



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 03:53 AM UTC

PDB ID : 4E36 / pdb_00004e36
Title : Crystal structure of the human Endoplasmic Reticulum Aminopeptidase 2 variant N392K
Authors : Birtley, J.R.; Saridakis, E.; Pegias, P.; Stratikos, E.; Mavridis, I.M.
Deposited on : 2012-03-09
Resolution : 3.22 Å (reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

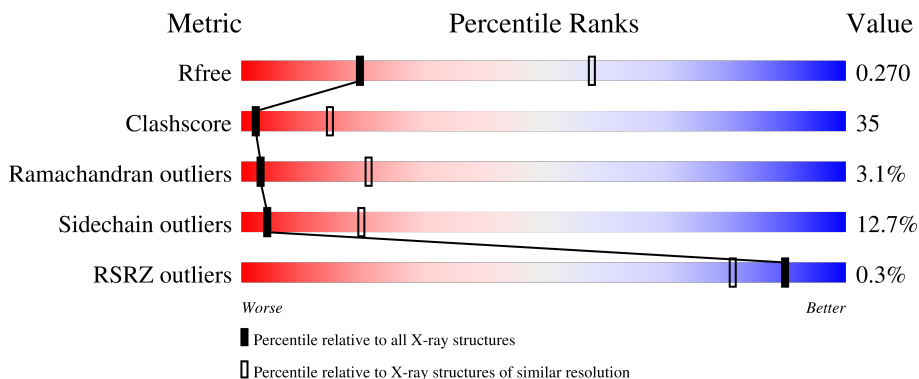
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.22 Å.

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



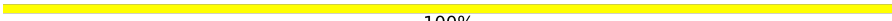
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1768 (3.24-3.20)
Clashscore	190562	1879 (3.24-3.20)
Ramachandran outliers	187476	1844 (3.24-3.20)
Sidechain outliers	187428	1843 (3.24-3.20)
RSRZ outliers	180081	1768 (3.24-3.20)

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

Mol	Chain	Length	Quality of chain
1	A	967	
1	B	967	
2	C	2	
2	D	2	
2	F	2	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	E	4	 100%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 14341 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 Endoplasmic reticulum aminopeptidase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	869	7030	4537	1167	1299	27	2	2	0
1	B	859	6969	4501	1157	1284	27	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

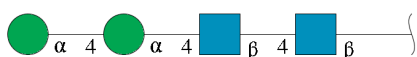
Chain	Residue	Modelled	Actual	Comment	Reference
A	2	VAL	PHE	SEE REMARK 999	UNP Q6P179
A	961	ARG	-	expression tag	UNP Q6P179
A	962	HIS	-	expression tag	UNP Q6P179
A	963	HIS	-	expression tag	UNP Q6P179
A	964	HIS	-	expression tag	UNP Q6P179
A	965	HIS	-	expression tag	UNP Q6P179
A	966	HIS	-	expression tag	UNP Q6P179
A	967	HIS	-	expression tag	UNP Q6P179
B	2	VAL	PHE	SEE REMARK 999	UNP Q6P179
B	961	ARG	-	expression tag	UNP Q6P179
B	962	HIS	-	expression tag	UNP Q6P179
B	963	HIS	-	expression tag	UNP Q6P179
B	964	HIS	-	expression tag	UNP Q6P179
B	965	HIS	-	expression tag	UNP Q6P179
B	966	HIS	-	expression tag	UNP Q6P179
B	967	HIS	-	expression tag	UNP Q6P179

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



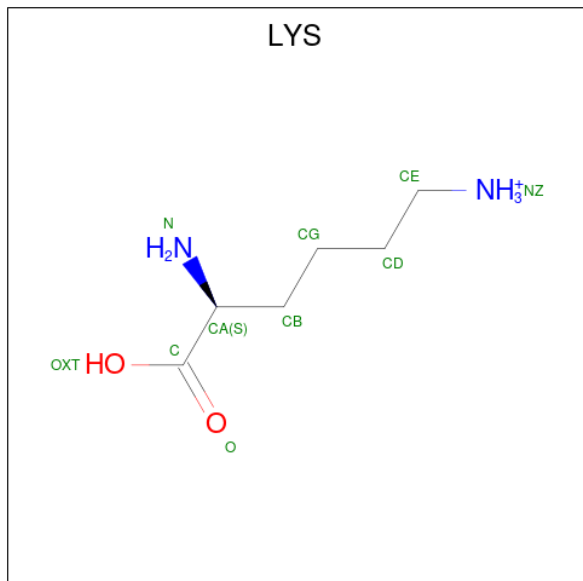
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	D	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	F	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-4)-alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



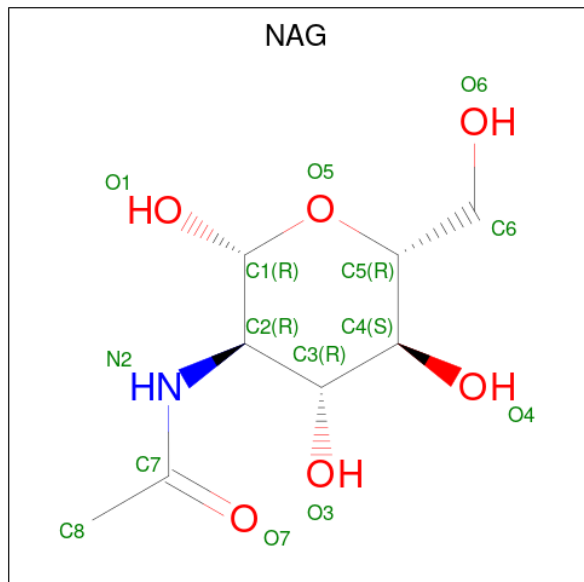
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 4 is LYSINE (CCD ID: LYS) (formula: C₆H₁₅N₂O₂).



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

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 6 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Zn	0	0
			1	1		
7	B	1	Total	Zn	0	0
			1	1		

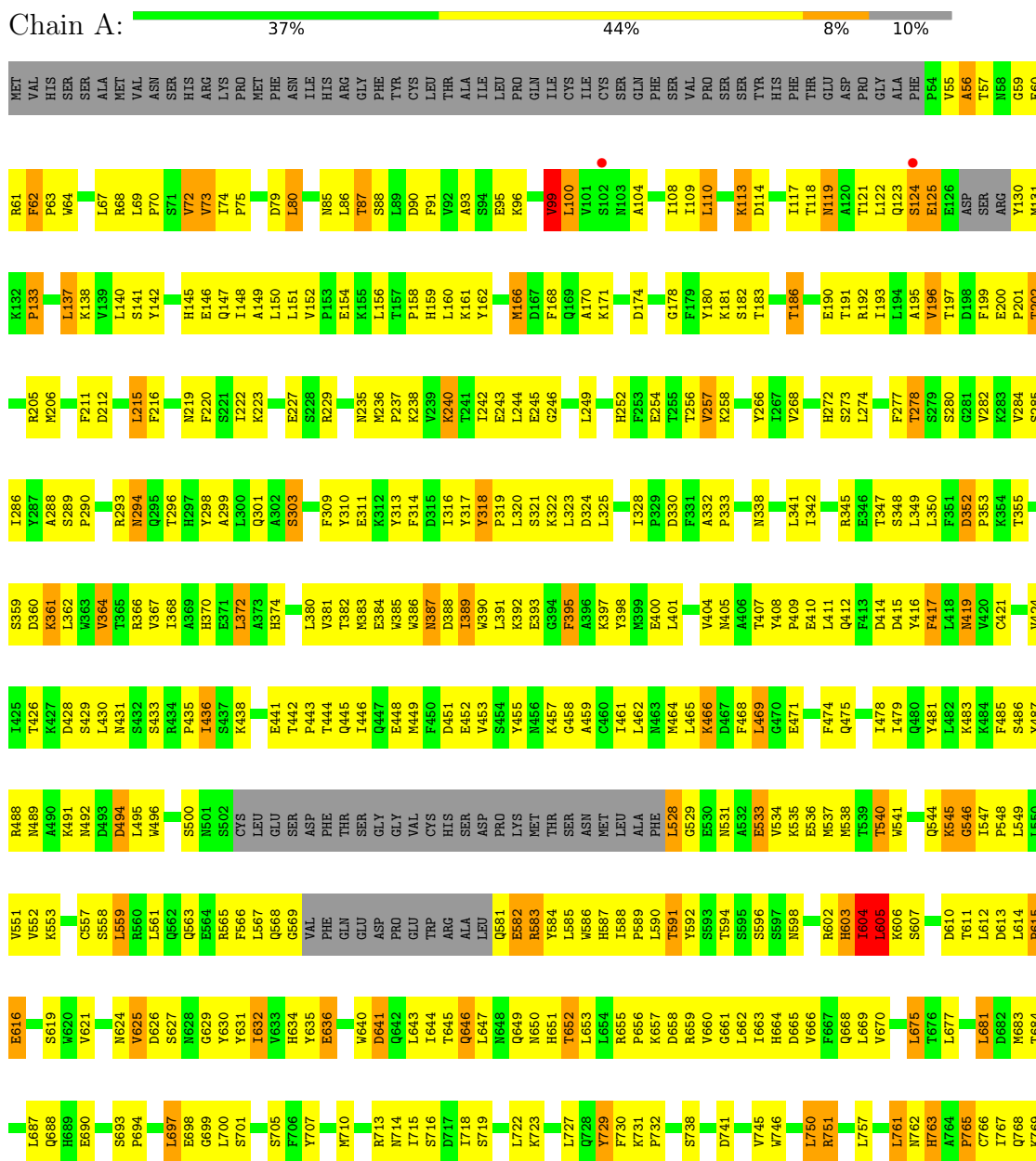
- Molecule 8 is water.

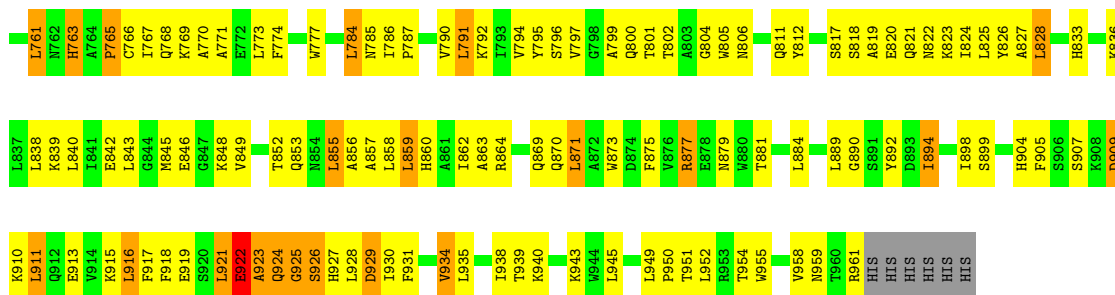
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	66	Total	O	0	0
			66	66		
8	B	40	Total	O	0	0
			40	40		

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: Endoplasmic reticulum aminopeptidase 2





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

Chain C: 100%

MAG1
MAG2

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

Chain D: 100%

MAG1
MAG2

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

Chain F: 50% 50%

MAG1
MAG2

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

Chain E: 100%

MAG1
MAG2
MAN3
MAN4

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.34Å 134.45Å 127.37Å 90.00° 90.85° 90.00°	Depositor
Resolution (Å)	11.00 – 3.22 11.00 – 3.22	Depositor EDS
% Data completeness (in resolution range)	89.4 (11.00-3.22) 96.5 (11.00-3.22)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.59 (at 3.19Å)	Xtrriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, R_{free}	0.209 , 0.261 0.218 , 0.270	Depositor DCC
R_{free} test set	2014 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	69.6	Xtrriage
Anisotropy	0.302	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 68.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.037 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	14341	wwPDB-VP
Average B, all atoms (Å ²)	71.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.01% 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: MES, ZN, 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	0.48	0/7207	0.86	12/9769 (0.1%)
1	B	0.44	0/7139	0.86	10/9674 (0.1%)
All	All	0.46	0/14346	0.86	22/19443 (0.1%)

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

There are no bond length outliers.

The worst 5 of 22 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	62	PHE	CA-C-N	10.56	130.17	119.82
1	B	62	PHE	C-N-CA	10.56	130.17	119.82
1	A	62	PHE	CA-C-N	10.02	129.64	119.82
1	A	62	PHE	C-N-CA	10.02	129.64	119.82
1	A	318	TYR	CA-C-N	7.74	127.64	119.05

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	922	GLU	Peptide

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	7030	0	6950	484	1
1	B	6969	0	6937	515	1
2	C	28	0	25	5	0
2	D	28	0	25	2	0
2	F	28	0	25	2	0
3	E	50	0	43	5	0
4	A	10	0	12	0	0
4	B	10	0	12	4	0
5	A	42	0	39	2	0
5	B	14	0	13	0	0
6	A	12	0	12	1	0
6	B	12	0	12	4	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
8	A	66	0	0	5	0
8	B	40	0	0	8	0
All	All	14341	0	14105	1005	2

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 35.

The worst 5 of 1005 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:227:GLU:HG3	2:C:1:NAG:H82	1.27	1.07
1:A:227:GLU:HG3	2:C:1:NAG:C8	1.84	1.07
1:A:56:ALA:HB1	1:A:57:THR:HA	1.40	1.02
1:B:488:ARG:HG2	1:B:489:ASN:H	1.24	1.00
1:B:741:ASP:OD2	1:B:787:PRO:HB3	1.61	0.99

All (2) 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)
1:A:280:SER:O	1:A:961:ARG:NH2[2_655]	2.11	0.09
1:B:320:LEU:O	1:B:961:ARG:NH1[2_556]	2.19	0.01

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	863/967 (89%)	729 (84%)	108 (12%)	26 (3%)	3	22
1	B	851/967 (88%)	710 (83%)	114 (13%)	27 (3%)	3	20
All	All	1714/1934 (89%)	1439 (84%)	222 (13%)	53 (3%)	3	21

5 of 53 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	55	VAL
1	A	119	ASN
1	A	583	ARG
1	A	596	SER
1	A	603	HIS

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	768/870 (88%)	669 (87%)	99 (13%)	4	19
1	B	768/870 (88%)	672 (88%)	96 (12%)	4	20

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1536/1740 (88%)	1341 (87%)	195 (13%)	4 20

5 of 195 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	186	THR
1	B	540	THR
1	B	215	LEU
1	B	364	VAL
1	B	591	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 57 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	58	ASN
1	B	932	GLN
1	B	301	GLN
1	B	927	HIS
1	B	834	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

10 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	C	1	1,2	14,14,15	0.84	0	17,19,21	2.50	9 (52%)
2	NAG	C	2	2	14,14,15	0.41	0	17,19,21	1.53	2 (11%)
2	NAG	D	1	1,2	14,14,15	0.65	0	17,19,21	1.61	3 (17%)
2	NAG	D	2	2	14,14,15	0.63	0	17,19,21	1.20	2 (11%)
3	NAG	E	1	1,3	14,14,15	0.39	0	17,19,21	1.44	2 (11%)
3	NAG	E	2	3	14,14,15	0.55	0	17,19,21	1.02	1 (5%)
3	MAN	E	3	3	11,11,12	0.70	0	15,15,17	0.88	0
3	MAN	E	4	3	11,11,12	0.59	0	15,15,17	0.57	0
2	NAG	F	1	1,2	14,14,15	0.50	0	17,19,21	0.83	0
2	NAG	F	2	2	14,14,15	0.55	0	17,19,21	1.11	1 (5%)

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. ^{1,2} means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	C	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	NAG	D	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	2/6/23/26	0/1/1/1
3	NAG	E	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	E	2	3	-	2/6/23/26	0/1/1/1
3	MAN	E	3	3	-	2/2/19/22	0/1/1/1
3	MAN	E	4	3	-	0/2/19/22	0/1/1/1
2	NAG	F	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	F	2	2	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2	NAG	C1-O5-C5	4.81	118.64	112.19
2	D	1	NAG	C1-O5-C5	4.31	117.96	112.19
2	C	1	NAG	O5-C1-C2	-4.20	104.79	111.29
2	C	1	NAG	C3-C4-C5	-4.14	102.73	110.23
2	C	1	NAG	C1-O5-C5	-3.81	107.08	112.19

There are no chirality outliers.

5 of 19 torsion outliers are listed below:

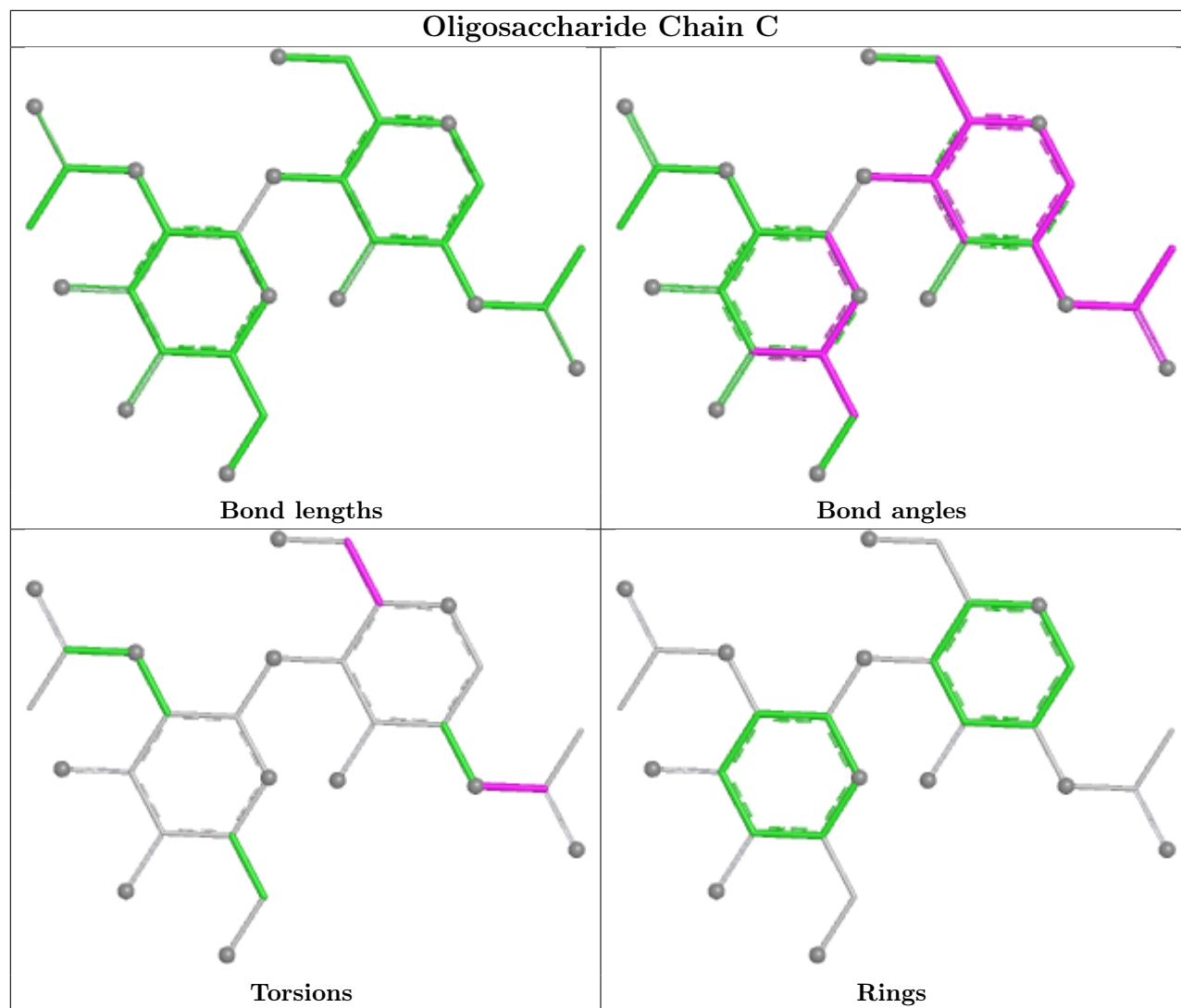
Mol	Chain	Res	Type	Atoms
2	C	1	NAG	C8-C7-N2-C2
2	C	1	NAG	O7-C7-N2-C2
2	D	2	NAG	O7-C7-N2-C2
2	F	1	NAG	O7-C7-N2-C2
2	D	2	NAG	C8-C7-N2-C2

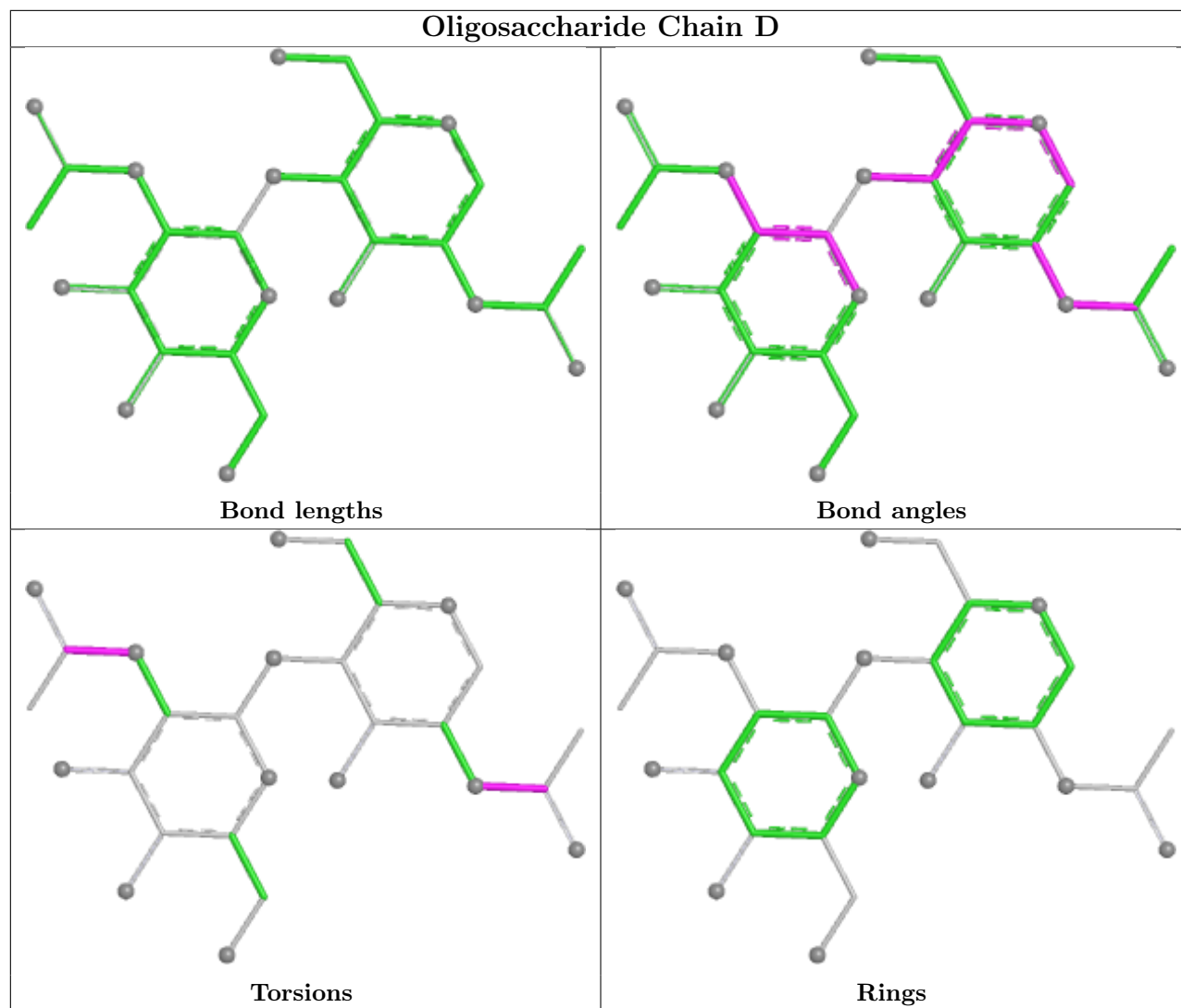
There are no ring outliers.

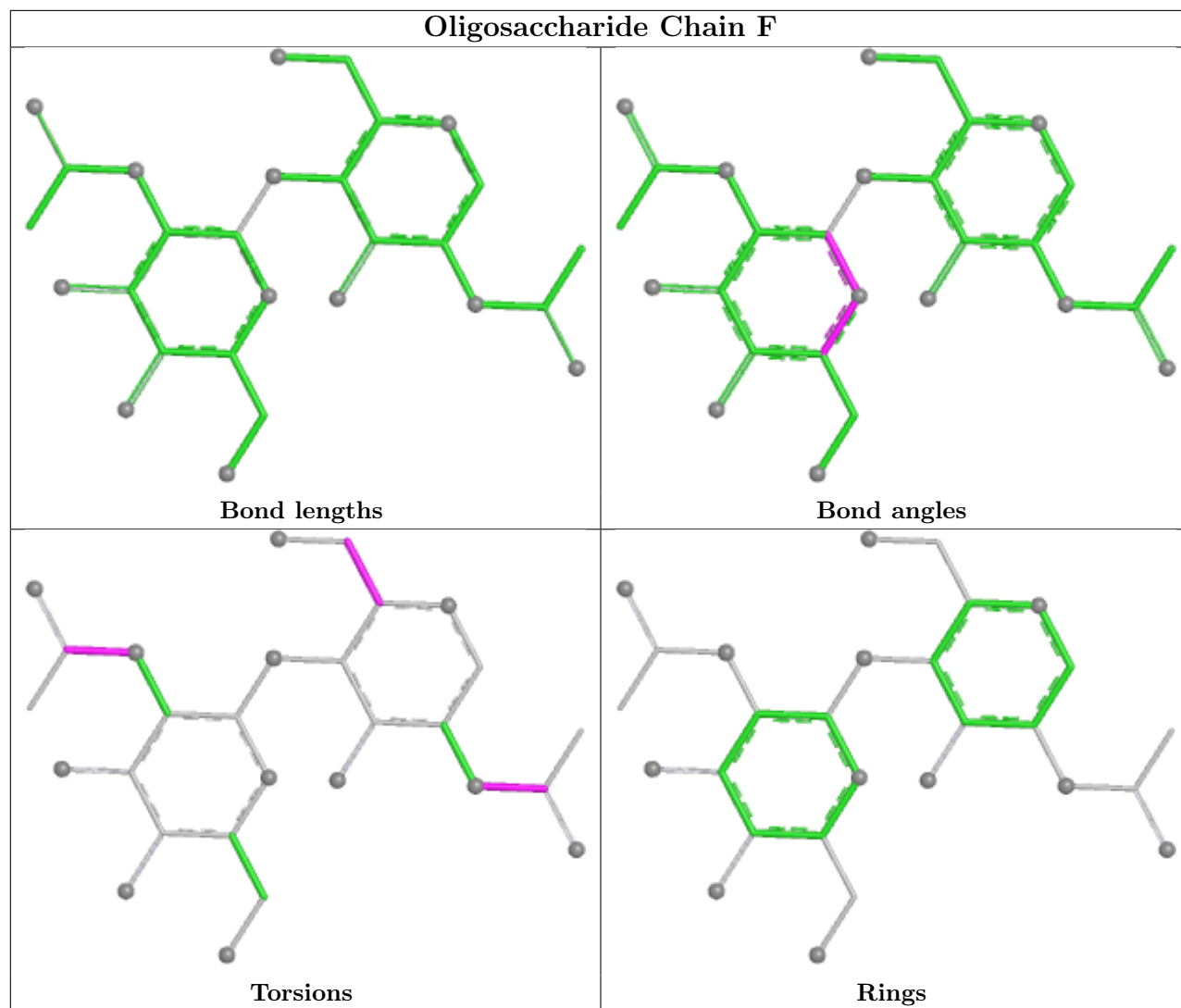
8 monomers are involved in 14 short contacts:

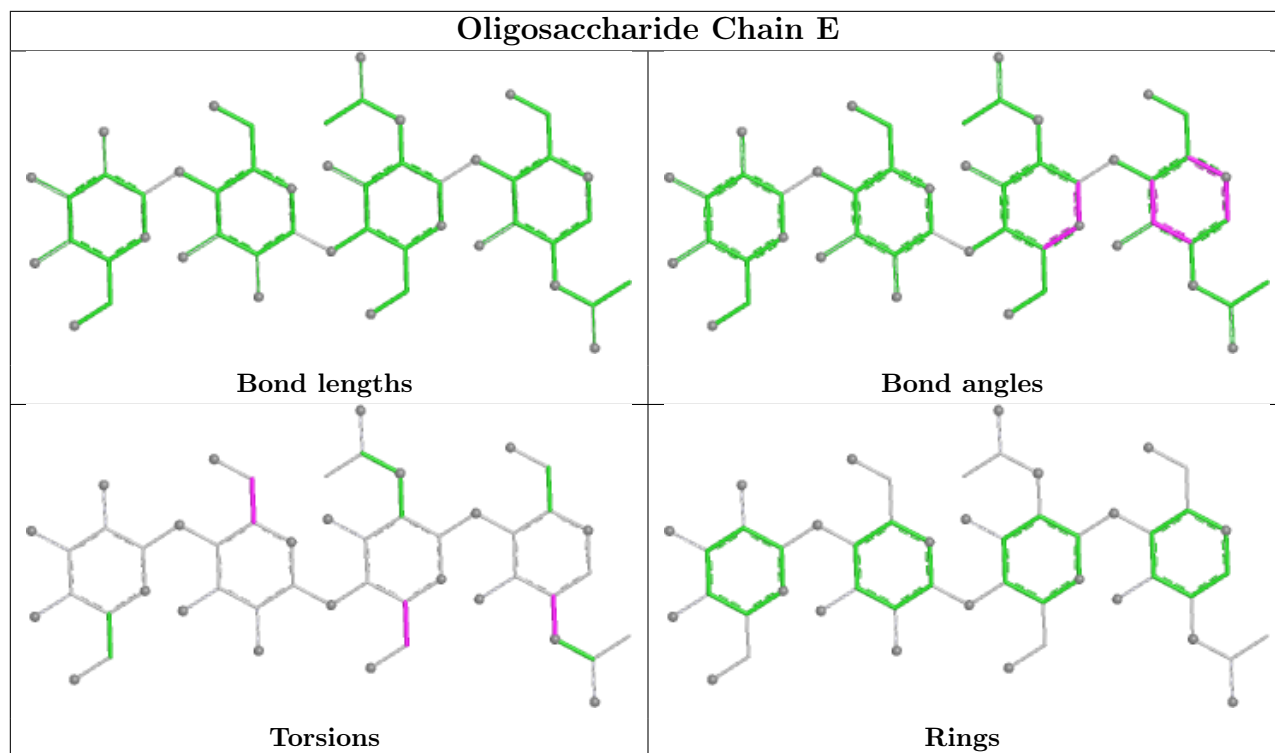
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	E	3	MAN	5	0
2	F	2	NAG	1	0
2	C	2	NAG	1	0
2	D	2	NAG	1	0
2	D	1	NAG	2	0
3	E	4	MAN	4	0
2	C	1	NAG	5	0
2	F	1	NAG	2	0

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









5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 2 are monoatomic - leaving 8 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
6	MES	B	1010	-	12,12,12	2.27	1 (8%)	15,16,16	2.57	7 (46%)
5	NAG	A	1006	1	14,14,15	0.53	0	17,19,21	1.40	2 (11%)
6	MES	A	1009	-	12,12,12	2.26	1 (8%)	15,16,16	2.54	6 (40%)
4	LYS	B	1005	7	8,9,9	0.96	1 (12%)	7,10,10	0.93	1 (14%)
4	LYS	A	1001	7	8,9,9	0.90	1 (12%)	7,10,10	0.68	0
5	NAG	A	1008	1	14,14,15	0.47	0	17,19,21	0.81	0
5	NAG	B	1009	1	14,14,15	0.43	0	17,19,21	1.30	2 (11%)
5	NAG	A	1007	1	14,14,15	0.61	0	17,19,21	2.07	5 (29%)

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	MES	B	1010	-	-	5/6/14/14	0/1/1/1
5	NAG	A	1006	1	-	4/6/23/26	0/1/1/1
6	MES	A	1009	-	-	3/6/14/14	0/1/1/1
4	LYS	B	1005	7	-	5/9/9/9	-
4	LYS	A	1001	7	-	5/9/9/9	-
5	NAG	A	1008	1	-	4/6/23/26	0/1/1/1
5	NAG	B	1009	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1007	1	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1010	MES	C8-S	-7.53	1.67	1.77
6	A	1009	MES	C8-S	-7.51	1.67	1.77
4	B	1005	LYS	OXT-C	-2.51	1.22	1.30
4	A	1001	LYS	OXT-C	-2.37	1.23	1.30

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	1010	MES	C5-N4-C3	4.93	119.45	108.84
6	A	1009	MES	C5-N4-C3	4.92	119.44	108.84
6	B	1010	MES	C6-C5-N4	-4.42	103.41	110.12
5	A	1007	NAG	C1-O5-C5	4.19	117.80	112.19
5	A	1007	NAG	C3-C4-C5	-4.18	102.64	110.23

There are no chirality outliers.

5 of 30 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	1005	LYS	C-CA-CB-CG
5	A	1006	NAG	C8-C7-N2-C2
5	A	1006	NAG	O7-C7-N2-C2
5	A	1008	NAG	C8-C7-N2-C2
5	A	1008	NAG	O7-C7-N2-C2

There are no ring outliers.

4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	1010	MES	4	0
6	A	1009	MES	1	0
4	B	1005	LYS	4	0
5	A	1007	NAG	2	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	869/967 (89%)	-0.27	3 (0%) 90 81	22, 67, 111, 147	4 (0%)
1	B	859/967 (88%)	-0.26	3 (0%) 90 81	34, 70, 116, 146	0
All	All	1728/1934 (89%)	-0.27	6 (0%) 90 81	22, 68, 114, 147	4 (0%)

The worst 5 of 6 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	124	SER	4.7
1	B	558	SER	2.8
1	A	102	SER	2.7
1	B	639	GLY	2.6
1	B	500	SER	2.3

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [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.

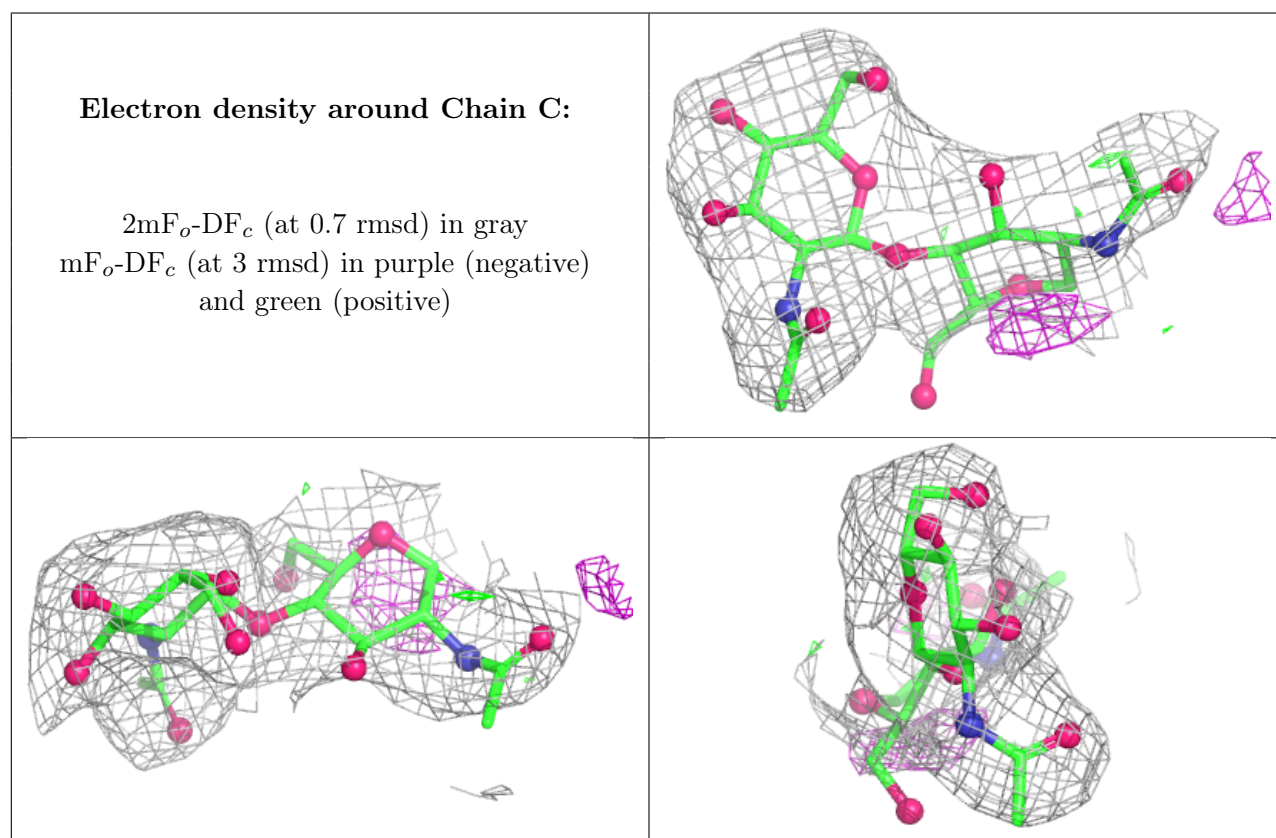
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	D	2	14/15	0.69	0.13	60,81,88,99	0
3	MAN	E	4	11/12	0.73	0.12	96,113,135,142	0
2	NAG	C	1	14/15	0.77	0.14	64,79,83,87	0
3	MAN	E	3	11/12	0.78	0.09	72,97,108,112	0
2	NAG	F	2	14/15	0.81	0.09	84,113,127,133	0

Continued on next page...

Continued from previous page...

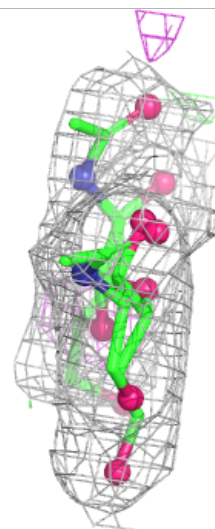
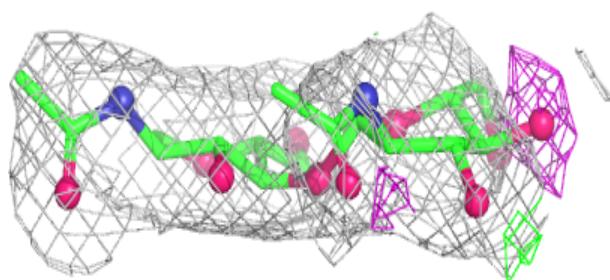
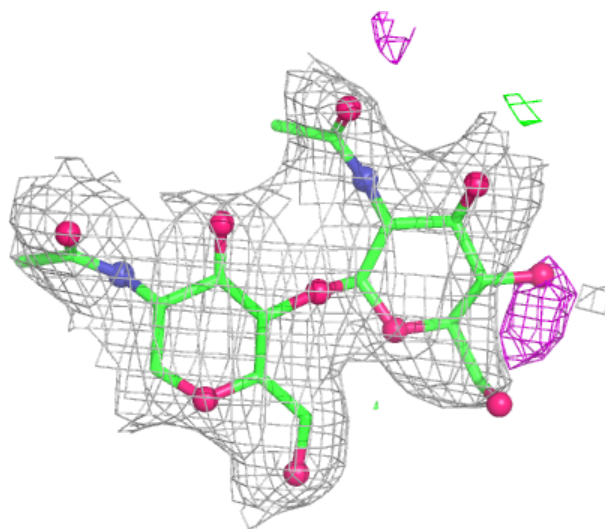
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	F	1	14/15	0.83	0.08	68,91,111,112	0
2	NAG	C	2	14/15	0.86	0.07	65,82,87,91	0
3	NAG	E	1	14/15	0.88	0.08	56,73,85,87	0
3	NAG	E	2	14/15	0.89	0.08	50,77,92,102	0
2	NAG	D	1	14/15	0.91	0.07	46,53,69,70	0

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.



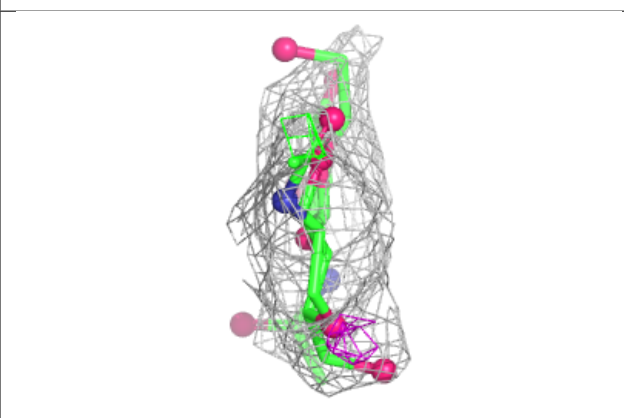
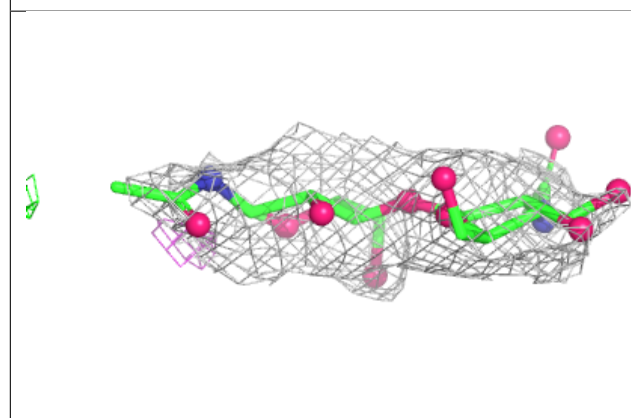
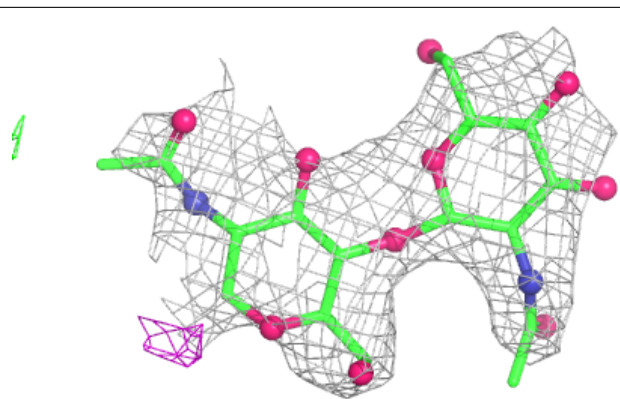
Electron density around Chain D:

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

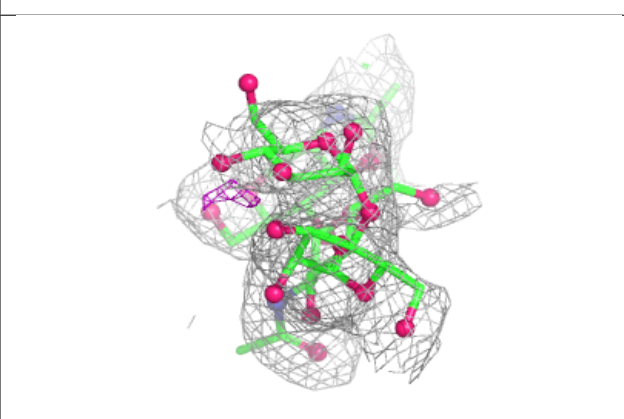
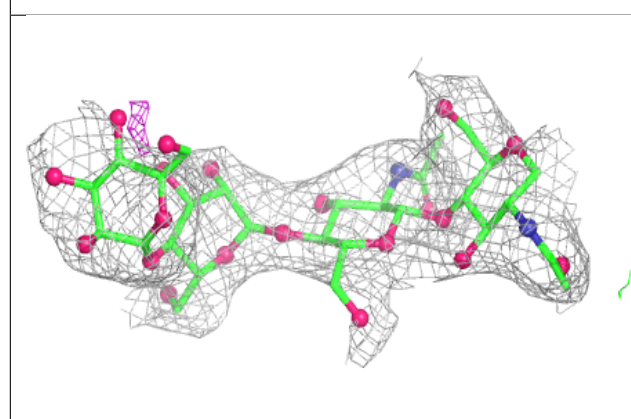
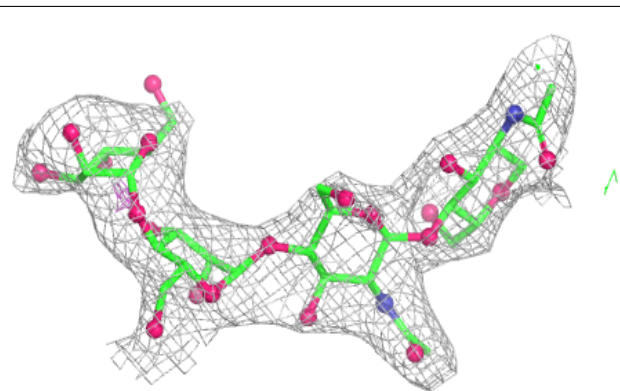


Electron density around Chain F:

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

**Electron density around Chain E:**

$2mF_o-DF_c$ (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(Å ²)	Q<0.9
5	NAG	B	1009	14/15	0.66	0.11	76,101,110,112	0
5	NAG	A	1008	14/15	0.70	0.10	96,107,114,117	0
6	MES	A	1009	12/12	0.75	0.13	57,72,86,95	12
5	NAG	A	1007	14/15	0.78	0.13	88,104,121,130	0
6	MES	B	1010	12/12	0.79	0.20	57,65,73,84	12
4	LYS	B	1005	10/10	0.84	0.14	46,59,65,69	0
5	NAG	A	1006	14/15	0.90	0.07	62,85,87,88	0
4	LYS	A	1001	10/10	0.94	0.09	34,45,52,53	0
7	ZN	A	1010	1/1	0.99	0.05	32,32,32,32	0
7	ZN	B	1006	1/1	0.99	0.04	46,46,46,46	0

6.5 Other polymers [i](#)

There are no such residues in this entry.