0.50
1:A:152:LEU:HD12	1:A:466:TYR:CZ	2.47	0.50
1:A:165:THR:CG2	9:A:856:HOH:O	2.59	0.50
6:A:751:BOG:H3	9:A:872:HOH:O	2.11	0.50
1:A:200:PHE:O	1:A:201:PHE:C	2.50	0.50
1:A:237:ASN:HD21	1:A:240:ARG:H	1.58	0.50
1:A:279:ILE:N	1:A:280:PRO:HD3	2.27	0.50
1:A:204:HIS:CD2	1:A:232:HIS:CD2	2.99	0.49
1:A:388:HIS:HB3	1:A:444:ILE:HD11	1.94	0.49
1:A:345:ILE:HG22	1:A:346:GLU:N	2.26	0.49
1:A:112:LEU:O	1:A:116:VAL:HG23	2.11	0.49
1:A:75:TRP:CE3	1:A:78:LEU:HD12	2.46	0.49
1:A:165:THR:HG21	9:A:856:HOH:O	2.12	0.49
1:A:243:GLN:HG3	1:A:270:PRO:CG	2.35	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:380:GLU:HG2	1:A:466:TYR:CZ	2.47	0.49
1:A:391:MET:HA	1:A:391:MET:CE	2.42	0.49
1:A:181:PHE:HB3	1:A:509:LEU:HD21	1.94	0.49
1:A:201:PHE:C	1:A:201:PHE:HD2	2.16	0.49
1:A:137:ILE:N	1:A:137:ILE:HD12	2.27	0.49
1:A:272:LEU:O	1:A:273:MET:HG2	2.12	0.49
1:A:352:LEU:HD23	8:A:700:EIC:H61	1.95	0.49
1:A:179:ARG:HA	1:A:183:LEU:HB2	1.95	0.49
1:A:291:VAL:HG22	1:A:291:VAL:O	2.12	0.48
1:A:204:HIS:CD2	1:A:232:HIS:HD2	2.31	0.48
1:A:257:LEU:O	1:A:258:ASN:HB2	2.12	0.48
1:A:267:GLU:O	1:A:268:GLU:CB	2.61	0.48
1:A:334:LEU:HD23	1:A:337:ILE:CD1	2.42	0.48
1:A:230:LEU:HA	1:A:232:HIS:CE1	2.49	0.48
1:A:433:ARG:HG2	1:A:435:GLY:O	2.13	0.48
1:A:35:PRO:C	1:A:37:CYS:H	2.17	0.48
1:A:326:GLU:O	1:A:330:GLN:HG2	2.14	0.48
1:A:204:HIS:HE2	1:A:232:HIS:CD2	2.31	0.48
1:A:237:ASN:HD22	1:A:239:GLU:CD	2.17	0.48
1:A:380:GLU:HG2	1:A:466:TYR:CE1	2.49	0.48
1:A:414:LEU:HD12	1:A:414:LEU:O	2.14	0.48
1:A:181:PHE:O	1:A:438:ARG:N	2.46	0.48
1:A:183:LEU:HD13	1:A:445:LEU:HD22	1.94	0.48
1:A:427:SER:OG	1:A:578:VAL:HA	2.14	0.48
1:A:339:GLU:HG2	1:A:562:ALA:HB2	1.95	0.47
1:A:556:PHE:CD1	1:A:560:LYS:HE3	2.49	0.47
1:A:577:TYR:CE2	1:A:583:PRO:HD3	2.49	0.47
1:A:408:LEU:O	1:A:410:ASN:N	2.47	0.47
1:A:280:PRO:HA	1:A:284:GLN:CG	2.44	0.47
1:A:145:VAL:HG13	1:A:226:HIS:CD2	2.50	0.47
1:A:241:GLN:O	1:A:245:ARG:HG3	2.13	0.47
1:A:246:LEU:O	1:A:248:LYS:N	2.47	0.47
1:A:64:TYR:CE1	1:A:76:THR:HG21	2.50	0.47
1:A:566:LYS:O	1:A:570:LEU:HB2	2.15	0.47
1:A:582:VAL:HG22	1:A:583:PRO:O	2.14	0.47
1:A:89:ILE:HG22	1:A:93:LEU:HD12	1.97	0.47
1:A:98:TRP:N	9:A:869:HOH:O	2.48	0.47
1:A:433:ARG:HG2	1:A:433:ARG:HH11	1.80	0.47
1:A:123:LEU:HD21	6:A:752:BOG:O3	2.15	0.47
1:A:389:PRO:HD3	1:A:440:ILE:HG12	1.96	0.46
1:A:86:PRO:HA	6:A:751:BOG:C6	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107:PHE:C	1:A:109:ARG:N	2.67	0.46
1:A:204:HIS:NE2	1:A:232:HIS:CD2	2.84	0.46
1:A:266:VAL:HG21	1:A:284:GLN:HE22	1.80	0.46
1:A:242:TYR:CD2	1:A:247:PHE:CZ	3.02	0.46
1:A:208:GLN:HB3	1:A:232:HIS:ND1	2.31	0.46
1:A:239:GLU:OE2	1:A:239:GLU:N	2.42	0.46
1:A:387:TRP:HH2	8:A:700:EIC:H1O1	1.80	0.46
1:A:387:TRP:CH2	8:A:700:EIC:H1O1	2.51	0.46
1:A:424:ASP:HB2	1:A:576:PRO:HB2	1.98	0.46
1:A:388:HIS:HB3	1:A:444:ILE:HD12	1.98	0.46
1:A:323:TRP:CE3	1:A:327:GLN:HG2	2.51	0.46
1:A:504:TYR:CZ	1:A:508:LEU:HD11	2.50	0.46
1:A:145:VAL:HG12	1:A:224:LEU:CD2	2.43	0.45
1:A:200:PHE:HE2	1:A:426:PHE:CE1	2.35	0.45
1:A:513:HIS:HE1	1:A:523:ILE:HD12	1.81	0.45
1:A:149:THR:O	1:A:378:ALA:HA	2.16	0.45
1:A:260:GLU:HB2	1:A:262:TYR:HE1	1.80	0.45
1:A:279:ILE:HG22	1:A:279:ILE:O	2.16	0.45
1:A:388:HIS:N	1:A:389:PRO:CD	2.80	0.45
1:A:538:PRO:HB2	1:A:544:TYR:CE1	2.51	0.45
1:A:278:GLY:C	1:A:280:PRO:HD3	2.37	0.45
1:A:327:GLN:O	1:A:328:LEU:C	2.54	0.45
1:A:483:GLY:H	1:A:511:LYS:HB3	1.82	0.45
1:A:137:ILE:HG23	9:A:800:HOH:O	2.17	0.45
1:A:300:LEU:HD12	1:A:419:VAL:HG22	1.99	0.45
1:A:419:VAL:O	1:A:420:GLU:C	2.56	0.45
1:A:447:VAL:HA	7:A:601:COH:O2A	2.16	0.45
1:A:89:ILE:HD12	6:A:751:BOG:C8'	2.43	0.45
1:A:308:GLU:O	1:A:311:ARG:HB3	2.16	0.45
1:A:254:TYR:CD1	1:A:261:VAL:HG13	2.52	0.44
1:A:575:CYS:HA	1:A:576:PRO:HD2	1.90	0.44
1:A:150:ARG:NH1	1:A:154:SER:CA	2.80	0.44
1:A:168:LYS:C	1:A:170:GLN:H	2.21	0.44
1:A:284:GLN:HE21	1:A:284:GLN:HB3	1.66	0.44
1:A:384:LEU:C	1:A:384:LEU:CD2	2.85	0.44
1:A:107:PHE:C	1:A:109:ARG:H	2.20	0.44
1:A:158:ASP:OD1	1:A:158:ASP:N	2.50	0.44
1:A:115:LEU:CD2	6:A:751:BOG:H5'2	2.41	0.44
1:A:422:LEU:HD23	1:A:422:LEU:HA	1.77	0.44
1:A:459:ARG:HG2	1:A:459:ARG:NH2	2.26	0.44
1:A:238:LEU:HD11	1:A:242:TYR:CZ	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:408:LEU:HB3	1:A:409:PHE:CE1	2.52	0.44
1:A:298:LEU:H	1:A:298:LEU:CD1	2.30	0.44
1:A:441:ASP:OD2	1:A:443:HIS:CD2	2.71	0.44
1:A:568:VAL:HG12	1:A:569:CYS:N	2.32	0.44
1:A:35:PRO:C	1:A:37:CYS:N	2.71	0.43
1:A:142:PHE:O	1:A:376:ARG:NH2	2.51	0.43
1:A:163:MET:HA	1:A:163:MET:HE2	1.99	0.43
1:A:288:GLY:N	9:A:879:HOH:O	2.31	0.43
1:A:524:GLU:OE2	6:A:751:BOG:H5	2.18	0.43
1:A:60:THR:O	1:A:62:THR:HG23	2.18	0.43
1:A:224:LEU:C	1:A:226:HIS:H	2.22	0.43
1:A:266:VAL:HG21	1:A:284:GLN:NE2	2.34	0.43
1:A:97:ARG:HB3	1:A:356:PHE:CE1	2.54	0.43
1:A:327:GLN:C	1:A:329:PHE:N	2.70	0.43
1:A:238:LEU:HG	1:A:242:TYR:CE1	2.53	0.43
1:A:574:THR:O	1:A:576:PRO:HD3	2.19	0.43
1:A:172:PRO:CB	1:A:177:LEU:HD13	2.49	0.43
1:A:182:LEU:HB3	1:A:440:ILE:CD1	2.49	0.42
1:A:413:MET:HA	4:D:1:NAG:O6	2.19	0.42
1:A:172:PRO:HB3	1:A:177:LEU:HD13	2.01	0.42
1:A:479:GLN:O	1:A:482:THR:O	2.37	0.42
1:A:518:PHE:CD1	1:A:522:MET:HG2	2.54	0.42
1:A:335:ILE:HG22	1:A:335:ILE:O	2.19	0.42
1:A:390:LEU:HD21	1:A:434:ILE:CD1	2.46	0.42
1:A:34:ASN:HB3	1:A:37:CYS:SG	2.58	0.42
1:A:49:ARG:NH1	9:A:865:HOH:O	2.51	0.42
1:A:157:ARG:CZ	1:A:459:ARG:HD2	2.49	0.42
1:A:171:LEU:HB3	1:A:456:ARG:NH2	2.34	0.42
1:A:512:CYS:HA	1:A:519:GLY:CA	2.50	0.42
1:A:179:ARG:O	1:A:183:LEU:HB3	2.20	0.42
1:A:453:LYS:O	1:A:457:VAL:HG23	2.20	0.42
1:A:579:SER:OG	1:A:581:HIS:O	2.37	0.42
1:A:150:ARG:NH1	1:A:154:SER:HA	2.35	0.42
1:A:44:GLN:HG3	9:A:864:HOH:O	2.20	0.42
1:A:187:PHE:CE1	1:A:189:PRO:HB3	2.55	0.42
1:A:269:ALA:O	1:A:271:VAL:N	2.53	0.42
1:A:309:HIS:CD2	1:A:313:CYS:SG	3.12	0.42
1:A:454:GLU:O	1:A:457:VAL:N	2.51	0.42
1:A:117:LEU:O	1:A:118:THR:C	2.57	0.42
1:A:238:LEU:O	1:A:241:GLN:HB3	2.19	0.42
1:A:338:GLY:O	1:A:339:GLU:C	2.59	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:35:PRO:O	1:A:37:CYS:N	2.53	0.41
1:A:193:GLY:O	1:A:582:VAL:HG12	2.20	0.41
1:A:298:LEU:N	1:A:298:LEU:CD1	2.81	0.41
1:A:120:ARG:HD2	1:A:120:ARG:HA	1.75	0.41
1:A:391:MET:HG3	7:A:601:COH:HAB	2.02	0.41
1:A:74:ILE:HG23	1:A:75:TRP:N	2.35	0.41
1:A:145:VAL:O	1:A:145:VAL:CG1	2.68	0.41
1:A:176:PHE:CZ	1:A:180:ARG:HG3	2.54	0.41
1:A:296:PRO:HD2	1:A:407:PHE:CE2	2.55	0.41
1:A:352:LEU:HD21	1:A:387:TRP:CH2	2.55	0.41
1:A:151:ILE:HG13	1:A:529:PHE:CZ	2.56	0.41
1:A:348:TYR:HA	1:A:580:PHE:CD1	2.56	0.41
1:A:251:LYS:HE2	1:A:314:ASP:OD2	2.20	0.41
1:A:567:LEU:HG	1:A:567:LEU:O	2.20	0.41
1:A:204:HIS:NE2	1:A:232:HIS:HD2	2.19	0.41
1:A:337:ILE:O	1:A:341:ILE:HG13	2.21	0.41
1:A:543:GLU:O	1:A:546:LYS:HE3	2.20	0.41
1:A:249:ASP:HA	1:A:328:LEU:HD12	2.02	0.41
1:A:544:TYR:O	1:A:546:LYS:N	2.51	0.41
1:A:550:PHE:O	1:A:551:GLY:C	2.59	0.41
1:A:197:MET:O	1:A:301:TYR:OH	2.38	0.41
1:A:422:LEU:O	1:A:426:PHE:CD2	2.74	0.41
1:A:261:VAL:HB	1:A:307:ARG:CD	2.49	0.40
1:A:249:ASP:C	1:A:251:LYS:H	2.25	0.40
1:A:289:GLN:HG3	1:A:292:PHE:CZ	2.56	0.40
1:A:500:ALA:O	1:A:501:LEU:C	2.60	0.40
1:A:151:ILE:CG2	1:A:469:ARG:HH11	2.34	0.40
1:A:444:ILE:O	1:A:446:HIS:N	2.55	0.40
1:A:463:PHE:HE1	1:A:507:LEU:HG	1.87	0.40

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	551/576 (96%)	450 (82%)	80 (14%)	21 (4%)	2	11

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	97	ARG
1	A	117	LEU
1	A	247	PHE
1	A	281	PRO
1	A	409	PHE
1	A	118	THR
1	A	160	PRO
1	A	268	GLU
1	A	277	ARG
1	A	545	TRP
1	A	551	GLY
1	A	569	CYS
1	A	204	HIS
1	A	278	GLY
1	A	328	LEU
1	A	178	SER
1	A	392	PRO
1	A	501	LEU
1	A	145	VAL
1	A	169	LYS
1	A	290	GLU

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	464/506 (92%)	426 (92%)	38 (8%)	9	29

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	THR
1	A	74	ILE
1	A	87	SER
1	A	97	ARG
1	A	99	LEU
1	A	101	ASP
1	A	120	ARG
1	A	130	TYR
1	A	136	TYR
1	A	163	MET
1	A	180	ARG
1	A	190	ASP
1	A	201	PHE
1	A	209	PHE
1	A	239	GLU
1	A	252	LEU
1	A	272	LEU
1	A	284	GLN
1	A	289	GLN
1	A	311	ARG
1	A	326	GLU
1	A	374	ARG
1	A	376	ARG
1	A	384	LEU
1	A	385	TYR
1	A	414	LEU
1	A	433	ARG
1	A	442	HIS
1	A	469	ARG
1	A	482	THR
1	A	484	GLU
1	A	518	PHE
1	A	534	LEU
1	A	554	VAL
1	A	556	PHE
1	A	564	LEU
1	A	574	THR
1	A	578	VAL

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

Mol	Chain	Res	Type
1	A	42	GLN

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Mol	Chain	Res	Type
1	A	43	HIS
1	A	56	GLN
1	A	122	ASN
1	A	203	GLN
1	A	208	GLN
1	A	232	HIS
1	A	237	ASN
1	A	258	ASN
1	A	274	HIS
1	A	375	ASN
1	A	443	HIS
1	A	513	HIS
1	A	557	ASN
1	A	581	HIS

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 ⓘ

9 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	0.65	0	17,19,21	1.43	3 (17%)
2	NDG	B	2	2	14,14,15	0.77	0	17,19,21	1.17	3 (17%)
3	NAG	C	1	1,3	14,14,15	0.58	0	17,19,21	1.09	2 (11%)
3	NAG	C	2	3	14,14,15	1.01	0	17,19,21	1.40	4 (23%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	BMA	C	3	3	11,11,12	1.25	2 (18%)	15,15,17	1.51	2 (13%)
3	BMA	C	4	3	11,11,12	1.13	1 (9%)	15,15,17	1.12	2 (13%)
3	MAN	C	5	3	11,11,12	0.80	0	15,15,17	0.72	1 (6%)
4	NAG	D	1	1,4	14,14,15	0.76	1 (7%)	17,19,21	0.59	0
4	NAG	D	2	4	14,14,15	0.74	0	17,19,21	1.15	2 (11%)

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	-	4/6/23/26	0/1/1/1
2	NDG	B	2	2	-	4/6/23/26	0/1/1/1
3	NAG	C	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	5/6/23/26	0/1/1/1
3	BMA	C	3	3	-	2/2/19/22	0/1/1/1
3	BMA	C	4	3	-	2/2/19/22	1/1/1/1
3	MAN	C	5	3	-	1/2/19/22	1/1/1/1
4	NAG	D	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	D	2	4	-	4/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	3	BMA	C1-C2	2.57	1.58	1.52
3	C	3	BMA	O5-C1	2.29	1.47	1.43
4	D	1	NAG	C1-C2	2.08	1.55	1.52
3	C	4	BMA	O5-C5	2.06	1.47	1.43

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	3	BMA	C1-C2-C3	4.17	115.71	109.64
3	C	2	NAG	C4-C3-C2	-3.72	105.56	111.02
2	B	1	NAG	C4-C3-C2	-3.59	105.76	111.02
3	C	4	BMA	C1-O5-C5	3.49	116.87	112.19
4	D	2	NAG	C2-N2-C7	-3.33	118.43	122.90
2	B	1	NAG	C2-N2-C7	-3.01	118.87	122.90

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W O R L D W I D E
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PROTEIN DATA BANK

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	3	BMA	C1-O5-C5	2.84	116.00	112.19
3	C	1	NAG	C2-N2-C7	-2.58	119.44	122.90
3	C	5	MAN	C1-O5-C5	2.43	115.44	112.19
2	B	2	NDG	C4-C3-C2	2.33	114.44	111.02
3	C	1	NAG	C1-O5-C5	2.30	115.27	112.19
2	B	2	NDG	C3-C4-C5	2.30	114.40	110.23
2	B	1	NAG	C3-C4-C5	-2.29	106.08	110.23
3	C	2	NAG	O5-C1-C2	-2.18	107.91	111.29
3	C	2	NAG	C1-C2-N2	2.16	113.83	110.43
2	B	2	NDG	C2-N2-C7	-2.14	120.04	122.90
3	C	2	NAG	O4-C4-C3	2.09	115.31	110.38
4	D	2	NAG	C4-C3-C2	-2.03	108.04	111.02
3	C	4	BMA	O3-C3-C2	2.02	114.18	110.05

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	2	NDG	C3-C2-N2-C7
3	C	2	NAG	C1-C2-N2-C7
4	D	1	NAG	C8-C7-N2-C2
4	D	1	NAG	O7-C7-N2-C2
4	D	2	NAG	C8-C7-N2-C2
4	D	2	NAG	O7-C7-N2-C2
3	C	3	BMA	C4-C5-C6-O6
3	C	4	BMA	C4-C5-C6-O6
2	B	2	NDG	C4-C5-C6-O6
3	C	3	BMA	O5-C5-C6-O6
2	B	2	NDG	O5-C5-C6-O6
3	C	4	BMA	O5-C5-C6-O6
2	B	1	NAG	C4-C5-C6-O6
3	C	2	NAG	C8-C7-N2-C2
3	C	2	NAG	O7-C7-N2-C2
3	C	2	NAG	O5-C5-C6-O6
3	C	2	NAG	C4-C5-C6-O6
3	C	5	MAN	O5-C5-C6-O6
2	B	1	NAG	C8-C7-N2-C2
4	D	2	NAG	O5-C5-C6-O6
2	B	1	NAG	O5-C5-C6-O6
2	B	1	NAG	O7-C7-N2-C2
2	B	2	NDG	C1-C2-N2-C7
4	D	2	NAG	C4-C5-C6-O6

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	5	MAN	C1-C2-C3-C4-C5-O5
3	C	4	BMA	C1-C2-C3-C4-C5-O5

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	3	BMA	1	0
4	D	1	NAG	1	0
3	C	1	NAG	1	0
3	C	2	NAG	2	0
2	B	2	NDG	2	0
2	B	1	NAG	3	0

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 B

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings
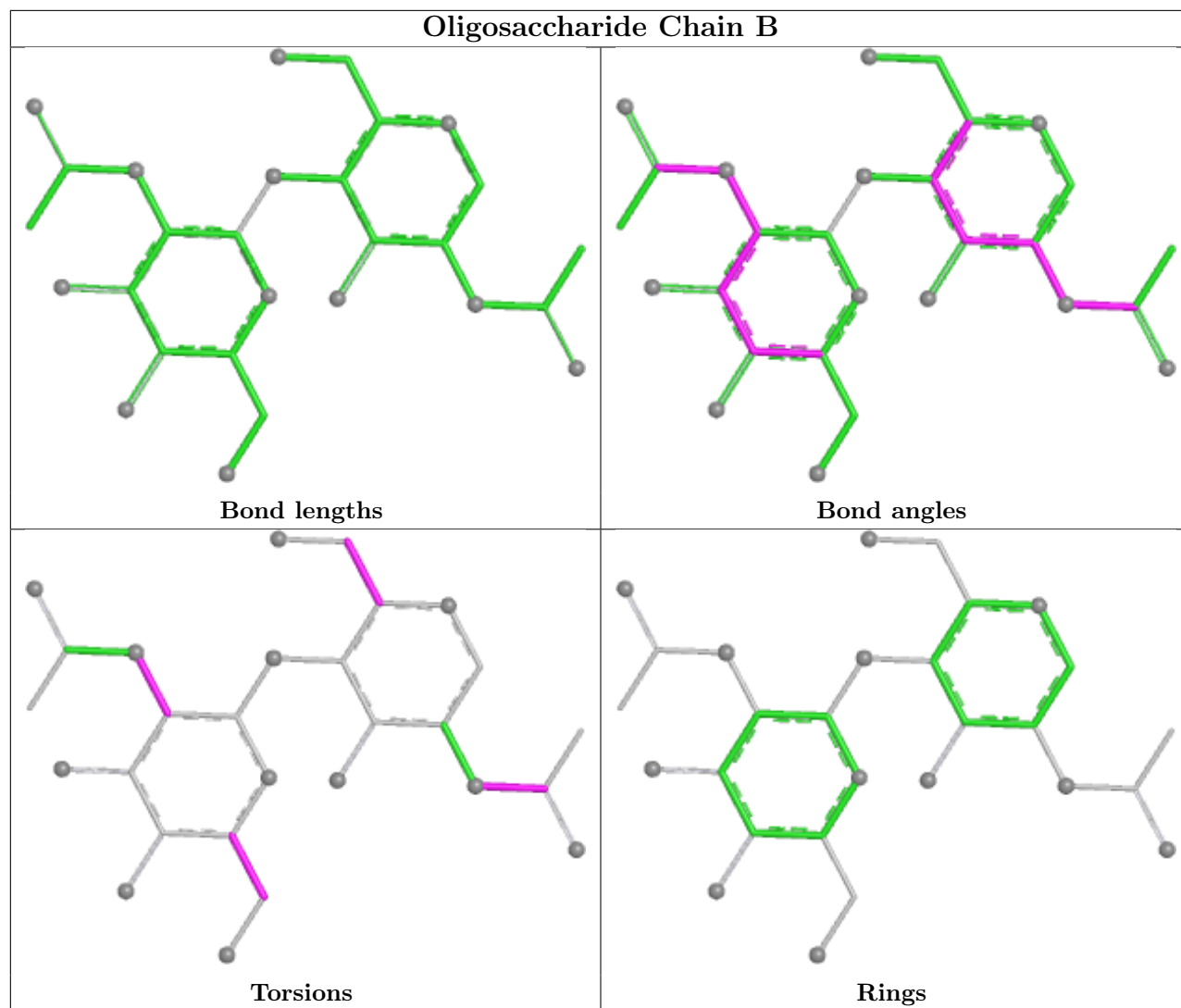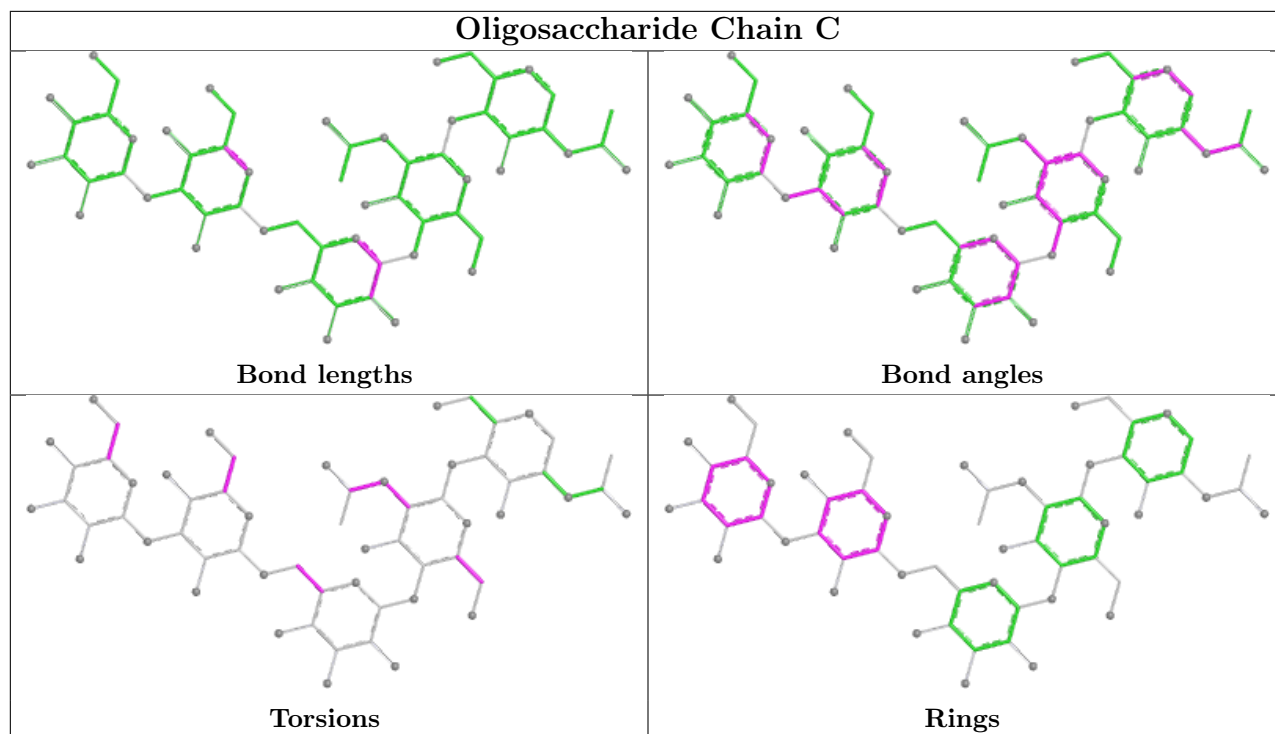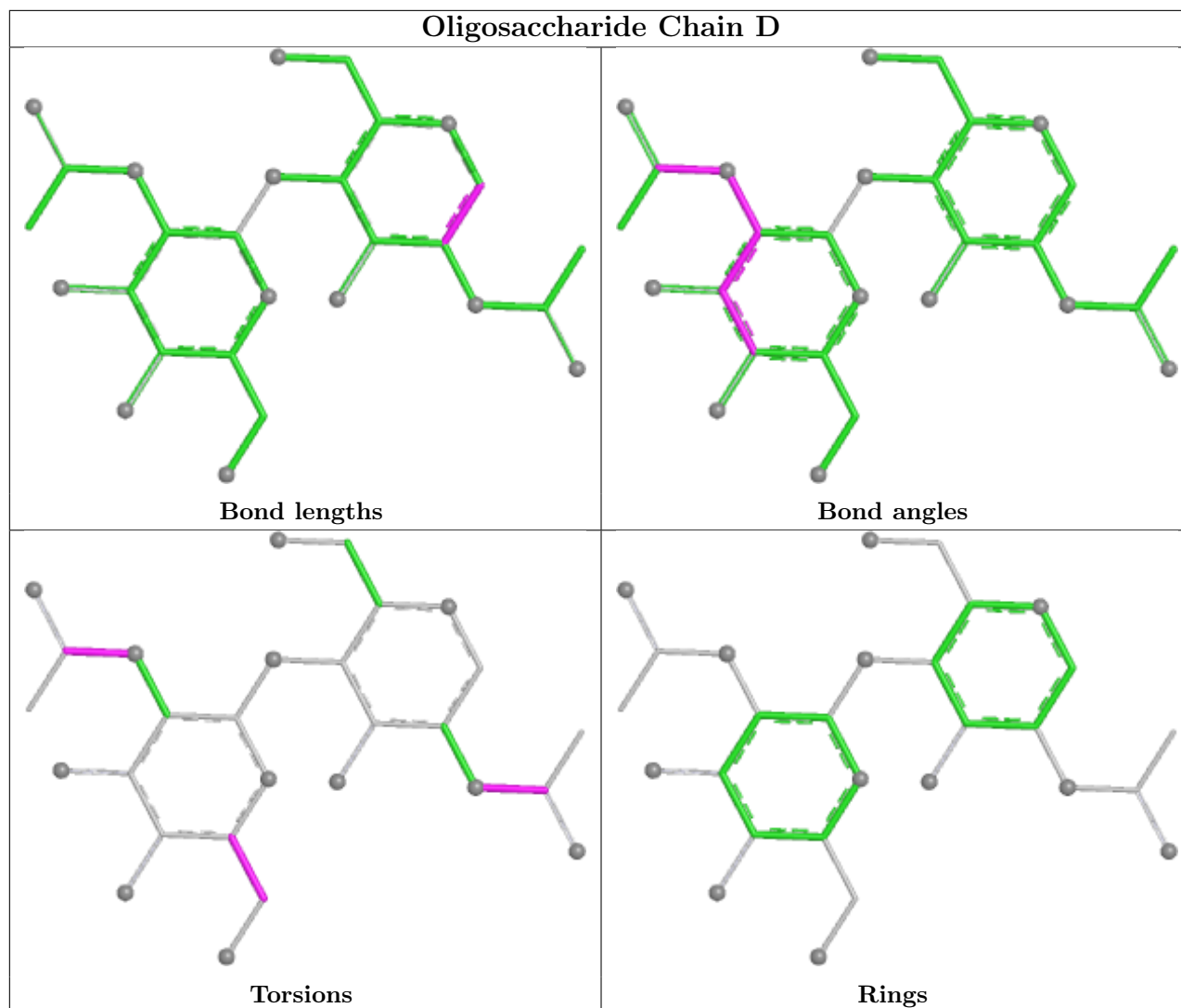
5.6 Ligand geometry ⓘ

5 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	$\#|Z| > 2$
6	BOG	A	752	-	20,20,20	0.74	0	25,25,25	0.73	0
5	BGC	A	750	-	12,12,12	0.60	0	17,17,17	0.60	0
6	BOG	A	751	-	20,20,20	0.39	0	25,25,25	0.88	1 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
7	COH	A	601	1	47,50,50	2.01	14 (29%)	55,82,82	1.86	13 (23%)
8	EIC	A	700	-	19,19,19	0.67	0	19,19,19	0.88	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
6	BOG	A	752	-	-	8/11/31/31	0/1/1/1
5	BGC	A	750	-	-	2/2/22/22	0/1/1/1
6	BOG	A	751	-	-	7/11/31/31	0/1/1/1
7	COH	A	601	1	1/1/3/9	8/14/54/54	-
8	EIC	A	700	-	-	10/17/17/17	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	601	COH	C4A-C3A	5.12	1.54	1.44
7	A	601	COH	C1A-C2A	4.87	1.53	1.45
7	A	601	COH	CAA-C2A	3.71	1.60	1.51
7	A	601	COH	C4C-NC	-3.38	1.33	1.39
7	A	601	COH	CMC-C2C	3.35	1.57	1.50
7	A	601	COH	C4D-ND	3.31	1.45	1.36
7	A	601	COH	C2A-C3A	3.13	1.43	1.36
7	A	601	COH	CBC-CAC	3.03	1.44	1.30
7	A	601	COH	CAD-C3D	2.49	1.58	1.52
7	A	601	COH	CHA-C1A	2.39	1.40	1.34
7	A	601	COH	CHD-C4C	2.35	1.40	1.34
7	A	601	COH	CHB-C4A	-2.21	1.34	1.39
7	A	601	COH	C1A-NA	2.16	1.43	1.39
7	A	601	COH	CO-NA	2.10	2.05	1.96

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	601	COH	C2B-C1B-NB	4.55	114.42	110.88
7	A	601	COH	CMD-C2D-C3D	4.35	133.14	124.94
7	A	601	COH	C1D-C2D-C3D	-4.11	104.14	107.00
7	A	601	COH	CMD-C2D-C1D	-3.92	122.72	128.46
7	A	601	COH	C3A-C4A-NA	3.83	114.94	110.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	601	COH	C4A-C3A-C2A	-3.69	103.09	106.98
7	A	601	COH	CHC-C4B-NB	-3.20	121.06	124.85
6	A	751	BOG	C1'-O1-C1	2.94	118.71	113.68
7	A	601	COH	CAA-C2A-C1A	2.83	129.62	124.70
7	A	601	COH	C4B-NB-C1B	-2.79	101.01	105.11
7	A	601	COH	CBD-CAD-C3D	2.76	117.17	112.54
7	A	601	COH	CHB-C1B-NB	-2.37	122.04	124.85
7	A	601	COH	C3B-C2B-C1B	-2.23	104.94	107.05
7	A	601	COH	CHB-C4A-C3A	-2.07	121.76	125.03

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
7	A	601	COH	NB

All (35) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	751	BOG	O5-C1-O1-C1'
7	A	601	COH	C2C-C3C-CAC-CBC
5	A	750	BGC	C4-C5-C6-O6
5	A	750	BGC	O5-C5-C6-O6
6	A	752	BOG	O5-C5-C6-O6
6	A	751	BOG	C2-C1-O1-C1'
6	A	752	BOG	C4-C5-C6-O6
6	A	751	BOG	C4-C5-C6-O6
6	A	752	BOG	O1-C1'-C2'-C3'
7	A	601	COH	C4C-C3C-CAC-CBC
6	A	752	BOG	C3'-C4'-C5'-C6'
6	A	752	BOG	C1'-C2'-C3'-C4'
6	A	752	BOG	C2'-C1'-O1-C1
6	A	751	BOG	O5-C5-C6-O6
8	A	700	EIC	C5-C6-C7-C8
8	A	700	EIC	C10-C11-C12-C13
8	A	700	EIC	C1-C2-C3-C4
7	A	601	COH	C2B-C3B-CAB-CBB
6	A	751	BOG	C2'-C1'-O1-C1
6	A	752	BOG	C4'-C5'-C6'-C7'
7	A	601	COH	C4B-C3B-CAB-CBB
6	A	751	BOG	C1'-C2'-C3'-C4'
8	A	700	EIC	C6-C7-C8-C9
6	A	752	BOG	C5'-C6'-C7'-C8'

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Mol	Chain	Res	Type	Atoms
7	A	601	COH	CAA-CBA-CGA-O2A
8	A	700	EIC	C7-C8-C9-C10
7	A	601	COH	CAD-CBD-CGD-O2D
8	A	700	EIC	O2-C1-C2-C3
7	A	601	COH	CAA-CBA-CGA-O1A
7	A	601	COH	CAD-CBD-CGD-O1D
8	A	700	EIC	C15-C16-C17-C18
8	A	700	EIC	O1-C1-C2-C3
8	A	700	EIC	C3-C4-C5-C6
8	A	700	EIC	C12-C13-C14-C15
6	A	751	BOG	C4'-C5'-C6'-C7'

There are no ring outliers.

4 monomers are involved in 28 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	752	BOG	4	0
6	A	751	BOG	14	0
7	A	601	COH	2	0
8	A	700	EIC	9	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 BOG A 752

Bond lengths

Bond angles

Torsions

Rings

Ligand BOG A 751

Bond lengths

Bond angles

Torsions

Rings

Ligand COH A 601

Bond lengths

Bond angles

Torsions

Rings

Ligand EIC A 700

Bond lengths

Bond angles

Torsions

Rings
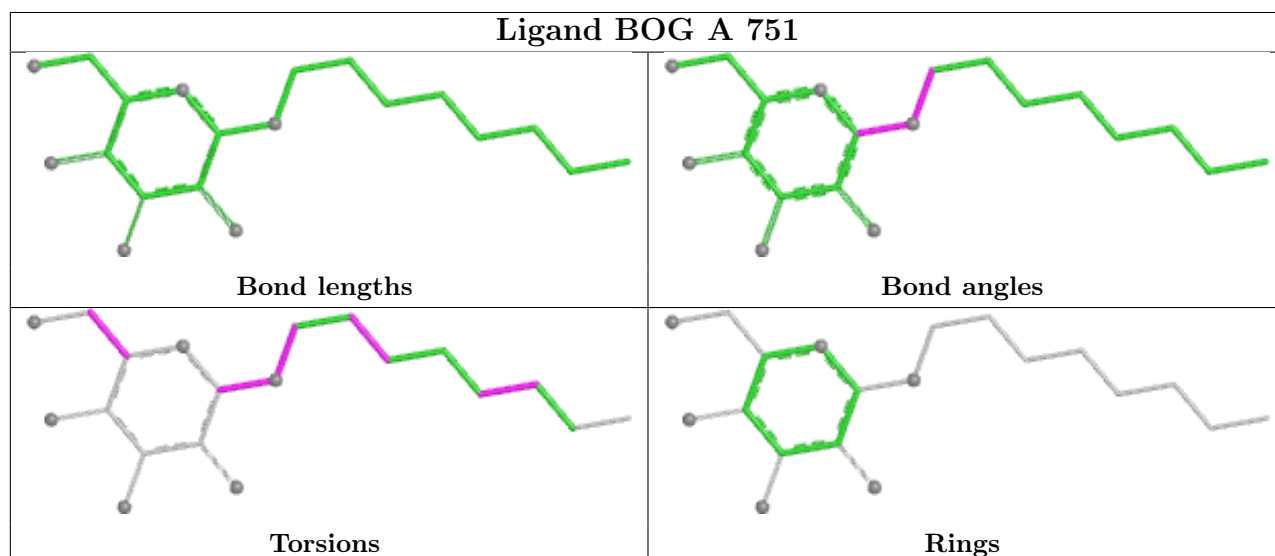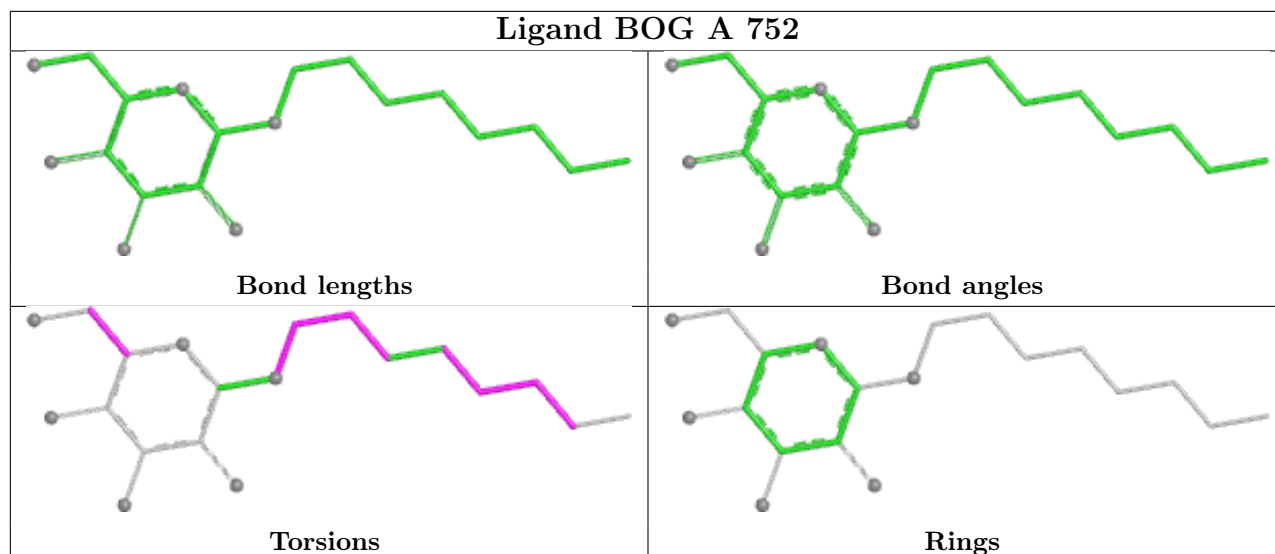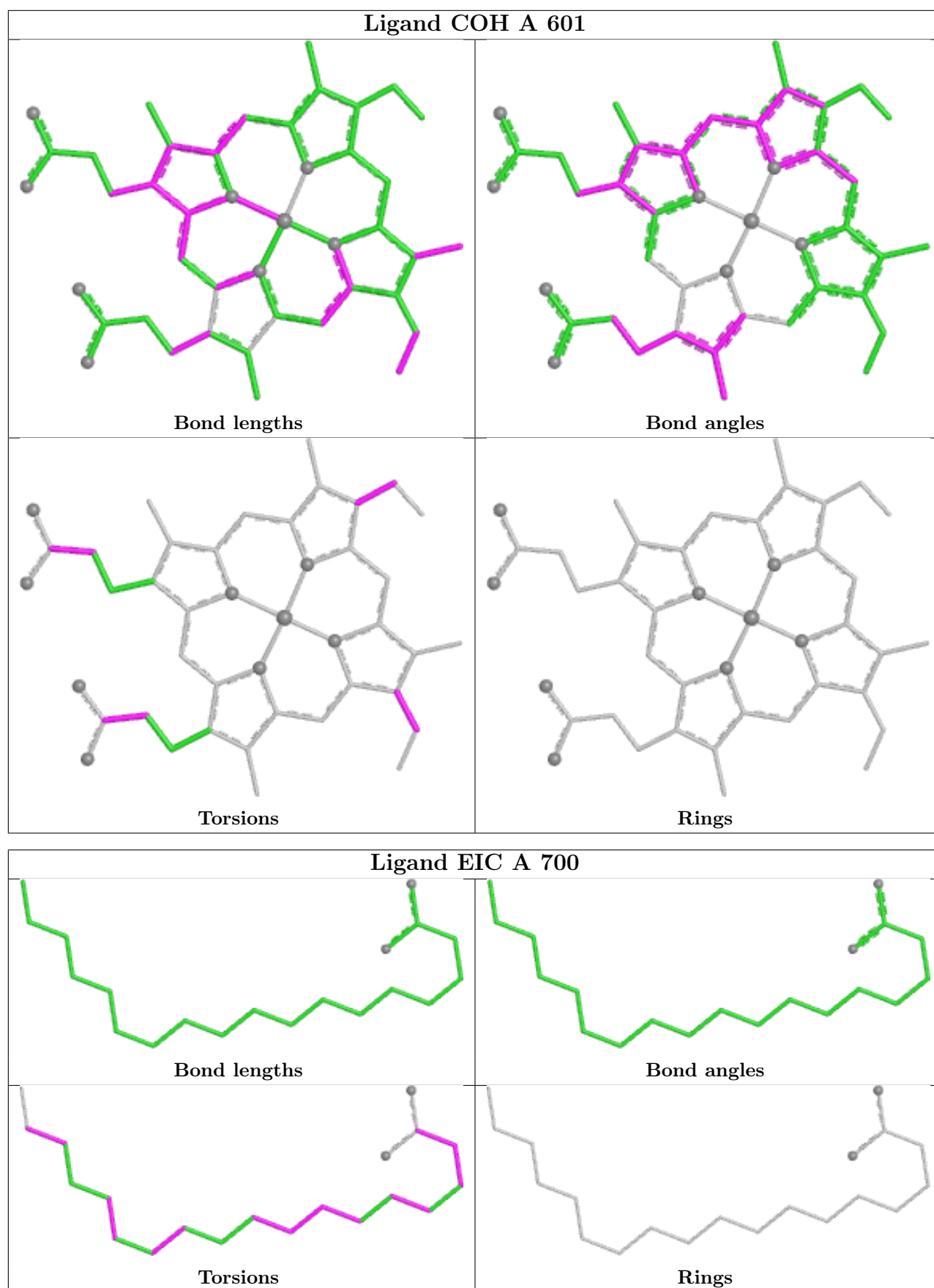
5.7 Other polymers ⓘ

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	553/576 (96%)	-0.34	2 (0%)	89	86	21, 46, 68, 116	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	97	ARG	3.2
1	A	280	PRO	3.1

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
3	BMA	C	4	11/12	0.59	0.16	87,87,87,87	0
3	BMA	C	3	11/12	0.64	0.13	78,78,78,78	0
4	NAG	D	2	14/15	0.66	0.15	74,74,74,74	0
3	MAN	C	5	11/12	0.71	0.12	83,83,83,83	0
2	NDG	B	2	14/15	0.73	0.13	73,73,73,73	0
2	NAG	B	1	14/15	0.85	0.12	64,64,64,64	0
3	NAG	C	2	14/15	0.86	0.10	57,57,57,57	0
4	NAG	D	1	14/15	0.90	0.10	64,64,64,64	0
3	NAG	C	1	14/15	0.90	0.08	45,45,45,45	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.
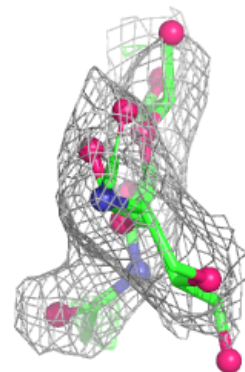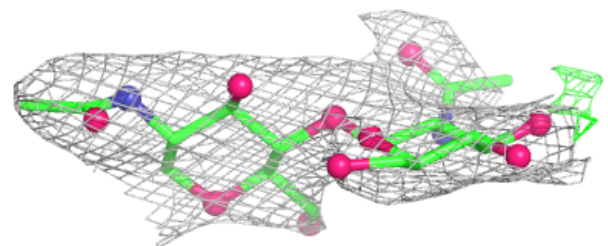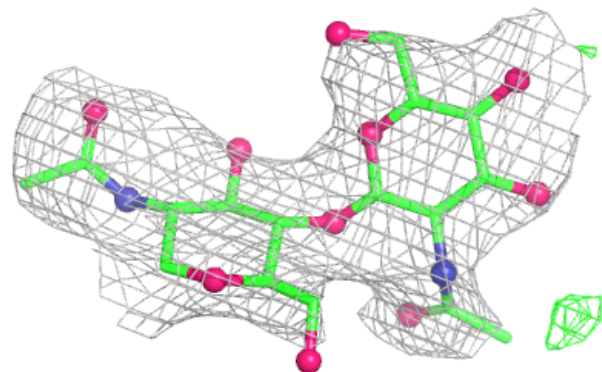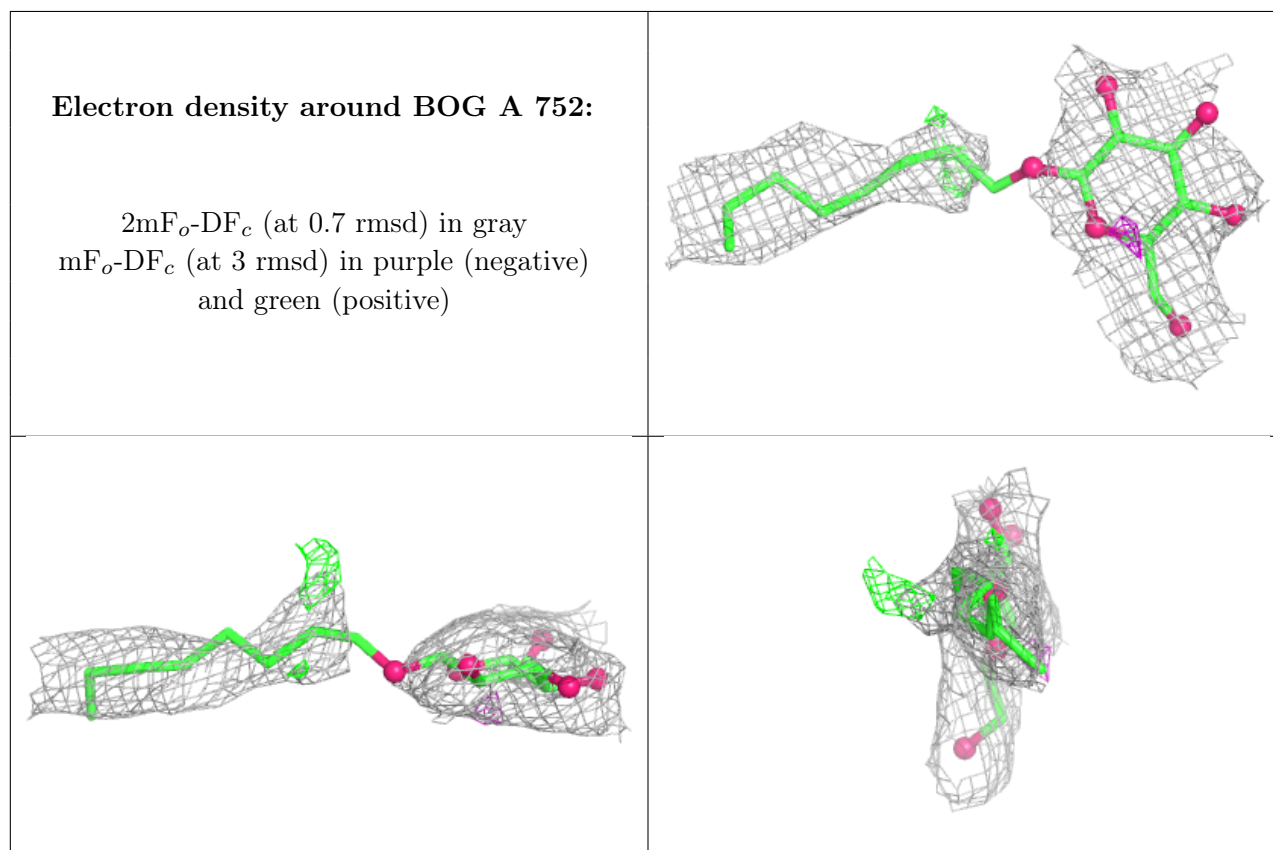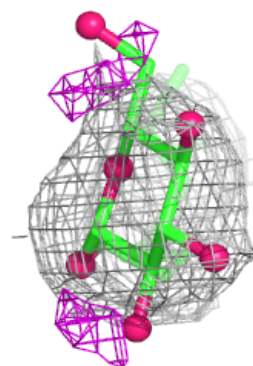
Electron density around Chain B:

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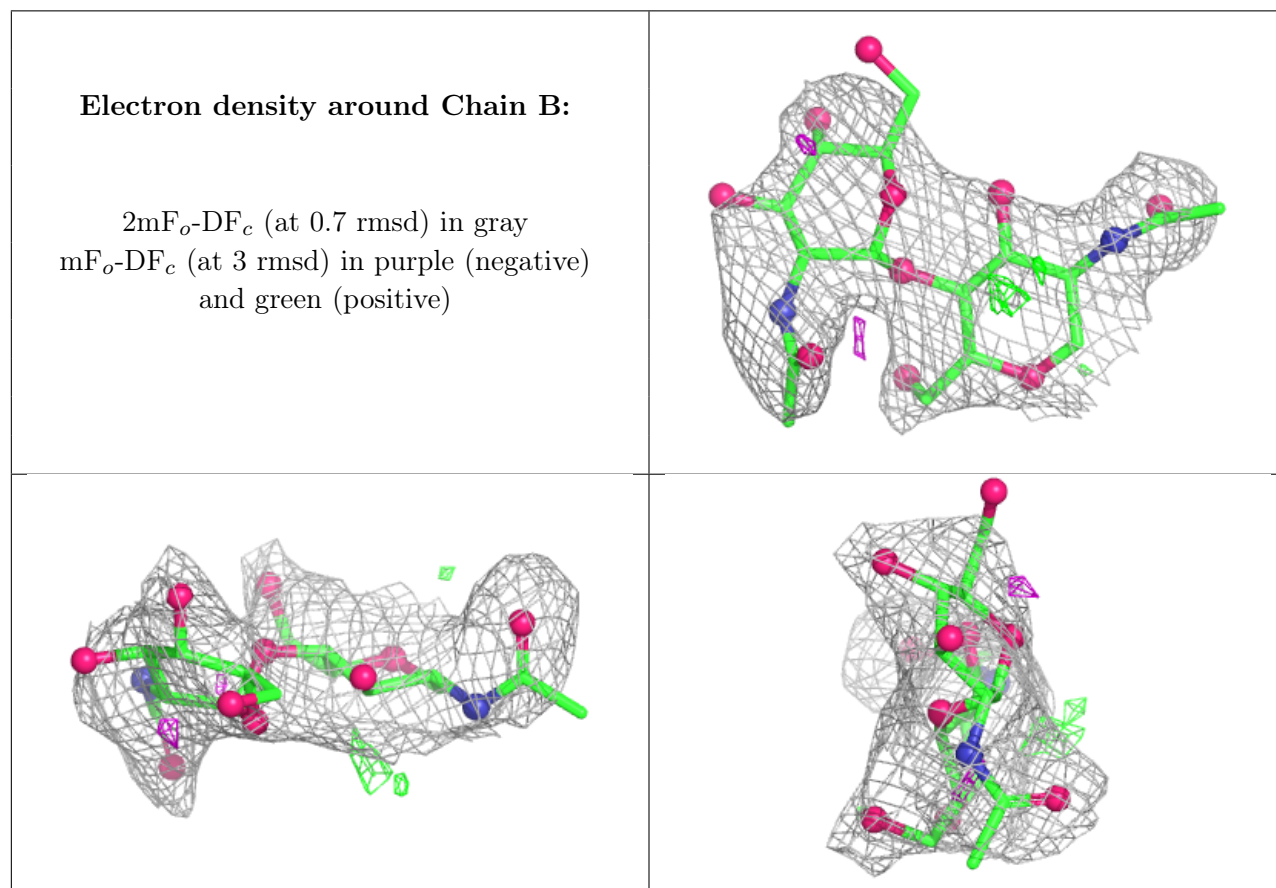
Electron density around Chain C:

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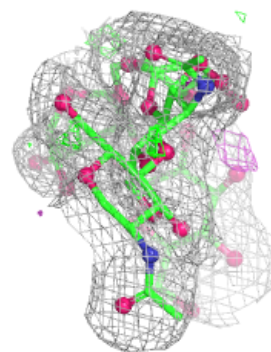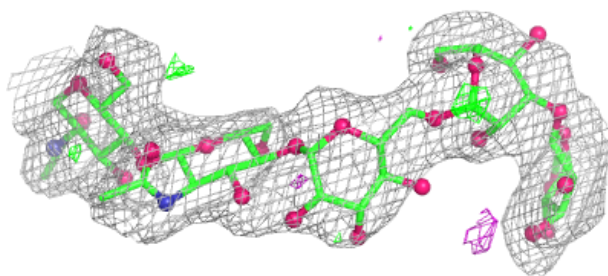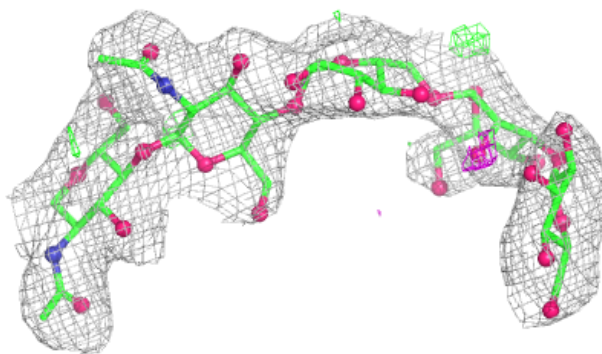
Electron density around Chain D:

$2mF_o-DF_c$ (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
6	BOG	A	752	20/20	0.65	0.18	98,98,98,98	0
5	BGC	A	750	12/12	0.80	0.16	82,82,82,82	0
6	BOG	A	751	20/20	0.83	0.14	57,57,57,57	0
7	COH	A	601	43/43	0.89	0.17	77,77,77,77	0
8	EIC	A	700	20/20	0.90	0.10	51,51,51,51	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.
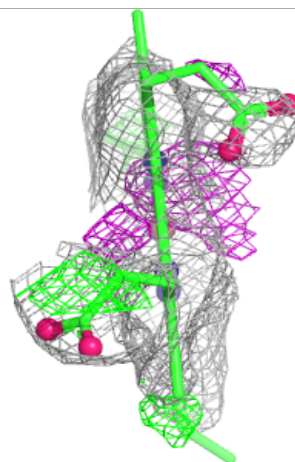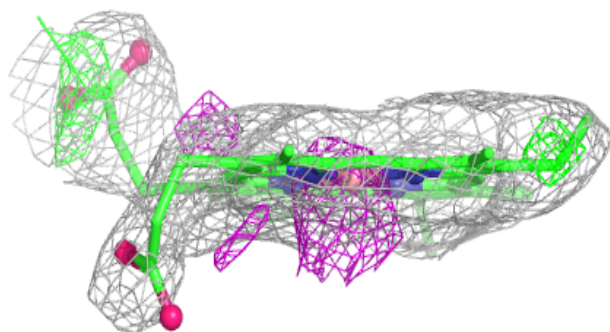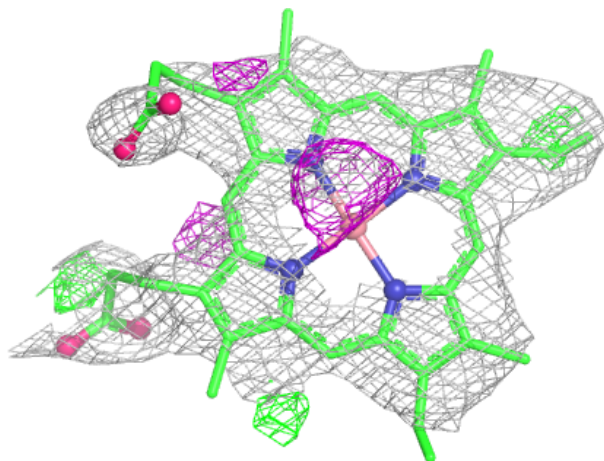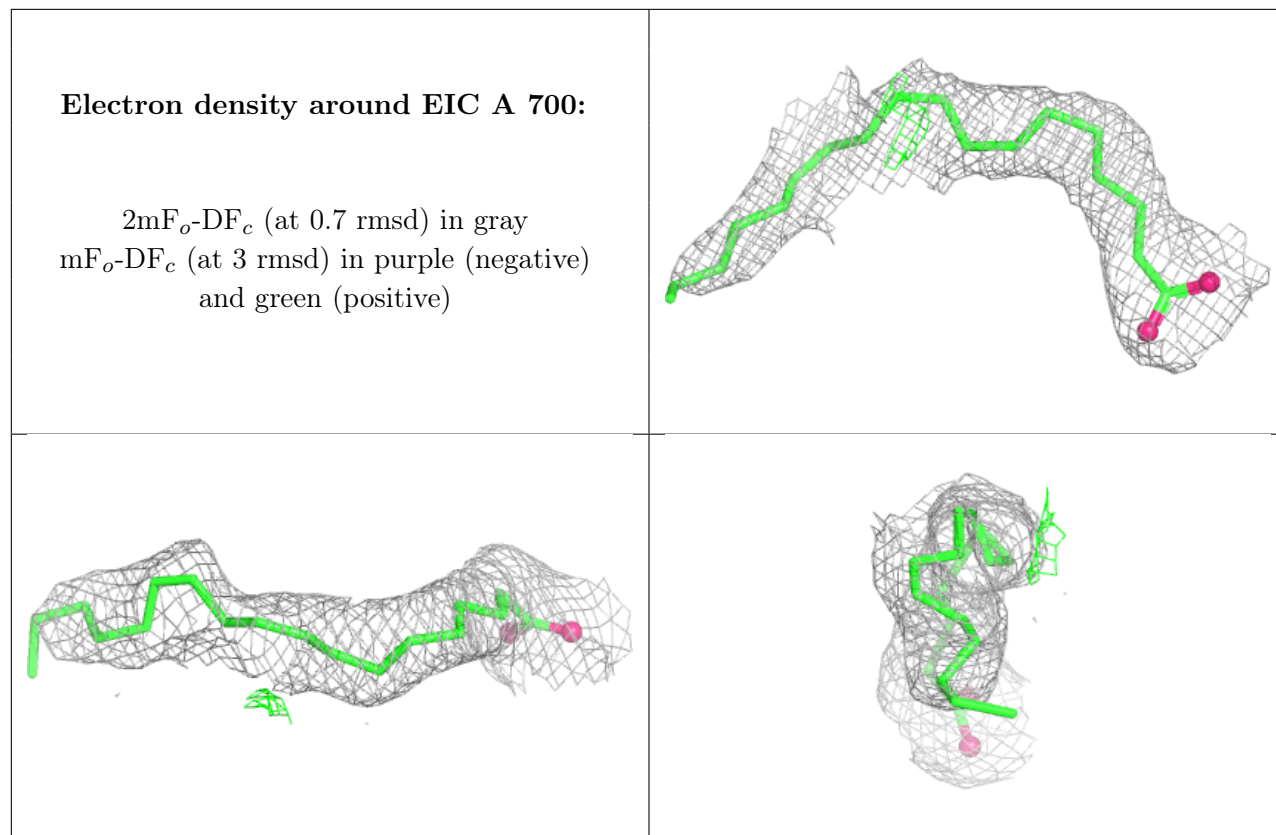
Electron density around BOG A 752:

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

Electron density around BOG A 751:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
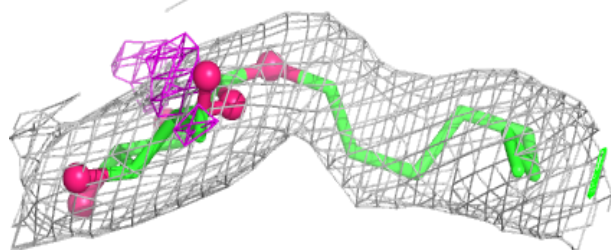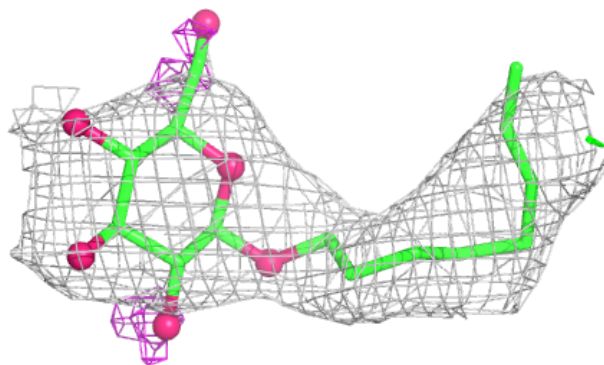
Electron density around COH A 601:

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

Electron density around EIC A 700:

$2mF_o$-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.