Full wwPDB X-ray Structure Validation Report ⓘ

Apr 26, 2022 – 10:12 am BST

PDB ID	:	7R3N
Title	:	mouse Interleukin-12 subunit beta - p80 homodimer in space group P21 crystal form 3
Authors	:	Bloch, Y.; Savvides, S.N.
Deposited on	:	2022-02-07
Resolution	:	3.16 Å(reported)

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

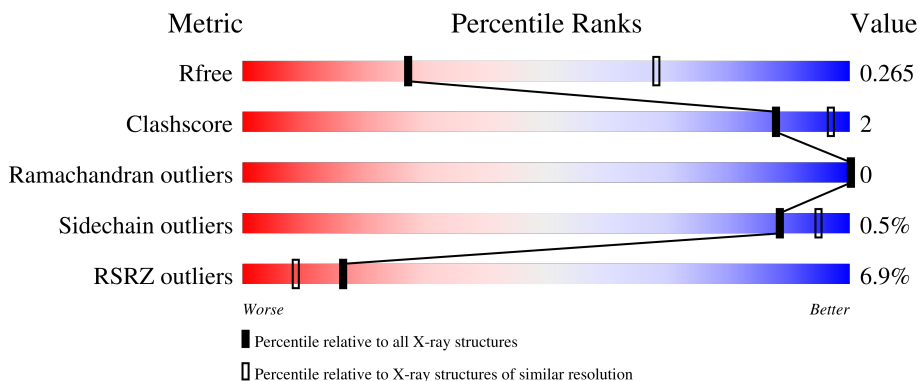|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.28
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.28

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 3.16 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.
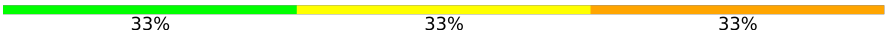
Metric	Percentile Ranks	Value
Rfree		0.265
Clashscore		2
Ramachandran outliers		0
Sidechain outliers		0.5%
RSRZ outliers		6.9%

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	1665 (3.20-3.12)
Clashscore	141614	1804 (3.20-3.12)
Ramachandran outliers	138981	1770 (3.20-3.12)
Sidechain outliers	138945	1769 (3.20-3.12)
RSRZ outliers	127900	1616 (3.20-3.12)

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	335	% 82% 9% 9%
1	B	335	11% 86% 5% 9%
1	C	335	11% 87% · 10%
1	D	335	2% 87% · 9%
2	E	4	50% 25% 25%

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WORLDWIDE
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Length	Quality of chain
2	F	4	25% 75%
2	H	4	50% 25% 25%
3	G	3	33% 33% 33%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 9888 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 Interleukin-12 subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	304	Total 2414	C 1519	N 401	O 477	S 17	0	1	0
1	B	304	Total 2429	C 1527	N 409	O 476	S 17	0	1	0
1	C	302	Total 2401	C 1509	N 402	O 473	S 17	0	0	0
1	D	305	Total 2429	C 1525	N 411	O 476	S 17	0	0	0

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-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
2	E	4	Total 50	C 28	N 2	O 20	0	0	0
2	F	4	Total 50	C 28	N 2	O 20	0	0	0
2	H	4	Total 50	C 28	N 2	O 20	0	0	0

- Molecule 3 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
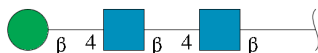
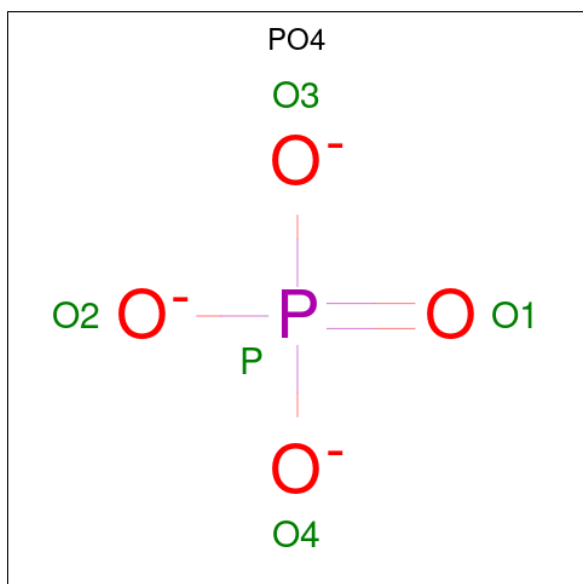| Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	G	3	Total 39	C 22	N 2	O 15	0	0	0

- Molecule 4 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 5	O 4	P 1	0	0
4	B	1	Total 5	O 4	P 1	0	0
4	B	1	Total 5	O 4	P 1	0	0
4	D	1	Total 5	O 4	P 1	0	0
4	D	1	Total 5	O 4	P 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total 1	O 1	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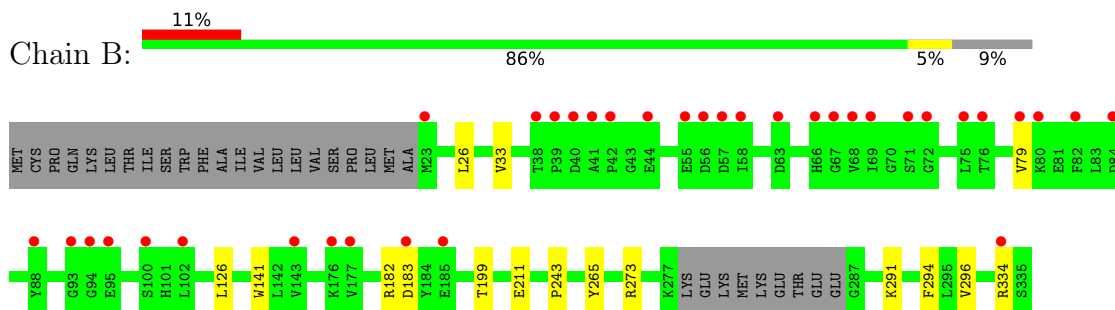 a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Interleukin-12 subunit beta
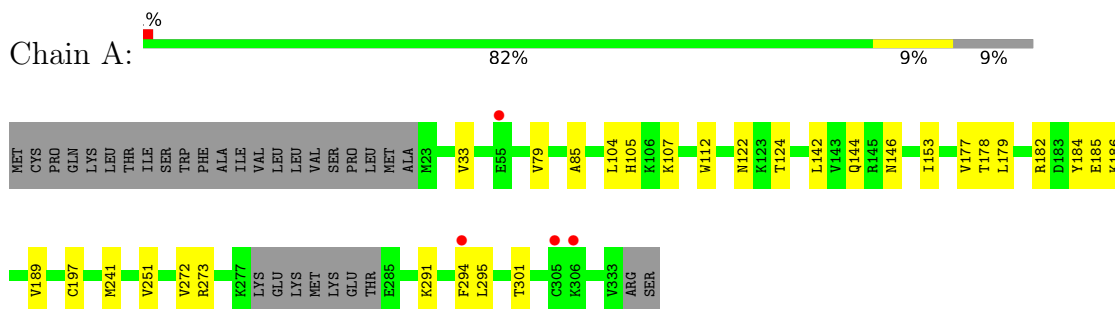
- Molecule 1: Interleukin-12 subunit beta

- Molecule 1: Interleukin-12 subunit beta

- Molecule 1: Interleukin-12 subunit beta

LYS MET LYS GLU THR **E285** K291 V296 T301 C311 V333 ARG SER
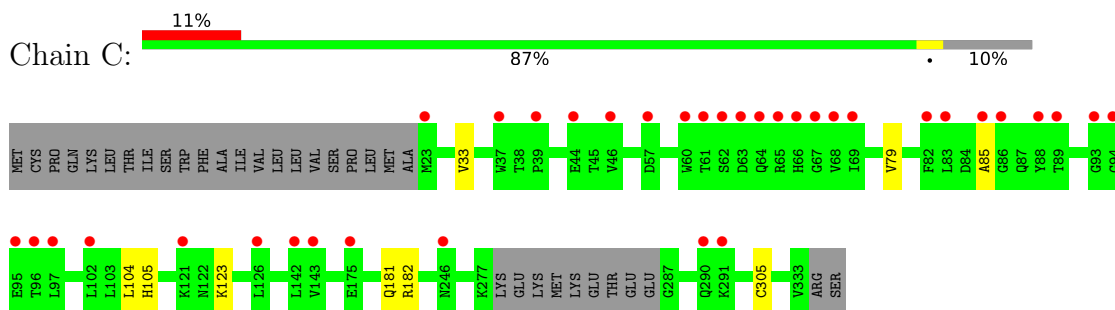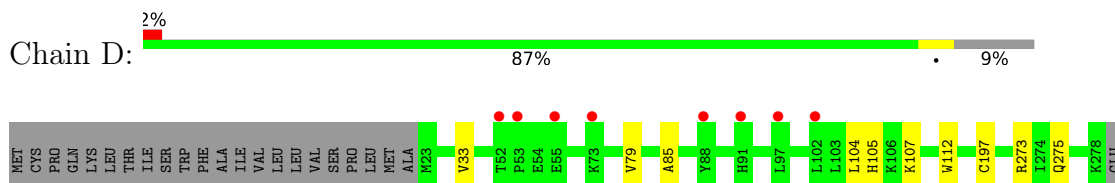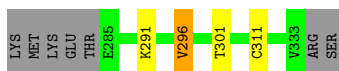
• Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-b eta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:　50%　25%　25%

NAG1 NAG2 BMA3 MAN4

• Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-b eta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:　25%　75%

NAG1 NAG2 BMA3 MAN4

• Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-b eta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:　50%　25%　25%

NAG1 NAG2 BMA3 MAN4

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-ac etamido-2-deoxy-beta-D-glucopyranose

Chain G:　33%　33%　33%

NAG1 NAG2 BMA3

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	112.81Å 65.17Å 134.31Å 90.00° 98.09° 90.00°	Depositor
Resolution (Å)	61.03 – 3.16 92.15 – 3.10	Depositor EDS
% Data completeness (in resolution range)	99.0 (61.03-3.16) 99.1 (92.15-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.25 (at 3.13Å)	Xtriage
Refinement program	BUSTER, PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.220 , 0.258 0.234 , 0.265	Depositor DCC
R_{free} test set	2111 reflections (6.01%)	wwPDB-VP
Wilson B-factor (Å^2)	92.6	Xtriage
Anisotropy	0.327	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	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	0.93	EDS
Total number of atoms	9888	wwPDB-VP
Average B, all atoms (Å^2)	117.0	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 45.29 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.3505e-04. 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: BMA, PO4, MAN, NAG

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	0.66	1/2474 (0.0%)	0.72	0/3356
1	B	0.53	0/2489	0.69	0/3373
1	C	0.37	0/2457	0.60	0/3332
1	D	0.54	1/2485 (0.0%)	0.66	0/3367
All	All	0.54	2/9905 (0.0%)	0.67	0/13428

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	D	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	296	VAL	CB-CG1	-5.91	1.40	1.52
1	A	184	TYR	CE2-CZ	-5.53	1.31	1.38

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	197	CYS	Peptide
1	D	197	CYS	Peptide

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	2414	0	2285	17	0
1	B	2429	0	2327	10	0
1	C	2401	0	2288	3	0
1	D	2429	0	2328	9	0
2	E	50	0	43	1	0
2	F	50	0	43	0	0
2	H	50	0	43	1	0
3	G	39	0	34	1	0
4	A	5	0	0	0	0
4	B	10	0	0	1	0
4	D	10	0	0	0	0
5	A	1	0	0	0	0
All	All	9888	0	9391	39	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 2.

All (39) 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:273:ARG:HH11	1:D:291:LYS:HG3	1.57	0.70
1:A:144:GLN:O	1:A:182:ARG:NH2	2.28	0.65
1:B:126:LEU:HD23	1:B:141:TRP:HB3	1.82	0.62
1:A:178:THR:O	1:A:179:LEU:HD12	2.05	0.56
1:B:296:VAL:HG23	4:B:401:PO4:O4	2.08	0.53
1:B:33:VAL:HG11	1:B:79:VAL:HG21	1.90	0.53
1:A:272:VAL:HB	1:A:294[B]:PHE:CE1	2.44	0.53
1:B:199:THR:HG23	1:B:265:TYR:CE2	2.44	0.52
1:D:105:HIS:CE1	2:H:1:NAG:H62	2.46	0.51
1:B:243:PRO:HG3	1:B:334:ARG:HG3	1.91	0.51
1:A:295:LEU:C	1:A:295:LEU:HD23	2.31	0.51
1:D:296:VAL:HG21	1:D:301:THR:HG23	1.93	0.51
1:A:107:LYS:HB2	1:A:112:TRP:CZ3	2.47	0.50
1:C:105:HIS:CE1	3:G:1:NAG:HO6	2.29	0.49
1:A:146:ASN:CB	1:A:185:GLU:OE1	2.61	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:33:VAL:HG11	1:D:79:VAL:HG21	1.95	0.48
1:A:85:ALA:HB2	1:A:104:LEU:HD13	1.96	0.48
1:C:33:VAL:HG11	1:C:79:VAL:HG21	1.94	0.48
1:A:33:VAL:HG11	1:A:79:VAL:HG21	1.95	0.47
1:D:296:VAL:HG21	1:D:301:THR:CG2	2.45	0.47
1:C:85:ALA:HB2	1:C:104:LEU:HD13	1.97	0.47
1:A:153:ILE:HG21	1:A:189:VAL:HG11	1.97	0.46
1:B:26:LEU:HD11	1:B:211:GLU:OE2	2.16	0.46
1:A:241:MET:SD	1:A:251:VAL:HG12	2.56	0.45
1:D:275:GLN:NE2	1:D:311:CYS:SG	2.89	0.45
1:A:122:ASN:OD1	1:A:124:THR:HG23	2.16	0.45
1:A:146:ASN:HB3	1:A:185:GLU:OE1	2.17	0.45
1:D:107:LYS:HB2	1:D:112:TRP:CZ3	2.52	0.44
1:A:142:LEU:HD23	1:A:186:LYS:HB2	1.98	0.44
1:A:177:VAL:HG12	1:A:179:LEU:HD13	2.00	0.44
1:B:199:THR:HG23	1:B:265:TYR:CZ	2.53	0.43
1:B:273:ARG:HH11	1:B:291:LYS:HG3	1.81	0.43
1:D:85:ALA:HB2	1:D:104:LEU:HD13	2.00	0.43
1:A:105:HIS:CE1	2:E:1:NAG:H62	2.55	0.42
1:A:251:VAL:HG22	1:A:301:THR:O	2.20	0.42
1:A:273:ARG:HD3	1:A:291:LYS:HB3	2.02	0.42
1:B:273:ARG:NH1	1:B:291:LYS:HG3	2.35	0.41
1:D:273:ARG:NH1	1:D:291:LYS:HG3	2.29	0.41
1:B:183:ASP:OD1	1:B:183:ASP:O	2.39	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	301/335 (90%)	292 (97%)	9 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	301/335 (90%)	292 (97%)	9 (3%)	0	100	100
1	C	298/335 (89%)	293 (98%)	5 (2%)	0	100	100
1	D	301/335 (90%)	295 (98%)	6 (2%)	0	100	100
All	All	1201/1340 (90%)	1172 (98%)	29 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	272/307 (89%)	272 (100%)	0	100	100
1	B	277/307 (90%)	274 (99%)	3 (1%)	73	88
1	C	272/307 (89%)	268 (98%)	4 (2%)	65	84
1	D	276/307 (90%)	276 (100%)	0	100	100
All	All	1097/1228 (89%)	1090 (99%)	7 (1%)	88	94

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	182	ARG
1	B	294[A]	PHE
1	B	294[B]	PHE
1	C	123	LYS
1	C	181	GLN
1	C	182	ARG
1	C	305	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 ⓘ

15 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	2,1	14,14,15	0.44	0	17,19,21	0.99	1 (5%)
2	NAG	E	2	2	14,14,15	0.33	0	17,19,21	1.25	1 (5%)
2	BMA	E	3	2	11,11,12	0.35	0	15,15,17	0.80	0
2	MAN	E	4	2	11,11,12	0.20	0	15,15,17	0.75	0
2	NAG	F	1	2,1	14,14,15	0.44	0	17,19,21	0.75	1 (5%)
2	NAG	F	2	2	14,14,15	0.34	0	17,19,21	1.10	1 (5%)
2	BMA	F	3	2	11,11,12	0.29	0	15,15,17	0.97	1 (6%)
2	MAN	F	4	2	11,11,12	0.25	0	15,15,17	0.65	0
3	NAG	G	1	3,1	14,14,15	0.51	0	17,19,21	0.96	1 (5%)
3	NAG	G	2	3	14,14,15	0.30	0	17,19,21	1.15	1 (5%)
3	BMA	G	3	3	11,11,12	0.28	0	15,15,17	0.63	0
2	NAG	H	1	2,1	14,14,15	0.27	0	17,19,21	0.85	1 (5%)
2	NAG	H	2	2	14,14,15	0.34	0	17,19,21	0.96	1 (5%)
2	BMA	H	3	2	11,11,12	0.31	0	15,15,17	0.65	0
2	MAN	H	4	2	11,11,12	0.22	0	15,15,17	0.52	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	2,1	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	2/6/23/26	0/1/1/1
2	BMA	E	3	2	-	0/2/19/22	0/1/1/1
2	MAN	E	4	2	-	0/2/19/22	0/1/1/1
2	NAG	F	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	2/6/23/26	0/1/1/1
2	BMA	F	3	2	-	1/2/19/22	0/1/1/1
2	MAN	F	4	2	-	0/2/19/22	0/1/1/1
3	NAG	G	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	G	2	3	-	2/6/23/26	0/1/1/1
3	BMA	G	3	3	-	0/2/19/22	0/1/1/1
2	NAG	H	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	2/6/23/26	0/1/1/1
2	BMA	H	3	2	-	0/2/19/22	0/1/1/1
2	MAN	H	4	2	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	G	2	NAG	O5-C1-C2	-4.34	104.44	111.29
2	E	2	NAG	O5-C1-C2	-4.23	104.60	111.29
2	F	2	NAG	O5-C1-C2	-3.84	105.22	111.29
3	G	1	NAG	C1-O5-C5	3.51	116.94	112.19
2	H	2	NAG	O5-C1-C2	-3.31	106.07	111.29
2	H	1	NAG	C1-O5-C5	3.18	116.50	112.19
2	E	1	NAG	C1-O5-C5	3.14	116.45	112.19
2	F	1	NAG	C1-O5-C5	2.53	115.63	112.19
2	F	3	BMA	C1-O5-C5	-2.41	108.93	112.19

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	F	2	NAG	C8-C7-N2-C2
2	F	2	NAG	O7-C7-N2-C2
3	G	2	NAG	C8-C7-N2-C2
3	G	2	NAG	O7-C7-N2-C2
3	G	1	NAG	C8-C7-N2-C2
3	G	1	NAG	O7-C7-N2-C2
2	H	2	NAG	C8-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
2	F	3	BMA	O5-C5-C6-O6
3	G	1	NAG	O5-C5-C6-O6
2	E	2	NAG	C8-C7-N2-C2
2	H	2	NAG	O7-C7-N2-C2
3	G	1	NAG	C4-C5-C6-O6
2	E	2	NAG	O7-C7-N2-C2

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	1	NAG	1	0
2	H	1	NAG	1	0
2	E	1	NAG	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 oligosaccharide.

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings
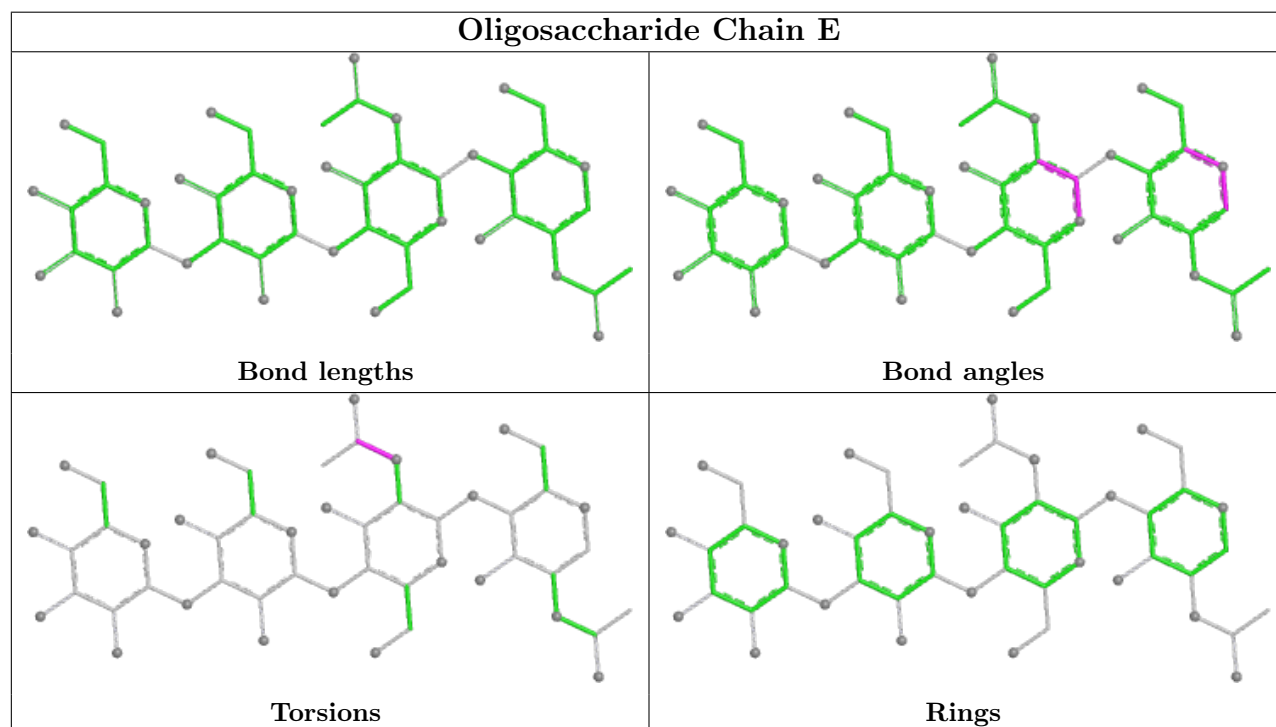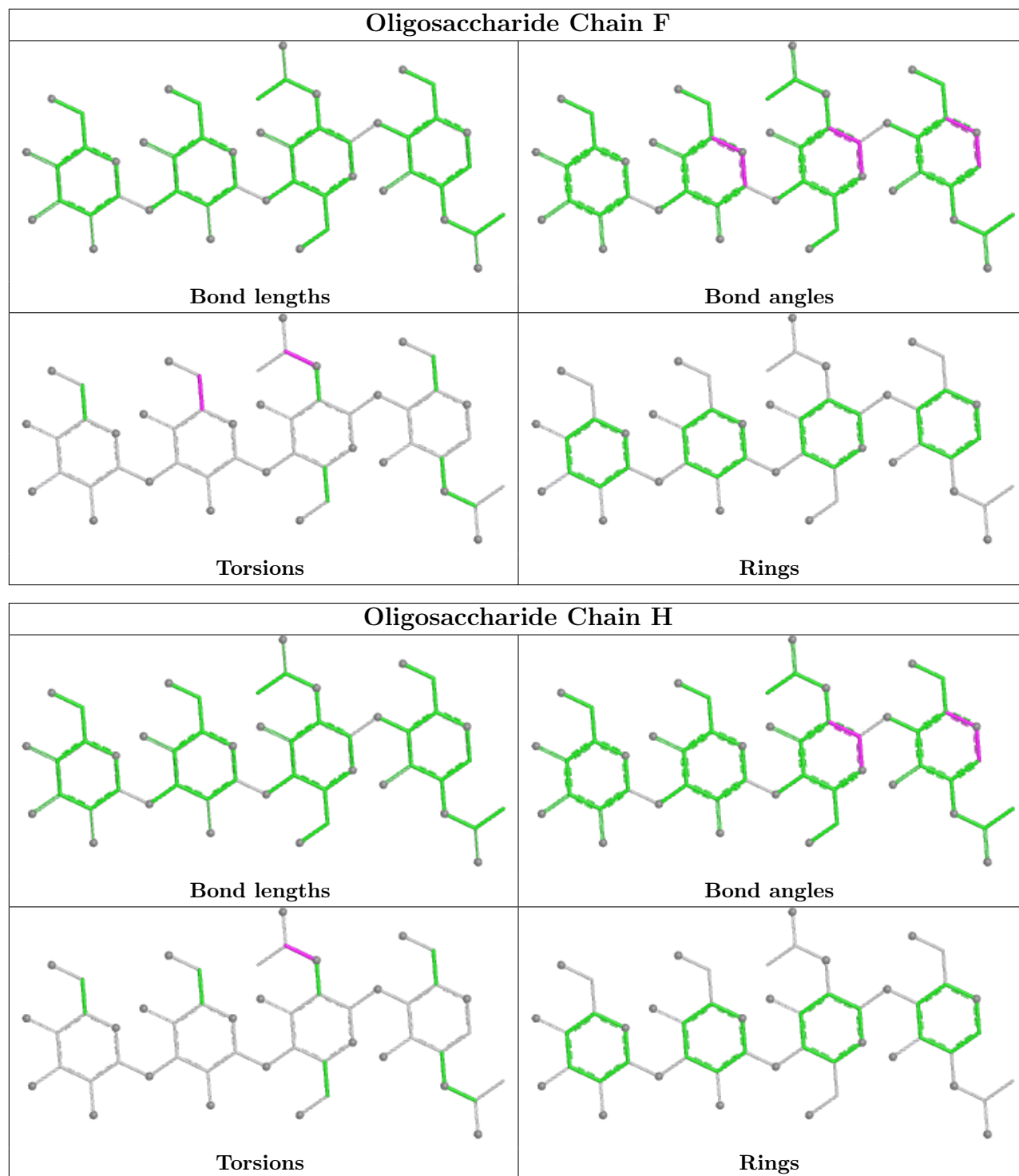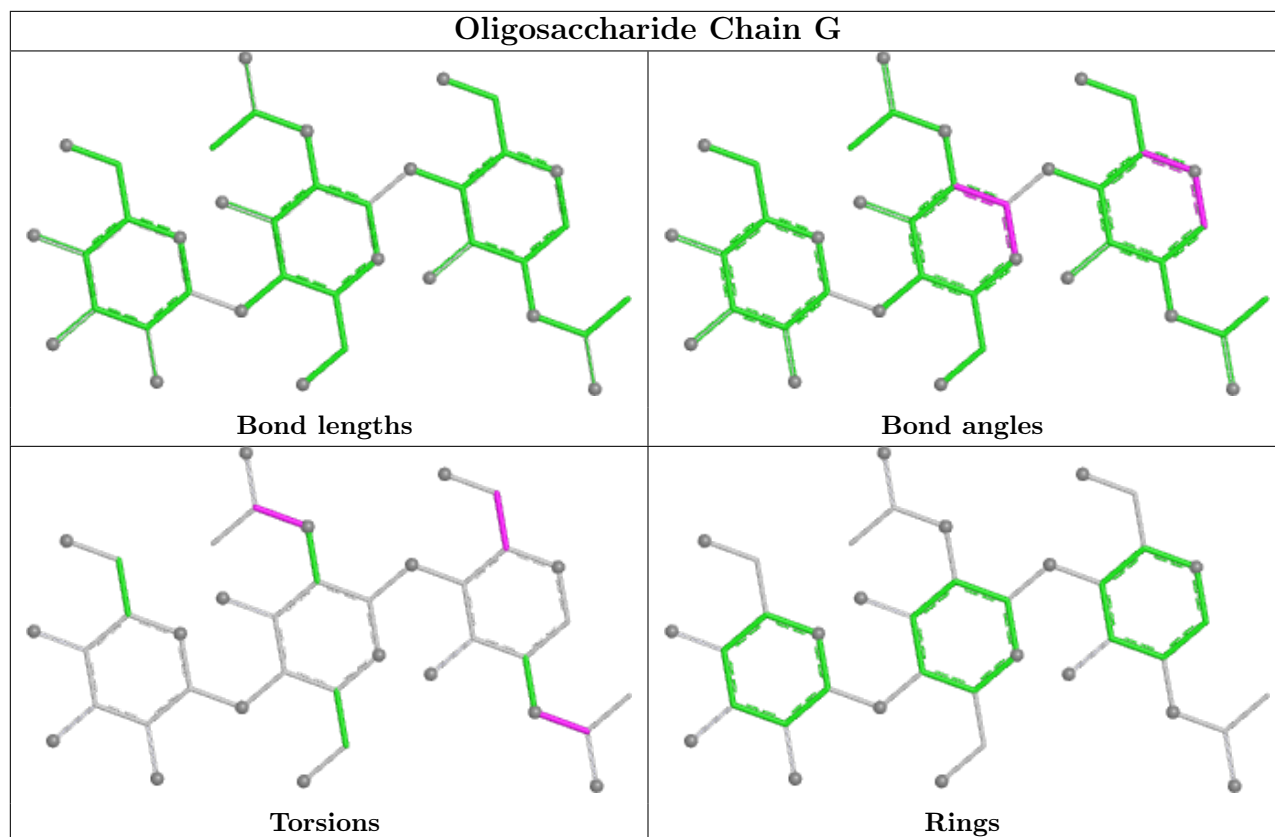
5.6 Ligand geometry ⓘ

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	#$|Z| > 2$
4	PO4	B	402	-	4,4,4	2.45	3 (75%)	6,6,6	0.44	0
4	PO4	B	401	-	4,4,4	2.45	3 (75%)	6,6,6	0.45	0
4	PO4	D	402	-	4,4,4	2.40	3 (75%)	6,6,6	0.39	0
4	PO4	A	401	-	4,4,4	2.44	3 (75%)	6,6,6	0.42	0
4	PO4	D	401	-	4,4,4	2.31	3 (75%)	6,6,6	0.38	0

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	402	PO4	P-O2	-2.78	1.46	1.54
4	A	401	PO4	P-O2	-2.75	1.46	1.54
4	A	401	PO4	P-O3	-2.72	1.46	1.54
4	B	401	PO4	P-O4	-2.67	1.46	1.54
4	B	401	PO4	P-O2	-2.66	1.46	1.54
4	D	402	PO4	P-O4	-2.66	1.46	1.54
4	D	402	PO4	P-O3	-2.64	1.46	1.54
4	B	401	PO4	P-O3	-2.63	1.46	1.54
4	B	402	PO4	P-O4	-2.58	1.46	1.54
4	B	402	PO4	P-O3	-2.58	1.46	1.54
4	D	401	PO4	P-O2	-2.56	1.46	1.54
4	D	402	PO4	P-O2	-2.56	1.46	1.54
4	A	401	PO4	P-O4	-2.55	1.46	1.54
4	D	401	PO4	P-O4	-2.48	1.47	1.54
4	D	401	PO4	P-O3	-2.43	1.47	1.54

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	401	PO4	1	0

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	304/335 (90%)	0.08	4 (1%)	77	66	45, 78, 153, 174	0
1	B	304/335 (90%)	0.48	36 (11%)	4	2	41, 120, 203, 238	0
1	C	302/335 (90%)	0.50	36 (11%)	4	2	106, 153, 203, 218	0
1	D	305/335 (91%)	0.07	8 (2%)	56	40	51, 93, 177, 216	0
All	All	1215/1340 (90%)	0.28	84 (6%)	16	9	41, 114, 199, 238	0

All (84) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	66	HIS	8.8
1	C	94	GLY	7.8
1	C	68	VAL	7.2
1	C	93	GLY	7.1
1	C	61	THR	6.7
1	C	69	ILE	5.8
1	B	93	GLY	5.5
1	C	88	TYR	5.4
1	B	39	PRO	5.1
1	C	39	PRO	5.1
1	C	62	SER	4.8
1	C	64	GLN	4.7
1	B	55	GLU	4.4
1	C	63	ASP	4.4
1	C	67	GLY	4.3
1	B	38	THR	4.3
1	C	57	ASP	4.2
1	C	85	ALA	4.2
1	C	143	VAL	4.2
1	B	69	ILE	4.2
1	C	89	THR	4.1

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Mol	Chain	Res	Type	RSRZ
1	D	53	PRO	4.1
1	B	88	TYR	4.0
1	B	40	ASP	4.0
1	D	55	GLU	4.0
1	C	290	GLN	3.9
1	C	82	PHE	3.9
1	B	42	PRO	3.9
1	B	183	ASP	3.8
1	C	291	LYS	3.7
1	B	75	LEU	3.7
1	C	96	THR	3.7
1	B	23	MET	3.7
1	B	41	ALA	3.6
1	B	67	GLY	3.6
1	D	91	HIS	3.4
1	C	44	GLU	3.4
1	B	80	LYS	3.2
1	B	143	VAL	3.2
1	B	56	ASP	3.1
1	B	95	GLU	3.0
1	B	71	SER	3.0
1	B	94	GLY	3.0
1	C	65	ARG	2.9
1	B	58	ILE	2.7
1	B	57	ASP	2.7
1	C	60	TRP	2.7
1	B	79	VAL	2.7
1	A	55	GLU	2.6
1	C	246	ASN	2.6
1	D	97	LEU	2.6
1	B	44	GLU	2.5
1	B	66	HIS	2.5
1	D	88	TYR	2.4
1	C	23	MET	2.4
1	B	176	LYS	2.4
1	A	306	LYS	2.4
1	B	84	ASP	2.3
1	D	52	THR	2.3
1	D	73	LYS	2.3
1	B	68	VAL	2.3
1	C	95	GLU	2.3
1	C	175	GLU	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	83	LEU	2.2
1	C	102	LEU	2.2
1	B	82	PHE	2.2
1	D	102	LEU	2.2
1	C	97	LEU	2.2
1	B	72	GLY	2.2
1	B	102	LEU	2.2
1	C	142	LEU	2.2
1	B	100	SER	2.2
1	C	86	GLY	2.1
1	C	121	LYS	2.1
1	B	177	VAL	2.1
1	B	334	ARG	2.1
1	B	185	GLU	2.1
1	B	76	THR	2.0
1	A	294[A]	PHE	2.0
1	B	63	ASP	2.0
1	C	37	TRP	2.0
1	C	126	LEU	2.0
1	A	305	CYS	2.0
1	C	46	VAL	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.
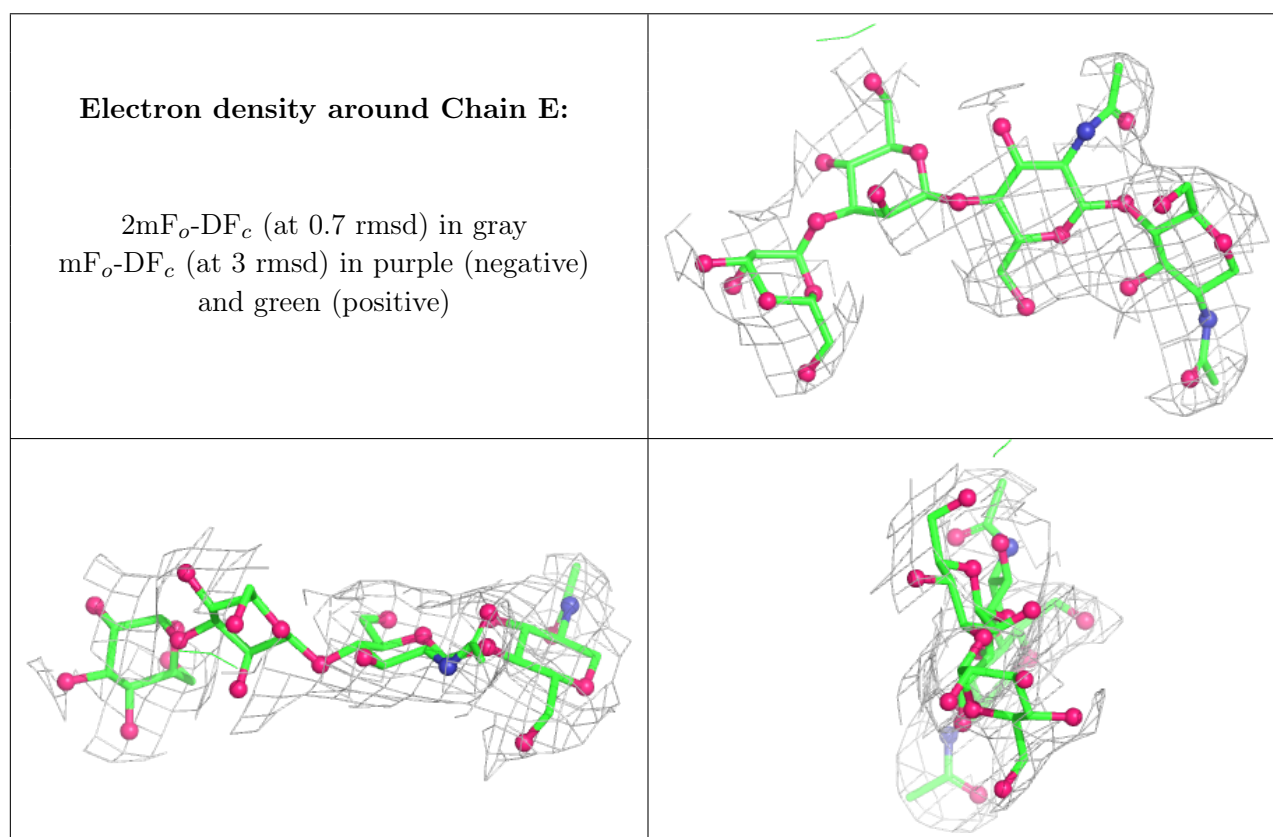
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	BMA	G	3	11/12	0.66	0.13	149,163,166,169	0
2	MAN	F	4	11/12	0.74	0.21	167,180,187,188	0
3	NAG	G	1	14/15	0.80	0.12	142,151,158,160	0
2	BMA	H	3	11/12	0.81	0.21	205,212,223,235	0
2	NAG	F	1	14/15	0.81	0.17	150,163,174,182	0
2	MAN	E	4	11/12	0.81	0.14	118,141,148,151	0
2	BMA	E	3	11/12	0.89	0.19	79,103,130,139	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	NAG	H	1	14/15	0.91	0.19	100,108,131,138	0
3	NAG	G	2	14/15	0.91	0.25	146,162,166,168	0
2	MAN	H	4	11/12	0.91	0.18	222,229,243,247	0
2	NAG	H	2	14/15	0.92	0.22	145,188,196,197	0
2	NAG	F	2	14/15	0.92	0.10	157,174,180,181	0
2	BMA	F	3	11/12	0.92	0.13	174,183,192,193	0
2	NAG	E	2	14/15	0.95	0.19	69,83,88,89	0
2	NAG	E	1	14/15	0.97	0.21	54,64,69,76	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.
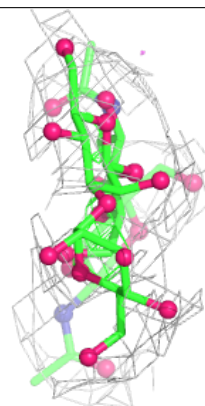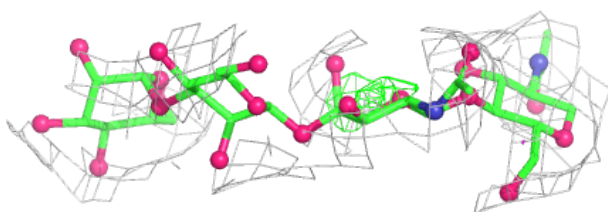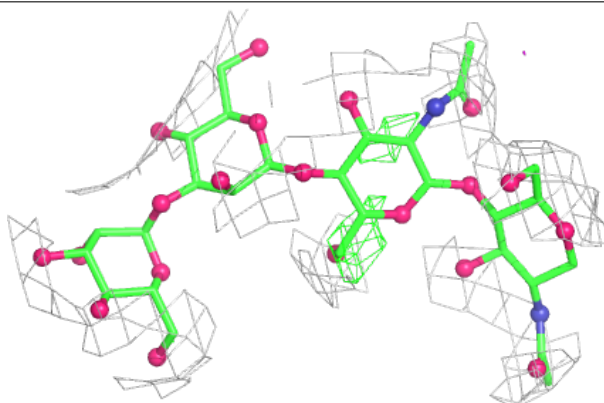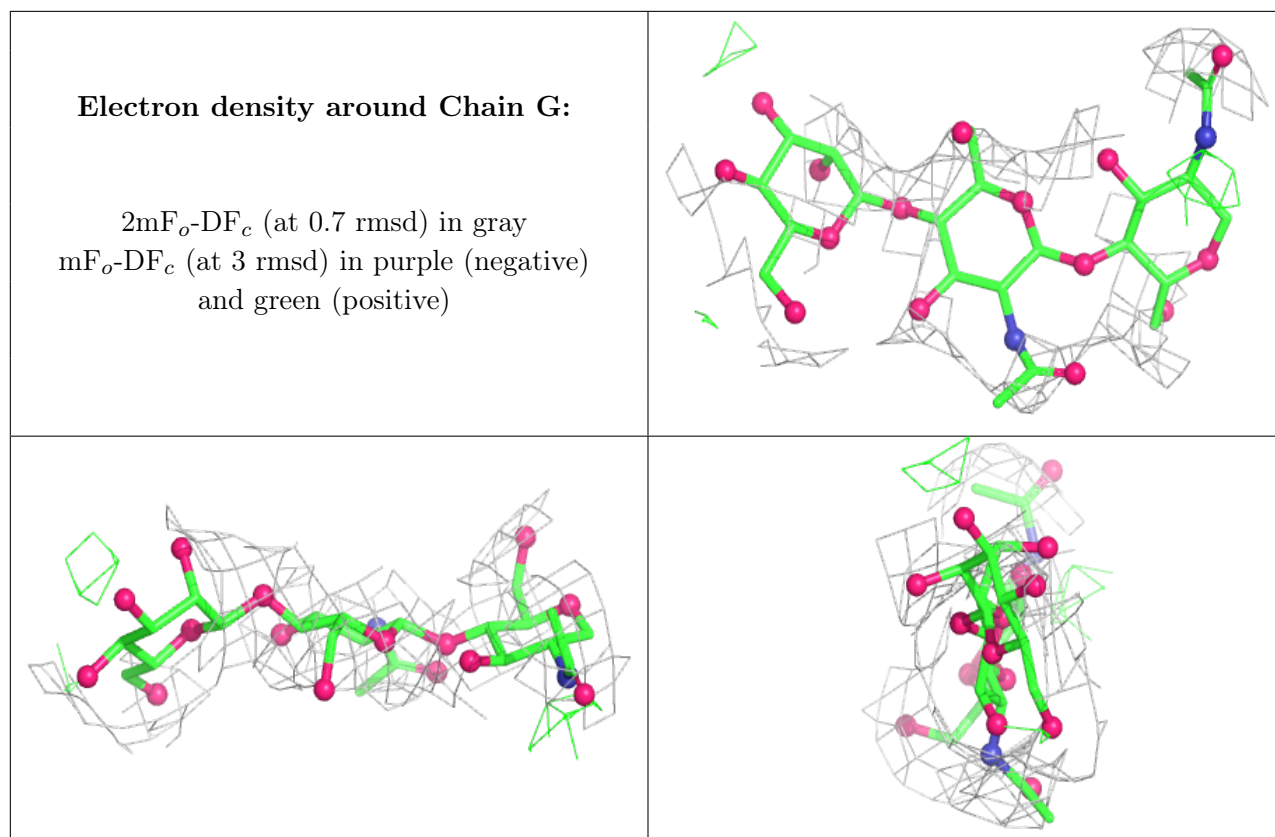
Electron density around Chain E:

$2mF_o\text{-}DF_c$ (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:

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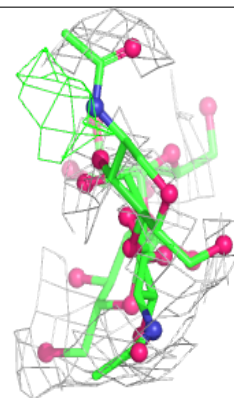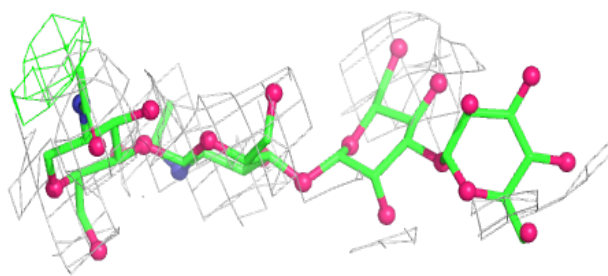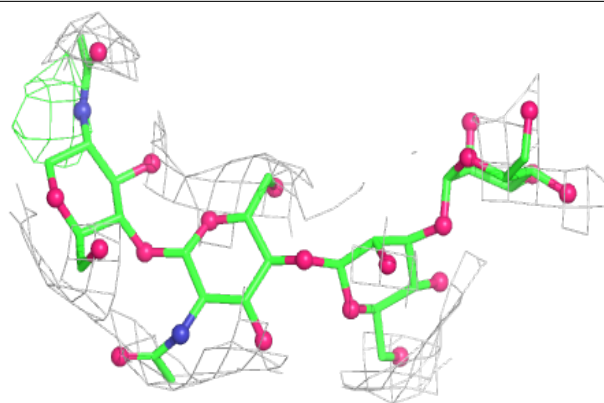
Electron density around Chain H:

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

Electron density around Chain G:

$2mF_o$-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
4	PO4	D	402	5/5	0.88	0.16	109,109,119,121	0
4	PO4	B	402	5/5	0.92	0.21	124,124,124,124	0
4	PO4	B	401	5/5	0.92	0.17	127,127,134,145	0
4	PO4	D	401	5/5	0.97	0.14	62,71,87,88	0
4	PO4	A	401	5/5	0.97	0.16	72,85,103,108	0

6.5 Other polymers ⓘ

There are no such residues in this entry.