



Full wwPDB NMR Structure Validation Report ⓘ

Aug 9, 2020 – 08:14 PM BST

PDB ID : 2K46
Title : Xenopus laevis malectin complexed with nigerose (Glc α 1-3Glc)
Authors : Schallus, T.
Deposited on : 2008-05-28

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/NMRValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : 2.13.1
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.13.1

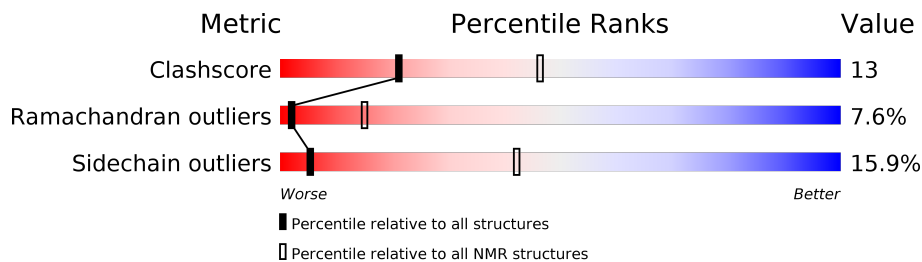
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	190	
2	B	2	

2 Ensemble composition and analysis i

This entry contains 20 models. Model 13 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:6-A:33, A:50-A:90, A:96-A:178 (152)	0.31	13

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 3 clusters and 4 single-model clusters were found.

Cluster number	Models
1	5, 7, 9, 13, 14, 17, 18
2	2, 3, 4, 6, 15, 16
3	1, 8, 10
Single-model clusters	11; 12; 19; 20

3 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 3015 atoms, of which 1498 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called MGC80075 protein.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	190	2970	952	1476	252	285	5	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	expression tag	UNP Q6INX3
A	2	ALA	-	expression tag	UNP Q6INX3
A	3	MET	-	expression tag	UNP Q6INX3

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose.



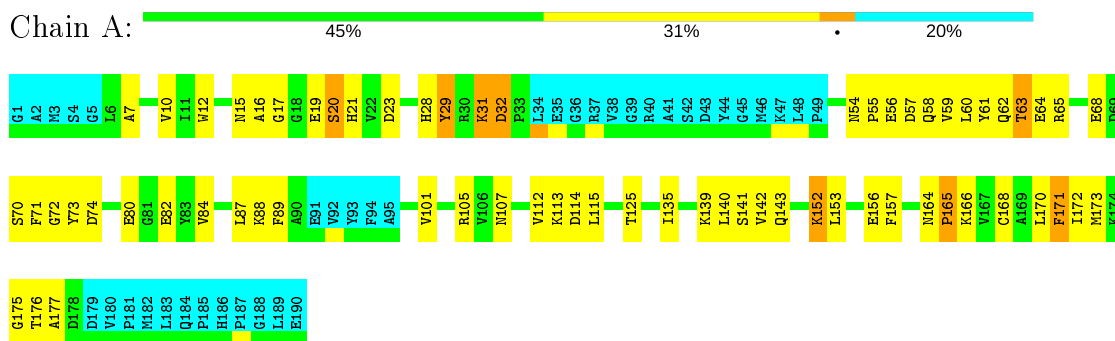
Mol	Chain	Residues	Atoms				Trace
			Total	C	H	O	
2	B	2	45	12	22	11	0

4 Residue-property plots [i](#)

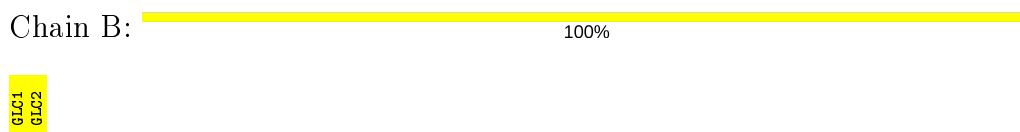
4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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. Stretches of 2 or more consecutive residues without any outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: MGC80075 protein



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

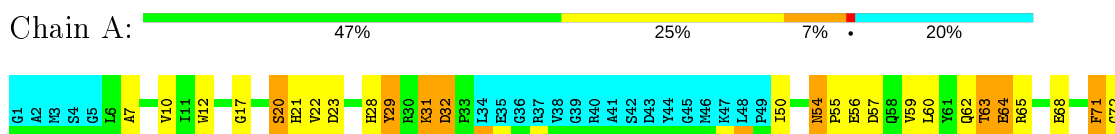


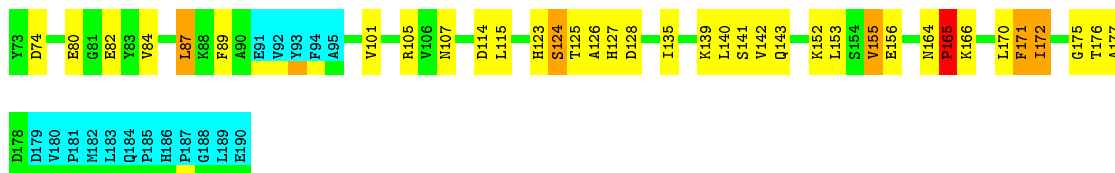
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

- Molecule 1: MGC80075 protein





- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

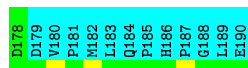
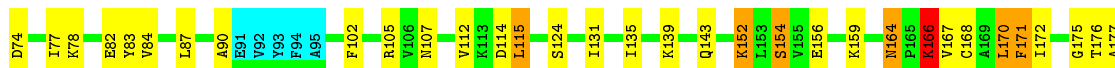
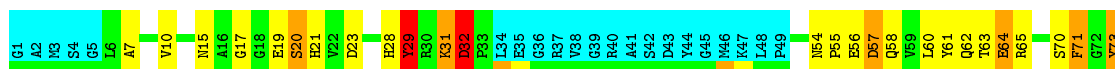
Chain B: 100%

GLC1
GLC2

4.2.2 Score per residue for model 2

- Molecule 1: MGC80075 protein

Chain A: 49% 23% 6% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

Chain B: 100%

GLC1
GLC2

4.2.3 Score per residue for model 3

- Molecule 1: MGC80075 protein

Chain A: 51% 23% 6% 20%



L183
Q184
P185
H186
P187
G188
L189
E190

- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

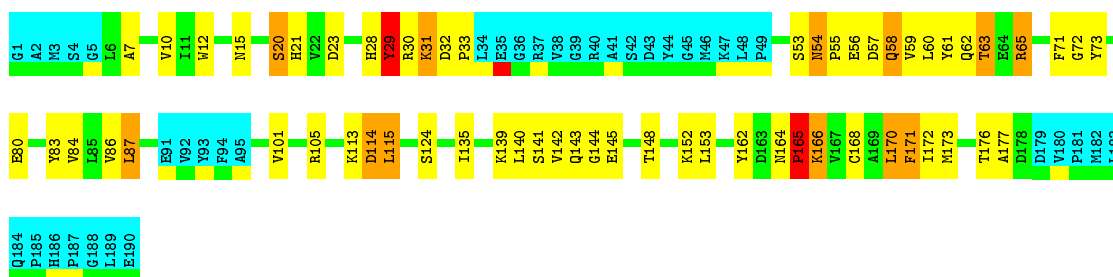
Chain B:  100%

GLC1
GLC2

4.2.4 Score per residue for model 4

- Molecule 1: MGC80075 protein

Chain A:  48% 25% 6% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

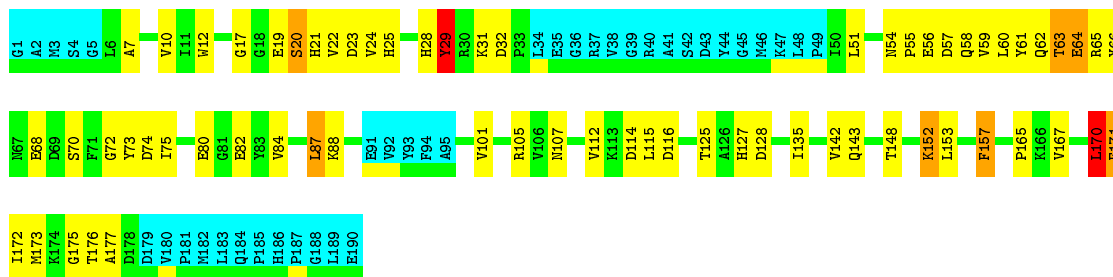
Chain B:  100%

GLC1
GLC2

4.2.5 Score per residue for model 5

- Molecule 1: MGC80075 protein

Chain A:  45% 30% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

Chain B:  100%

GLC1
GLC2

4.2.6 Score per residue for model 6

- Molecule 1: MGC80075 protein

Chain A:  45% 28% 6% 20%

G1 A2 M3 S4 G5 L6 A7 V10 I11 W12 M15 M16 G17 E18 E19 S20 H21 H22 D23 H28 Y29 R30 K31 E32 L34 E35 G36 R37 V38 G39 R40 A41 S42 D43 Y44 G45 M46 K47 L48 P49 L51 N54 P55 E56 D57 Q58 W59 L60 T63 E64 R65 S70

F71 G72 Y73 D74 E80 G81 E82 V84 L87 K88 F89 A90 E91 V92 Q93 F94 A95 V101 R105 V106 M107 V112 K113 D114 L115 H123 S124 T125 A126 H127 I130 I131 I135 K139 V142 Q143 T148 K152 L153 E156 Y162 D163 M164 P165 K166

V167 C168 F171 I172 M173 K174 G175 A177 D178 V179 K180 P181 M182 Q183 P185 H186 P187 G188 L189 E190

- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

Chain B:  100%

GLC1
GLC2

4.2.7 Score per residue for model 7

- Molecule 1: MGC80075 protein

Chain A:  47% 25% 7% 20%

G1 A2 M3 S4 G5 L6 A7 V10 N15 A16 G17 G18 E19 S20 H21 V22 D23 H28 Y29 R30 K31 L34 E35 G36 R37 V38 G39 R40 A41 S42 D43 Y44 G45 M46 K47 L48 P49 R52 S53 N54 P55 E56 D57 Q58 W59 L60 Y61 T63 E64 R65 E68 D69 S70

D74 E80 G81 E82 V84 L87 K88 F89 A90 E91 V92 Q93 F94 A95 V101 M107 V112 K113 D114 L115 T125 A126 H127 I135 K136 K139 L140 S141 V142 Q143 G144 E145 T148 K152 L153 M164 P165 K166 Y167 C168 A169 L170 G175 T176 A177 D178

D179 V180 P181 M182 L183 Q184 P185 H186 P187 G188 L189 E190

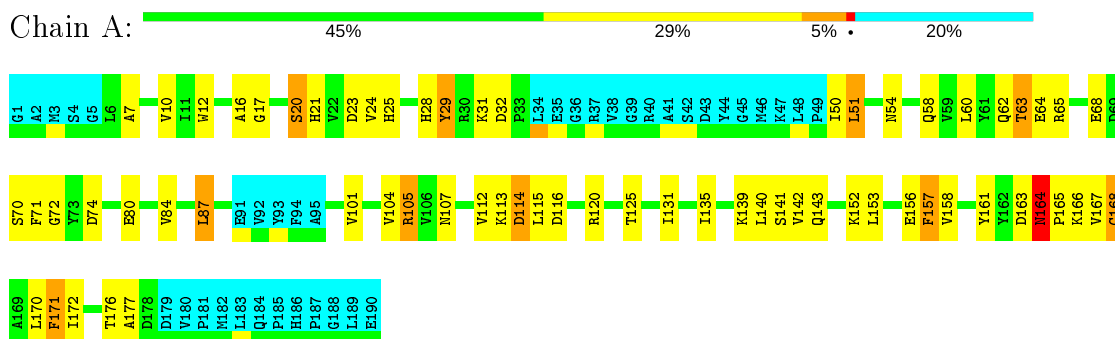
- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

Chain B:  100%

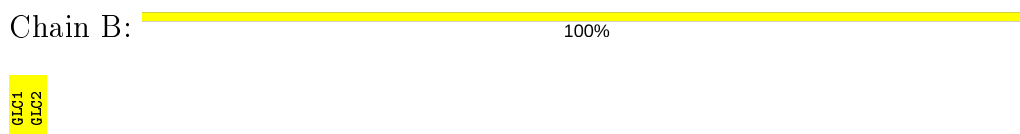
GLC1
GLC2

4.2.8 Score per residue for model 8

- Molecule 1: MGC80075 protein

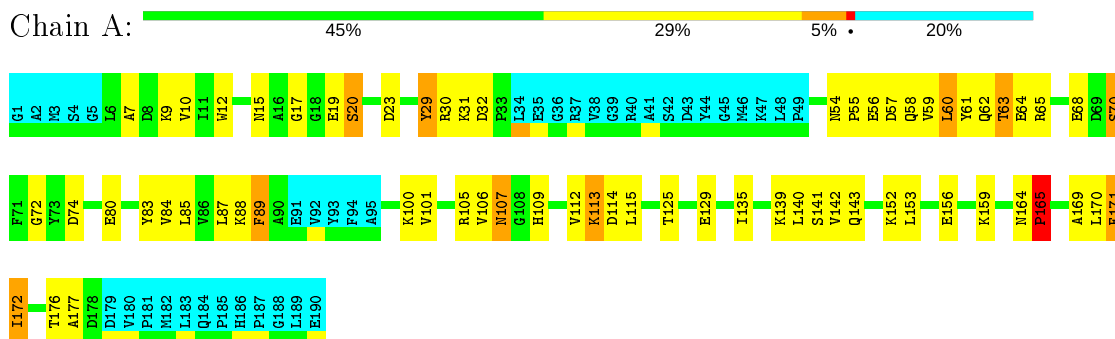


- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

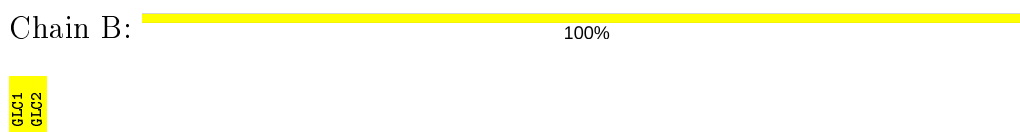


4.2.9 Score per residue for model 9

- Molecule 1: MGC80075 protein

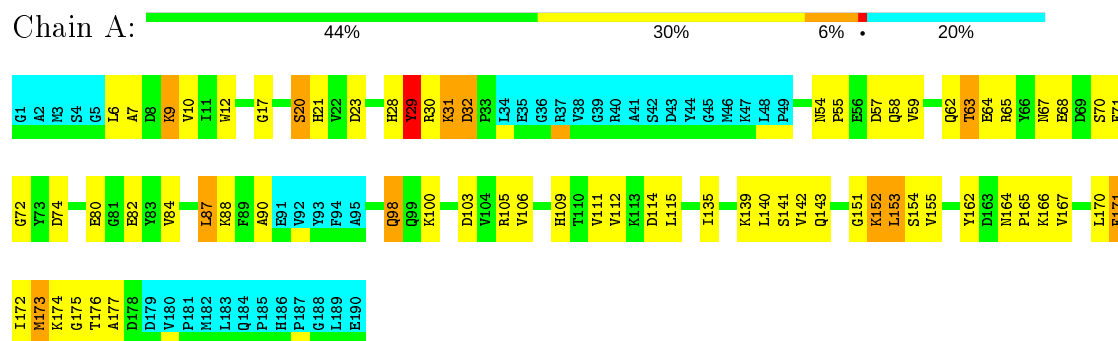


- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

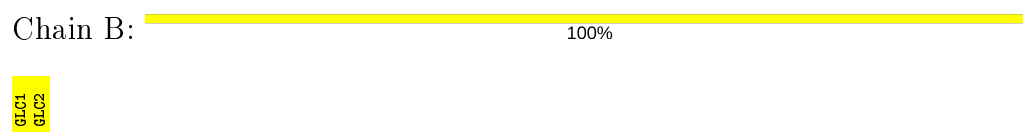


4.2.10 Score per residue for model 10

- Molecule 1: MGC80075 protein

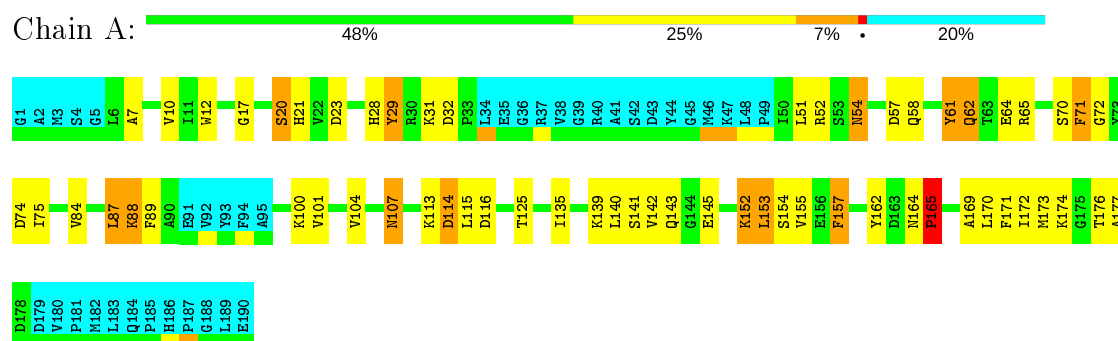


- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

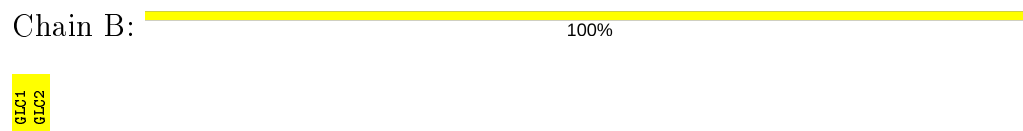


4.2.11 Score per residue for model 11

- Molecule 1: MGC80075 protein

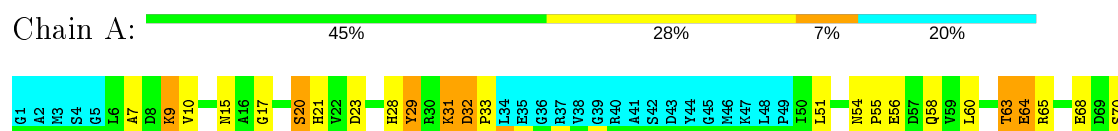


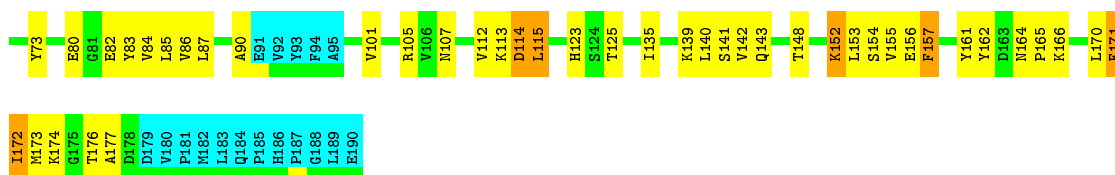
- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose



4.2.12 Score per residue for model 12

- Molecule 1: MGC80075 protein





- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

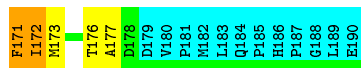
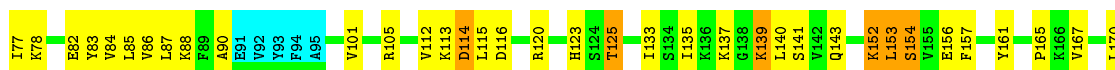
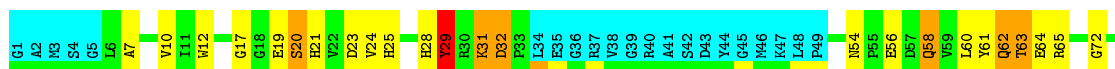
Chain B: 100%

GLC1
GLC2

4.2.13 Score per residue for model 13 (medoid)

- Molecule 1: MGC80075 protein

Chain A: 46% 26% 7% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

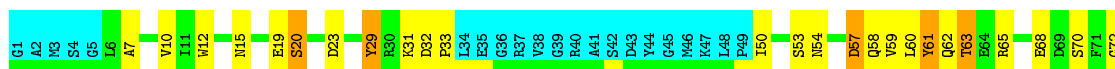
Chain B: 100%

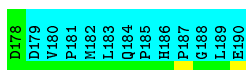
GLC1
GLC2

4.2.14 Score per residue for model 14

- Molecule 1: MGC80075 protein

Chain A: 48% 28% 20%





- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

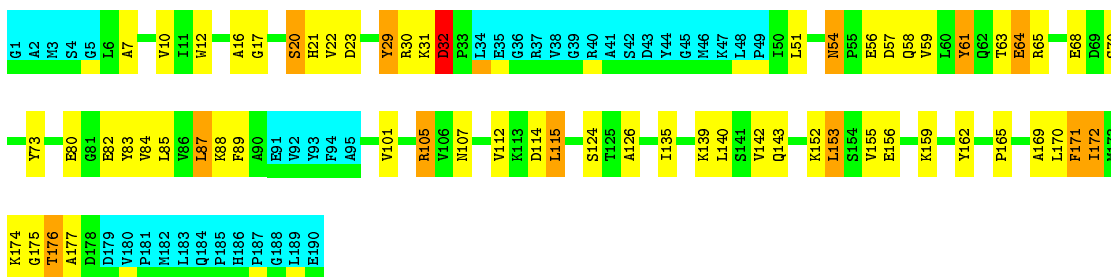
Chain B: 100%



4.2.15 Score per residue for model 15

- Molecule 1: MGC80075 protein

Chain A: 47% 26% 6% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

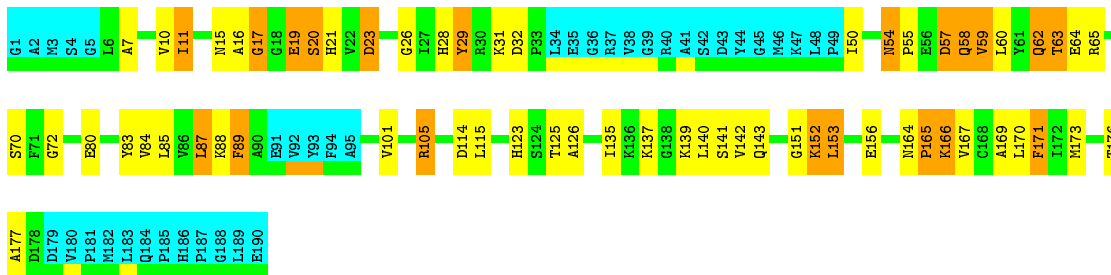
Chain B: 100%




4.2.16 Score per residue for model 16

- Molecule 1: MGC80075 protein

Chain A: 47% 23% 11% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

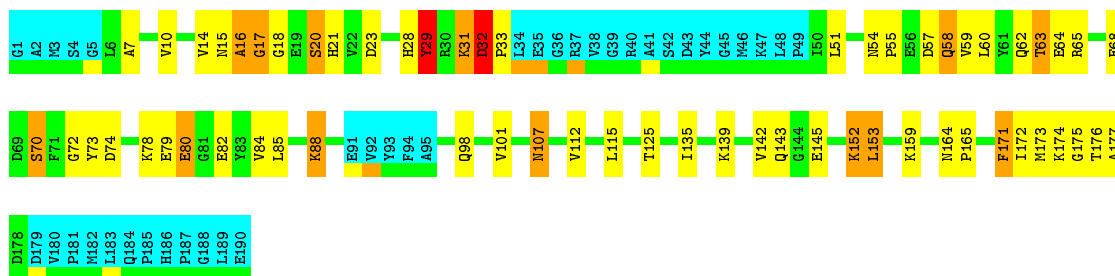
Chain B:  100%

GLC1
GLC2

4.2.17 Score per residue for model 17

- Molecule 1: MGC80075 protein

Chain A:  48% 24% 7% 20%



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

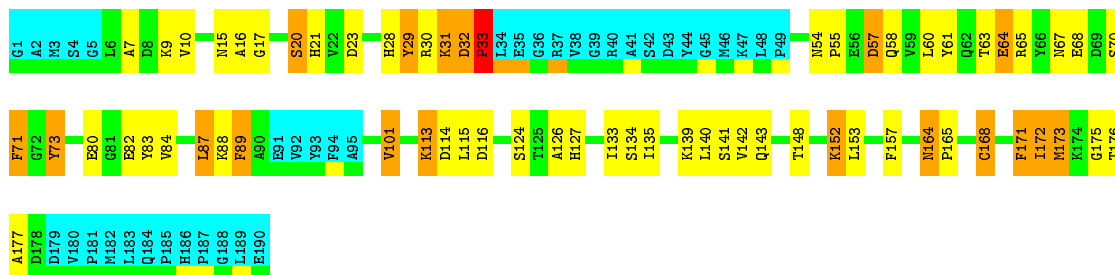
Chain B:  100%

GLC1
GLC2

4.2.18 Score per residue for model 18

- Molecule 1: MGC80075 protein

Chain A:  46% 24% 9% 20%



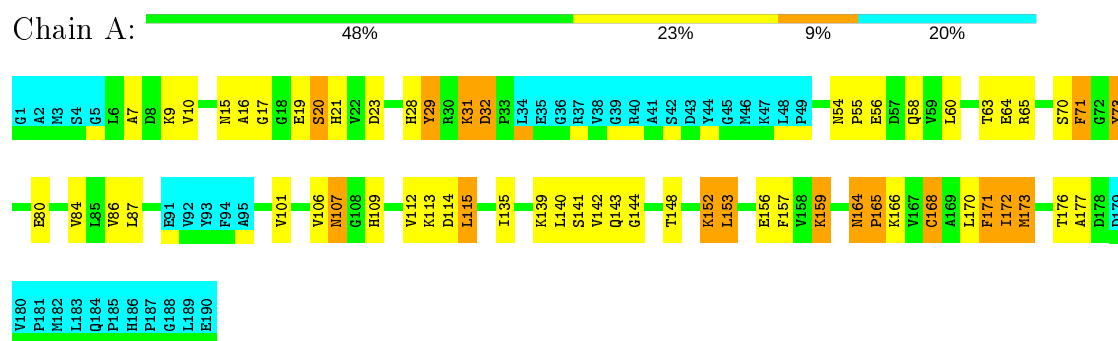
- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

Chain B:  100%

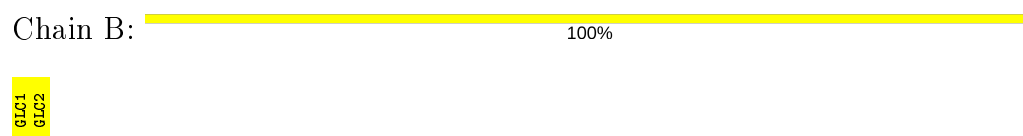
GLC1
GLC2

4.2.19 Score per residue for model 19

- Molecule 1: MGC80075 protein

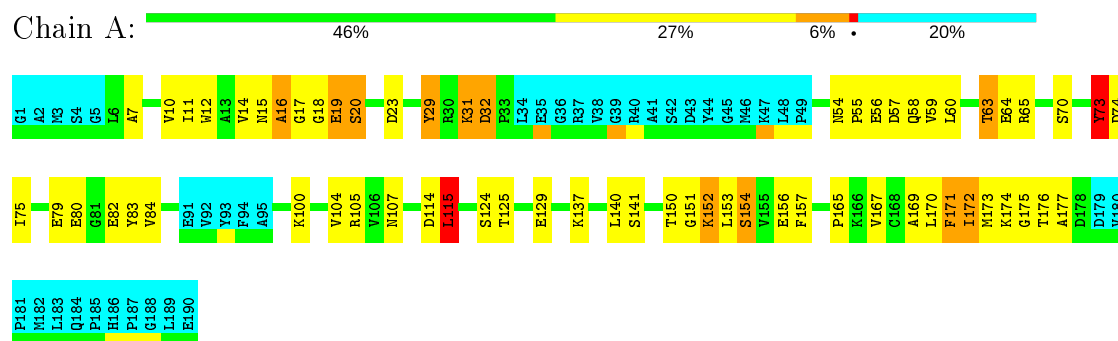


- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose

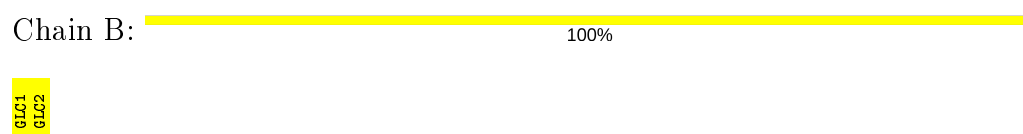


4.2.20 Score per residue for model 20

- Molecule 1: MGC80075 protein



- Molecule 2: alpha-D-glucopyranose-(1-3)-alpha-D-glucopyranose



5 Refinement protocol and experimental data overview

The models were refined using the following method: *torsion angle dynamics*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
ARIA	refinement	1.2
CNS	refinement	

No chemical shift data was provided. No validations of the models with respect to experimental NMR restraints is performed at this time.

6 Model quality i

6.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: GLC

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 (average) 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	0.51±0.09	2±1/1236 (0.2± 0.1%)	0.54±0.02	0±0/1673 (0.0± 0.0%)
All	All	0.52	38/24720 (0.2%)	0.54	0/33460 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	Chirality	Planarity
1	A	0.0±0.0	0.5±0.6
All	All	0	9

All unique bond outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)	Models	
								Worst	Total
1	A	61	TYR	CE2-CZ	-12.80	1.22	1.38	14	6
1	A	61	TYR	CE1-CZ	11.86	1.53	1.38	14	6
1	A	83	TYR	CE1-CZ	-7.62	1.28	1.38	9	8
1	A	89	PHE	CE2-CZ	7.30	1.51	1.37	9	7
1	A	83	TYR	CE2-CZ	6.84	1.47	1.38	9	5
1	A	73	TYR	CE1-CZ	-5.93	1.30	1.38	12	3
1	A	71	PHE	CE2-CZ	5.55	1.47	1.37	19	1
1	A	73	TYR	CE2-CZ	5.22	1.45	1.38	12	1
1	A	89	PHE	CE1-CZ	-5.16	1.27	1.37	9	1

There are no bond-angle outliers.

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the

ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	29	TYR	Sidechain	7
1	A	71	PHE	Sidechain	1
1	A	157	PHE	Sidechain	1

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1209	1197	1191	32±4
All	All	24640	24380	24240	647

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 13.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:16:ALA:HB3	1:A:168:CYS:SG	0.79	2.17	18	4
1:A:59:VAL:O	1:A:63:THR:HG23	0.73	1.84	20	7
1:A:87:LEU:HD12	1:A:87:LEU:O	0.65	1.91	7	5
1:A:164:ASN:N	1:A:165:PRO:HD2	0.64	2.07	12	2
1:A:19:GLU:HA	1:A:29:TYR:OH	0.64	1.93	13	6
1:A:88:LYS:HD2	1:A:88:LYS:N	0.64	2.08	16	1
1:A:100:LYS:HZ2	1:A:100:LYS:HB2	0.64	1.53	9	1
1:A:88:LYS:NZ	1:A:90:ALA:HB2	0.63	2.08	13	1
1:A:15:ASN:ND2	1:A:60:LEU:O	0.63	2.32	20	6
1:A:135:ILE:HG23	1:A:139:LYS:O	0.63	1.92	13	17
1:A:153:LEU:HD23	1:A:154:SER:N	0.63	2.08	12	1
1:A:50:ILE:O	1:A:51:LEU:HB2	0.62	1.93	8	1
1:A:56:GLU:O	1:A:59:VAL:HG12	0.62	1.93	9	5
1:A:88:LYS:HZ3	1:A:126:ALA:HB1	0.61	1.55	6	2
1:A:20:SER:HA	1:A:29:TYR:O	0.61	1.96	7	20
1:A:106:VAL:O	1:A:109:HIS:HB2	0.59	1.97	10	3
1:A:88:LYS:HZ3	1:A:126:ALA:HA	0.59	1.56	7	1
1:A:87:LEU:O	1:A:87:LEU:HD12	0.59	1.97	15	3
1:A:7:ALA:O	1:A:10:VAL:HG12	0.59	1.96	7	20
1:A:16:ALA:HB2	1:A:73:TYR:OH	0.58	1.98	20	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:29:TYR:CD1	1:A:29:TYR:C	0.58	2.76	15	9
1:A:62:GLN:O	1:A:63:THR:O	0.58	2.22	9	6
1:A:21:HIS:O	1:A:28:HIS:HA	0.57	2.00	17	16
1:A:107:ASN:HA	1:A:154:SER:OG	0.57	2.00	2	3
1:A:29:TYR:C	1:A:29:TYR:CD1	0.57	2.77	6	11
1:A:90:ALA:O	1:A:167:VAL:HG13	0.56	2.00	2	2
1:A:84:VAL:HG21	1:A:177:ALA:N	0.56	2.16	8	20
1:A:55:PRO:O	1:A:58:GLN:HB3	0.56	2.00	19	14
1:A:140:LEU:HD23	1:A:141:SER:N	0.56	2.16	1	14
1:A:71:PHE:CE1	1:A:164:ASN:ND2	0.56	2.73	2	2
1:A:88:LYS:C	1:A:88:LYS:HD3	0.56	2.21	13	3
1:A:58:GLN:HE22	1:A:62:GLN:NE2	0.55	1.99	13	1
1:A:17:GLY:N	1:A:65:ARG:HG3	0.55	2.16	11	5
1:A:17:GLY:HA2	1:A:64:GLU:C	0.55	2.22	18	13
1:A:62:GLN:HG2	1:A:63:THR:N	0.55	2.17	10	6
1:A:172:ILE:HD13	1:A:173:MET:N	0.55	2.17	18	3
1:A:54:ASN:O	1:A:58:GLN:N	0.54	2.40	17	15
1:A:164:ASN:O	1:A:166:LYS:N	0.54	2.40	16	4
1:A:54:ASN:N	1:A:57:ASP:OD1	0.54	2.41	14	7
1:A:88:LYS:HD3	1:A:88:LYS:C	0.54	2.23	17	1
1:A:157:PHE:N	1:A:157:PHE:CD1	0.54	2.75	11	2
1:A:12:TRP:O	1:A:172:ILE:HG22	0.53	2.02	8	12
1:A:157:PHE:CD1	1:A:157:PHE:N	0.53	2.76	12	1
1:A:31:LYS:NZ	1:A:31:LYS:HB3	0.53	2.19	17	2
1:A:50:ILE:HG21	1:A:126:ALA:HB2	0.53	1.80	16	2
1:A:100:LYS:O	1:A:116:ASP:HA	0.53	2.04	11	2
1:A:21:HIS:CE1	1:A:56:GLU:O	0.53	2.62	7	4
1:A:16:ALA:HA	1:A:65:ARG:CZ	0.53	2.34	15	1
1:A:150:THR:O	1:A:152:LYS:N	0.52	2.42	20	1
1:A:11:ILE:HD13	1:A:11:ILE:N	0.52	2.20	16	1
1:A:58:GLN:HE22	1:A:62:GLN:HE21	0.52	1.46	13	1
1:A:73:TYR:N	1:A:73:TYR:CD1	0.52	2.78	2	2
1:A:107:ASN:ND2	1:A:153:LEU:HG	0.52	2.20	9	1
1:A:152:LYS:NZ	1:A:152:LYS:HB3	0.52	2.20	16	2
1:A:79:GLU:HG2	1:A:174:LYS:NZ	0.51	2.20	17	1
1:A:135:ILE:HA	1:A:139:LYS:O	0.51	2.06	13	4
1:A:166:LYS:HB2	1:A:166:LYS:NZ	0.51	2.19	2	1
1:A:88:LYS:CD	1:A:88:LYS:N	0.51	2.74	16	1
1:A:17:GLY:HA3	1:A:63:THR:OG1	0.51	2.05	17	1
1:A:152:LYS:HE2	1:A:152:LYS:O	0.51	2.06	7	3
1:A:15:ASN:ND2	1:A:169:ALA:HA	0.51	2.21	20	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:166:LYS:NZ	1:A:166:LYS:HB2	0.50	2.21	7	1
1:A:88:LYS:NZ	1:A:126:ALA:HA	0.50	2.21	7	1
1:A:88:LYS:O	1:A:169:ALA:HB3	0.50	2.07	14	4
1:A:62:GLN:O	1:A:167:VAL:HG13	0.50	2.06	8	1
1:A:84:VAL:HB	1:A:173:MET:SD	0.50	2.47	10	6
1:A:152:LYS:O	1:A:152:LYS:HE2	0.50	2.05	3	1
1:A:9:LYS:HB3	1:A:9:LYS:NZ	0.50	2.22	10	1
1:A:159:LYS:HB2	1:A:159:LYS:NZ	0.50	2.22	19	1
1:A:88:LYS:HZ3	1:A:126:ALA:CB	0.50	2.19	6	1
1:A:75:ILE:N	1:A:75:ILE:HD12	0.50	2.22	20	1
1:A:32:ASP:HB3	1:A:65:ARG:NH2	0.50	2.21	20	1
1:A:152:LYS:HG2	1:A:153:LEU:N	0.49	2.21	19	5
1:A:32:ASP:HB3	1:A:65:ARG:NE	0.49	2.21	1	1
1:A:171:PHE:CD1	1:A:171:PHE:C	0.49	2.85	4	5
1:A:171:PHE:C	1:A:171:PHE:CD1	0.49	2.84	13	14
1:A:15:ASN:OD1	1:A:60:LEU:O	0.49	2.30	16	3
1:A:60:LEU:O	1:A:60:LEU:HD23	0.49	2.07	5	1
1:A:19:GLU:O	1:A:20:SER:C	0.49	2.51	20	2
1:A:21:HIS:CD2	1:A:22:VAL:N	0.49	2.80	5	3
1:A:89:PHE:CD2	1:A:115:LEU:HD21	0.49	2.43	9	4
1:A:16:ALA:HA	1:A:65:ARG:NE	0.49	2.22	15	1
1:A:60:LEU:O	1:A:60:LEU:HG	0.48	2.08	17	2
1:A:63:THR:O	1:A:167:VAL:HG22	0.48	2.07	5	1
1:A:164:ASN:O	1:A:166:LYS:HG2	0.48	2.08	12	1
1:A:32:ASP:HA	1:A:65:ARG:CZ	0.48	2.38	15	1
1:A:15:ASN:ND2	1:A:168:CYS:O	0.48	2.46	7	1
1:A:17:GLY:HA3	1:A:63:THR:C	0.48	2.28	8	2
1:A:31:LYS:HB3	1:A:31:LYS:NZ	0.48	2.23	13	1
1:A:61:TYR:O	1:A:88:LYS:HD2	0.48	2.09	7	1
1:A:152:LYS:HB3	1:A:152:LYS:NZ	0.48	2.23	19	3
1:A:142:VAL:HG13	1:A:142:VAL:O	0.48	2.09	10	5
1:A:82:GLU:HB2	1:A:175:GLY:O	0.48	2.09	18	12
1:A:100:LYS:HB3	1:A:100:LYS:NZ	0.48	2.23	20	1
1:A:19:GLU:O	1:A:20:SER:O	0.48	2.31	9	3
1:A:106:VAL:HG12	1:A:107:ASN:ND2	0.48	2.23	9	1
1:A:62:GLN:O	1:A:63:THR:C	0.48	2.51	8	1
1:A:71:PHE:N	1:A:71:PHE:CD1	0.48	2.82	11	3
1:A:79:GLU:CG	1:A:80:GLU:N	0.48	2.77	3	2
1:A:164:ASN:N	1:A:164:ASN:OD1	0.48	2.47	18	1
1:A:164:ASN:N	1:A:165:PRO:CD	0.47	2.76	12	2
1:A:166:LYS:HB3	1:A:166:LYS:NZ	0.47	2.24	8	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:ILE:HD13	1:A:11:ILE:H	0.47	1.68	16	1
1:A:107:ASN:ND2	1:A:153:LEU:HA	0.47	2.24	14	2
1:A:32:ASP:HB3	1:A:65:ARG:HH11	0.47	1.70	13	1
1:A:152:LYS:N	1:A:152:LYS:HE2	0.47	2.25	18	1
1:A:60:LEU:HG	1:A:60:LEU:O	0.47	2.09	8	3
1:A:88:LYS:HA	1:A:127:HIS:O	0.47	2.09	7	2
1:A:139:LYS:NZ	1:A:139:LYS:HB2	0.47	2.24	19	1
1:A:71:PHE:CD1	1:A:71:PHE:N	0.47	2.81	3	1
1:A:142:VAL:O	1:A:142:VAL:HG13	0.47	2.09	8	10
1:A:60:LEU:C	1:A:62:GLN:H	0.47	2.13	14	3
1:A:123:HIS:O	1:A:125:THR:HG23	0.47	2.09	13	4
1:A:88:LYS:NZ	1:A:126:ALA:HB1	0.47	2.24	6	3
1:A:170:LEU:HD13	1:A:171:PHE:N	0.47	2.25	4	1
1:A:71:PHE:HE1	1:A:164:ASN:ND2	0.46	2.07	2	2
1:A:153:LEU:HD23	1:A:154:SER:H	0.46	1.68	12	1
1:A:31:LYS:O	1:A:32:ASP:C	0.46	2.54	19	9
1:A:17:GLY:HA3	1:A:63:THR:O	0.46	2.11	8	3
1:A:120:ARG:NE	1:A:120:ARG:HA	0.46	2.25	8	2
1:A:105:ARG:HG3	1:A:156:GLU:O	0.46	2.10	15	8
1:A:82:GLU:HA	1:A:133:ILE:O	0.46	2.11	13	1
1:A:63:THR:O	1:A:167:VAL:HG13	0.46	2.10	20	4
1:A:17:GLY:N	1:A:65:ARG:HD3	0.46	2.26	16	1
1:A:71:PHE:CE2	1:A:164:ASN:ND2	0.45	2.84	8	1
1:A:50:ILE:O	1:A:51:LEU:CB	0.45	2.63	8	1
1:A:79:GLU:HG3	1:A:80:GLU:N	0.45	2.26	17	1
1:A:65:ARG:HA	1:A:65:ARG:NE	0.45	2.26	4	1
1:A:16:ALA:HA	1:A:65:ARG:NH1	0.45	2.27	16	1
1:A:9:LYS:NZ	1:A:9:LYS:HB3	0.45	2.27	12	1
1:A:115:LEU:HD21	1:A:129:GLU:OE2	0.45	2.10	20	1
1:A:113:LYS:O	1:A:114:ASP:CB	0.45	2.64	7	3
1:A:86:VAL:O	1:A:171:PHE:HB3	0.45	2.12	13	3
1:A:164:ASN:O	1:A:165:PRO:C	0.45	2.55	19	6
1:A:29:TYR:CD1	1:A:30:ARG:N	0.45	2.85	10	5
1:A:15:ASN:OD1	1:A:169:ALA:HA	0.45	2.12	16	1
1:A:18:GLY:N	1:A:63:THR:HB	0.45	2.27	20	1
1:A:172:ILE:HD13	1:A:173:MET:O	0.45	2.12	18	2
1:A:17:GLY:C	1:A:63:THR:HB	0.44	2.32	19	6
1:A:32:ASP:HB3	1:A:65:ARG:NH1	0.44	2.27	13	2
1:A:17:GLY:O	1:A:65:ARG:HG3	0.44	2.12	6	1
1:A:65:ARG:NH2	1:A:67:ASN:HB2	0.44	2.27	10	1
1:A:70:SER:H	1:A:164:ASN:ND2	0.44	2.10	17	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:17:GLY:HA3	1:A:64:GLU:N	0.44	2.28	10	2
1:A:105:ARG:HH21	1:A:158:VAL:HG21	0.44	1.72	8	1
1:A:105:ARG:O	1:A:155:VAL:HA	0.44	2.13	12	3
1:A:164:ASN:C	1:A:166:LYS:N	0.44	2.71	8	1
1:A:166:LYS:NZ	1:A:166:LYS:HB3	0.44	2.27	4	1
1:A:87:LEU:N	1:A:87:LEU:HD12	0.43	2.27	5	1
1:A:54:ASN:OD1	1:A:55:PRO:HD2	0.43	2.13	1	3
1:A:89:PHE:O	1:A:127:HIS:HB3	0.43	2.12	18	3
1:A:57:ASP:O	1:A:61:TYR:HB2	0.43	2.14	7	1
1:A:101:VAL:HG12	1:A:116:ASP:OD2	0.43	2.13	18	1
1:A:15:ASN:OD1	1:A:60:LEU:HA	0.43	2.13	2	1
1:A:77:ILE:HG22	1:A:78:LYS:N	0.43	2.28	13	2
1:A:142:VAL:O	1:A:144:GLY:N	0.43	2.50	4	2
1:A:88:LYS:CD	1:A:88:LYS:C	0.43	2.86	13	2
1:A:131:ILE:HD12	1:A:131:ILE:N	0.43	2.28	8	2
1:A:71:PHE:HD1	1:A:71:PHE:N	0.43	2.12	3	2
1:A:88:LYS:HE2	1:A:90:ALA:HB2	0.43	1.90	3	1
1:A:54:ASN:OD1	1:A:57:ASP:HB3	0.43	2.14	2	1
1:A:87:LEU:HD23	1:A:87:LEU:N	0.43	2.29	9	4
1:A:62:GLN:CG	1:A:63:THR:N	0.43	2.81	7	3
1:A:130:ILE:O	1:A:131:ILE:HD13	0.43	2.14	6	1
1:A:106:VAL:HG23	1:A:106:VAL:O	0.43	2.14	10	1
1:A:21:HIS:CD2	1:A:60:LEU:HB2	0.43	2.49	7	2
1:A:30:ARG:O	1:A:33:PRO:HD3	0.43	2.14	18	1
1:A:17:GLY:HA2	1:A:65:ARG:N	0.43	2.28	3	1
1:A:80:GLU:HB3	1:A:135:ILE:O	0.43	2.14	7	5
1:A:15:ASN:ND2	1:A:169:ALA:CB	0.43	2.82	14	2
1:A:170:LEU:HD13	1:A:171:PHE:H	0.42	1.74	5	1
1:A:54:ASN:ND2	1:A:57:ASP:OD1	0.42	2.52	11	1
1:A:60:LEU:C	1:A:62:GLN:N	0.42	2.72	4	4
1:A:127:HIS:ND1	1:A:128:ASP:N	0.42	2.67	5	2
1:A:85:LEU:C	1:A:85:LEU:HD23	0.42	2.35	17	1
1:A:73:TYR:CD1	1:A:73:TYR:N	0.42	2.87	20	1
1:A:113:LYS:O	1:A:114:ASP:HB3	0.42	2.14	12	4
1:A:113:LYS:O	1:A:114:ASP:HB2	0.42	2.14	19	1
1:A:70:SER:H	1:A:164:ASN:HD21	0.42	1.58	9	1
1:A:14:VAL:O	1:A:170:LEU:HB3	0.42	2.15	20	1
1:A:24:VAL:HG23	1:A:25:HIS:N	0.42	2.30	5	3
1:A:107:ASN:OD1	1:A:153:LEU:HG	0.42	2.14	6	3
1:A:113:LYS:CG	1:A:113:LYS:O	0.42	2.67	18	1
1:A:75:ILE:C	1:A:152:LYS:HB2	0.42	2.35	11	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:113:LYS:O	1:A:113:LYS:HG2	0.42	2.14	6	2
1:A:98:GLN:C	1:A:100:LYS:H	0.42	2.18	10	1
1:A:15:ASN:O	1:A:17:GLY:N	0.42	2.52	17	1
1:A:74:ASP:CG	1:A:152:LYS:HG3	0.42	2.35	20	1
1:A:58:GLN:O	1:A:62:GLN:N	0.41	2.53	13	1
1:A:123:HIS:O	1:A:124:SER:C	0.41	2.57	1	1
1:A:113:LYS:O	1:A:113:LYS:HG3	0.41	2.15	11	2
1:A:51:LEU:N	1:A:51:LEU:HD22	0.41	2.30	12	1
1:A:61:TYR:O	1:A:88:LYS:NZ	0.41	2.53	13	1
1:A:64:GLU:O	1:A:65:ARG:HB2	0.41	2.14	6	1
1:A:88:LYS:CE	1:A:90:ALA:HB2	0.41	2.44	13	1
1:A:133:ILE:HG22	1:A:134:SER:N	0.41	2.30	18	1
1:A:23:ASP:O	1:A:26:GLY:N	0.41	2.54	16	1
1:A:15:ASN:HA	1:A:168:CYS:O	0.41	2.16	4	2
1:A:86:VAL:C	1:A:87:LEU:HD23	0.41	2.36	4	1
1:A:113:LYS:HG2	1:A:113:LYS:O	0.41	2.16	18	1
1:A:107:ASN:HA	1:A:154:SER:H	0.41	1.76	20	1
1:A:21:HIS:CD2	1:A:21:HIS:C	0.41	2.93	5	1
1:A:88:LYS:H	1:A:169:ALA:HB3	0.41	1.76	11	2
1:A:96:GLN:NE2	1:A:100:LYS:HB2	0.41	2.30	14	1
1:A:87:LEU:CD2	1:A:87:LEU:N	0.41	2.83	16	1
1:A:32:ASP:HB3	1:A:65:ARG:CZ	0.41	2.46	1	1
1:A:54:ASN:O	1:A:57:ASP:OD1	0.41	2.38	4	1
1:A:30:ARG:O	1:A:31:LYS:C	0.41	2.59	18	2
1:A:51:LEU:HD12	1:A:51:LEU:N	0.41	2.30	6	1
1:A:14:VAL:HG11	1:A:73:TYR:CE2	0.41	2.51	17	1
1:A:102:PHE:O	1:A:114:ASP:N	0.41	2.53	2	1
1:A:67:ASN:HB2	1:A:164:ASN:OD1	0.41	2.16	18	1
1:A:15:ASN:HB3	1:A:29:TYR:CD2	0.41	2.51	7	1
1:A:72:GLY:HA3	1:A:155:VAL:O	0.41	2.15	10	1
1:A:154:SER:HB3	1:A:156:GLU:OE1	0.41	2.15	13	1
1:A:60:LEU:O	1:A:62:GLN:N	0.41	2.54	14	1
1:A:59:VAL:CG2	1:A:60:LEU:N	0.41	2.83	16	1
1:A:107:ASN:OD1	1:A:154:SER:N	0.41	2.54	20	1
1:A:77:ILE:CG2	1:A:78:LYS:N	0.41	2.84	13	1
1:A:83:TYR:N	1:A:83:TYR:CD1	0.41	2.89	18	1
1:A:57:ASP:OD1	1:A:60:LEU:HD13	0.40	2.16	9	1
1:A:140:LEU:CD1	1:A:153:LEU:HD11	0.40	2.46	15	1
1:A:85:LEU:HD23	1:A:85:LEU:C	0.40	2.37	15	1
1:A:50:ILE:O	1:A:125:THR:HA	0.40	2.15	8	1
1:A:107:ASN:OD1	1:A:153:LEU:HA	0.40	2.17	11	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:79:GLU:HB2	1:A:83:TYR:OH	0.40	2.17	20	1
1:A:50:ILE:HG22	1:A:53:SER:OG	0.40	2.16	14	1
1:A:84:VAL:HG21	1:A:176:THR:C	0.40	2.37	15	1
1:A:62:GLN:CG	1:A:63:THR:H	0.40	2.29	16	1
1:A:15:ASN:ND2	1:A:63:THR:OG1	0.40	2.55	16	1
1:A:113:LYS:O	1:A:113:LYS:CG	0.40	2.69	9	1
1:A:15:ASN:ND2	1:A:60:LEU:HA	0.40	2.31	18	1

6.3 Torsion angles [i](#)

6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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	152/190 (80%)	115±3 (76±2%)	25±3 (17±2%)	12±2 (8±1%)	2	15
All	All	3040/3800 (80%)	2305 (76%)	505 (17%)	230 (8%)	2	15

All 30 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	20	SER	20
1	A	143	GLN	19
1	A	31	LYS	18
1	A	165	PRO	18
1	A	32	ASP	18
1	A	70	SER	17
1	A	114	ASP	17
1	A	63	THR	16
1	A	68	GLU	11
1	A	125	THR	10
1	A	115	LEU	8
1	A	162	TYR	7
1	A	124	SER	7
1	A	33	PRO	5
1	A	17	GLY	5

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Mol	Chain	Res	Type	Models (Total)
1	A	61	TYR	5
1	A	163	ASP	4
1	A	166	LYS	4
1	A	151	GLY	4
1	A	161	TYR	3
1	A	16	ALA	2
1	A	64	GLU	2
1	A	30	ARG	2
1	A	170	LEU	2
1	A	52	ARG	1
1	A	65	ARG	1
1	A	164	ASN	1
1	A	51	LEU	1
1	A	18	GLY	1
1	A	98	GLN	1

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	133/162 (82%)	112±3 (84±2%)	21±3 (16±2%)	5	42
All	All	2660/3240 (82%)	2238 (84%)	422 (16%)	5	42

All 66 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	29	TYR	20
1	A	152	LYS	20
1	A	23	ASP	20
1	A	176	THR	20
1	A	171	PHE	18
1	A	101	VAL	16
1	A	115	LEU	15
1	A	153	LEU	15
1	A	170	LEU	15
1	A	87	LEU	14

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Mol	Chain	Res	Type	Models (Total)
1	A	80	GLU	14
1	A	107	ASN	12
1	A	112	VAL	12
1	A	64	GLU	10
1	A	74	ASP	10
1	A	172	ILE	10
1	A	173	MET	9
1	A	157	PHE	9
1	A	105	ARG	9
1	A	73	TYR	8
1	A	57	ASP	8
1	A	148	THR	7
1	A	159	LYS	7
1	A	174	LYS	6
1	A	88	LYS	6
1	A	165	PRO	5
1	A	164	ASN	5
1	A	19	GLU	5
1	A	85	LEU	5
1	A	9	LYS	5
1	A	71	PHE	5
1	A	54	ASN	5
1	A	154	SER	4
1	A	156	GLU	4
1	A	145	GLU	4
1	A	168	CYS	4
1	A	56	GLU	4
1	A	58	GLN	4
1	A	32	ASP	4
1	A	51	LEU	4
1	A	104	VAL	3
1	A	166	LYS	3
1	A	116	ASP	3
1	A	65	ARG	3
1	A	137	LYS	3
1	A	62	GLN	3
1	A	113	LYS	3
1	A	31	LYS	2
1	A	11	ILE	2
1	A	33	PRO	2
1	A	78	LYS	2
1	A	155	VAL	2

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Mol	Chain	Res	Type	Models (Total)
1	A	53	SER	1
1	A	59	VAL	1
1	A	52	ARG	1
1	A	111	VAL	1
1	A	82	GLU	1
1	A	20	SER	1
1	A	60	LEU	1
1	A	103	ASP	1
1	A	66	TYR	1
1	A	129	GLU	1
1	A	136	LYS	1
1	A	98	GLN	1
1	A	139	LYS	1
1	A	68	GLU	1

6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates [i](#)

2 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds for which Mogul statistics could be retrieved, the number of bonds that are observed in the model and the number of bonds 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 is the number of standard deviations the observed value is removed from the expected value. A bond length with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the average root-mean-square of all Z scores of the bond lengths.

Mol	Type	Chain	Res	Link	Bond lengths		
					Counts	RMSZ	#Z>2
2	GLC	B	1	2	12,12,12	1.83±0.00	0±0 (0±0%)
2	GLC	B	2	2	11,11,12	2.42±0.00	0±0 (0±0%)

In the following table, the Counts columns list the number of angles for which Mogul statistics

could be retrieved, the number of angles that are observed in the model and the number of 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 angle is the number of standard deviations the observed value is removed from the expected value. A bond angle with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the average root-mean-square of all Z scores of the bond angles.

Mol	Type	Chain	Res	Link	Bond angles		
					Counts	RMSZ	#Z>2
2	GLC	B	1	2	17,17,17	1.32±0.00	0±0 (0±0%)
2	GLC	B	2	2	15,15,17	1.34±0.00	0±0 (0±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
2	GLC	B	1	2	-	0±0,2,22,22	0±0,1,1,1
2	GLC	B	2	2	-	0±0,2,19,22	0±0,1,1,1

There are no bond-length outliers.

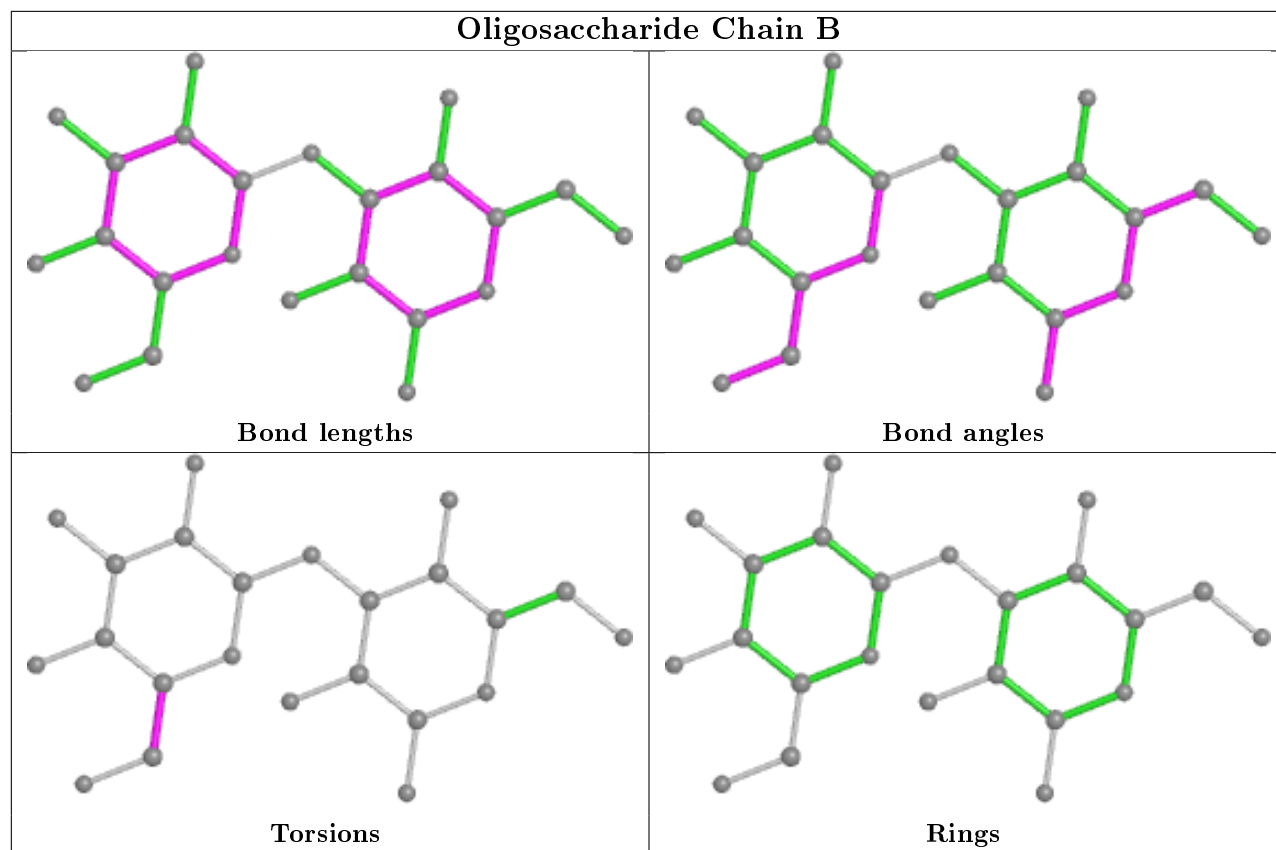
There are no bond-angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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



6.6 Ligand geometry [i](#)

There are no ligands in this entry.

6.7 Other polymers [i](#)

There are no such molecules in this entry.

6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided