wwPDB X-ray Structure Validation Summary Report (i)

Sep 28, 2024 – 08:35 pm BST

PDB ID	:	2WRG
Title	:	structure of H1 1918 hemagglutinin with human receptor
Authors	:	Liu, J.; Stevens, D.J.; Haire, L.F.; Walker, P.A.; Coombs, P.J.; Russell, R.J.; Gamblin, S.J.; Skehel, J.J.
Deposited on	:	2009-09-01
Resolution	:	3.00 Å(reported)

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

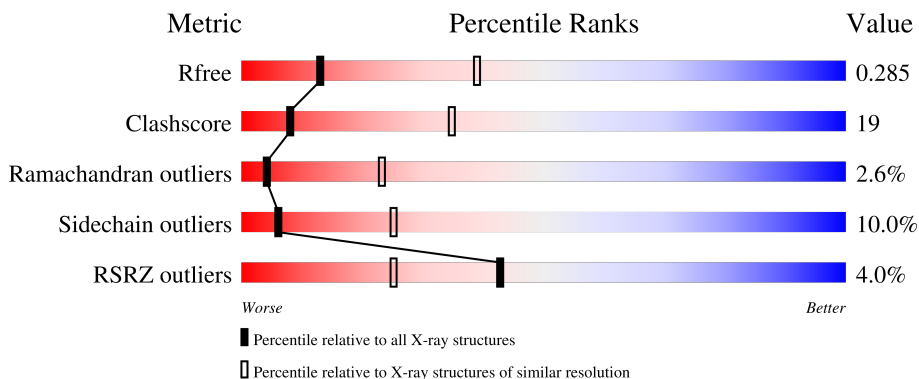|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.00 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.
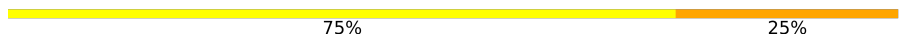
Metric	Percentile Ranks	Value
Rfree		0.285
Clashscore		19
Ramachandran outliers		2.6%
Sidechain outliers		10.0%
RSRZ outliers		4.0%

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}	164625	2511 (3.00-3.00)
Clashscore	180529	2866 (3.00-3.00)
Ramachandran outliers	177936	2778 (3.00-3.00)
Sidechain outliers	177891	2781 (3.00-3.00)
RSRZ outliers	164620	2523 (3.00-3.00)

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	H	326	4%　64%　31%　•
1	J	326	3%　63%　33%　•
1	L	326	3%　66%　29%　5%
2	I	222	4%　46%　21%　•　•　27%
2	K	222	3%　46%　21%　•　•　27%

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Mol	Chain	Length	Quality of chain
2	M	222	3% ██ 49% ████ 18% 5% • 27%
3	A	4	75% ████ 25%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	GAL	A	3	X	-	-	-

2   Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 11619 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 HEMAGGLUTININ HA1 CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	325	Total	C	N	O	S	0	0	1
			2517	1586	435	485	11			
1	J	325	Total	C	N	O	S	0	0	1
			2517	1586	435	485	11			
1	L	325	Total	C	N	O	S	0	0	1
			2517	1586	435	485	11			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	327	ARG	ILE	conflict	UNP Q9WFX3
J	327	ARG	ILE	conflict	UNP Q9WFX3
L	327	ARG	ILE	conflict	UNP Q9WFX3

- Molecule 2 is a protein called HEMAGGLUTININ HA2 CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	I	161	Total	C	N	O	S	0	0	1
			1282	802	221	253	6			
2	K	161	Total	C	N	O	S	0	0	1
			1282	802	221	253	6			
2	M	161	Total	C	N	O	S	0	0	1
			1282	802	221	253	6			

- Molecule 3 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galacto pyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	A	4	Total	C	N	O	0	0	0
			57	31	2	24			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	H	1	Total	C	N	O	0	0
			15	8	1	6		
4	H	1	Total	C	N	O	0	0
			15	8	1	6		
4	H	1	Total	C	N	O	0	0
			15	8	1	6		
4	H	1	Total	C	N	O	0	0
			15	8	1	6		
4	H	1	Total	C	N	O	0	0
			15	8	1	6		
4	J	1	Total	C	N	O	0	0
			15	8	1	6		
4	J	1	Total	C	N	O	0	0
			15	8	1	6		
4	K	1	Total	C	N	O	0	0
			15	8	1	6		
4	L	1	Total	C	N	O	0	0
			15	8	1	6		
4	L	1	Total	C	N	O	0	0
			15	8	1	6		

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| Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	M	1	Total	C	N	O	0	0
			15	8	1	6		

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: HEMAGGLUTININ HA1 CHAIN
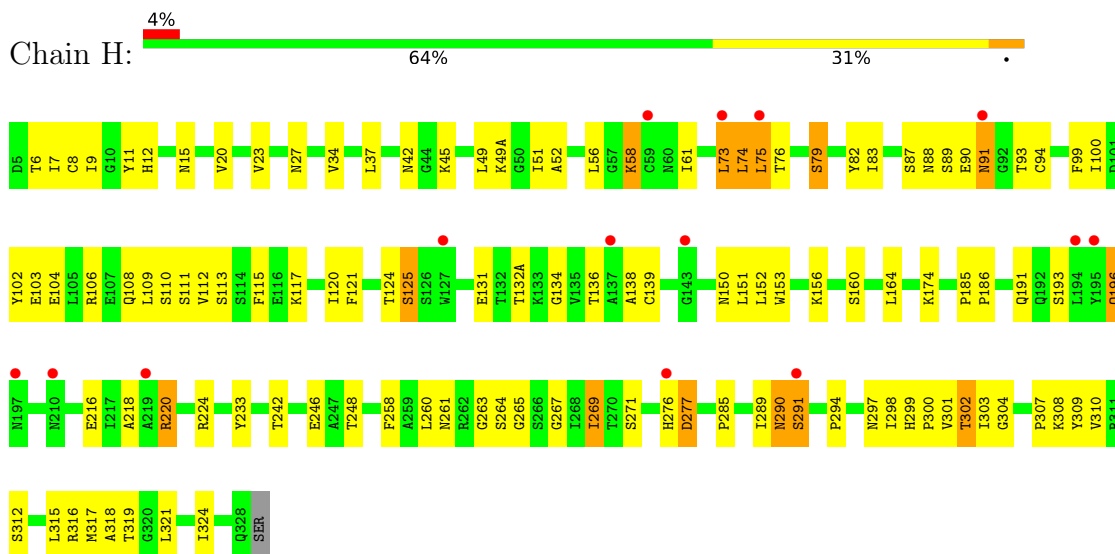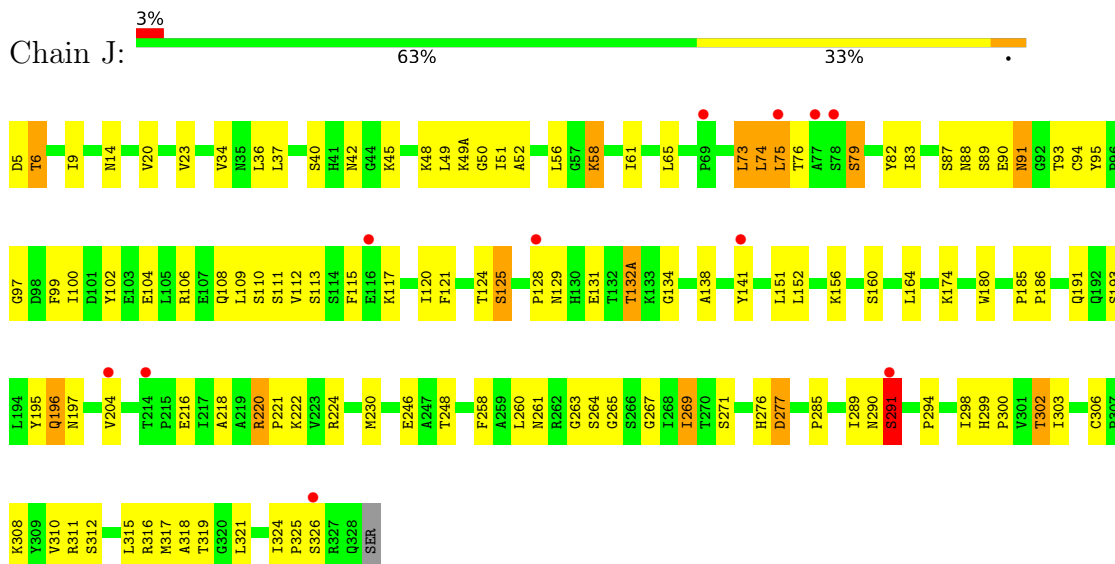
Chain H:

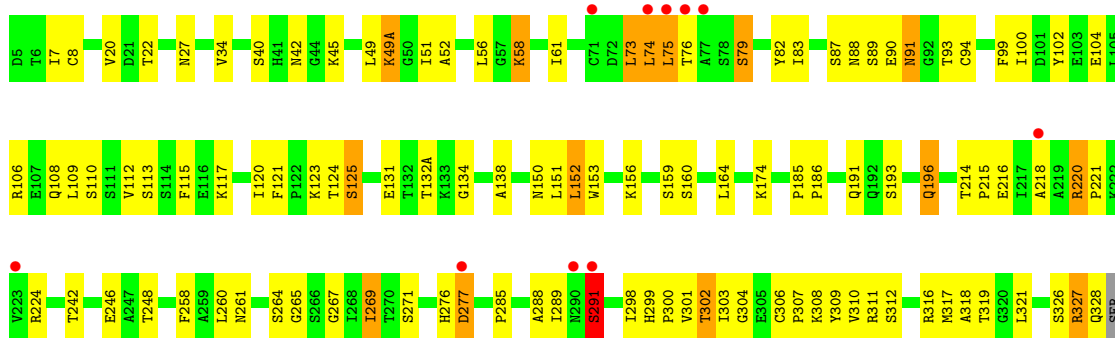• Molecule 1: HEMAGGLUTININ HA1 CHAIN

Chain J:

• Molecule 1: HEMAGGLUTININ HA1 CHAIN

Chain L:

● Molecule 2: HEMAGGLUTININ HA2 CHAIN

Chain I:
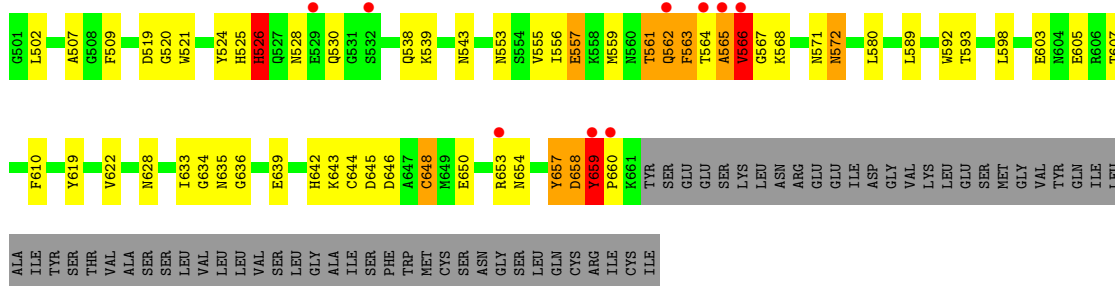
● Molecule 2: HEMAGGLUTININ HA2 CHAIN
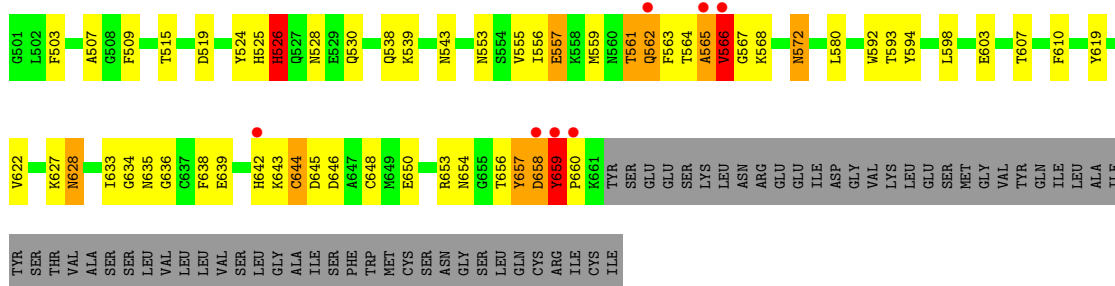
Chain K:

● Molecule 2: HEMAGGLUTININ HA2 CHAIN
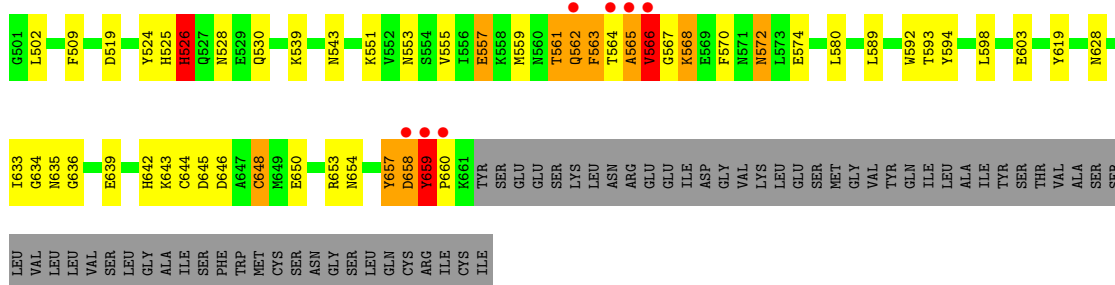
Chain M:

• Molecule 3: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose

Chain A:

75%   25%

GAL1 NAG2 GAL3 SIA4

4   Data and refinement statistics   ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	104.76Å 156.84Å 157.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.68 – 3.00 29.68 – 3.00	Depositor EDS
% Data completeness (in resolution range)	87.8 (29.68-3.00) 97.8 (29.68-3.00)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.63 (at 3.00Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.268 , 0.308 0.256 , 0.285	Depositor DCC
R_{free} test set	2646 reflections (5.13%)	wwPDB-VP
Wilson B-factor (Å^2)	85.0	Xtriage
Anisotropy	0.349	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 54.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.53, < L^2 > = 0.37$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	11619	wwPDB-VP
Average B, all atoms (Å^2)	76.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.61% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, GAL, SIA

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	H	0.38	0/2581	0.54	0/3516
1	J	0.43	0/2581	0.58	1/3516 (0.0%)
1	L	0.44	0/2581	0.58	1/3516 (0.0%)
2	I	0.50	0/1308	0.60	0/1764
2	K	0.58	0/1308	0.64	0/1764
2	M	0.55	0/1308	0.63	1/1764 (0.1%)
All	All	0.46	0/11667	0.59	3/15840 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	M	568	LYS	CB-CG-CD	5.94	127.03	111.60
1	J	291	SER	N-CA-C	5.12	124.81	111.00
1	L	291	SER	N-CA-C	5.09	124.74	111.00

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	H	2517	0	2439	116	0
1	J	2517	0	2439	95	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	L	2517	0	2439	99	2
2	I	1282	0	1200	69	0
2	K	1282	0	1198	60	2
2	M	1282	0	1200	64	1
3	A	57	0	44	1	0
4	H	75	0	75	17	0
4	J	30	0	30	4	0
4	K	15	0	15	3	0
4	L	30	0	30	4	0
4	M	15	0	15	6	0
All	All	11619	0	11124	435	3

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 19.

The worst 5 of 435 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:H:58:LYS:H	1:H:58:LYS:HE2	1.07	1.18
1:L:58:LYS:HE2	1:L:58:LYS:H	1.06	1.11
1:J:58:LYS:HE2	1:J:58:LYS:H	1.11	1.08
1:L:27:ASN:ND2	4:L:1329:NAG:H4	1.70	1.07
1:H:27:ASN:ND2	4:H:1332:NAG:H4	1.73	1.02

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:123:LYS:NZ	2:M:659:TYR:OH[2_454]	2.11	0.09
1:J:141:TYR:OH	2:K:658:ASP:OD1[3_555]	2.14	0.06
2:K:639:GLU:OE2	1:L:75:LEU:O[2_455]	2.16	0.04

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	H	323/326 (99%)	289 (90%)	29 (9%)	5 (2%)	8	36
1	J	323/326 (99%)	287 (89%)	31 (10%)	5 (2%)	8	36
1	L	323/326 (99%)	288 (89%)	29 (9%)	6 (2%)	6	31
2	I	159/222 (72%)	144 (91%)	8 (5%)	7 (4%)	2	12
2	K	159/222 (72%)	144 (91%)	8 (5%)	7 (4%)	2	12
2	M	159/222 (72%)	143 (90%)	9 (6%)	7 (4%)	2	12
All	All	1446/1644 (88%)	1295 (90%)	114 (8%)	37 (3%)	4	23

5 of 37 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	125	SER
2	I	562	GLN
2	I	565	ALA
2	I	657	TYR
2	I	659	TYR

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	H	279/282 (99%)	253 (91%)	26 (9%)	7	29
1	J	279/282 (99%)	251 (90%)	28 (10%)	6	25
1	L	279/282 (99%)	252 (90%)	27 (10%)	6	27
2	I	135/190 (71%)	121 (90%)	14 (10%)	5	23
2	K	135/190 (71%)	120 (89%)	15 (11%)	5	21
2	M	135/190 (71%)	121 (90%)	14 (10%)	5	23
All	All	1242/1416 (88%)	1118 (90%)	124 (10%)	6	25

5 of 124 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	193	SER
2	M	519	ASP
2	K	561	THR
1	L	327	ARG
2	M	580	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 46 such sidechains are listed below:

Mol	Chain	Res	Type
2	K	629	ASN
1	L	191	GLN
2	K	642	HIS
1	L	55	GLN
1	L	250	ASN

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 ⓘ

4 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	GAL	A	1	3	12,12,12	2.10	4 (33%)	17,17,17	2.97	5 (29%)
3	NAG	A	2	3	14,14,15	1.96	6 (42%)	17,19,21	1.32	1 (5%)
3	GAL	A	3	3	11,11,12	2.91	7 (63%)	15,15,17	2.75	6 (40%)
3	SIA	A	4	3	20,20,21	6.00	9 (45%)	24,28,31	3.13	8 (33%)

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	GAL	A	1	3	-	0/2/22/22	0/1/1/1
3	NAG	A	2	3	-	0/6/23/26	0/1/1/1
3	GAL	A	3	3	1/1/4/5	0/2/19/22	0/1/1/1
3	SIA	A	4	3	-	0/18/34/38	0/1/1/1

The worst 5 of 26 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	4	SIA	C2-C1	13.45	1.64	1.52
3	A	4	SIA	C11-C10	-13.33	1.22	1.50
3	A	4	SIA	O10-C10	13.03	1.52	1.23
3	A	4	SIA	O4-C4	-7.40	1.27	1.43
3	A	4	SIA	C3-C4	6.11	1.63	1.52

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	4	SIA	C6-O6-C2	11.61	136.17	111.34
3	A	1	GAL	O1-C1-C2	9.57	135.99	109.03
3	A	3	GAL	O5-C1-C2	7.18	121.85	110.77
3	A	1	GAL	O1-C1-O5	-5.12	95.00	110.38
3	A	3	GAL	C1-O5-C5	4.94	118.89	112.19

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	3	GAL	C1

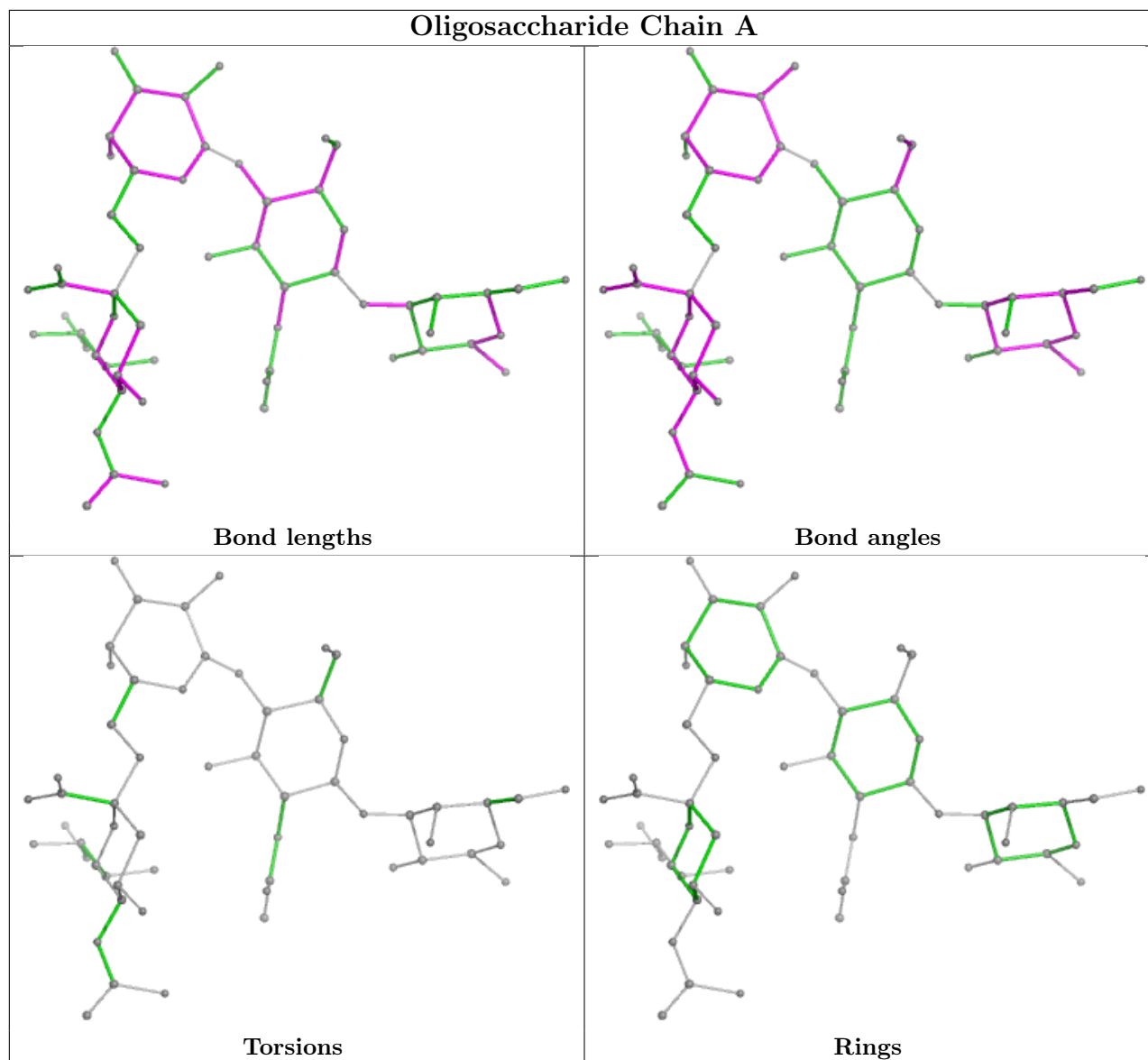There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	3	GAL	1	0

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

5.6 Ligand geometry ⓘ

11 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	$\#|Z| > 2$
4	NAG	J	1329	-	15,15,15	0.61	0	21,21,21	2.18	4 (19%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
4	NAG	H	1328	-	15,15,15	0.82	0	21,21,21	3.06	4 (19%)
4	NAG	K	1661	-	15,15,15	0.41	0	21,21,21	0.89	1 (4%)
4	NAG	H	1330	-	15,15,15	0.41	0	21,21,21	0.93	1 (4%)
4	NAG	H	1332	-	15,15,15	0.55	0	21,21,21	1.60	7 (33%)
4	NAG	H	1331	-	15,15,15	0.43	0	21,21,21	1.18	1 (4%)
4	NAG	H	1329	-	15,15,15	0.45	0	21,21,21	1.12	2 (9%)
4	NAG	L	1329	-	15,15,15	0.52	0	21,21,21	0.96	1 (4%)
4	NAG	M	1661	-	15,15,15	0.69	0	21,21,21	2.59	5 (23%)
4	NAG	L	1328	-	15,15,15	0.49	0	21,21,21	1.46	3 (14%)
4	NAG	J	1328	-	15,15,15	0.64	0	21,21,21	2.44	6 (28%)

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	J	1329	-	-	3/6/26/26	0/1/1/1
4	NAG	H	1328	-	-	4/6/26/26	0/1/1/1
4	NAG	K	1661	-	-	4/6/26/26	0/1/1/1
4	NAG	H	1330	-	-	6/6/26/26	0/1/1/1
4	NAG	H	1332	-	-	3/6/26/26	0/1/1/1
4	NAG	H	1331	-	-	4/6/26/26	0/1/1/1
4	NAG	H	1329	-	-	3/6/26/26	0/1/1/1
4	NAG	L	1329	-	-	4/6/26/26	0/1/1/1
4	NAG	M	1661	-	-	4/6/26/26	0/1/1/1
4	NAG	L	1328	-	-	6/6/26/26	0/1/1/1
4	NAG	J	1328	-	-	0/6/26/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	H	1328	NAG	C1-C2-C3	-11.88	94.34	110.54
4	M	1661	NAG	C1-C2-C3	-9.08	98.16	110.54
4	J	1328	NAG	O5-C1-C2	6.54	116.09	109.52
4	J	1329	NAG	O5-C1-C2	-6.18	103.30	109.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	J	1328	NAG	C4-C3-C2	-5.69	102.01	110.34

There are no chirality outliers.

5 of 41 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	H	1328	NAG	C1-C2-N2-C7
4	H	1328	NAG	C8-C7-N2-C2
4	H	1328	NAG	O7-C7-N2-C2
4	H	1329	NAG	C1-C2-N2-C7
4	H	1329	NAG	C8-C7-N2-C2

There are no ring outliers.

10 monomers are involved in 34 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	1328	NAG	6	0
4	K	1661	NAG	3	0
4	H	1330	NAG	5	0
4	H	1332	NAG	3	0
4	H	1331	NAG	3	0
4	H	1329	NAG	1	0
4	L	1329	NAG	2	0
4	M	1661	NAG	6	0
4	L	1328	NAG	2	0
4	J	1328	NAG	4	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	H	325/326 (99%)	0.35	14 (4%)	40	23	40, 92, 141, 207	0
1	J	325/326 (99%)	0.03	11 (3%)	48	28	35, 68, 118, 182	0
1	L	325/326 (99%)	-0.00	10 (3%)	51	30	32, 63, 122, 166	0
2	I	161/222 (72%)	0.12	9 (5%)	31	18	36, 69, 120, 176	0
2	K	161/222 (72%)	-0.16	7 (4%)	40	23	33, 54, 90, 162	0
2	M	161/222 (72%)	-0.10	7 (4%)	40	23	32, 61, 109, 195	0
All	All	1458/1644 (88%)	0.07	58 (3%)	43	25	32, 69, 128, 207	0

The worst 5 of 58 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	M	562	GLN	5.3
2	K	658	ASP	4.9
1	L	77	ALA	4.7
2	M	659	TYR	4.5
2	I	529	GLU	4.4

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 ⓘ

SUGAR-RSR INFOmissingINFO

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
4	NAG	L	1329	15/15	0.19	0.17	125,130,131,131	0
4	NAG	M	1661	15/15	0.29	0.21	155,161,162,162	0
4	NAG	H	1331	15/15	0.34	0.15	151,153,154,154	0
4	NAG	H	1329	15/15	0.52	0.13	128,129,131,132	0
4	NAG	H	1330	15/15	0.54	0.15	133,136,138,138	0
4	NAG	H	1332	15/15	0.57	0.15	127,128,130,130	0
4	NAG	K	1661	15/15	0.61	0.15	138,142,144,144	0
4	NAG	J	1329	15/15	0.66	0.16	128,128,129,129	0
4	NAG	L	1328	15/15	0.74	0.14	76,81,83,83	0
4	NAG	H	1328	15/15	0.89	0.10	102,103,104,104	0
4	NAG	J	1328	15/15	0.92	0.09	68,71,74,74	0

6.5   Other polymers ⓘ

There are no such residues in this entry.