



# wwPDB X-ray Structure Validation Summary Report

Sep 3, 2023 – 09:34 AM EDT

PDB ID : 3RY6  
Title : Complex of fcgammariia (CD32) and the FC of human IGG1  
Authors : Ramsland, P.A.; Farrugia, W.; Scott, A.M.; Hogarth, P.M.  
Deposited on : 2011-05-11  
Resolution : 3.80 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](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)  
Xtrriage (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

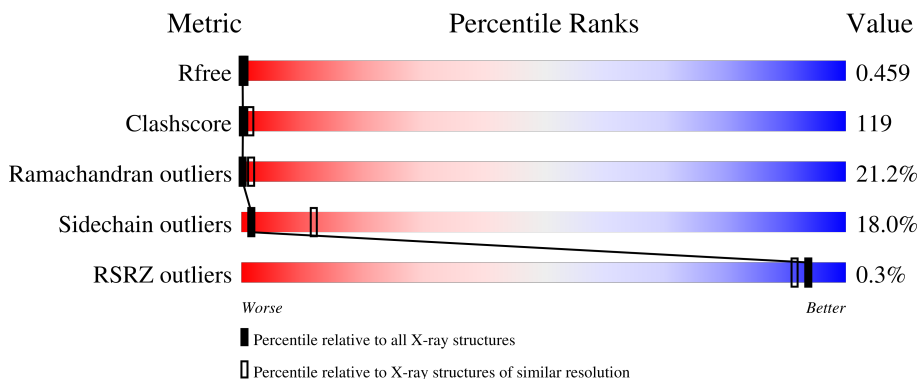
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.80 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	1212 (4.00-3.60)
Clashscore	141614	1288 (4.00-3.60)
Ramachandran outliers	138981	1243 (4.00-3.60)
Sidechain outliers	138945	1237 (4.00-3.60)
RSRZ outliers	127900	1121 (4.00-3.60)

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	214	
1	B	214	
2	C	167	
3	D	10	
4	E	12	

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Mol	Chain	Length	Quality of chain
5	F	6	 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
4	SIA	E	11	-	-	-	X
4	MAN	E	4	-	-	X	-
4	NAG	E	5	-	-	X	-
5	NAG	F	2	-	-	X	-
5	FUL	F	6	-	-	X	-
6	GOL	A	600	-	X	-	-
6	GOL	B	601	-	X	-	-
6	GOL	B	602	-	X	-	-
6	GOL	B	603	-	X	-	-

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 5145 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 Ig gamma-1 chain C region.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	214	1707	1086	289	325	7	0	0	0
1	B	214	1707	1086	289	325	7	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	272	GLN	GLU	SEE REMARK 999	UNP P01857
A	283	GLN	GLU	SEE REMARK 999	UNP P01857
A	294	GLN	GLU	SEE REMARK 999	UNP P01857
A	312	ASN	ASP	SEE REMARK 999	UNP P01857
A	315	ASP	ASN	SEE REMARK 999	UNP P01857
A	356	GLU	ASP	variant	UNP P01857
A	358	MET	LEU	variant	UNP P01857
B	272	GLN	GLU	SEE REMARK 999	UNP P01857
B	283	GLN	GLU	SEE REMARK 999	UNP P01857
B	294	GLN	GLU	SEE REMARK 999	UNP P01857
B	312	ASN	ASP	SEE REMARK 999	UNP P01857
B	315	ASP	ASN	SEE REMARK 999	UNP P01857
B	356	GLU	ASP	variant	UNP P01857
B	358	MET	LEU	variant	UNP P01857

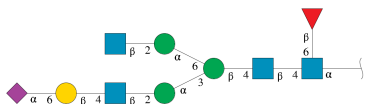
- Molecule 2 is a protein called Low affinity immunoglobulin gamma Fc region receptor II-a.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	167	1331	841	229	256	5	0	0	0

There is a discrepancy between the modelled and reference sequences:

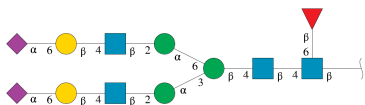
Chain	Residue	Modelled	Actual	Comment	Reference
C	134	ARG	HIS	engineered mutation	UNP P12318

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



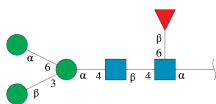
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	D	10	130	73	5	52	0	0	0

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	E	12	161	90	6	65	0	0	0

- Molecule 5 is an oligosaccharide called beta-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-alpha-D-glucopyranose.



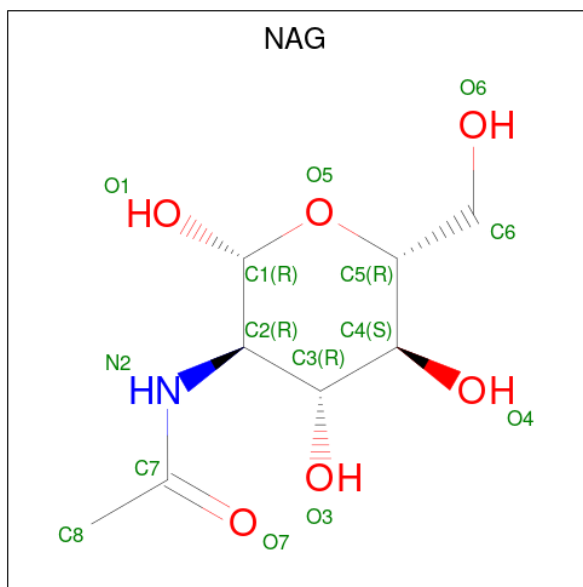
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
5	F	6	71	40	2	29	0	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).

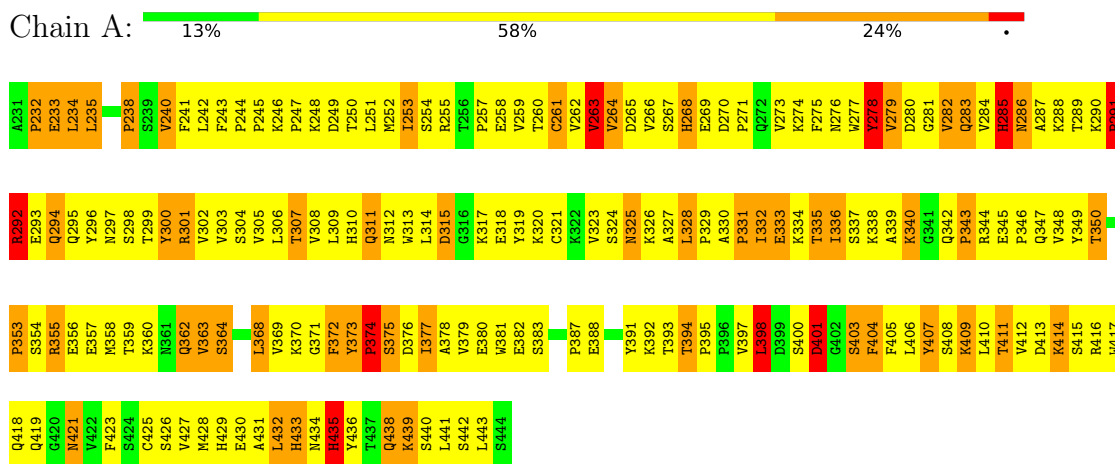


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
7	C	1	14	8	1	5	0	0

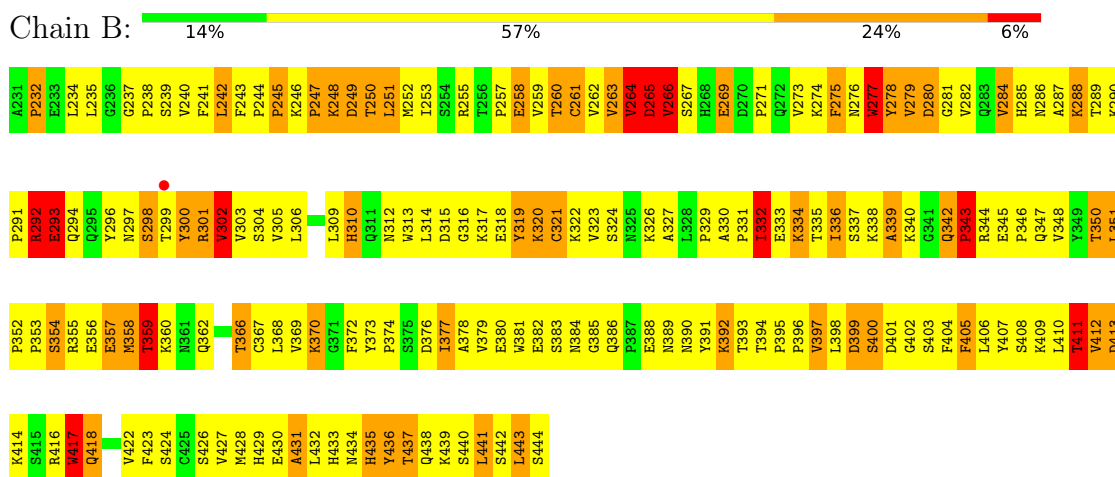
### 3 Residue-property plots [i](#)

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.

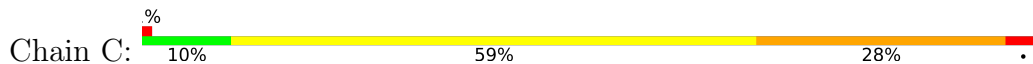
- Molecule 1: Ig gamma-1 chain C region



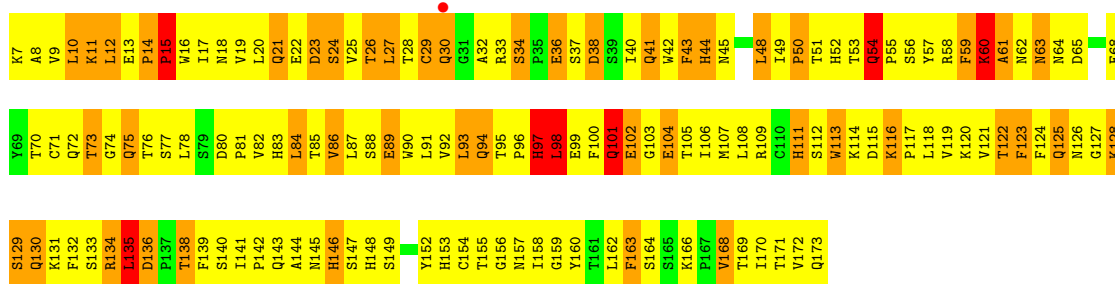
- Molecule 1: Ig gamma-1 chain C region



- Molecule 2: Low affinity immunoglobulin gamma Fc region receptor II-a







- Molecule 3: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-alpha-D-glucopyranose

Chain D: 30% 70%



- Molecule 4: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E: 33% 67%



- Molecule 5: beta-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-alpha-D-glucopyranose

Chain F: 33% 67%



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	153.38Å 255.55Å 58.44Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.71 – 3.80 29.71 – 3.78	Depositor EDS
% Data completeness (in resolution range)	(Not available) (29.71-3.80) 93.9 (29.71-3.78)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.14	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.52 (at 3.75Å)	Xtrriage
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.252 , 0.426 0.251 , 0.459	Depositor DCC
$R_{free}$ test set	1207 reflections (10.26%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	69.5	Xtrriage
Anisotropy	0.526	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 283.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.023 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.025 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtrriage
$F_o, F_c$ correlation	0.79	EDS
Total number of atoms	5145	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.12% 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: BMA, NDG, NAG, GAL, MAN, FUL, SIA, GOL

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	0.50	0/1754	0.76	0/2388
1	B	0.54	0/1754	0.83	1/2388 (0.0%)
2	C	0.49	0/1369	0.80	1/1865 (0.1%)
All	All	0.51	0/4877	0.80	2/6641 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	399	ASP	N-CA-C	-5.86	95.18	111.00
2	C	93	LEU	CA-CB-CG	5.46	127.87	115.30

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	1707	0	1678	382	0
1	B	1707	0	1679	462	0
2	C	1331	0	1273	351	1
3	D	130	0	109	16	0
4	E	161	0	135	25	0
5	F	71	0	60	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	6	0	4	0	0
6	B	18	0	12	3	0
7	C	14	0	13	0	0
All	All	5145	0	4963	1205	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 119.

The worst 5 of 1205 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)
2:C:40:ILE:HG13	2:C:54:GLN:H	1.04	1.19
1:B:377:ILE:HG12	1:B:378:ALA:H	1.10	1.13
1:A:328:LEU:HD23	1:A:329:PRO:HD2	1.22	1.12
1:B:380:GLU:HB2	1:B:426:SER:HB3	1.19	1.12
3:D:5:NAG:H62	3:D:6:GAL:H2	1.27	1.11

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)
2:C:77:SER:O	2:C:77:SER:O[4_557]	2.14	0.06

## 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	212/214 (99%)	120 (57%)	50 (24%)	42 (20%)	0 2
1	B	212/214 (99%)	108 (51%)	55 (26%)	49 (23%)	0 1
2	C	165/167 (99%)	78 (47%)	53 (32%)	34 (21%)	0 2

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	589/595 (99%)	306 (52%)	158 (27%)	125 (21%)	0 1

5 of 125 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	234	LEU
1	A	268	HIS
1	A	282	VAL
1	A	285	HIS
1	A	291	PRO

### 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	198/198 (100%)	164 (83%)	34 (17%)	2 13
1	B	198/198 (100%)	161 (81%)	37 (19%)	1 11
2	C	154/154 (100%)	126 (82%)	28 (18%)	1 11
All	All	550/550 (100%)	451 (82%)	99 (18%)	1 12

5 of 99 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	370	LYS
2	C	12	LEU
1	B	390	ASN
1	B	417	TRP
2	C	27	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	386	GLN
1	B	419	GLN

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Mol	Chain	Res	Type
1	B	390	ASN
1	B	434	ASN
1	A	434	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](#)

28 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	NDG	D	1	3	14,14,15	0.79	0	17,19,21	1.18	2 (11%)
3	FUL	D	10	3	10,10,11	0.88	1 (10%)	14,14,16	0.60	0
3	NAG	D	2	3	14,14,15	0.54	0	17,19,21	1.16	3 (17%)
3	BMA	D	3	3	11,11,12	0.60	0	15,15,17	0.95	1 (6%)
3	MAN	D	4	3	11,11,12	1.17	1 (9%)	15,15,17	0.82	0
3	NAG	D	5	3	14,14,15	0.87	1 (7%)	17,19,21	0.92	0
3	GAL	D	6	3	11,11,12	0.77	0	15,15,17	1.22	2 (13%)
3	SIA	D	7	3	20,20,21	1.15	2 (10%)	24,28,31	1.25	3 (12%)
3	MAN	D	8	3	11,11,12	0.77	0	15,15,17	0.69	0
3	NAG	D	9	3	14,14,15	0.72	0	17,19,21	1.01	1 (5%)
4	NAG	E	1	1,4	14,14,15	0.82	1 (7%)	17,19,21	0.89	0
4	GAL	E	10	4	11,11,12	1.00	0	15,15,17	0.56	0
4	SIA	E	11	4	20,20,21	1.68	5 (25%)	24,28,31	1.25	3 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	FUL	E	12	4	10,10,11	0.67	0	14,14,16	0.68	0
4	NAG	E	2	4	14,14,15	0.73	1 (7%)	17,19,21	0.69	0
4	BMA	E	3	4	11,11,12	1.29	1 (9%)	15,15,17	1.30	2 (13%)
4	MAN	E	4	4	11,11,12	0.93	1 (9%)	15,15,17	1.15	2 (13%)
4	NAG	E	5	4	14,14,15	0.73	0	17,19,21	1.95	4 (23%)
4	GAL	E	6	4	11,11,12	0.49	0	15,15,17	0.43	0
4	SIA	E	7	4	20,20,21	1.40	2 (10%)	24,28,31	0.94	0
4	MAN	E	8	4	11,11,12	0.82	0	15,15,17	0.94	1 (6%)
4	NAG	E	9	4	14,14,15	0.74	1 (7%)	17,19,21	1.27	2 (11%)
5	NDG	F	1	5	14,14,15	0.91	1 (7%)	17,19,21	0.98	2 (11%)
5	NAG	F	2	5	14,14,15	0.96	1 (7%)	17,19,21	0.71	0
5	MAN	F	3	5	11,11,12	0.94	0	15,15,17	1.85	3 (20%)
5	BMA	F	4	5	11,11,12	0.58	0	15,15,17	1.06	1 (6%)
5	MAN	F	5	5	11,11,12	0.67	0	15,15,17	1.46	3 (20%)
5	FUL	F	6	5	10,10,11	0.89	0	14,14,16	0.76	1 (7%)

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	NDG	D	1	3	-	3/6/23/26	0/1/1/1
3	FUL	D	10	3	-	-	0/1/1/1
3	NAG	D	2	3	-	3/6/23/26	0/1/1/1
3	BMA	D	3	3	-	0/2/19/22	0/1/1/1
3	MAN	D	4	3	-	1/2/19/22	0/1/1/1
3	NAG	D	5	3	-	6/6/23/26	0/1/1/1
3	GAL	D	6	3	-	2/2/19/22	0/1/1/1
3	SIA	D	7	3	-	6/18/34/38	0/1/1/1
3	MAN	D	8	3	-	2/2/19/22	0/1/1/1
3	NAG	D	9	3	-	4/6/23/26	0/1/1/1
4	NAG	E	1	1,4	-	6/6/23/26	0/1/1/1
4	GAL	E	10	4	-	2/2/19/22	0/1/1/1
4	SIA	E	11	4	-	13/18/34/38	0/1/1/1
4	FUL	E	12	4	-	-	0/1/1/1
4	NAG	E	2	4	-	5/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BMA	E	3	4	-	2/2/19/22	0/1/1/1
4	MAN	E	4	4	-	2/2/19/22	0/1/1/1
4	NAG	E	5	4	-	4/6/23/26	0/1/1/1
4	GAL	E	6	4	-	1/2/19/22	0/1/1/1
4	SIA	E	7	4	-	4/18/34/38	0/1/1/1
4	MAN	E	8	4	-	2/2/19/22	0/1/1/1
4	NAG	E	9	4	-	5/6/23/26	0/1/1/1
5	NDG	F	1	5	-	4/6/23/26	0/1/1/1
5	NAG	F	2	5	-	4/6/23/26	0/1/1/1
5	MAN	F	3	5	-	1/2/19/22	0/1/1/1
5	BMA	F	4	5	-	1/2/19/22	0/1/1/1
5	MAN	F	5	5	-	2/2/19/22	0/1/1/1
5	FUL	F	6	5	-	-	0/1/1/1

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	7	SIA	C2-C1	3.98	1.56	1.52
4	E	11	SIA	C7-C6	3.72	1.57	1.53
4	E	11	SIA	C2-C1	3.72	1.55	1.52
4	E	3	BMA	C2-C3	3.45	1.57	1.52
3	D	4	MAN	C2-C3	2.93	1.56	1.52

The worst 5 of 36 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	3	MAN	C1-C2-C3	5.17	116.02	109.67
4	E	5	NAG	C4-C3-C2	-4.95	103.76	111.02
4	E	5	NAG	C2-N2-C7	-3.79	117.50	122.90
4	E	3	BMA	C1-C2-C3	3.79	114.32	109.67
5	F	5	MAN	C1-C2-C3	3.72	114.24	109.67

There are no chirality outliers.

5 of 85 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	2	NAG	C8-C7-N2-C2
3	D	2	NAG	O7-C7-N2-C2
3	D	5	NAG	C8-C7-N2-C2

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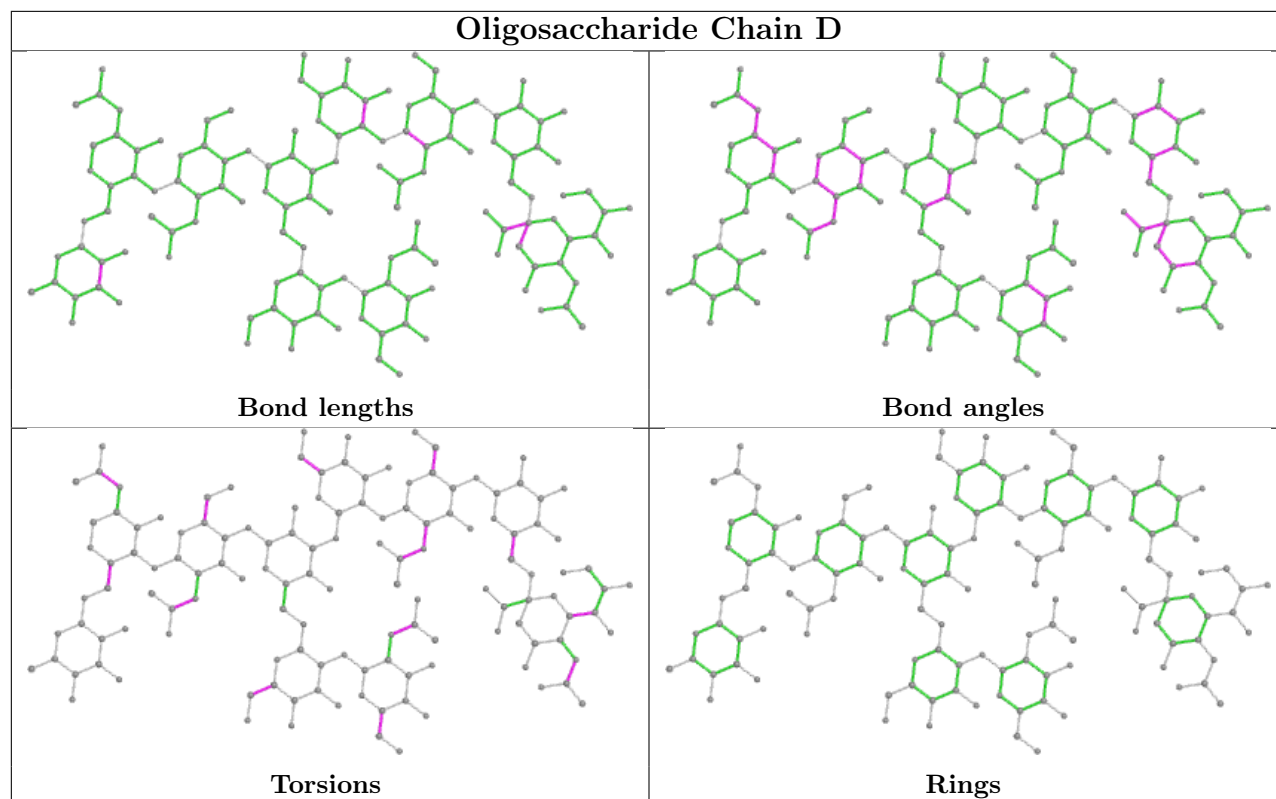
Mol	Chain	Res	Type	Atoms
3	D	5	NAG	O7-C7-N2-C2
3	D	7	SIA	C5-C6-C7-C8

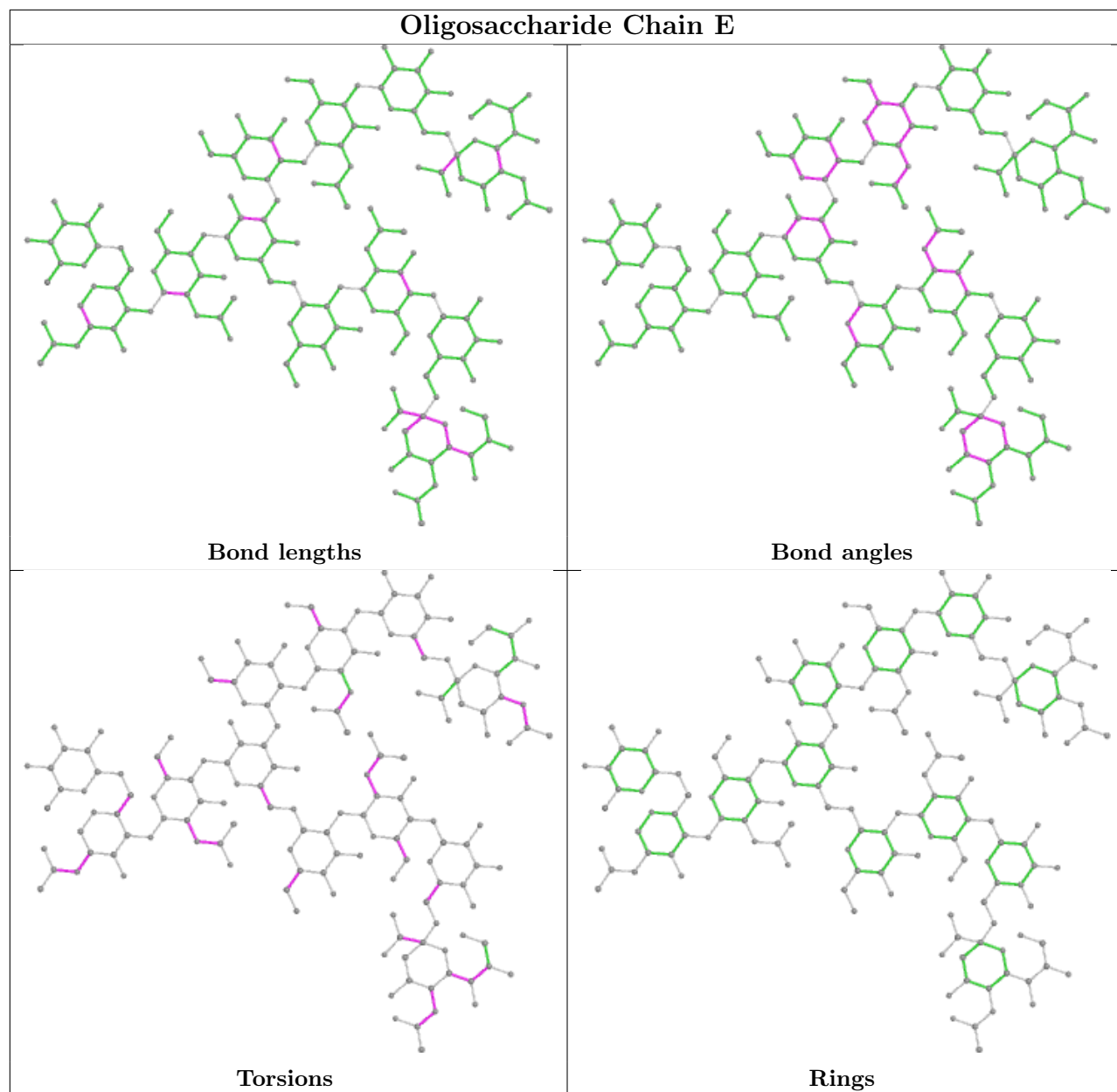
There are no ring outliers.

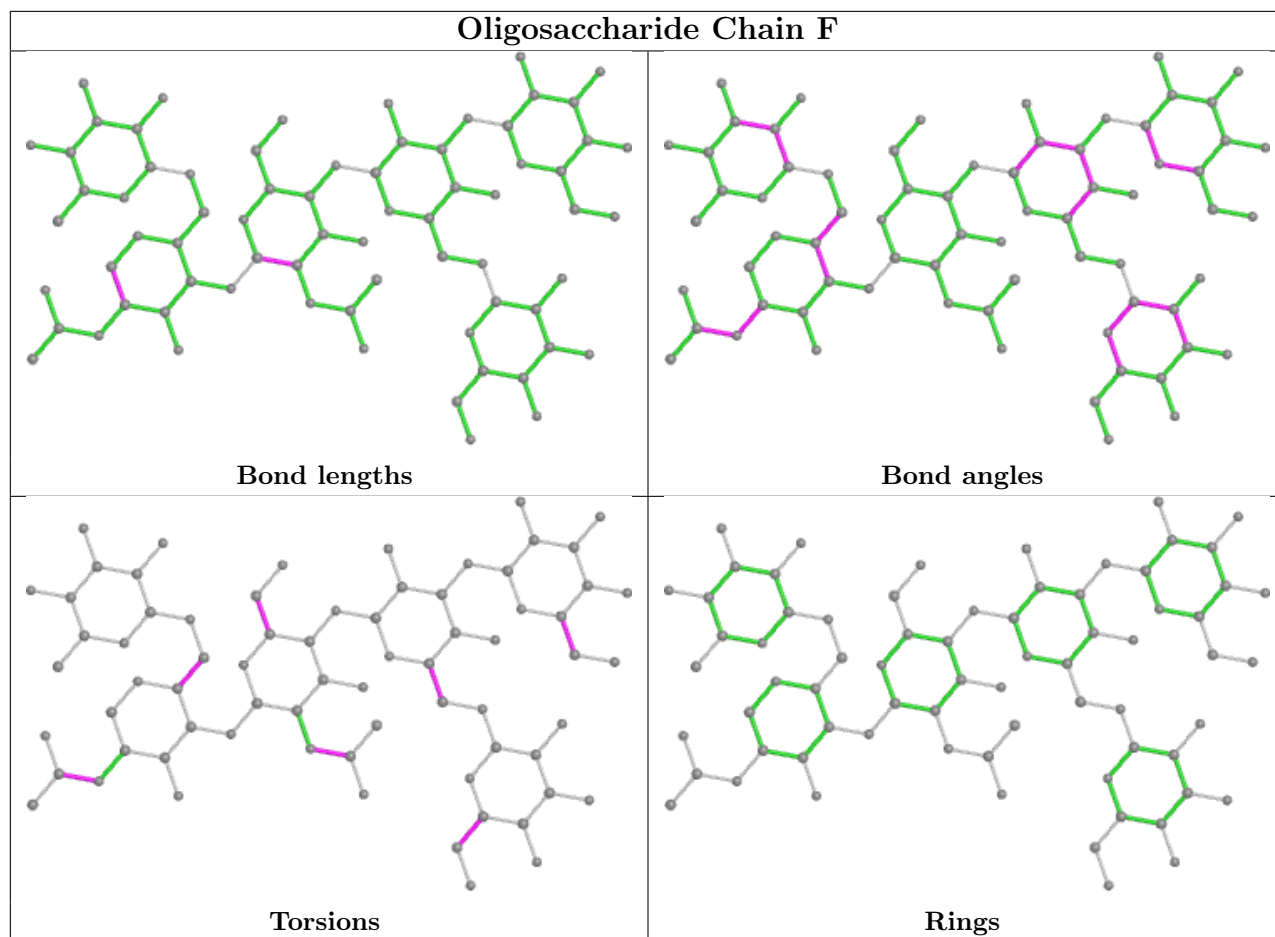
23 monomers are involved in 55 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	8	MAN	2	0
3	D	5	NAG	5	0
3	D	10	FUL	1	0
3	D	9	NAG	2	0
4	E	9	NAG	3	0
4	E	8	MAN	2	0
3	D	6	GAL	3	0
5	F	6	FUL	9	0
4	E	1	NAG	4	0
4	E	4	MAN	6	0
3	D	2	NAG	5	0
5	F	1	NDG	4	0
5	F	2	NAG	13	0
4	E	6	GAL	1	0
3	D	4	MAN	2	0
4	E	5	NAG	12	0
4	E	10	GAL	1	0
4	E	12	FUL	4	0
4	E	7	SIA	1	0
4	E	11	SIA	1	0
5	F	3	MAN	2	0
3	D	7	SIA	4	0
4	E	2	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](#)

5 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	GOL	B	601	-	5,5,5	4.41	5 (100%)	5,5,5	4.36	3 (60%)
6	GOL	A	600	-	5,5,5	4.39	5 (100%)	5,5,5	4.35	3 (60%)
6	GOL	B	603	-	5,5,5	4.47	5 (100%)	5,5,5	4.34	3 (60%)
7	NAG	C	206	2	14,14,15	0.53	0	17,19,21	0.63	0
6	GOL	B	602	-	5,5,5	4.49	5 (100%)	5,5,5	4.31	3 (60%)

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	GOL	B	601	-	-	2/4/4/4	-
6	GOL	A	600	-	-	3/4/4/4	-
6	GOL	B	603	-	-	2/4/4/4	-
7	NAG	C	206	2	-	3/6/23/26	0/1/1/1
6	GOL	B	602	-	-	2/4/4/4	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	602	GOL	C3-C2	-7.31	1.21	1.51
6	B	603	GOL	C3-C2	-7.26	1.21	1.51
6	B	601	GOL	C3-C2	-7.01	1.22	1.51
6	A	600	GOL	C3-C2	-6.95	1.23	1.51
6	B	603	GOL	O1-C1	4.74	1.62	1.42

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	601	GOL	O3-C3-C2	6.81	142.86	110.20
6	A	600	GOL	O3-C3-C2	6.80	142.82	110.20
6	B	602	GOL	O3-C3-C2	6.77	142.68	110.20
6	B	603	GOL	O3-C3-C2	6.70	142.34	110.20
6	B	603	GOL	O2-C2-C3	6.35	137.07	109.12

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	600	GOL	C1-C2-C3-O3
6	B	601	GOL	O1-C1-C2-C3
6	B	601	GOL	C1-C2-C3-O3
6	B	602	GOL	C1-C2-C3-O3
6	B	603	GOL	O1-C1-C2-C3

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	601	GOL	3	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, 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	214/214 (100%)	-0.48	0 <b>100</b>   <b>100</b>	1, 28, 70, 118	0
1	B	214/214 (100%)	-0.27	1 (0%) <b>91</b>   <b>87</b>	1, 33, 72, 108	0
2	C	167/167 (100%)	-0.29	1 (0%) <b>89</b>   <b>85</b>	1, 35, 76, 113	0
All	All	595/595 (100%)	-0.35	2 (0%) <b>94</b>   <b>91</b>	1, 31, 74, 118	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	299	THR	3.0
2	C	30	GLN	2.1

### 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	SIA	D	7	20/21	0.74	0.34	59,92,97,98	0
4	SIA	E	11	20/21	<b>0.77</b>	<b>0.45</b>	51,51,138,142	0
3	GAL	D	6	11/12	0.79	0.37	81,81,82,82	0
3	FUL	D	10	10/11	0.81	0.46	65,65,71,81	0
4	NAG	E	2	14/15	0.81	0.23	36,43,59,75	0
4	BMA	E	3	11/12	0.81	0.25	54,54,96,141	0

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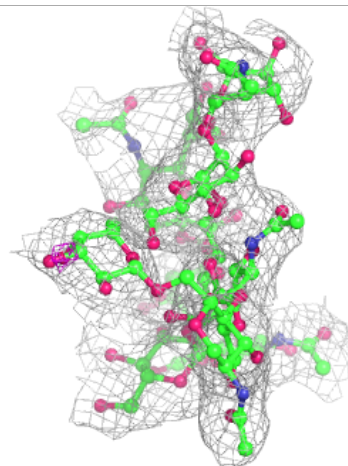
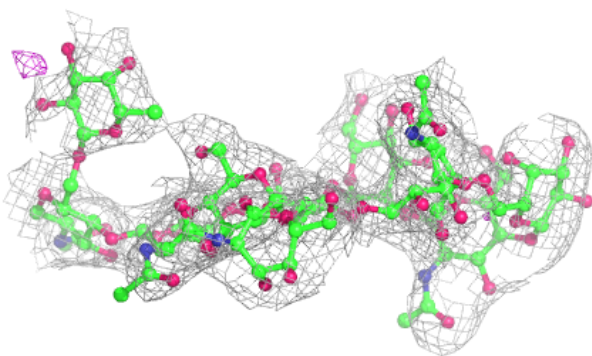
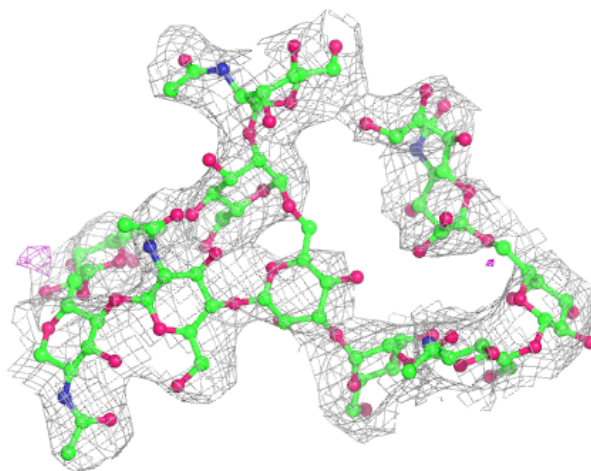
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	NAG	D	2	14/15	0.81	0.31	25,29,53,63	0
4	MAN	E	4	11/12	0.82	0.25	37,87,96,106	0
3	MAN	D	4	11/12	0.82	0.21	15,55,56,56	0
5	MAN	F	5	11/12	0.82	0.27	42,52,64,68	0
5	FUL	F	6	10/11	0.82	0.29	69,69,69,69	0
4	MAN	E	8	11/12	0.83	0.28	65,65,65,65	0
4	SIA	E	7	20/21	0.83	0.26	40,40,64,64	0
3	NAG	D	5	14/15	0.84	0.22	86,86,87,87	0
3	NDG	D	1	14/15	0.84	0.32	36,36,112,112	0
4	GAL	E	6	11/12	0.85	0.27	46,131,132,132	0
4	NAG	E	1	14/15	0.85	0.22	22,71,80,86	0
5	NDG	F	1	14/15	0.86	0.22	26,27,62,62	0
4	GAL	E	10	11/12	0.87	0.32	31,71,72,72	0
4	NAG	E	9	14/15	0.88	0.18	34,47,69,71	0
5	MAN	F	3	11/12	0.89	0.17	68,78,90,94	0
5	BMA	F	4	11/12	0.89	0.23	71,82,94,98	0
4	FUL	E	12	10/11	0.89	0.21	11,21,32,43	0
3	BMA	D	3	11/12	0.89	0.40	68,78,90,94	0
4	NAG	E	5	14/15	0.90	0.15	1,1,1,1	0
5	NAG	F	2	14/15	0.90	0.26	24,81,82,82	0
3	NAG	D	9	14/15	0.90	0.21	17,17,17,62	0
3	MAN	D	8	11/12	0.92	0.25	41,41,67,68	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.



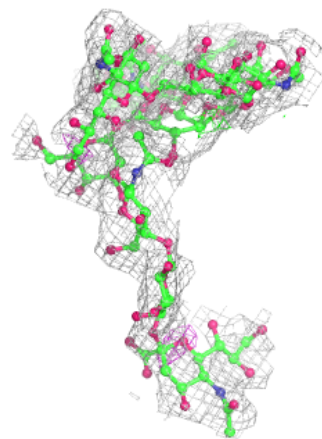
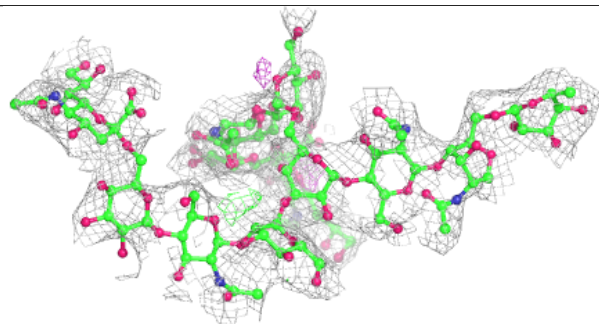
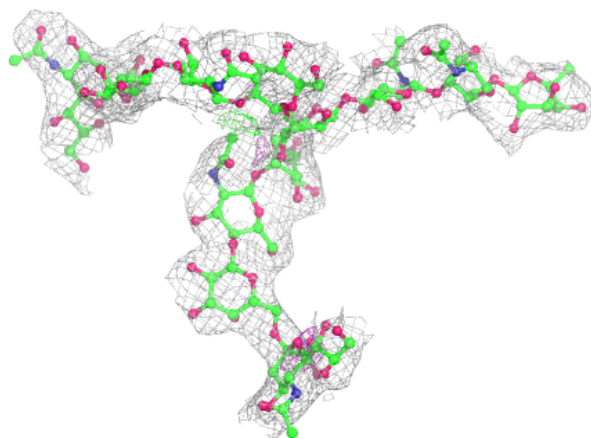
**Electron density around Chain D:**

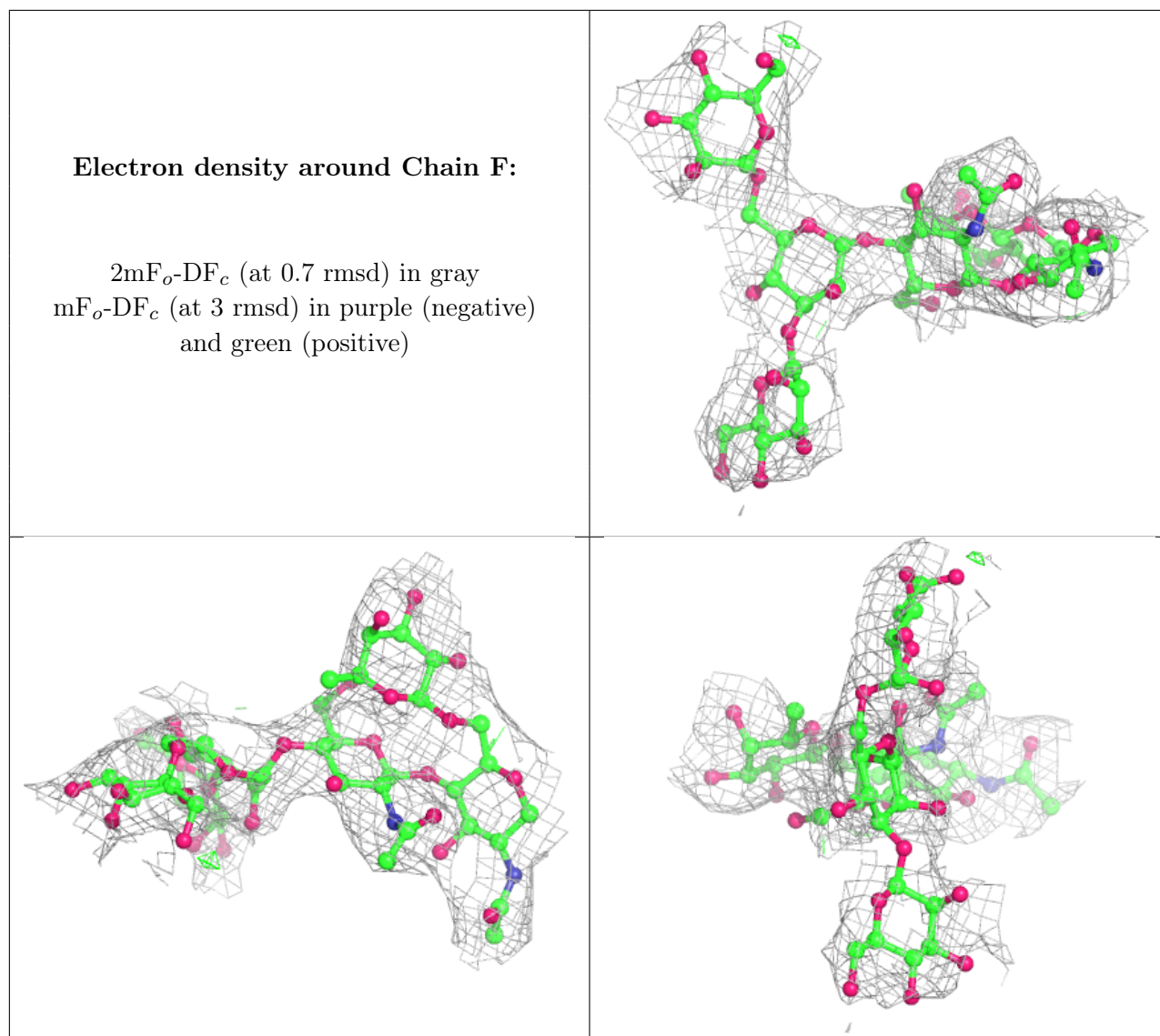
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain 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, 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
6	GOL	B	603	6/6	0.66	0.36	23,26,27,31	0
6	GOL	B	602	6/6	0.86	0.23	23,26,27,31	0
7	NAG	C	206	14/15	0.86	0.28	57,61,63,65	0
6	GOL	A	600	6/6	0.87	0.25	23,26,27,31	0
6	GOL	B	601	6/6	0.89	0.27	23,26,27,31	0

## 6.5 Other polymers

There are no such residues in this entry.