



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 21, 2020 – 11:13 AM BST

PDB ID : 6ETY
Title : X-ray structure of human glutamate carboxypeptidase II (GCP II) in complex with a inhibitor JHU3371
Authors : Barinka, C.; Novakova, Z.; Motlova, L.
Deposited on : 2017-10-27
Resolution : 1.68 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.13.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.13.1

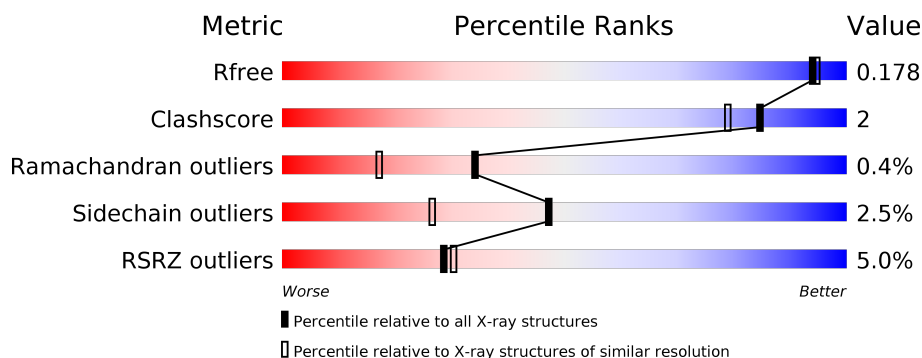
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.68 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	6780 (1.70-1.66)
Clashscore	141614	7310 (1.70-1.66)
Ramachandran outliers	138981	7173 (1.70-1.66)
Sidechain outliers	138945	7172 (1.70-1.66)
RSRZ outliers	127900	6661 (1.70-1.66)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	707	<div> <div>5%</div> <div> <div></div> <div>91%</div> <div>7%</div> <div>••</div> </div> </div>
2	B	2	<div> <div>100%</div> </div>
2	C	2	<div> <div>50%</div> <div>50%</div> </div>
3	D	3	<div> <div>33%</div> <div>67%</div> </div>
4	E	5	<div> <div>20%</div> <div>80%</div> </div>

2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 6600 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 Glutamate carboxypeptidase 2.

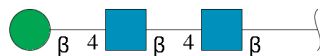
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	696	Total	C	N	O	S	0	50	0
			5846	3745	981	1099	21			

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



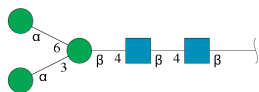
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	C	2	Total	C	N	O	0	0	0
			28	16	2	10			

- 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.



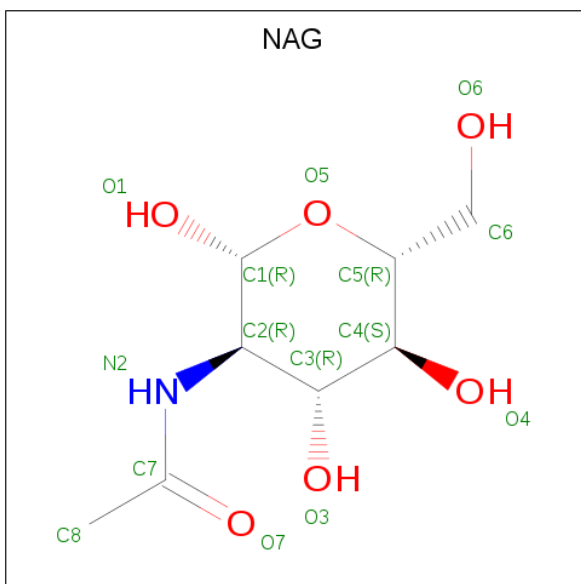
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	D	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-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
4	E	5	Total	C	N	O	0	0	0
			61	34	2	25			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $\text{C}_8\text{H}_{15}\text{NO}_6$).



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

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	2	Total Zn 2 2	0	0

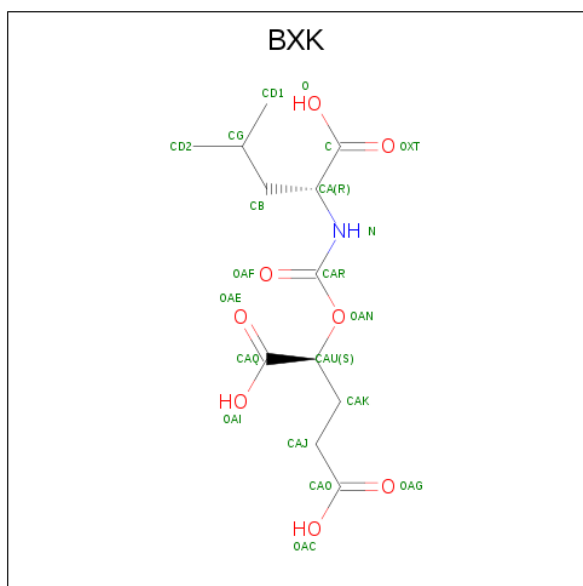
- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Ca 1 1	0	0

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

- Molecule 9 is (2 {S})-2-[[[(2 {R})-4-methyl-1-oxidanyl-1-oxidanylidene-pentan-2-yl]carbamoyloxy]pentanedioic acid (three-letter code: BXK) (formula: C₁₂H₁₉NO₈) (labeled as "Ligand of Interest" by author).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total C N O 21 12 1 8	0	0

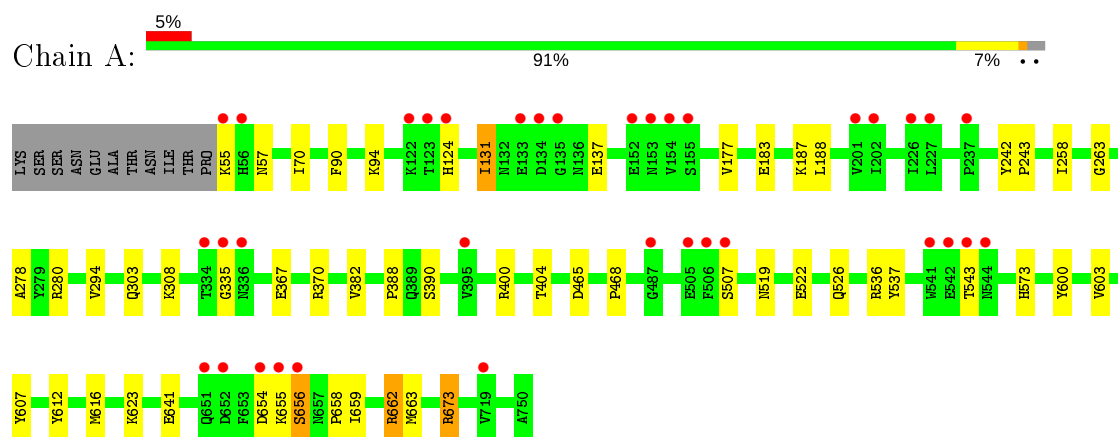
- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	530	Total O 531 531	0	3

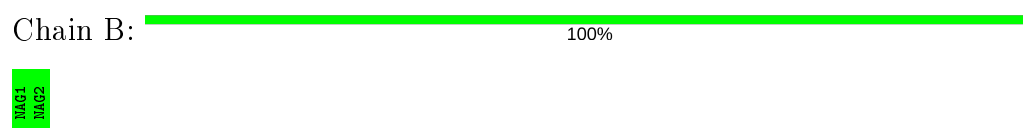
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Glutamate carboxypeptidase 2



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



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



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



- Molecule 4: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain E:  20% 80%

MAG1	MAG2	E/LJ3	MAT4	MAT5
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4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	101.65Å 130.72Å 158.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.68 29.55 – 1.68	Depositor EDS
% Data completeness (in resolution range)	99.3 (30.00-1.68) 99.3 (29.55-1.68)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 1.68Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.155 , 0.178 0.156 , 0.178	Depositor DCC
R_{free} test set	3573 reflections (3.01%)	wwPDB-VP
Wilson B-factor (Å ²)	21.8	Xtriage
Anisotropy	0.657	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 46.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6600	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.24% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, BMA, NAG, CL, CA, BXK, MAN

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	0.80	1/6097 (0.0%)	0.80	7/8256 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	183	GLU	CD-OE1	5.17	1.31	1.25

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	673	ARG	NE-CZ-NH2	-8.96	115.82	120.30
1	A	673	ARG	NE-CZ-NH1	7.34	123.97	120.30
1	A	662[A]	ARG	NE-CZ-NH2	-5.80	117.40	120.30
1	A	662[B]	ARG	NE-CZ-NH2	-5.80	117.40	120.30
1	A	370	ARG	NE-CZ-NH1	5.69	123.14	120.30
1	A	623	LYS	CD-CE-NZ	-5.09	100.00	111.70
1	A	465	ASP	CB-CG-OD1	5.01	122.81	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5846	0	5686	27	0
2	B	28	0	25	0	0
2	C	28	0	25	0	0
3	D	39	0	34	0	0
4	E	61	0	52	0	0
5	A	42	0	39	0	0
6	A	2	0	0	0	0
7	A	1	0	0	0	0
8	A	1	0	0	0	0
9	A	21	0	0	0	0
10	A	531	0	0	3	1
All	All	6600	0	5861	27	1

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 (27) 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:654[B]:ASP:HB2	10:A:1355:HOH:O	1.89	0.72
1:A:177:VAL:HG12	1:A:188:LEU:HD11	1.73	0.71
1:A:603[B]:VAL:CG1	1:A:607:TYR:CE2	2.76	0.69
1:A:400:ARG:O	1:A:404[B]:THR:HG23	1.93	0.68
1:A:603[B]:VAL:HG13	1:A:607:TYR:CZ	2.28	0.68
1:A:655[B]:LYS:O	1:A:656[B]:SER:HB2	1.96	0.65
1:A:603[B]:VAL:CG1	1:A:607:TYR:CZ	2.82	0.62
1:A:278:ALA:HB3	1:A:280[B]:ARG:NH1	2.15	0.61
1:A:131:ILE:HG22	1:A:137:GLU:HG2	1.85	0.58
1:A:656[B]:SER:O	1:A:658[B]:PRO:HD3	2.03	0.58
1:A:90:PHE:CE2	1:A:94:LYS:HE2	2.43	0.54
1:A:655[B]:LYS:O	1:A:656[B]:SER:CB	2.60	0.50
1:A:278:ALA:HB3	1:A:280[B]:ARG:CZ	2.43	0.49
1:A:641:GLU:HG3	10:A:1306:HOH:O	2.11	0.48
1:A:390[A]:SER:HB2	1:A:573:HIS:NE2	2.30	0.47
1:A:603[B]:VAL:HG12	1:A:607:TYR:CE2	2.49	0.46
1:A:468:PRO:CG	1:A:603[A]:VAL:HG21	2.45	0.46
1:A:468:PRO:HG2	1:A:603[A]:VAL:HG21	1.99	0.45
1:A:612:TYR:CZ	1:A:616:MET:HG3	2.52	0.45
1:A:308:LYS:HB2	10:A:953:HOH:O	2.17	0.45
1:A:70:ILE:HG21	1:A:573:HIS:HB3	2.00	0.44
1:A:263:GLY:HA2	1:A:522:GLU:OE1	2.18	0.43
1:A:659[B]:ILE:O	1:A:663[B]:MET:HG3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:242:TYR:CG	1:A:243:PRO:HA	2.53	0.43
1:A:367:GLU:OE1	1:A:662[B]:ARG:NH1	2.52	0.43
1:A:258:ILE:HD13	1:A:294:VAL:HB	2.01	0.42
1:A:655[B]:LYS:H	1:A:655[B]:LYS:HG3	1.59	0.42

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:A:1280:HOH:O	10:A:1379:HOH:O[2_565]	2.18	0.02

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	744/707 (105%)	723 (97%)	17 (2%)	4 (0%)	29 12

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	656[A]	SER
1	A	656[B]	SER
1	A	335	GLY
1	A	382	VAL

5.3.2 Protein sidechains [i](#)

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

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	643/603 (107%)	627 (98%)	16 (2%)	47 26

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	55	LYS
1	A	57	ASN
1	A	124	HIS
1	A	131	ILE
1	A	187	LYS
1	A	303	GLN
1	A	388	PRO
1	A	507	SER
1	A	519	ASN
1	A	526[A]	GLN
1	A	526[B]	GLN
1	A	536	ARG
1	A	537	TYR
1	A	543	THR
1	A	600	TYR
1	A	673	ARG

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

Mol	Chain	Res	Type
1	A	57	ASN
1	A	216	ASN
1	A	345	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 ⓘ

12 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	0.49	0	17,19,21	0.98	0
2	NAG	B	2	2	14,14,15	0.58	0	17,19,21	0.88	0
2	NAG	C	1	1,2	14,14,15	0.57	0	17,19,21	1.36	2 (11%)
2	NAG	C	2	2	14,14,15	0.54	0	17,19,21	1.02	0
3	NAG	D	1	1,3	14,14,15	0.51	0	17,19,21	1.01	0
3	NAG	D	2	3	14,14,15	0.41	0	17,19,21	1.31	2 (11%)
3	BMA	D	3	3	11,11,12	0.66	0	15,15,17	0.92	1 (6%)
4	NAG	E	1	1,4	14,14,15	0.46	0	17,19,21	1.10	2 (11%)
4	NAG	E	2	4	14,14,15	0.46	0	17,19,21	1.25	2 (11%)
4	BMA	E	3	4	11,11,12	0.43	0	15,15,17	0.83	0
4	MAN	E	4	4	11,11,12	0.68	0	15,15,17	1.14	1 (6%)
4	MAN	E	5	4	11,11,12	0.62	0	15,15,17	0.99	1 (6%)

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

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	MAN	E	4	4	-	0/2/19/22	0/1/1/1
4	MAN	E	5	4	-	1/2/19/22	0/1/1/1

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	2	NAG	C1-O5-C5	3.18	116.50	112.19
4	E	1	NAG	C1-O5-C5	3.01	116.28	112.19
4	E	4	MAN	O5-C5-C6	2.93	111.80	107.20
4	E	2	NAG	C1-O5-C5	2.80	115.99	112.19
3	D	2	NAG	C8-C7-N2	2.71	120.68	116.10
2	C	1	NAG	C8-C7-N2	2.69	120.65	116.10
2	C	1	NAG	C2-N2-C7	2.67	126.70	122.90
4	E	2	NAG	C8-C7-N2	2.57	120.45	116.10
4	E	5	MAN	C1-O5-C5	2.39	115.43	112.19
3	D	3	BMA	C1-O5-C5	2.36	115.39	112.19
4	E	1	NAG	O4-C4-C5	-2.09	104.11	109.30

There are no chirality outliers.

All (18) torsion outliers are listed below:

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

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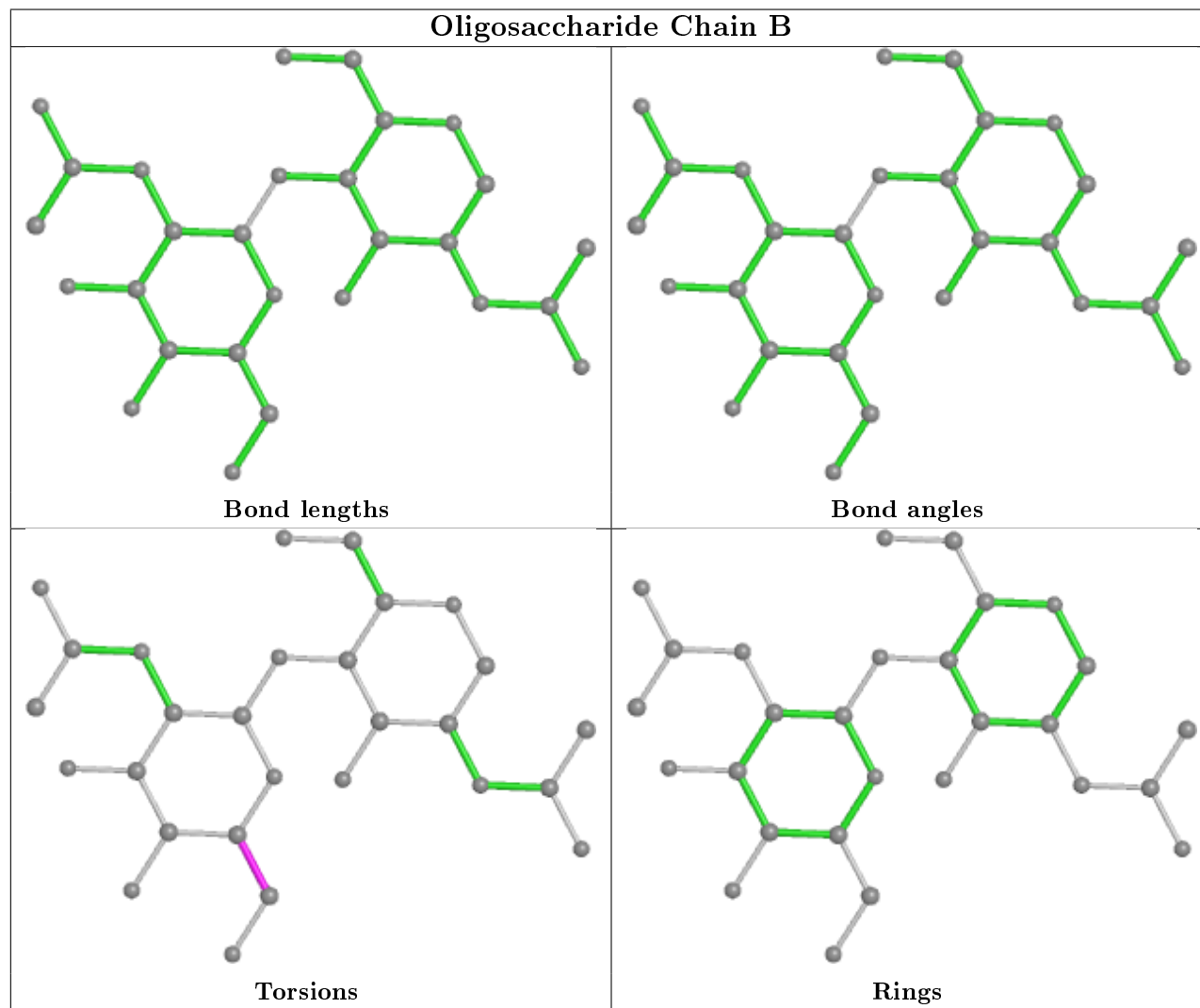
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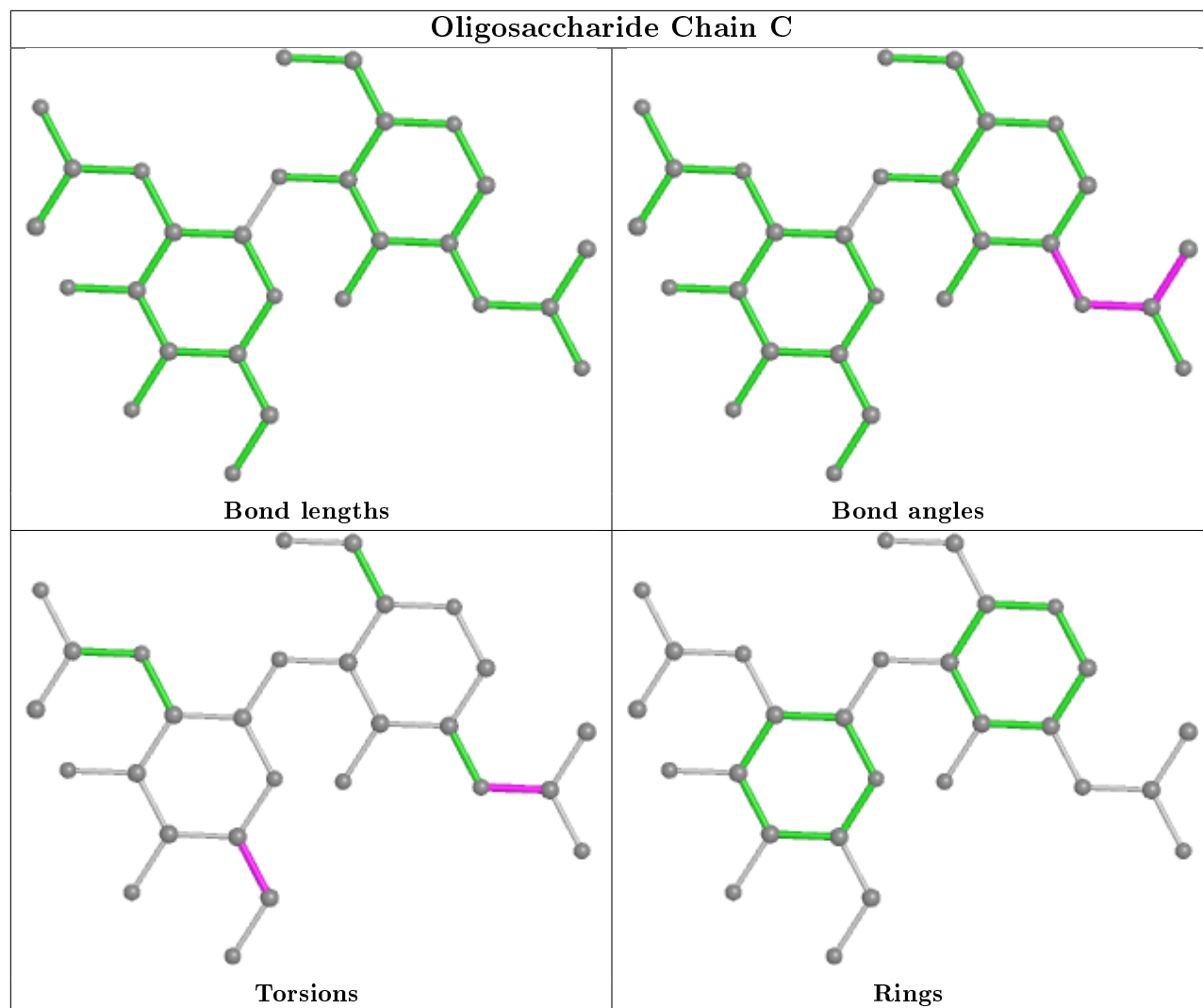
Mol	Chain	Res	Type	Atoms
4	E	2	NAG	O5-C5-C6-O6

There are no ring outliers.

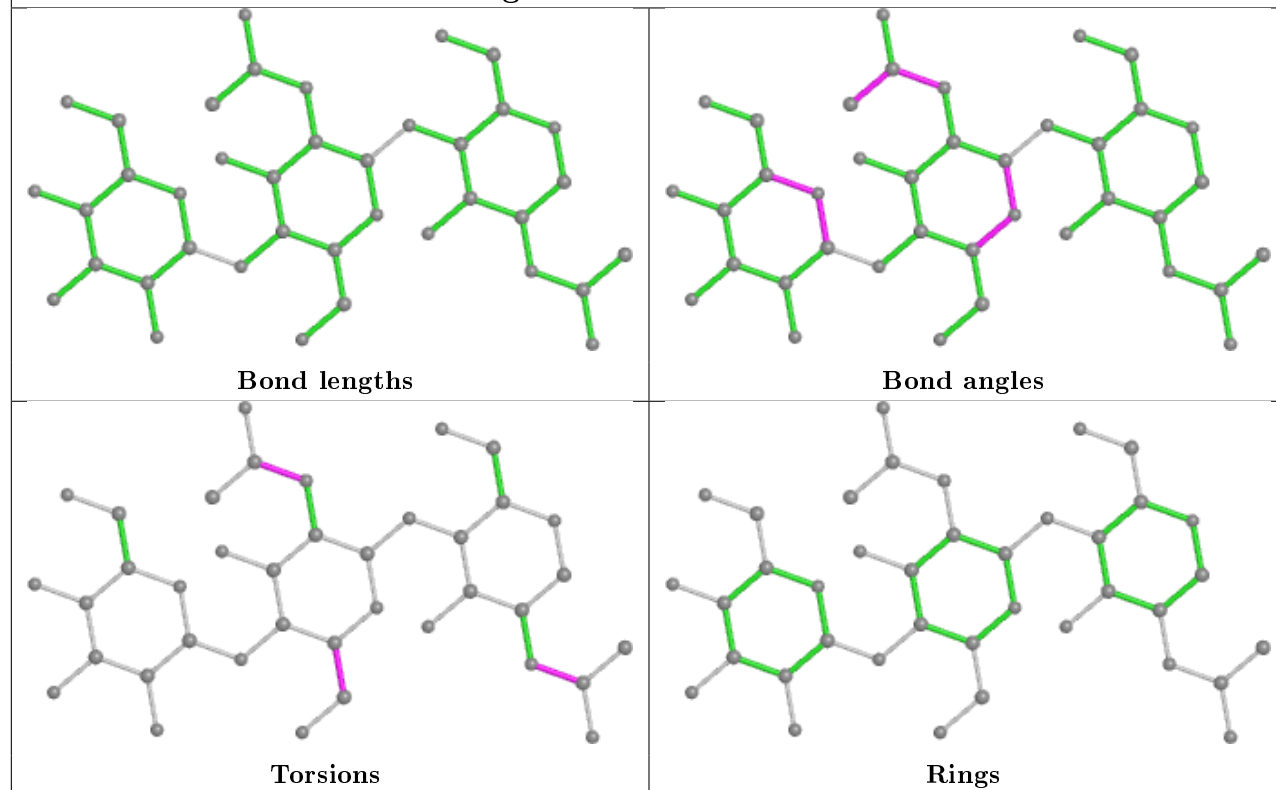
No monomer is involved in short contacts.

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

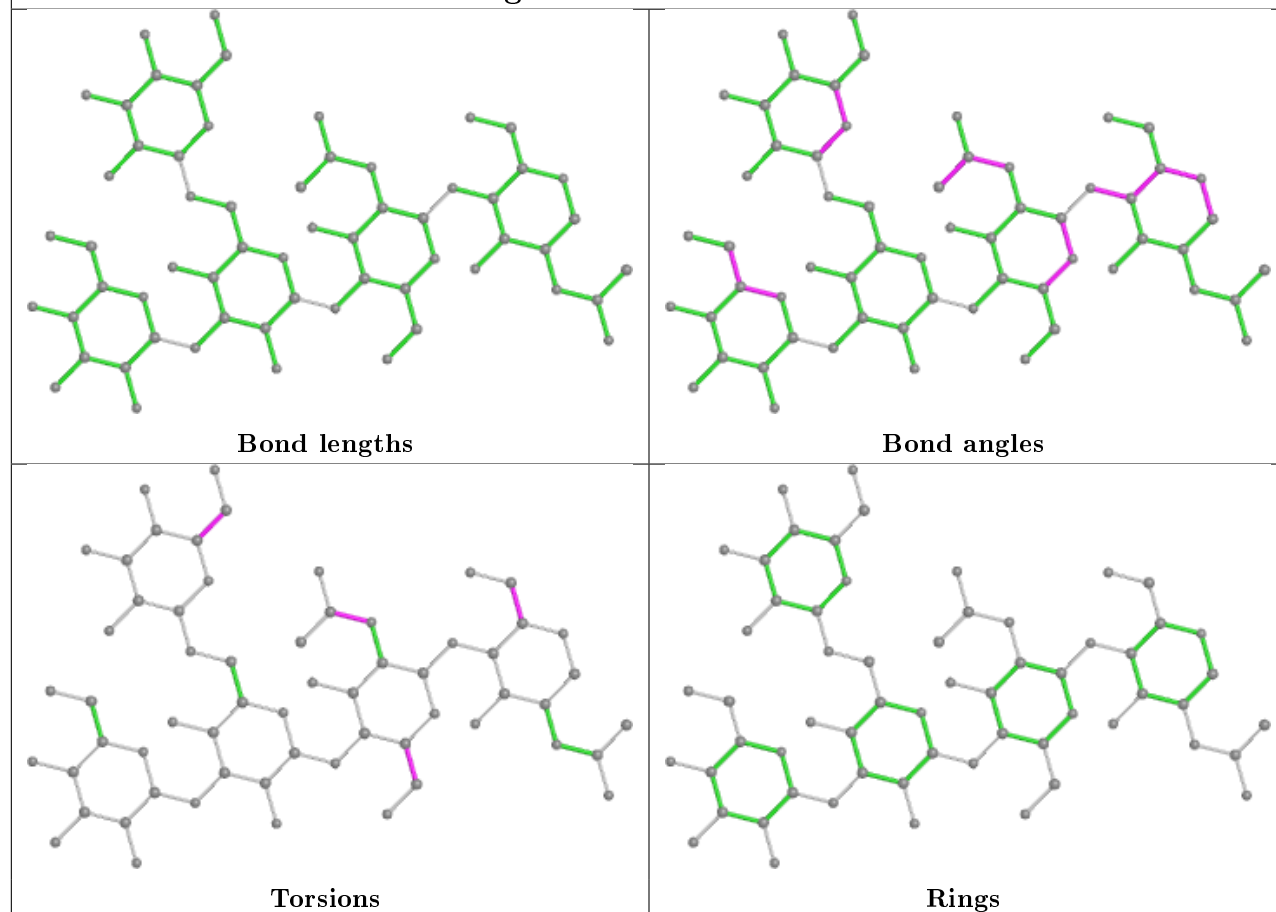




Oligosaccharide Chain D



Oligosaccharide Chain E



5.6 Ligand geometry

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
5	NAG	A	807	1	14,14,15	0.64	0	17,19,21	1.13	1 (5%)
5	NAG	A	803	1	14,14,15	0.59	0	17,19,21	1.29	3 (17%)
5	NAG	A	806	1	14,14,15	0.71	0	17,19,21	2.03	5 (29%)
9	BXK	A	820	-	11,20,20	0.99	1 (9%)	13,26,26	2.26	4 (30%)

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
5	NAG	A	807	1	-	0/6/23/26	0/1/1/1
5	NAG	A	803	1	-	0/6/23/26	0/1/1/1
5	NAG	A	806	1	-	4/6/23/26	0/1/1/1
9	BXK	A	820	-	-	2/15/25/25	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	820	BXK	OAF-CAR	2.02	1.25	1.21

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	806	NAG	C1-O5-C5	5.87	120.14	112.19
9	A	820	BXK	OAN-CAR-N	4.33	115.93	110.32
9	A	820	BXK	CA-N-CAR	4.08	127.17	121.93
9	A	820	BXK	CAJ-CAK-CAU	-3.58	108.13	113.97
5	A	807	NAG	C1-O5-C5	3.38	116.77	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	820	BXK	OAN-CAU-CAK	3.30	110.06	105.34
5	A	806	NAG	O5-C5-C6	3.00	111.91	107.20
5	A	803	NAG	C1-C2-N2	-2.80	105.71	110.49
5	A	803	NAG	C4-C3-C2	2.53	114.73	111.02
5	A	803	NAG	O5-C5-C6	2.53	111.17	107.20
5	A	806	NAG	C2-N2-C7	2.50	126.47	122.90
5	A	806	NAG	C8-C7-N2	2.42	120.20	116.10
5	A	806	NAG	C6-C5-C4	-2.13	108.02	113.00

There are no chirality outliers.

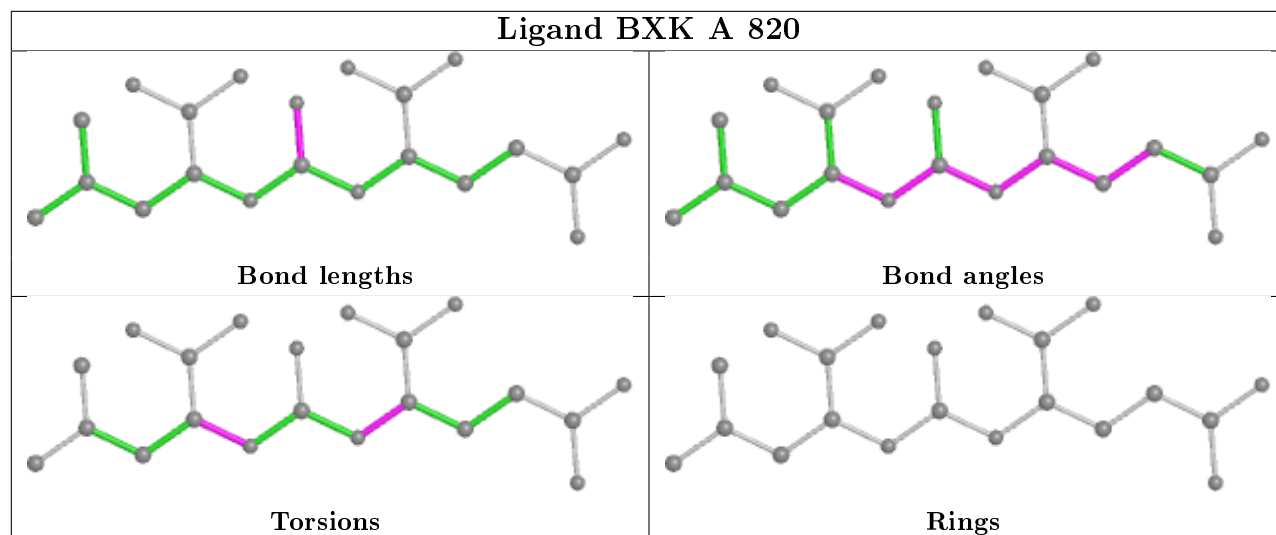
All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	A	820	BXK	CAQ-CAU-OAN-CAR
5	A	806	NAG	C8-C7-N2-C2
5	A	806	NAG	O7-C7-N2-C2
5	A	806	NAG	O5-C5-C6-O6
9	A	820	BXK	C-CA-N-CAR
5	A	806	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å ²)	Q<0.9
1	A	696/707 (98%)	-0.05	35 (5%)	28 30	18, 29, 48, 78	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	541	TRP	7.4
1	A	543	THR	6.8
1	A	55	LYS	4.4
1	A	155[A]	SER	4.3
1	A	134	ASP	4.1
1	A	719	VAL	4.0
1	A	153	ASN	3.9
1	A	656[A]	SER	3.4
1	A	336	ASN	3.1
1	A	56	HIS	3.0
1	A	652	ASP	3.0
1	A	335	GLY	3.0
1	A	154	VAL	3.0
1	A	487	GLY	2.9
1	A	507	SER	2.8
1	A	124	HIS	2.8
1	A	226	ILE	2.7
1	A	133	GLU	2.7
1	A	135	GLY	2.7
1	A	227	LEU	2.6
1	A	123	THR	2.5
1	A	506	PHE	2.5
1	A	152	GLU	2.5
1	A	201	VAL	2.5
1	A	542	GLU	2.4
1	A	122	LYS	2.4
1	A	651	GLN	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	505[A]	GLU	2.2
1	A	202	ILE	2.2
1	A	655[A]	LYS	2.2
1	A	395	VAL	2.2
1	A	334	THR	2.1
1	A	654[A]	ASP	2.1
1	A	544	ASN	2.1
1	A	237	PRO	2.1

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 ⓘ

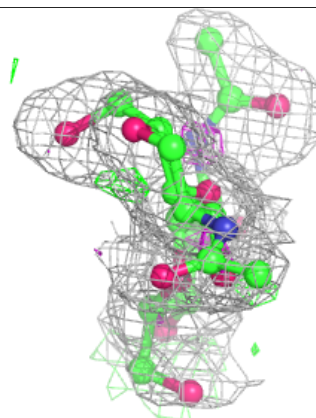
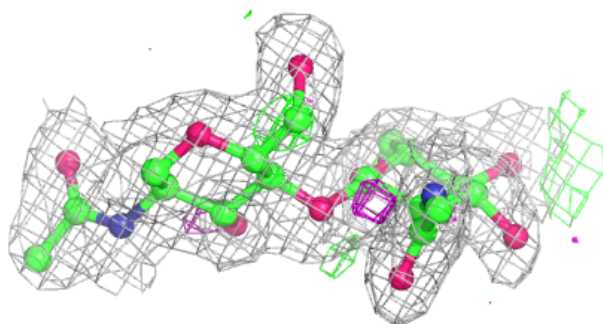
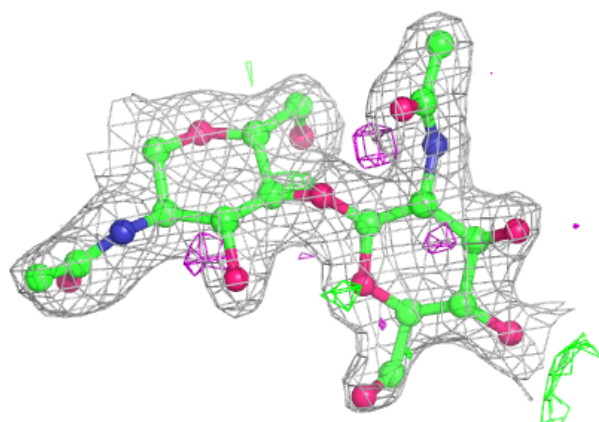
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	BMA	D	3	11/12	0.70	0.32	70,73,77,77	0
2	NAG	B	2	14/15	0.71	0.29	44,55,64,65	0
2	NAG	C	2	14/15	0.82	0.31	55,62,72,76	0
2	NAG	C	1	14/15	0.87	0.13	39,44,52,52	0
3	NAG	D	2	14/15	0.90	0.18	42,49,61,61	0
4	MAN	E	5	11/12	0.91	0.23	57,63,67,76	0
3	NAG	D	1	14/15	0.92	0.10	32,36,41,44	0
4	NAG	E	1	14/15	0.92	0.09	24,30,36,45	0
2	NAG	B	1	14/15	0.93	0.12	34,44,50,55	0
4	NAG	E	2	14/15	0.93	0.14	35,39,50,51	0
4	BMA	E	3	11/12	0.94	0.12	37,38,43,46	0
4	MAN	E	4	11/12	0.96	0.16	39,42,46,47	0

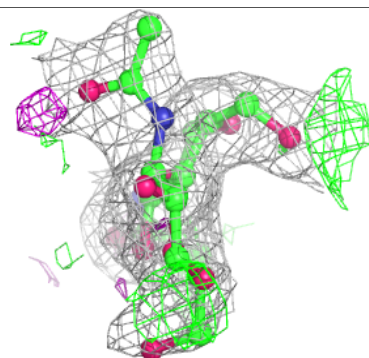
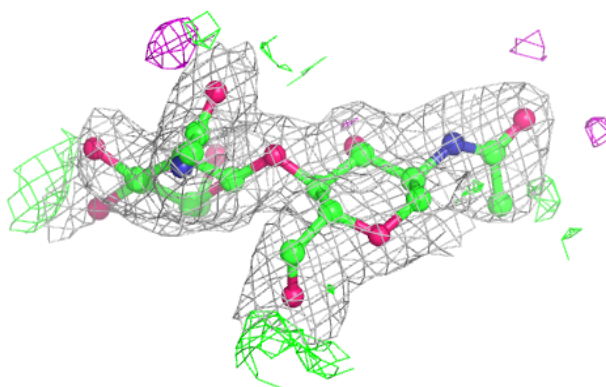
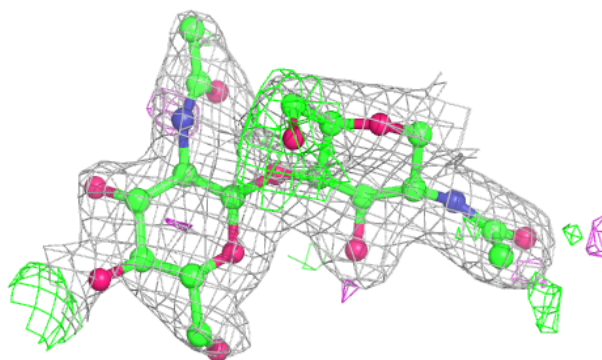
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain B:

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

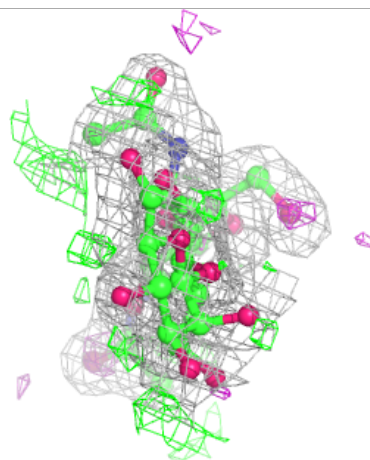
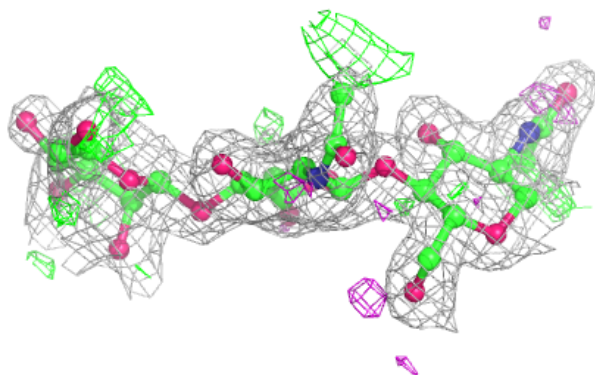
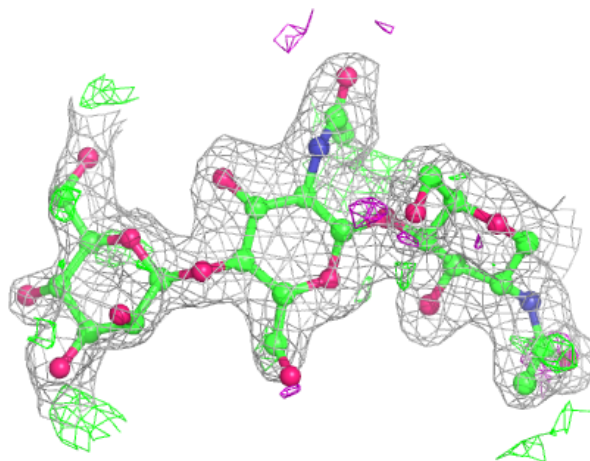
**Electron density around Chain C:**

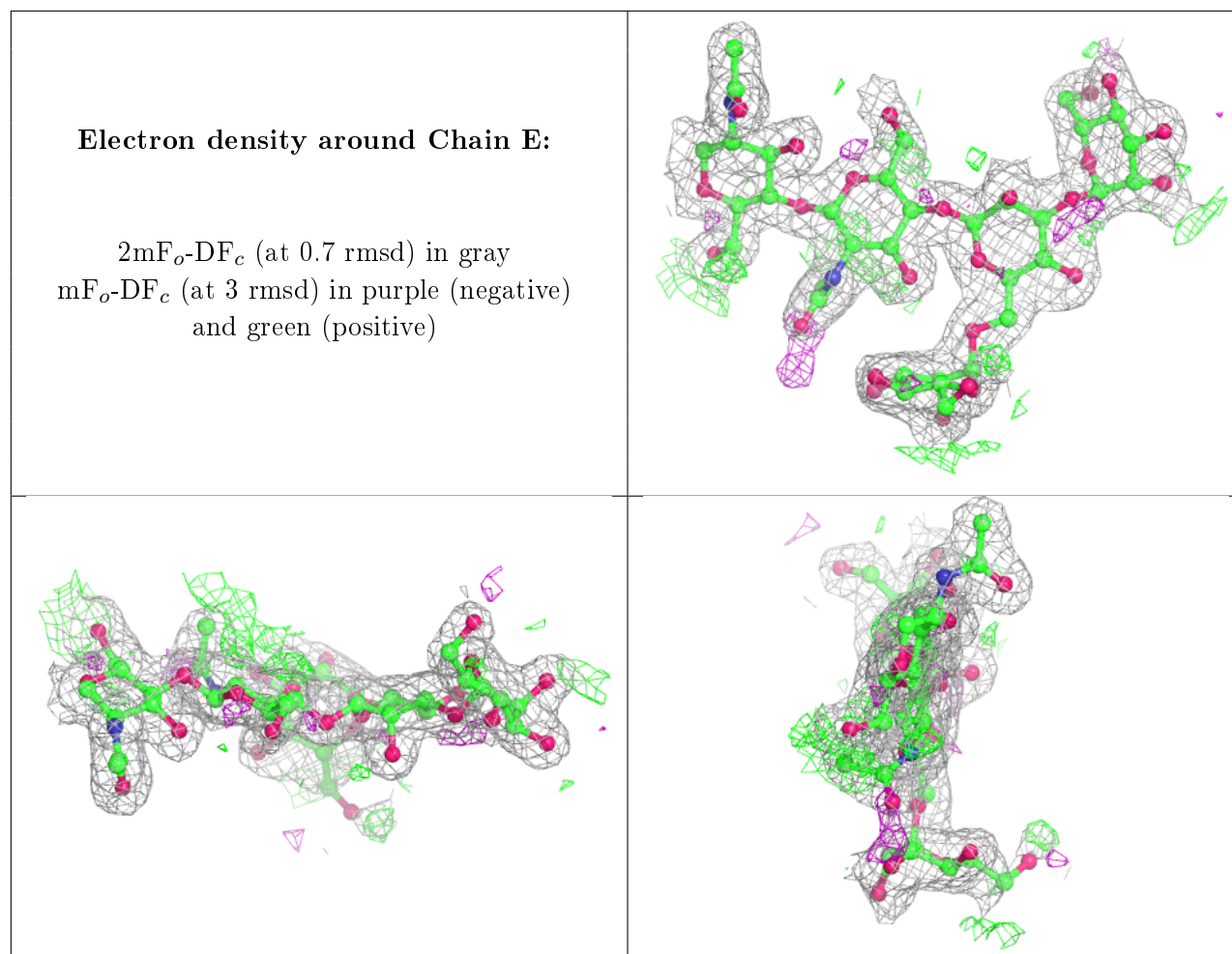
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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)





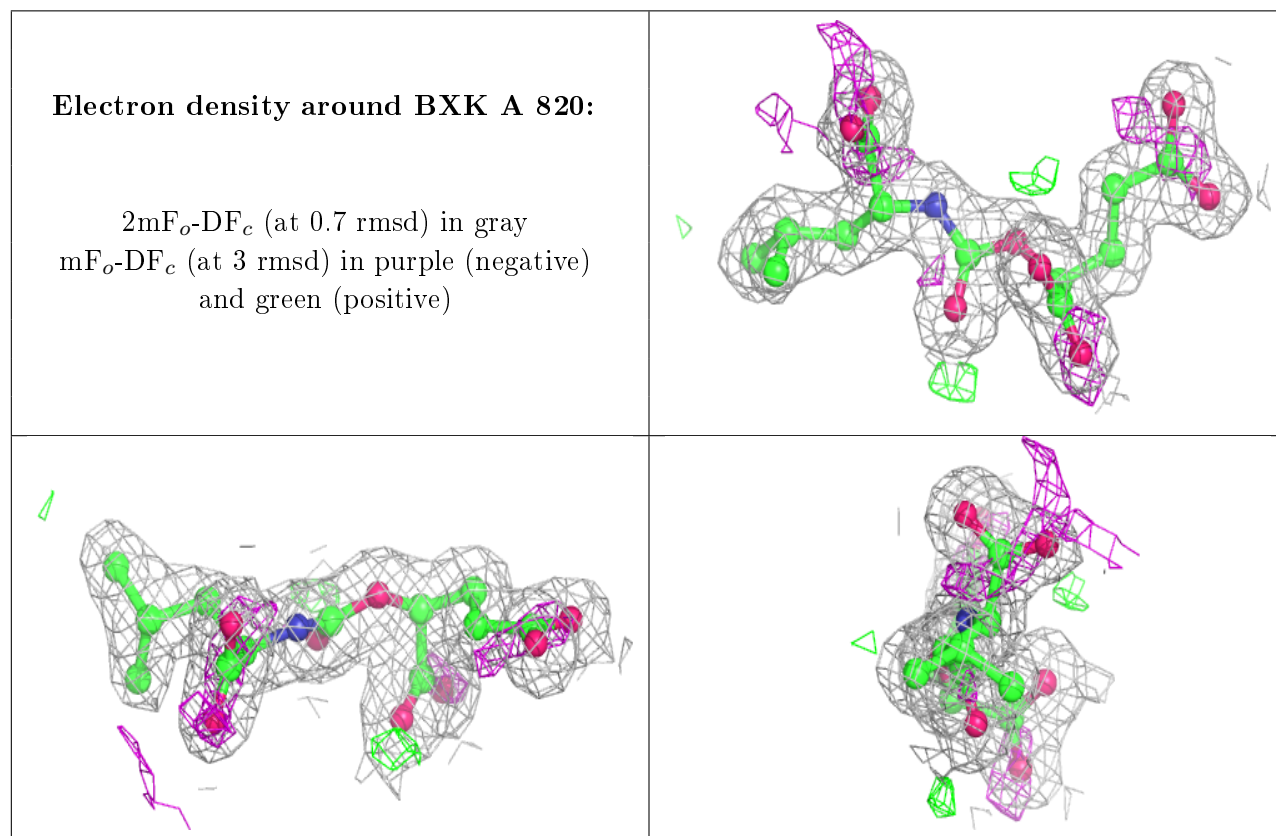
6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	NAG	A	803	14/15	0.79	0.27	45,53,60,62	0
5	NAG	A	806	14/15	0.81	0.24	63,75,81,83	0
5	NAG	A	807	14/15	0.84	0.17	32,47,59,62	0
9	BXK	A	820	21/21	0.95	0.09	23,26,31,37	0
8	CL	A	819	1/1	0.99	0.07	25,25,25,25	0
6	ZN	A	817	1/1	1.00	0.07	20,20,20,20	0
7	CA	A	818	1/1	1.00	0.07	20,20,20,20	0
6	ZN	A	816	1/1	1.00	0.07	21,21,21,21	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.



6.5 Other polymers ⓘ

There are no such residues in this entry.