



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 4, 2023 – 02:08 AM EDT

PDB ID : 6PQL  
Title : SBP RafE in complex with raffinose  
Authors : Meier, E.P.W.; Boraston, A.B.  
Deposited on : 2019-07-09  
Resolution : 2.65 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

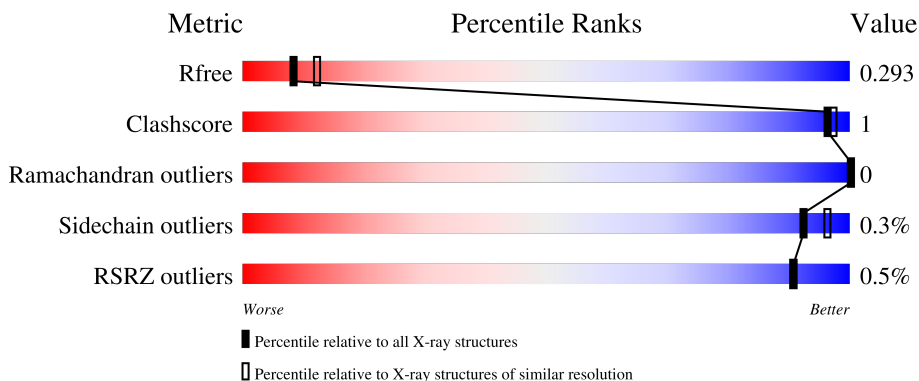
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.65 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	1332 (2.68-2.64)
Clashscore	141614	1374 (2.68-2.64)
Ramachandran outliers	138981	1349 (2.68-2.64)
Sidechain outliers	138945	1349 (2.68-2.64)
RSRZ outliers	127900	1318 (2.68-2.64)

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	416	 90% 7%
1	B	416	 88% 8%
1	C	416	 91% 7%
1	D	416	 89% 8%
2	E	3	 33% 67%

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Mol	Chain	Length	Quality of chain
2	F	3	 33% 67%
2	G	3	 67% 33%
2	H	3	 67% 33%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 12164 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 ABC transporter sugar-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	385	2968	1895	486	576	11	0	0	0
1	B	384	2967	1894	485	577	11	0	0	0
1	C	385	2972	1896	485	580	11	0	0	0
1	D	384	2882	1836	470	565	11	0	0	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4	MET	-	initiating methionine	UNP A0A0E8ZWG6
A	5	GLY	-	expression tag	UNP A0A0E8ZWG6
A	6	SER	-	expression tag	UNP A0A0E8ZWG6
A	7	SER	-	expression tag	UNP A0A0E8ZWG6
A	8	HIS	-	expression tag	UNP A0A0E8ZWG6
A	9	HIS	-	expression tag	UNP A0A0E8ZWG6
A	10	HIS	-	expression tag	UNP A0A0E8ZWG6
A	11	HIS	-	expression tag	UNP A0A0E8ZWG6
A	12	HIS	-	expression tag	UNP A0A0E8ZWG6
A	13	HIS	-	expression tag	UNP A0A0E8ZWG6
A	14	SER	-	expression tag	UNP A0A0E8ZWG6
A	15	SER	-	expression tag	UNP A0A0E8ZWG6
A	16	GLY	-	expression tag	UNP A0A0E8ZWG6
A	17	LEU	-	expression tag	UNP A0A0E8ZWG6
A	18	VAL	-	expression tag	UNP A0A0E8ZWG6
A	19	PRO	-	expression tag	UNP A0A0E8ZWG6
A	20	ARG	-	expression tag	UNP A0A0E8ZWG6
A	21	GLY	-	expression tag	UNP A0A0E8ZWG6
A	22	SER	-	expression tag	UNP A0A0E8ZWG6
A	23	HIS	-	expression tag	UNP A0A0E8ZWG6
B	4	MET	-	initiating methionine	UNP A0A0E8ZWG6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	5	GLY	-	expression tag	UNP A0A0E8ZWG6
B	6	SER	-	expression tag	UNP A0A0E8ZWG6
B	7	SER	-	expression tag	UNP A0A0E8ZWG6
B	8	HIS	-	expression tag	UNP A0A0E8ZWG6
B	9	HIS	-	expression tag	UNP A0A0E8ZWG6
B	10	HIS	-	expression tag	UNP A0A0E8ZWG6
B	11	HIS	-	expression tag	UNP A0A0E8ZWG6
B	12	HIS	-	expression tag	UNP A0A0E8ZWG6
B	13	HIS	-	expression tag	UNP A0A0E8ZWG6
B	14	SER	-	expression tag	UNP A0A0E8ZWG6
B	15	SER	-	expression tag	UNP A0A0E8ZWG6
B	16	GLY	-	expression tag	UNP A0A0E8ZWG6
B	17	LEU	-	expression tag	UNP A0A0E8ZWG6
B	18	VAL	-	expression tag	UNP A0A0E8ZWG6
B	19	PRO	-	expression tag	UNP A0A0E8ZWG6
B	20	ARG	-	expression tag	UNP A0A0E8ZWG6
B	21	GLY	-	expression tag	UNP A0A0E8ZWG6
B	22	SER	-	expression tag	UNP A0A0E8ZWG6
B	23	HIS	-	expression tag	UNP A0A0E8ZWG6
C	4	MET	-	initiating methionine	UNP A0A0E8ZWG6
C	5	GLY	-	expression tag	UNP A0A0E8ZWG6
C	6	SER	-	expression tag	UNP A0A0E8ZWG6
C	7	SER	-	expression tag	UNP A0A0E8ZWG6
C	8	HIS	-	expression tag	UNP A0A0E8ZWG6
C	9	HIS	-	expression tag	UNP A0A0E8ZWG6
C	10	HIS	-	expression tag	UNP A0A0E8ZWG6
C	11	HIS	-	expression tag	UNP A0A0E8ZWG6
C	12	HIS	-	expression tag	UNP A0A0E8ZWG6
C	13	HIS	-	expression tag	UNP A0A0E8ZWG6
C	14	SER	-	expression tag	UNP A0A0E8ZWG6
C	15	SER	-	expression tag	UNP A0A0E8ZWG6
C	16	GLY	-	expression tag	UNP A0A0E8ZWG6
C	17	LEU	-	expression tag	UNP A0A0E8ZWG6
C	18	VAL	-	expression tag	UNP A0A0E8ZWG6
C	19	PRO	-	expression tag	UNP A0A0E8ZWG6
C	20	ARG	-	expression tag	UNP A0A0E8ZWG6
C	21	GLY	-	expression tag	UNP A0A0E8ZWG6
C	22	SER	-	expression tag	UNP A0A0E8ZWG6
C	23	HIS	-	expression tag	UNP A0A0E8ZWG6
D	4	MET	-	initiating methionine	UNP A0A0E8ZWG6
D	5	GLY	-	expression tag	UNP A0A0E8ZWG6
D	6	SER	-	expression tag	UNP A0A0E8ZWG6

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Chain	Residue	Modelled	Actual	Comment	Reference
D	7	SER	-	expression tag	UNP A0A0E8ZWG6
D	8	HIS	-	expression tag	UNP A0A0E8ZWG6
D	9	HIS	-	expression tag	UNP A0A0E8ZWG6
D	10	HIS	-	expression tag	UNP A0A0E8ZWG6
D	11	HIS	-	expression tag	UNP A0A0E8ZWG6
D	12	HIS	-	expression tag	UNP A0A0E8ZWG6
D	13	HIS	-	expression tag	UNP A0A0E8ZWG6
D	14	SER	-	expression tag	UNP A0A0E8ZWG6
D	15	SER	-	expression tag	UNP A0A0E8ZWG6
D	16	GLY	-	expression tag	UNP A0A0E8ZWG6
D	17	LEU	-	expression tag	UNP A0A0E8ZWG6
D	18	VAL	-	expression tag	UNP A0A0E8ZWG6
D	19	PRO	-	expression tag	UNP A0A0E8ZWG6
D	20	ARG	-	expression tag	UNP A0A0E8ZWG6
D	21	GLY	-	expression tag	UNP A0A0E8ZWG6
D	22	SER	-	expression tag	UNP A0A0E8ZWG6
D	23	HIS	-	expression tag	UNP A0A0E8ZWG6

- Molecule 2 is an oligosaccharide called beta-D-fructofuranose-(2-1)-[alpha-D-galactopyranos e-(1-6)]alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
			Total	C	O			
2	E	3	34	18	16	0	0	0
2	F	3	34	18	16	0	0	0
2	G	3	34	18	16	0	0	0
2	H	3	34	18	16	0	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	69	69	69	0	0
3	B	62	62	62	0	0

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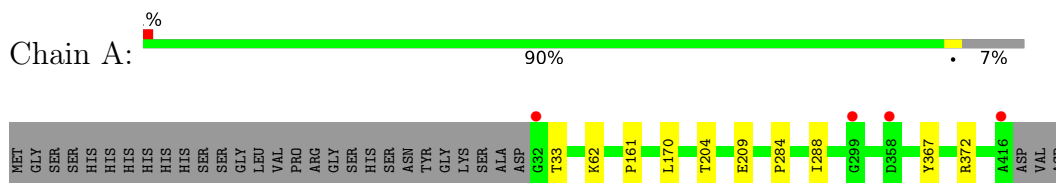
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
3	C	64	Total 64	O 64	0	0
3	D	44	Total 44	O 44	0	0

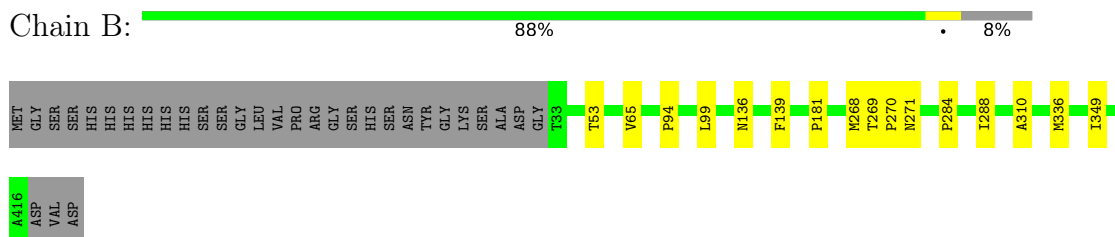
### 3 Residue-property plots [i](#)

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.

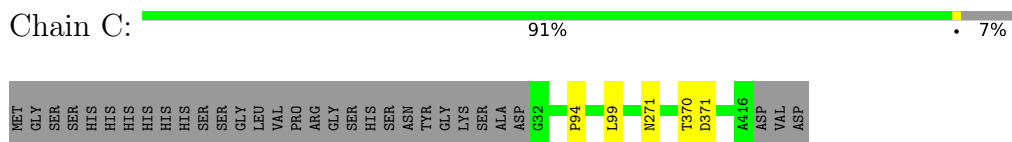
- Molecule 1: ABC transporter sugar-binding protein



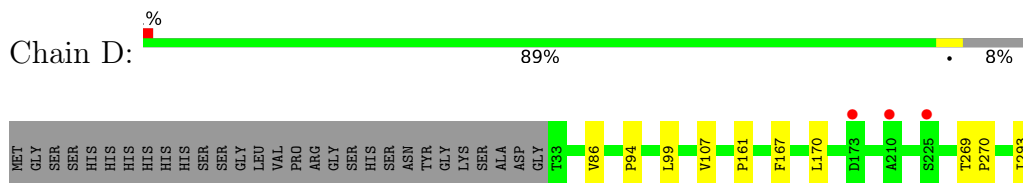
- Molecule 1: ABC transporter sugar-binding protein



- Molecule 1: ABC transporter sugar-binding protein



- Molecule 1: ABC transporter sugar-binding protein



- Molecule 2: beta-D-fructofuranose-(2-1)-[alpha-D-galactopyranose-(1-6)]alpha-D-glucopyranose







- Molecule 2: beta-D-fructofuranose-(2-1)-[alpha-D-galactopyranose-(1-6)]alpha-D-glucopyranose

Chain F:



- Molecule 2: beta-D-fructofuranose-(2-1)-[alpha-D-galactopyranose-(1-6)]alpha-D-glucopyranose

Chain G:



- Molecule 2: beta-D-fructofuranose-(2-1)-[alpha-D-galactopyranose-(1-6)]alpha-D-glucopyranose

Chain H:



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	48.86Å 145.82Å 118.68Å 90.00° 92.64° 90.00°	Depositor
Resolution (Å)	29.66 – 2.65 29.64 – 2.65	Depositor EDS
% Data completeness (in resolution range)	98.1 (29.66-2.65) 85.9 (29.64-2.65)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.47 (at 2.64Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, $R_{free}$	0.248 , 0.293 0.247 , 0.293	Depositor DCC
$R_{free}$ test set	2363 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	43.9	Xtrriage
Anisotropy	0.099	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 2.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.145 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	12164	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	40.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.02% 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: GLC, FRU, GLA

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	0.24	0/3038	0.47	0/4138
1	B	0.24	0/3037	0.47	0/4137
1	C	0.24	0/3042	0.47	0/4144
1	D	0.24	0/2952	0.47	0/4033
All	All	0.24	0/12069	0.47	0/16452

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	2968	0	2817	5	0
1	B	2967	0	2816	8	0
1	C	2972	0	2814	3	0
1	D	2882	0	2620	6	0
2	E	34	0	30	0	0
2	F	34	0	30	0	0
2	G	34	0	30	0	0
2	H	34	0	30	0	0
3	A	69	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	62	0	0	0	0
3	C	64	0	0	0	0
3	D	44	0	0	0	0
All	All	12164	0	11187	22	0

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 1.

All (22) 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:C:94:PRO:HA	1:C:99:LEU:HD22	1.79	0.65
1:A:284:PRO:HG2	1:A:288:ILE:HD11	1.88	0.55
1:A:367:TYR:HB3	1:A:372:ARG:HB2	1.89	0.54
1:A:33:THR:HG22	1:A:62:LYS:HA	1.92	0.51
1:B:136:ASN:OD1	1:B:310:ALA:HB1	2.12	0.50
1:D:94:PRO:HA	1:D:99:LEU:HD22	1.94	0.48
1:B:94:PRO:HA	1:B:99:LEU:HD22	1.97	0.46
1:B:181:PRO:O	1:B:268:MET:N	2.48	0.45
1:B:336:MET:HE3	1:B:349:ILE:HG13	1.99	0.44
1:D:86:VAL:HG21	1:D:107:VAL:HG13	1.99	0.44
1:B:284:PRO:HG3	1:B:288:ILE:HD11	2.00	0.43
1:B:139:PHE:HB3	1:B:336:MET:CE	2.48	0.43
1:A:161:PRO:HD3	1:A:170:LEU:HD22	2.01	0.42
1:C:370:THR:HG22	1:C:371:ASP:N	2.34	0.42
1:D:386:ASP:HB2	1:D:410:PHE:CD2	2.55	0.42
1:D:269:THR:HA	1:D:270:PRO:HD3	1.92	0.42
1:B:53:THR:HG23	1:B:65:VAL:HB	2.01	0.41
1:B:269:THR:HA	1:B:270:PRO:HD3	1.92	0.41
1:A:204:THR:HB	1:A:209:GLU:HB3	2.02	0.41
1:D:293:ILE:HA	1:D:294:PRO:HD3	1.91	0.41
1:C:370:THR:HG22	1:C:371:ASP:H	1.86	0.40
1:D:161:PRO:HD3	1:D:170:LEU:HD22	2.02	0.40

There are no symmetry-related clashes.

## 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	383/416 (92%)	371 (97%)	12 (3%)	0	100	100
1	B	382/416 (92%)	372 (97%)	10 (3%)	0	100	100
1	C	383/416 (92%)	373 (97%)	10 (3%)	0	100	100
1	D	382/416 (92%)	366 (96%)	16 (4%)	0	100	100
All	All	1530/1664 (92%)	1482 (97%)	48 (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	302/346 (87%)	302 (100%)	0	100	100
1	B	303/346 (88%)	302 (100%)	1 (0%)	92	96
1	C	303/346 (88%)	302 (100%)	1 (0%)	92	96
1	D	277/346 (80%)	276 (100%)	1 (0%)	91	95
All	All	1185/1384 (86%)	1182 (100%)	3 (0%)	92	96

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	271	ASN
1	C	271	ASN
1	D	167	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

12 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GLC	E	1	2	11,11,12	0.37	0	15,15,17	1.15	1 (6%)
2	FRU	E	2	2	11,12,12	0.70	1 (9%)	10,18,18	0.66	0
2	GLA	E	3	2	11,11,12	0.38	0	15,15,17	0.69	0
2	GLC	F	1	2	11,11,12	0.30	0	15,15,17	1.18	1 (6%)
2	FRU	F	2	2	11,12,12	0.71	1 (9%)	10,18,18	0.57	0
2	GLA	F	3	2	11,11,12	0.38	0	15,15,17	0.71	0
2	GLC	G	1	2	11,11,12	0.33	0	15,15,17	1.12	1 (6%)
2	FRU	G	2	2	11,12,12	0.68	0	10,18,18	0.64	0
2	GLA	G	3	2	11,11,12	0.36	0	15,15,17	0.77	0
2	GLC	H	1	2	11,11,12	0.34	0	15,15,17	1.03	1 (6%)
2	FRU	H	2	2	11,12,12	0.65	0	10,18,18	0.64	0
2	GLA	H	3	2	11,11,12	0.40	0	15,15,17	0.80	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	E	1	2	-	0/2/19/22	0/1/1/1
2	FRU	E	2	2	-	0/5/24/24	0/1/1/1
2	GLA	E	3	2	-	1/2/19/22	0/1/1/1
2	GLC	F	1	2	-	0/2/19/22	0/1/1/1
2	FRU	F	2	2	-	0/5/24/24	0/1/1/1
2	GLA	F	3	2	-	2/2/19/22	0/1/1/1
2	GLC	G	1	2	-	1/2/19/22	0/1/1/1
2	FRU	G	2	2	-	0/5/24/24	0/1/1/1
2	GLA	G	3	2	-	2/2/19/22	0/1/1/1
2	GLC	H	1	2	-	1/2/19/22	0/1/1/1
2	FRU	H	2	2	-	5/5/24/24	0/1/1/1
2	GLA	H	3	2	-	2/2/19/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	2	FRU	O2-C2	2.09	1.44	1.40
2	E	2	FRU	O2-C2	2.03	1.44	1.40

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	1	GLC	C1-O5-C5	3.34	116.72	112.19
2	E	1	GLC	C1-O5-C5	3.32	116.69	112.19
2	G	1	GLC	C1-O5-C5	2.91	116.14	112.19
2	H	1	GLC	C1-O5-C5	2.78	115.95	112.19

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	H	2	FRU	O1-C1-C2-O2
2	H	2	FRU	O1-C1-C2-O5
2	H	2	FRU	C4-C5-C6-O6
2	H	2	FRU	O5-C5-C6-O6
2	H	2	FRU	O1-C1-C2-C3
2	F	3	GLA	C4-C5-C6-O6
2	G	3	GLA	C4-C5-C6-O6
2	F	3	GLA	O5-C5-C6-O6
2	G	3	GLA	O5-C5-C6-O6
2	H	3	GLA	C4-C5-C6-O6

*Continued on next page...*

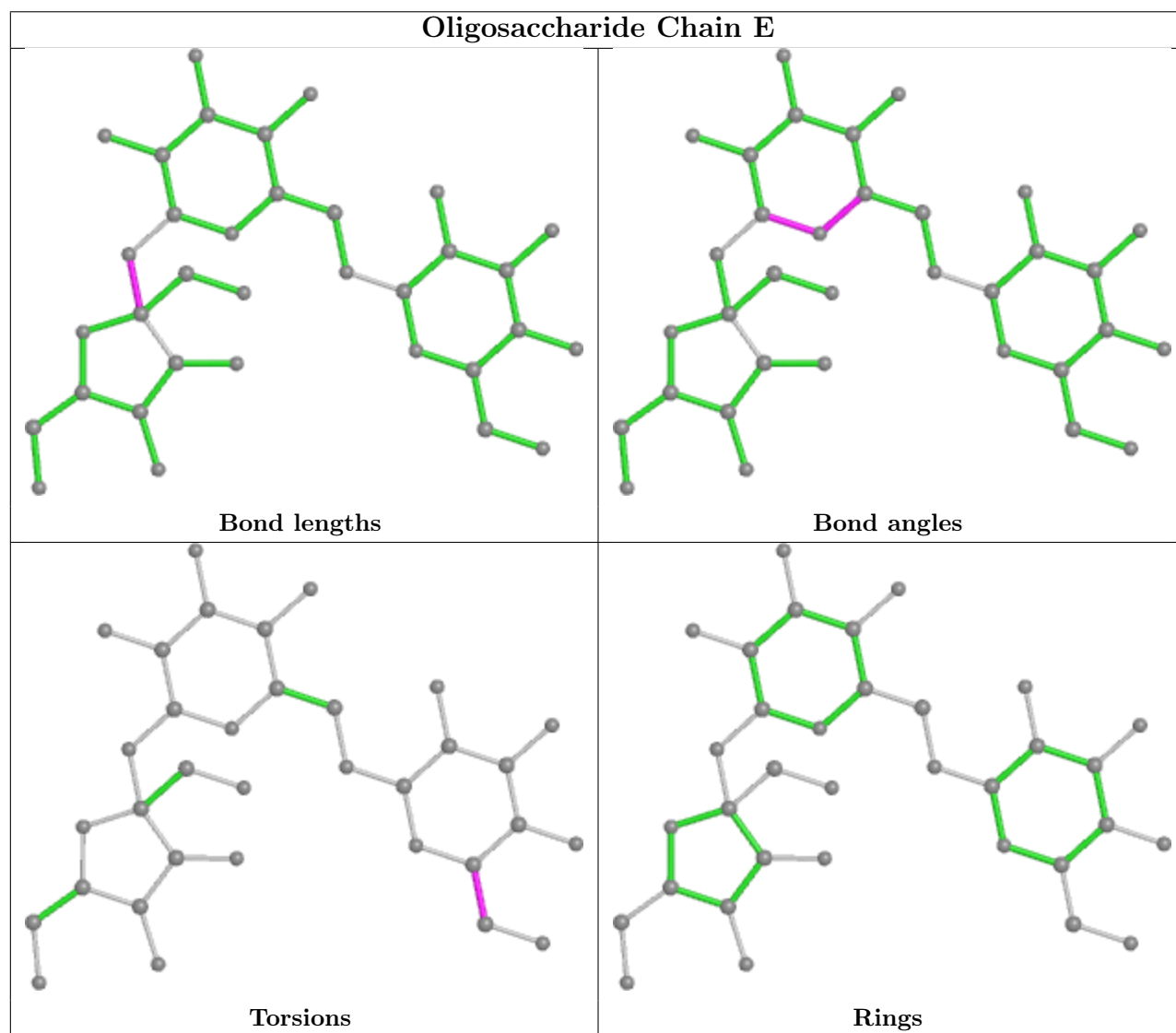
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Mol	Chain	Res	Type	Atoms
2	E	3	GLA	C4-C5-C6-O6
2	G	1	GLC	C4-C5-C6-O6
2	H	3	GLA	O5-C5-C6-O6
2	H	1	GLC	C4-C5-C6-O6

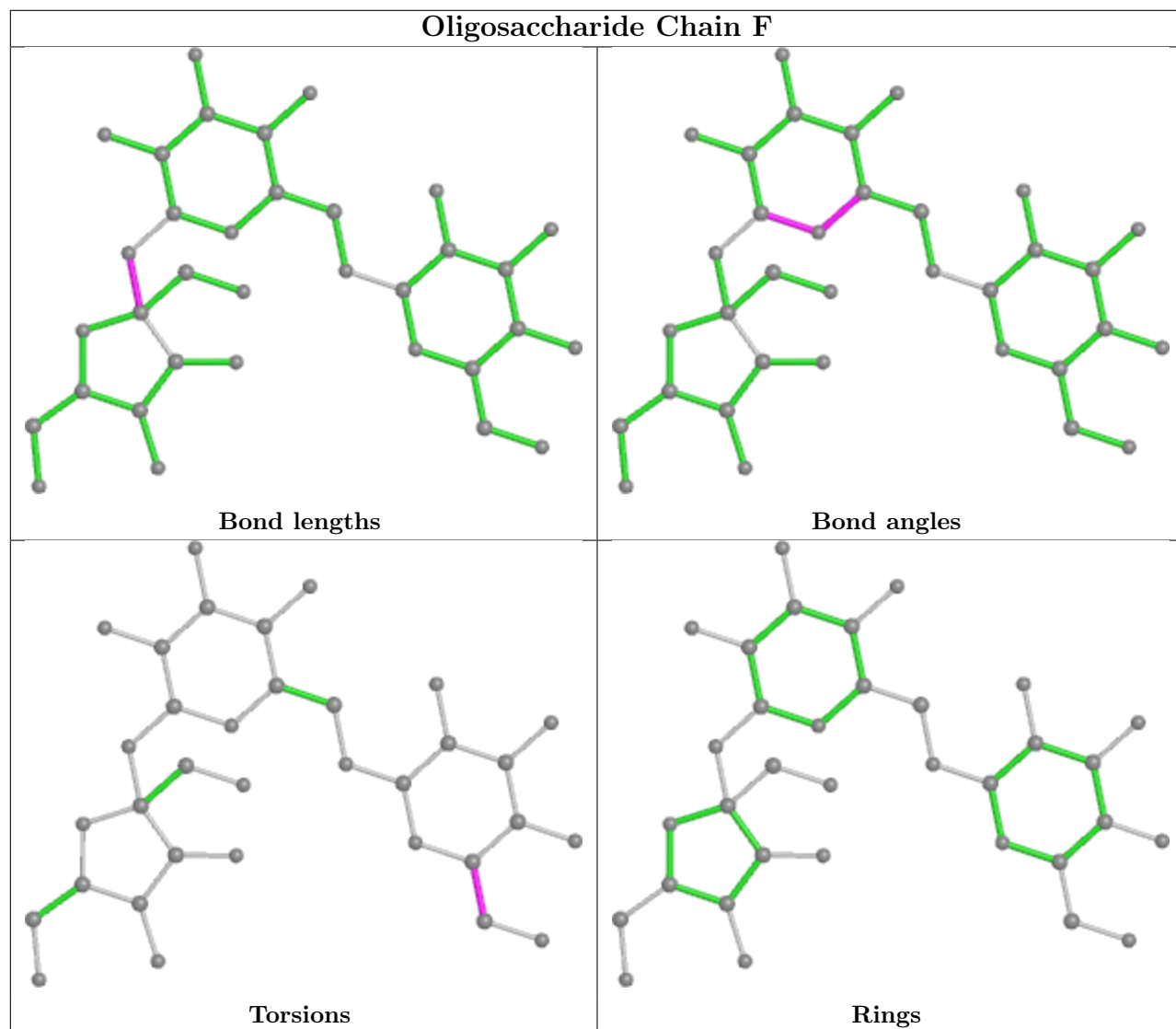
There are no ring outliers.

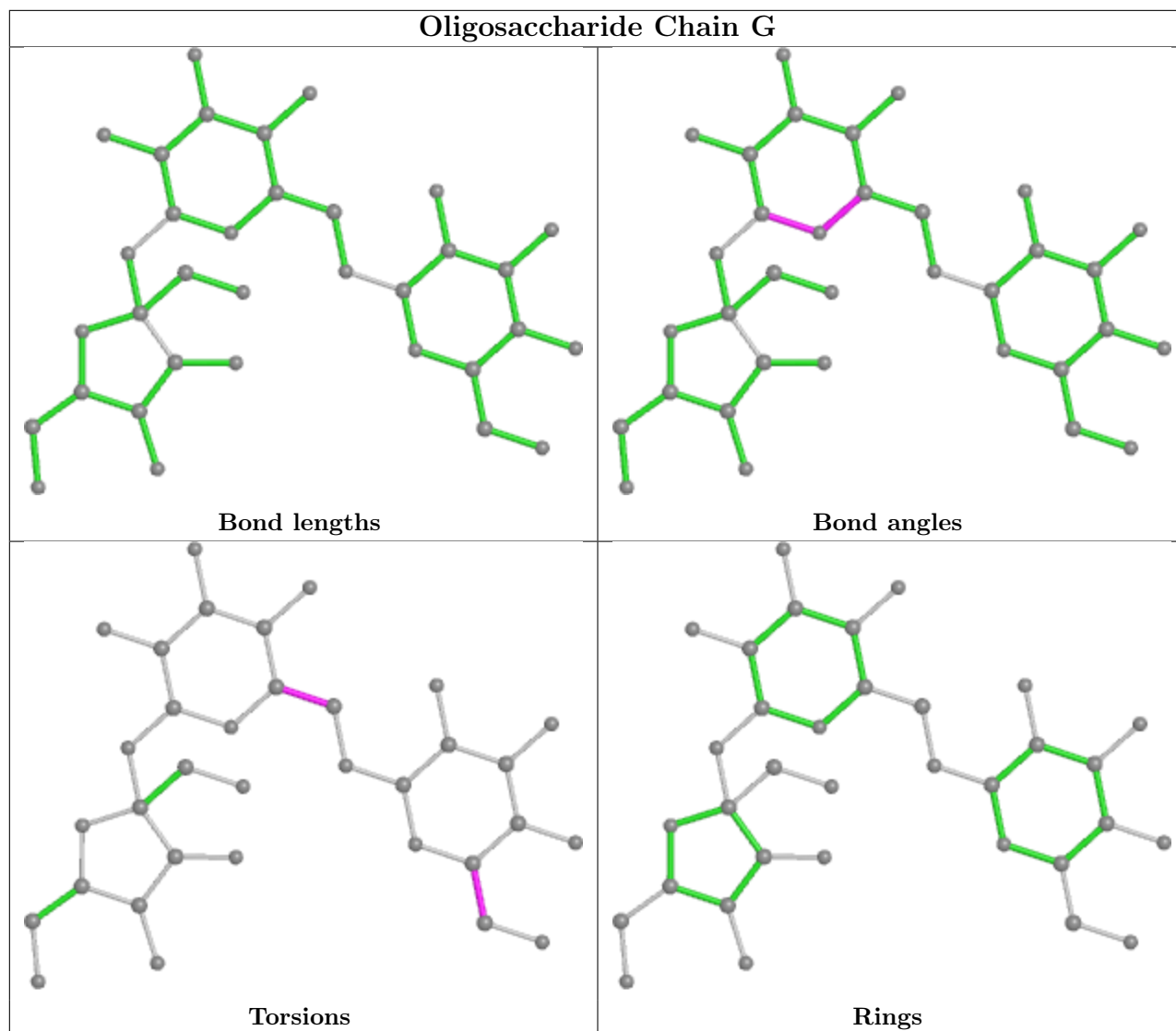
No monomer is involved in short contacts.

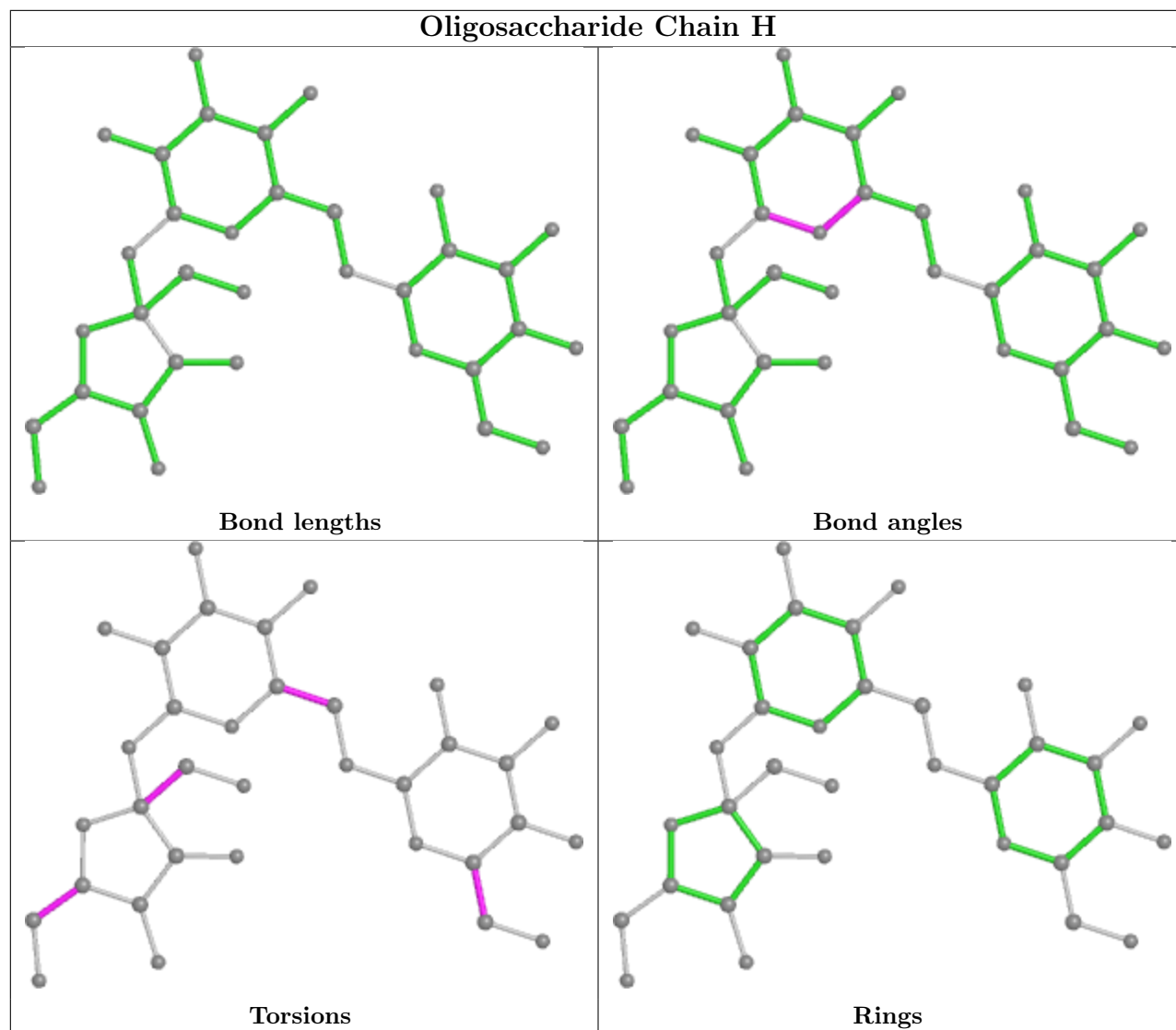
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 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 [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	385/416 (92%)	-0.23	4 (1%) 82   81	26, 36, 47, 56	0
1	B	384/416 (92%)	-0.17	0 100   100	30, 40, 49, 55	0
1	C	385/416 (92%)	-0.20	0 100   100	28, 39, 49, 62	0
1	D	384/416 (92%)	0.06	3 (0%) 86   85	32, 46, 74, 84	0
All	All	1538/1664 (92%)	-0.14	7 (0%) 91   91	26, 40, 61, 84	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	225	SER	4.3
1	A	299	GLY	3.3
1	A	358	ASP	3.1
1	D	173	ASP	2.9
1	A	32	GLY	2.6
1	D	210	ALA	2.2
1	A	416	ALA	2.0

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

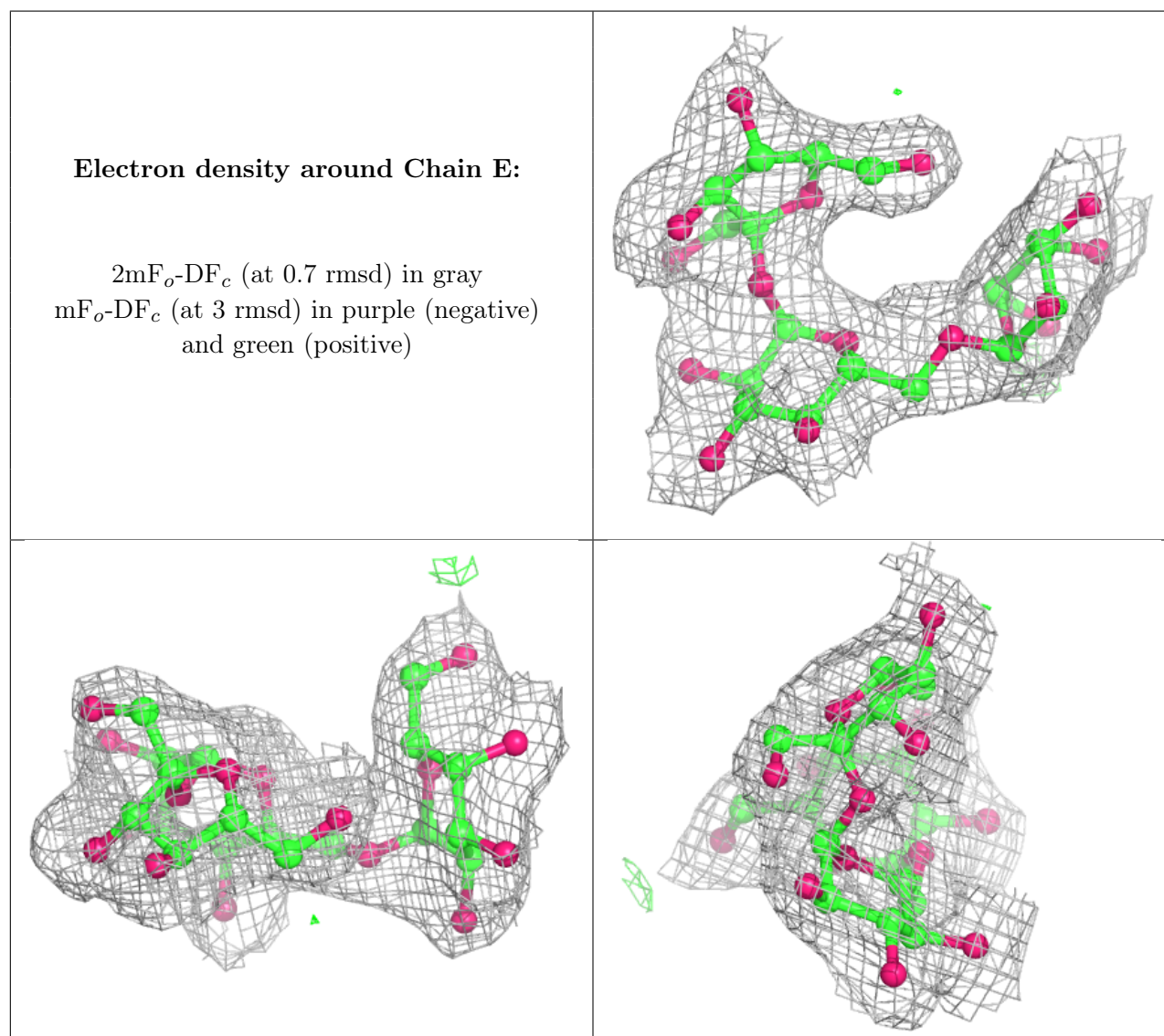
There are no non-standard protein/DNA/RNA residues in this entry.

### 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.

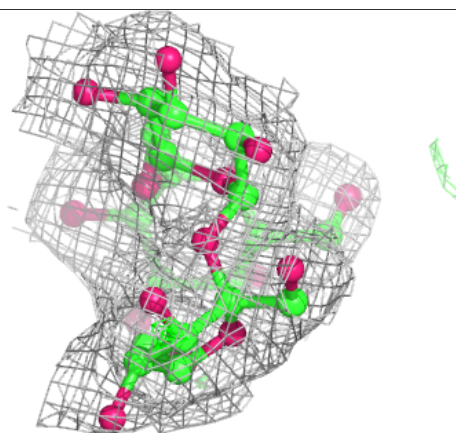
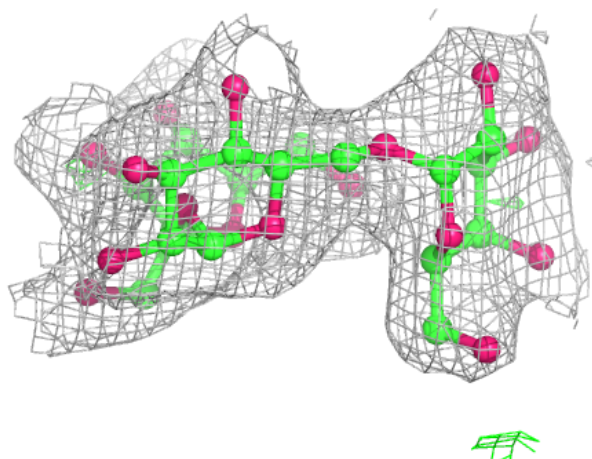
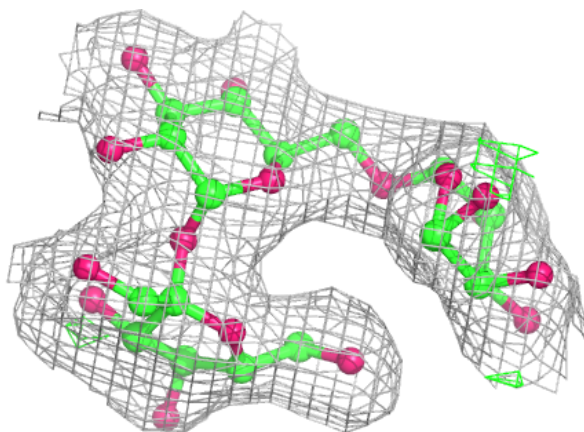
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	FRU	G	2	12/12	0.88	0.16	36,37,37,37	0
2	FRU	H	2	12/12	0.89	0.15	36,36,37,38	0
2	FRU	E	2	12/12	0.90	0.15	31,32,33,33	0
2	FRU	F	2	12/12	0.90	0.15	32,33,33,33	0
2	GLA	F	3	11/12	0.91	0.13	34,34,35,35	0
2	GLA	H	3	11/12	0.92	0.18	37,37,38,39	0
2	GLC	F	1	11/12	0.93	0.17	32,32,33,34	0
2	GLC	E	1	11/12	0.94	0.12	29,30,30,31	0
2	GLC	H	1	11/12	0.94	0.14	36,37,37,37	0
2	GLA	G	3	11/12	0.95	0.15	37,37,37,38	0
2	GLC	G	1	11/12	0.96	0.14	35,36,36,37	0
2	GLA	E	3	11/12	0.96	0.14	29,30,30,30	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.



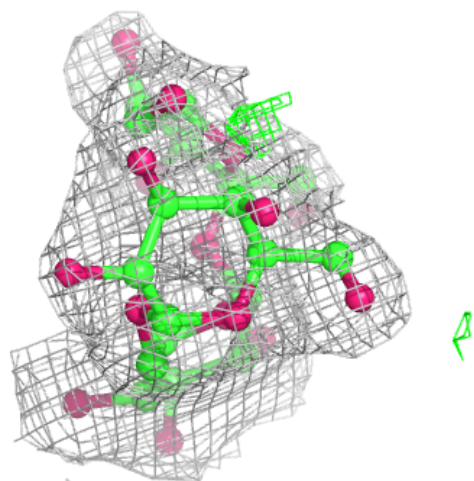
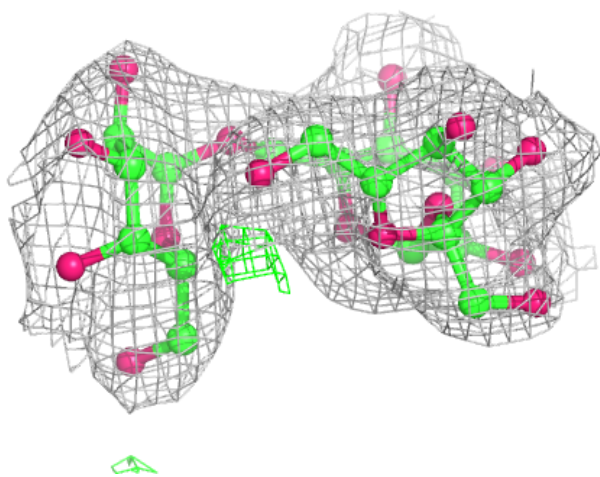
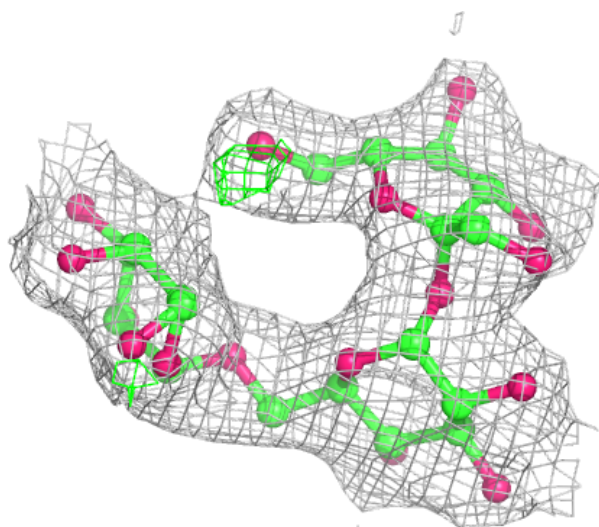
**Electron density around Chain F:**

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

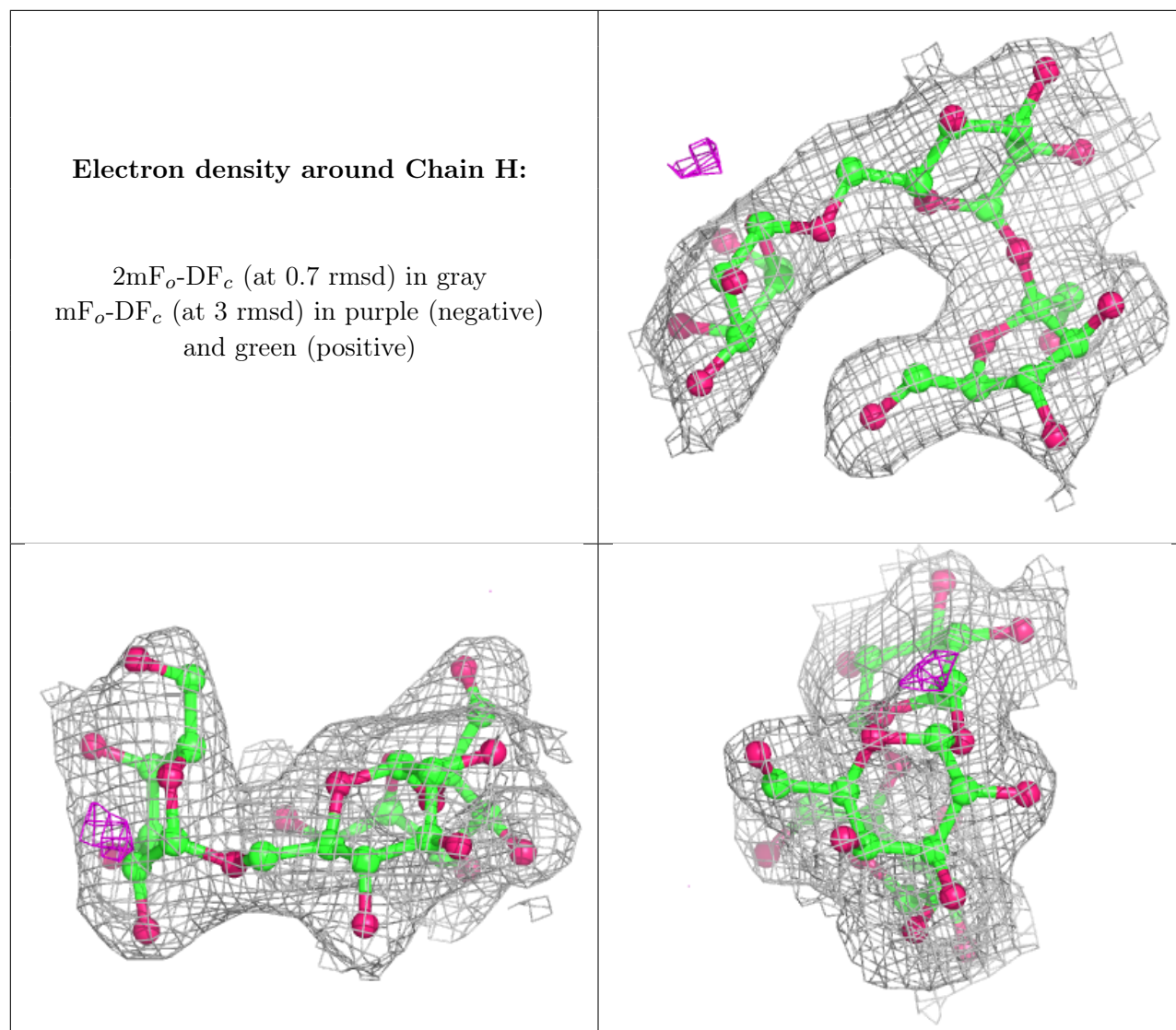


**Electron density around Chain G:**

$2mF_o-DF_c$  (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.