WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

May 9, 2022 – 11:28 am BST

PDB ID	:	7QF1
Title	:	Crystal structure of the SARS-CoV-2 RBD in complex with the human antibody CV2.6264
Authors	:	Fernandez, I.; Pederzoli, R.; Rey, F.A.
Deposited on	:	2021-12-03
Resolution	:	2.80 Å(reported)

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

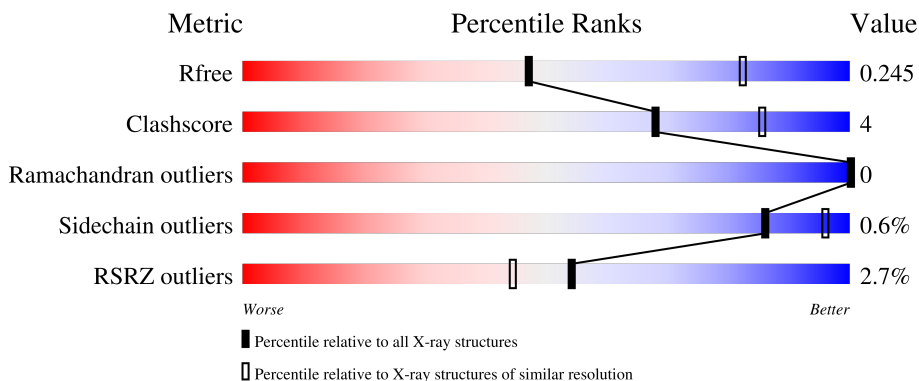|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.28.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.28.1

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 2.80 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	Percentile Ranks	Value
Rfree		0.245
Clashscore		4
Ramachandran outliers		0
Sidechain outliers		0.6%
RSRZ outliers		2.7%

Worse *Better*

▮ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	206	% — 86% 8% 6%
1	F	206	15% — 86% 6% 8%
2	B	213	92% 8%
2	D	213	93% 7%
3	C	236	% — 80% 13% 7%

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Mol	Chain	Length	Quality of chain
3	E	236	78% 14% 7%
4	G	2	50% 50%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 9689 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
1	A	194	Total	C	N	O	S	0	0	0
			1540	989	256	287	8			
1	F	190	Total	C	N	O	S	0	0	0
			1516	974	252	282	8			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	367	PHE	VAL	variant	UNP P0DTC2
A	529	GLY	-	expression tag	UNP P0DTC2
A	530	SER	-	expression tag	UNP P0DTC2
A	531	GLY	-	expression tag	UNP P0DTC2
A	532	ASP	-	expression tag	UNP P0DTC2
A	533	ASP	-	expression tag	UNP P0DTC2
A	534	ASP	-	expression tag	UNP P0DTC2
A	535	ASP	-	expression tag	UNP P0DTC2
A	536	LYS	-	expression tag	UNP P0DTC2
F	367	PHE	VAL	variant	UNP P0DTC2
F	529	GLY	-	expression tag	UNP P0DTC2
F	530	SER	-	expression tag	UNP P0DTC2
F	531	GLY	-	expression tag	UNP P0DTC2
F	532	ASP	-	expression tag	UNP P0DTC2
F	533	ASP	-	expression tag	UNP P0DTC2
F	534	ASP	-	expression tag	UNP P0DTC2
F	535	ASP	-	expression tag	UNP P0DTC2
F	536	LYS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called CV2.6264 light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	213	Total	C	N	O	S	0	1	0
			1640	1025	274	336	5			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	213	Total 1637	C 1023	N 274	O 335	S 5	0	0	0

- Molecule 3 is a protein called CV2.6264 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	219	Total 1659	C 1058	N 268	O 327	S 6	0	3	0
3	E	219	Total 1658	C 1057	N 268	O 327	S 6	0	2	0

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	G	2	Total 25	C 14	N 1	O 10	0	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).
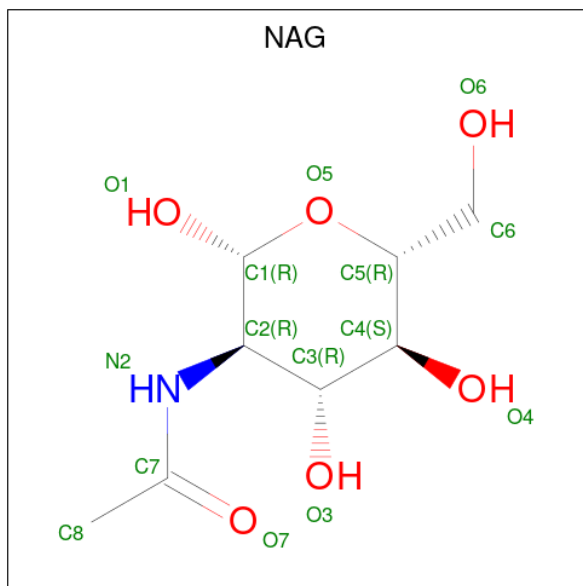
| Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	F	1	Total	C	N	O	0	0
			14	8	1	5		

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various 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: Spike protein S1
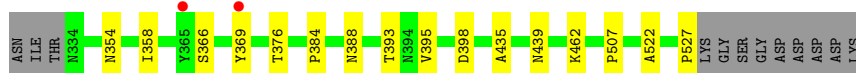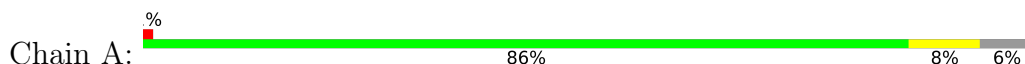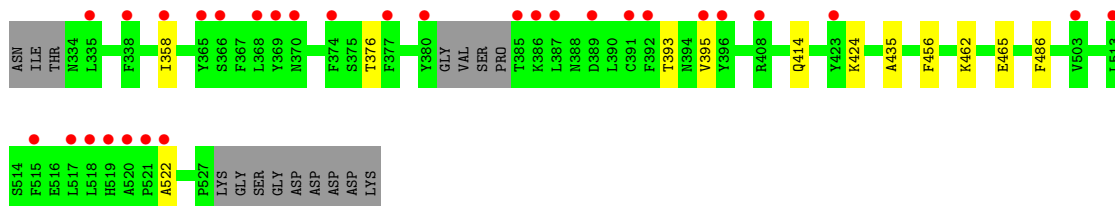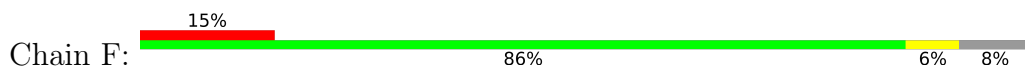
Chain A:

• Molecule 1: Spike protein S1

Chain F:

• Molecule 2: CV2.6264 light chain

Chain B:

• Molecule 2: CV2.6264 light chain

Chain D:

• Molecule 3: CV2.6264 heavy chain

Chain C:

GLN V2 Q3 L4 V5 Q6 V11 S25 G26 G27 Y32 W36 A40 Q43 V68 M81 E82 L83 T91 C96 A97 R98 Y113 Q116 T121 P130 L135 S138 SER LYS SER THR SER G144 L152 V153 Y156 F157 P158 A179

L189 I206 C207 N208 V209 R221 K225 SER CYS ASP LYS THR HIS HIS HIS HIS HIS HIS
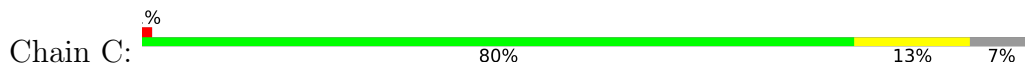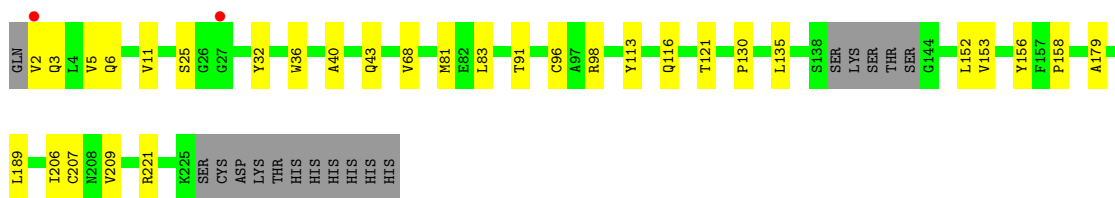
● Molecule 3: CV2.6264 heavy chain

Chain E: 78% 14% 7%

GLN V2 Q3 L4 V5 Q6 V11 A24 Y32 S35 W36 A40 Q43 M48 I57 F64 V68 M81 Y94 R98 L99 P100 Y101 Y102 Y103 D104 D112 Q116 T127 P130 S139 LYS SER THR SER GLY G145 Y156 F157 P158

T171 V174 A179 L189 I206 C207 H211 K212 P213 R221 K225 SER CYS ASP LYS THR HIS HIS HIS HIS HIS HIS
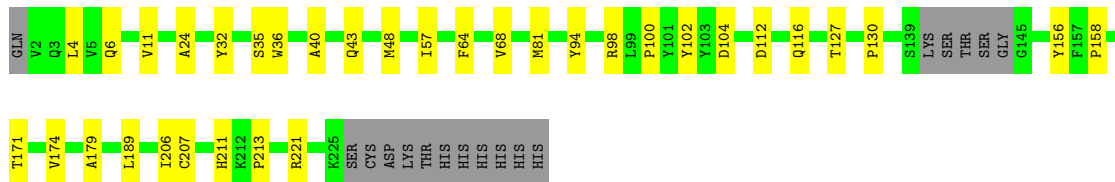
● Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G: 50% 50%

NAG1 BMA2

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	67.16Å 191.32Å 220.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.21 – 2.80 49.21 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.21-2.80) 99.2 (49.21-2.80)	Depositor EDS
R_{merge}	0.45	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	1.40 (at 2.81Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.229 , 0.254 0.219 , 0.245	Depositor DCC
R_{free} test set	3560 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	65.8	Xtriage
Anisotropy	1.144	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning [2]	$<|L|> = 0.47, <L^2> = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	9689	wwPDB-VP
Average B, all atoms (Å^2)	91.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.60% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $<|L|>$, $<L^2>$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, 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	0.28	0/1585	0.46	0/2157
1	F	0.26	0/1559	0.44	0/2119
2	B	0.30	0/1679	0.52	0/2280
2	D	0.28	0/1673	0.48	0/2272
3	C	0.29	0/1710	0.51	0/2331
3	E	0.29	0/1706	0.52	0/2326
All	All	0.28	0/9912	0.49	0/13485

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 ⓘ

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	1540	0	1452	10	0
1	F	1516	0	1427	8	0
2	B	1640	0	1590	10	0
2	D	1637	0	1585	8	0
3	C	1659	0	1629	18	0
3	E	1658	0	1626	21	0
4	G	25	0	22	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	F	14	0	13	1	0
All	All	9689	0	9344	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)
3:C:2:VAL:HG11	3:C:5:VAL:HG12	1.52	0.91
3:C:6:GLN:H	3:C:116:GLN:HE22	1.21	0.85
3:C:2:VAL:HG11	3:C:5:VAL:CG1	2.08	0.83
2:B:4:MET:CE	2:B:23:CYS:SG	2.68	0.81
2:B:4:MET:HE3	2:B:23:CYS:SG	2.21	0.81
3:E:6:GLN:H	3:E:116:GLN:HE22	1.35	0.73
2:D:136:LEU:HD21	2:D:196:VAL:HG11	1.73	0.70
3:C:11:VAL:HG21	3:C:158:PRO:HG3	1.78	0.64
3:C:206:ILE:HG12	3:C:221:ARG:HG2	1.79	0.64
3:E:127:THR:HG22	3:E:158:PRO:HD3	1.82	0.61
3:E:11:VAL:HG21	3:E:158:PRO:HG3	1.82	0.60
2:D:46:LEU:HD23	2:D:55:GLN:HE21	1.65	0.59
3:C:3:GLN:HB3	3:C:113:TYR:CZ	2.38	0.58
3:E:206:ILE:HG12	3:E:221:ARG:HG2	1.85	0.57
3:E:100:PRO:HD3	3:E:112:ASP:HB2	1.87	0.57
3:E:40:ALA:HB3	3:E:43:GLN:HG3	1.86	0.56
3:C:179:ALA:HA	3:C:189:LEU:HB3	1.87	0.56
5:F:601:NAG:H83	5:F:601:NAG:H3	1.88	0.55
3:C:40:ALA:HB3	3:C:43:GLN:HG3	1.89	0.55
3:C:91:THR:HG23	3:C:121:THR:HA	1.90	0.53
1:A:369:TYR:OH	1:A:384:PRO:O	2.21	0.53
3:E:32:TYR:CE2	3:E:98:ARG:HD3	2.43	0.53
3:C:3:GLN:HA	3:C:25:SER:HB2	1.92	0.52
1:A:388:ASN:HB3	1:A:527:PRO:HD2	1.92	0.51
2:D:37:GLN:HB2	2:D:47:LEU:HD11	1.91	0.51
2:B:4:MET:HE2	2:B:23:CYS:SG	2.50	0.50
3:C:6:GLN:H	3:C:116:GLN:NE2	2.00	0.50
3:E:130:PRO:HB3	3:E:156:TYR:HB3	1.94	0.50
2:D:146:VAL:HG22	2:D:196:VAL:HG12	1.93	0.50
1:F:376:THR:HB	1:F:435:ALA:HB3	1.93	0.50
3:C:130:PRO:HB3	3:C:156:TYR:HB3	1.92	0.50
3:C:32:TYR:CD2	3:C:98:ARG:HD3	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:32:TYR:HE2	3:E:100:PRO:HB3	1.76	0.49
3:C:32:TYR:CE2	3:C:98:ARG:HD3	2.48	0.48
2:B:4:MET:SD	2:B:25:ALA:HB2	2.54	0.48
1:A:393:THR:HA	1:A:522:ALA:HA	1.95	0.48
2:D:212:GLY:O	2:D:213:GLU:HB2	2.14	0.48
3:E:171:THR:O	3:E:174:VAL:HG12	2.14	0.48
2:B:50:ALA:C	2:B:52:SER:H	2.16	0.48
1:F:358:ILE:HB	1:F:395:VAL:HB	1.96	0.47
3:E:211:HIS:CD2	3:E:213:PRO:HD2	2.50	0.47
3:C:135:LEU:HD11	3:C:152:LEU:HB2	1.97	0.47
2:B:212:GLY:O	2:B:213:GLU:HB2	2.15	0.47
2:B:187:GLU:HG2	2:B:211:ARG:NH1	2.30	0.47
1:A:376:THR:HB	1:A:435:ALA:HB3	1.97	0.47
1:F:414:GLN:O	1:F:424:LYS:NZ	2.48	0.46
2:B:62:PHE:CZ	2:B:75:ILE:HD12	2.50	0.46
1:F:393:THR:HA	1:F:522:ALA:HA	1.99	0.45
1:F:456:PHE:HZ	3:E:57:ILE:HD11	1.82	0.45
1:F:456:PHE:CZ	3:E:57:ILE:HD11	2.52	0.45
3:C:68:VAL:HG22	3:C:83:LEU:HD13	2.00	0.44
1:A:366:SER:HA	1:A:369:TYR:CD2	2.52	0.44
3:E:98:ARG:HD2	3:E:112:ASP:HB3	2.00	0.44
2:B:141:PRO:HB2	2:B:143:GLU:OE1	2.17	0.44
1:A:439:ASN:HA	1:A:507:PRO:HG2	2.01	0.43
3:E:36:TRP:CE2	3:E:81:MET:HB2	2.54	0.43
3:E:48:MET:HE1	3:E:94:TYR:CE2	2.54	0.43
2:D:113:PRO:HB3	2:D:139:PHE:HB3	2.01	0.43
3:E:64:PHE:O	3:E:68:VAL:HG22	2.19	0.42
3:C:36:TRP:CE2	3:C:81:MET:HB2	2.55	0.42
1:F:486:PHE:HZ	3:E:35:SER:HG	1.66	0.42
1:A:366:SER:HA	1:A:369:TYR:CE2	2.55	0.41
1:A:354:ASN:O	1:A:398:ASP:HA	2.20	0.41
3:E:4:LEU:HD23	3:E:24:ALA:HA	2.02	0.41
2:D:55:GLN:OE1	2:D:56:SER:N	2.54	0.41
1:A:358:ILE:HB	1:A:395:VAL:HB	2.03	0.41
3:C:153:VAL:HG11	3:C:209:VAL:HG11	2.03	0.41
1:A:462:LYS:H	1:A:462:LYS:HG2	1.74	0.41
2:D:35:TRP:CE2	2:D:73:LEU:HB2	2.56	0.41
3:E:179:ALA:HA	3:E:189:LEU:HB3	2.03	0.40
2:B:125:LEU:HD21	2:B:186:TYR:CD2	2.56	0.40
1:F:462:LYS:HG2	1:F:465:GLU:OE1	2.21	0.40
3:E:102:TYR:CZ	3:E:104:ASP:HB2	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	192/206 (93%)	187 (97%)	5 (3%)	0	100	100
1	F	186/206 (90%)	181 (97%)	5 (3%)	0	100	100
2	B	212/213 (100%)	205 (97%)	7 (3%)	0	100	100
2	D	211/213 (99%)	203 (96%)	8 (4%)	0	100	100
3	C	218/236 (92%)	211 (97%)	7 (3%)	0	100	100
3	E	217/236 (92%)	214 (99%)	3 (1%)	0	100	100
All	All	1236/1310 (94%)	1201 (97%)	35 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	167/177 (94%)	167 (100%)	0	100	100
1	F	164/177 (93%)	164 (100%)	0	100	100
2	B	189/188 (100%)	186 (98%)	3 (2%)	62	88
2	D	188/188 (100%)	188 (100%)	0	100	100
3	C	186/200 (93%)	184 (99%)	2 (1%)	73	92
3	E	186/200 (93%)	185 (100%)	1 (0%)	88	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1080/1130 (96%)	1074 (99%)	6 (1%)	86 96

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

Mol	Chain	Res	Type
2	B	14	SER
2	B	142	ARG
2	B	181	LEU
3	C	96	CYS
3	C	207	CYS
3	E	207	CYS

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

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

2 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	G	1	4,1	14,14,15	0.27	0	17,19,21	0.49	0
4	BMA	G	2	4	11,11,12	0.97	1 (9%)	15,15,17	0.93	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	G	1	4,1	-	2/6/23/26	0/1/1/1
4	BMA	G	2	4	-	0/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	2	BMA	C1-C2	2.32	1.57	1.52

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	G	1	NAG	O5-C5-C6-O6
4	G	1	NAG	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.

Oligosaccharide Chain G
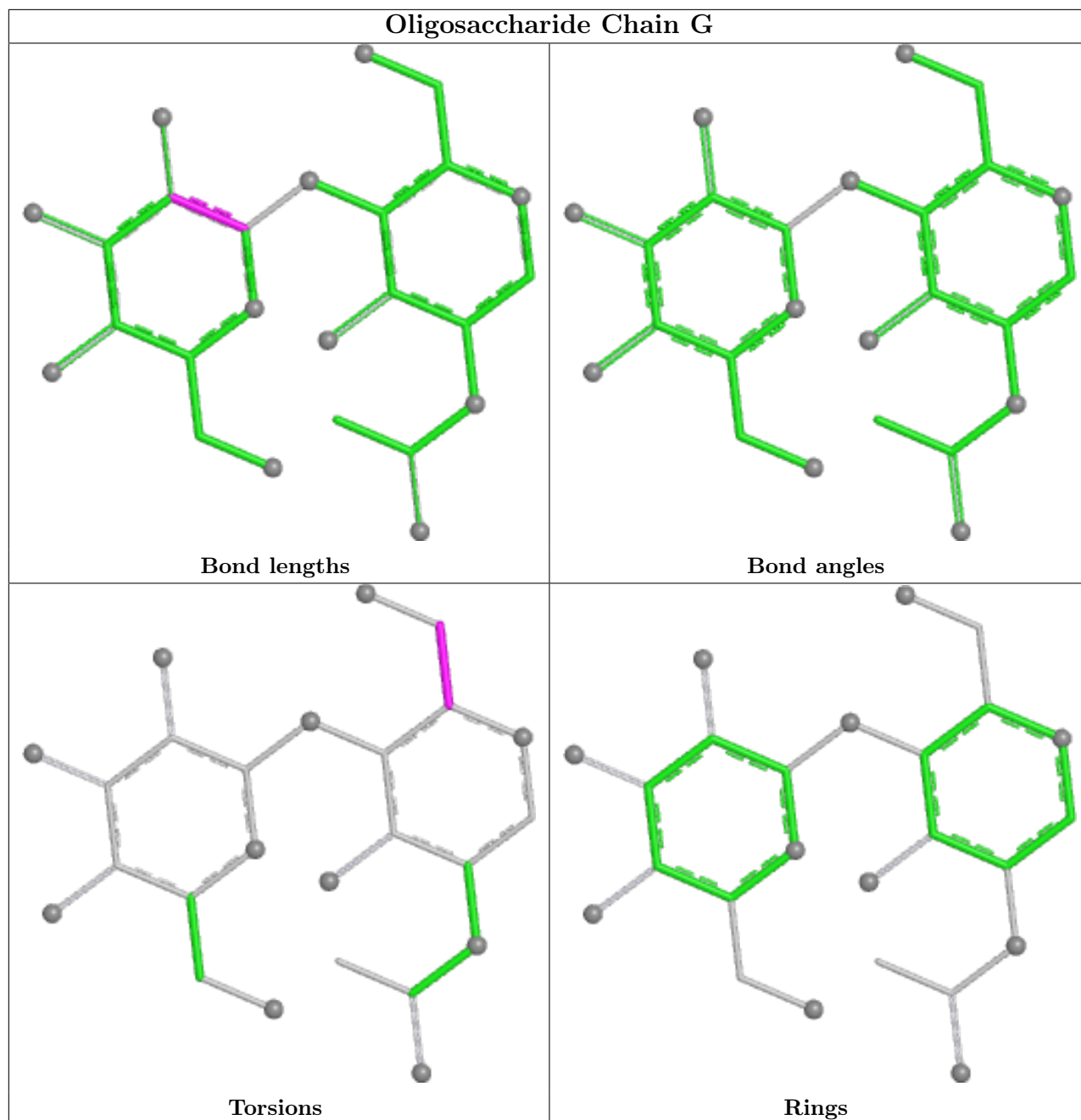
5.6 Ligand geometry ⓘ

1 ligand is 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
5	NAG	F	601	1	14,14,15	0.42	0	17,19,21	1.29	2 (11%)

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
5	NAG	F	601	1	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	F	601	NAG	C2-N2-C7	4.40	129.17	122.90
5	F	601	NAG	C1-C2-N2	2.07	114.02	110.49

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	F	601	NAG	C8-C7-N2-C2
5	F	601	NAG	O7-C7-N2-C2
5	F	601	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
5	F	601	NAG	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	194/206 (94%)	0.09	2 (1%)	82	77	62, 91, 132, 186	0
1	F	190/206 (92%)	0.82	30 (15%)	2	1	58, 122, 192, 240	0
2	B	213/213 (100%)	0.04	0	100	100	59, 80, 105, 125	0
2	D	213/213 (100%)	-0.00	0	100	100	50, 79, 107, 129	0
3	C	219/236 (92%)	0.05	2 (0%)	84	80	68, 90, 127, 140	0
3	E	219/236 (92%)	-0.02	0	100	100	50, 74, 102, 129	0
All	All	1248/1310 (95%)	0.15	34 (2%)	54	44	50, 85, 151, 240	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	365	TYR	5.6
1	F	519	HIS	4.9
1	F	515	PHE	4.8
1	F	370	ASN	4.7
1	F	387	LEU	3.9
1	F	521	PRO	3.8
3	C	2	VAL	3.6
1	F	391	CYS	3.4
1	F	369	TYR	3.3
1	F	513	LEU	3.3
1	A	365	TYR	3.1
1	F	386	LYS	3.1
1	F	423	TYR	3.0
1	F	366	SER	2.9
1	F	518	LEU	2.9
1	F	396	TYR	2.9
1	F	385	THR	2.8
1	F	522	ALA	2.8
1	F	503	VAL	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	369	TYR	2.6
1	F	338	PHE	2.5
1	F	335	LEU	2.5
1	F	368	LEU	2.5
1	F	380	TYR	2.5
1	F	358	ILE	2.4
1	F	520	ALA	2.4
1	F	392	PHE	2.3
1	F	395	VAL	2.3
1	F	517	LEU	2.3
3	C	27	GLY	2.3
1	F	408	ARG	2.3
1	F	389	ASP	2.3
1	F	374	PHE	2.1
1	F	377	PHE	2.1

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ
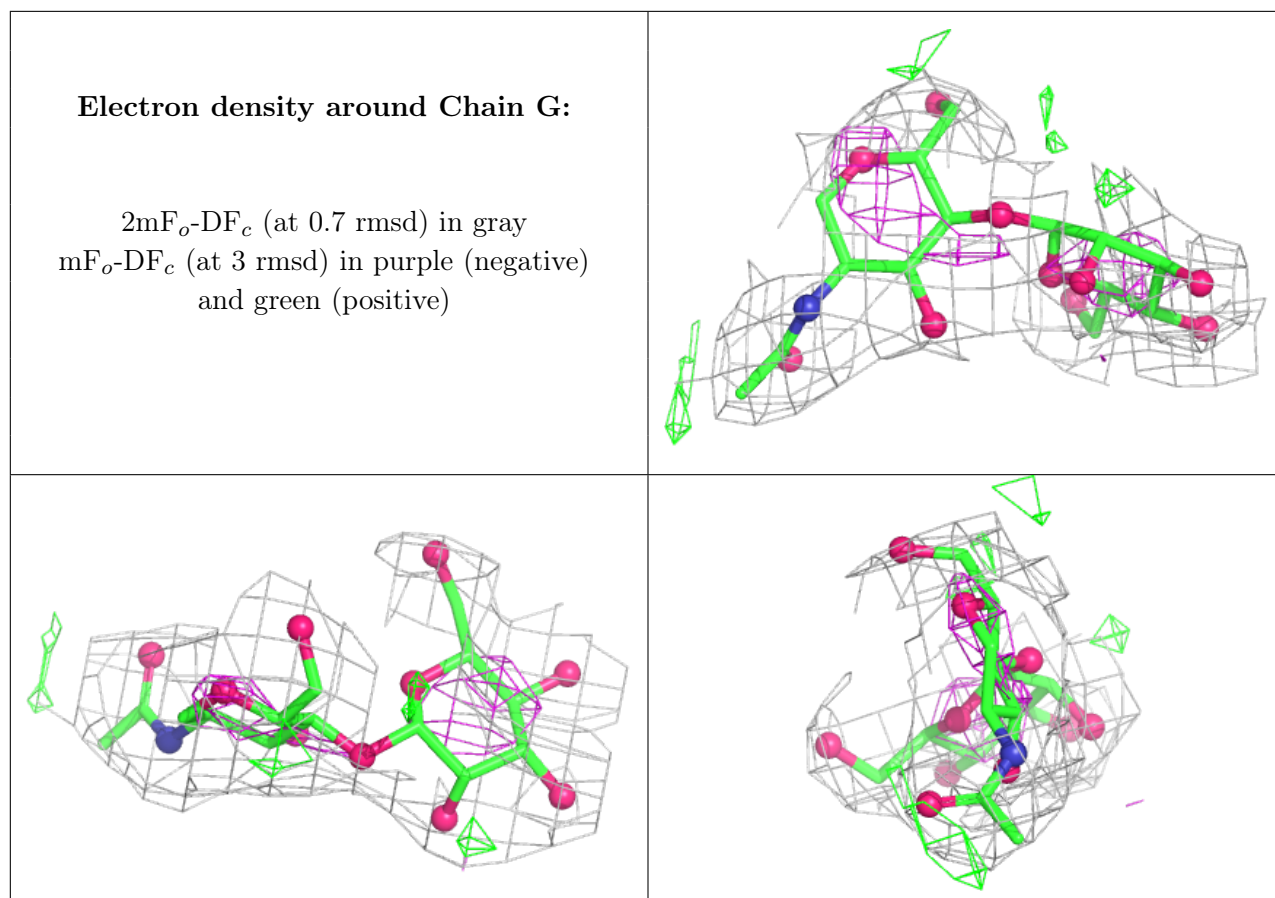
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	BMA	G	2	11/12	0.65	0.23	134,138,143,144	0
4	NAG	G	1	14/15	0.91	0.16	80,95,113,129	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 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　ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	NAG	F	601	14/15	0.73	0.25	114,124,132,134	0

6.5　Other polymers　ⓘ

There are no such residues in this entry.