



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 7, 2023 – 11:32 PM EDT

PDB ID : 6DY3  
Title : Caenorhabditis elegans N-acylethanolamine-hydrolyzing acid amidase (NAAA) ortholog  
Authors : Gorelik, A.; Gebai, A.; Illes, K.; Piomelli, D.; Nagar, B.  
Deposited on : 2018-07-01  
Resolution : 2.70 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](mailto: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>.

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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 : 2.35.1  
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

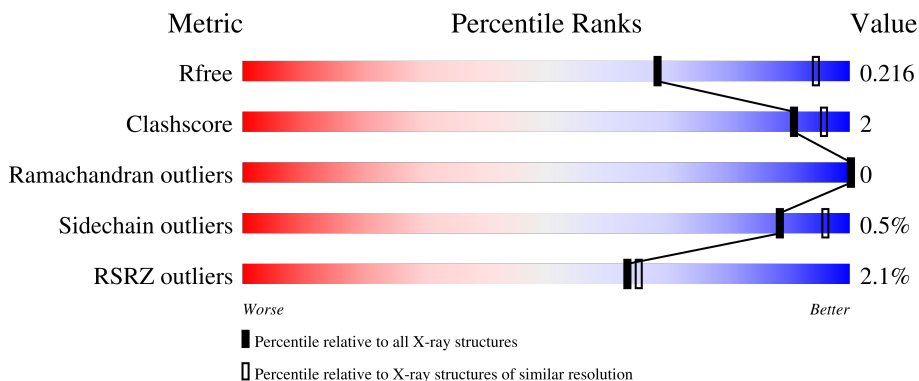
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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.



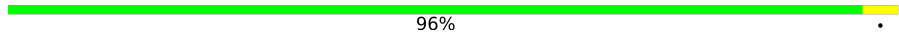
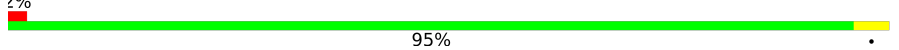
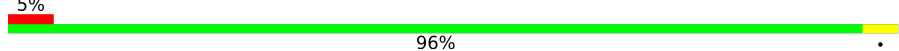
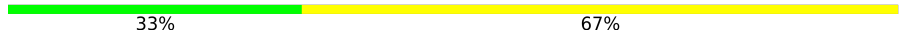
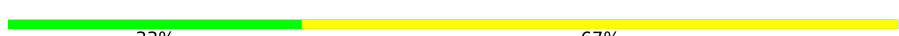
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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  $\geq 3$ , 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	113	 83% 7% 10%
1	C	113	 4% 88% 10%
1	E	113	 85% 12%
1	G	113	 3% 80% 11% 10%
2	B	234	 96%

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Mol	Chain	Length	Quality of chain
2	D	234	 96%
2	F	234	 95%
2	H	234	 96%
3	I	3	 33% 67%
3	J	3	 33% 67%

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	NAG	I	2	-	-	-	X
3	FUC	I	3	-	-	-	X

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 22223 atoms, of which 10866 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 N-acylethanolamine-hydrolyzing acid amidase alpha-subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	102	1697	554	845	144	153	1	0	0	0
1	C	102	1697	554	845	144	153	1	0	0	0
1	E	100	1656	542	821	141	151	1	0	0	0
1	G	102	1697	554	845	144	153	1	0	0	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	9	ASP	-	expression tag	UNP Q9GUI1
A	10	ARG	-	expression tag	UNP Q9GUI1
A	11	HIS	-	expression tag	UNP Q9GUI1
A	12	HIS	-	expression tag	UNP Q9GUI1
A	13	HIS	-	expression tag	UNP Q9GUI1
A	14	HIS	-	expression tag	UNP Q9GUI1
A	15	HIS	-	expression tag	UNP Q9GUI1
A	16	HIS	-	expression tag	UNP Q9GUI1
A	17	LYS	-	expression tag	UNP Q9GUI1
A	18	LEU	-	expression tag	UNP Q9GUI1
C	9	ASP	-	expression tag	UNP Q9GUI1
C	10	ARG	-	expression tag	UNP Q9GUI1
C	11	HIS	-	expression tag	UNP Q9GUI1
C	12	HIS	-	expression tag	UNP Q9GUI1
C	13	HIS	-	expression tag	UNP Q9GUI1
C	14	HIS	-	expression tag	UNP Q9GUI1
C	15	HIS	-	expression tag	UNP Q9GUI1
C	16	HIS	-	expression tag	UNP Q9GUI1
C	17	LYS	-	expression tag	UNP Q9GUI1
C	18	LEU	-	expression tag	UNP Q9GUI1
E	9	ASP	-	expression tag	UNP Q9GUI1

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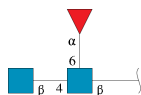
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Chain	Residue	Modelled	Actual	Comment	Reference
E	10	ARG	-	expression tag	UNP Q9GUI1
E	11	HIS	-	expression tag	UNP Q9GUI1
E	12	HIS	-	expression tag	UNP Q9GUI1
E	13	HIS	-	expression tag	UNP Q9GUI1
E	14	HIS	-	expression tag	UNP Q9GUI1
E	15	HIS	-	expression tag	UNP Q9GUI1
E	16	HIS	-	expression tag	UNP Q9GUI1
E	17	LYS	-	expression tag	UNP Q9GUI1
E	18	LEU	-	expression tag	UNP Q9GUI1
G	9	ASP	-	expression tag	UNP Q9GUI1
G	10	ARG	-	expression tag	UNP Q9GUI1
G	11	HIS	-	expression tag	UNP Q9GUI1
G	12	HIS	-	expression tag	UNP Q9GUI1
G	13	HIS	-	expression tag	UNP Q9GUI1
G	14	HIS	-	expression tag	UNP Q9GUI1
G	15	HIS	-	expression tag	UNP Q9GUI1
G	16	HIS	-	expression tag	UNP Q9GUI1
G	17	LYS	-	expression tag	UNP Q9GUI1
G	18	LEU	-	expression tag	UNP Q9GUI1

- Molecule 2 is a protein called N-acylethanolamine-hydrolyzing acid amidase beta-subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
2	B	234	3744	1202	1859	326	352	5	0	0	0
2	D	234	3745	1202	1860	326	352	5	0	0	0
2	F	234	3743	1202	1858	326	352	5	0	0	0
2	H	234	3744	1202	1859	326	352	5	0	0	0

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
3	I	3	75	22	37	2	14	0	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
3	J	3	75	22	37	2	14	0	0	0

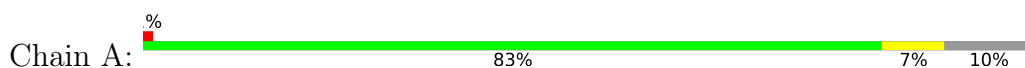
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	22	Total 22	O 22	0	0
4	B	92	Total 92	O 92	0	0
4	C	12	Total 12	O 12	0	0
4	D	63	Total 63	O 63	0	0
4	E	32	Total 32	O 32	0	0
4	F	51	Total 51	O 51	0	0
4	G	21	Total 21	O 21	0	0
4	H	57	Total 57	O 57	0	0

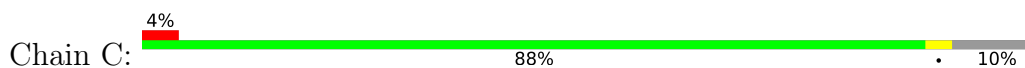
### 3 Residue-property plots [i](#)

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.

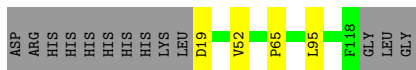
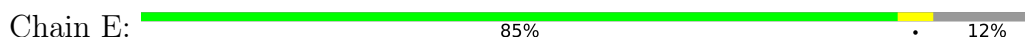
- Molecule 1: N-acylethanolamine-hydrolyzing acid amidase alpha-subunit



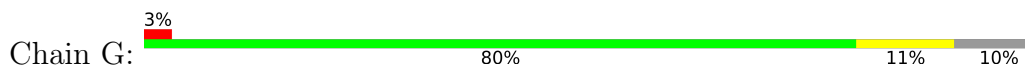
- Molecule 1: N-acylethanolamine-hydrolyzing acid amidase alpha-subunit



- Molecule 1: N-acylethanolamine-hydrolyzing acid amidase alpha-subunit



- Molecule 1: N-acylethanolamine-hydrolyzing acid amidase alpha-subunit

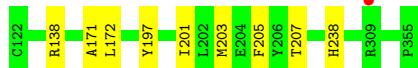


- Molecule 2: N-acylethanolamine-hydrolyzing acid amidase beta-subunit



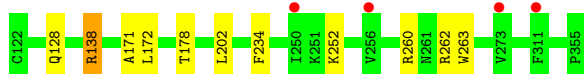
- Molecule 2: N-acylethanolamine-hydrolyzing acid amidase beta-subunit

Chain D:  96%



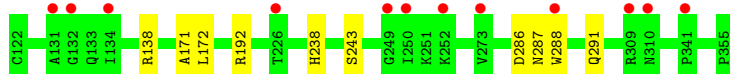
- Molecule 2: N-acyl ethanolamine-hydrolyzing acid amidase beta-subunit

Chain F:  95%



- Molecule 2: N-acyl ethanolamine-hydrolyzing acid amidase beta-subunit

Chain H:  96%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  33% 67%



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  33% 67%





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	89.61Å 89.61Å 207.06Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	44.82 – 2.70 44.82 – 2.70	Depositor EDS
% Data completeness (in resolution range)	95.6 (44.82-2.70) 90.9 (44.82-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.18 (at 2.69Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, $R_{free}$	0.168 , 0.215 0.170 , 0.216	Depositor DCC
$R_{free}$ test set	1961 reflections (4.59%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.7	Xtrriage
Anisotropy	0.049	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 42.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.046 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	22223	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	59.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.58% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: FUC, 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	0.26	0/877	0.40	0/1190
1	C	0.26	0/877	0.41	0/1190
1	E	0.30	0/860	0.41	0/1168
1	G	0.27	0/877	0.41	0/1190
2	B	0.29	0/1927	0.47	0/2616
2	D	0.28	0/1927	0.47	0/2616
2	F	0.29	0/1927	0.46	0/2616
2	H	0.29	0/1927	0.46	0/2616
All	All	0.28	0/11199	0.45	0/15202

There are no bond length outliers.

There are no bond angle outliers.

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	852	845	845	5	0
1	C	852	845	845	3	0
1	E	835	821	821	2	1
1	G	852	845	845	8	0
2	B	1885	1859	1858	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1885	1860	1859	5	0
2	F	1885	1858	1858	7	0
2	H	1885	1859	1859	5	1
3	I	38	37	34	1	0
3	J	38	37	34	0	0
4	A	22	0	0	0	0
4	B	92	0	0	0	0
4	C	12	0	0	0	0
4	D	63	0	0	0	0
4	E	32	0	0	0	0
4	F	51	0	0	0	0
4	G	21	0	0	0	0
4	H	57	0	0	0	0
All	All	11357	10866	10858	36	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 (36) 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:52:VAL:HG22	1:A:103:MET:HE1	1.82	0.61
2:H:287:ASN:OD1	2:H:288:TRP:N	2.39	0.55
2:B:171:ALA:O	2:B:172:LEU:HB2	2.08	0.53
2:F:171:ALA:O	2:F:172:LEU:HB2	2.07	0.53
2:D:171:ALA:O	2:D:172:LEU:HB2	2.08	0.52
2:H:171:ALA:O	2:H:172:LEU:HB2	2.09	0.52
1:A:52:VAL:HG21	1:A:95:LEU:HD13	1.95	0.48
1:G:33:PRO:HB2	1:G:84:GLU:HB2	1.94	0.48
1:E:52:VAL:HG21	1:E:95:LEU:HD13	1.97	0.47
1:C:69:TRP:CE2	1:G:118:PHE:HB3	2.51	0.46
2:F:138:ARG:NH1	2:F:178:THR:OG1	2.49	0.45
1:G:117:ILE:HG23	1:G:118:PHE:CD2	2.52	0.44
2:D:197:TYR:CE2	2:D:201:ILE:HD13	2.52	0.44
2:D:203:MET:O	2:D:207:THR:HG23	2.17	0.44
2:B:146:GLU:OE1	3:I:1:NAG:H82	2.17	0.44
2:F:234:PHE:O	2:F:260:ARG:NH1	2.50	0.44
2:F:171:ALA:O	2:F:172:LEU:CB	2.66	0.44
1:G:52:VAL:HG21	1:G:95:LEU:HD13	2.01	0.43
2:F:262:ARG:HA	2:F:263:TRP:HA	1.81	0.43
2:D:201:ILE:HD11	2:D:205:PHE:CE2	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:65:PRO:HG2	1:G:65:PRO:HG2	2.01	0.42
2:B:171:ALA:O	2:B:172:LEU:CB	2.68	0.42
1:G:59:ILE:HD12	1:G:68:TRP:CH2	2.54	0.42
1:G:59:ILE:HG12	1:G:109:VAL:HG21	2.02	0.42
2:B:192:ARG:HB2	2:B:243:SER:HA	2.01	0.42
2:B:128:GLN:HE22	2:B:252:LYS:HA	1.84	0.42
2:F:128:GLN:HE22	2:F:252:LYS:HA	1.85	0.42
2:H:286:ASP:O	2:H:287:ASN:OD1	2.38	0.42
1:G:55:THR:HG21	1:G:103:MET:HE3	2.01	0.41
1:C:63:LEU:HD11	2:D:201:ILE:CG1	2.49	0.41
2:B:202:LEU:HD22	2:F:202:LEU:HD22	2.03	0.41
1:A:59:ILE:HG12	1:A:109:VAL:HG21	2.03	0.41
2:H:171:ALA:O	2:H:172:LEU:CB	2.69	0.41
1:A:33:PRO:HB2	1:A:84:GLU:HB2	2.03	0.40
2:H:192:ARG:HB2	2:H:243:SER:HA	2.03	0.40
1:A:65:PRO:HG2	1:E:65:PRO:HG2	2.04	0.40

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)
1:E:19:ASP:O	2:H:291:GLN:HE22[3_654]	1.50	0.10

## 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	100/113 (88%)	99 (99%)	1 (1%)	0	100	100
1	C	100/113 (88%)	100 (100%)	0	0	100	100
1	E	98/113 (87%)	98 (100%)	0	0	100	100
1	G	100/113 (88%)	100 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	232/234 (99%)	223 (96%)	9 (4%)	0	100	100
2	D	232/234 (99%)	222 (96%)	10 (4%)	0	100	100
2	F	232/234 (99%)	223 (96%)	9 (4%)	0	100	100
2	H	232/234 (99%)	221 (95%)	11 (5%)	0	100	100
All	All	1326/1388 (96%)	1286 (97%)	40 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	92/101 (91%)	92 (100%)	0	100	100
1	C	92/101 (91%)	92 (100%)	0	100	100
1	E	90/101 (89%)	90 (100%)	0	100	100
1	G	92/101 (91%)	92 (100%)	0	100	100
2	B	207/207 (100%)	206 (100%)	1 (0%)	88	96
2	D	207/207 (100%)	205 (99%)	2 (1%)	76	91
2	F	207/207 (100%)	206 (100%)	1 (0%)	88	96
2	H	207/207 (100%)	205 (99%)	2 (1%)	76	91
All	All	1194/1232 (97%)	1188 (100%)	6 (0%)	88	96

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	138	ARG
2	D	138	ARG
2	D	238	HIS
2	F	138	ARG
2	H	138	ARG
2	H	238	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	200	ASN

### 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](#)

6 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
3	NAG	I	1	3,2	14,14,15	0.67	0	17,19,21	0.52	0
3	NAG	I	2	3	14,14,15	0.20	0	17,19,21	0.63	0
3	FUC	I	3	3	10,10,11	0.95	1 (10%)	14,14,16	1.29	3 (21%)
3	NAG	J	1	3,2	14,14,15	0.94	1 (7%)	17,19,21	1.04	2 (11%)
3	NAG	J	2	3	14,14,15	0.21	0	17,19,21	0.40	0
3	FUC	J	3	3	10,10,11	1.57	2 (20%)	14,14,16	1.72	3 (21%)

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
3	NAG	I	1	3,2	-	4/6/23/26	0/1/1/1
3	NAG	I	2	3	-	1/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	FUC	I	3	3	-	-	0/1/1/1
3	NAG	J	1	3,2	-	4/6/23/26	0/1/1/1
3	NAG	J	2	3	-	2/6/23/26	0/1/1/1
3	FUC	J	3	3	-	-	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	J	3	FUC	C1-C2	3.76	1.60	1.52
3	J	1	NAG	O5-C1	-3.46	1.38	1.43
3	J	3	FUC	O5-C1	2.57	1.47	1.43
3	I	3	FUC	C1-C2	2.32	1.57	1.52

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	3	FUC	C1-C2-C3	4.11	114.72	109.67
3	J	3	FUC	C1-O5-C5	3.45	120.59	112.78
3	J	1	NAG	C1-O5-C5	2.78	115.96	112.19
3	J	3	FUC	O5-C1-C2	2.70	114.94	110.77
3	I	3	FUC	C1-O5-C5	2.54	118.53	112.78
3	I	3	FUC	O5-C5-C4	2.27	113.60	109.52
3	I	3	FUC	C1-C2-C3	2.21	112.39	109.67
3	J	1	NAG	O5-C5-C6	-2.16	103.82	107.20

There are no chirality outliers.

All (11) torsion outliers are listed below:

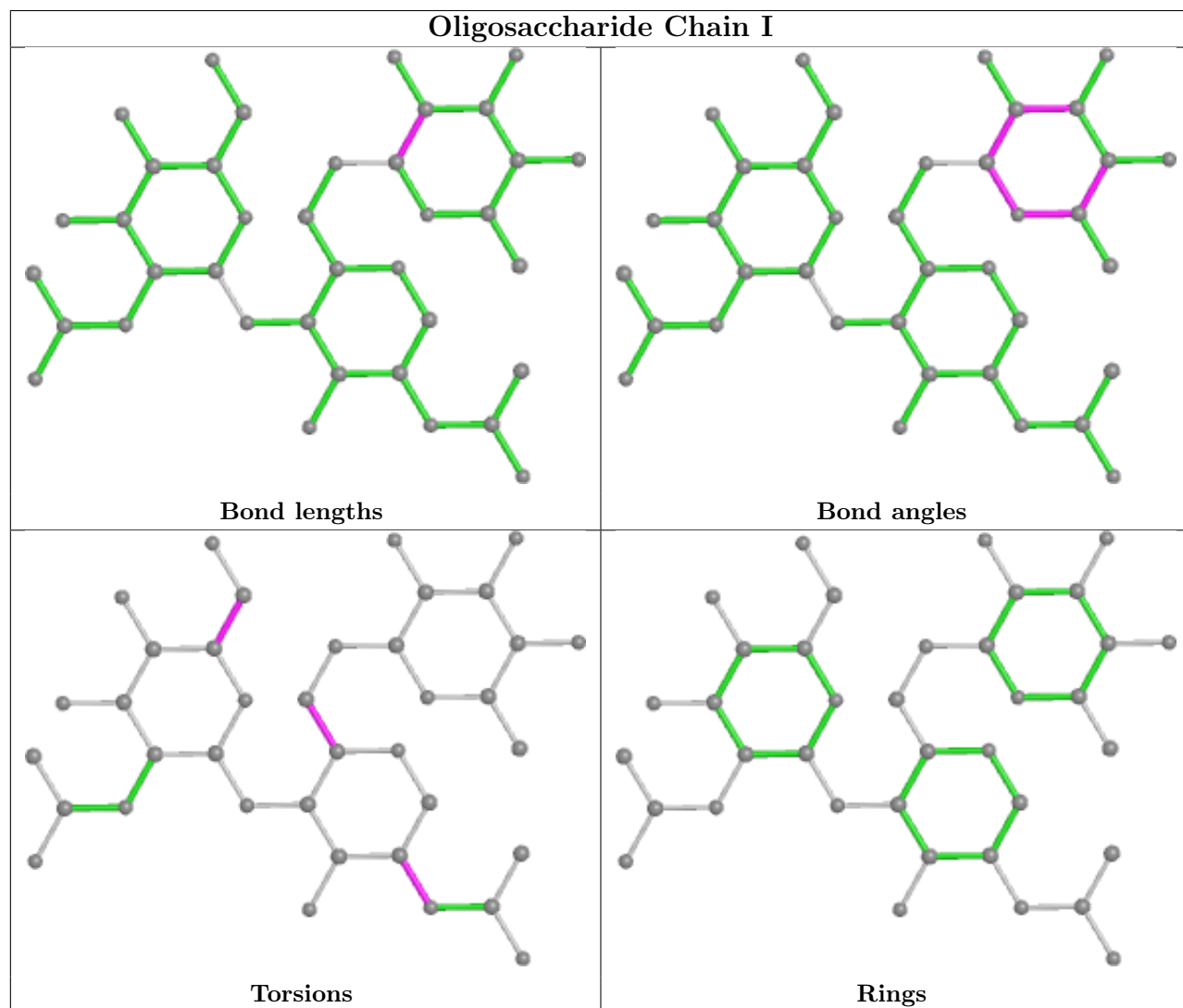
Mol	Chain	Res	Type	Atoms
3	I	1	NAG	C4-C5-C6-O6
3	J	1	NAG	O5-C5-C6-O6
3	I	1	NAG	O5-C5-C6-O6
3	J	1	NAG	C4-C5-C6-O6
3	J	2	NAG	C4-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
3	J	2	NAG	O5-C5-C6-O6
3	J	1	NAG	C1-C2-N2-C7
3	I	1	NAG	C1-C2-N2-C7
3	I	1	NAG	C3-C2-N2-C7
3	J	1	NAG	C3-C2-N2-C7

There are no ring outliers.

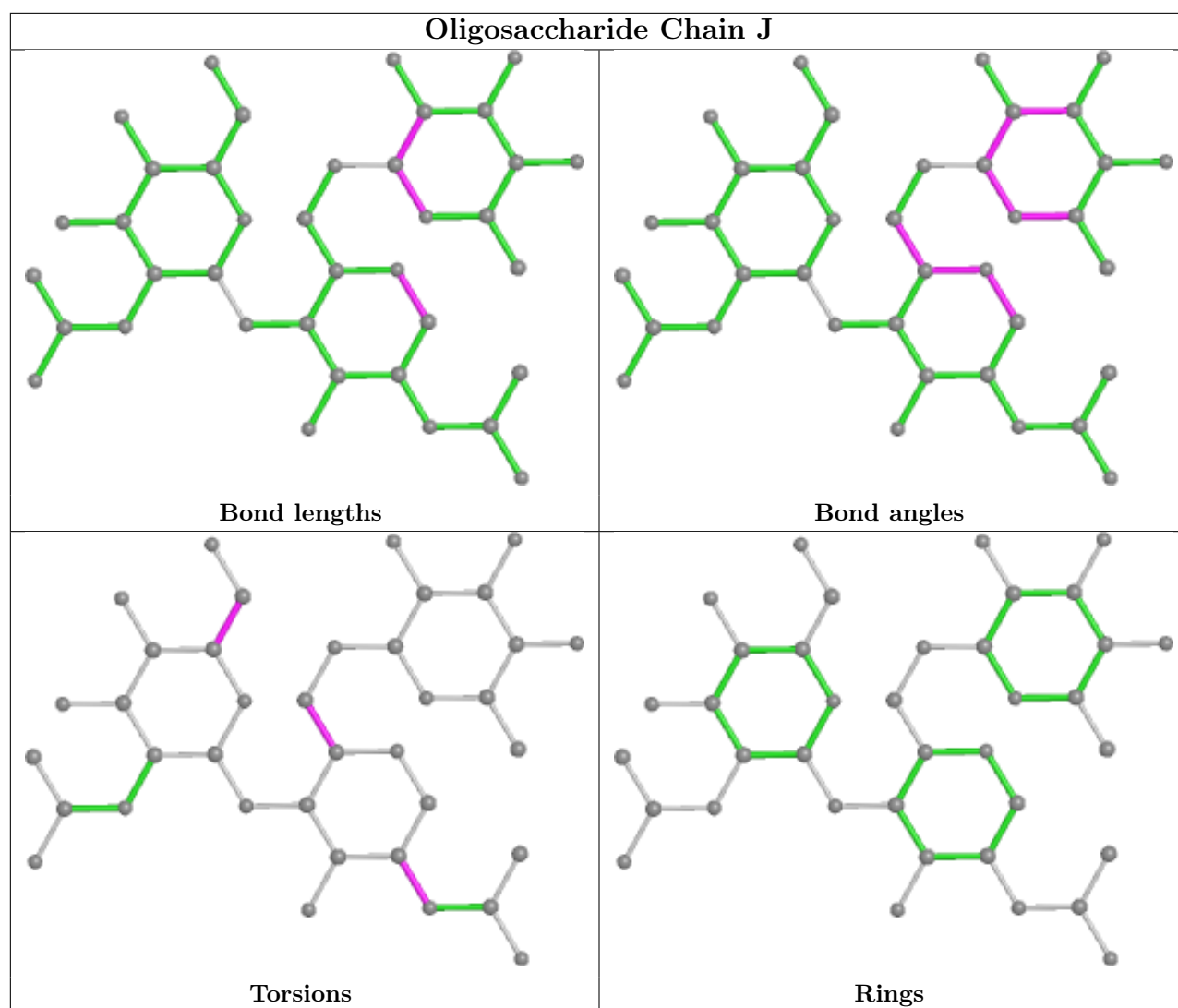
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	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.







## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	102/113 (90%)	-0.01	1 (0%) 82 83	33, 52, 77, 101	0
1	C	102/113 (90%)	0.55	5 (4%) 29 28	36, 73, 98, 125	0
1	E	100/113 (88%)	-0.09	0 100 100	28, 42, 72, 86	0
1	G	102/113 (90%)	0.32	3 (2%) 51 52	40, 64, 95, 124	0
2	B	234/234 (100%)	-0.06	2 (0%) 84 85	26, 42, 68, 87	0
2	D	234/234 (100%)	0.02	1 (0%) 92 93	28, 49, 73, 94	0
2	F	234/234 (100%)	0.21	4 (1%) 70 72	26, 56, 91, 117	0
2	H	234/234 (100%)	0.21	12 (5%) 28 26	26, 50, 85, 146	0
All	All	1342/1388 (96%)	0.12	28 (2%) 63 65	26, 51, 87, 146	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	118	PHE	5.8
2	H	288	TRP	4.7
1	C	88	GLY	3.5
2	H	250	ILE	3.2
2	H	226	THR	3.1
2	H	309	ARG	2.8
2	H	341	PRO	2.7
1	C	32	PRO	2.6
2	B	250	ILE	2.6
1	G	116	HIS	2.6
2	H	134	ILE	2.5
2	H	310	ASN	2.4
2	F	273	VAL	2.4
1	C	101	VAL	2.3
1	C	74	ILE	2.3
2	F	250	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
2	H	249	GLY	2.3
1	C	89	ILE	2.3
2	H	252	LYS	2.2
2	H	131	ALA	2.2
2	D	309	ARG	2.2
2	F	311	PHE	2.2
1	A	118	PHE	2.1
2	F	256	VAL	2.1
2	H	273	VAL	2.1
2	B	309	ARG	2.1
2	H	132	GLY	2.0
1	G	112	PHE	2.0

## 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](#)

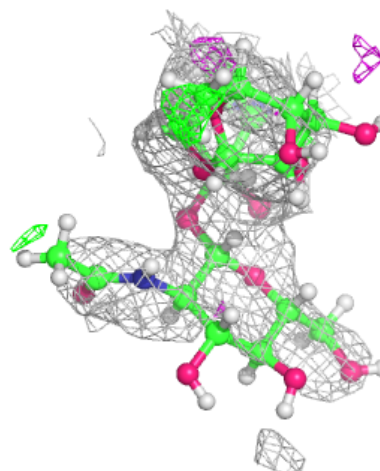
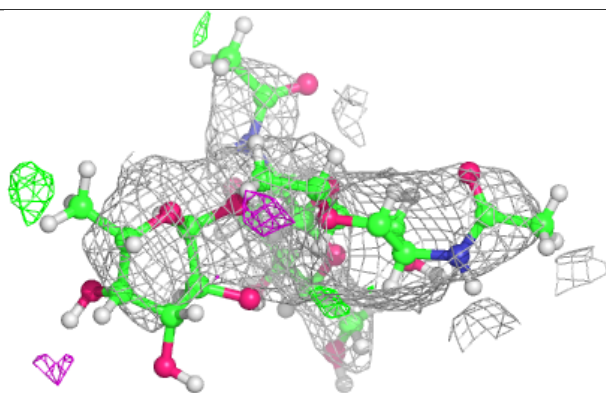
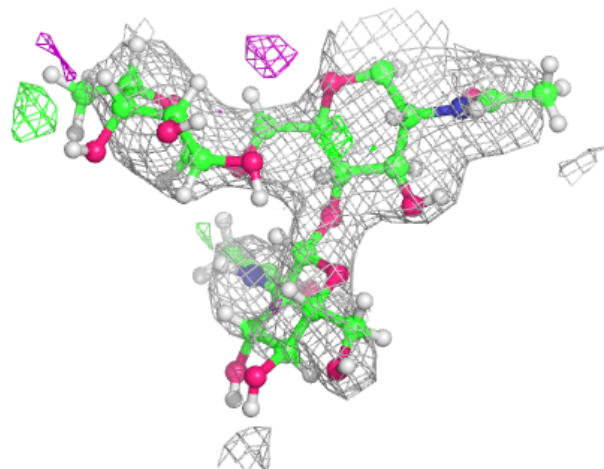
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

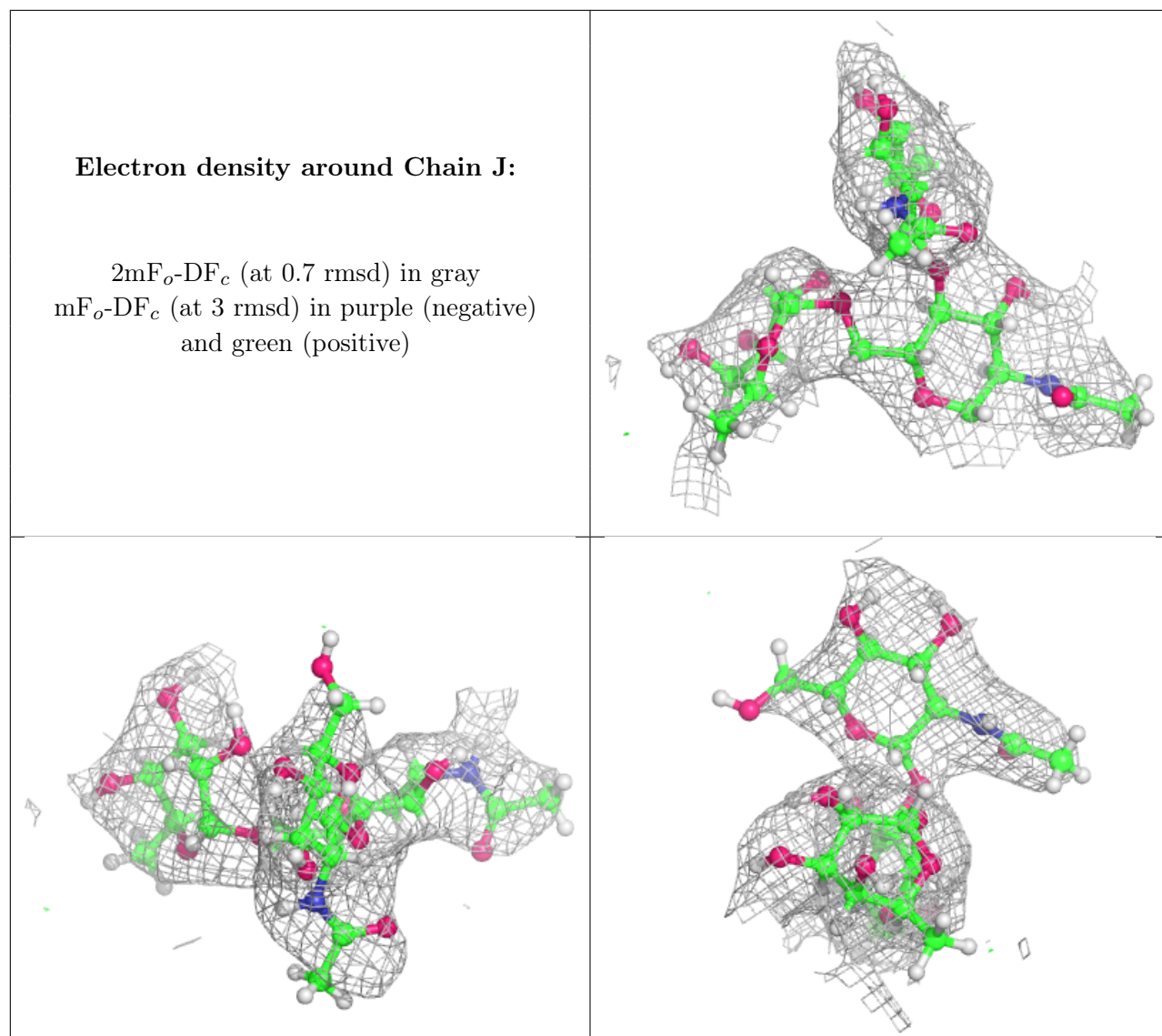
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	FUC	I	3	10/11	0.74	0.41	100,119,136,143	0
3	NAG	I	2	14/15	0.76	0.54	94,118,142,143	0
3	NAG	I	1	14/15	0.82	0.27	57,93,130,132	0
3	NAG	J	2	14/15	0.88	0.20	79,95,115,119	0
3	NAG	J	1	14/15	0.94	0.15	42,62,82,87	0
3	FUC	J	3	10/11	0.94	0.15	60,76,89,98	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 I:**

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





## 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.