



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 10, 2023 – 02:29 AM EDT

PDB ID : 7MSQ  
Title : Complex between the Fab arm of AB-3467 and the SARS-CoV-2 receptor binding domain (RBD)  
Authors : Langley, D.B.; Christ, D.  
Deposited on : 2021-05-12  
Resolution : 2.29 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>.

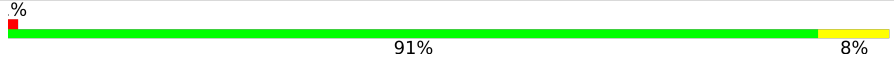

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

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



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Mol	Chain	Length	Quality of chain
3	L	214	 <p>% 91% 8%</p>
4	C	5	 <p>20% 80%</p>

## 2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 9962 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 Spike protein S1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	195	1541	988	257	288	8	0	0	0
1	B	189	1492	955	248	281	8	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	529	GLY	-	expression tag	UNP P0DTC2
A	530	SER	-	expression tag	UNP P0DTC2
A	531	HIS	-	expression tag	UNP P0DTC2
A	532	HIS	-	expression tag	UNP P0DTC2
A	533	HIS	-	expression tag	UNP P0DTC2
A	534	HIS	-	expression tag	UNP P0DTC2
A	535	HIS	-	expression tag	UNP P0DTC2
A	536	HIS	-	expression tag	UNP P0DTC2
B	529	GLY	-	expression tag	UNP P0DTC2
B	530	SER	-	expression tag	UNP P0DTC2
B	531	HIS	-	expression tag	UNP P0DTC2
B	532	HIS	-	expression tag	UNP P0DTC2
B	533	HIS	-	expression tag	UNP P0DTC2
B	534	HIS	-	expression tag	UNP P0DTC2
B	535	HIS	-	expression tag	UNP P0DTC2
B	536	HIS	-	expression tag	UNP P0DTC2

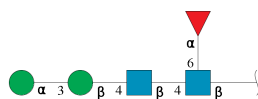
- Molecule 2 is a protein called AB-3467 Fab Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	D	221	1698	1082	279	331	6	0	3	0
2	H	221	1702	1084	280	332	6	0	4	0

- Molecule 3 is a protein called AB-3467 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	213	Total	C	N	O	S	0	0	0
			1637	1027	274	332	4			
3	L	214	Total	C	N	O	S	0	0	0
			1640	1027	274	334	5			

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

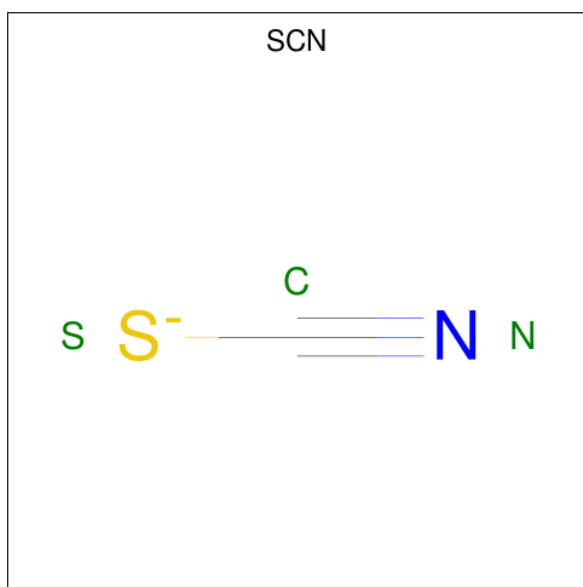


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	C	5	Total	C	N	O	0	0	0
			60	34	2	24			

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

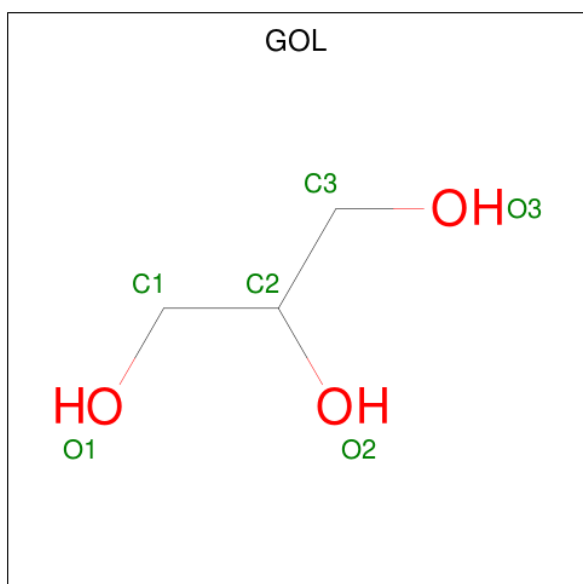
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Cl 1 1	0	0
5	B	1	Total Cl 1 1	0	0
5	D	2	Total Cl 2 2	0	0
5	E	2	Total Cl 2 2	0	0
5	H	1	Total Cl 1 1	0	0

- Molecule 6 is THIOCYANATE ION (three-letter code: SCN) (formula: CNS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	S		
6	B	1	Total 3	C 1	N 1	S 1	0	0
6	E	1	Total 3	C 1	N 1	S 1	0	0
6	L	1	Total 3	C 1	N 1	S 1	0	0
6	L	1	Total 3	C 1	N 1	S 1	0	0
6	L	1	Total 3	C 1	N 1	S 1	0	0

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	D	1	Total	C	O	0	0
			6	3	3		

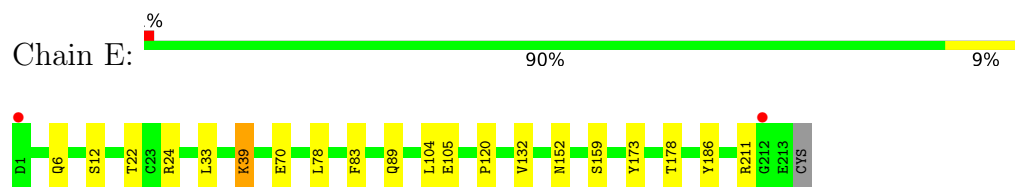
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	10	Total	O	0	0
			10	10		
8	B	18	Total	O	0	0
			18	18		
8	D	32	Total	O	0	0
			32	32		
8	E	35	Total	O	0	0
			35	35		
8	H	38	Total	O	0	0
			38	38		
8	L	31	Total	O	0	0
			31	31		

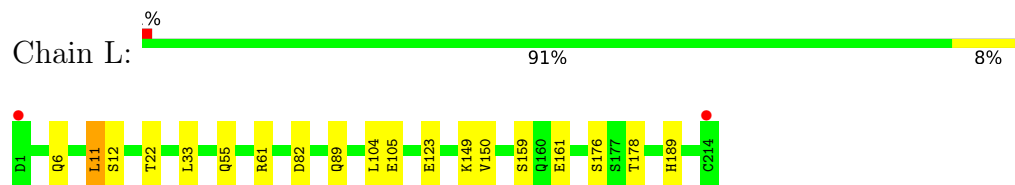




- Molecule 3: AB-3467 Fab Light Chain



- Molecule 3: AB-3467 Fab Light Chain



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



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	109.76Å 115.49Å 240.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.00 – 2.29 48.00 – 2.29	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.00-2.29) 99.8 (48.00-2.29)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.27 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 5.8.0267	Depositor
R, $R_{free}$	0.194 , 0.245 0.198 , 0.246	Depositor DCC
$R_{free}$ test set	3368 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	46.8	Xtrriage
Anisotropy	0.182	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 34.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.023 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	9962	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	54.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.62% 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: GOL, SCN, NAG, MAN, CL, FUC, BMA

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	0.78	0/1585	0.90	0/2158
1	B	0.74	0/1533	0.92	0/2084
2	D	0.77	1/1744 (0.1%)	0.96	2/2382 (0.1%)
2	H	0.76	1/1748 (0.1%)	0.94	0/2388
3	E	0.79	0/1673	0.94	0/2273
3	L	0.78	1/1676 (0.1%)	0.90	0/2277
All	All	0.77	3/9959 (0.0%)	0.93	2/13562 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	162	GLU	CD-OE1	6.51	1.32	1.25
2	D	16	GLU	CD-OE1	5.44	1.31	1.25
3	L	123	GLU	CD-OE2	5.10	1.31	1.25

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	66	ARG	NE-CZ-NH2	-7.75	116.42	120.30
2	D	66	ARG	NE-CZ-NH1	5.50	123.05	120.30

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	1541	0	1454	14	0
1	B	1492	0	1395	17	0
2	D	1698	0	1645	11	0
2	H	1702	0	1644	11	0
3	E	1637	0	1590	11	0
3	L	1640	0	1584	10	0
4	C	60	0	52	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	D	2	0	0	0	0
5	E	2	0	0	0	0
5	H	1	0	0	0	0
6	B	3	0	0	0	0
6	E	3	0	0	0	0
6	L	9	0	0	0	0
7	D	6	0	8	0	0
8	A	10	0	0	0	0
8	B	18	0	0	0	0
8	D	32	0	0	0	0
8	E	35	0	0	0	0
8	H	38	0	0	2	0
8	L	31	0	0	0	0
All	All	9962	0	9372	73	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 4.

All (73) 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:H:213[A]:ASN:OD1	8:H:401:HOH:O	1.85	0.94
1:B:365:TYR:HB3	1:B:387:LEU:HD13	1.60	0.82
1:B:371:SER:O	1:B:373:SER:N	2.29	0.65
3:L:11:LEU:CD2	3:L:104:LEU:HD13	2.27	0.63
3:L:11:LEU:HD22	3:L:104:LEU:HD13	1.82	0.62
1:B:403:ARG:HG2	1:B:504:GLY:O	2.00	0.61
2:H:36:TRP:C	2:H:37:ILE:HD12	2.21	0.61
1:B:384:PRO:HA	1:B:387:LEU:HD12	1.83	0.61
1:A:352:ALA:HA	1:A:468:ILE:HD11	1.82	0.60
2:H:192:LEU:C	2:H:192:LEU:HD12	2.22	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:371:SER:C	1:B:373:SER:H	2.04	0.60
2:D:36:TRP:C	2:D:37:ILE:HD12	2.25	0.56
3:E:39:LYS:HE2	3:E:83:PHE:O	2.04	0.56
2:D:55[B]:GLY:HA2	2:D:106:TYR:CD1	2.40	0.56
1:A:484:GLU:OE2	1:A:490:PHE:HB2	2.06	0.55
1:A:364:ASP:OD1	1:A:388:ASN:ND2	2.41	0.54
1:B:383:SER:O	1:B:387:LEU:HG	2.08	0.54
3:L:12:SER:HA	3:L:105:GLU:O	2.08	0.53
3:L:55:GLN:OE1	3:L:55:GLN:HA	2.10	0.52
2:D:37:ILE:HD12	2:D:37:ILE:N	2.24	0.52
2:H:55[B]:GLY:HA2	2:H:106:TYR:CE1	2.45	0.51
1:A:384:PRO:HA	1:A:387:LEU:HD22	1.91	0.51
2:H:37:ILE:HD12	2:H:37:ILE:N	2.26	0.51
1:B:365:TYR:HB2	1:B:387:LEU:HB3	1.93	0.51
3:E:78:LEU:HD11	3:E:104:LEU:HD21	1.92	0.50
2:H:55[B]:GLY:HA2	2:H:106:TYR:CD1	2.47	0.49
3:E:39:LYS:CE	3:E:83:PHE:O	2.60	0.49
3:E:33:LEU:HD22	3:E:89:GLN:O	2.12	0.49
1:B:357:ARG:HH11	1:B:357:ARG:HG2	1.78	0.48
1:A:369:TYR:CD1	1:A:384:PRO:HB2	2.49	0.48
1:B:369:TYR:HA	1:B:377:PHE:CE2	2.48	0.48
1:B:384:PRO:O	1:B:387:LEU:HB2	2.13	0.48
2:D:192:LEU:C	2:D:192:LEU:HD12	2.34	0.48
3:L:61:ARG:NH1	3:L:82:ASP:OD1	2.47	0.48
3:L:33:LEU:HD22	3:L:89:GLN:O	2.15	0.47
1:B:388:ASN:HB2	1:B:389:ASP:OD1	2.14	0.47
3:E:105:GLU:OE2	3:E:173:TYR:OH	2.18	0.47
1:B:359:SER:HA	1:B:524:VAL:HG22	1.97	0.47
1:B:357:ARG:HG2	1:B:357:ARG:NH1	2.30	0.46
2:D:14:PRO:O	2:D:15:SER:HB2	2.14	0.46
2:D:206:GLN:HA	2:D:206:GLN:OE1	2.14	0.46
1:A:378:LYS:HB2	2:H:103:TYR:CD1	2.51	0.46
1:B:357:ARG:HH11	1:B:357:ARG:CG	2.29	0.46
2:H:55[B]:GLY:CA	2:H:106:TYR:CD1	2.99	0.46
2:H:12:VAL:O	2:H:125:VAL:HA	2.16	0.46
2:D:18:LEU:HD12	2:D:123:VAL:HG11	1.98	0.45
2:D:64:LYS:O	2:D:65:SER:CB	2.64	0.45
3:E:6:GLN:HA	3:E:22:THR:O	2.17	0.45
3:E:12:SER:HA	3:E:105:GLU:O	2.16	0.45
2:H:155:LEU:HD11	8:H:436:HOH:O	2.16	0.45
1:A:378:LYS:O	1:A:432:CYS:HA	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:486:PHE:CE2	1:B:487:ASN:ND2	2.85	0.45
2:D:55[B]:GLY:CA	2:D:106:TYR:CD1	3.00	0.45
2:D:12:VAL:O	2:D:125:VAL:HA	2.17	0.44
3:E:24:ARG:HD3	3:E:70:GLU:OE1	2.18	0.43
3:L:150:VAL:CG1	3:L:189:HIS:CG	3.01	0.43
2:D:215:LYS:HB3	2:D:216:PRO:HD3	2.01	0.43
1:A:338:PHE:CE1	1:A:358:ILE:HD12	2.54	0.43
1:A:403:ARG:HD2	1:A:505:TYR:HA	2.01	0.43
3:L:159:SER:HA	3:L:178:THR:O	2.19	0.42
2:H:55[B]:GLY:O	2:H:56[B]:ASN:CB	2.67	0.42
1:B:378:LYS:O	1:B:432:CYS:HA	2.20	0.42
1:A:482:GLY:O	1:A:483:VAL:HG22	2.20	0.42
3:E:186:TYR:CE2	3:E:211:ARG:HD2	2.55	0.42
1:A:468:ILE:HD13	1:A:468:ILE:HA	1.83	0.41
1:A:405:ASP:HB2	1:A:504:GLY:O	2.20	0.41
3:L:161:GLU:HA	3:L:176:SER:O	2.20	0.41
1:A:365:TYR:O	1:A:368:LEU:HB3	2.21	0.41
1:B:338:PHE:HE2	1:B:363:ALA:HB1	1.85	0.41
1:A:366:SER:OG	1:A:385:THR:O	2.39	0.41
3:E:120:PRO:HD3	3:E:132:VAL:HG22	2.03	0.41
3:L:6:GLN:HA	3:L:22:THR:O	2.21	0.41
3:E:159:SER:HA	3:E:178:THR:O	2.20	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	193/204 (95%)	174 (90%)	17 (9%)	2 (1%)	15 17
1	B	185/204 (91%)	174 (94%)	9 (5%)	2 (1%)	14 15
2	D	220/238 (92%)	210 (96%)	7 (3%)	3 (1%)	11 11

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	221/238 (93%)	213 (96%)	5 (2%)	3 (1%)	11	11
3	E	211/214 (99%)	204 (97%)	7 (3%)	0	100	100
3	L	212/214 (99%)	202 (95%)	10 (5%)	0	100	100
All	All	1242/1312 (95%)	1177 (95%)	55 (4%)	10 (1%)	25	23

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	372	ALA
1	A	519	HIS
1	B	387	LEU
2	D	65	SER
1	A	483	VAL
2	H	56[A]	ASN
2	H	56[B]	ASN
2	D	56[A]	ASN
2	D	56[B]	ASN
2	H	2	VAL

### 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	167/176 (95%)	160 (96%)	7 (4%)	30	42
1	B	161/176 (92%)	153 (95%)	8 (5%)	24	34
2	D	190/207 (92%)	183 (96%)	7 (4%)	34	48
2	H	190/207 (92%)	185 (97%)	5 (3%)	46	63
3	E	186/187 (100%)	184 (99%)	2 (1%)	73	86
3	L	186/187 (100%)	184 (99%)	2 (1%)	73	86
All	All	1080/1140 (95%)	1049 (97%)	31 (3%)	42	58

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	346	ARG
1	A	371	SER
1	A	377	PHE
1	A	387	LEU
1	A	455	LEU
1	A	483	VAL
1	A	498	GLN
1	B	357	ARG
1	B	371	SER
1	B	377	PHE
1	B	385	THR
1	B	387	LEU
1	B	445	VAL
1	B	480	CYS
1	B	516	GLU
2	D	5	GLN
2	D	68	SER
2	D	122	MET
2	D	140	PRO
2	D	175	SER
2	D	195	VAL
2	D	228	LYS
3	E	39	LYS
3	E	152	ASN
2	H	50	TYR
2	H	140	PRO
2	H	163	PRO
2	H	175	SER
2	H	228	LYS
3	L	11	LEU
3	L	149	LYS

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

5 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
4	NAG	C	1	4,1	14,14,15	0.89	1 (7%)	17,19,21	1.10	1 (5%)
4	NAG	C	2	4	14,14,15	0.62	0	17,19,21	1.35	3 (17%)
4	BMA	C	3	4	11,11,12	0.61	0	15,15,17	1.70	4 (26%)
4	MAN	C	4	4	11,11,12	0.43	0	15,15,17	1.09	2 (13%)
4	FUC	C	5	4	10,10,11	0.52	0	14,14,16	0.95	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	NAG	C	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	C	2	4	-	0/6/23/26	0/1/1/1
4	BMA	C	3	4	-	0/2/19/22	0/1/1/1
4	MAN	C	4	4	-	0/2/19/22	0/1/1/1
4	FUC	C	5	4	-	-	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	1	NAG	O5-C1	-2.15	1.40	1.43

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	3	BMA	C1-O5-C5	3.88	117.45	112.19
4	C	3	BMA	O2-C2-C1	-3.48	102.04	109.15
4	C	3	BMA	O5-C1-C2	2.56	114.72	110.77
4	C	2	NAG	O5-C5-C6	2.44	111.04	107.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	3	BMA	O5-C5-C6	2.41	110.98	107.20
4	C	2	NAG	O7-C7-N2	2.30	126.18	121.95
4	C	1	NAG	O7-C7-C8	-2.20	117.98	122.06
4	C	4	MAN	C1-C2-C3	-2.09	107.10	109.67
4	C	4	MAN	O2-C2-C3	2.06	114.27	110.14
4	C	2	NAG	O4-C4-C3	-2.02	105.69	110.35

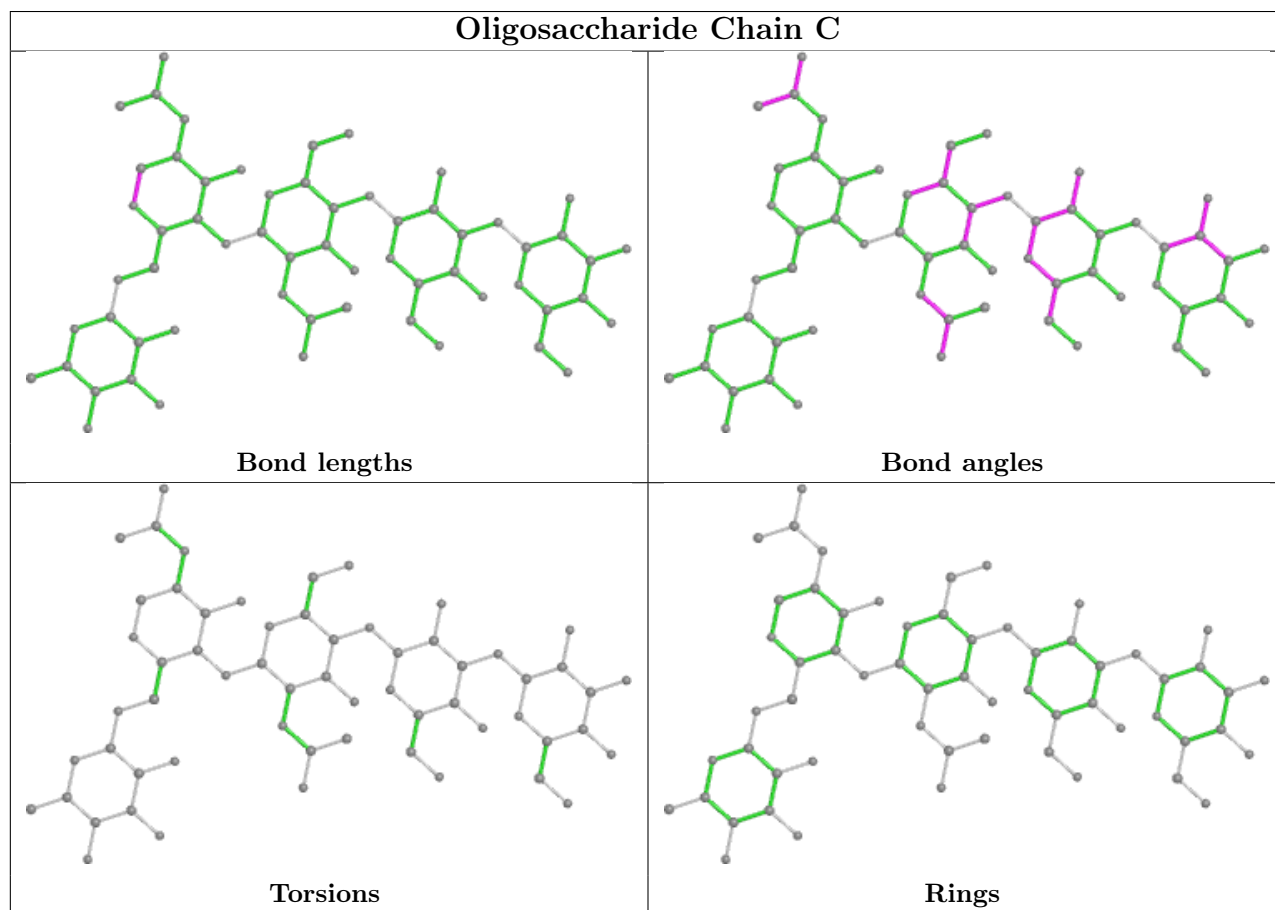
There are no chirality outliers.

There are no torsion outliers.

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](#)

Of 13 ligands modelled in this entry, 7 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	SCN	L	301	-	1,2,2	0.74	0	0,1,1	-	-
6	SCN	B	602	-	1,2,2	0.32	0	0,1,1	-	-
6	SCN	L	303	-	1,2,2	0.78	0	0,1,1	-	-
7	GOL	D	303	-	5,5,5	0.21	0	5,5,5	0.56	0
6	SCN	E	303	-	1,2,2	0.53	0	0,1,1	-	-
6	SCN	L	302	-	1,2,2	0.91	0	0,1,1	-	-

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
7	GOL	D	303	-	-	4/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	D	303	GOL	O1-C1-C2-O2
7	D	303	GOL	O1-C1-C2-C3
7	D	303	GOL	C1-C2-C3-O3
7	D	303	GOL	O2-C2-C3-O3

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

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 [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	195/204 (95%)	0.68	27 (13%) 2 4	31, 63, 119, 146	0
1	B	189/204 (92%)	0.74	27 (14%) 2 3	35, 63, 106, 133	0
2	D	221/238 (92%)	0.04	5 (2%) 60 67	34, 46, 71, 101	0
2	H	221/238 (92%)	-0.01	3 (1%) 75 80	33, 47, 66, 100	0
3	E	213/214 (99%)	-0.12	2 (0%) 84 88	31, 46, 68, 96	0
3	L	214/214 (100%)	-0.14	2 (0%) 84 88	36, 48, 66, 124	0
All	All	1253/1312 (95%)	0.18	66 (5%) 26 33	31, 49, 94, 146	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	486	PHE	6.6
1	B	476	GLY	6.0
3	L	214	CYS	5.4
1	A	477	SER	5.3
1	B	477	SER	5.2
1	A	486	PHE	5.2
1	B	364	ASP	4.9
1	B	365	TYR	4.7
1	B	483	VAL	4.6
1	B	485	GLY	4.3
1	A	480	CYS	4.2
1	B	334	ASN	4.1
1	A	385	THR	4.0
1	B	335	LEU	4.0
1	B	385	THR	4.0
3	E	1	ASP	3.9
1	B	484	GLU	3.8
1	B	488	CYS	3.6
1	A	521	PRO	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	334	ASN	3.6
1	B	366	SER	3.5
1	B	523	THR	3.5
1	B	363	ALA	3.3
2	H	55[A]	GLY	3.3
1	A	489	TYR	3.3
1	A	484	GLU	3.2
1	B	338	PHE	3.2
1	A	483	VAL	3.2
1	B	387	LEU	3.2
2	D	228	LYS	3.1
1	A	518	LEU	3.1
3	E	212	GLY	3.0
1	B	475	ALA	3.0
2	D	55[A]	GLY	3.0
1	A	365	TYR	2.9
1	A	335	LEU	2.9
3	L	1	ASP	2.8
2	H	64	LYS	2.8
1	A	488	CYS	2.6
1	A	387	LEU	2.6
1	B	393	THR	2.6
2	D	205	THR	2.6
2	D	1	GLN	2.5
1	A	481	ASN	2.5
1	B	481	ASN	2.5
1	A	478	THR	2.5
1	B	489	TYR	2.5
1	A	364	ASP	2.4
2	H	226	GLU	2.4
1	A	479	PRO	2.4
1	B	362	VAL	2.4
1	A	500	THR	2.4
1	A	369	TYR	2.3
1	A	522	ALA	2.3
1	A	519	HIS	2.3
1	A	449	TYR	2.2
1	B	490	PHE	2.2
1	B	478	THR	2.2
1	B	516	GLU	2.1
2	D	140	PRO	2.1
1	A	445	VAL	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	493	GLN	2.1
1	A	390	LEU	2.0
1	B	447	GLY	2.0
1	B	493	GLN	2.0
1	A	505	TYR	2.0

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

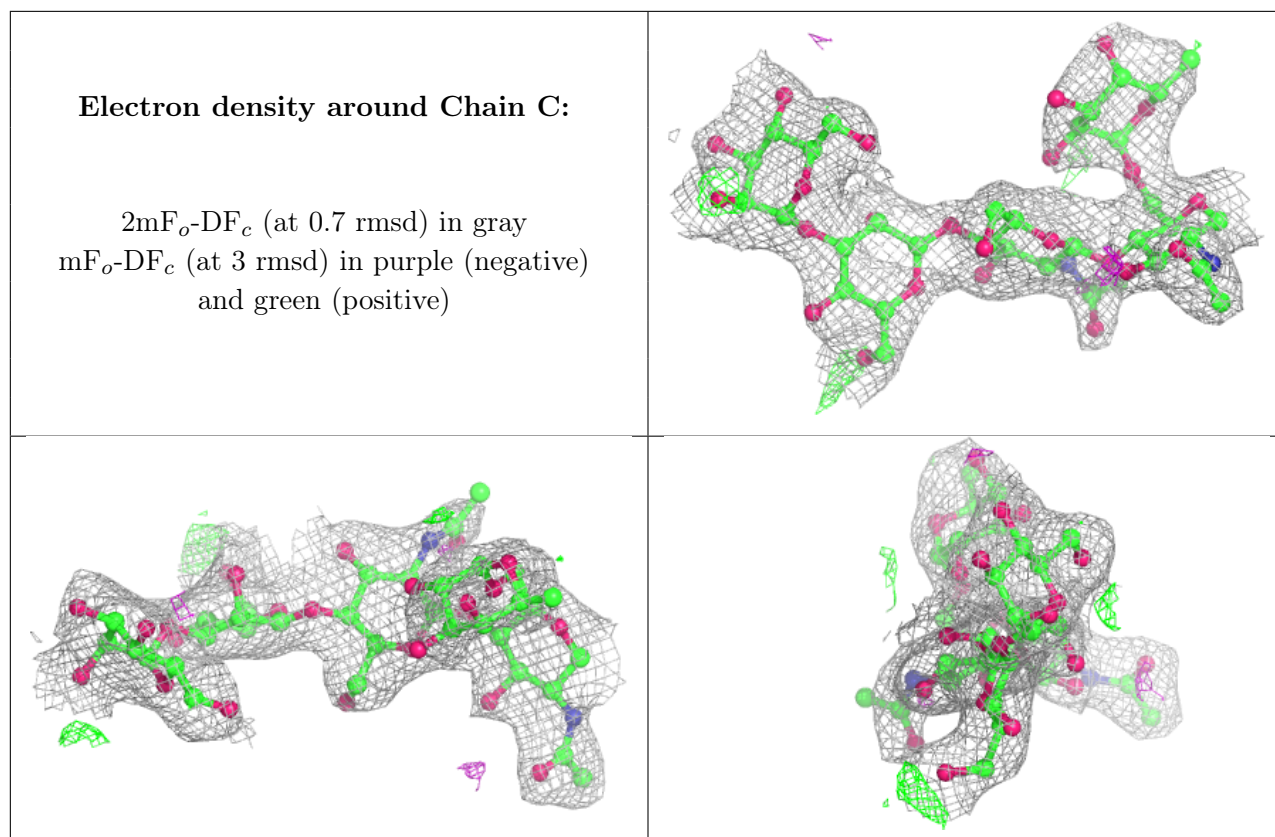
There are no non-standard protein/DNA/RNA residues in this entry.

## 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
4	FUC	C	5	10/11	0.83	0.21	112,117,121,121	0
4	BMA	C	3	11/12	0.84	0.14	74,76,80,83	0
4	NAG	C	1	14/15	0.87	0.17	56,70,82,90	0
4	MAN	C	4	11/12	0.90	0.12	77,81,85,86	0
4	NAG	C	2	14/15	0.93	0.17	70,75,79,81	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.



## 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
5	CL	D	302	1/1	0.56	0.17	89,89,89,89	0
7	GOL	D	303	6/6	0.75	0.17	44,55,63,67	0
6	SCN	L	303	3/3	0.82	0.28	46,46,63,75	0
5	CL	A	601	1/1	0.82	0.09	84,84,84,84	0
5	CL	B	601	1/1	0.89	0.23	77,77,77,77	0
6	SCN	L	301	3/3	0.90	0.13	60,60,69,88	0
6	SCN	L	302	3/3	0.94	0.15	55,55,58,59	0
5	CL	E	302	1/1	0.94	0.11	64,64,64,64	0
5	CL	D	301	1/1	0.94	0.09	63,63,63,63	0
6	SCN	E	303	3/3	0.95	0.10	47,47,54,60	0
6	SCN	B	602	3/3	0.96	0.09	43,43,45,53	0
5	CL	E	301	1/1	0.97	0.10	59,59,59,59	0
5	CL	H	301	1/1	0.99	0.11	63,63,63,63	0



## 6.5 Other polymers [i](#)

There are no such residues in this entry.