W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

Sep 5, 2023 – 07:53 PM EDT

PDB ID	:	4E36
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)

The following versions of software and data (see references (i)) 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	:	2.35
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)	:	2.35

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.

Percentile relative to all X-ray structures
Percentile relative to X-ray structures of similar resolution
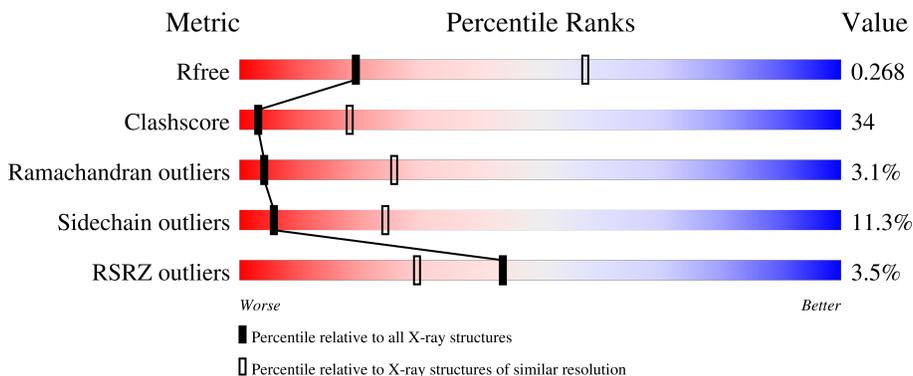
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1335 (3.24-3.20)
Clashscore	141614	1460 (3.24-3.20)
Ramachandran outliers	138981	1437 (3.24-3.20)
Sidechain outliers	138945	1436 (3.24-3.20)
RSRZ outliers	127900	1291 (3.24-3.20)

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 <=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	39% 44% 7% 10%
1	B	967	6% 36% 45% 7% 11%
2	C	2	100%
2	D	2	100%
2	F	2	50% 50%

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Mol	Chain	Length	Quality of chain
3	E	4	75% 25%

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
3	MAN	E	3	-	-	X	-
6	MES	A	1009	-	-	-	X

2 Entry composition ⓘ

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
1	A	869	Total	C	N	O	S	2	2	0
			7030	4537	1167	1299	27			
1	B	859	Total	C	N	O	S	0	0	0
			6969	4501	1157	1284	27			

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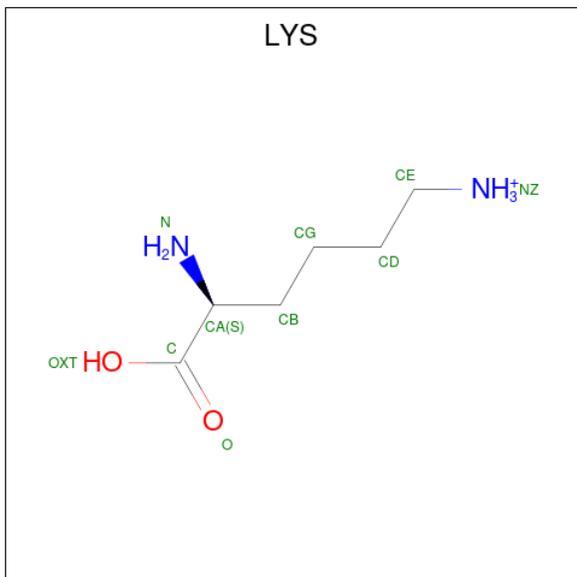
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	2	Total 28	C 16	N 2	O 10	0	0	0
2	D	2	Total 28	C 16	N 2	O 10	0	0	0
2	F	2	Total 28	C 16	N 2	O 10	0	0	0

- 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.
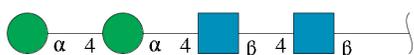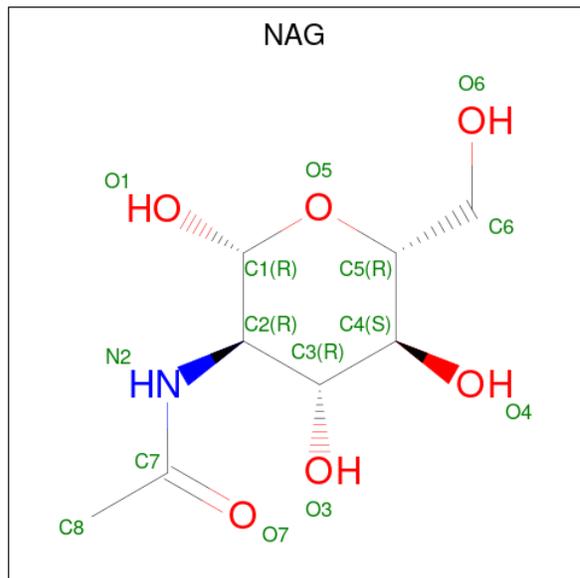

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	4	Total 50	C 28	N 2	O 20	0	0	0

- Molecule 4 is LYSINE (three-letter code: LYS) (formula: $C_6H_{15}N_2O_2$).

LYS

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

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

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

- Molecule 6 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).
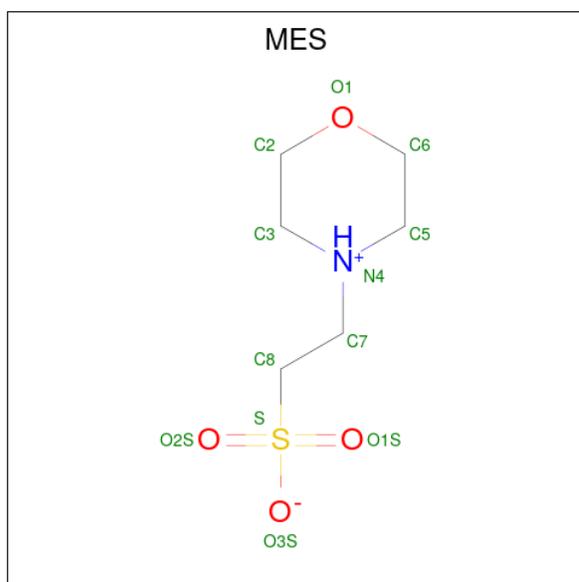
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

• Molecule 7 is ZINC ION (three-letter code: 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 o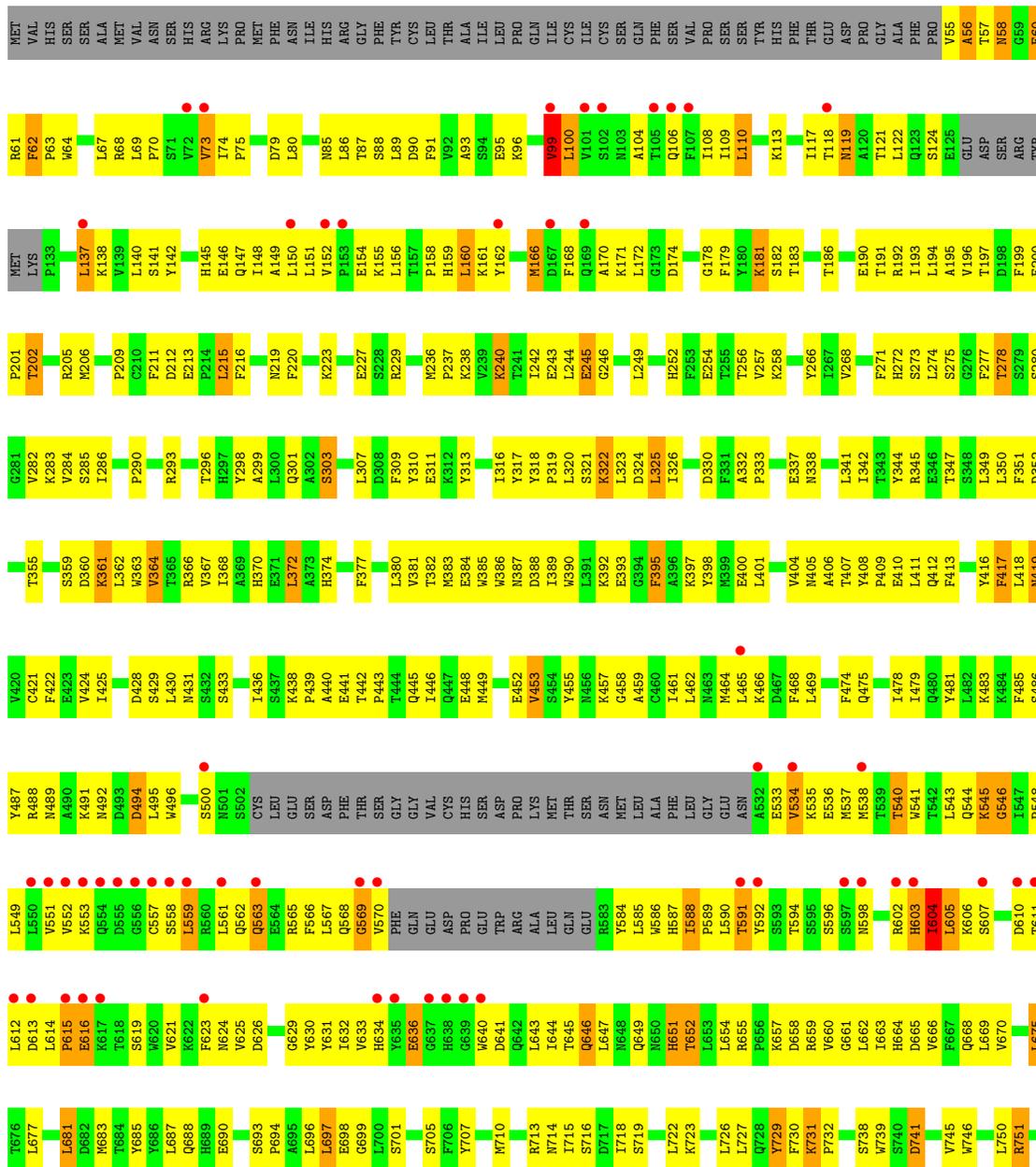utlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 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.
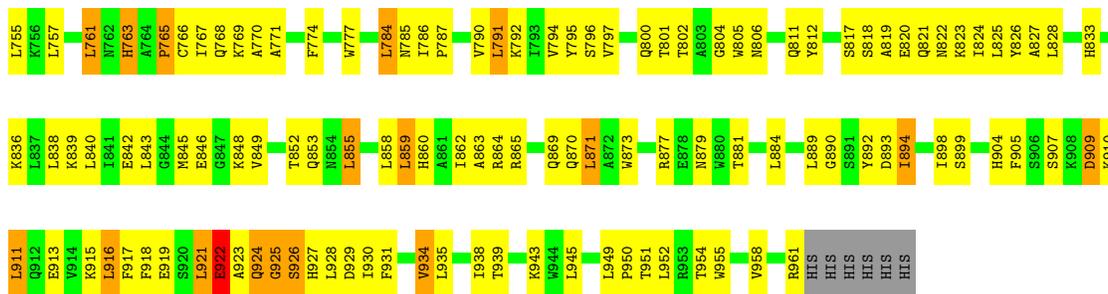
• Molecule 1: Endoplasmic reticulum aminopeptidase 2

• Molecule 1: Endoplasmic reticulum aminopeptidase 2

L755 K756 L757 L761 N762 H763 A764 P765 C766 I767 Q768 K769 A770 A771 F774 W777 L784 N785 I786 P787 V790 L791 K792 I793 V794 Y795 S796 V797 Q800 T801 T802 A803 G804 W805 N806 Q811 Y812 S817 S818 A819 E820 Q821 N822 K823 I824 L825 Y826 A827 L828 H833

K836 L837 L838 K839 L840 I841 E842 L843 G844 M845 E846 G847 K848 V849 T852 Q853 N854 L855 L858 L859 H860 A861 I862 A863 R864 R865 Q869 Q870 L871 A872 W873 R877 E878 N879 W880 T881 L884 L889 G890 S891 Y892 D893 I894 I898 S899 H904 F905 S906 S907 K908 D909 K910

L911 Q912 E913 V914 K915 L916 F917 F918 E919 S920 L921 E922 A923 Q924 G925 S926 H927 L928 D929 I930 F931 V934 L935 I938 T939 K943 W944 L945 L949 P950 T951 L952 R953 T954 W955 V958 R961 HIS HIS HIS HIS HIS HIS

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

Chain C: 100%

NAG1 NAG2

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

Chain D: 100%

NAG1 NAG2

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

Chain F: 50%   50%

NAG1 NAG2

• 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: 75%   25%

NAG1 NAG2 MAN3 MAN4

4 Data and refinement statistics (i)

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 59.45 – 3.22	Depositor EDS
% Data completeness (in resolution range)	89.4 (11.00-3.22) 99.1 (59.45-3.22)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.59 (at 3.19Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, R_{free}	0.209 , 0.261 0.216 , 0.268	Depositor DCC
R_{free} test set	2014 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	69.6	Xtriage
Anisotropy	0.302	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 65.1	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.037 for h,-k,-l	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	14341	wwPDB-VP
Average B, all atoms (Å^2)	71.0	wwPDB-VP

Xtriage'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.*

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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: NAG, ZN, MAN, MES

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	0.37	0/7207	0.54	0/9769
1	B	0.39	0/7139	0.54	0/9674
All	All	0.38	0/14346	0.54	0/19443

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.

There are no bond angle outliers.

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	459	1
1	B	6969	0	6937	495	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	6	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	961	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 34.

The worst 5 of 961 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 ⓘ

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	863/967 (89%)	729 (84%)	108 (12%)	26 (3%)	4	27
1	B	851/967 (88%)	710 (83%)	114 (13%)	27 (3%)	4	25
All	All	1714/1934 (89%)	1439 (84%)	222 (13%)	53 (3%)	4	26

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 ⓘ

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%)	679 (88%)	89 (12%)	5	23
1	B	768/870 (88%)	684 (89%)	84 (11%)	6	25
All	All	1536/1740 (88%)	1363 (89%)	173 (11%)	6	24

5 of 173 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	352	ASP

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Mol	Chain	Res	Type
1	B	681	LEU
1	B	372	LEU
1	B	588	ILE
1	B	741	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 47 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	159	HIS
1	B	646	GLN
1	B	294	ASN
1	B	489	ASN
1	B	664	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 ⓘ

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	2,1	14,14,15	0.84	0	17,19,21	2.59	9 (52%)
2	NAG	C	2	2	14,14,15	0.43	0	17,19,21	1.52	2 (11%)
2	NAG	D	1	2,1	14,14,15	0.65	0	17,19,21	1.59	3 (17%)
2	NAG	D	2	2	14,14,15	0.63	0	17,19,21	1.20	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	NAG	E	1	3,1	14,14,15	0.39	0	17,19,21	1.43	2 (11%)
3	NAG	E	2	3	14,14,15	0.56	0	17,19,21	1.02	1 (5%)
3	MAN	E	3	3	11,11,12	0.72	0	15,15,17	0.97	0
3	MAN	E	4	3	11,11,12	0.61	0	15,15,17	0.76	1 (6%)
2	NAG	F	1	2,1	14,14,15	0.50	0	17,19,21	0.83	0
2	NAG	F	2	2	14,14,15	0.54	0	17,19,21	1.14	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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	C	1	2,1	-	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	2,1	-	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	3,1	-	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	2,1	-	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 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	1	NAG	O5-C5-C6	4.77	114.68	107.20
2	C	2	NAG	C1-O5-C5	4.76	118.64	112.19
2	D	1	NAG	C1-O5-C5	4.26	117.96	112.19
2	C	1	NAG	C3-C4-C5	-4.21	102.73	110.24
2	C	1	NAG	O5-C1-C2	-4.11	104.79	111.29

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

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Mol	Chain	Res	Type	Atoms
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 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	E	4	MAN	5	0
2	C	2	NAG	1	0
2	D	2	NAG	1	0
2	D	1	NAG	2	0
3	E	3	MAN	6	0
2	F	2	NAG	1	0
2	F	1	NAG	2	0
2	C	1	NAG	5	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.

wwPDB X-ray Structure Validation Summary Report

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

wwPDB X-ray Structure Validation Summary Report

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings
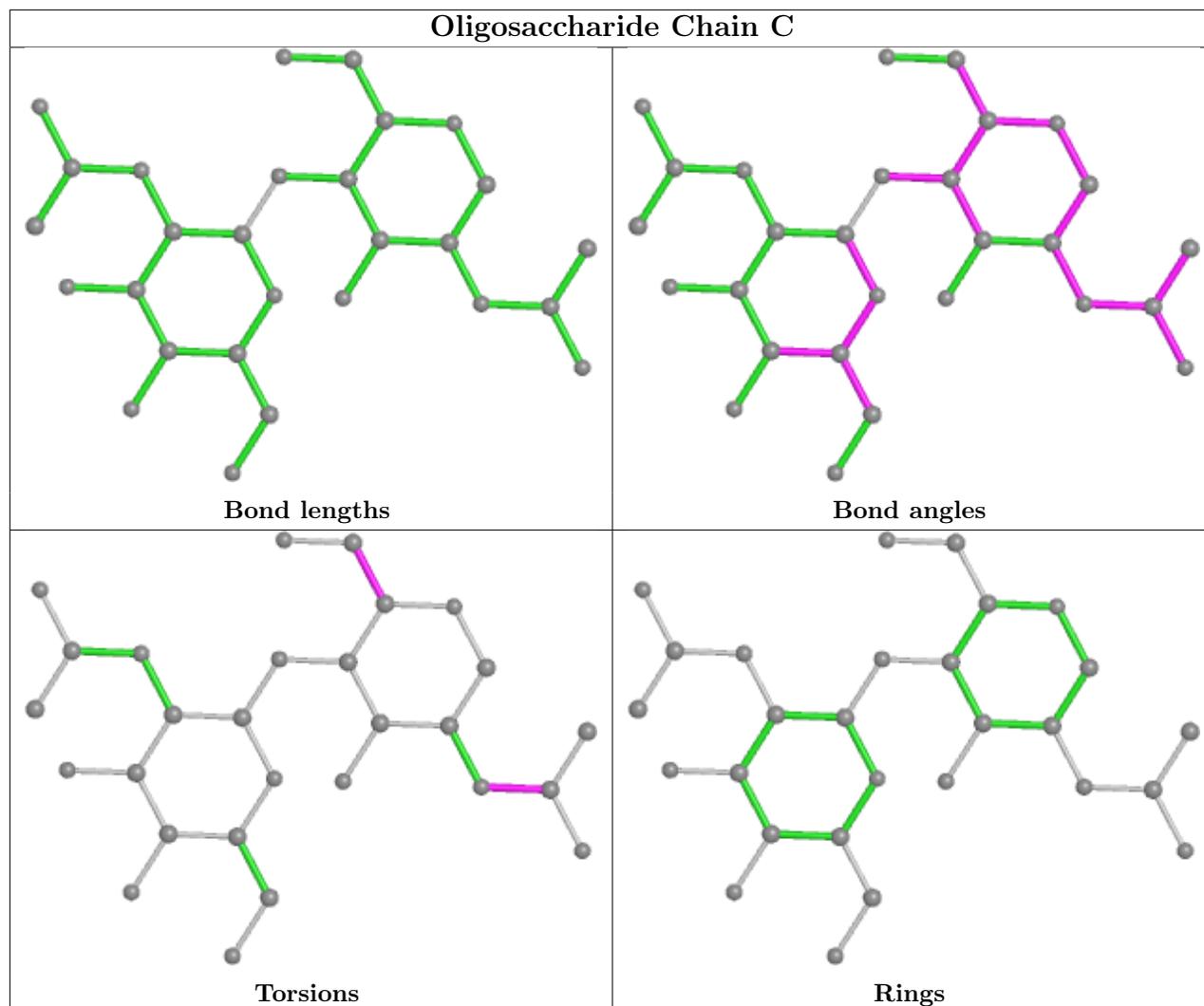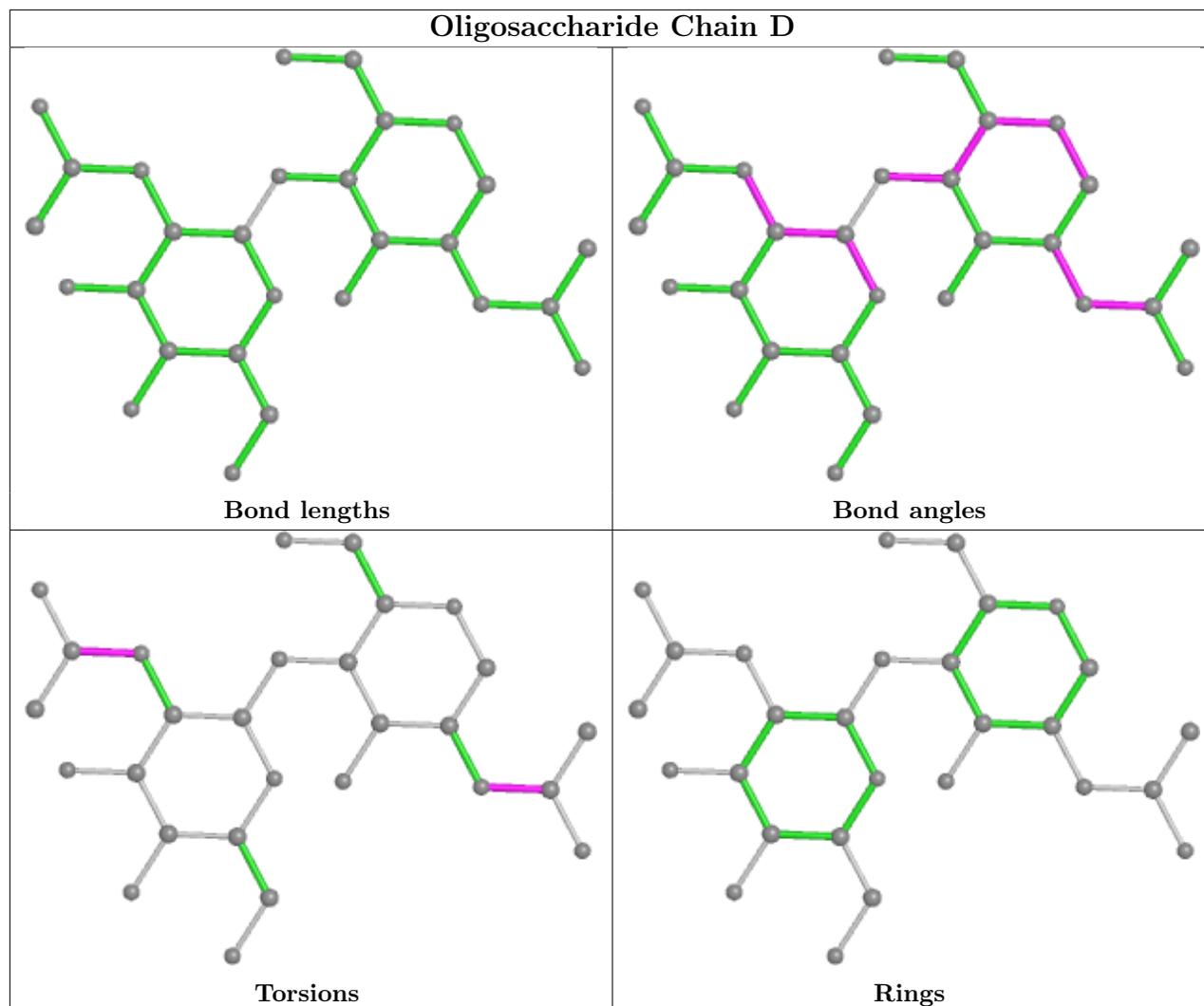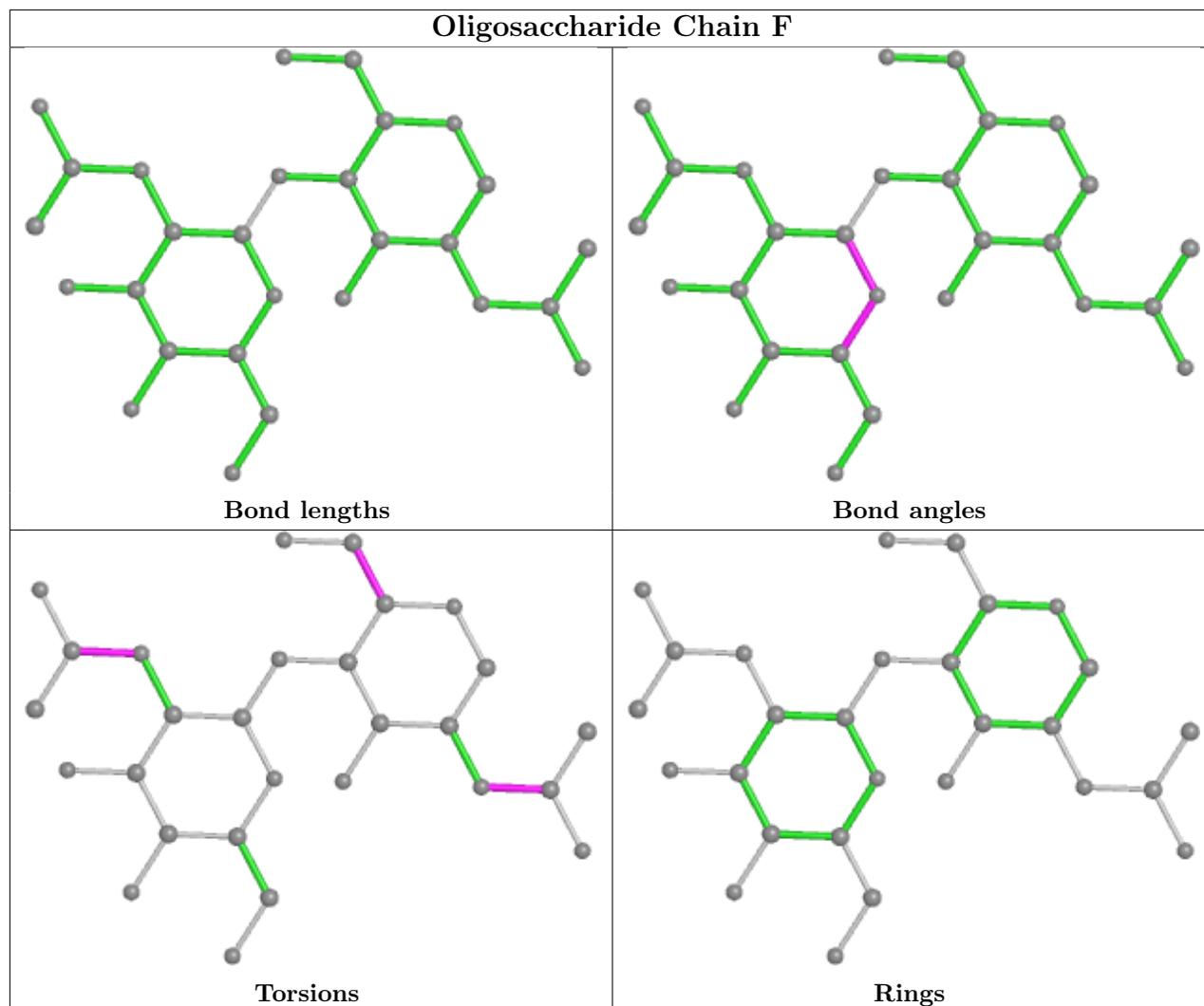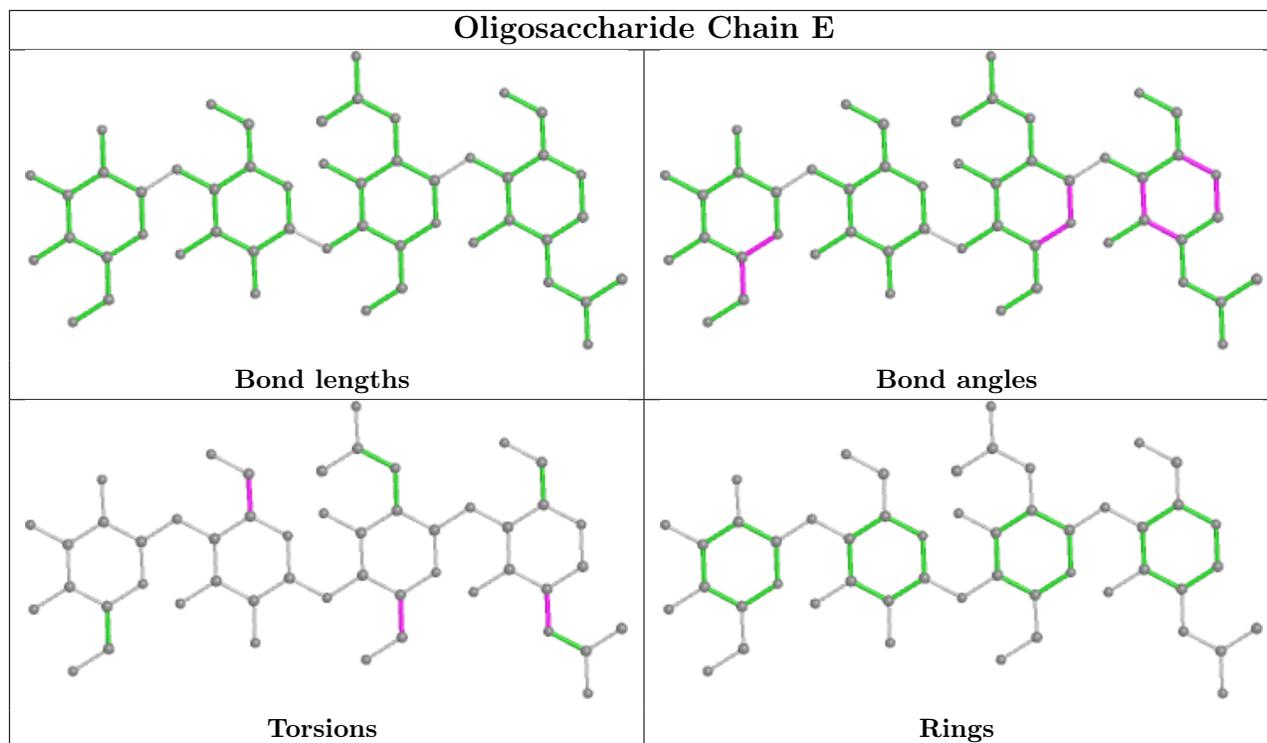
5.6 Ligand geometry ⓘ

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	$\#|Z| > 2$
4	LYS	B	1005	7	8,9,9	0.94	1 (12%)	9,10,10	1.05	1 (11%)
5	NAG	A	1007	1	14,14,15	0.59	0	17,19,21	2.12	5 (29%)
5	NAG	A	1006	1	14,14,15	0.54	0	17,19,21	1.38	2 (11%)
6	MES	B	1010	-	12,12,12	2.22	1 (8%)	14,16,16	2.68	7 (50%)
5	NAG	A	1008	1	14,14,15	0.49	0	17,19,21	0.83	0
5	NAG	B	1009	1	14,14,15	0.43	0	17,19,21	1.29	2 (11%)
6	MES	A	1009	-	12,12,12	2.21	1 (8%)	14,16,16	2.67	7 (50%)
4	LYS	A	1001	7	8,9,9	0.87	1 (12%)	9,10,10	0.82	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
4	LYS	B	1005	7	-	5/9/9/9	-
5	NAG	A	1007	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1006	1	-	4/6/23/26	0/1/1/1
6	MES	B	1010	-	-	6/6/14/14	0/1/1/1
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
6	MES	A	1009	-	-	3/6/14/14	0/1/1/1
4	LYS	A	1001	7	-	4/9/9/9	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1010	MES	C8-S	-7.37	1.67	1.77
6	A	1009	MES	C8-S	-7.35	1.67	1.77
4	B	1005	LYS	OXT-C	-2.41	1.22	1.30
4	A	1001	LYS	OXT-C	-2.27	1.23	1.30

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	1010	MES	C5-N4-C3	4.72	119.45	108.83
6	A	1009	MES	C5-N4-C3	4.72	119.44	108.83
6	B	1010	MES	C6-C5-N4	-4.42	103.41	110.10
5	A	1007	NAG	C3-C4-C5	-4.26	102.64	110.24
5	A	1007	NAG	C1-O5-C5	4.14	117.80	112.19

There are no chirality outliers.

5 of 30 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	1005	LYS	O-C-CA-N
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

There are no ring outliers.

4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1005	LYS	4	0
5	A	1007	NAG	2	0
6	B	1010	MES	4	0
6	A	1009	MES	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(Å^2)	Q<0.9
1	A	869/967 (89%)	-0.06	4 (0%)	91	86	33, 67, 111, 147	2 (0%)
1	B	859/967 (88%)	0.17	56 (6%)	18	11	34, 70, 116, 146	0
All	All	1728/1934 (89%)	0.05	60 (3%)	44	29	33, 68, 114, 147	2 (0%)

The worst 5 of 60 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	615	PRO	5.1
1	B	613	ASP	4.9
1	B	561	LEU	4.8
1	B	553	LYS	4.7
1	B	559	LEU	4.7

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.
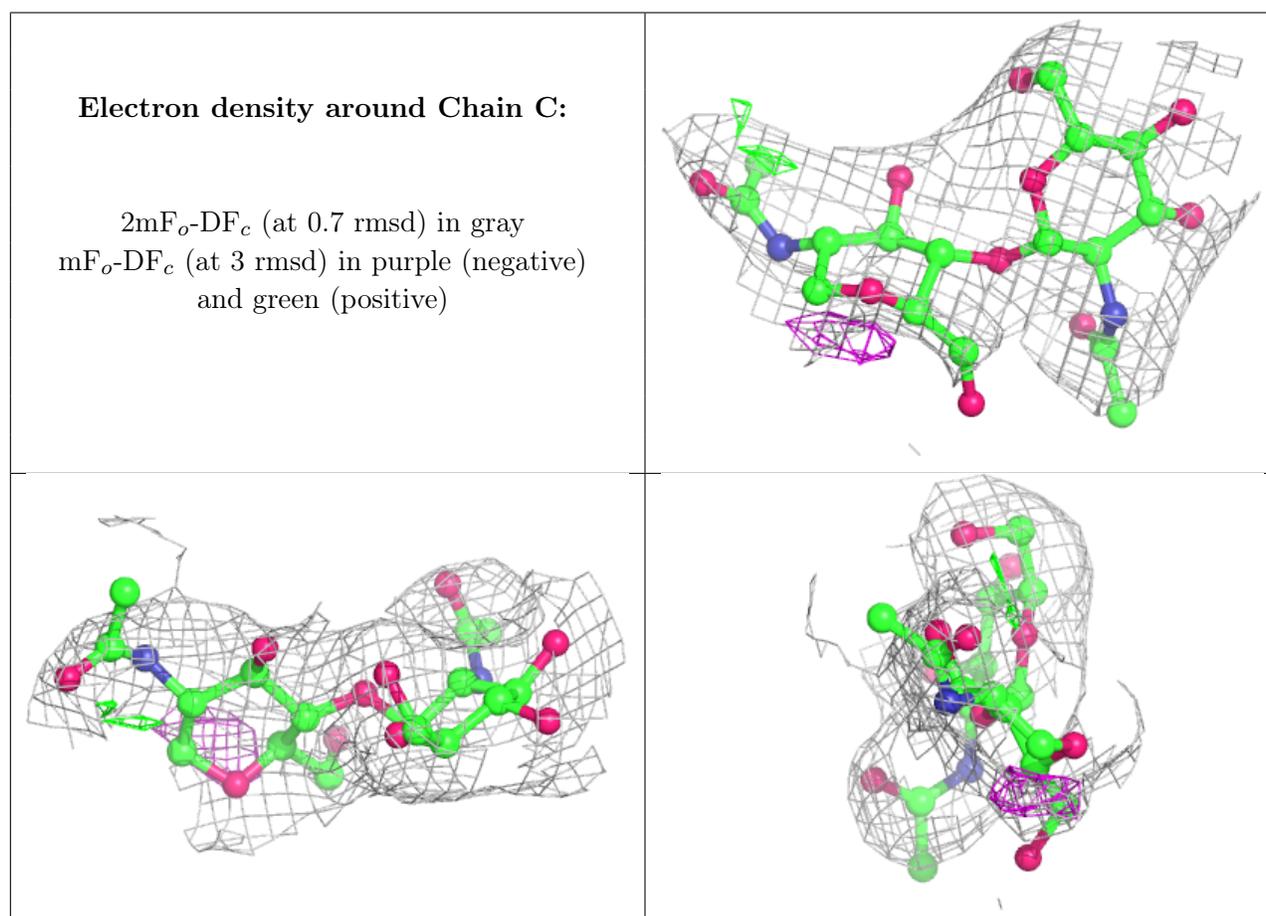
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAG	F	2	14/15	0.75	0.34	84,113,127,133	0
3	MAN	E	3	11/12	0.80	0.17	72,97,108,112	0
3	MAN	E	4	11/12	0.82	0.31	96,113,135,142	0
2	NAG	C	1	14/15	0.85	0.28	64,79,83,87	0
2	NAG	D	2	14/15	0.86	0.21	60,81,88,99	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
3	NAG	E	2	14/15	0.90	0.19	50,77,92,102	0
2	NAG	F	1	14/15	0.91	0.26	68,91,111,112	0
3	NAG	E	1	14/15	0.92	0.24	56,73,85,87	0
2	NAG	D	1	14/15	0.92	0.15	46,53,69,70	0
2	NAG	C	2	14/15	0.93	0.14	65,82,87,91	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.
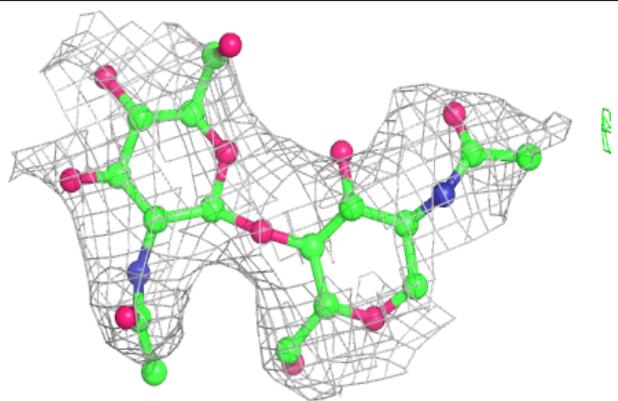

Electron density around Chain C:

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

Electron density around Chain D:

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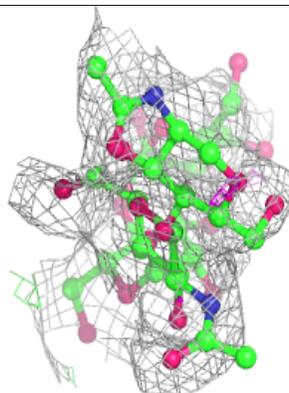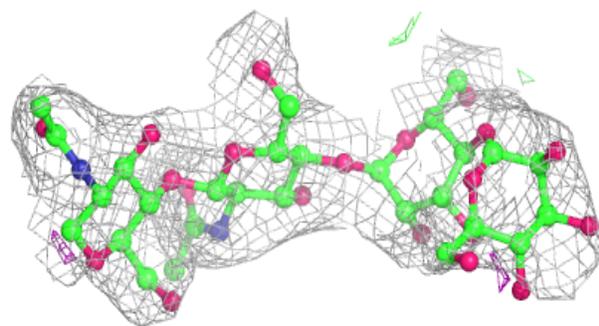$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
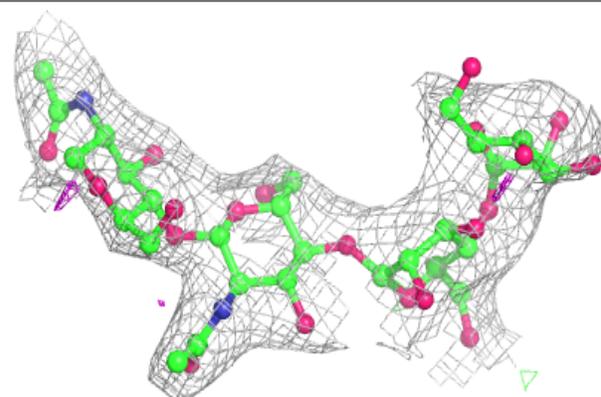and green (positive)
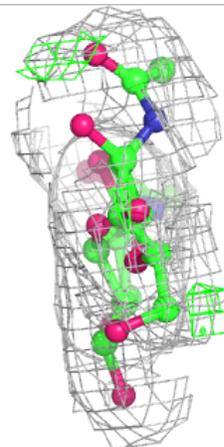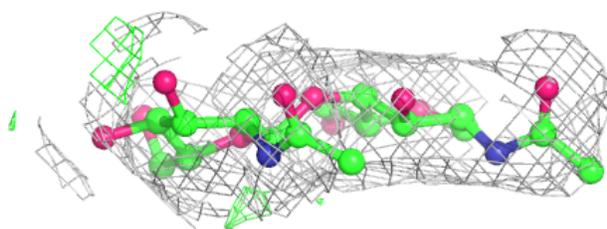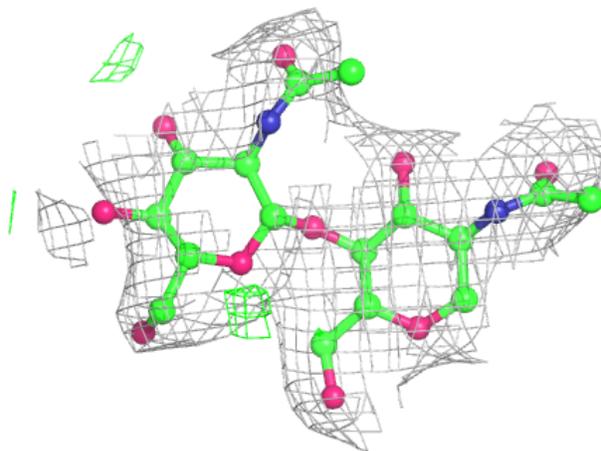
Electron density around Chain F:

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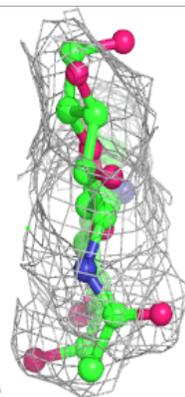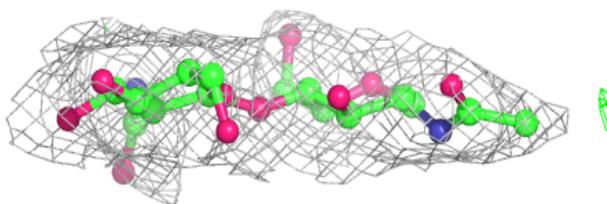
Electron density around Chain E:

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 ⓘ

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	MES	A	1009	12/12	0.78	0.43	57,72,86,95	12
5	NAG	B	1009	14/15	0.79	0.28	76,101,110,112	0
6	MES	B	1010	12/12	0.82	0.41	57,65,73,84	12
5	NAG	A	1007	14/15	0.86	0.28	88,104,121,130	0
5	NAG	A	1008	14/15	0.87	0.14	96,107,114,117	0
5	NAG	A	1006	14/15	0.92	0.19	62,85,87,88	0
4	LYS	B	1005	10/10	0.92	0.34	46,59,65,69	0
4	LYS	A	1001	10/10	0.97	0.31	34,45,52,53	0
7	ZN	A	1010	1/1	0.99	0.26	32,32,32,32	0
7	ZN	B	1006	1/1	0.99	0.20	46,46,46,46	0

6.5 Other polymers ⓘ

There are no such residues in this entry.